Internat. Marit. Health, 2007, 58, 1 - 4

TRANSITION FROM OPEN ACCESS TO QUOTA BASED FISHERY MANAGEMENT REGIMES IN ALASKA INCREASED THE SAFETY OF OPERATIONS

STEVEN E. HUGHES[1] , CHRISTOPHER WOODLEY [2]

ABSTRACT

During the past 12 years fishery managers responsible for federal fisheries off Alaska have developed and implemented three new fishery management limited access/quota share programs in place of traditional open access management. The three limited access programs are unique but each provides for the allocation of quota shares to individual participants in the halibut and sablefish longline fishery, in the Bering Sea pollock trawl fishery and in the Bering Sea king and Tanner crab fishery, respectively.

New management programs are briefly described and contrasted with traditional management. For each of the three fisheries, management changes over time have generated substantial changes in fishing fleets, their operations, crew employment, economics and safety records. Under quota share management, fleet consolidations have occurred, particularly in the more over capitalized fisheries. The intense speed and inflexible timing associated with open access fisheries have greatly lessened as have the risk taking and incentives to maximize fishing power. Active vessel economic viability

[1] Steven E.Hughes, Natural Resources Consultants, Inc.
1900 W.Nickerson Street, Suite 207, Seattle, WA 98119, Tel. (206)285-3480,
E-mail: shughes@nrccorp.com

[2] Chris Woodley, , 13th U.S.Coast Guard District, 915 2nd Avenue, Suite 3584,
Seattle, WA 98174, USA, E-mail: Christopher.j.woodley@uscg.mil

has strengthened due to a combination of increased efficiency, higher product yields, reduced costs, greater crew stability and safer operations.

Keywords: Alaska fishery management, transition, open access management, limited access/quota share based management, commercial fishing impacts

INTRODUCTION

Fishery managers responsible for the federal fisheries off Alaska are steadily changing fishery management regimes from open access/Olympic style fisheries to individual fishing quota (IFQ) or to industry sector/quota share/co-op programs. Three of the ten major fisheries in the region, the Pacific halibut and sablefish longline fishery in 1995, the trawl pollock fishery in 1999-2000 and the notoriously dangerous king and Tanner crab fishery in 2005, have each adopted unique measures that allow for quota-based type management of these significant fishery resources. The North Pacific Fishery Management Council (NPFMC) is continuing to develop quota based management programs for other federal fisheries off Alaska, as are other regulatory authorities around the world.

Fishery management regimes and implementing regulations are powerful tools that directly impact fishing fleets, vessel operations, industry economics, employment and safety. This document identifies and addresses operational, economic and employment changes that have occurred in three Alaska fishing fleets impacted by management regime change, and it sets the stage for subsequent comparative analysis of safety records before and after those management changes occurred. Effects of management changes on the three described fleets in Alaska are provided to benefit others considering future changes in management regimes and the likely regulatory impact of IFQ type programs.

METHODS

For each of the three diverse fisheries, the open access and subsequent quota share management regimes are described. Fleet composition, operations, economic viability and crew are next described by fishery with changes over time as a result of transition from open access to quota share management.

The majority of information documenting trends in fleet composition, seasonal and operational modes, and crew employment is drawn from a recent report by Hughes and Goodman (2006) which was compiled from several sources of data plus practical knowledge of the fisheries. Data were based on a variety of Federal and State of Alaska reports including publications from; Alaska Department of Fish and Game (ADF&G), Alaska Commercial Fisheries Entry Commission (CFEC), International Pacific Halibut Commission (IPHC), National Marine Fisheries Service (NMFS) and the NPFMC. While fleet size and season duration are well documented, crew employment information stems from a combination of actual data and practical knowledge of the fisheries.

ALASKA HALIBUT AND SABLEFISH INDIVIDUAL FISHING QUOTA

The Alaska halibut fishery has been fully developed and operational in the Gulf of Alaska, Aleutian Islands and in the Bering Sea since the late 1800s. The sablefish fishery has since developed over the same region from the mid 1900s. Both fisheries are conducted exclusively by longline gear operated by what we now characterize as small- to mid-sized vessels in the 25-80 foot range. Prior to 1995, these fisheries were managed by the setting of annual harvest quotas, season opening dates, in-season harvest monitoring and closure of fishing at a date of projected quota achievement. Access to fisheries was basically open to any vessel that obtained the required license.

In 1994, the final year of the "open access fishery," both halibut and sablefish fisheries had become extremely overcapitalized with participating vessels and crews. The 1994 halibut fleet numbered 3,450 unique vessels and the 1994 sablefish fleet numbered 1,191 unique vessels. Fishing had progressively shortened to less than one week per year for halibut and less than two weeks per year for sablefish. Employment was commensurately short-term in terms of days and stretched to the maximum hours per day. Fishing operations were intense "derby style" and conducted in any weather conditions that occurred during the short season openings.

Alaska's halibut and sablefish "Individual Fishing Quota" (IFQ) program was developed by the NPFMC during a five to six year period prior to implementation in 1995 (58 FR 59375). Vessel owners were allocated "quota shares" based on documented catches during qualifying history years. Each year, 1995 to date, specified pounds of halibut and sablefish are allocated to quota share holders for their exclusive use based upon their quota share (their percentage of the total annual quota) and the current year total allocation for the directed halibut and sablefish fisheries.

The Alaska halibut and sablefish IFQ program has been in place for 12 years. Substantial changes have occurred. These fisheries now extend over approximately a ten month period rather than one to two weeks. Quota share ownership has consolidated substantially. The operational halibut fleet has been reduced from 3,450 unique vessels

in 1994, to 1,279 unique vessels in 2005, while harvest quotas have remained quite stable (Exhibit 1). Similarly, the sablefish fleet has been reduced from 1,191 unique vessels in 1994, to 378 unique vessels in 2005 with little change in annual quota.

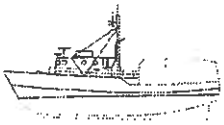
Operations have changed in many ways. Although individual vessels actively fish a greater number of days each season under quota share management compared with open access management, vessel operators can choose when to fish during the longer fishing season maximizing safe weather and sea conditions and optimizing price and market opportunities. Longer seasons and more fishing days provide employment opportunities for full-time professional crews who are well trained and operate the vessels and gear safely and efficiently. Under derby fishing management, some vessels would set more longline gear than they could haul during the short open period allowing them to abandon gear with low catch rates causing waste of the fishery resource and loss of gear. Under quota share management, the quality and value of the harvested halibut and sablefish is maximized increasing overall profitability. A dedicated longline fleet of more efficient and professionally operated vessels has again become prominent.

Professional longline crews have gained opportunities for long term employment and a strong level of income from combinations of halibut and sablefish fisheries. Halibut and sablefish, but especially halibut landings are now spread over the year and sold largely as fresh steaks and portions to a large domestic market. Fish quality is up and processing costs are down, both to the consumer's advantage.

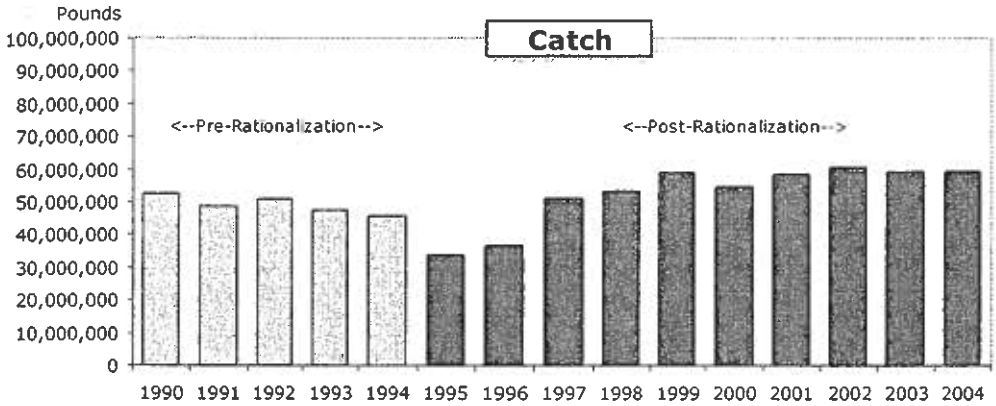
Between 1989–1994, vessel losses and fatalities associated with the halibut fishery were fairly commonplace. During this six year time frame, there were 33 vessel losses and 14 fatalities (USCG 2006) (Exhibit 2). Historically, this safety record has been interpreted as being the logical result of the "derby" style prosecution of the halibut fishery, which combined factors of smaller vessels operating in poor weather conditions and crews working without rest during the short duration, intense fisheries. Improving the fleet's safety record was a primary goal of the halibut and sablefish IFQ program. Following the change from open access to IFQ based management, vessel loss and fatality data declined during the subsequent six years, with 27 vessels lost and 11 fatalities during the 1995-2005, suggesting an improvement, (USCG 2006).

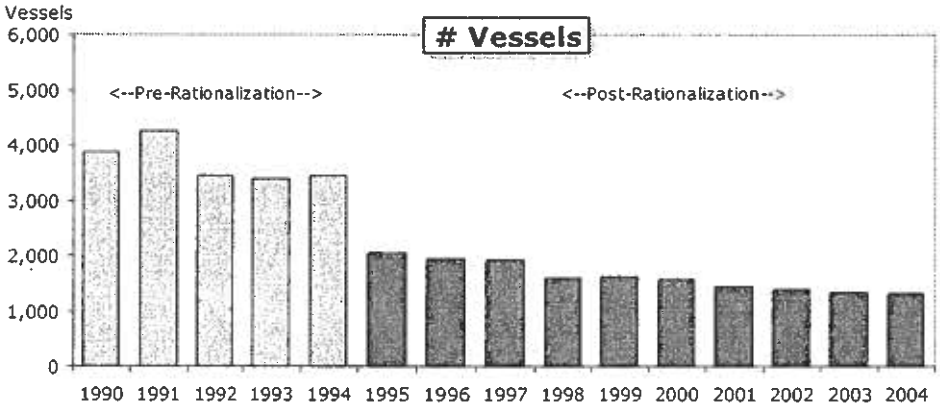
Exhibit 1. Comparative history of the Alaska halibut fishery before and after rationalization, 1990-2004.

Alaska Halibut



Length Overall: 25-80 feet
Crew: 2-5
Gear: Longline
Products: Dressed Fresh Fish
Rationalization (IFQ): 1995





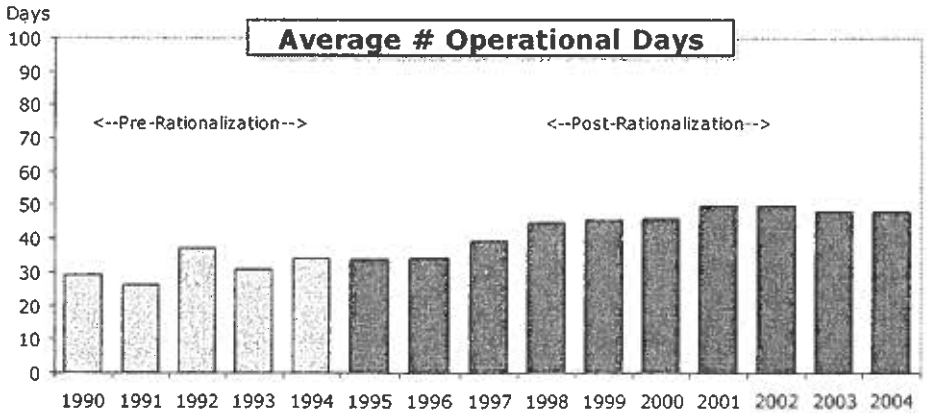
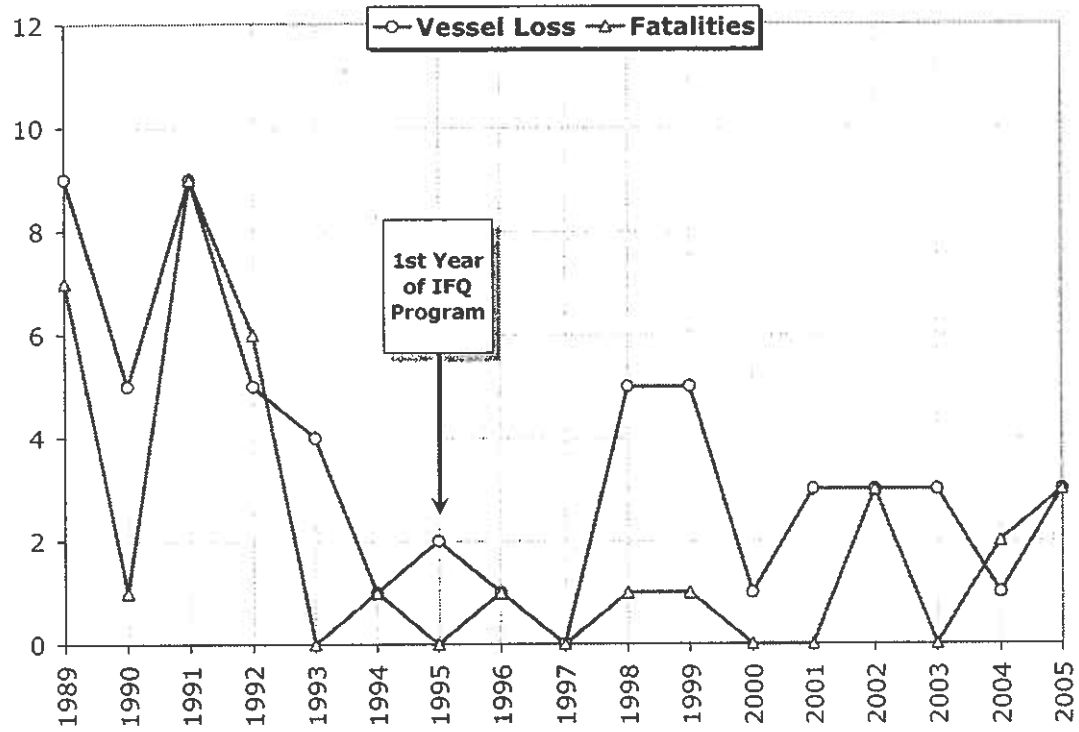


Exhibit 2. Comparative safety record in terms of vessel loss and fatalities in Alaska halibut and sablefish fisheries before and after rationalization, 1989-2005.



Surveys of Alaska halibut and sablefish IFQ holders from 1997 to 1998 indicated that 85% of those surveyed felt "IFQ's have made fishing for halibut safer (Knapp 1999). While the overall decrease in number of vessel losses and fatalities is a positive indicator, a thorough analysis of rates of vessel loss and fatalities in the fisheries, adjusted for seasonal variations in employment and fishery effort, is needed to confidently state whether vessel loss and fatality rates have declined. Currently the National Institute of Occupational Health and Safety is conducting such an assessment, with final results expected in March 2007.

BERING SEA POLLOCK SECTOR ALLOCATIONS AND QUOTA SHARES

The modern day Bering Sea pollock fishery off Alaska is the largest volume fishery in the U.S. with annual landings of approximately 1.4 million metric tons (mt) in recent years. This is a large boat midwater trawl fishery, described by three separate industry sectors--the factory trawler sector, the mothership/catcher boat sector and the inshore processor/catcher boat sector. After the Bering Sea pollock fishery was fully developed and somewhat over developed by U.S. interests, a moratorium on new entrants into the fishery became effective in 1996 (60 FR 40763). Management through 1998-1999 remained by the setting of annual harvest quotas, sector allocations, season opening dates, in-season harvest monitoring and closure of fishing to sectors when sector

allocations were reached. In late 1998, management was changed to quota share management by federal legislation commonly known as the American Fisheries Act (AFA) (AFA 1999). This Act was implemented in 1999-2000 and remains in place today.

In 1998, the Bering Sea fleets numbered 29 factory trawlers, three motherships and 100 catcher trawlers. These fleets operated about 100 days per year, in split winter and late summer/fall seasons. During the 1990s, season durations were becoming shorter with harvesting and processing upgrades within existing fleets as operations became intensely competitive between the three fleet sectors and between vessels and plants within sectors. The fishery was becoming more "derby style" and basically all operations were geared to maximize revenue per day during the open seasons rather than revenue per fish. Processing operations both at-sea aboard factory trawlers and motherships and inshore at shore plants and floating processors followed the same pattern in their production of pollock fillets, surimi and pollock roe.

By direct federal legislation and by directions to the NPFMC, the AFA substantially changed management of the Bering Sea pollock fishery beginning in 1999 and 2000.

Annual pollock allocations to vessel owners are based on quota shares (a percentage of the total annual quota established from catch history years) and the current year pollock allocation established for the fishery as a whole and for each sector. Season dates remain part of the management and each vessel basically operates within those seasons with the exclusive right to harvest their allocated pollock on a schedule that best fits their overall operations, weather conditions and their markets.

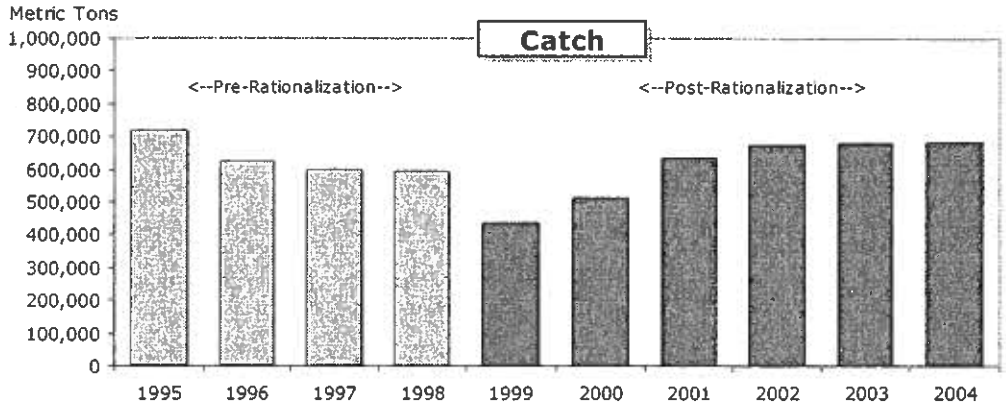
The AFA has now been fully in force for seven years. The greatest changes to the fishery occurred during the first year of the AFA management. More gradual changes have continued to a point of major stability. The fleet of 29 factory trawlers was reduced to 20 factory trawlers by law, and further reduced to 16 operating factory trawlers by industry consolidation of quota shares within and between companies (Exhibit 3). The three motherships and the inshore processing facilities have all remained intact and operational. The fleet of catcher trawlers has been reduced by about 15 percent from 100 vessels in 1998 to a current fleet of 86 vessels.

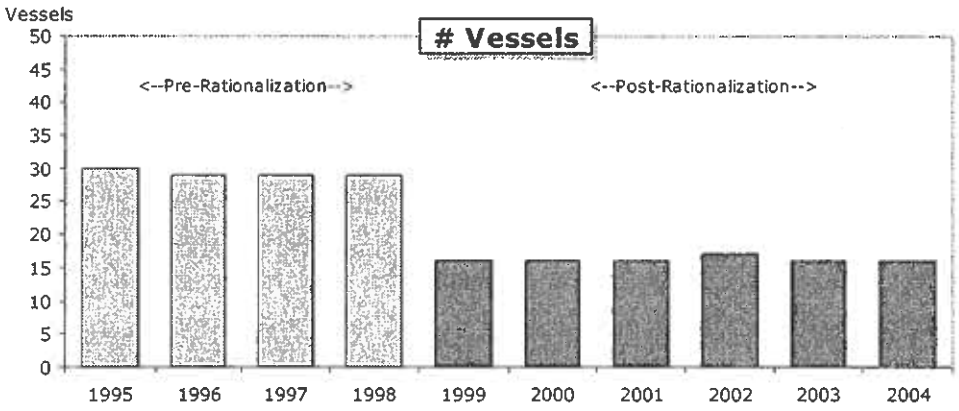
Catcher vessel reductions have occurred largely by the stacking of pollock quota shares on the larger and more efficient vessels and by retiring some smaller and less efficient vessels.

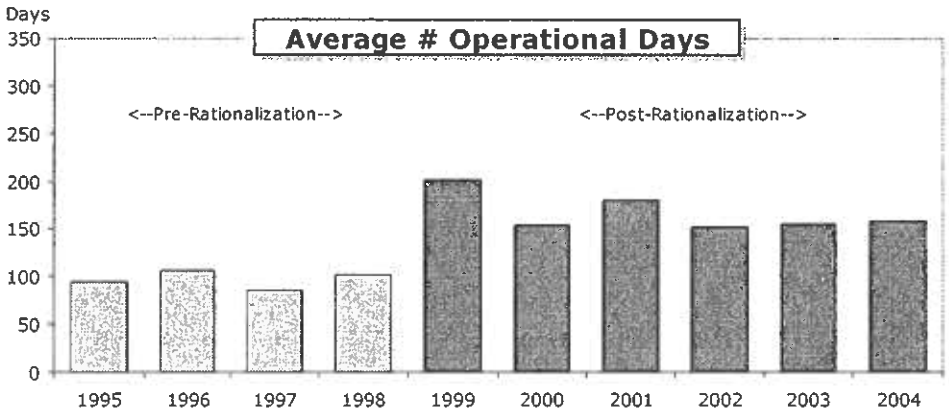
Exhibit 3. Comparative history of the Bering Sea factory trawler pollock fishery before and after rationalization, 1995-2004.

Bering Sea Pollock Factory Trawlers

Length Overall:	210-380 feet
Crew:	100
Trawl Gear:	Midwater
Products:	Surimi/Fillets/Roe
Rationalization (AFA):	1999







Employment has become much more stable with greater certainty of incomes for processing workers, fishermen and owners of vessels and plants. Both plants and vessels are better maintained, upgrades are financed with increased revenues and people are better trained and working longer in highly desired positions throughout the fishery.

With the notable exception of the capsizing of the *FV Aleutian Enterprise* in 1991 with a loss of nine crew members, all sectors of the Bering Sea pollock fishery have been free of vessel loss and operational fatalities (USCG 2006). As such, it is difficult to determine whether changes in fishery management from open access to the AFA cooperatives have improved safety. Individual interviews with vessel operators indicate that the fishery is safer because it can be prosecuted at a more deliberate pace and there is greater economic stability. One area where an assessment could be made is to determine whether the number of serious injuries occurring within the fleet (particularly the catcher processor and mother ship sectors) have declined since the implementation of the AFA. Currently the National Institute of Occupational Health and Safety is conducting such an assessment, with final results expected in March 2007.

BERING SEA CRAB HARVESTING AND PROCESSING QUOTA SHARES

The Bristol Bay red king crab fishery and the *opilio* Tanner crab fishery, both occurring in the eastern Bering Sea off Alaska, have been fully developed fisheries since the late 1970s and early 1980s, respectively. The crab fleet is comprised by mid-sized vessels that average about 115 feet in length and are typically crewed by a crew of five. Both fisheries are conducted with steel-framed pots measuring about seven feet square by 30 inches high and weighing 780 pounds. Until March 2005, Bering Sea crab fisheries were managed largely as "open access" fisheries with some restrictions on new entrants imposed during the 1990s, long after these fisheries were heavily overcapitalized by both harvesting and processing capacities. Management was conducted by the setting of annual harvest quotas for legal sized male crab, setting a season start date, monitoring in-season harvests, and closing the season at a date of projected quota achievement. Over the last 25 years, Bering Sea crab stocks have been subject to substantial variations in biomass and large fluctuations in annual harvest quotas.

During the 2004-2005 season which marked the end of the traditional management of Bering Sea crab fisheries, the Bristol Bay red king crab fishery was conducted by 243 catcher boats and eight catcher processors. The season opening duration was only four days. The *opilio* Tanner crab fishery in January of 2005 was conducted by 168 catcher vessels and six catcher processors and the season duration was five days. These fisheries had grown into a classic "derby style" operation with each vessel and crew operating at maximum capacity for the short duration season in an attempt to harvest as much crab as possible in competition with every other vessel in the fleet. Employment was very

short term. Revenues for the crew were subject to a share of the catch. Revenues for the vessel owners were also based on catch volume and value and subject to a great deal of annual variation depending on short-term performance in an intense fishery.

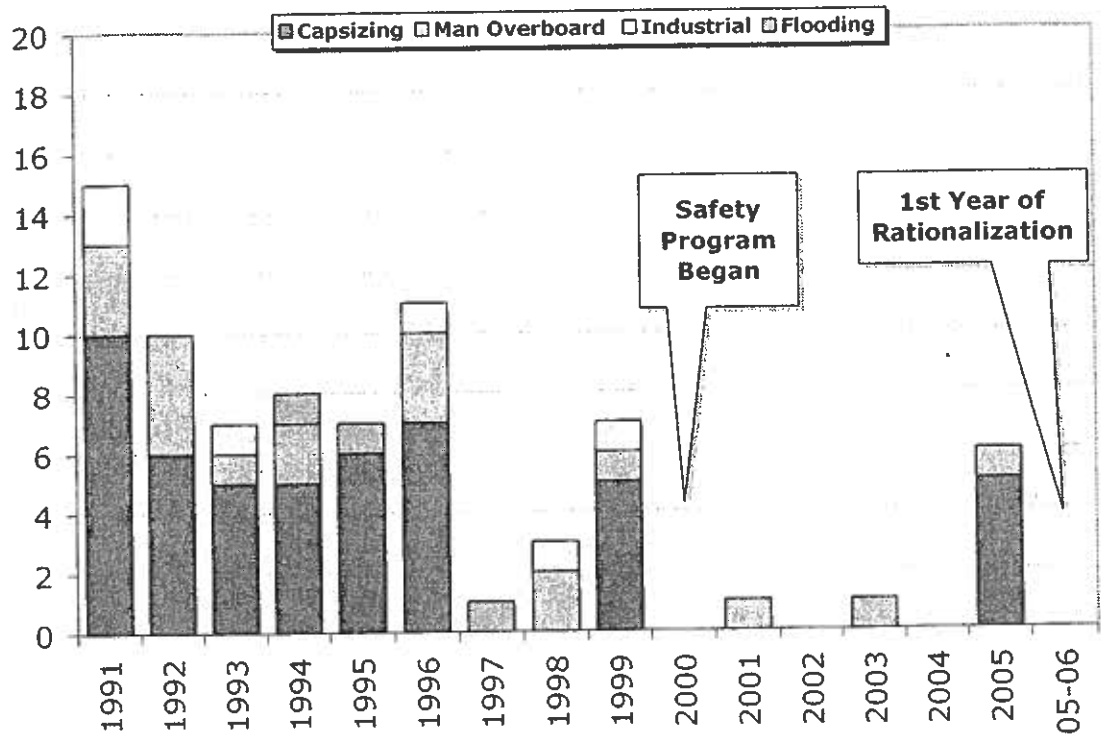
The Bering Sea Crab Rationalization Program was developed by the NPFMC during a five to six year period and implemented in March 2005 (70 FR 10174). This new management program has only been in place for one season spanning the 2005-2006 Bristol Bay red king crab fishery and the 2005-2006 *opilio* Tanner crab season.

The first season of Bristol Bay red king crab and *opilio* Tanner crab fisheries under the Bering Sea Crab Rationalization Program saw the operational crab fleet reduced to about 85 vessels from the prior years 251 vessels for red king crab and reduced to about 90 vessels from 174 vessels in the *opilio* Tanner crab fishery.

Vessel crew employment changes followed suit. There was a reduction of several hundred crew jobs. Jobs were eliminated for those younger crew members with short-term experience in favor of crew with long-term relationships with vessel owners, particularly crew having been skippers and holding skipper quota shares that could be fished along with the vessel's crab quota shares.

The Bering Sea crab fisheries have the well-deserved reputation as being one of the most dangerous occupations in the United States. From 1991-2005, 26 vessels sank and 77 fatalities occurred in these fisheries (USCG 2006). Broken down along casualty types, the two major fatality groupings have been due to capsizing events and man overboard events. Forty-nine lives have been lost in ten capsizing events and nineteen crew members have died as a result of man overboard events (Exhibit 4).

Exhibit 4. Comparative safety record in terms of fatalities by type in Bering Sea & Aleutian Islands crab fisheries before and after rationalization, 1991-2005.



Over half of these capsizing events occurred during the first twenty-four hours prior to the start of the season, when the vessels were fully loaded with pots and transiting to the fishery grounds. Many of these capsizing incidents were directly the result of masters loading more pots than the vessel could safely carry as a way to maximize catching power in the derby style fishery (Woodley 2000). Contributing factors to these incidents often included crews operating without sleep for days at a time, vessels operating in extremely poor weather and in icing conditions, which could quickly compromise vessel stability. A major disruption to Bering Sea crab fatality trend occurred in 1999 when the Coast Guard began an aggressive safety campaign to address vessel stability and overloading concerns (Woodley 1999). This safety initiative focused upon enforcing loading practices as required by the vessel's stability books and keeping overloaded vessels from departing port.

One of the main goals of the Bering Sea crab "three pie" rationalization system was to improve fleet safety. It is the hope of fishery managers and safety agencies such as the Coast Guard that crab rationalization allow operators to place less emphasis on catching power, and will result in better operational decision making (e.g. not operating in poor weather and not operating without rest). Additionally there is hope that rationalization will result in only the most capable vessels remaining in the fishery

while less efficient vessels retire. The first year of crab rationalization has been promising, with no lost vessels, no fatalities and a reduced number of injuries. However, there has not been a sufficient passage of time to determine whether crab rationalization has lived up to its promise. Further study on the safety benefits of crab rationalization is needed.

CONCLUSIONS

Each of the new limited access quota-based management programs implemented to manage the halibut/sablefish longline fishery, the Bering Sea pollock fishery and the Bering Sea crab fishery have been effective in addressing management problems inherent in traditional open access fisheries management. Details of the three management programs are different but each program limits entry to qualified operators/permit holders, establishes quota shares based on past participation and documented catch histories, allocates annual harvest quotas to quota share holders based on their percentage of total allowable catch and provides for procedures to buy/sell/lease owned quota shares or annual harvest quotas. We summarize the key points as:

- Limited access/quota share management stops the "race for fish."
- Operations benefit from improved certainty that planned fisheries will be achieved, less time wasted, higher efficiency, lower costs and more stable employment of crews
- Numbers of employed crew in overcapitalized fisheries will be reduced, leaving remaining crew with dedicated long-term careers in fisheries and improved opportunities for longer fishing seasons and increased incomes.
- Limited access/quota share management promotes vessel safety by eliminating the need to be competitive in bad weather conditions that would compromise vessel stability and crew safety.
- Changes in fishery management from open access limited access/quota share programs, have significant potential to promote vessel safety. However these improvements are not automatically guaranteed. A significant and continued commitment on the part of the owner and the operator are necessary to ensure that other economic factors do not override the obligation for providing a safe workplace.
- Changes in fishery management practices can significantly enhance economic viability, thus allowing owners to provide well-maintained vessels and professionally trained crews.

- Operationally, limited access/quota share programs also have significant potential to promote vessel safety by allowing the master to err on the side of safety by avoiding bad weather, fishing at a slower pace (allowing for increased crew member rest) and not overloading the vessel.

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