Economic Impacts of BSAI Crab Rationalization on Kodiak Fishing Employment and Earnings and Kodiak Businesses

A Preliminary Analysis

Prepared by

Gunnar Knapp
Professor of Economics
Institute of Social and Economic Research
University of Alaska Anchorage
3211 Providence Drive
Anchorage, AK 99508-8180
907-786-7717 (telephone)
907-786-7739 (fax)
Gunnar.Knapp@uaa.alaska.edu (e-mail)

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EXECUTIVE SUMMARY

This study was requested by the City of Kodiak to analyze how crab rationalization has affected crab fishing jobs and earnings of Kodiak residents and sales of Kodiak businesses. The study is limited to these issues. It does not address many other important issues raised by crab rationalization.

There are significant challenges in studying economic effects of crab rationalization on Kodiak. There are important differences between crab fisheries, and within each fishery there are differences in boat sizes, vessel ownership, quota allocation, and many other factors which affect how quota is fished. Many factors besides rationalization affect crab fisheries, and many factors besides crab fisheries affect Kodiak's economy—making it difficult to identify the specific effects of crab rationalization on Kodiak

General Economic Effects of Crab Rationalization

Rationalization began very recently. It is far too early to know what the long-term effects of crab rationalization will be on how many boats fish, on crab fishing jobs and earnings, on quota lease rates, on crab markets and prices, and on communities.

Since rationalization began in the 2005/06 season, there have been very rapid and dramatic changes in the crab fisheries. Between the 2004/05 and 2005/06 seasons, vessel registration declined by about two-thirds for the Bristol Bay Red King Crab (BBR) fishery and by about one-half for the Bering Sea Snow Crab (BSS) fishery.[1]

Changes in the Bristol Bay Red King Crab Fishery Between the 2005 and 2005/06 Seasons

Type of measure	Measure	2005	2005/06	Change	% Change
Total catch, value and effort	Harvest (000 pounds)	14,112	16,467	2,355	17%
	Assumed ex-vessel price ($/lb)	$4.71	$4.30	-$0.41	-9%
	Estimated ex-vessel value ($ million)	$65.7	$70.5	$4.8	7%
	Number of pots pulled	90,972	103,337	12,365	14%
	Number of landings	270	263	-7	-3%
Use of vessels and pots in fishing	Average pots registered per vessel	197	177	-21	-10%
	Catch per unit of effort (CPUE)	23	24	1	4%
Vessel participation	Number of vessels registered	251	89	-162	-65%
	Number of pots registered	49,506	15,713	-33,793	-68%
Average effort, harvest and value per vessel	Average pots pulled per vessel	362	1,161	799	220%
	Estimated avg. days fished per vessel	3	26	23	767%
	Average landings per vessel	1.1	3.0	1.9	175%
	Average harvest per vessel (pounds)	56,225	185,024	128,799	229%
	Average ex-vessel value per vessel ($)	$261,806	$791,858	$530,052	202%

There has been a corresponding dramatic decline in the number of crab fishing jobs, with a decline of about 900 BBR jobs and about 450 BSS jobs. Not all of the decline in vessel participation and jobs is due specifically to crab rationalization. About 15% of the 2005/06 decline for the BBR fishery was due to the crab vessel buyback program.

[1] Throughout this report I refer to the Bering Sea Opilio Crab fishery as the "Bering Sea Snow Crab" fishery, following ADFG practice.

The remaining crab fishing jobs are a different kind of job, generally with longer seasons, more total income (for those working), lower earnings per day fishing (but not necessarily per day worked), more certainty about income (for those working), and a decline in the share of fishing income in total ex-vessel value.

Rationalization has cut into sales of businesses which sell to crab boats and crab fishermen—particularly those businesses whose sales depend on the number of boats and people fishing.

Economic Effects of Crab Rationalization on Kodiak

Not enough information is presently available to measure economic effects of crab rationalization on Kodiak with any great degree of precision.

Between 2004/05 and 2005/06, the number of Kodiak boats which fished for Bristol Bay Red King Crab fell from about 54 to about 23, or by about 57%.

Kodiak residents probably lost between 100 and 180 Bristol Bay Red King Crab fishing jobs and between 60 and 105 Bering Sea Snow Crab fishing jobs due to rationalization.

Rationalization probably reduced the total earnings of Kodiak residents working in the Bristol Bay Red King Crab fishery by between $1.0 million and $1.6 million.

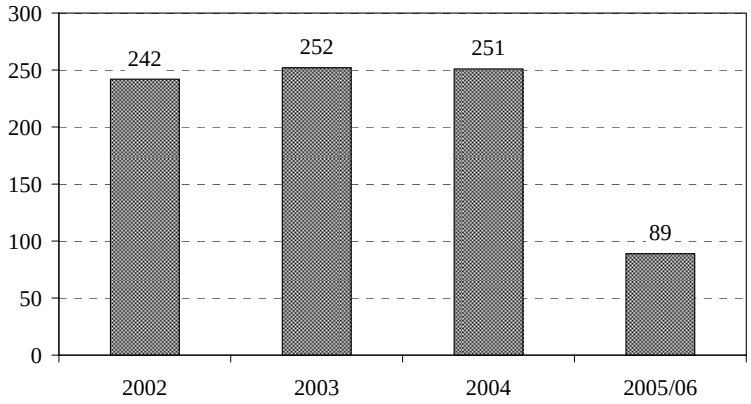
Rationalization has cut into the sales of some Kodiak businesses which supply and service the crab fleet—but there has been no obvious major decline for marine supply and service companies since rationalization began.

Total sales of Kodiak businesses declined slightly in the fourth quarter of 2005 and the first quarter of 2006, compared to the corresponding quarters of the previous year—but it is unclear to what extent this was caused by crab rationalization or other factors.

Kodiak is a relatively large and diversified community that depends on many fisheries and other activities. This tends to dampen the relative economic effects of crab rationalization on Kodiak.

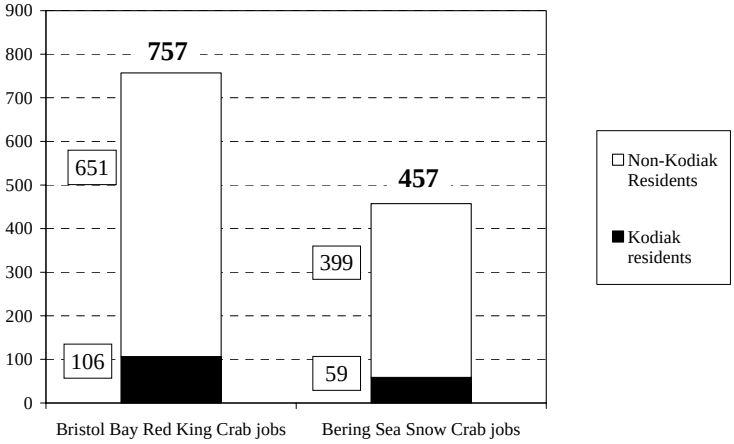
The number of vessels participating in the Bristol Bay Red King Crab fishery declined dramatically during the first year of rationalization.

Bristol Bay Red King Crab Fishery, 2002-2005:
Total Vessels Registered



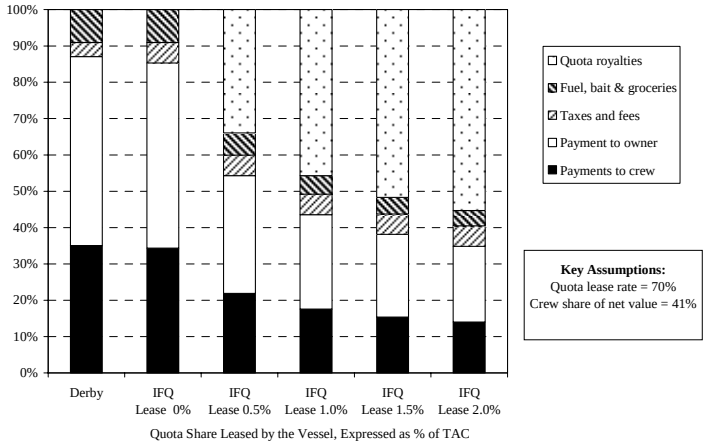
A "best guess" estimate is that in 2005/06 Kodiak residents lost 106 Bristol Bay Red King Crab fishing jobs and 59 Bering Sea Snow Crab fishing jobs due to rationalization. Upper-bound estimates would be that Kodiak residents lost 179 Bristol Bay Red King Crab fishing jobs and 105 Bering Sea Snow Crab fishing jobs.

Estimated Crab Fishing Job Losses due to Crab Rationalization



Estimates based on a model of costs and payments for a hypothetical fishing vessel suggest that as crab vessel leases more quota, the share of ex-vessel value paid for quota royalties increases while the shares paid to vessel owners and crew decline.

Estimated Distribution of Total Vessel Revenues for Different Levels of Quota Leasing:
Bristol Bay Red King Crab Fishery



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I. INTRODUCTION

In the fall of 2005, significant changes were implemented in the management of Bering Sea Aleutian Islands (BSAI) crab fisheries. These changes are referred to as "Crab Rationalization."[2] According to the National Marine Fisheries Service:

> The Crab Rationalization Program allocates BSAI crab resources among harvesters, processors, and coastal communities. The North Pacific Fishery Management Council developed the Program over a 6-year period to accommodate the specific dynamics and needs of the BSAI crab fisheries. . . Program components include: quota share allocation, processor quota share allocation, IFQ and individual processing quota (IPQ) issuance, quota transfers, use caps, crab harvesting cooperatives, protections for Gulf of Alaska groundfish fisheries, arbitration system, monitoring, economic data collection, and cost recovery fee collection.

With the implementation of crab rationalization, major changes occurred in BSAI crab fisheries during the 2005-06 season, including a dramatic consolidation in the number of vessels participating in BSAI crab fisheries.

The changes in the crab fisheries during the first season of crab rationalization raised concerns in many coastal Alaska communities, including Kodiak. Among these concerns were losses in crab fishing jobs, changes in compensation for crab fishing captains and crew, and effects on businesses selling services and supplies to vessels and fishermen. The early experience with crab rationalization also raised concerns about the potential implications of proposals for rationalization of Gulf of Alaska groundfish fisheries.[3]

Origins of this Study

In order to get a better understanding of how Kodiak had been affected by crab rationalization, in December 2005 the City of Kodiak invited the Institute of Social and Economic Research (ISER) to prepare a study addressing these three questions:

- How has BSAI crab rationalization affected employment of Kodiak residents as skippers and crew in BSAI crab fisheries?
- How has BSAI crab rationalization affected compensation paid to Kodiak residents participating as captains and crew in BSAI crab fisheries?
- How has BSAI crab rationalization affected Kodiak businesses?

[2] Detailed information about crab rationalization may be found at the "Bering Sea and Aleutian Islands (BSAI) Crab Rationalization Program" website of the National Marine Fisheries Service Alaska Regional Office, at: http://www.fakr.noaa.gov/sustainablefisheries/crab/crfaq.htm#CRreports.

[3] Not all Kodiak residents share these concerns. As with any fisheries policy issue, Kodiak residents have widely varying perceptions of and attitudes towards crab rationalization.

In response to this invitation, I prepared a proposal for a study addressing these questions. In the proposal, I recommended that the study be divided into two phases:

> **Phase I: Preliminary Analysis**. This phase of the project will address the research questions as best possible based on existing studies and data, and a relatively small number of interviews (put differently, without conducting large numbers of interviews and/or surveys.) Phase I will focus on the King Crab fishery.
>
> **Phase II: Interviews and Surveys; Opilio Season Analysis.** This phase of the project will extend the preliminary analysis by conducting additional interviews and/or surveys to obtain more reliable and more detailed information. Phase II will also include analysis of the Opilio fishery.

I noted that the proposal was for Phase I of the study, and suggested that I should "prepare a proposal for Phase II of the research at a later date, after considering what kinds of interviews and/or surveys would be most useful and cost-effective for obtaining additional information about the research questions."

The City of Kodiak accepted the proposal and I began work on this project in January 2006. This document is the report for Phase I of this project (Preliminary Analysis).[4] In the final chapter, I describe options for further analysis.

My Background and Objectives in Undertaking this Study

As a Professor of Economics at the University of Alaska Anchorage Institute of Social and Economic Research (ISER), I have been actively involved in research and teaching about the Alaska economy and Alaska resource management and markets for the past twenty-five years.[5] For the past fifteen years, most of my research has focused on the Alaska seafood industry, including seafood markets, fisheries management, and the role of the seafood industry in the Alaska economy. I have worked primarily on issues related to the salmon industry, but I have also studied markets for and management issues related to the halibut, herring, and pollock fisheries.

Until this study, I had done relatively little work related to Alaska crab fisheries. I was not involved in any way with the development of the crab rationalization program. I did not advocate for or against the program or any elements of the program.

I undertook this study because I was asked to by the City of Kodiak and because it addresses issues of importance to Alaska. My goal in this study has been to develop the best possible objective answers to the three questions the City of Kodiak asked me to

[4] Preliminary ADFG data for the Bering Sea Snow Crab fishery became available in early May. As a result, I was able to include some analysis of the Bering Sea Snow Crab fishery in this preliminary analysis.
[5] My resume and copies of selected publications and presentations are available on my website: www.iser.uaa.alaska.edu/iser/people/knapp.

study, given the limited available data and the limited time and resources available for the research.

My goal in this study is not to argue for or against crab rationalization or any component of the crab rationalization program. I do not offer or intend any conclusions about whether crab rationalization is good or bad or should or shouldn't have been done differently.

Questions Not Addressed by this Study

This study focuses on three specific questions related to effects of crab rationalization:

- How has crab rationalization affected employment of captains and crew?
- How has crab rationalization affected compensation of captains and crew?
- How has rationalization affected fishing support businesses?

These are important questions. But—as is clear from reading the newspapers, listening to public testimony, or talking about rationalization with Kodiak residents, fishermen, vessel owners and processors—they are by no means the only questions raised by crab rationalization. Other important questions raised by crab rationalization include (but are not limited to):

- How has rationalization affected crab markets?
- How has rationalization affected wholesale and ex-vessel prices?
- How has rationalization affected fishing costs?
- How has rationalization affected processing costs?
- How has rationalization affected economic efficiency and profitability of the crab fishery and processing industry?
- How has rationalization affected income and profits of vessel owners?
- How has rationalization affected safety of the crab fishery?
- How has management affected costs of management and enforcement?
- How has rationalization affected other fisheries?
- What factors have affected the extent and speed of consolidation of the crab fleet?
- What factors have affected quota lease rates?
- What have been the economic effects of processor quotas?
- What does experience with crab rationalization imply about potential effects of rationalization of other fisheries?

In the course of this study many people talked to me at length about these other questions and why they are important. I agree that they are important and should be studied. But I have not studied them, because I was not asked to study them—and because studying them would have vastly expanded the scope of this preliminary analysis.

In short, this report is not a comprehensive analysis of economic effects of crab rationalization on Kodiak, much less a comprehensive analysis of the effects of crab

rationalization. It is, rather, a start towards examining a few of the many complex questions raised by crab rationalization
An important policy question for fishery managers and the many stakeholders in Alaska fisheries is when, how, and by whom the many other questions raised by crab rationalization should be studied.

Challenges in Studying Economic Effects of Crab Rationalization on Kodiak

There are significant challenges in studying economic effects of crab rationalization on Kodiak. These challenges have limited my ability to answer the three questions the City of Kodiak asked me to address for this study. More generally, these challenges confront, to varying extents, any potential study of effects of crab rationalization.

1. Rationalization began very recently. The effects of crab rationalization will happen over a long period of time.

Crab rationalization has been in place for less than a year. Crab rationalization is a learning experience for everyone involved. The crab fisheries will most likely not stay the same as they were in the first year of crab rationalization. It is far too early to know what the long-term effects of crab rationalization will be on how many boats fish, on crab fishing jobs and earnings, on quota lease rates, on crab markets and prices, and on communities. It took far longer than one year to begin to understand the long-term economic effects of salmon limited entry, halibut and sablefish IFQs, the CDQ program, and the American Fisheries Act.

A practical challenge is that only limited data are available for what has happened during the first year of rationalization, and these data have become available only recently. I did not receive data for the Bering Sea Snow Crab (opilio) fishery until the middle of May.[6]

2. There is wide variation between and within BSAI crab fisheries.

There are differences between crab fisheries. Within each crab fishery, there are differences in boat sizes, vessel ownership, quota allocation, and many other factors which affect how quota is fished. Some vessel owners own only one vessel, while others own multiple vessels. Some quota holders leased out their quota, some fished only their own quota, while others leased additional quota. Boats vary in how long they fished and how crew were paid. Boats also vary in the extent to which they participate in other fisheries. Historically, of course, there was also great variation in vessel catches and earnings prior to rationalization. This variation makes it difficult to generalize about

[6] Although the first season can't show all the effects of crab rationalization, it is useful to study the effects of crab rationalization from the beginning. It's only by beginning to study these effects that we will begin to understand the challenges involved in studying them. If we wait three years we may discover that we haven't collected the information we need to answer the questions that we now wish to ask. In addition, people are very interested in the effects of crab rationalization, and will discuss and debate these effects based on the information they have.

what is happening in the crab fisheries and about how boats, crew, and communities have been affected by rationalization

3. Many factors besides rationalization affect crab fisheries.

Not all of the changes in the crab fishery in the 2005-06 season were due to rationalization. Nor will all future changes be due to rationalization. Crab resource conditions and quotas change from year to year; world crab market conditions change from year to year; and fuel prices change from year to year. It is difficult to separate the effects of rationalization from the effects of these other factors on the crab fishery. This year's crab fisheries—and how people perceive the effects of rationalization—would have been different if the total crab quota had been larger, prices had been higher, or fuel costs had been lower.

4. Many factors besides crab fisheries affect Kodiak's economy.

Not all of the economic changes in Kodiak this year or in future years have been or will be due to crab rationalization. Economic conditions in other fisheries and other industries change from year to year. Federal spending and state spending change from year to year. Permanent fund dividends change from year to year. Old businesses close and new businesses open. It is difficult to separate the effects of rationalization from the effects of these other factors on Kodiak's economy.

5. The crab fisheries would have changed even without rationalization.

We can't assume that if rationalization hadn't happened, the same number of boats would have continued to fish for crab, providing the same number of crab fishing jobs. It is likely that some consolidation would have happened in the crab fishery without rationalization—as has occurred, for example, in Kodiak seine fisheries. The true effects of rationalization can't be measured by the changes we observe over time. They are, rather, how the fisheries differ from what they would have become without rationalization—which we can't know exactly.

6. Crab rationalization affects more fisheries than crab.

Different Alaska fisheries are economically linked in many ways. Changes in one fishery affect other fisheries. For example, captains and crew may work in a lower-paying fishery or tendering to gain the opportunity to fish in a higher paying fishery (like crab). If crab fishing job opportunities decline, this may affect availability of crew for other fisheries. As another example, boats and fishermen that stop fishing for crab may participate in other fisheries—creating more jobs in those fisheries (but probably not more value). Crab boats often participate in multiple fisheries. A change in one of these fisheries may affect the profitability of the entire operation. Put simply, we can't understand the effects of crab rationalization by only looking at the crab fishery!

II. OVERVIEW OF CHANGES IN BSAI CRAB FISHERIES IN 2005/06

There are several different BSAI crab fisheries affected by crab rationalization. As shown in Table II-1, the two fisheries which account for most of the harvest volume are the Bristol Bay Red King Crab (BBR) fishery and the Bering Sea Snow (Opilio) Crab fishery (BSS). This report focuses on these two fisheries. It focuses particularly on the Bristol Bay Red King Crab fishery, since the Bering Sea Snow Crab fishery was still under way while I was writing this report.

Table II-1
BSAI Crab Individual Fishing Quota (IFQ) Allocations
August 15 2005 - June 30 2006

Fishery code	Fishery description	Allocation (lbs)
BBR	Bristol Bay red king crab	16,496,100
BSS	Bering Sea snow crab	33,465,600
BST	Bering Sea Bairdi Tanner crab	1,458,000
EAG	Eastern Aleutian Islands golden king crab	2,700,000
WAG	Western Aleutian Islands golden king crab	2,430,000
Total	TOTAL	56,549,700

Source: NOAA Restricted Access Management Division, NMFS Crab IFQ Allocations and Landings Report, www.fakr.noaa.gov/ram/daily/cratland.htm. Data downloaded May 18, 2006.

Harvest volumes have been higher in recent years for the Bering Sea Snow Crab fishery, but ex-vessel prices and ex-vessel value have been higher for the Bristol Bay Red King Crab fishery (Table II-2). The Bristol Bay Red King Crab fishery opens in October while the Bering Sea Snow Crab fishery opens in January. Prior to and after implementation of rationalization, the average number of days fished has been longer for the Bering Sea Snow Crab fishery.

Table II-2
Comparison of the Two Major BSAI Crab Fisheries, 2002/03-2005/06

		2002-03	2003-04	2004-05	2005-06
Bristol Bay Red King Crab	Harvest (million pounds)	8.9	14.5	14.1	16.5
	Ex-vessel price ($ millions)	$6.14	$5.08	$4.71	$4.30
	Ex-vessel value ($ millions)	54.2	72.7	65.7	70.5
	Opens in	October			
	Days	3	5	3	26
Bering Sea Snow Crab (Opilio)	Harvest (million pounds)	26.3	22.2	23.0	30.8
	Ex-vessel price ($/lb)	$1.83	$2.05	$2.05	NA
	Ex-vessel value ($ millions)	47.0	45.0	46.8	NA
	Opens in	January			
	Days	9	8	5	42

Note: 2002-03 refers to the Bristol Bay Red King Crab season which began in October 2002 and the Bering Sea Snow Crab season which began in January 2003. Data for the 2005-06 season are preliminary. Sources are listed in Tables II-3 and II-4.

Tables II-3 and II-4 provide summary data for the Bristol Bay Red King Crab and the Bering Sea Snow Crab fisheries. Note that all of the data for the 2005/06 are preliminary and subject to change, particularly data for pot lifts, days fished, ex-vessel price and ex-vessel value.[7]

Table II-3

Bristol Bay Red King Crab Fishery Summary Data, 1996-2005/06

	Source	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005/06
Harvest (000 pounds)	A	8,406	8,756	14,233	11,091	7,546	7,786	8,857	14,530	14,112	16,467
Deadloss (000 pounds)	A	24	14	54	44	76	57	32	228	161	78
Estimated live deliveries (000 pounds)	*	8,381	8,743	14,179	11,047	7,470	7,729	8,825	14,302	13,952	16,390
Number of vessels registered	A	196	256	274	257	246	230	242	252	251	89
Number of landings	A	198	265	284	268	256	238	254	275	270	263
Number of pots registered	A	39,461	27,499	56,420	42,403	26,352	24,571	25,833	46,964	49,506	15,713
Number of pots pulled	A	76,433	90,510	141,707	146,997	98,694	63,242	68,328	129,019	90,972	103,337
Catch per unit of effort (CPUE)	A	16	15	15	12	12	19	20	18	23	24
Estimated avg. days fished per vessel	A	4	4	5	5	4	3	3	5	3	26
Ex-vessel price ($/lb)	B	$4.01	$3.26	$2.64	$6.26	$4.81	$4.81	$6.14	$5.08	$4.71	
Ex-vessel price ($/lb)	C	$4.00	$3.25	$2.60	$6.27	$4.80	$4.92	$6.27	$5.15	$4.70	$4.30
Assumed ex-vessel price ($/lb)	*	$4.01	$3.26	$2.64	$6.26	$4.81	$4.81	$6.14	$5.08	$4.71	$4.30
Estimated ex-vessel value ($ million)	*	$33.6	$28.5	$37.4	$69.2	$35.9	$37.2	$54.2	$72.7	$65.7	$70.5
Average pots registered per vessel	*	201	107	206	165	107	107	107	186	197	177
Average pots pulled per vessel	*	390	354	517	572	401	275	282	512	362	1,161
Average harvest per vessel (pounds)	*	42,886	34,205	51,945	43,155	30,675	33,854	36,598	57,660	56,225	185,024
Average ex-vessel value per vessel ($)	*	$171,478	$111,333	$136,619	$269,078	$146,057	$161,640	$223,898	$288,310	$261,806	$791,858
Average landings per vessel	*	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	3.0
Average live deliveries per landing	*	42,331	32,991	49,927	41,219	29,179	32,475	34,743	52,007	51,674	62,318

Notes: All 2005/06 data are preliminary and subject to change, particularly data for pot lifts, average days fished, ex-vessel price and ex-vessel value. Catch per unit of effort (CPUE) is defined as number of legal crabs retained per pot lift.

A. Review of major BSAI crab fisheries, 2005/06. Powerpoint presentation prepared by Forrest R. Bowers, ADFG, May 2006.

B. ADFG 2004 Shellfish Management Report, Table 2-2.

C. ADFG Preliminary Alaska Shellfish Summaries, posted at www.cf.adfg.state.ak.us/geninfo/shellfsh/shellfish_harvest.php.

** Calculated from data in table.*

Table II-4

Bering Sea Snow Crab Fishery Summary Data, 1997-2006

	Source	1997	1998	1999	2000	2001	2002	2003	2004	2005	2005/06
Harvest (000 pounds)	A	119,543	243,341	184,530	30,775	23,382	30,253	26,342	22,170	23,036	30,840
Deadloss (000 pounds)	A	2,352	2,894	1,828	338	430	583	665	224	224	299
Estimated live deliveries (000 pounds)	*	117,191	240,447	182,702	30,437	22,952	29,670	25,677	21,946	22,812	30,541
Number of vessels registered	A	226	229	241	229	207	191	192	189	164	80
Number of landings	A	1127	1767	1630	287	293	403	230	240	196	274
Number of pots registered	A	47,036	47,909	50,173	43,407	40,379	37,807	20,452	14,444	12,930	13,734
Number of pots pulled	A	754,140	891,268	899,043	170,064	176,930	307,666	139,903	110,087	69,617	114,161
Catch per unit of effort (CPUE)	A	133	209	159	137	97	76	155	157	240	180
Estimated avg. days fished per vessel	A	65	64	66	7	30	24	9	8	5	42
Ex-vessel price ($/lb)	B	$0.79	$0.56	$0.88	$1.81	$1.53	$1.49	$1.83	$2.05		
Ex-vessel price ($/lb)	C	$0.75	$0.55	$0.98	$1.85	$1.55	$1.40	$1.84	$2.05	$1.80	
Assumed ex-vessel price ($/lb)	*	$0.79	$0.56	$0.88	$1.81	$1.53	$1.49	$1.83	$2.05	$2.05	NA
Estimated ex-vessel value ($ million)	*	$92.6	$134.7	$160.8	$55.1	$35.1	$44.2	$47.0	$45.0	$46.8	NA
Average pots registered per vessel	*	208	209	208	190	195	198	107	76	79	172
Average pots pulled per vessel	*	3,337	3,892	3,730	743	855	1,611	729	582	424	1,427
Average harvest per vessel (pounds)	*	528,951	1,062,626	765,684	134,388	112,957	158,390	137,198	117,302	140,465	385,495
Average ex-vessel value per vessel ($)	*	$409,652	$587,994	$667,126	$240,570	$169,646	$231,456	$244,732	$238,036	$285,151	NA
Average landings per vessel	*	5.0	7.7	6.8	1.3	1.4	2.1	1.2	1.3	1.2	3.4
Average live deliveries per landing	*	103,985	136,077	112,087	106,052	78,335	73,623	111,638	91,441	116,388	111,462

Notes: All 2006 data are preliminary and subject to change, particularly data for pot lifts and average days fished. Catch per unit of effort (CPUE) is defined as number of legal crabs retained per pot lift. No ex-vessel price data for 2006 were available when this report was prepared.

A. Review of major BSAI crab fisheries, 2005/06. Powerpoint presentation prepared by Forrest R. Bowers, ADFG, May 2006.

B. ADFG 2004 Shellfish Management Report, Table 2-29.

C. ADFG Preliminary Alaska Shellfish Summaries, posted at www.cf.adfg.state.ak.us/geninfo/shellfsh/shellfish_harvest.php.

** Calculated from data in table.*

[7] Changes in the management of the BSAI crab fisheries impose a need for corresponding changes in the collection, analysis, and reporting of data for these fisheries, requiring extra time and work for ADFG in this first season. I appreciate the assistance of ADFG in providing these preliminary data in order to make this analysis possible.

Table II-5 provides an overview of changes in the Bristol Bay Red King Crab fishery between the 2004 season and the 2005/06 season. I have divided Table II-5 into four types of measures of the fishery.

Table II-5
Changes in the Bristol Bay Red King Crab Fishery Between the 2004 and 2005/06 Seasons

Type of measure	Measure	2004	2005/06	Change	% Change
Total catch, value and effort	Harvest (000 pounds)	14,112	16,467	2,355	17%
	Assumed ex-vessel price ($/lb)	$4.71	$4.30	-$0.41	-9%
	Estimated ex-vessel value ($ million)	$65.7	$70.5	$4.8	7%
	Number of pots pulled	90,972	103,337	12,365	14%
	Number of landings	270	263	-7	-3%
Use of vessels and pots in fishing	Average pots registered per vessel	197	177	-21	-10%
	Catch per unit of effort (CPUE)	23	24	1	4%
Vessel participation	Number of vessels registered	251	89	-162	-65%
	Number of pots registered	49,506	15,713	-33,793	-68%
Average effort, harvest and value per vessel	Average pots pulled per vessel	362	1,161	799	220%
	Estimated avg. days fished per vessel	3	26	23	767%
	Average landings per vessel	1.1	3.0	1.9	175%
	Average harvest per vessel (pounds)	56,225	185,024	128,799	229%
	Average ex-vessel value per vessel ($)	$261,806	$791,858	$530,052	202%

There was relatively little change in total catch, value and effort in the fishery. The total harvest was up 17% and the total ex-vessel value was up 7%. The total number of pots pulled was up 14% and the total number of landings (vessel deliveries to processors) was down 3%. By themselves these measures do not reveal major changes in the fishery.

Similarly, there was relatively little change in how vessels and pots were used in fishing. The average number of pots registered per vessel was 10% lower, and the catch per unit of effort (number of legal crabs per pot lift) was 4% higher. By themselves these measures also do not reveal major changes in the fishery.

However, there were dramatic changes in vessel participation. The number of vessels registered for the fishery fell from 251 to 89—or by almost two-thirds (65%). Correspondingly, the number of pots registered fell by more than two-thirds (68%).

With the decline in vessel participation there was a dramatic increase in average effort, harvest, and ex-vessel value per vessel. The average number of pots pulled per vessel more than tripled from 362 to 1161. The average landings per vessel almost tripled from 1.1 to 3.0. The average harvest per vessel more than tripled from 56 thousand pounds to 185 thousand pounds. The average ex-vessel value per vessel more than tripled from $262 thousand to $792 thousand.

These changes are summarized in Figures II-1 through II-8 on the following page. They clearly show a dramatic consolidation in the number of vessels participating in the Bering Sea Red King Crab fishery—with a corresponding dramatic increase in average catches and ex-vessel value per vessel.

Figure II-1

Bristol Bay Red King Crab Fishery, 2002-2005:
Total Harvest (pounds)

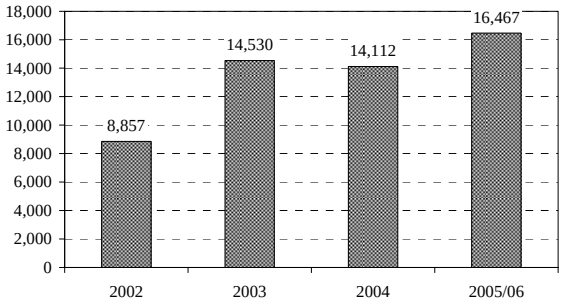


Figure II-2

Bristol Bay Red King Crab Fishery, 2002-2005:
Total Pots Pulled

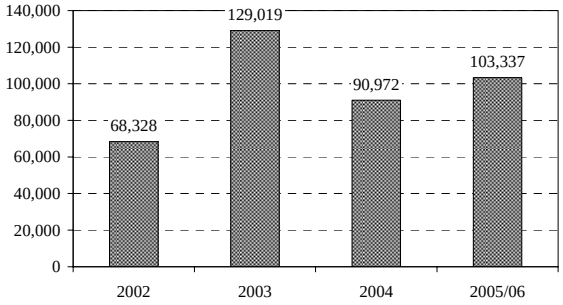


Figure II-3

Bristol Bay Red King Crab Fishery, 2002-2005:
Total Landings

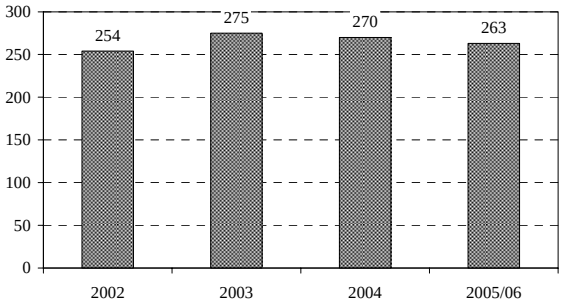


Figure II-4

Bristol Bay Red King Crab Fishery, 2002-2005:
Total Vessels Registered

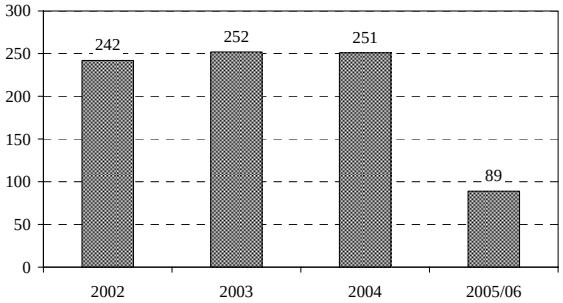


Figure II-5

Bristol Bay Red King Crab Fishery, 2002-2005:
Average Pots Pulled per Vessel

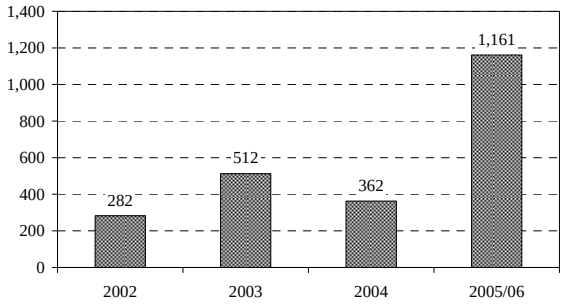


Figure II-6

Bristol Bay Red King Crab Fishery, 2002-2005:
Average Harvest per Vessel (pounds)

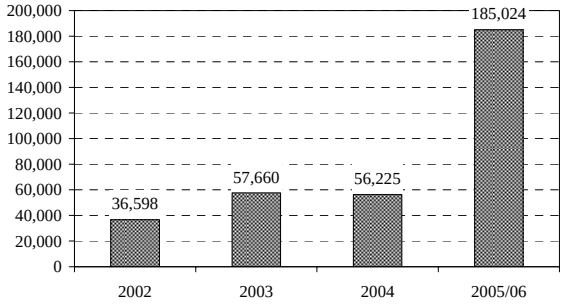


Figure II-7

Bristol Bay Red King Crab Fishery, 2002-2005:
Average Landings per Vessel

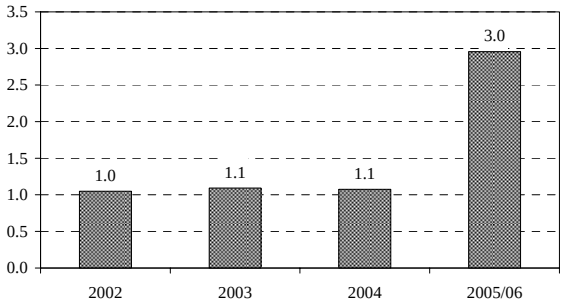
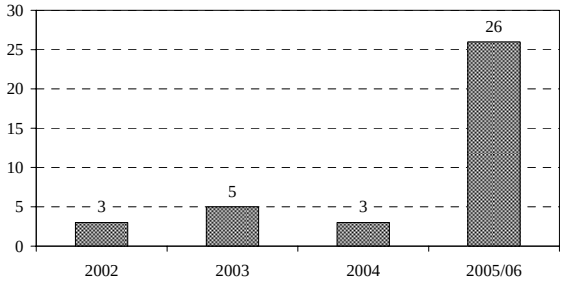


Figure II-8

Bristol Bay Red King Crab Fishery, 2002-2005:
Average Days Fished per Vessel
(2005/06 estimate is preliminary)



Almost all of the 2005 Bristol Bay Red King Crab fishery took place during a ten-week period from the middle of October to the middle of December. The number of participating vessels peaked at 72 during the second and third weeks and declined to less than 30 by the seventh week.

Catch per unit of effort (CPUE) declined from 41 in the first week to 22 by the fourth week and 15 by the eighth week.

I did not have data on which vessels fished in which weeks. However, available preliminary ADFG data suggest that most of the fleet fished for 2-3 weeks near the beginning of the season, with relatively high catch per unit of effort (CPUE) compared to historical averages. A smaller number fished much longer seasons, with CPUE declining as the season progressed.

Data in Figures II-9 through II-11 are from "Review of major BSAI crab fisheries, 2005/06," a powerpoint presentation prepared by Forrest R. Bowers, ADFG, May 2006. The data are preliminary estimates.

Figure II-9

Bristol Bay Red King Crab Fishery 2005
Estimated Fleet Size, by Week

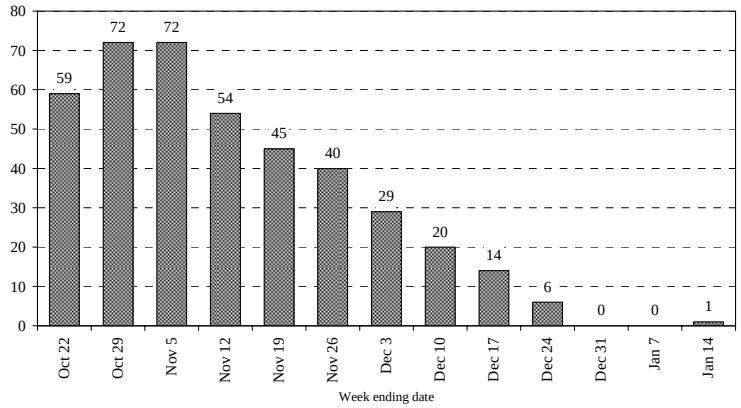


Figure II-10

Bristol Bay Red King Crab Fishery 2005
Weekly Average Catch per Unit of Effort

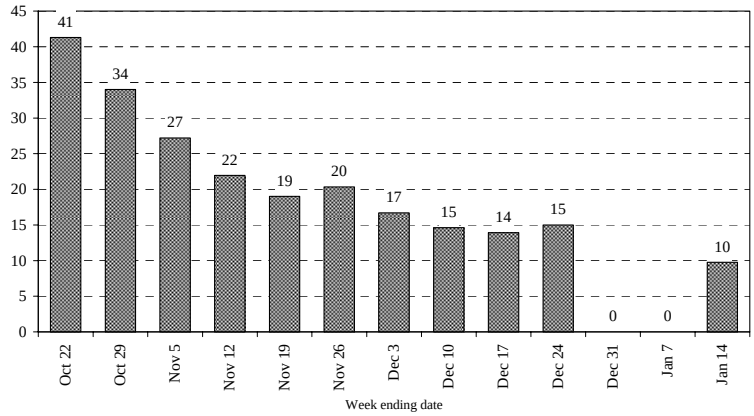


Figure II-11

Bristol Bay Red King Crab Fishery 2005
Weekly Harvest (thousands of pounds)

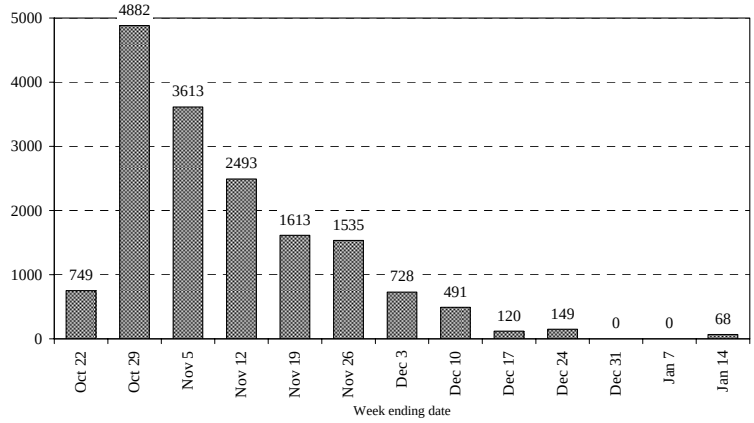


Table II-6 provides an overview of changes in the Bering Sea Snow Crab fishery between the 2005 season and the 2006 season.

Table II-6
Changes in the Bering Sea Snow Crab Fishery Between the 2005 and 2005/06 Seasons

Type of measure	Measure	2004	2005/06	Change	% Change
Total catch and effort	Harvest (000 pounds)	23,036	30,840	7,803	34%
	Number of pots pulled	69,617	114,161	44,544	64%
	Number of landings	196	274	78	40%
Use of vessels and pots in fishing	Average pots registered per vessel	79	172	93	118%
	Catch per unit of effort (CPUE)	240	180	-60	-25%
Vessel participation	Number of vessels registered	164	80	-84	-51%
	Number of pots registered	12,930	13,734	804	6%
Average effort, harvest and value per vessel	Average pots pulled per vessel	424	1,427	1,003	236%
	Estimated avg. days fished per vessel	5	42	37	740%
	Average landings per vessel	1.2	3.4	2.2	187%
	Average harvest per vessel (pounds)	140,465	385,495	245,030	174%

The 2006 harvest was 34% higher than the 2005 harvest, and the total number of landings was 40% higher. The total number of pots pulled was 64% higher (reflecting a 25% decline in catch per unit of effort). Note that these changes were much greater than for the Bristol Bay Red King Crab (BBR) fishery, for which harvests and pots pulled increased by only 17% and 14%, respectively, and the number of landings stayed about the same.

The average number of pots registered per vessel was more than twice as high, again in contrast to the BBR fishery for which average pots registered per vessel declined.

The number of vessels registered fell dramatically from 164 to 80—or by about one-half. However, the relative decline was less dramatic than for the BBR fishery, for which vessel participation fell by almost two-thirds.

With the decline in vessel participation and CPUE, there was a dramatic increase in average effort per vessel. The average number of pots pulled per vessel more than tripled from 424 to 1427.

Similarly, there was a dramatic increase in average landings and catches per vessel. Average landings per vessel almost tripled from 1.2 to 3.4, and average harvest per vessel almost tripled from 140 thousand pounds to 385 thousand pounds.

These changes are summarized in Figures II-12 through II-19 on the following page.

Figure II-12

Bering Sea Snow Crab Fishery, 2003-2006:
Total Harvest (pounds)

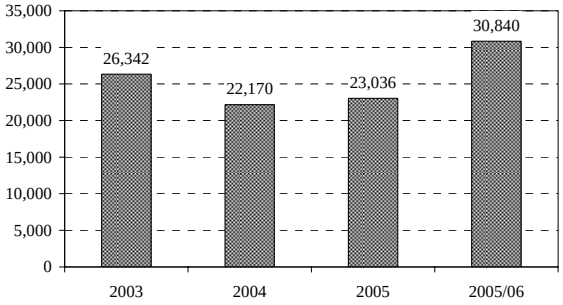


Figure II-13

Bering Sea Snow Crab Fishery, 2003-2006:
Total Pots Pulled

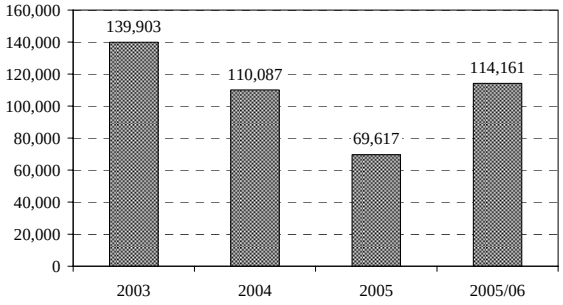


Figure II-14

Bering Sea Snow Crab Fishery, 2003-2006:
Total Landings

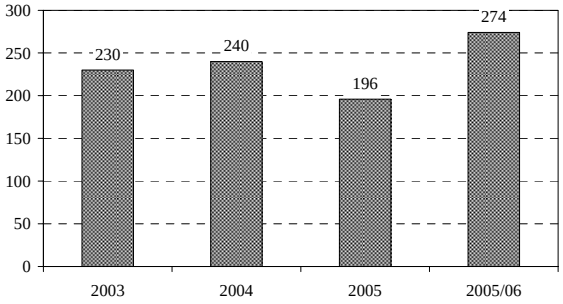


Figure II-15

Bering Sea Snow Crab Fishery, 2003-2006:
Total Vessels Registered

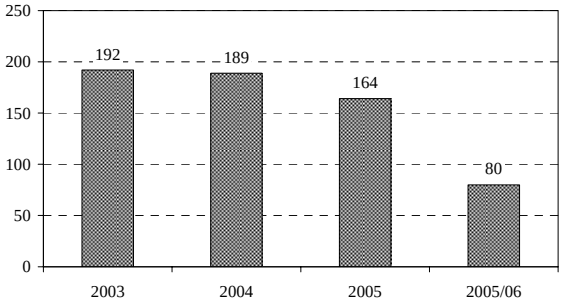


Figure II-16

Bering Sea Snow Crab Fishery, 2003-2006:
Average Pots Pulled per Vessel

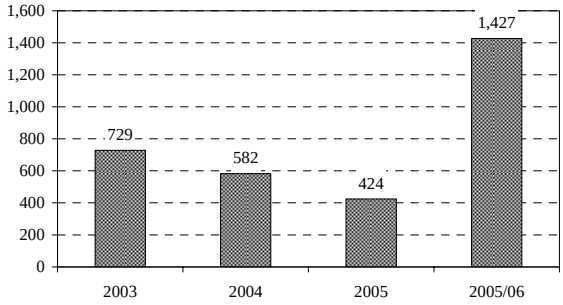


Figure II-17

Bering Sea Snow Crab Fishery, 2003-2006:
Average Harvest per Vessel (pounds)

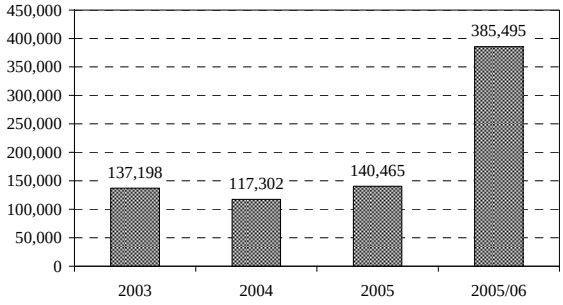


Figure II-18

Bering Sea Snow Crab Fishery, 2003-2006:
Average Landings per Vessel

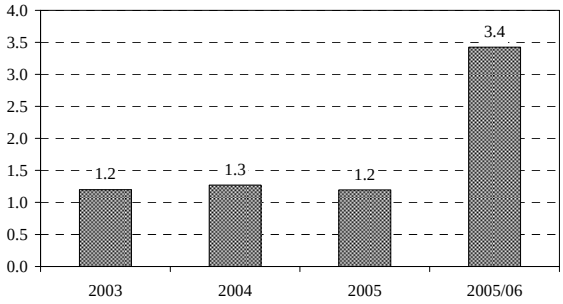
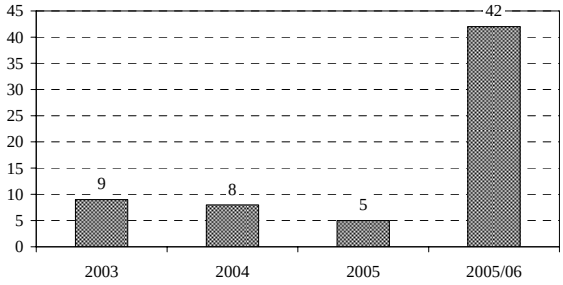


Figure II-19

Bering Sea Snow Crab Fishery, 2003-2006:
Average Days Fished per Vessel
(2005/06 estimate is preliminary)



Almost all of the 2006 Bering Sea Snow Crab fishery took place during a fifteen-week period from the middle of January to the end of April. The highest weekly participation was 43 vessels. The seasons lasted longer and vessel participation, average catches per unit of effort, and weekly harvests were distributed more uniformly across the season than for the Bristol Bay Red King Crab fishery. Participation and harvests peaked twice, in late January and mid-March.

I did not have data on which vessels fished in which weeks. However, available preliminary ADFG data suggest that individual vessels participated at different times during the season, for more weeks on average than for the Bristol Bay Red King Crab fishery.

Data in Figures II-20 through II-22 are from "Review of major BSAI crab fisheries, 2005/06," a powerpoint presentation prepared by Forrest R. Bowers, ADFG, May 2006. The data are preliminary estimates.

Figure II-20

Bering Sea Snow Crab Fishery 2006
Estimated Fleet Size, by Week

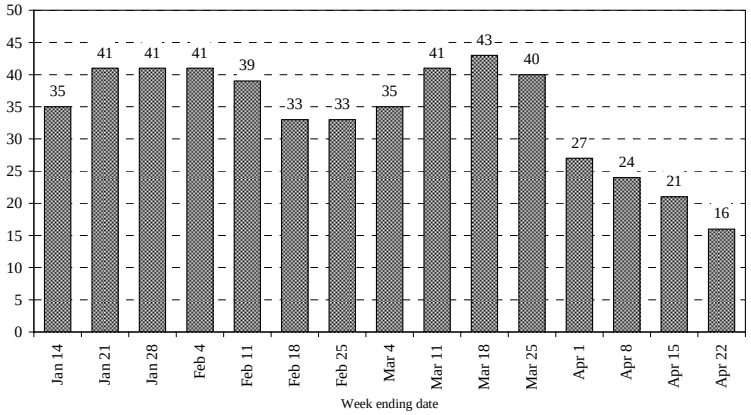


Figure II-21

Bering Sea Snow Crab Fishery 2006
Weekly Average Catch per Unit of Effort

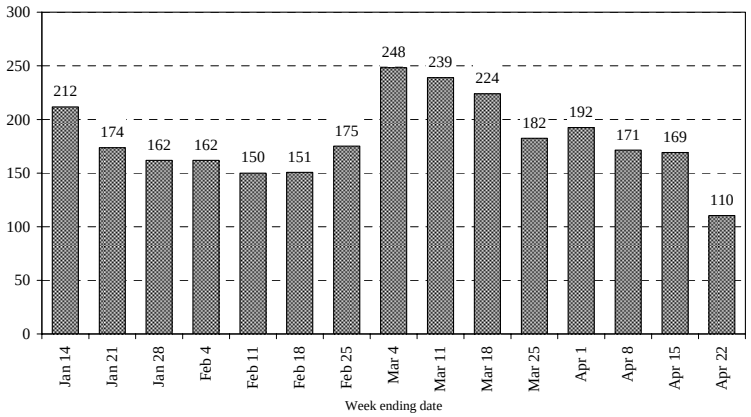
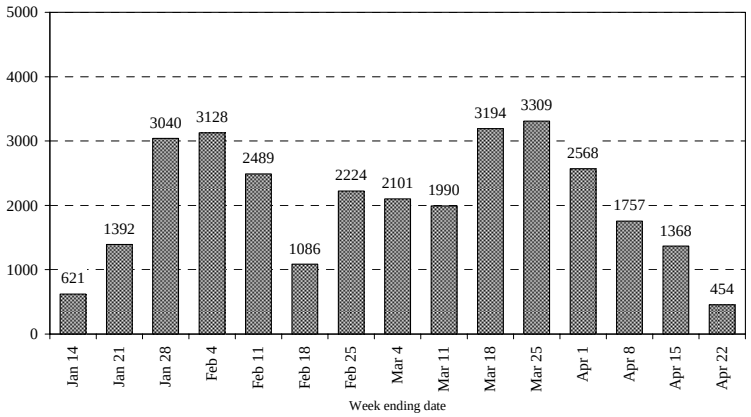


Figure II-22

Bering Sea Snow Crab Fishery 2006
Weekly Harvest (thousands of pounds)



III. EFFECTS OF RATIONALIZATION ON KODIAK VESSEL PARTICIPATION IN BSAI CRAB FISHERIES

In this chapter, I discuss the extent of fleet consolidation in the BSAI crab fisheries which occurred in 2005/06, and in particular changes in Kodiak vessel participation in these fisheries. As noted above, the extent of consolidation in the first year of BSAI crab rationalization was dramatic.

For this study I have not analyzed why consolidation occurred, nor am I concluding that the extent of consolidation was good or bad or too much or too little. My general understanding from talking with vessel owners is that high fuel prices and high quota lease rates probably contributed to the extent of consolidation. Note that the number of vessels which fished in 2005/06 is not necessarily an indication of how many may fish in the future. As quotas, prices and costs change, the number of vessels participating in the fishery in the future could increase or decrease compared with this year.

The analysis in this chapter is based upon lists provided by the Alaska Department of Fish and Game of the vessels which registered for the Bristol Bay Red King Crab fishery and the Bering Sea Snow Crab fishery in 2004/05 and 2005/06. There were 259 vessels which registered for at least one of these fisheries in at least one of these years.

Table III-1 summarizes the combinations of vessel registration in these two fisheries for these two years. There were 67 vessels (26%) which registered for both fisheries in both years. There were 79 vessels (31%) which registered for both fisheries in 2004/05 but in neither fishery in 2005/06. There were 73 vessels (29%) which registered only for the 2004/05 Bristol Bay Red King Crab fishery. Other registration combinations accounted for the remaining 40 vessels (14%).

Table III-1
Combinations of Vessel Registration in the
Bristol Bay Red King Crab and Bering Sea Snow Crab Fisheries
in 2004/05 and 2005/06

Year and Fishery Participation Combinations				Number of vessels	Percent of vessels
BBR 2004/05	BSS 2004/05	BBR 2005/06	BSS 2005/06		
X	X	X	X	67	26%
X	X			79	31%
X				73	29%
X	X	X		11	4%
X	X		X	9	4%
X		X	X	3	1%
X		X		8	3%
X			X	1	0.4%
	X			3	1%
Total number of vessels				254	100%

Between 2004/05 and 2005/06, the total number of vessels registering for at least one of the two major BSAI crab fisheries fell from 254 to 99 (a decline of 61%). Only 39% of the vessels which registered for at least one fishery in 2004/05 registered for at least one fishery in 2005/06 (Table III-2 and Figure III-1).

Between 2004/05 and 2005/06, the total number of vessels registering for the Bristol Bay Red King Crab fishery fell from 251 to 89 (a decline of 65%), and the total number of vessels registering for the Bering Sea Snow Crab fishery fell from 169 to 80 (a decline of 53%).[8]

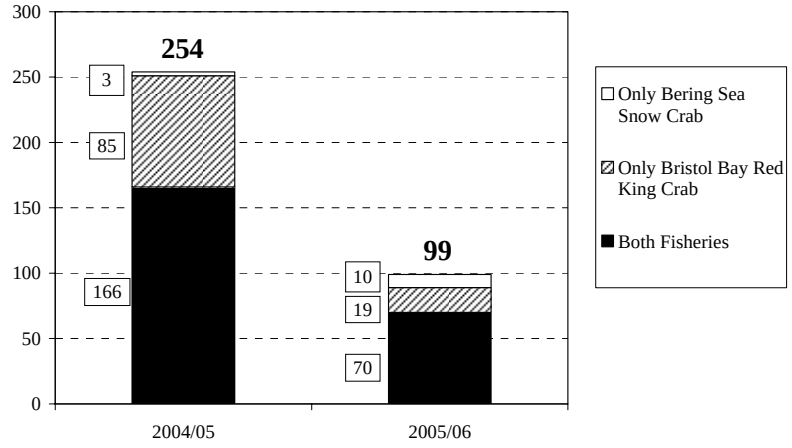
Table III-2
Number of Vessels Which Registered for the Bristol Bay Red King Crab and Bering Sea Snow Crab Fisheries in 2004/05 and 2005/06

	2004/05	2005/06	2004/05	2005/06	Change	% Change
Either Fishery: TOTAL	**254**	**99**	**100%**	**39%**	**-155**	**-61%**
Bristol Bay Red King Crab: TOTAL	251	89	99%	35%	-162	-65%
Bering Sea Snow Crab: TOTAL	169	80	67%	31%	-89	-53%
Both Fisheries	166	70	65%	28%	-96	-58%
Only Bristol Bay Red King Crab	85	19	33%	7%	-66	-78%
Only Bering Sea Snow Crab	3	10	1%	4%	7	233%
Neither Fishery	0	155	0%	61%	155	

Note: A total of 254 vessels registered for at least one fishery in 2004/05. All of the vessels which registered in 2005/06 had registered for at least one fishery in 2004/05.

Figure III-1

Number of Vessels Which Registered for the Two Major BSAI Crab Fisheries, 2004/05 & 2005/06



[8] Note that fishery participation may be slightly smaller than the number of vessels which registered. For both fisheries and years, the number of vessels which registered in both years is identical to the "number of vessels" reported in "Review of major BSAI crab fisheries, 2005/06" (powerpoint presentation prepared by Forrest R. Bowers, ADFG, May 2006), except that for the Bering Sea Snow Crab Fishery in 2004/05, the number of vessels which registered was 169 while the "number of vessels" in "Review of major BSAI crab fisheries, 2005/06" was 164.

A starting point for my analysis for this report was to estimate the changes in participation in these fisheries by Kodiak vessels. However, there isn't any clear definition of a "Kodiak Vessel." Potential definitions of a "Kodiak Vessel" might be based, for example, upon where the owner lives, where the vessel is usually docked when it is not fishing, or whether the vessel rents a slip in the harbor. Any of these indicators may change over time if the owner moves, the vessel is sold, or the vessel's fishery participation change.

In order to get a general sense of which crab vessels might be "Kodiak Boats," I showed the 2004/05 Bristol Bay Red King Crab fishery vessel registration list to a number of Kodiak residents involved with or knowledgeable about Kodiak fishing (the harbormaster, vessel owners, captains and crew members). These individuals were generally in agreement about (a) which boats were definitely "Kodiak boats" and (b) which boats were definitely not "Kodiak boats."

There were a few boats—about five—on which individuals had differing opinions. Generally these were boats that were in Kodiak only some of the time, that were in Kodiak less now than they had formerly been, or that had been formerly owned by a Kodiak resident but which had been sold.

Based on these individuals' opinions, I developed the list shown below of those vessels which had registered for the Bristol Bay Red King Crab fishery in 2004/05 which I assumed—for the purposes of the analysis in this report—to be "Kodiak Boats."

Table III-3
Vessels which Registered for the 2004/05 Bristol Bay King Crab Fishery
Which I Assumed to be "Kodiak Boats" for this Preliminary Analysis

ALASKA CHALLENGER	HANDLER	MELANIE
ALASKA SPIRIT	ICE LANDER	MIDNITE SUN
ALICIA JEAN	INCENTIVE	NORDIC VIKING
ALPINE COVE	IRENE H	NORTH POINT
AMERICAN WAY	ISLAND MIST	NUKA ISLAND
ARGOSY	JEANOAH	OBSESSION
ATLANTICO	KATHERINE	OCEAN BAY
BIG BLUE	KATRINA EM	PACIFIC STAR
BIG VALLEY	KODIAK	PACIFIC VENTURE
BOTANY BAY	LADY ALASKA	PERSEVERANCE
BUCCANEER	LADY ALEUTIAN	PROVIDER
CHISIK ISLAND	LADY HELEN	RUFF & REDDY
CORNELIA MARIE	LADY KISKA	SAGA
COUGAR	LADY KODIAK	SEABROOKE
DETERMINED	LUCKY LADY	SILVER SPRAY
ELIZABETH F	MAR DEL SUD	STORM BIRD
FOUR DAUGHTERS	MARCY J	TRAIL BLAZER
GUARDIAN	MARY J	VIEKODA BAY

I emphasize that this is not a "scientific" list. Nor can I claim any personal expertise at all as to which boats are "Kodiak Boats." (There are probably hundreds of Kodiak residents more qualified to make this kind of judgment.) Probably many readers of this

report might suggest a few boats which should be left off or added to this list. However, I believe that the list is reasonable for the purposes of this preliminary analysis. Changing the list slightly—adding or removing a few boats—would not significantly change any of the conclusions of this analysis.[9]

Table III-5 summarizes the combinations of vessel registration for the 54 "Kodiak Boats" in the two major BSAI fisheries in 2004/05 and 2005/06. There were 16 vessels (30%) which registered for both fisheries in both years. There were 13 vessels (24%) which registered for both fisheries in 2004/05 but in neither fishery in 2005/06. There were 15 vessels (28%) which registered only for the 2004/05 Bristol Bay Red King Crab fishery. Other registration combinations accounted for the remaining 10 vessels (19%).

Table III-5
Combinations of "Kodiak Boat" Registration in the Bristol Bay Red King Crab and Bering Sea Snow Crab Fisheries in 2004/05 and 2005/06

Year and Fishery Participation Combinations				Number of vessels	Percent of vessels
BBR 2004/05	BSS 2004/05	BBR 2005/06	BSS 2005/06		
X	X	X	X	16	30%
X	X			13	24%
X				15	28%
X	X	X		6	11%
X	X		X	3	6%
X		X		1	2%
Total number of vessels				54	100%

[9] I had originally planned to base my list of "Kodiak Boats" based upon the "home ports" listed in the Alaska Department of Fish and Game's 2004 vessel database. However, upon talking with Kodiak residents it quickly became clear that they did not consider the "home port" listed in the ADFG 2004 vessel database to be an accurate indicator of which boats were "Kodiak Boats." As shown in the table, for 5 of the vessels considered "Kodiak Boats" by Kodiak residents, the ADFG vessel database listed home ports in other Alaska communities, and for 9 of these boats the ADFG vessel database listed home ports in other states. In addition, the ADFG vessel database listed Kodiak as home port for 5 vessels not considered "Kodiak Boats" by residents.

Comparision of "Kodiak Boats" with Home Port in ADFG 2004 Vessel Database

	Home Port in ADFG 2004 Vessel Database			
	Kodiak	Other Alaska Community	Other State	Total
Kodiak Boats	40	5	9	54
Non-Kodiak Boats	5	48	147	200
Total	45	53	156	254

Between 2004/05 and 2005/06, the total number of “Kodiak Boats” registering for at least one of the two major BSAI crab fisheries fell from 54 to 26 (a decline of 52%). Only 48% of the “Kodiak Boats” which registered for at least one fishery in 2004/05 registered for at least one fishery in 2005/06 (Table III-2 and Figure III-1).

Between 2004/05 and 2005/06, the total number of “Kodiak Boats” registering for the Bristol Bay Red King Crab fishery fell from 54 to 23 (a decline of 57%), and the total number of vessels registering for the Bering Sea Snow Crab fishery fell from 38 to 19 (a decline of 50%).

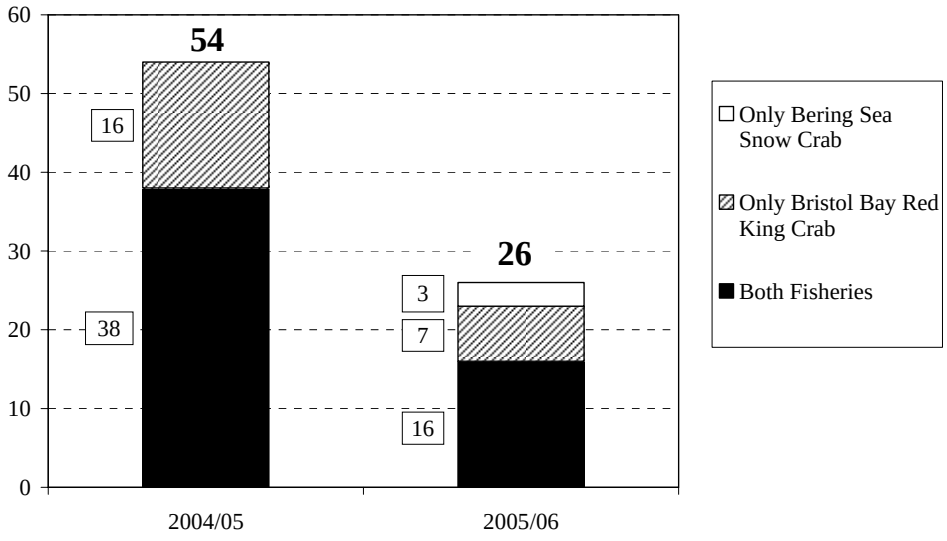
Table III-6
Number of "Kodiak Boats" Which Registered for the Bristol Bay Red King Crab and Bering Sea Snow Crab Fisheries in 2004/05 and 2005/06

	2004/05	2005/06	2004/05	2005/06	Change	% Change
Either Fishery: TOTAL	**54**	**26**	**100%**	**48%**	**-28**	**-52%**
Bristol Bay Red King Crab: TOTAL	54	23	100%	43%	-31	-57%
Bering Sea Snow Crab: TOTAL	38	19	70%	35%	-19	-50%
Both Fisheries	38	16	70%	30%	-22	-58%
Only Bristol Bay Red King Crab	16	7	30%	13%	-9	-56%
Only Bering Sea Snow Crab	0	3	0%	6%	3	
Neither Fishery	0	28	0%	52%	28	

Note: A total 54 "Kodiak Boats" registered for at least one fishery in 2004/05.

Figure III-2

Number of "Kodiak Boats" Which Registered for the Two Major BSAI Crab Fisheries, 2004/05 & 2005/06



Not all of the decline in vessel participation in the 2004/05 BSAI crab fisheries is attributable to rationalization. As shown in Table III-7, of the vessels which registered for either of the two 2004/05 major BSAI crab fisheries, 155 did not register for either fishery in 2005/06. Of these 155 vessels, 23 were "bought out" under the buyback program, one of which was a Kodiak Boat. In addition, one "Kodiak Boat," the Big Valley, was lost at the start of the 2004/05 Bering Sea Snow Crab season. The remaining 131 boats which did not register left the crab fishery for other reasons—which were presumably associated with crab rationalization.

Based on this reasoning, crab rationalization accounted for about 85% of the decline in the number of vessels registering for the Bristol Bay Red King Crab season, and 99% of the decline in the number of vessels registering for the Bering Sea Snow Crab season. Similarly, crab rationalization accounted for about 94% of the decline in the number of "Kodiak Boats" registering for the Bristol Bay Red King Crab season, and 95% of the decline in the number of "Kodiak Boats" registering for the Bering Sea Snow Crab season.

Table III-7
Reasons for Changes in Fishery Participation Between 2004/05 and 2005/06

				Did not register in 2005/06					
		Registered in 2004/05	Also registered in 2005/06	Total	Bought out	Lost during 2004/05 season	Other reasons (presumably rationalization)	*% bought out or lost*	*% other reasons (presumably rationalization)*
All vessels	Either fishery	254	99	155	23	1	131	*15%*	*85%*
	Bristol Bay Red King Crab	251	89	162	23	1	138	*15%*	*85%*
	Bering Sea Snow Crab*	169	76	97	0	1	96	*1%*	*99%*
"Kodiak Boats"	Either fishery	54	26	28	1	1	26	*7%*	*93%*
	Bristol Bay Red King Crab	54	23	31	1	1	29	*6%*	*94%*
	Bering Sea Snow Crab	38	19	19	0	1	18	*5%*	*95%*
Non-Kodiak Boats	Either fishery	200	73	127	22	0	105	*17%*	*83%*
	Bristol Bay Red King Crab	197	66	131	22	0	109	*17%*	*83%*
	Bering Sea Snow Crab*	131	57	78	0	0	78	*0%*	*100%*

*Four vessels registered for the Bering Sea Snow Crab Fishery in 2005/06 which had not registered in 2004/05. None of these were "Kodiak Boats."

Table III-8 below summarizes the data on which the analysis in this chapter of "Kodiak Boat" registration for major Bering Sea crab fisheries is based.[10]

Table III-8
"Kodiak Boat" Registration for Major Bering Sea Crab Fisheries, 2004/05 and 2005/06

		2004/05		2005/06	
Vessel Name	ADF&G#	Bristol Bay Red King Crab	Bering Sea Snow Crab	Bristol Bay Red King Crab	Bering Sea Snow Crab
Atlantico	37	X	X	X	X
Provider	58	X	X	X	X
Nordic Viking	8500	X	X	X	X
Mar Del Sud	21652	X	X	X	X
Trailblazer	33704	X	X	X	X
Obsession	34374	X	X	X	X
Determined	35306	X	X	X	X
Seabrooke	36800	X	X	X	X
Big Blue	37241	X	X	X	X
Four Daughters	41444	X	X	X	X
Storm Bird	46854	X	X	X	X
Cornelia Marie	59109	X	X	X	X
Silver Spray	60860	X	X	X	X
Lady Alaska	61351	X	X	X	X
Island Mist	61791	X	X	X	X
Handler	62436	X	X	X	X
Kodiak	3525	X	X	X	
Alaska Challenger	4100	X	X	X	
Melanie	20363	X	X	X	
Nuka Island	35640	X	X	X	
Botany Bay	45066	X	X	X	
Incentive	63000	X	X	X	
Alaska Spirit	35949	X	X		X
Viekoda Bay	57971	X	X		X
Guardian	61571	X	X		X
Big Valley**	23460	X	X		
Icelander	2	X	X		
Lady Helen	16	X	X		
Pacific Venture	986	X	X		
Saga	11022	X	X		
Lady Kiska	35522	X	X		
Katrina Em	38972	X	X		
Mary J	40217	X	X		
Lady Aleutian	41715	X	X		
Pacific Star	59521	X	X		
Alicia Jean	60865	X	X		
Lady Kodiak	61352	X	X		
Perseverance	63219	X	X		
Elizabeth F	14767	X		X	
American Way*	47839	X			
Buccaneer	25	X			
Ruff & Reddy	53	X			
Marcy J	55	X			
Midnite Sun	65	X			
Lucky Lady	6485	X			
Cougar	6700	X			
Irene H	6710	X			
Chisik Island	12512	X			
Jeanoah	14963	X			
Alpine Cove	30100	X			
Argosy	38547	X			
North Point	53800	X			
Katherine	58133	X			
Ocean Bay	68008	X			

*Bought out in crab vessel buyback program. **Lost during 2004/05 Bering Sea Snow Crab season.

[10] In June 2006 I plan to revise this draft preliminary analysis to address review comments and questions. I invite comments on the list of "Kodiak Boats," as well as corrections to any errors this table may contain. I may be contacted at 907-786-7717 or Gunnar.Knapp@uaa.alaska.edu.

IV. EFFECTS OF RATIONALIZATION ON KODIAK CRAB FISHING JOBS

In this chapter, I estimate effects of rationalization on Kodiak crab fishing jobs and days worked in crab fishing. This involves several steps, which are summarized in Table IV-1. Each step requires making assumptions. Some of these assumptions are uncertain because the information on which to base them is limited.

Table IV-1
Steps in Estimating Changes in Kodiak Crab Fishing Jobs and Days Worked

Step	Key Assumptions	Quality of Information on Which to Base Assumptions
Estimate total changes in jobs on Kodiak Boats and other boats	Average jobs per boat before and after rationalization	Medium: No data are available on average crew size before or after rationalization,but anecdotal evidence is fairly consistent. It is uncertain whether average crew sizes have changed.
Estimate change in jobs for Kodiak residents	Percentage of jobs held by Kodiak residents on "Kodiak Boats" and on Non-Kodiak Boats	Low. We don't have any reliable data on where crew live. We do have data however on where crab permit holders (usually captains) live.
Estimate changes in days worked	Days worked per crab fishing job	Low. Available ADFG data on "average fishing days" are preliminary. No data are available on average days spent in transit, in port between landings, or working in Kodiak before and after the season.

In this chapter, I begin by using "best guess" assumptions for each step in order to develop "best guess" estimates of effects of rationalization on Kodiak jobs. Then I show how changing different assumptions changes the estimated effects of rationalization on Kodiak jobs and hours worked.

For this study, I use the term "job" to refer to working on a crab fishing boat for a season for a particular BSAI crab fishery. The job includes not only days spent fishing but also work done in port before and after the season as well as transit time to the Bering Sea. In previous seasons these were relatively short-term jobs, lasting a few weeks of very hard work. With rationalization crab fishing jobs last longer (and vary considerably in how long they last, because boats vary in how much quota they catch and how long they fish for it).

I did not have any data on how many people work on Bering Sea crab boats. Most people I talked with told me that most Bering Sea crab boats fish with either 5 or 6 people working on board (captain and crew total). As a starting "best guess" I assumed an average of 5.5 crab fishing jobs per vessel. To estimate total crab fishing jobs before and after rationalization, I multiplied the number of vessels fishing by 5.5.[11]

During the 2005/06 season, some boats which had fished for BSAI crab in earlier seasons participated in other fisheries—in effect creating new jobs in those fisheries. I haven't estimated how many of these new jobs were created because I did not have any data on

[11] With rationalization, the number of people working on some boats declined. Later in this chapter, I show how assuming a lower average crew size after rationalization would affect the estimated loss in jobs.

how many boats which left the crab fishery participated in other fisheries. To the extent that new jobs were created in other fisheries, my analysis overstates fishing job losses due to rationalization. Note, however, that earnings from working in other fisheries were probably less than earnings had been in the crab fisheries.

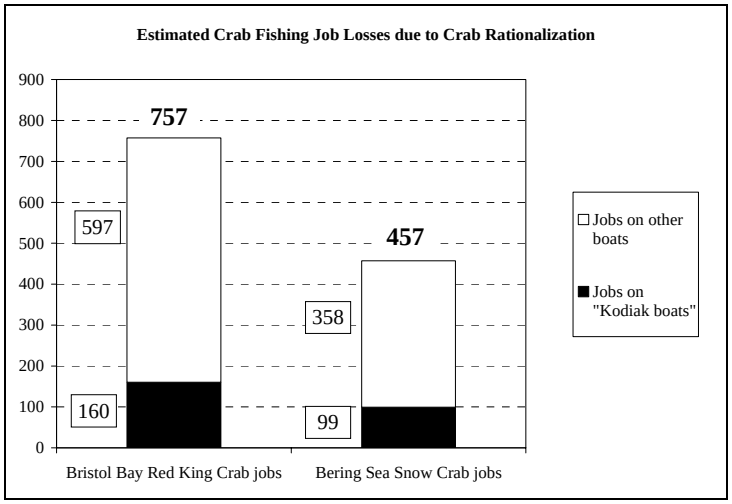
Assuming an average of 5.5 jobs per vessel, the decline in the number of boats fishing between 2004/05 and 2005/06 resulted in a loss of 891 total jobs in the Bristol Bay Red King Crab fishery and 462 jobs in the Bering Sea Snow Crab fishery. Adjusting for the percentage of the decline in vessel participation attributable to rationalization (rather than buyback and vessel losses), rationalization resulted in an estimated loss of 757 total jobs in the BBR fishery, of which 160 were on "Kodiak Boats," and an estimated loss of 457 total jobs in the BSS fishery, of which 99 were on "Kodiak Boats." (Table IV-1, Figure IV-1)

Table IV-2
Estimated Job Losses in Major BSAI Crab Fisheries Between 2004/05 and 2005/06

		Bristol Bay Red King Crab Fishery			Bering Sea Snow Crab Fishery		
		Total	"Kodiak Boats"	Other Boats	Total	"Kodiak Boats"	Other Boats
Number of vessels	2004/05	251	54	197	164	38	126
	2005/06	89	23	66	80	19	61
	Change	-162	-31	-131	-84	-19	-65
Estimated fishing jobs	2004/05	1381	297	1084	902	209	693
	2005/06	490	127	363	440	105	336
	Change	-891	-171	-721	-462	-105	-358
% of job losses attributable to rationalization*		85%	94%	83%	99%	95%	100%
Estimated job losses due to rationalization		**757**	**160**	**598**	**457**	**99**	**358**

Note: Assumes average of 5.5 jobs per vessel. *Based on percentage of vessels not registering in 2005/06 for reasons other than buyback or vessel loss (see Table III-7 for derivation). Totals may not add exactly due to rounding.

Figure IV-1



The number of jobs lost by Kodiak residents is different from the loss of jobs on "Kodiak boats"—because not everyone working on a Kodiak boat is a Kodiak resident, and some Kodiak residents work on non-Kodiak boats. To estimate job losses for Kodiak residents, I had to adjust for percentage of jobs held by Kodiak residents. There are no data where crab fishing crew live, or the extent the people who work on Kodiak Boats are Kodiak residents. However, data are available on where crab permit-holders live.[12] I used the percentage of 2004/05 permit-holders who were Kodiak residents (Tables IV-3 through IV-6) as "best guess" assumptions for how many crab jobs were held by Kodiak residents.

Table IV-3
Residence of Bristol Bay Red King Crab Fishery Permit Holders, 2004/05

		"Kodiak Boats"	Other Boats	Total
Permit holder residence	Kodiak	35	4	39
	Other communities	19	191	210
	Unknown		2	2
	Total	54	197	251
% Kodiak residents		65%	2%	16%

Source: Based on permit holder residency reported in CFEC Permit Holder Database 2004.

Table IV-4
Residence of Bristol Bay Red King Crab Fishery Permit Holders, 2005/06

		"Kodiak Boats"	Other Boats	Total
Permit holder residence	Kodiak	12		12
	Other communities	11	65	76
	Unknown		1	1
	Total	23	66	89
% Kodiak residents		52%	0%	13%

Source: Based on permit holder residency reported in CFEC Permit Holder Database 2005.

Table IV-5
Residence of Bering Sea Snow Crab Fishery Permit Holders, 2004/05

		"Kodiak Boats"	Other Boats	Total
Permit holder residence	Kodiak	19	2	21
	Other communities	19	126	145
	Unknown		3	3
	Total	38	131	169
% Kodiak residents		50%	2%	12%

Source: Based on permit holder residency reported in CFEC Permit Holder Database 2005.

Table IV-6
Residence of Bering Sea Snow Crab Fishery Permit Holders, 2005/06

		"Kodiak Boats"	Other Boats	Total
Permit holder residence	Kodiak	10		10
	Other communities	9	60	69
	Unknown		1	1
	Total	19	61	80
% Kodiak residents		53%	0%	13%

Source: Based on permit holder residency reported in CFEC Permit Holder Database 2005. Note: Actual permit holders may have differed for this fishery, which took place in 2006.

[12] Every vessel delivering crab must have an ADFG permit holder on board, who signs the fish ticket. The permit holder is usually the vessel captain.

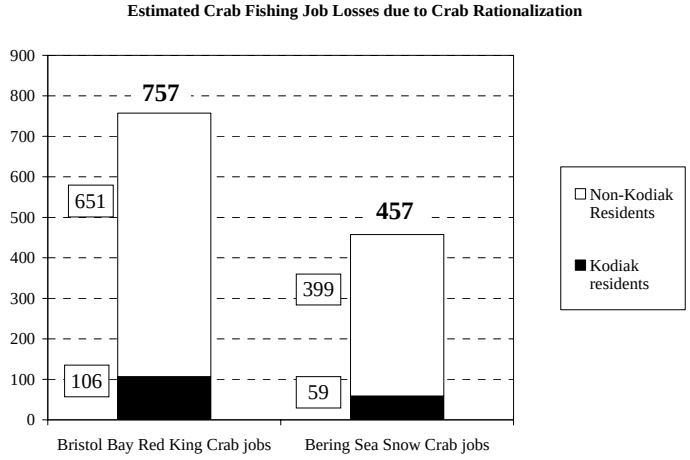
During the 2004/05 season, about two-thirds (65%) of the permit holders on "Kodiak Boats" in the BBR fishery were Kodiak residents, and half (50%) of the permit holders in the BSS fishery were Kodiak residents. Only 2% of the permit holders on other boats were Kodiak residents. Assuming similar Kodiak residency shares for all the jobs on crab fishing vessels, rationalization resulted in an estimated loss of 104 jobs for Kodiak residents in the BBR fishery and 59 jobs for Kodiak residents in the BSS fishery (Table IV-7 and Figure IV-2).

Table IV-7
Estimated Crab Fishing Job Losses of Kodiak Residents Between 2004/05 and 2005/06

		Bristol Bay Red King Crab Fishery			Bering Sea Snow Crab Fishery		
		Total	"Kodiak Boats"	Other Boats	Total	"Kodiak Boats"	Other Boats
Number of vessels	2004/05	251	54	197	164	38	126
	2005/06	89	23	66	80	19	61
Estimated fishing jobs*	2004/05	1381	297	1084	902	209	693
	2005/06	490	127	363	440	105	336
Assumed residency (%)**	Kodiak residents		65%	2%		50%	2%
	Non-Kodiak residents		35%	98%		50%	98%
Estimated fishing jobs in 2004/05, by residency	Total	1381	297	1084	902	209	693
	Kodiak residents	**215**	**193**	**22**	**118**	**105**	**14**
	Non-Kodiak residents	1166	104	1062	784	105	679
Estimated fishing jobs in 2005/06, by residency	Total	490	127	363	440	105	336
	Kodiak residents	**89**	**82**	**7**	**59**	**52**	**7**
	Non-Kodiak residents	400	44	356	381	52	329
Estimated loss of fishing jobs, by residency	Total	891	171	721	462	105	358
	Kodiak residents	**125**	**111**	**14**	**59**	**52**	**7**
	Non-Kodiak residents	766	60	706	403	52	350
Estimated job losses attributable to rationalization	Percentage***	85%	94%	83%	99%	95%	100%
	Total	757	160	598	457	99	358
	Kodiak residents	**106**	**104**	**12**	**59**	**50**	**7**
	Non-Kodiak residents	651	56	586	399	50	350

*Assumes average of 5.5 jobs per vessel.
*Based on residency of vessel permit holders calculated in Tables IV-2 and IV-4.
***Based on percentage of vessels not registering in 2005/06 for reasons other than buyback or vessel loss (see Table III-7 for derivation). Totals may not add exactly due to rounding.

Figure IV-2



The estimates shown in Table IV-7 of crab fishing job losses due to rationalization are based on several "best guess" assumptions. Table IV-8 shows how changing some of these assumptions changes the estimates of job losses due to rationalization.

Table IV-8
Effects of Different Assumptions on Estimated Job Losses due to Rationalization

		"Best guess" assumptions	Alternative Assumptions				
			A	B	C	D	F
Assumptions*							
Average jobs per vessel	2004/05	5.5	**6.0**	5.5	5.5	5.5	**6.0**
	2005/06	5.5	**5.0**	5.5	5.5	5.5	**5.0**
Kodiak resident share of jobs on Kodiak Boats, BBR	2004/05	65%	65%	65%	**75%**	65%	**75%**
	2005/06	65%	65%	**52%**	**75%**	65%	**75%**
Kodiak resident share of jobs on Kodiak Boats, BSS	2004/05	50%	50%	50%	**75%**	50%	**75%**
	2005/06	50%	50%	**53%**	**75%**	50%	**75%**
Kodiak resident share of jobs on other boats, BBR	2004/05	2%	2%	2%	**5%**	2%	**5%**
	2005/06	2%	2%	**0%**	**5%**	2%	**5%**
Kodiak resident share of jobs on other boats, BSS	2004/05	2%	2%	2%	**5%**	2%	**5%**
	2005/06	2%	2%	**0%**	**5%**	2%	**5%**
% of job losses attributable to rationalization	Kodiak boats, BBR	94%	94%	94%	94%	**100%**	**100%**
	Other boats, BBR	83%	83%	83%	83%	**100%**	**100%**
	Kodiak boats, BSS	95%	95%	95%	95%	**100%**	**100%**
	Other boats, BSS	100%	100%	100%	100%	**100%**	**100%**
Estimated job losses due to rationalization							
Kodiak Residents	**BBR**	**106**	**116**	**127**	**139**	**125**	**179**
	BSS	**59**	**64**	**62**	**95**	**59**	**105**
Non-Kodiak Resident	BBR	651	710	631	618	766	793
	BSS	399	435	395	362	403	399
Total	BBR	757	826	757	757	891	972
	BSS	457	499	457	457	462	504

Those assumptions which are different from the "best guess assumptions are shown in **bold.**

Alternative Assumptions A. If we assume that the average jobs per vessel decreased from 6.0 to 5.0 (rather than staying constant at 5.5) then the estimated Kodak resident job loss due to rationalization increases from 106 to 116 for the BBR fishery and from 59 to 64 for the BSS fishery.

Alternative Assumptions B. If we assume that the share of crab jobs held by Kodiak residents in 2005/06 was equal to the share of permit holders on vessels in 2005/06 (rather than to the share of permit holders on vessels in 2004/06), then the estimated Kodiak resident job loss increases to 127 for the BBR fishery and 62 for the BBS fishery.

Alternative Assumptions C. If we assume higher Kodiak resident shares of crab fishing jobs of 75% of jobs on Kodiak boats and 5% of jobs on other boats, for both fisheries in both years, then the estimated Kodiak resident job loss increases to 139 for the BBR fishery and 95 for the BSS fishery.

Alternative Assumptions D. If we assume that 100% of job losses are due to rationalization, then the estimated Kodiak resident job loss increases to 125 for the BBR fishery but stays the same for the BSS fishery.

Alternative Assumptions E. If we use the A, C and D assumptions together, then the estimated Kodiak resident job loss increases to 179 for the BBR fishery and 105 for the BSS fishery. I would consider this a maximum or upper-bound estimate of the Kodiak crab fishing job losses attributable to rationalization.

Many people have pointed out to me that, although rationalization caused a dramatic decline in the number of crab fishing jobs, it was important to keep in mind that the remaining jobs lasted longer. Clearly the total amount of work being done in the crab fishery, as measured by the number of pots pulled and the volume of the crab harvest (shown in Tables II-5 and II-6), has not declined with rationalization.

As an alternative measure of the effects of rationalization on crab fishing employment, I estimated how the number of days worked in the fishery changed. To do this, I multiplied the estimated number of crab fishing jobs in 2004/05 and 2005/06 by "best guess" assumptions about the average days worked in 2004/05 and 2005/06.

The Alaska Department of Fish and Game has estimated that the average number of "days fished" in the BBR fishery increased from 3 days in 2004/05 to 26 days in 2005/06, and that the average number of "days fished" in the BSS fishery increased from 5 days in 2004/05 to 42 days in 2005/06. Note, however, that these estimates are preliminary and may change. Note also that the number of days fished varied widely for different vessels, reflecting variation in the total crab quota which they harvested.

The number of days worked in the crab fisheries is considerably higher than the number of days fished, if we include days working on the boat in port before and after the season, days transiting from Kodiak or other ports to the Bering Sea, days spent in Dutch Harbor or other Bering Sea ports delivering crab and loading or unloading pots, and days traveling between these ports and the fishing grounds. However, no data are available on how many days are spent in these other activities that are an integral part of crab fishing.

Table IV-9 (on the following page) shows the total days of work for BBR and BSS fishing jobs under alternative assumptions about days spent in these different crab fishing activities. For example, depending upon which assumptions we use, the total days worked per job in the BBR fishery may have been between 11 and 17 days in 2004/05 and between 34 and 44 days in 2005/06.

I used the numbers shown in **bold font** as "best guess" assumptions about average days worked in each fishery—but these should *not* be considered "precise" or "accurate."[13] Under these assumptions, in the BBR fishery days worked per job increased from 14 in 2004/05 to 39 in 2005/06, and in the BSS fishery days worked per job increased from 16 to 55. The ratio of days worked per job in 2005/06 to days worked per job in 2004/05 was 2.8 for the BBR fishery and 3.4 for the BSS fishery.

[13] Note that for purposes of estimating how rationalization affected total days worked, what really matters is what we assume about how the relative number of total days worked per job changed. For example, if the number of jobs decreased by two-thirds, the number of days worked would stay the same if the number of days worked per job tripled.

Table IV-9
Estimated Total Days of Work for Bering Sea Fishing Jobs, Under Alternative Assumptions

	Total days worked	Average days fishing*	Days working in port before and after season	Days in transit to and from Dutch Harbor	Days traveling to and from fishing grounds and unloading	Average number of landings*	Days traveling to and from fishing grounds and unloading per landing
Bristol Bay Red King Crab Fishery, 2004/05	11	3	4	4	0	1.1	0
	12	3	4	4	1	1.1	1
	13	3	4	4	2	1.1	2
	13	3	6	4	0	1.1	0
	14	**3**	**6**	**4**	**1**	**1.1**	**1**
	15	3	6	4	2	1.1	2
	15	3	8	4	0	1.1	0
	16	3	8	4	1	1.1	1
	17	3	8	4	2	1.1	2
Bristol Bay Red King Crab Fishery, 2005/06	34	26	4	4	0	3.0	0
	37	26	4	4	3	3.0	1
	40	26	4	4	6	3.0	2
	36	26	6	4	0	3.0	0
	39	**26**	**6**	**4**	**3**	**3.0**	**1**
	42	26	6	4	6	3.0	2
	38	26	8	4	0	3.0	0
	41	26	8	4	3	3.0	1
	44	26	8	4	6	3.0	2
Bering Sea Snow Crab Fishery, 2004/05	13	5	4	4	0	1.2	0
	14	5	4	4	1	1.2	1
	15	5	4	4	2	1.2	2
	15	5	6	4	0	1.2	0
	16	**5**	**6**	**4**	**1**	**1.2**	**1**
	17	5	6	4	2	1.2	2
	17	5	8	4	0	1.2	0
	18	5	8	4	1	1.2	1
	19	5	8	4	2	1.2	2
Bering Sea Snow Crab Fishery, 2005/06	50	42	4	4	0	3.4	0
	53	42	4	4	3	3.4	1
	57	42	4	4	7	3.4	2
	52	42	6	4	0	3.4	0
	55	**42**	**6**	**4**	**3**	**3.4**	**1**
	59	42	6	4	7	3.4	2
	54	42	8	4	0	3.4	0
	57	42	8	4	3	3.4	1
	61	42	8	4	7	3.4	2

*Based on ADFG estimates from Tables II-3 and II-4. 2005/06 estimates are preliminary.
Estimates shown in **bold** are used for Table IV-8.

Based on these assumptions about days worked per job, the total days or years worked by Kodiak residents in the BBR and BSS crab fisheries stayed about the same in 2005/06 as in 2004/05. Put differently, the loss in jobs was approximately offset by the increase in days worked per job. A smaller number of people worked at crab fishing jobs which lasted longer, and did about the same amount of work in about the same number of total days.

Table IV-10
Estimated Change in Years Worked in Major BSAI Crab Fisheries Between 2004/05 and 2005/06
(A Very Rough Approximation for Purposes of Illustration)

		Bristol Bay Red King Crab Fishery			Bering Sea Snow Crab Fishery		
		Total	"Kodiak Boats"	Other Boats	Total	"Kodiak Boats"	Other Boats
Estimated fishing jobs*	2004/05	1381	297	1084	902	209	693
	2005/06	490	127	363	440	105	336
Work days per job**	2004/05		14	14		16	16
	2005/06		39	39		55	55
Total work days	2004/05	19327	4158	15169	14432	3344	11088
	2005/06	19091	4934	14157	24200	5748	18453
	Change	-237	776	-1012	9768	2404	7365
Total work years***	2004/05	81	17	63	60	14	46
	2005/06	80	21	59	101	24	77
	Change	-1	3	-4	41	10	31
Assumed residency (%)	Kodiak residents*		65%	2%		50%	2%
	Non-Kodiak residents		35%	98%		50%	98%
Estimated work year losses, 2004/05 to 2005/06	Total**	-1	3	-4	41	10	31
	Kodiak residents	2	2	0	6	5	1
	Non-Kodiak residents	-3	1	-4	35	5	30
Estimated work year losses attributable to rationalization	Percentage***	85%	94%	83%	99%	95%	100%
	Total**	-1	3	-3	40	10	31
	Kodiak residents	**2**	**2**	**0**	**6**	**5**	**1**
	Non-Kodiak residents	-3	1	-3	35	5	30

*From Table IV-2. **Based on assumptions shown in bold in Table IV-7. ***Assumes 48 5-day work weeks per year.
Note: Estimates of changes in work years for Kodiak residents in the bottom half of the table are based on the same assumptions used in Table IV-7.

V. EFFECTS OF RATIONALIZATION ON CRAB FISHING EARNINGS OF KODIAK CAPTAINS AND CREW

The previous chapter looked at the crab fishing jobs which were lost due to crab rationalization. This chapter looks at the crab fishing jobs which remain after crab rationalization.

As shown in Table V-1, in the first year of crab rationalization, the number of crab fishing jobs declined significantly. However, as was discussed in Chapter II, the total amount of work being done in the crab fisheries—as measured by the total harvest and the number of pots lifted—stayed about the same. This is reflected in the estimates of crab fishing work-years shown in Table V-1, which stayed about the same for the Bristol Bay Red King Crab fishery and increased for the Bering Sea Snow Crab fishery. These work-years estimates should be considered highly approximate. The important point to be drawn from them is that rationalization did not lead to a significant decline in work years.

Table V-1
"Best Guess" Estimates of Jobs and Work Years in Bering Sea Crab Fisheries, 2004/05 and 2005/06

		Estimated Number of Jobs			Assumed work days per job*	Estimated Work-Years**		
		Kodiak Residents	Non-Kodiak Residents	Total		Kodiak Residents	Non-Kodiak Residents	Total
2004/05	Bristol Bay Red King Crab	**215**	1166	1381	14	**13**	68	81
	Bering Sea Snow Crab	**118**	784	902	16	**8**	52	60
	Total	**333**	1949	2283		**20**	120	141
Change	Bristol Bay Red King Crab	**-125**	-766	-891	25	**2**	-3	-1
	Bering Sea Snow Crab	**-59**	-403	-462	39	**6**	35	41
	Total	**-185**	-1168	-1353		**8**	32	40
2005/06	Bristol Bay Red King Crab	**89**	400	490	39	**15**	65	80
	Bering Sea Snow Crab	**59**	381	440	55	**14**	87	101
	Total	**148**	781	930		**28**	152	180

*Assumed work days per job, and the estimates of work-years which are based on them, are based on limited preliminary information and should be considered highly approximate. **Estimated work-years are calculated based on the assumption that one work-year has 48 5-day weeks. Source: Estimates derived in Tables IV-7 and IV-9.

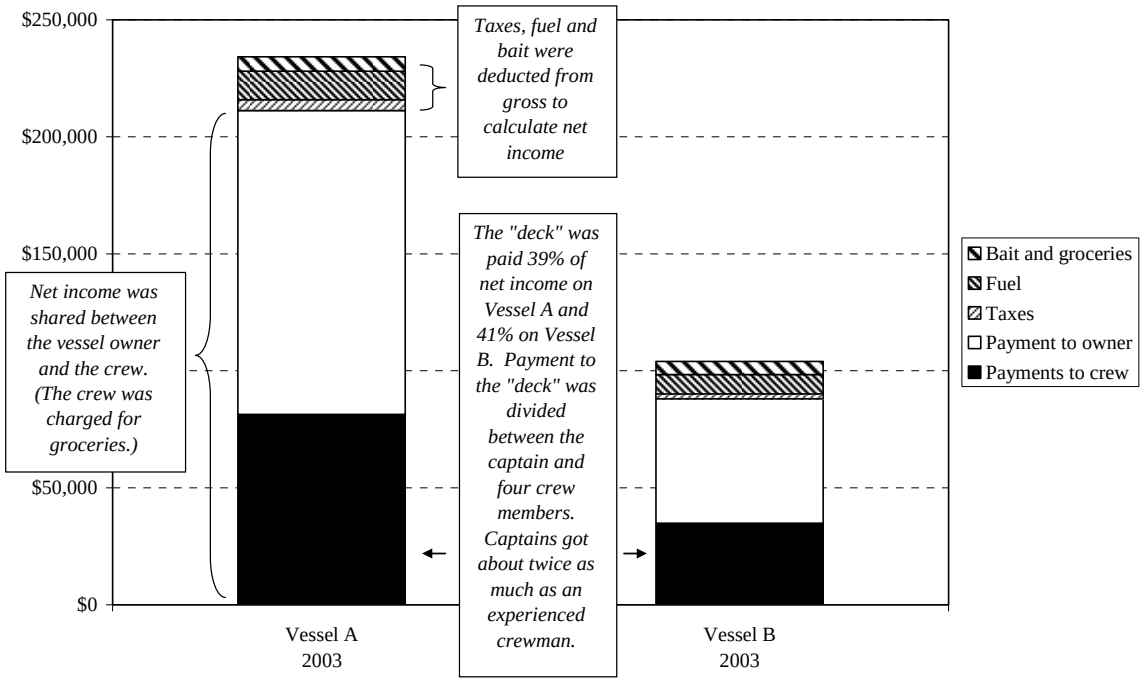
With much longer fishing seasons, most BSAI crab fishing jobs lasted much longer. In addition, there were other important changes in these jobs, particularly in how captains and crew were paid and what they earned.

To understand these changes, it is important first to understand how crab fishermen were typically paid prior to rationalization. On most boats, captains and crew were paid a share of net earnings after deducting taxes and costs of fuel and bait. After calculating individual shares, costs of groceries were also deducted from what fishermen were paid. The specific details of how payments were calculated varied from boat to boat, with regard to what costs were deducted before calculating net earnings, and the shares paid to individual captains and crew. Typically, however, the total share paid to the "deck" (everyone working on the boat) was about 40%:—somewhat higher on some boats, and somewhat lower on others.

Figure V-1 shows where gross earnings went for two Kodiak vessels for the 2003 Bristol Bay Red King crab season, based on copies of the crew settlement sheets provided by the vessel owner. Note that on these boats the "deck" received about 40% of net earnings. After deducting costs of taxes, fuel and bait, the payment to the "deck" was about 34% of the gross earnings.

Figure V-1

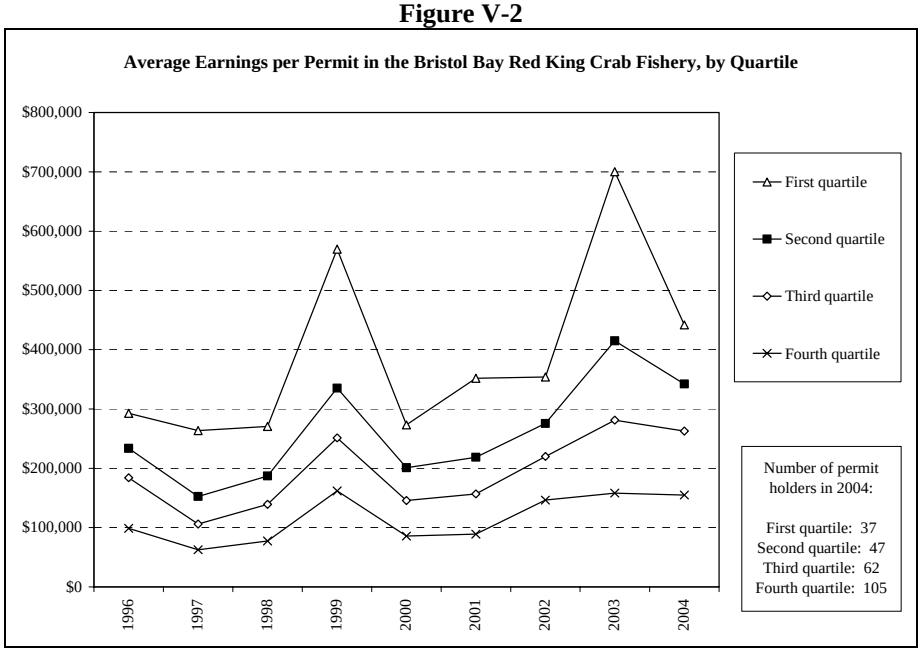
Where Gross Earnings Went for Two Kodiak Vessels in 2003



An obvious but important point illustrated by this graph is that the fishermen on Vessel B earned only about half as much for their season as those on Vessel A—because they only caught about half as much. Put simply, not all crab fishing jobs are the same. Fishermen on some boats earn much more than fishermen on other boats. This makes it more difficult to summarize how fishermen's earnings have been affected by rationalization.

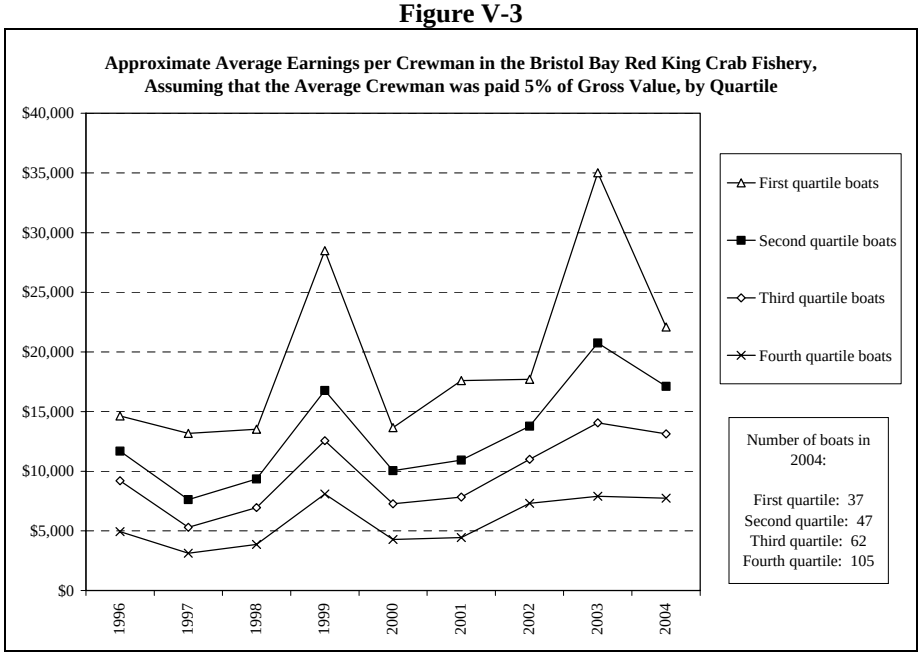
Figure V-2 (on the next page) makes the same point in a different way. It shows average earnings in the BSAI crab fishery prior to rationalization, by quartile group. Boats in each of the four quartile groups had approximately equal total earnings. This means that the 37 boats in the top quartile group in 2004 had average earnings almost three time as high as the 105 boats in the bottom quartile group.

Figure V-2



As a rough approximation, a "typical" crab fishing crewman might have been paid about 6% of a vessel's net earnings or about 5% of a vessel's gross earnings. Figure V-3 shows the implied average earnings for a "typical" crewman in each quartile group. Note that fishermen working on the boats in the top quartile group would have earned much more than those working on boats in the bottom quartile group.

Figure V-3



Note also that fishermen's earnings in the BSAI crab fisheries prior to rationalization varied widely from year to year, depending upon catches and ex-vessel prices. In addition, fishermen's earnings were uncertain or "risky." Before the season, crab

fishermen did not know how much money they were going to earn. If they boat caught a lot of crab, they might earn a lot. If the boat didn't catch a lot of crab, they might not earn much money at all. Reflecting this financial risk, as well as the physical difficulty and danger of the work, average earnings for BSAI crab fishermen were high for the few weeks of work, both compared to earnings in other fisheries as well as jobs on land.

In the first season of rationalization, the share system remained in place on most crab vessels, but with one important change. Of those vessels which fished, many fished for not only their own quota, but also additional quota leased from other vessel owners. On most vessels the lease payments to other vessel owners were deducted from gross earnings before calculating share payments to captains and crew.

In the Bristol Bay Red King Crab fishery, the typical quota lease rate was about 70% of ex-vessel value after taxes. In the Bering Sea Snow Crab fishery, the typical lease rate was about 50% of ex-vessel value after taxes. Deducting this large share of ex-vessel value before calculating share payments meant that captains and crew received a much smaller share of ex-vessel value for that portion of the vessel's catch for which the quota was leased.

On most vessels there was no corresponding deduction for that part of the vessel's catch for which the quota was owned by the vessel owner.[14] In effect, that meant that crew were paid differently for fishing quota owned by the vessel owner than for fishing leased quota. It also meant that their share of the total value of the boat's catch depended on the relative share of the catch for which the quota was leased.

How much quota leasing occurred, why it occurred, and what determined quota lease rates are important and complicated issues that are all well beyond the scope of this preliminary analysis. In the remainder on this chapter, I discuss in greater detail the implications of fleet consolidation and quota leasing for crab fishermen's earnings.

In considering the effects of rationalization for fishermen's earnings, it is useful to distinguish between boats in terms of the relative share of three kinds of quota in the boat's total catches. The greater the share of leased quota in the quota fished by the vessel, the greater the share of lease payments in the total value of the boat's catch, and the lower the share of value likely to be paid to fishermen.

Type of quota	Implications for deductions before calculating fishermen's shares
A. Quota awarded for the boat's historical catches	Imputed lease payment least likely to be deducted
B. Other quota owned by the same vessel owner	Imputed lease payment may be deducted
C. Quota leased by the vessel owner	Lease payment very likely to be deducted

[14] Keep in mind, as pointed out in the first chapter, that there is wide variation within the crab fisheries. What was deducted before calculating crew payments varied between vessels. On some vessels owners may have deducted imputed lease costs for their own quota. No data are currently available which would make it possible to quantify the extent to which deductions for different kinds of quota were made before calculating crew payments.

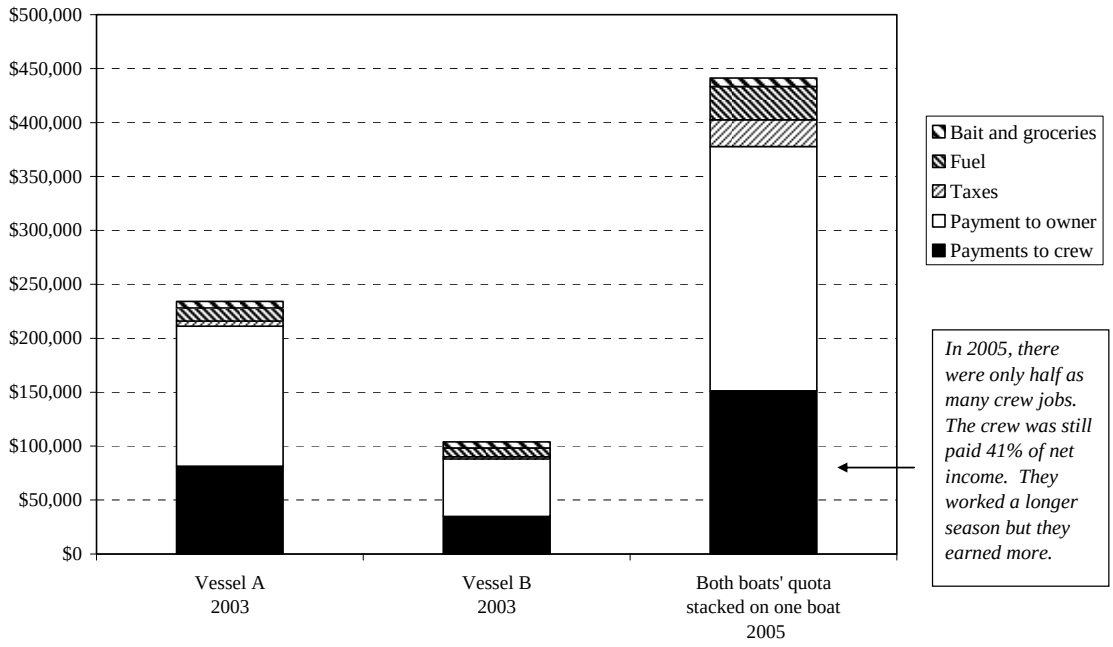
If a boat fished only for quota awarded to the owner for the boat's historical catches, and the vessel owner didn't deduct an imputed lease payment, then there may have been relatively little change in the boat's costs or the compensation paid to crew.

Some crab vessel owners own more than one boat. Rather than fish each vessel's quota separately, they used one boat to catch all of their own quota—but didn't lease any additional quota. This was done by the owner of the two Kodiak vessels for which the distribution of earnings in 2003 was shown above in Figure V-1.

As shown in Figure V-4, in 2005 the vessel owner chose to have one boat fish for boat boats' quota. The owner chose to continue to pay the crew for that boat the same shares, calculated in the same way. As a result, the crew continued to receive approximately the same share of ex-vessel value. The only change in the crew's share resulted from changes in taxes and fuel costs, which are discussed in greater detail below. If the only fleet consolidation occurring with rationalization had been of this type, with no quota lease payments and deductions, the smaller number of crab fishermen would have continued to receive a similar share of the total ex-vessel value.

Figure V-4

Comparison of Bristol Bay Red King Crab Earnings and Payments for an Owner of Two Kodiak Crab Vessels: 2003 and 2005



To examine the implications of quota leasing for crew earnings, I developed a simple "crab fishing model" of revenues and costs for a hypothetical crab boat. The model calculates the vessel's revenues, costs and payments with and without rationalization, and how revenues, costs and payments changes as the vessel leases more quota and catches more crab. I based the model's assumptions on estimates provided by the owner of a large crab vessel of the historical relationship between his vessel's total catch and costs of fuel, bait and groceries.

Table V-2 summarizes the model's assumptions. Tables V-3 and V-4 (on the following pages) show how the model calculations work, referring to the rows in Table V-2.

Table V-2
Summary of Crab Fishing Model Assumptions Used for Examples in This Chapter

		With and without rational-ization	Without rational-izaiton	With rational-ization	Row
Total quota for the fishery (pounds)		16,496,100			A
Ex-vessel price ($/lb)		$4.30			B
Fuel price ($/gallon)		$2.14			C
Fuel gallons/day	Fishing	800			D
	Running	1100			E
	Transit	1100			F
	Port	300			G
Fuel cost/day (= fuel price x	Fishing	$1712			H
	Running	$2354			I
	Transit	$2354			J
	Port	$642			K
Other costs/day	Bait (per fishing day)	$650			L
	Groceries (per day)	$200			M
	Repair & Maintenance (per operating day)	$1,000			N
	Other (per operating day)	$300			O
Vessel's fixed costs		$200,000			P
Total number of boats fishing for quota			251		Q
Average boat catch/day for fleet			15,000		R
Days	Running		2	2	S
	Transit		4	4	T
	In port		9	9	U
Vessel's catch per day (pounds)			20,000	20,000	V
Number of crew working on vessel			8		W
Crew share of net earnings	Total		41.0%		X
	Captain		15.0%		Y
	Crewman		6.0%		Z
Taxes	Fisheries landings tax rate		2.0%	2.0%	AA
	Buyback tax		1.9%	1.9%	AB
	Rationalization tax			1.5%	AC
	Arbitration fee per pound			$0.01	AD
Ratio of vessel owner's quota share to owner's catch share without				1.00	AE
Royalty charge for leased quota				70%	AF
Leased quota, expressed as % of TAC				(varies)	AG

Table V-3 shows the model's calculations for the vessel without rationalization: what its catch, gross revenues, and costs would have been, and what the resulting share payments to the crew and the vessel owner would have been.

The model calculations are complicated. I have included the formulas for the benefit of those readers who may wish to work through the details of the calculations, but most readers may wish to skip over these. In brief, without rationalization, the vessel's catch and its costs are driven by the number of days that the fishery is open. The longer the fishery is open, the greater the vessel's gross and net earnings, the greater the corresponding share payments to the crew and the vessel owner, and the greater the chance that the payment to the vessel owner will be sufficient to cover the owner's fixed costs, so that the operation is profitable.

Table V-3
Crab Fishing Model Calculations for the Vessel Without Rationalization

Variable		Value	Formula	Row*
Total fleet catch per day (pounds)		3,765,000	Q * R	a
Fleet fishing days		4.4	A / a	b
Days	Fishing	4.4	b	c
	Running	2.0	S	d
	Transit	4.0	T	e
	Port	9.0	U	f
Operating days (Fishing, Running, & Transit)		10.4	c + d + e	g
Total days (Fishing, Running, Transit & Port)		19.4	c + d + e + f	h
Vessel's catch per day (pounds)		20,000	V	i
Vessel's total catch (pounds)		87,629	V * c	j
Vessel's share of total catch		0.53%	j / A	k
Vessel's gross revenue		$376,803	j * B	l
Total tax rate		3.9%	AA + AB	m
Total taxes		$14,695	m * l	n
Vessel's fuel costs		$27,403	C * [D*c+E*d + F*e + G*f]	o
Vessel's bait costs		$2,848	L * c	p
Vessel's net earnings after taxes, fuel and bait costs		$331,857	l - (n + o + p)	q
Crew payments	Total	$136,061	X * q	r
	Captain	$49,779	Y * q	s
	Crewman	$19,911	Z * q	t
Grocery costs	Total grocery costs	$3,876	M * h	u
	Grocery costs per crew	$485	u / W	v
Crew payments after grocery cost deduction	Total	$132,185	r - v	w
	Captain	$49,294	s - v	x
	Crewman	$19,427	t - v	y
Payment to vessel		$195,796	q - w	z
Vessel costs	Repair & maintenance	$10,381	N * g	aa
	Other	$3,114	O * g	ab
	Fixed costs	$300,000	P	ac
	Total	$313,496	aa + ab + ac	ad
Vessel owner's profit		-$117,700	z - ad	ae

*Lower case letters refer to rows in the "calculations" tables; UPPER CASE letters refer to rows in the assumptions table.

Table V-4 shows the model's calculations for the vessel with rationalization, assuming that the vessel leases quota equal to 0.5% of the TAC. In brief, with rationalization, the vessel's catch and its costs are driven by the amount of quota that it fishes, and how much of that quota is leased. The more quota the vessel fishes, the greater the vessel's gross and net earnings, and the greater the corresponding share payments to the crew and the vessel owner—even though a large share of the value of leased quota goes to pay quota royalties.

Table V-4
Crab Fishing Model Calculations for the Vessel With Rationalization, Assuming the Vessel Leases Quota Equal to 0.5% of the TAC

Variable		Value	Formula	Row*
Owner quota (share of TAC)		0.53%	Assumed to be equal to the vessel's catch share without rationalization	af
Leased quota (share of TAC)		0.50%	Assumed	ag
Pounds harvested	Owner quota	87,629	af * A	ah
	Leased quota	82,481	ag * A	ai
	Total	170,109	ah + ai	j
Vessel's catch per day (pounds)		20,000	V	i
Days	Fishing	8.5	j / V	c
	Running	2.0	S	d
	Transit	4.0	T	e
	Port	9.0	U	f
Operating days (Fishing, Running, & Transit)		14.5	c + d + e	g
Total days (Fishing, Running, Transit & Port)		23.5	c + d + e + f	h
Vessel's gross revenue		$731,469	j * B	l
Total tax rate		5.4%	AA + AB + AC	m
Arbitration fee per pound		$0.01	AD	aj
Total taxes and fees		$41,200	m * l + aj * j	n
Quota royalties		$248,266	ai * B * (1 - m) - ai * aj	ak
Vessel's fuel costs		$34,463	C * [D*c+E*d + F*e + G*f]	o
Vessel's bait costs		$5,529	L * c	p
Vessel's net earnings after taxes, royalties, fuel & bait		$402,011	l - (n + o + p + ak)	q
Crew payments	Total	$164,824	X * q	r
	Captain	$60,302	Y * q	s
	Crewman	$24,121	Z * q	t
Grocery costs	Total grocery costs	$4,701	M * h	u
	Grocery costs per crew	$588	u / W	v
Crew payments after grocery cost deduction	Total	$160,123	r - v	w
	Captain	$59,714	s - v	x
	Crewman	$23,533	t - v	y
Payment to vessel		$237,186	q - w	z
Vessel costs	Repair &	$14,505	N * g	aa
	Other	$4,352	O * g	ab
	Fixed costs	$300,000	P	ac
	Total	$318,857	aa + ab + ac	ad
Vessel owner's profit		-$81,671	z - ad	ae

*Lower case letters refer to rows in the "calculations" tables; UPPER CASE letters refer to rows in the assumptions table.

The vessel catches, revenues, costs and payments calculated by the crab fishing model are not necessarily representative for vessels in the BSAI crab fisheries. They are more likely to be representative for large vessels. However, the general nature of the effects of rationalization on payments illustrated by the model is likely to be similar for vessels of all sizes.

Figure V-5 shows the model calculations for how the vessel's revenues and payments change as it leases progressively greater amounts of quota. Note that the model assumes that the vessel owner's own quota is equal to what he would have caught in a derby fishery before rationalization. Although this is probably not the case for most vessel owners, it allows the model to focus specifically on the effects of quota leasing. The model also assumes that the vessel owner pays crew in the same way as before rationalization for fishing his own quota. (This was not necessarily the case for all boats).

If the vessel doesn't lease any quota, its costs and payments are almost the same as in the non-rationalized ("derby") fishery. The only difference is that its taxes are higher, because of the new rationalization tax (1.5% of ex-vessel value) and the arbitration fee of $0.01/lb.

The more quota share the vessel leases--expressed as a share of the TAC—the more crab it catches and the higher its total revenues. Quota royalties increase because 70% of the revenues from leased quota go to pay for royalties. Payments to crew and the vessel owner also increase, but by much smaller amounts.

Figure V-5

Distribution of Total Vessel Revenues for Different Levels of Quota Leasing: Bristol Bay Red King Crab Fishery

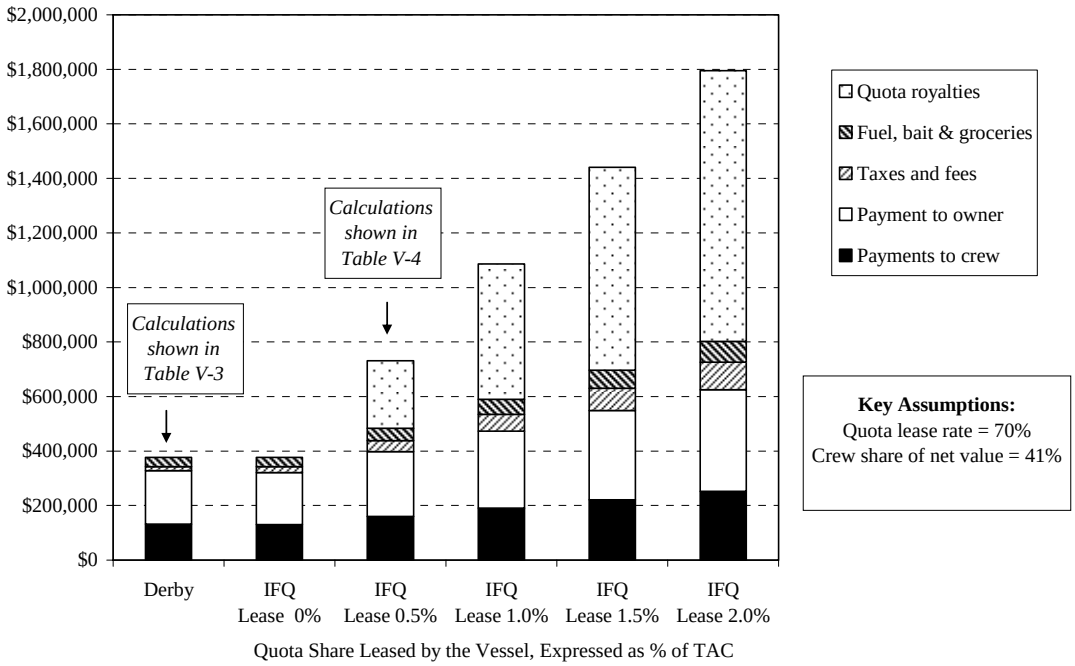
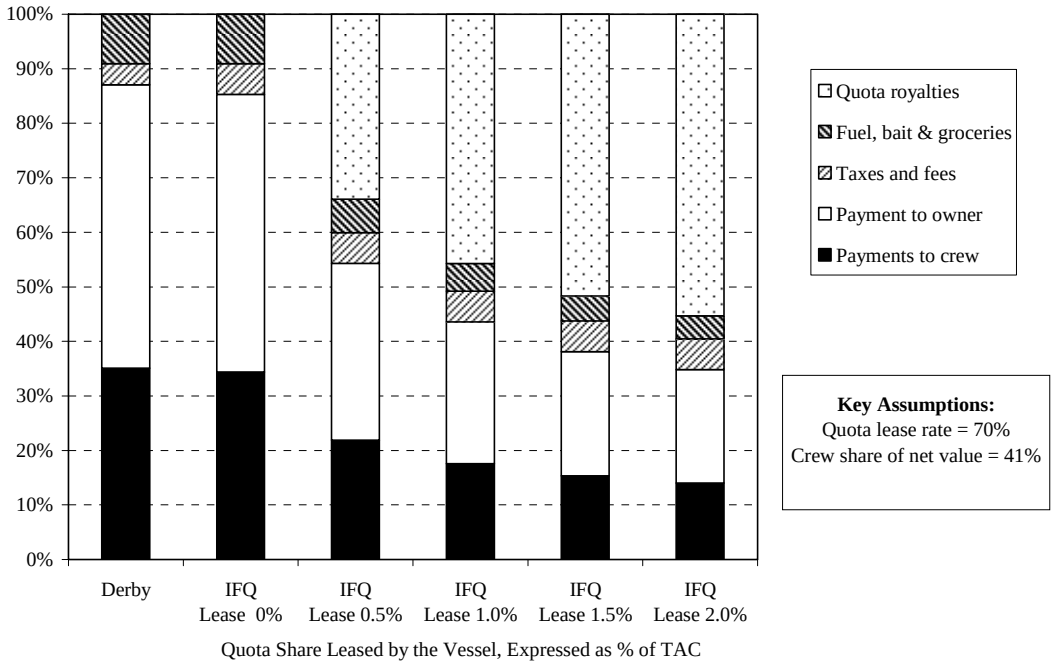


Figure V-6 shows how the percentage shares of different kinds of payments in the vessel's total revenue change as the volume of quota leased increases. As the vessel leases more quota, the share of quota royalties in total revenues increases, and the shares of payments to crew and payments to vessel owners decline. If the vessel leases no quota, the total crew share is 34% of ex-vessel value. If the vessel leases quota equal to 1% of the TAC, the total crew share falls to 18% of ex-vessel value.

Figure V-6

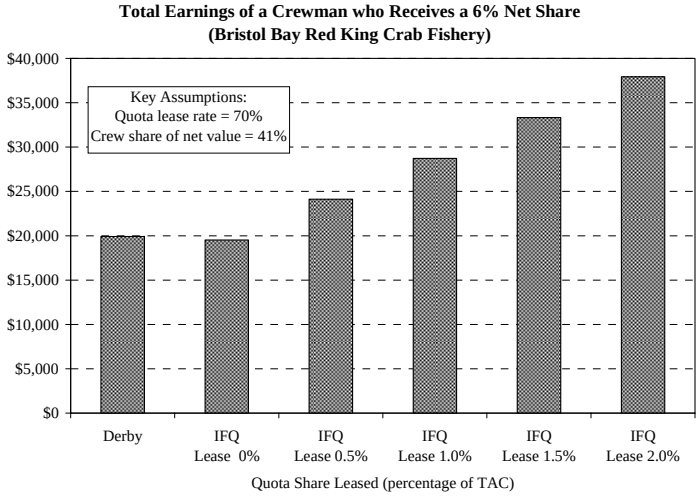
Percentage Distribution of Total Vessel Revenues for Different Levels of Quota Leasing: Bristol Bay Red King Crab Fishery



Figures V-7 through V-12 (on the following two pages) illustrate other projections of the model for how payments in the fishery change as the volume of quota leased by the vessel increases.

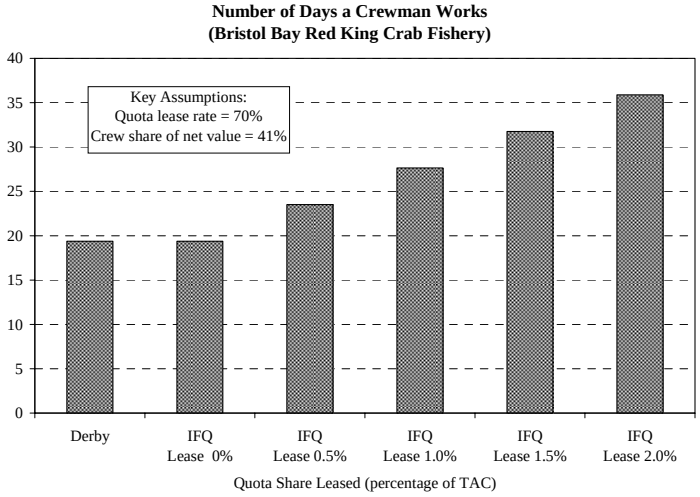
As a vessel leases and fishes more quota, a crewman's total earnings increase. (Table V-7)

Figure V-7



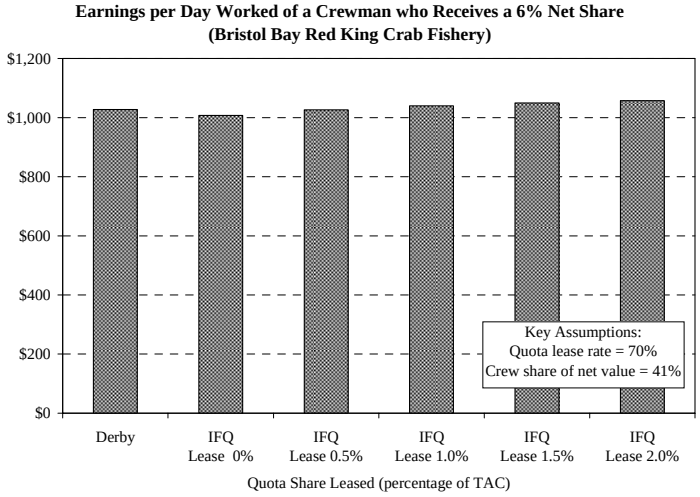
As the vessel leases and fishes more quota, the total days worked by a crewman also increase (Figure V-8).

Figure V-8



Under the assumptions of this model, as a vessel leases and fishes more quota, a crewman's earnings increase by about the same relative amount as the number of days worked—so that his earnings per day worked remain about the same (Figure V-9). If we made different assumptions about the number of days spent working in port and in transit, earnings per day worked could increase or decrease.

Figure V-9



If all boats which fished owned and leased identical amounts of quota, then the more each individual boat leases, the smaller the fleet and the fewer the total jobs in the fishery (Figure V-10). The number of boats and jobs projected by the model would be roughly similar to what occurred in the 2005/05 fishery at an average quota lease share between 0.5% and 1.0% of TAC.

If all boats which fished owned and leased identical amounts of quota, then the more each individual boat leases, the greater the share of the total quota which would be leased, the smaller the share of total value of the fishery which would be paid to crew, and the smaller total crew earnings (Figure V-11)

As the vessel owner leases more quota, the payments to the vessel owner (net of royalties, taxes, fuel and bait and grocery costs, and payments to crew) increase at a faster rate than the vessel owner's costs. As a result, the vessel owner's profits increase (Figure V-12). In this example the vessel owner loses money if he doesn't lease quota. It is only by leasing at least some quota that he is able to make a profit. Note that the estimated profit is highly sensitive to what we assume about the vessel owner's fixed costs.

Figure V-10

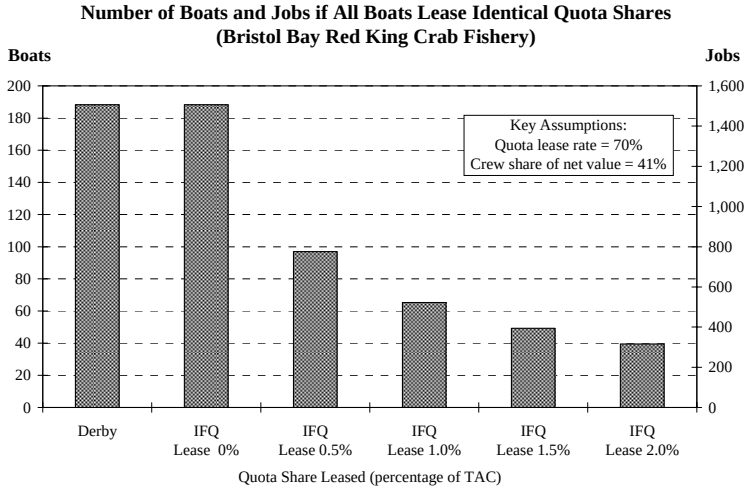


Figure V-11

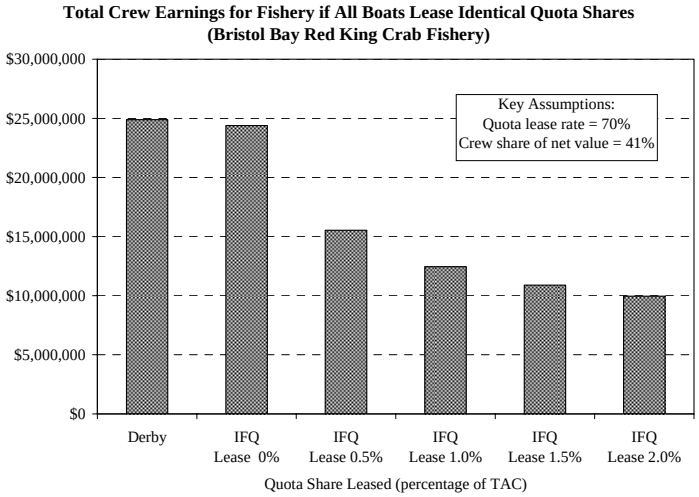
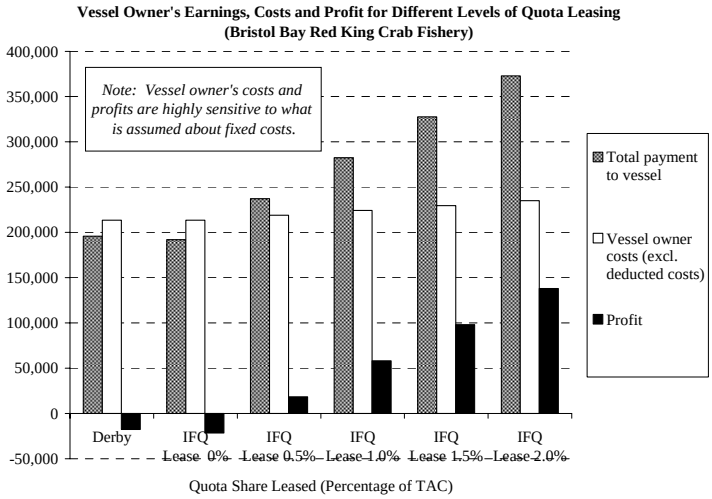


Figure V-12



As noted above (discussion of Figure V-10) the total number of boats and jobs projected by the crab fishing model would be roughly similar to the actual total number of boats and jobs in the 2005/06 Bristol Bay Red King Crab fishery at an average quota lease share between 0.5% and 1.0% of TAC. We may use the crab fishing model's projections of the distribution of revenue in the fishery for these two average quota lease shares to derive a rough estimate of how rationalization may have affected total payments to captains and crew in the 2005/06 Bristol Bay Red King Crab fishery.

Table V-5 shows the model's projections for the percentage distribution of ex-vessel value for these two average quota lease shares, and the corresponding projected payments from the 2005/06 Bristol Bay Red King Crab fishery ex-vessel value of $70.9 million. At an average quota lease share of 0.5% of TAC, total payments to captains and crew would have declined from $24.9 million (without rationalization) to $15.5 million (with rationalization). At an average quota lease share of 1.0% of TAC, total payments to captains and crew would have declined from $24.9 million (without rationalization) to $12.5 million (with rationalization).

Table V-5
Model Projections of the Distribution of Bristol Bay Red King Crab Revenues With and Without Rationalization, Under Alternative Assumptions About the Average Quota Lease per Vessel

		Share of Ex-Vessel Value		Payments ($ millions)			
	Payment to	Without rational-ization	With rational-ization	Without rational-ization	With rational-ization	Change	% change in payments
Assuming average quota lease share of 0.5% of TAC	Total Ex-Vessel Value	100.0%	100.0%	70.9	70.9	0.0	0%
	Taxes & fees	3.9%	5.6%	2.8	4.0	1.2	44%
	Quota Share Holders		33.9%		24.1	24.1	
	Costs (Fuel, Bait & Groc.)	9.1%	6.1%	6.4	4.3	-2.1	-33%
	Vessel Owners	52.0%	32.4%	36.9	23.0	-13.9	-38%
	Captains and Crew	**35.1%**	**21.9%**	**24.9**	**15.5**	**-9.4**	**-38%**
Assuming average quota lease share of 1.0% of TAC	Total Ex-Vessel Value	100.0%	100.0%	70.9	70.9	0.0	0%
	Taxes & fees	3.9%	5.6%	2.8	4.0	1.2	44%
	Quota Share Holders		45.7%		32.4	32.4	
	Costs (Fuel, Bait & Groc.)	9.1%	5.1%	6.4	3.6	-2.8	-44%
	Vessel Owners	52.0%	26.0%	36.9	18.4	-18.4	-50%
	Captains and Crew	**35.1%**	**17.6%**	**24.9**	**12.5**	**-12.4**	**-50%**

Table V-6 shows projected payments to Kodiak and non-Kodiak residents, assuming that payments were distributed in proportion to the number of jobs. At an average quota lease share of 0.5% of TAC, total payments to Kodiak captains and crew would have declined from $3.9 million (without rationalization) to $2.8 million (with rationalization)—a decline in total Kodiak crab fishing earnings of about $1.0 million. At an average quota lease share of 1.0% of TAC, total payments to captains and crew would have declined from $3.9 million (without rationalization) to $2.3 million (with rationalization)—a decline in total Kodiak crab fishing earnings of about $1.6 million.

Table V-6
Estimated Effects of Rationalization on Earnings of Captains and Crew in the Bristol Bay Red King Crab Fishery, Under Different Assumptions About Average Quota Lease Share

			2004/05	2005/06	Change
Estimated number of jobs (from Table V-1)		**Kodiak Residents**	**215**	**89**	**-125**
		Non-Kodiak Residents	1166	400	-766
		Total	1381	490	-891
Total payments to captains and crew ($ millions)	Assumed average quota lease share of 0.5% of TAC	**Kodiak Residents**	**3.9**	**2.8**	**-1.0**
		Non-Kodiak Residents	21.0	12.7	-8.3
		Total	24.9	15.5	-9.4
	Assumed average quota lease share of 1.0% of TAC	**Kodiak Residents**	**3.9**	**2.3**	**-1.6**
		Non-Kodiak Residents	21.0	10.2	-10.8
		Total	24.9	12.5	-12.4

Note: Estimates are based on crab fishing model assumptions and should be considered only approximate.

These estimates suggest an approximate range for the effects of crab rationalization on crab fishing earnings of Kodiak residents in the 2005/06 Bristol Bay Red King Crab fishery. As discussed at the beginning of this chapter, the total number of hours worked by Kodiak residents in this fishery probably stayed about the same, with a smaller number of fishermen working longer seasons. However, because the share of vessel earnings paid to fishermen declined, rationalization may have reduced the total earnings of Kodiak residents working in the fishery by between $1.0 million and $1.6 million.

As I discussed at the beginning of this report, the 2005/06 crab fishing season is not necessarily representative of how the BSAI crab fisheries may change over time with rationalization. Over time, it is likely that quota lease rates, the extent of quota leasing, and how crab fishermen are paid will change.[15]

Economic theory suggests that what crab fishing crews are paid is driven by labor market forces of supply and demand. For a given set of working conditions, the payment for a crab fishing season will tend towards the level at which the number of fishermen vessels owners want to hire (demand) is equal to the number of fishermen willing to work (supply). The dramatic consolidation of the crab fishing fleet in the first year of rationalization greatly reduced the demand for crab fishermen without any corresponding reduction in supply. Under these conditions, it is not surprising that the total payment to

[15] A number of vessel owners have told me that the 70% royalty share paid to lease Bristol Bay Red King Crab quota this year was too high to be profitable, and that they expect the royalty share to be lower in the future.

crab fishermen for a similar amount of total crab fishing work would decline. With hundreds of crab fishermen out of crab fishing jobs, it is not surprising that vessel owners would be able to find crew willing to work for lower average earnings (per day worked or crab pot pulled) than in earlier seasons.

But this situation is not necessarily permanent. As former crab fishermen find other jobs, fewer will be looking for crab jobs, and this may put upward pressure on average crew shares or daily earnings.

Crab fishing has become a different kind of job than it was prior to rationalization. With vessels fishing for known quota volumes, crew can be more certain about how much money they will earn for a season than they could before rationalization. Economic theory suggests that with lower financial risk, people may be willing to work for lower total pay if there is less financial risk about how much they will be paid.

With vessels fishing for known quota volumes, it is less important to catch crab fast. That may tend to reduce what vessel owners are willing to pay for highly skilled crab fishermen.

Crab fishing seasons are longer—meaning that crew can earn more total income, but also have to give up more alternative work opportunities to go crab fishing. Over time, all of these factors and others may affect what crab fishermen are paid for what have become fewer and different jobs than they were prior to rationalization.

VI. EFFECTS OF RATIONALIZATION ON KODIAK BUSINESSES

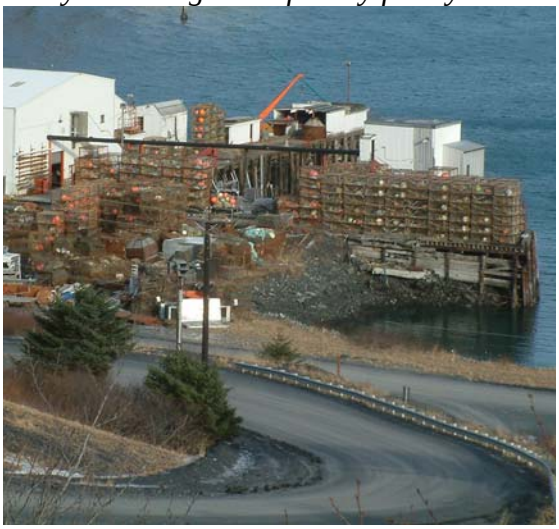
Kodiak is a fishing community. Many Kodiak businesses provide a wide variety of supplies and services to fishing vessels. Many Kodiak residents are fishermen. Thus a major change to the fishing industry has the potential to significantly affect Kodiak businesses by affecting purchases by fishing vessels and fishermen.

As shown in Table VI-1, we would expect crab rationalization to affect different kinds of businesses in different ways. Those most likely to be affected are those that derive a large share of their business from sales to crab boats and crab fishermen, and for which those sales depend on how many boats and fishermen are fishing, such as pot storage and welding businesses.

Table VI-1
How Different Types of Businesses Might Be Affected by Crab Rationalization

Significance of effect	Type of Business	Examples	What the Effects of Rationalization Depend on
Most affected	Businesses which sell to fishing boats, and for which sales depend on the number of boats fishing	Pot storage and loading Welding Marine supplies	Change in number of crab boats fishing Crab boats as % of total sales
	Businesses which sell to fishing crews	Fishing clothing Fisherman bars	Change in number of crab fishermen working Crab fishermen as % of total sales
Somewhat affected	Businesses which sell to local residents	Grocery stores Restaurants Auto dealers	Change in crab fishing income Crab fishing % of total resident income
Least affected	Businesses which sell to fishing boats, and for which sales depend on the number of days fished	Fuel sales Bait sales	Change in total crab fishing days Crab boats as % of total sales
	Businesses which don't sell to fishing boats or local residents	Tourism businesses	No change

Businesses which store crab pots are directly affected by how many pots are fished. The number of pots registered in the 2005 Bristol Bay Red King Crab fishery fell by 68%.



Some crab fleet purchases—such as fuel, bait and groceries—depend more on the total days spent fishing than on the number of boats fishing or fishermen working. For example, if one-third as many fishermen work for three times as many days, they will still need about the same amount of groceries. However, rationalization may have caused some of these sales to shift from Kodiak communities closer to the fishing grounds, such as Dutch Harbor, to the extent that boats buy more fuel, bait and groceries when they deliver crab, rather than buying supplies for their entire season in Kodiak.

A number of Kodiak business owners have told me about specific ways in which their sales were harmed by crab rationalization. Below are examples:

> "I own a life raft inspection station, so I sell and service life rafts, EPIRBS and other marine safety equipment. Of course I do business with most all the fisheries. The mainstay of my business is life raft servicing, so if a boat doesn't go fishing I don't get to service their raft/s. Additionally, depending on the way the boat operates the crew sometimes buy safety gear for themselves if the boat doesn't (i.e., survival suit personal lights or personal EPIRBS). I can't nail down specific numbers as far as percentages of loss until last year taxes are filed . . . However, when halibut was turned into an IFQ based fishery I lost over 30% of my business due to high attrition in the fishing fleet. While I hope the crab impact is not so severe it will still loom large."

> "We own a boat yard in Kodiak. Previous to this year we had 5 boats that came up to store in the yard for a couple of months before crab season until a month after the season because their owners or operators also fished other fisheries with those boats and ran a crabber for the crab season. This year we had none. . . There is no other reason for boats to come out of the water and store at that time of year. What did not occur as it has in the past 23 years is the cross-over owners with smaller boats that also fish crab did not fish this year because of Crab Ratz, so there was no need to store the smaller boat out of the water."

> "We have several rental units . . . One of renters was a crab fisherman and he moved back to Seattle as his skipper told him in September that the boat would no longer fish and he no longer had a job as skipper. So I was out a renter at $950 per month for the last 5 months for a total of $4750."

> "I spoke with [operator of a bunkhouse] this morning and he told me that he usually had the same 3 or 4 guys rent from him each year for a couple of months before crab when they mended pots and got gear on board the boats and then again when they cleaned gear and stacked pots for a month. This year none of them showed up or called. Four guys at $300 each per month for 3 months equals $3600 for those rooms."

Accounts like these suggest that the effects of crab rationalization are real and important for some Kodiak businesses. However, they don't provide a basis for estimating how significant the total effects may be.

Some of the Many Kodiak Businesses Which Supply and Service the Fishing Industry

One indicator of the potential general magnitude of the change in vessel expenditures due to rationalization is this list, provided to me by a Kodiak crab vessel owner, of separate purchases made from Kodiak businesses in preparing the vessel for the 2005 Bristol Bay King Crab season:

Alaska Hydraulics	$	925.91
Alaska Hydraulics	$	20.24
Arc & Spark Welding	$	1,406.85
Breakwater Plumbing	$	69.61
Crescent Electric	$	505.88
Crescent Electric	$	386.37
Island Hydraulics	$	3,726.82
NAPA Parts Supply	$	170.32
Kodiak Marine Supply	$	2,909.01
Kodiak Metals	$	767.00
Kodiak Service	$	547.69
Radar Alaska	$	100.70
AIMS (Industrial Marine)	$	143.06
Sutliff's True Value Hardware	$	3,067.24
Nets Pacific	$	1,776.71
Petro Marine	$	374.37
Total Supplies & Related	**$**	**16,897.78**

Extrapolating very roughly, if every vessel had spent this amount, then the 54 "Kodiak Boats" which fished the Bristol Bay Red King season in 2004/05 would have spent $912,000, and the 23 "Kodiak Boats which fished the Bristol Bay Red King Crab season in 2005/06 would have spent $389,000. The decline (not all of which would be attributable to rationalization) would be about $523,000, or about half a million dollars. Note that this estimate does not include expenditures made by fishing crew (as opposed to the vessel).

As another potential indicator of the effects of crab rationalization on Kodiak businesses, I looked at business sales data collected by the City of Kodiak each quarter for the purpose of calculating sales tax obligations. The sales data are confidential for individual businesses, but the City can release combined data for a group of businesses.

I asked the City to calculate total sales by quarter for twelve Kodiak businesses that supply or service the crab fleet, shown in Table VI-2 on the following page. These twelve companies are not (by any means!) the only businesses that supply or service the crab fleet, or necessarily the largest. However, they were regularly mentioned by crab vessel owners that I talked to, and their sales may be representative of trends for these types of businesses.

Table VI-2
Twelve Kodiak Marine Supply and Service Businesses

Alaska Hydraulics, Inc
Alaska Industrial and Marine Services
Arc N Spark Welding
Island Hydraulics
Kodiak Marine Supply
Kodiak Metals & Supply Inc
Kodiak Ocean Safety Services
Kodiak Service Company
Kodiak Welding & Supply
Nets Pacific
Radar-Alaska Marine Electronic
Sutliff's Hardware Inc

Table VI-3 shows combined quarterly sales data for these twelve businesses. We would expect to see effects of crab rationalization in sales for the fourth quarter (October-December) of 2005 and the first quarter (January-March) of 2006, compared with previous-year sales for the same quarters. Total sales for these twelve businesses increased by 14% in the fourth quarter of 2005 and by 10% in the first quarter of 2006.

Table VI-3
Total Sales of Twelve Kodiak Marine Supply and Services Businesses ($000)

	Year			% change from previous year	
Quarter	2004	2005	2006	2005	2006
1st quarter	2,367	2,657	2,951	11%	10%
2nd quarter	3,004	3,650	NA	18%	NA
3rd quarter	2,590	3,086	NA	16%	NA
4th quarter	2,128	2,480	NA	14%	NA

Source: City of Kodiak, Sales Tax Office

Sales trends are not the same for all of these businesses. According to the city sales tax technician, compared with the previous year, during the fourth quarter of 2005, sales were down for three businesses, and one business reported a big decrease in sales. During the first quarter of 2006, sales were down for four businesses, and two businesses reported a big decrease in sales.

Table VI-4
Change in Sales Compared with the Previous Year
for Twelve Kodiak Marine Supply and Service Companies

Change	Fourth Quarter 2005	First Quarter 2006
Decrease	3	4
Big decrease	1	2
Increase	9	7
Big increase	"several"	6

Source: City of Kodiak Sales Tax Technician, personal communication. One company's sales presumably remained about the same in the first quarter of 2006.

In contrast, the majority of these businesses are doing well. During the fourth quarter of 2005, sales were up for nine businesses, and "several" business reported a big increase in sales. During the first quarter of 2006, sales were up for seven businesses and six businesses reported a big increase in sales.

From this limited evidence, it is difficult to find any clear evidence of any major effect of crab rationalization on Kodiak marine supply and service businesses in general. Some marine supply and service businesses have experienced declining sales since rationalization began. However, as a group these twelve businesses have not experienced any dramatic or obvious decline in sales, and the majority have experienced growth in sales. This does not, of course, mean that they weren't affected by rationalization or didn't experience a loss in sales to the crab fleet and crab fishermen. It does suggest that—for most of these particular businesses—the effects of crab rationalization have been outweighed by other factors affecting their sales.

Tables VI-5, VI-6 and VI-7 (on the following three pages) are based on total reported quarterly sales of Kodiak businesses since 2002 for the 27 "business types" for which the City regularly compiles quarterly sales information. Table VI-5 shows total reported sale. Table VI-6 shows the percentage change in sales compared to the corresponding quarter of the previous year. Table VI-7 compares the average of fourth-and-first-quarter sales for 2004/05 and 2005/06.

These data also do not provide any conclusive evidence about the effects of crab rationalization on Kodiak businesses. Sales for some business types were down in the fourth quarter of 2005 and the first quarter of 2006, while sales for other business types were up. There is no obvious relationship between rationalization and the types of businesses for which sales were up or down. For several of the business types for which sales were down, including taxi cabs, communications, rentals/leases, personal services, business services, health services and legal services, sales had been declining before the fourth quarter of 2005--suggesting that other factors were driving the decline.

The business type which experienced the largest absolute reported decline for the combined fourth and first quarters was "contractors." However, according to the City sales tax technician, these data may not be reliable since contractors as a group tend to turn in their reports late.

Table VI-5
Total Sales Reported by Kodiak Businesses, by Year and Quarter (thousands of dollars)

Business Type	2002 I	2002 II	2002 III	2002 IV	2003 I	2003 II	2003 III	2003 IV	2004 I	2004 II	2004 III	2004 IV	2005 I	2005 II	2005 III	2005 IV	2006 I
Contractors	2,792	5,597	13,302	7,209	5,700	13,546	16,255	9,976	4,775	8,866	13,521	12,581	7,349	9,879	13,132	9,077	6,233
Grocery Stores	7,227	8,062	8,177	7,220	7,756	8,044	8,335	7,933	7,483	8,109	8,466	7,342	7,770	8,656	8,844	7,793	7,903
Canneries	2,286	4,789	4,354	3,648	3,125	5,421	5,705	3,029	3,356	4,535	6,585	2,579	3,225	5,676	5,862	3,263	3,092
Taxi Cabs	176	189	200	184	155	158	201	161	182	196	200	183	175	164	191	161	150
City Boat Harbor	525	371	585	312	618	329	744	296	570	119	854	159	273	148	700	563	503
Boat Charters	60	101	429	170	49	66	643	82	88	268	869	238	37	260	904	318	111
Communications	1,025	1,236	1,131	1,168	1,037	1,129	1,060	1,158	1,121	1,330	1,435	1,466	1,294	1,230	1,193	1,312	1,578
City Utilities	1,250	1,172	1,131	1,121	1,218	1,161	1,302	1,176	1,234	1,091	1,228	1,041	1,210	1,110	1,281	1,083	NA
Utilities	5,361	4,983	5,381	5,284	5,697	4,993	5,380	5,001	5,724	5,112	5,843	5,012	5,975	5,206	5,922	5,507	6,402
Beverage Distributors	213	377	481	362	296	416	492	410	360	471	453	294	352	509	546	462	647
Retail Sales	22,491	32,664	28,223	25,717	23,751	35,135	28,864	26,620	25,243	32,475	35,311	32,343	32,122	33,281	45,885	31,584	29,464
Restaurants	1,482	1,851	1,930	1,753	1,584	1,864	2,094	1,864	1,715	1,985	2,134	1,890	1,675	1,955	2,276	1,749	1,635
Bars/Liquor Stores	1,824	2,209	2,475	2,313	1,411	2,499	2,717	2,386	2,126	2,465	2,767	2,385	2,181	2,465	2,864	2,352	2,183
Rentals/Leases	2,321	2,346	2,390	2,428	2,312	2,360	2,549	2,350	2,416	2,489	2,546	2,431	2,488	2,421	2,370	2,239	2,488
Hotels/Motels/B&B	478	918	1,375	756	683	1,068	1,512	831	812	1,025	1,484	858	788	1,138	1,651	966	1,017
Beauticians	166	184	184	208	173	208	201	188	185	192	188	202	183	195	199	213	196
Personal Services	123	140	159	155	167	183	200	185	225	232	220	211	200	182	189	178	198
Advertising	0	0	0	0	0	0	0	0	0	0	0	11	3	0	0	32	0
Artists/Photographers	18	53	16	89	17	57	64	49	19	53	75	88	38	82	101	89	49
Business Services	962	979	1,031	1,037	928	1,022	1,109	1,057	1,053	1,213	1,323	1,210	1,148	981	991	1,071	1,242
Vehicle Repairs	917	1,365	1,252	1,109	851	1,152	1,292	1,153	1,299	1,244	1,389	1,166	819	1,229	1,059	1,073	843
Service Stations	706	828	773	712	736	841	840	822	796	913	976	891	832	1,014	1,067	990	1,547
General Repair Services	1,333	1,617	1,836	1,863	1,743	1,767	1,722	1,461	1,411	1,850	1,798	1,599	1,560	1,724	1,607	1,689	1,728
Amusements	150	144	172	121	125	132	158	88	278	277	295	272	271	274	259	261	243
Health Services	114	104	113	100	37	126	83	84	122	103	110	106	88	126	101	68	51
Legal Services	287	236	353	267	231	284	325	243	275	287	532	495	325	427	182	294	385
Miscellaneous Services	669	1,040	1,494	1,234	707	1,686	1,662	1,298	1,232	1,831	1,726	1,470	1,475	2,087	2,022	1,495	1,709
Total	54,956	73,556	78,947	66,541	61,107	85,646	85,510	69,902	64,098	78,729	92,328	78,523	73,857	82,418	101,398	75,882	NA
Total, excl. City Utilities	53,707	72,384	77,816	65,421	59,889	84,484	84,208	68,726	62,864	77,638	91,101	77,482	72,647	81,308	100,117	74,798	71,596

Source: City of Kodiak, Sales Tax Office.

Table VI-6
Percentage Change in Total Sales Reported by Kodiak Businesses Compared to Previous-Year Corresponding Quarter

Business Type	2003 I	2003 II	2003 III	2003 IV	2004 I	2004 II	2004 III	2004 IV	2005 I	2005 II	2005 III	2005 IV	2006 I
Contractors	104%	142%	22%	38%	-16%	-35%	-17%	26%	54%	11%	-3%	-28%	-15%
Grocery Stores	7%	0%	2%	10%	-4%	1%	2%	-7%	4%	7%	4%	6%	2%
Canneries	37%	13%	31%	-17%	7%	-16%	15%	-15%	-4%	25%	-11%	27%	-4%
Taxi Cabs	-12%	-17%	0%	-12%	18%	24%	0%	13%	-4%	-16%	-4%	-12%	-14%
City Boat Harbor	18%	-11%	27%	-5%	-8%	-64%	15%	-46%	-52%	25%	-18%	253%	84%
Boat Charters	-18%	-35%	50%	-51%	80%	309%	35%	189%	-57%	-3%	4%	34%	197%
Communications	1%	-9%	-6%	-1%	8%	18%	35%	27%	15%	-8%	-17%	-10%	22%
City Utilities	-3%	-1%	15%	5%	1%	-6%	-6%	-11%	-2%	2%	4%	4%	NA
Utilities	6%	0%	0%	-5%	0%	2%	9%	0%	4%	2%	1%	10%	7%
Beverage Distributors	39%	10%	2%	13%	22%	13%	-8%	-28%	-2%	8%	21%	57%	84%
Retail Sales	6%	8%	2%	4%	6%	-8%	22%	21%	27%	2%	30%	-2%	-8%
Restaurants	7%	1%	8%	6%	8%	6%	2%	1%	-2%	-2%	7%	-7%	-2%
Bars/Liquor Stores	-23%	13%	10%	3%	51%	-1%	2%	0%	3%	0%	4%	-1%	0%
Rentals/Leases	0%	1%	7%	-3%	5%	5%	0%	3%	3%	-3%	-7%	-8%	0%
Hotels/Motels/B&B	43%	16%	10%	10%	19%	-4%	-2%	3%	-3%	11%	11%	13%	29%
Beauticians	4%	13%	10%	-10%	7%	-8%	-6%	8%	-1%	2%	5%	5%	7%
Personal Services	36%	31%	26%	19%	34%	26%	10%	14%	-11%	-21%	-14%	-16%	-1%
Advertising												187%	
Artists/Photographers	-7%	8%	293%	-45%	8%	-7%	17%	81%	105%	54%	35%	1%	28%
Business Services	-4%	4%	8%	2%	14%	19%	19%	15%	9%	-19%	-25%	-11%	8%
Vehicle Repairs	-7%	-16%	3%	4%	53%	8%	8%	1%	-37%	-1%	-24%	-8%	3%
Service Stations	4%	2%	9%	15%	8%	9%	16%	9%	5%	11%	9%	11%	86%
General Repair Services	31%	9%	-6%	-22%	-19%	5%	4%	9%	11%	-7%	-11%	6%	11%
Amusements	-16%	-9%	-8%	-27%	121%	110%	87%	209%	-2%	-1%	-12%	-4%	-10%
Health Services	-68%	21%	-26%	-16%	232%	-18%	33%	26%	-28%	22%	-8%	-36%	-42%
Legal Services	-20%	21%	-8%	-9%	19%	1%	64%	104%	18%	49%	-66%	-41%	19%
Miscellaneous Services	6%	62%	11%	5%	74%	9%	4%	13%	20%	14%	17%	2%	16%
Total	11%	16%	8%	5%	5%	-8%	8%	12%	15%	5%	10%	-3%	NA
Total, excl. City Utilities	12%	17%	8%	5%	5%	-8%	8%	13%	16%	5%	10%	-3%	-1%

Source: City of Kodiak, Sales Tax Office.

The only business types for which sales declined in the fourth and first quarters of 2005/06 but not for the third quarter of 2005 were retail sales, restaurants, and bars/liquor stores. The decline in retail sales of 5% is important because it represent by far the largest component of total sales. We may speculate that the decline for these three sectors may have been due to reduced spending by crab boats which didn't fish and crab fishermen who lost jobs and income. But without a much more detailed examination of the Kodiak economy and all the other factors which may have affected sales, we can't know how important a factor crab rationalization was or wasn't.

Table IV-7
Comparison of Average Fourth and First Quarter Sales, 2004/05 & 2005/06

Business Type	Average sales, 4th & 1st quarters ($000) 2004/05	2005/06	Change	% Change*
Contractors	9,965	7,655	-4,620	-23%
Retail Sales	32,232	30,524	-3,417	**-5%**
Rentals/Leases	2,459	2,364	-192	-4%
Restaurants	1,782	1,692	-180	**-5%**
Legal Services	410	339	-141	-17%
Health Services	97	60	-75	-38%
Vehicle Repairs	993	958	-69	-3%
Taxi Cabs	179	156	-46	-13%
Business Services	1,179	1,156	-46	-2%
Amusements	272	252	-39	-7%
Personal Services	205	188	-35	-9%
Bars/Liquor Stores	2,283	2,268	-30	**-1%**
Artists/Photographers	63	69	11	9%
Advertising	7	16	18	124%
Beauticians	193	204	24	6%
Communications	1,380	1,445	131	5%
Boat Charters	138	214	153	56%
General Repair Services	1,580	1,708	258	8%
Miscellaneous Services	1,473	1,602	259	9%
Hotels/Motels/B&B	823	992	338	21%
Beverage Distributors	323	554	463	72%
Canneries	2,902	3,177	550	9%
Grocery Stores	7,556	7,848	584	4%
City Boat Harbor	216	533	633	146%
Service Stations	862	1,268	813	47%
Utilities	5,494	5,954	921	8%
City Utilities	1,126	NA	NA	NA
Total	76,190	NA	NA	NA
Total, excl. City Utilities	76,011	73,658	-4,706	-3%

Source: City of Kodiak, Sales Tax Office. * Business types for which sales declined in the fourth and first quarters of 2005/06 but not for the third quarter of 2005 are shown in **bold.**

More generally, Kodiak has a relatively large and diversified economy that is based on many different fisheries, a large fish processing industry, a large Coast Guard base, a rocket launch facility, and state spending (including Permanent Fund dividends). This diversity tends to reduce the relative economic impact of changes in any one fishery, and makes it difficult to measure these impacts using aggregate economic data such as City sales data.