Commercial Fishing Vessel Safety in Alaska

By

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Dedicated to:

The Pat & Marylou Sullivan Family (Family of seven who perished in the waters of Lutak Inlet while working halibut skates near Haines Alaska in 1975)
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>3</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>5</td>
</tr>
<tr>
<td>I. Problem Statement</td>
<td>6</td>
</tr>
<tr>
<td>II. Background and Conceptual Framework</td>
<td>8</td>
</tr>
<tr>
<td>III. Literature</td>
<td>13</td>
</tr>
<tr>
<td>IV. Research Methodology</td>
<td>16</td>
</tr>
<tr>
<td>V. Findings and Policy Options</td>
<td>18</td>
</tr>
<tr>
<td>VI. Conclusions, Recommendations or Next Step Actions</td>
<td>31</td>
</tr>
<tr>
<td>VII. References</td>
<td>34</td>
</tr>
<tr>
<td>VIII. Appendices</td>
<td></td>
</tr>
<tr>
<td>Appendix A: Acronyms</td>
<td>38</td>
</tr>
<tr>
<td>Appendix B: NIOSH 1990-2009 Graph of Commercial Fishing Fatalities in Alaska</td>
<td>40</td>
</tr>
<tr>
<td>Appendix C: Alaska Fishing Vessel Safety Law Enforcement Boardings and Violations</td>
<td>41</td>
</tr>
<tr>
<td>Appendix D: Tables</td>
<td>42</td>
</tr>
</tbody>
</table>
Preface

The Magnuson-Stevens Fishery Conservation and Management Act (FCMA) of 1976 was passed to establish a 200 nautical mile (NM) fishery conservation zone (FCZ), reclaim those waters from foreign fishing, and initiate the expansion of our domestic fishing industry into those areas. It established the transitional mechanism of joint fishing ventures for our fishermen to allow them to learn from their foreign counterparts before they assumed full harvesting responsibilities. Our present day Regional Fisheries Management Councils (RFMCs), were created by the FCMA to provide fisheries management oversight of our major coastal fisheries.

During the two decades (1990-2010) following the passage of the FCMA, the Alaskan commercial fishing industry underwent significant changes and growth which resulted in a large increase in injury to or death of fishermen and damage and/or loss of many of their fishing vessels.

I had the unique “insider’s” opportunity to be involved in the story of Alaskan commercial fishing vessel safety (CFVS) in the early FCMA era. My perspective was developed during the following experiences:

- From 1978 to 1980, I was a Coast Guard (CG) fisheries law enforcement officer, under the FCMA, working with the foreign fishing vessels operating in the Gulf of Alaska, along the Aleutian Chain, and north into the Bering Sea.

- From 1983 to 1985, I was a CG Search and Rescue (SAR) controller coordinating responses to commercial fishing vessels in distress from Ketchikan north and west along the Alaskan coast to the Bering Straits.

- From 1991 to 1993, I was the first coordinator of CFVS for Western Alaska, from Cook Inlet west out the Aleutian Chain and north into Bristol Bay. We introduced Alaskan fishermen to the new regulations resulting from the Commercial Fishing Industry Vessel Safety Act (CFVSA) of 1988 and established the voluntary dockside examination (VDE) program that still exists today.

In 1993 I left the Coast Guard as it was staged to transition from a public education role to that of enforcing safety standards. I lost contact with the commercial fishing industry for twenty years and returned in 2013 to work with the National Institute for Occupational Safety and Health (NIOSH) Commercial Fishing Safety Research and Design Program at their Alaska Pacific Office in Anchorage on this UAA policy report. I reacquainted myself with the initiatives of CFVSA and the resultant National Research Council (NRC) fishing vessel safety study.

In 2013, twenty years later, I was initially struck by two apparent finds:

1) There has been a significant reduction in commercial fishing fatalities.
2) Commercial fishing vessels were still not being inspected and fully accountable for the requirements of the CFVSA.

This led me to ask the following questions:
a. Have the outreach efforts of the last twenty years to educate and promote fishing vessel safety resulted in an acceptable level of improvement to negate the need for compliance?

b. What other factors contributed to this improvement?

c. Are the commercial fishing vessels effectively self-regulating?

d. Is a mandatory examination or formal inspection necessary to achieve the intent of the CFVSA?

e. How frequently should vessels be inspected/examined to achieve an acceptable level of safety?
Executive Summary

The U.S. commercial fishing industry existed as an open access market for hundreds of years. In 1976 the Fishery Conservation and Management Act (FCMA) was passed to establish and Americanize the U.S. 200 nautical mile (NM) fishery conservation zone (FCZ) and place it under eight federal regional fisheries management councils (RFMCs). The commercial fishing industry underwent extreme transformation and their fishing grounds expanded ten-fold as a result of the FCMA. The FCMA created a rush of entrepreneurs to enter the market and cash in on the opportunity.

One unanticipated consequence of the FCMA was that by the mid-1980s commercial fishing vessel casualties were averaging 250 vessels and 100 lives lost annually. The American people and their congressional representatives reacted by passing the Commercial Fishing Industry Vessel Safety Act (CFVSA) of 1988. Congress sought to establish a public safety program for commercial fishing vessels and set forth safety and survival standards for such vessels. The industry has used its political power to prevent the standards from becoming fully enforceable (Fishing Vessel Casualty Task Force, March 1999).

In 1992 the North Pacific Fisheries Management Council (NPFMC) called a three year moratorium on new entries in the federally managed fisheries off Alaska. In the mid-1990s The NPFMC started implementing an Individual Fishing Quota (IFQ) system issuing shares of the total allowable catch to those fishermen who had historically worked in a given fishery. IFQs gave ownership shares of the fish to the fishermen and eliminated the dangers of competition and urgency of short seasons, often during adverse weather conditions.

During the period 1990 to 2009 the number of commercial fishing fatalities in Alaska fell by approximately seventy percent. The Coast Guard implemented a safety outreach and educational campaign to help the fishermen comply with the standards. The commercial fishing industry stakeholders created a safety coalition using agency collaboration and partnerships with industry and non-profit organizations to promote safety.

Simultaneously, the National Institute for Occupational Health and Safety (NIOSH) developed the comprehensive Commercial Fishing Incident Database (CFID) and a scientific approach to identify fishery-specific risk factors for tailoring programs targeted at specific hazards of individual fleets. This technique is being used to continue to drive the industry fatality rates down even further.

Many factors have contributed to today’s commercial fishing industry vessels’ steadily improving safety record. The FCMA changes, CFVSA, commercial fishing industry stakeholders safety coalition efforts, NIOSH data and approach, and recently implemented Coast Guard Authorization Act of 2010 safety standard revisions have resulted in a much safer, efficient and effective harvest of our fisheries resources.
1. **Problem Statement**

My client for this report is the director of the National Institute for Occupational Safety and Health (NIOSH), Alaska Pacific Office, Jennifer Lincoln. She asked me to develop data to support reversing a recent change to commercial fishing vessel safety examination requirements. The change required that the frequency of examination be extended from biannually to every five years. Upon completing my initial research, I determined that this change is the most recent result of the fishing industry’s century long efforts to prevent governmental regulation of their fishing operations. She was agreeable to expand the report focus to the bigger issue of government regulation of commercial fishing and more specifically how safety improvement of commercial fishermen and their vessels has been achieved.

Americans have been drawn to watch the working conditions portrayed in the TV series “Deadliest Catch.” They wondered why fishermen choose to expose themselves to such dangers and what is being done to protect them. Workplace safety has been a public safety focus of our government since the late nineteenth century. Corresponding efforts to define such safety standards and implement them in the commercial fishing vessel industry have been attempted. Progress has been slow, accounting for its present day image as being one of the highest-risk occupations in our country.

Marine safety standards have evolved over the last century through technological advances and with lessons learned from maritime tragedies. Generally, these standards were defined in statutes to apply to all passenger and commercial vessels. They included requirements for comprehensive vessel inspection and licensing of the operators. Commercial fishing vessels, the exception to this rule, were categorized as “uninspected vessels” and are not regulated by such comprehensive safety standards. A review of the last century of legislative history shows that almost every decade efforts have been made to redesignate such vessels as inspected vessels, but each time the legislation was changed or defeated. Independent safety studies of this industry conducted during the same period also recommended that commercial fishing vessels be formally inspected and operators licensed (Magno & Hiscock, 1991).

Over twenty years ago, Congress passed the Commercial Fishing Industry Vessel Safety Act (CFVSA) of 1988 to reduce injuries, fatalities, and damage or loss of fishing vessels (U.S. annual losses averaged 100 fishermen and 250 fishing vessels). It mandated new safety requirements and directed the Secretary of Transportation to conduct a study using the National Academy of Engineering (National Research Council (NRC)). The NRC study was to assess the safety problems and identify ways to address them. It also called for a specific recommendation on whether or not a vessel inspection program should be implemented. The study committee issued their findings in 1991 as the Fishing Vessel Safety: Blueprint for a National Program. It specifically recommended an inspection program for vessels (beginning with compulsory self-inspection with audits) and professional qualification standards for operators (National Research Council, 1991).

Today commercial fishing vessels are still uninspected and the majority of them are run by unlicensed operators. The commercial fishing industry has lobbied hard to prevent their vessels from becoming inspected vessels for economic reasons (Hiscock, 2000). The Act gave the Secretary of Transportation (Coast Guard) the authority to address the problem, but not the resources to do it. The Coast Guard was tasked with implementing and enforcing the CFVSA regulations and has to balance the use of their limited resources against the demand of their many
other federally mandated responsibilities (missions). The NRC study committee foresaw these factors as principal determinants of the ultimate solution (National Research Council, 1991).

During the last twenty years (1990-2010) much has been done to address the factors identified in the NRC study. Many of the NRC study recommendations have been implemented to improve the safety of the commercial fishing industry, along with the CFVSA. Among those actions has been the dedication of a number of government agencies and non-governmental organizations (NGOs) to help implement the safety requirements and educate the commercial fishing industry.

One of the study’s biggest obstacles was that very little data existed to quantify the safety problems. Section 6104 of the Act required the Secretary of Transportation to compile statistics concerning marine casualties. (100th U.S Congress, 1991). The National Institute for Occupational Health and Safety (NIOSH) has assumed the role of documenting commercial fishing vessel safety issues. NIOSH opened their Alaska Pacific Office in Anchorage back in 1991 and began gathering marine casualty data to better define safety issues and solutions. NIOSH Alaska Region commercial fishing fatality data indicates that the annual number of fatalities has dropped by over two-thirds (70%) since their office opened (NIOSH National Institute for Occupational Safety and Health, 2013).

As the CFVSA regulations took effect in the 1990s, political and economic realities changed the face of an inspection program into a long term voluntary dockside examination (VDE). Dockside examinations were initially introduced by the Coast Guard in a 1978 voluntary program which was terminated due to budget cuts by the early 1980s (Magno & Hiscock, 1991). They were reintroduced in 1991 as a public outreach and voluntary educational tool to introduce commercial fishermen to the “new safety standards” set forth in the CFVSA of 1988 (Hill, 2013). Throughout this period (1990-2010) VDEs have been available upon request. The only consistent safety standards enforcement has been prior to and during specific fisheries openings when the fleets are concentrated. Commercial fishing vessel accountability for complying with the CFVSA standards is dependent upon resource availability and involves boarding commercial fishing vessels at sea, which can result in termination of a vessel’s voyage until they comply.

The latest development in the regulatory battle was initiated by the Coast Guard Authorization Act (CGAA) of 2010 which included a requirement to make such dockside safety examinations mandatory biannually and would have resulted in compliance by many more commercial fishing vessels (111th U.S Congress, 2010). The Coast Guard and Maritime Transportation Act of 2012 postponed the implementation of mandatory safety exams and extended the frequency to every five years (112th U.S. Congress, 2012). The power struggle between the regulators and the industry continues to limit compliance accountability.

The effort to regulate the safety of the commercial fishing industry is a conundrum. NIOSH’s data indicates that significant progress has been achieved in making commercial fishing a much safer occupation. The CFVSA was passed to provide a standard for improving safety of fishermen on their vessels. The primary regulatory tool, dockside examinations, used to promote compliance with the CFVSA standard was voluntary until the CG Authorization Act of 2010 went into effect in October 2012. What factors contributed to the significant improvement in commercial fishing vessel safety achieved during the twenty years following the passage of the CFVSA?
II. **Background and Conceptual Framework**

One of the primary attractions of explorers to the new world of America was our abundance of natural resources. Early settlers and explorers were also often motivated by profit to locate and exploit these vast natural reserves. Examples of such actions are the fur trade and gold rushes which brought many of our forefathers north into Alaska.

Fish stocks were one of these plentiful resources that were found off the shores of America. Early explorers and settlers harvested these resources and they became one of the early staples upon which they survived. Over time a significant commercial fishing industry developed to supply the growing needs of our young nation and for export to world markets.

In his ocean resource harvesting efforts, man has developed many efficient and effective methods. He has had to learn to operate in a hazardous work environment threatening damage or destruction of his work platform and possible injury or death. As he has perfected such harvest techniques, he has also learned how to survive and operate safely in the harsh marine conditions.

After a couple of centuries of harvesting off the shores of America, our fishermen have become concerned about the long term health and sustainability of our fish stocks as the source of their livelihood (Lindsay, 2013).

The issue of fisheries conservation in Alaska during the first half of the twentieth century is best portrayed in an article entitled: “The Pacific Salmon Fisheries: A Study of Irrational Conservation” by James A. Crutchfield and Giulio Pontecorvo. They wrote that “The Alaska salmon-canning industry is identified as the most important economic enterprise in the Territory of Alaska during that period, outdistancing gold and copper mining, timber, and tourism in value of export, number of people employed, and the scope of the activity.” It explains that the industry was primarily run by absentee investment in Alaskan resources with significant political power over federal agencies which manage Alaska’s resources. Their lobbying efforts have had a major effect on legislation and policy concerning Alaska from its territorial days (Crutchfield & Pontecorvo, 1969).

The Pacific Salmon fisheries, representative of other fisheries which have followed, repeatedly experienced a cyclic depletion of stocks during the period leading up to statehood, resulting in federal intervention and policy under the White Act of 1924 (Crutchfield & Pontecorvo, 1969). Overfishing during World War I led to this major regulatory legislation, setting a pattern for fisheries regulation until statehood in 1959. It established two major changes: 1) federal authority to manage and regulate fisheries; and 2) required no less than 50 percent escapement in most streams. Alaskans came away with strong opposition to outside interests and dissatisfaction with federal control, which boiled over when the salmon stocks became depleted once again during World War II. As Alaska prepared for statehood during the 1950s, similar problems persisted and a 1952 statewide referendum resulted in Congress turning control of fisheries over to the territory (Crutchifield & Pontecorvo, 1969).

During the late 1940s, other American fisheries came under attack from outside the country. Foreign fishing vessels (FFVs) invaded the coastal waters outside the U.S.’s (Alaska’s) existing 12 nautical mile (NM) Contiguous Fishery Zone (CFZ). Many nations had depleted the fish stocks of their own CFZs and started searching out other sources on the high seas and along the shores of other countries, including the U.S. These actions lead to two decades of conflict
and the development of national and international policies to lay claim to hundreds of miles of coastal waters and armed enforcement of those claims. (Crutchfield & Pontecorvo, 1969)

In 1945, President Truman declared his seabed doctrine which claimed the resources of the seabed along the U.S. continental shelf to 12 miles offshore. Three more decades of conflict and disputed resource claims followed before the U.S. decided to expand the Truman seabed doctrine to specifically include fisheries and out to the 200 NM limit we know today. (Pacific Coast Federation of Fishermen's Associations, 1999) In 1976, The U.S. Congress passed the Magnuson-Stevens Fishery Conservation and Management Act (FCMA) establishing policies to implement this change (P.L. 94-265, HR 200) establishing the following policies (94th U.S Congress, 1976):

1) U.S. Ocean Policy, expanding U.S. Fishery Conservation Zone out to 200 NM (Under President Reagan incorporated into U.S. Exclusive Economic Zone (EEZ)).

2) Americanization Policy, phasing out foreign fishing offshore of U.S. and initiating the redefining of the U.S. domestic fishing fleet to be capable of harvesting the fisheries resources of the EEZ.

3) Federal Fisheries Management Policy, establishing eight regional fisheries management councils (RFMCs) under the Department of Commerce and launching a new era of commercial fishing in the U.S. (Pacific Coast Federation of Fishermen's Associations, 1999).

These policies profoundly changed the Alaskan commercial fisheries and resulted in some unanticipated fallout. Our commercial fisherman had their fishing grounds expanded over ten-fold. The distance they could operate away from the security of the shore expanded from a few miles to hundreds of miles. Many of them entered into totally new fisheries on a much grander scale of operation and adopted totally new techniques. They had to obtain new fishing vessels or significantly modify and expand their existing ones to carry the fishing gear of each new fishery they chose to enter. The learning curve was steep and the sea was unforgiving when mistakes were made. Their teachers were their joint venture, foreign partners with cultural and language barriers. The crowning factor which pushed safety limits over the edge was the fact that the construction or modifications of these vessels were not required to be done to industry standards. It can be assumed that many casualties of personnel and vessels resulted from these major changes during the transition into this new era of commercial fishing. These safety issues led to the need for additional federal policies and regulation.

Up until the passage of the FCMA, commercial fishing vessels had not been subject to much government oversight. Commercial fishing had always involved heroic men going to sea, battling the elements to claim their prize catch, and provide for their own livelihood. During the twentieth century fishermen have experienced significant changes in their professional requirements, work environment, and means of transportation. Ships and the tools fishermen work with have transitioned from sail and manual power to mechanical and computerized systems allowing them to become much more productive, but also making their work place even more dangerous. Commercial vessels at large have evolved along with technological changes, resulting in them being heavily regulated as inspected vessels. Commercial fishing vessels were able to avoid most of these government controls under the category of “uninspected vessels.” (Magno & Hiscock, 1991)
The game changing policies of the FCMA opened a door of opportunity and the industry raced to meet this very profitable challenge. Three and a half billion dollars was the average annual value of U.S. Commercial Landings of Fish and Shellfish (2000-2009), with Alaska contributing approximately 1/3 of that catch (NOAA Fisheries: Office of Science & Technology, 2010). This ten-fold increase in profitability reinvigorated the U.S. commercial fishing industry. Owners and investors worked hard using their political power to develop the FCMA policies to gain control of the greatly expanded industrial resource pool. In turn these policies created new safety problems of their own which have fueled further politics and generated a safety policy through the legislative cycle.

By the late 1970s and early 1980s the Americanization of the U.S. domestic fishing fleet was in full motion. The learning curve was steep with high rewards for success and fatal consequences for failure. Crewmen of fishing boats were making hundreds of thousands of dollars per season and owners/operators, motivated by such high profits, were pushing the limits of their crews and fishing boats (Hill, 2013). As a result, the industry was experiencing a very high cost in casualties to people and vessels. An average of 100 fishermen died and 250 vessels were lost each year across the U.S. In addition to the loss of people and equipment, the industry felt the resultant economic pressure of higher insurance rates and in many cases could not obtain such coverage with their poor safety record. (National Research Council, 1991)

The floors of Congress again rang with commercial fishing issues as the fishermen and investors attempted to obtain economic relief from the high cost of insurance and liability for their high risk industry. A number of initiatives were considered, but the solutions lay in making the industry safer to reduce the losses. The industry and its lobbyists were not willing to allow compliance to be legislated for commercial vessel standards and other appropriate safety requirements. However, in 1985 there was a commercial fishing vessel tragedy involving the F/V Western Sea and her six crewmen. This event tipped the scale as the parents (Robert & Peggy Barry) of one of those fishermen, Peter Barry, took up the safety cause. They spent the next five years pressing for changes to improve the safety standards of the U.S. commercial fishing fleets (Magno & Hiscock, 1991) (Hiscock, 2000).

Congress finally agreed that such losses were not acceptable and they passed the Commercial Fishing Industry Vessel Safety Act (CFVSA) of 1988. The CFVSA required and/or authorized:

1) All uninspected fishing vessels to comply.
2) Clearly defined and enforceable safety standards.
3) Enforcement of those standards through termination of operations and financial penalties.
4) A CFVS Advisory Committee.
5) A plan for licensing operators of commercial fishing vessels.
6) A vessel casualty data base.
7) A study by the National Academy of Engineering of the safety problems and a recommendation as to whether or not CFVs should become inspected vessels.
8) Fishing agreements with all crewmembers including a process to recover wages/fish shares.
9) Crewmen to notify their employer of any work related illness, disability or injury.(100th U.S. Congress, 1991)
The National Academy of Engineering, working through the National Research Council’s Committee on Fishing Vessel Safety, conducted the safety study and provided research on safety factors and recommendations. Their report was issued as the: *Fishing Vessel Safety: Blueprint for a National Program in 1991*. This report provided a comprehensive analysis of the nature, scope, and causes of the safety problems using the available data. They also considered past safety initiatives developed for our commercial fishing industry and those of similar programs around the world. They sought input from the fishing communities and other stakeholders in the many regions of the country through focus meetings and individual interviews (National Research Council, 1991).

The NRC Fishing Vessel Safety study is the starting point of this policy report in assessing how this industry had evolved to its unsafe condition by the late 1980s. The study defined the known factors at that time and made recommendations to improve the safety of the commercial fisherman and their fishing vessels. It will provide a foundation for considering the progress that has been made over the twenty years (1990-2010) since it was released. It will help us to more fully understand this industry and the pre-existing and new factors which are the objective of our research question.

The objective of improving commercial fishing vessel safety has been measured in the same terms as the problem was defined, casualty statistics. Before the NRC study was completed and the CFVSA went into effect, such data was not being captured in a comprehensive reporting system. The study proposed strategies for improving the quality and completeness of such data (National Research Council, 1991).

The Act tasked the Secretary of Transportation to compile casualty statistics. The National Institute for Occupational Safety and Health (NIOSH) within the Department of Health and Human Services (DHHS) established an effective data collection system back in the early 1990s. In 2010 NIOSH issued a report based on twenty years of data (1990 – 2009) indicating that the annual rate of commercial fishing vessel fatalities has dropped by approximately seventy percent (NIOSH National Institute for Occupational Safety and Health, 2013).

Design, construction, and operating equipment standards for commercial vessels are defined in the U.S. Code of Federal Regulations (CFR). Coast Guard inspected vessels are required to be statutorily certified under Title 46 of the CFR before they can legally operate. They are formally inspected for compliance and issued a Certificate of Inspection (COI). However, commercial fishing vessels are classified as uninspected vessels and not required to meet those comprehensive high standards(National Research Council, 1991).

Commercial fishing vessels are held to much less comprehensive standards than other commercial vessels. In the 1990s, following the passage of the CFVSA, the Coast Guard developed a voluntary dockside examination (VDE) based on the requirements of the Act. The VDE has been the primary tool used to educate and promote safety within the commercial fishing fleets for the last twenty years. In October 2012 VDEs became mandatory for commercial fishing vessels operating outside 3NM and are currently required every five years under the 2012 Coast Guard and Maritime Transportation Act of 2012 (112th U.S. Congress, 2012).

The CFVSA was developed as government regulation to establish safety standards to protect fishermen and their vessels from workplace and operational casualties. The goal of
improving CFVS was to be achieved through compliance with the CFVSA. The Coast Guard developed its VDE to help fishermen gauge their compliance with the standards. Historically, only six to seven percent of the U.S. commercial fishing vessels have chosen to participate in the VDE program (Lawrenson, 2013). True compliance accountability could be achieved through an active safety standards enforcement program.

There are many other factors which have contributed to the significant safety improvement achieved over the last twenty years. The industry has played a major role; both politically and through its efforts to self-regulate its members, which must be considered in this success story. Many other organizations and agencies have been involved in the process which has led to these improvements and are part of the equation. The report will seek to define their roles along with the other factors to provide a more complete understanding of commercial fishing vessel safety.
III. Literature

This report identifies the legislative process, The Fishery Conservation Management Act (FCMA), by which the U.S Ocean policy expanded our exclusive fishing rights out to 200 NM, the Americanization policy turned over all fishing in those waters from foreign vessels to the U.S. domestic fishing fleets, and the federal fisheries management policy placed regional councils in control of our coastal fisheries. The initial implementation of the U.S. Ocean and Americanization policies created a transitional environment resulting in a large number of marine casualties.

The significant unanticipated safety problems which resulted led to a second legislative response, the Commercial Fishing Industry Vessel Safety Act (CFVSA). The CFVSA in turn was a regulatory safety policy to improve survivability during vessel casualties. Each of these policies, the FCMA and CFVSA, was the result of commercial fishing groups using their political power to their benefit or to minimize the impact on their self interests. They are the powers who shaped the current U.S. domestic fishing industry in counterbalancing government regulation during the last quarter of the Twentieth Century (Fishing Vessel Casualty Task Force, March 1999).

The CFVSA was Congress’s policy attempt to intervene in the name of public safety. Families and groups who had suffered personal losses joined with government to impose safety requirements on an industry that they perceived was not willing to hold itself accountable. The NRC study points out that prior to the establishment of the CFVSA safety standards no federal requirements applied to 99% of the uninspected commercial fishing vessels. This partnership of government and private interest group used our political process to force more stringent safety standards on the commercial fishing industry (Magno & Hiscock, 1991).

The Coast Guard was charged with enforcement, but was not given sufficient additional resources to effectively hold the commercial fishing vessels to the standards. They kept their outreach tool, the dockside examination, voluntary and remained responsive to the fishermen who choose to participate. They limited their active enforcement effort to holding fishermen accountable to the standards prior to and during actual fishing openings to use their resources most effectively. In the most recent development in which dockside examinations have become mandatory, the commercial fishing interest group may have been involved in significantly blunting the impact by getting the examination frequency extended to five years.

Pluralism teaches that policy is the result of a political process. Pluralists see government as being dominated by a multitude of small interest groups who are powerful because they control various resources. These entities include among others, business and financial lobbies, and influence the making and administration of laws and policy. Such a model accurately describes a number of our domestic industries, including commercial fishing. (Reynolds, 1997) Louis Bragaw, in his examination of the Coast Guard as a federal agency, identified a similar charge that “… government organizations with regulatory functions are said to be co-opted over time by the very publics they are created to regulate (Bragaw, 1980).”

The FCMA of 1976 was developed in response to a significant economic opportunity available to the domestic commercial fishing industry investors and owners. Pluralist politics led to this policy. They effectively lobbied Congress to claim and manage the rich natural resources in our economic exclusion zone (EEZ). This set the stage for an economic boom much like the
Alaskan Gold Rush of the 1890s or the building of the Alaskan Pipeline in the 1970s. Growth was rapid to stake claims and safety took a back seat in a rapidly changing industry.

In the 1960s and 70s, Theodore Lowi reversed the pluralist ideas of the politics-policy relationship with the development of his “arenas of power” approach, asserting that policy determines politics. He portrayed regulative policy as only one of the political ways governments seek to control (coerce) society and individual conduct. The other policy types in his 4-cell matrix were distributive, redistributive, and constituent (Lowi, Four Systems of Policy, Politics, and Choice, 1972). Since then, H.L.A. Hart’s rules modified the Lowi model to reflect costs and benefits and changed to a focus on public and private forums as indicated below (Kellow, 2009):

**Revised Arenas of Power**

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<td>Distributive</td>
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<td>Redistributive</td>
<td>Private Interest Regulatory</td>
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Under the Lowi-Hart model, the policies affecting the commercial fishing industry can be better understood. The FCMA was a public distributive policy which gave the 200 NM FCZ fishing rights to a small group of investors and fishermen, much like the elitist distribution of American land to the railroad industry in the Nineteenth Century(Ambrose, 2000). It was also the public interest regulatory policy establishing the regional fisheries management councils which oversee domestic fisheries today. The CFVSA was a public interest regulatory effort seeking to improve the safety of all commercial fishermen. The CFVSA also involved a private interest regulatory response to prevent mandatory compliance and allow self-regulation and other external factors to achieve the safety objectives.

The end product of the political process is federal legislation through which policies are developed, maintained, and altered. In addition to the legislators themselves, this process involves many interested parties or groups who seek to influence the policy decisions effecting them. Meier and Copeland in their article, *Interest Groups and Public Policy*, indicated that “…the views of organized groups are both sought and given” during the legislative process. (Copeland & Meier, 1983). Harold Lasswell described such politics as a question of “who gets what, when, and how”(Lassell, 1958). The U.S. commercial fishing industry, as such an interest group, played a very active role in the passage of the FCMA and continues to do so with the CFVSA and related legislation preventing commercial fishing vessels from becoming Coast Guard inspected vessels and fully accountable to safety standards (Magno & Hiscock, 1991).
Lawrence Mead in his journal article, *Policy Studies and Political Science*, points out that politics often is in direct conflict with American values and the democratic agenda. It is not always responsive and accessible to the general public or free of control by narrow interest groups, especially business. As a result, it may serve the immediate needs of such groups, but not consider the long term economic impact for all parties. The FCMA allowed the commercial fishing industry investors and fishermen to reclaim our CFZ for domestic harvest for themselves, but it did not properly prepare them to safely assume their new primary role. Mead included S.P. Huntington’s observation that such policy problems end up being blamed on government rather than tagging the public demands which caused them. (Mead, 1985)

Federal legislation often alters the process itself through the creation of new interest groups. These new interest groups have changed American politics by altering and often controlling policy arenas. Interest groups are made up of individuals with a common interest who organize to promote that interest. One reason they may organize is to protect or promote their real or precieved rights within a political system (Truman, 1971). The commercial fishing industry and its investors fit the profile of such interest groups.

A special type of interest group develops as a result of government action in creating a new government program. They are called “imputed interest groups” and act to maintain that program because it provides benefits to its members. They form a triangulated relationship of government bureaucracies, congressional subcommittees and group members with the mutual objective of perpetuating that government program or policy (Colarulli & Berg, 1983). The commercial fishing industry draws its power from the fisheries resources it gained control of under the FCMA and they are very active in maintaining their power through such relationships.

Robert Dahl divides people into homo civicus or potential interest groups and homo politicus (organized groups). Homo politicus is actively involved in his local governmental decisions. Homo civicus is too busy with everyday life to get involved (Dahl, 1961). However, when our politically active neighbors or a local governmental policy disturb our world, we react and seek to influence the outcome of that policy. They take these actions as often as not to deny or deter some governmental action (Dahl, 1961). Commercial fishermen by nature are more homo civicus, but when their livelihood is threatened by government regulations many have shifted gears and become homo politicus. This characteristic has motivated the fishing industry to prevent their fishing vessels from becoming inspected vessels for almost a century (Magno & Hiscock, 1991).

Commercial fishermen have always been known for their independent spirit and go to sea to escape the rules and boundaries we experience in our society on shore. They have learned to organize to address their common interest, such as regulations, insurance, or conservation of fish stocks. The more professional owner/operators take responsibility for such issues and actively participate in fishing associations, insurance pools, and programs to conserve the sources of their livelihood. They acknowledge that safety is good business and work within their safety associations to develop procedures and checklists to ensure that their safety gear, survival training and equipment maintenance are adequate. These efforts are being made to prevent further actions by the federal government to regulate their livelihood and fishing vessels.
IV. **Research Methodology**

The research for this policy report will be accomplished using a mixed model of quantitative and qualitative methods. The report will focus on the Alaskan fishing region and only data from that region will be evaluated to obtain measures of safety improvement and voluntary program participation and compliance with safety standards. This population is being used because actions taken in the Alaskan region have been well documented and provide a wide range of contributing factors to consider.

The degree of safety improvement experienced in Alaska during the twenty year period (1990-2010) immediately following the passage of the Commercial Fishing Industry Vessel Safety Act (CFVSA) will be defined by NIOSH data and analysis of annual commercial fishing fatalities. This measure is a good gauge of casualty reductions, the policy objective sought by the CFVSA.

With the policy objective clearly defined, the research will shift its focus to identifying and defining what quantitative factors led to this accomplishment. The quantitative sources to be considered will be the CFVSA standards and how they have been implemented. One of the primary purposes of the CFVSA was to establish quantifiable safety standards for commercial fishing vessels. The Coast Guard reintroduced its Voluntary Dockside Examination (VDE) program based on the CFVSA safety standards and has been conducting those examinations for over two decades (1990-2010). It has maintained a data base (Port State Info System (PSIS)) of the results of those evaluations and the compliance decals they issued to vessels having no major deficiencies.

Quantitative analysis will be conducted to define CFVSA compliance and VDE participation. The Coast Guard data will be evaluated to determine the levels of participation and compliance. The establishment of the CFVSA standards was a necessary step toward improving safety on commercial fishing vessels. For the standard to be effective in achieving the safety goal, it had to be applied to the majority of the vessels in question. Therefore this evaluation will define the extent of participation of the Alaskan fishing fleets. The data will also give us a sense of the degree to which these vessels are complying with the safety standards. We can obtain this information from the records of compliance decals which are issued to the participants. We need to acknowledge that these results will be biased by the fact that participation was voluntarily and therefore not a good representation of the Alaskan fishing fleet population.

A more objective gauge of compliance can be obtained from sampling the data obtained from commercial fishing vessels during law enforcement boardings. A boarding is the term used to describe when law enforcement officers enter a vessel to check compliance with a regulatory standard(Hill, 2013). They may be boarded to provide assistance during rescue operations or other CG missions, including law enforcement. They are required to undergo a safety examination during a law enforcement boarding specifically targeting them for compliance during a fishing season.

With the issues of safety improvement and safety standards compliance defined, their relationship between each other can be determined. One possible answer may be that the level of compliance was not significant enough to result in the safety improvement. This will set the stage for introducing the many other factors, some of which were identified in the National Research Council (NRC) study and addressed in its recommendations.
The NRC fishing vessel safety study was the most comprehensive safety assessment of commercial fishing in the U.S. available at the start of the period in question. There had been many such formal assessments before it and they have continued through the twenty year period (1990-2010) being studied here. Its finding and recommendations were further re-enforced and updated by the Fishing Vessel Casualty Task Force halfway through the period (1999). The Task Force consisted of members of the Coast Guard, National Marine Fisheries Service (NMFS), National Transportation Safety Board (NTSB), National Oceanic and Atmospheric Administration (NOAA), and Occupational Safety and Health Administration (OSHA). They also build on the 1987 NTSB study, “Uninspected Commercial Fishing Vessel Safety and the 1997 National Institute for Occupational Safety and Health, Current Intelligence Bulletin 58, “Commercial Fishing Fatalities in Alaska, Risk Factors and Prevention Strategies. These references will be used as the foundation for identifying and defining the many qualitative factors which have contributed to the reduction in casualties (Fishing Vessel Casualty Task Force, March 1999).

The full impact of the Fishery Conservation Management Act (FCMA) was not considered in the NRC study. The policies and contributions of the FCMA will be discussed next because it was the primary factor which created the environment in which the casualties took place. It has also provided the fisheries management structure under which the fishing practices have been changed to dramatically reduce the unsafe conditions which led the casualties.

One solution which continues to be promoted as the ideal option for improving safety aboard commercial fishing vessels is to fully regulate them as CG inspected vessels. Such an action appears to be a simple clean solution, but doesn’t reflect a true understanding of the vessels in question. This alternative will be discussed to determine if it has merit.

There are a number of factors which were not fully envisioned at the time the NRC study was conducted, but now need to be considered as part of the solution. The study and others conducted through the years have identified the causes of the high level of casualties. Many of the stakeholders of the commercial fishing industry have also been working to address these problems and their efforts must be considered.

Qualitative data will be collected in a series of interviews with current representatives of the stakeholder organizations to obtain their safety assessments of the Alaskan commercial fishing fleets. This will expand the solution to capture the many factors which have come in to play since the NRC study was completed.

This approach will provide an insight into how the desired safety improvement objective has been achieved and thus help focus the continuing efforts to maintain and further improve these achievements.
V. Findings and Policy Options

The U.S. commercial fishing industry as it exists today was shaped by a number of government policies. This report describes policies which affected safety onboard commercial fishing vessels. This era of our fishing industry began with the passage of the Fishery Conservation and Management Act (FCMA) in 1976. While this act did not directly address safety, it established three policies (oceans, Americanization, and federal fisheries management) which have dramatically influenced the safety of our modern commercial fishing fleets (94th U.S Congress, 1976).

The FCMA Oceans policy expanded U.S. sovereignty over offshore resources, including fisheries out to the 200 nautical mile (NM) limit, drawing fishermen into a much more hostile and challenging work environment. Its Americanization policy expanded the territory exclusively available to our commercial fishermen by approximately ten-fold and gave them rights to our multi-billion dollar commercial fisheries. The fisheries management policy it created changed the fisheries in ways that reduced their risks and ultimately is making them more effective and efficient at harvesting our fisheries resources (Pacific Coast Federation of Fishermen's Associations, 1999). It also made them a much more powerful industry in the political arena.

One of the primary factors which led to the passage of the FCMA was the invasion of foreign fishing vessels operating off our shores. The FCMA contained the Americanization Policy. It was a plan to phase out foreign fishing off our shores. It established transitional joint-venture opportunities to introduce our fishermen to the fisheries the foreigners had pioneered. Our fishermen were drawn into very profitable, but much larger scale and more hazardous fisheries. They had to learn new techniques and how to operate in a much more complicated work environment (Hill, 2013).

American commercial fishermen have been concerned about the shrinking size of their catch for many years. The commercial fishing interest groups brought these concerns to their legislators who were drafting the FCMA. They recognized the need for conservation measures to protect and preserve our national fish stocks. Such measures could only be developed and implemented at the federal government level.

Their efforts resulted in the federal fishery management policies, plans, and practices which have radically changed the management and structure of the U.S. domestic commercial fishing industry. Before the foreign fleets were removed from our shores, U.S. fishermen blamed catch fluctuations on them. Since the departure of the foreign fishing vessels, our fishermen have learned to be part of the management process on the eight regional fisheries management councils created by the FCMA. This has not magically fixed our fish stock shortages, but it has given them hope that they may be able to save their industry and livelihood for future generations (Pacific Coast Federation of Fishermen's Associations, 1999).

Among the many important findings of the National Resource Council (NRC), one of the most important was the recognition of the lack of quality and quantity of data being collected to document commercial fishing safety issues. The NRC dedicated a chapter and two appendices of their study to the data that was available, and while it was not sufficient to determine causal relationships, they were able to identify potential factors and substantiate that there was a safety problem that needed to be addressed (National Research Council, 1991). Their recommendation
to upgrade safety data reinforced the Commercial Fishing Industry Vessel Safety Act (CFVSA) requirement to compile casualty statistics (100th U.S. Congress, 1991). Today, the lack of data quality and quantity continues to impact our ability to address the safety questions.

As a result of the CFVSA and NRC recommendations to improve documentation of the commercial fishing safety, today we can obtain a much clearer picture of the factors which affect the safety of commercial fishermen. A number of federal and state government agencies undertook the responsibility to improve documentation of such safety issues within their circle of influence. Foremost, NIOSH acted by opening their Alaska Pacific Office, and establishing a comprehensive statistical data collection, analysis, and utilization program in 1992.

NIOSH’s documentation and analysis of the data they collected over a twenty year period (1990-2009) is the basis of the research question being addressed in this policy report. Appendix II shows a bar graph of the annual Alaska commercial fishing fatalities during that period. Annual number of fatalities decreased from a high in the mid-thirties in the 1990s down to below ten in 2010. During the period, the annual fatality totals averaged a decrease of one fatality each year, resulting in a cumulative reduction of twenty fatalities or over seventy percent. That is a significant safety improvement which raises the question: What factors contributed to the significant improvement in commercial fishing vessel safety achieved during the twenty years (1990-2010) following the passage of the CFVSA?

The logical answer to that question should be that it is a result of the CFVSA, as intended. The Coast Guard’s Voluntary Dockside Examination (VDE) program is the tool they have used since 1992 to educate and assist fishermen in assessing their own safety preparedness and level of compliance. I contacted the Seventeenth Coast Guard District (Juneau, Alaska) Commercial Fishing Vessel Safety Coordinator, Ken Lawrenson, to quantify the level of participation and compliance in their VDE program. He provided the following data (Lawrenson, 2013):

**TABLE 1: Coast Guard Alaska Voluntary Dockside Examination Data Comparison**

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>FLEET SIZE (K)</th>
<th>VESSELS EXAMINED</th>
<th>PARTICIPATION LEVEL (%)</th>
<th>DECAL ISSUED</th>
<th>COMPLIANCE VDE AK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-2009</td>
<td>US:110 &gt; 74</td>
<td>UNK</td>
<td>6-7</td>
<td>UNK</td>
<td>UNK UNK</td>
</tr>
<tr>
<td>2010</td>
<td>AK: 6.8</td>
<td>1,277</td>
<td>18.8</td>
<td>809</td>
<td>63.4 11.9</td>
</tr>
<tr>
<td>2011</td>
<td>AK: 6.8</td>
<td>1,343</td>
<td>19.8</td>
<td>864</td>
<td>64.3 12.7</td>
</tr>
</tbody>
</table>

He indicated that in the past, the Commandant of the Coast Guard has stated that an estimated six to seven percent of all U.S. commercial fishing vessels participated in the VDE program. He provided 2010 & 2011 data on Alaska fishing vessels which indicated that 1,277 and 1,343 vessels respectively were examined for an annual average of 1,310 vessels. During those examination seasons, 809 and 864 vessels earned compliance decals for an annual average of 837 vessels. There were 6,800 Alaska Department of Fish & Game (ADFG) permitted commercial fishing vessels operating at that time. This data indicated an average fleet participation level of 19.3% and compliance level of 12.3%. 62.9% of the examined vessels received compliance decals.
Analysis of his data shows that Alaska has almost three times the national historical level of participation in the VDE program and over sixty percent of them were found to be in compliance with the CFVSA safety standards. In absolute terms, the data indicates that over 12% of all Alaska commercial fishing vessels were in compliance during those years. No relative fleet wide conclusions can be drawn from this data because this sample is not representative of the Alaska fishing fleets. The vessels who participated were volunteers or self-selected, not randomly chosen. This method of data collection, allows for the possibility of selection bias. The resultant finding can’t be taken as proof that the CFVSA has been a primary factor in the safety improvement question.

The majority of the fishing vessels in Alaska have not received a VDE by the Coast Guard. There are over fifty fishing ports in Alaska (World Port Source, 2013). Coast Guard examiners are normally available in ten of those ports, but seasonally they travel and expand that coverage to as many as half the Alaskan ports. They try to be available to fishermen in these areas prior to and during fishery openings (Hill, 2013). Alaskan Ports are separated by hundreds of miles of open sea and many of the fishing vessels that operate in Alaskan waters may never enter a port where Coast Guard examiners are conducting VDEs.

One of the Coast Guard’s missions is to enforce a wide range of laws and treaties, including fisheries regulations. They usually approach fishing vessels at sea and board them to assess compliance with safety and survival equipment and training requirements, along with a long list of other regulatory requirements. The Coast Guard’s boarding checklists are quite comprehensive, cover the safety issues in depth, and have evolved over the years as new issues have been identified (Hill, 2013).

The most recent Coast Guard records of safety enforcement boardings in Alaska indicate that during the decade from 2000 to 2009, 6,183 fishing vessels were boarded or at most nine percent of the current fleet. 4,916 of those vessels were not issued violations and were therefore in compliance with all applicable regulations, including the CFVSA. This sample indicates that almost 80% of the vessels boarded were in compliance with the CFVSA safety standards. (U.S. Coast Guard LT Ray Riechl, 2010) See Appendix III: Alaska Fishing Vessel Safety Law Enforcement Boardings and Violations.

The safety enforcement boarding data is a much better representation of the Alaska fishing fleet population because these vessels were randomly chosen. Ken Lawrenson indicated that the vessels were chosen based on the type of gear they carried, matching the fishery being targeted for enforcement (Lawrenson, 2013). The fleet was larger earlier in the decade which would reduce the percentage of the fleet boarded, but not bias the results. Some of those vessels may have been boarded more than once over the years which would add a small error to either side of the compliance question.

CFVSA safety standards may have been effectively achieved within the Alaska fishing fleet. This statement is based on the high level of compliance (80%) found using Coast Guard safety enforcement data. This achievement could be the result of a long, persistent effort on the part of many different players and involves many different factors. Before leaving the subject of the CFVSA and its safety standards, a few comments need to be made about their true value and the role of this Act.
The safety standards established by the CFVSA address some very basic safety and survival requirements which had not been set for commercial fishing vessels prior to its enactment. Table 2 is a list of the items covered by the act. These safety standards brought the commercial fishing industry up to the standards that other commercial vessels had been required to meet for years (National Research Council, 1991). In most cases these are survival requirements which come into play after the vessel and fishermen are already in peril. They do not prevent initial primary causes of the casualties (Woodley Lincoln & Medlicott, 2009).

<table>
<thead>
<tr>
<th>TABLE 2: Commercial Fishing Industry Vessel Safety Act (CFVSA) of 1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Equipment Standards Covered by 46 USC 4502 for Uninspected Commercial Fishing Vessels</td>
</tr>
<tr>
<td>➢ Fire Extinguishers</td>
</tr>
<tr>
<td>➢ Life Preservers (PFDs)</td>
</tr>
<tr>
<td>➢ Carburetor Flame Arrestors</td>
</tr>
<tr>
<td>➢ Fuel Space Ventilation</td>
</tr>
<tr>
<td>➢ Visual Distress Signals</td>
</tr>
<tr>
<td>➢ Buoyant Apparatus/Liferaft/Lifeboat</td>
</tr>
<tr>
<td>➢ Immersion Suits</td>
</tr>
<tr>
<td>➢ Radio Communications Equipment</td>
</tr>
<tr>
<td>➢ Emergency Position Indicating Radio Beacon (EPIRB)</td>
</tr>
<tr>
<td>➢ Navigation Equipment</td>
</tr>
<tr>
<td>➢ Employer Injury Notification Placard</td>
</tr>
<tr>
<td>➢ First Aid Equipment</td>
</tr>
<tr>
<td>➢ “Other equipment required to minimize risk of injury to crew during vessel operations”</td>
</tr>
</tbody>
</table>

The FCMA set the stage for major changes in the commercial fishing industry. As a result of this Act, commercial fishing vessels or their crews:

1) Began operating hundreds of miles offshore in much more hostile and challenging work environments;
2) Were significantly modified or replaced to achieve larger catch capacity in new and often multiple fisheries;
3) Had to learn new fishing techniques and acquired education and experience in joint ventures with their foreign counterparts; and
4) As uninspected fishing vessels, they were not required to meet safety and construction standards of other U.S. commercial vessels.

These changes provided significant financial rewards and a transitional mechanism, joint ventures, to upsize their industry tenfold. They motivated our fishermen, provided a model, and even teachers to help them learn how to take control of our CFZ resources during the decade of the 1980s. Their challenge was that they only had a few years to learn and apply the lessons before their foreign partners were phased out (Hill, 2013).

During the transition time the learning curve was steep, but they accepted the challenges, suffered the losses, developed effective harvesting capacity (fishing vessels), and perfected the new fishing techniques. Over the thirty years since the FCMA gate was opened, commercial fishermen have learned by trial and error what gets the job done and how to survive. We have all learned the common sense principle that when we exercise a skill repeatedly or practice a new one, our performance improves and we become more proficient at it. The industry was able to grow into their expanded role and recover from their growing pains.
The commercial fishing industry worked through its safety problems, but never documented them. Very little documentation of commercial fishing activities was collected before 1990 as was noted in the NRC study. The commercial fishing industry’s own efforts to grow into the role they gained through the FCMA, while not quantified, were major factors contributing to the commercial fishing vessel safety problem and its recovery (Hill, 2013).

The NRC was tasked to conduct a study of the safety problems on fishing vessels and make recommendations on how to address them to Congress before January 1, 1990. They were specifically asked to consider the merits of these vessels becoming Coast Guard inspected vessels. The NRC, like many previous researchers, recognized how thorough the inspection process was and strongly recommended that fishing vessels be required to participate in the formal process too. This comprehensive solution appeared to be the right choice to address many of the causes identified by the NRC, but has not been implemented and will not be in the future (National Research Council, 1991).

**TABLE 3: 1987 Commercial Fishing Vessel Estimate**

<table>
<thead>
<tr>
<th>TYPE OF VSL</th>
<th>LENGTH</th>
<th># OF VSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDOCUMENTED</td>
<td>&lt; 32 FT</td>
<td>80,000</td>
</tr>
<tr>
<td>DOCUMENTED</td>
<td>26-49</td>
<td>23,400</td>
</tr>
<tr>
<td></td>
<td>50-64</td>
<td>3,600</td>
</tr>
<tr>
<td></td>
<td>65-78</td>
<td>3,200</td>
</tr>
<tr>
<td></td>
<td>79+</td>
<td>800</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>111,000</strong></td>
</tr>
</tbody>
</table>

Table 3 (above) contains a breakdown of the NRC study’s 1987 estimate of the national fleet size as 111,000 vessels. Undocumented (state-numbered) vessels with a tonnage under five net tons and length 32 feet or less made up 80,000 of those vessels. Documented (Certificate of Documentation) vessels with a tonnage of at least five net tons and length of less than 49 feet added another 23,400 vessels. These two vessel size groupings together make up 93 percent of our national commercial fishing fleet (National Research Council, 1991). They represent the majority of the commercial fishing or uninspected vessels and are relatively small, simple vessels which do not fit the inspected vessel model and standards.

The wide range of vessels employed in commercial fishing needs to be considered to understand why they do not qualify for formal inspection. Commercial fishing vessels are so varied in size and design that many of the inspection standards are too complicated and can’t be applied to them. The Coast Guard Acquisition Act of 2010 addressed the disparity of size and design by applying recreational boat standards to those less than 50 feet in length (111th U.S Congress, 2010).

These vessels are scattered along the coasts of the United States and generally do not travel more than a few hundred miles from their homeports. Formal inspection would require that they go to a major regional port or that the Coast Guard inspectors travel to numerous remote sites on a regular basis. Neither option is reasonable or likely under our current economic
and budgetary restrictions. In the end, the decision will be dictated by the political system and the industry will continue to block commercial fishing vessel inspection.

There have been some significant design changes to U.S. commercial fishing vessels over the last two decades. As already mentioned, those fishermen who have chosen to take full advantage of the newly claimed fishing grounds under the FCMA have had to renovate or replace their fishing vessels to operate in a more challenging environment and to perform different techniques on a larger scale. They have made design changes or obtained totally different vessels better tailored for the new jobs. From the numbers given above it can be concluded that such vessels make up less than ten percent of the fleet (National Research Council, 1991). Many of these changes were defined in the 2010 CGAA design requirements (111th U.S Congress, 2010).

One other important fishing fleet change is in the number of vessels which are currently still operating in U.S. commercial fishing. Economic fluctuations responding to fish availability and pricing have always played a role in the number of vessels entering and leaving the market. With the creation of the Regional Fisheries Management Councils (RFMCs) under the FCMA, the federal government began actively shaping the industry to better match the available fish stocks. They allowed the fisheries to continue to operate as a free market for fifteen years after the FCMA went into effect. In the early 1990s they began limiting entry in fisheries by imposed moratoriums on new entries. Only those vessels and fishermen who had a history in the market were allowed to continue fishing (North Pacific Fishery Management Council (NPFMC), 1992).

RFMCs worked with the fishermen to eliminate open competition and made fishery openings flexible. Fishermen no longer have to battle bad weather and against the clock to obtain their catch. Historically, fishing had been open access, allowing anyone who chose to enter the profession to compete for the available resources. Open access fisheries created a pressure cooker or “derby” atmosphere. Sometimes fishing openings took on dimensions of the Wild West in the Last Frontier, with actual shootouts and boat rammings. Fishermen had to go to sea during scheduled openings, regardless of the weather conditions, to be competitive and earn their livelihood (Hill, 2013).

The RFMCs introduced a new tool, Individual Fishing Quotas (IFQs), which gave each qualifying fishermen a share in the fisheries based on their historical participation. Similar programs have been used successfully around the world. The NMFS provided the RFMCs with research data to predict the optimal annual harvest levels, while allow each fishery to remain healthy and sustainable. Fishermen gain the freedom of choosing where and when they will fill their quotas. This has allowed them to stay out of harm’s way, drastically reducing the number of vessels in distress due to the many situations identified in the NRC study. It has also allowed them to maintain better product quality and stabilize pricing in the market by leveling out the available supply throughout the year (North Pacific Fishery Management Council (NPFMC), 1992).

IFQs serve as a market barrier to entry, but they can be sold. A fisherman must own an IFQ for a specific fishery to enter it. He can purchase an IFQ at the market price which usually runs several times the annual quota catch value. The RFMCs were concerned about such quotas being bought up and creating a potential monopoly. They placed concentration limits or caps on quota ownership so that only a few percent of a given fishery may be controlled by an individual or group of investors. The ability of a young fisherman working his way up on a boat and
becoming an owner has become much harder due to the additional cost of buying IFQs (North Pacific Fishery Management Council (NPFMC), 1992).

A special case quota share was also created to allow Western Alaska community residents to participate in the quota system. The NPFMC created the Community Development Quotas (CDQs) to bring those communities into the fisheries which exist off their coasts. CDQs are assigned to individual fishermen by their residential community (North Pacific Fishery Management Council (NPFMC), 1992).

The size of the total fishing fleets around the country has significantly shrunk since the three-year moratorium and creation of IFQ ownership of the fisheries. The NRC estimated the national fleet size to be 111,000 commercial fishing vessels in 1987. This total including 80,000 undocumented vessels and 31,000 documented vessels (See Table 3 on page 22.)(National Research Council, 1991). Ken Lawrenson provided 2012 Coast Guard data (See Table 4, below) indicating a total of approximately 73,000 (53,000 undocumented + 20,000 documented) fishing vessels are still active in the fisheries (Lawrenson, 2013). These figures indicate the number of fishing vessels competing for the various fisheries has decreased by a third (34%) over the last twenty years.

**TABLE 4: 2010 Commercial Fishing Vessel Estimate**

<table>
<thead>
<tr>
<th>UNDOCUMENTED</th>
<th>&lt; 32 FT</th>
<th>53,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOCUMENTED</td>
<td></td>
<td>20,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>73,000</td>
</tr>
</tbody>
</table>

The NRC recommended that the Coast Guard act as the lead agency in carrying out the national commercial fishing vessel safety program. The Coast Guard initially tried to solve the problem using its established commercial vessel inspection program. The fishing industry effectively blocked applying that approach to its very diverse and much smaller vessels. It used its political power to have commercial fishing vessels classified as uninspected vessels and that designation still applies today (Magno & Hiscock, 1991). The Coast Guard had to develop a different approach to ensure the safety of commercial fishing vessels.

The CFVSA was legislation intended to provide the Coast Guard with authority and establish safety standards for them to regulate commercial fishing safety. It turned out to be an unfunded congressional mandate. They were tasked to take on the additional job of regulating over 100,000 fishing vessels without additional funding. They were unable to exercise their CFVSA authority without enforcement resources to hold the fishermen accountable to the safety standards (Christensen & Kemerer, Winter 2010-11).

This was not the first time that the Coast Guard had been given additional duties without adequate funding. Fifteen years before, they had been pulled into the FCMA implementation to enforce the newly created 200 NM Fishery Conservation Zone (FCZ). Admiral Owen Siler, Commandant of the Coast Guard, had testified before Congress seeking additional funding for
manpower and aging capital plant replacement (shore facilities, ships, and aircraft) to continue to carry out and expand their many peacetime and wartime missions. His efforts resulted in only a third of the funding they sought. They had to learn how to reprioritize their assigned missions and become more efficient with their limited resources. Those lessons had taught them the need to be innovative, frugal, and not expect Congress to provide additional funding (Bragaw, 1980).

The Coast Guard had developed the VDE as a short term outreach tool to educate and prepare the industry to be accountable for the standards as they phased in over the next couple of years. They ended up prolonging the VDE educational outreach program for another twenty years. In the interim they continued to formulate changes to the CVFSA as safety concerns evolved. They attempted to move proposed changes through the legislative rule making process on an annual basis. In 2005 the Coast Guard changed their strategy to requesting authority to conduct mandatory safety examinations and in 2008 narrowed their focus to fishing vessels operating beyond the three nautical mile (NM) limit. Finally in 2010, after another decade of highly publicized fishing vessel losses, they succeeded in getting the revisions passed in the Coast Guard Authorization Act (CGAA) of 2010 (Christensen & Kemerer, Winter 2010-11).

The CGAA of 2010 contained most of the requirement changes which had been proposed since the CVFSA went into effect in 1991. The most significant change was in the biannual mandatory dockside safety examination requirement for commercial fishing vessels that operate outside the three NM boundary. This requirement included the issuance of a Certificate of Compliance (COC) which will serve to more accurately define another segment of the commercial fishing fleets.

The 2010 CGAA redefined vessels based on how far offshore they fish and the Coast Guard estimates there are 35,000 of these vessels. Another major new development was the requirement for cooperative alternate safety compliance programs (ASCPs) to be tailored to specific regions and fisheries. It also contained additional operator training, construction standards, loadline, surveying and classification; survival craft, safety logbook, and safety grant requirements(U.S Coast Guard Marine Safety & Security Council, Winter 2010-11).

The Coast Guard and Maritime Transportation Act of 2012 changed mandatory dockside examinations from biannually to every five years with a compliance deadline of October 15, 2015. This change may have been made to align the term of validity of the COC with the standards prescribed in the 1974 Safety of Life at Sea (SOLAS) Convention. The U.S. ratified the 1988 Protocol relating to the International Convention for SOLAS on July 1, 1991. This requirement was codified at 46 USC 3307: Frequency of Inspection for this type of vessel at least every five years (U.S. Coast Guard Headquarters, Office of Standards Evaluation and Development (G-MSR-2), 2000). This reference was written for Certificates of Inspection (COIs) not COCs and intended for vessels operating outside U.S. waters to follow international standards.

The proper basis of establishing an inspection frequency should be to optimize the inspection frequency to match the failure rate of the equipment in question(Subhash, 2004). A review of the equipment list covered by the CVFSA (See table 2 on page 21) shows that there is a range from monthly to a couple of years of expiration, inspection, and maintenance schedules for the items to be examined. The responsibility lies with the person in charge of the vessel. Government oversight should not replace vessel leadership responsibility for their crew.
Ultimately the frequency of examination will depend on the availability of examiners to conduct the examinations. That is a budget and resource management issue.

A third possible source of the examination frequency change may have been political action by the fishing industry to continue their history of blocking such government intervention. I was unable to substantiate this rumor which circulated earlier this year after the October CGAA 2010 mandatory dockside examination requirement went into effect.

According to Ken Lawrenson the other major benefit they expect to achieve from the mandatory examination requirements will be in the actual documentation of each vessel during the issuance of their COC. Existing databases have never had a method of verifying the completeness of their vessel listings. Under this requirement they should be able to get complete data and gain a much better understanding of the vessels they have been trying to evaluate for the last twenty years (Lawrenson, 2013).

With the passage of the requirement for mandatory dockside examinations, the Coast Guard gain direct leverage to achieve compliance with the safety standards for approximately half of all commercial fishing vessels. Up to this point they have only been able to examine ten percent or approximately 7,000 of these vessels annually. They estimate that there are 35,000 vessels that need to complete a mandatory dockside examination by October 15, 2015 (Christensen & Kemerer, Winter 2010-11). Once again no funding accompanied the congressional directive.

The Coast Guard has developed a strategy for meeting their examination obligations under the new examination requirement, without significantly shifting manpower into the program from other missions. (See Table 5, below.) They will continue to use their trained full-time inspectors to meet their obligation to inspect 12,000 commercial vessels. The 35,000 voluntary and 35,000 mandatory dockside examinations will be performed by Coast Guard active duty, reserve, and auxiliary members (Hooper, Winter 2010-11). They will recruit experienced, professional surveyors into a third-party examination program to fill their examiner shortfall for the new mandatory dockside examinations (Belliveau, Winter 2010-11). The practice of using professionals from the industry to meet the requirements for a fee has been effectively used with inspected vessels for years.

**TABLE 5: CG Commercial Vessel Inspection & Examination Requirements**

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Number</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>12,000</td>
<td>CG Inspection</td>
</tr>
<tr>
<td>Commercial Fishing &gt; 3 NM</td>
<td>35,000</td>
<td>Mandatory Dockside Safety Exam</td>
</tr>
<tr>
<td>Commercial Fishing &lt; 3 NM</td>
<td>35,000</td>
<td>Voluntary Dockside Exam</td>
</tr>
</tbody>
</table>

The NRC study recommended an integrated safety strategy and NIOSH developed just such an approach and began applying it in the late 1990s. It is their public health approach or “the Alaska model.” It involved four steps:

1. Define the problem through surveillance. (Collect data on specific fishery, gear, and type of vessel.)
2. Establish why fatalities occur. Use scientific research and industry input to determine causes and risk factors.

3. Design tailored interventions for specific fisheries and evaluate their effectiveness.

4. Implement the most effective interventions.

In 2007, NIOSH developed the Commercial Fishing Incident Database (CFID) to analyze all available occupational fatality data from the industry. From this data they are able to identify and target the highest risk fisheries. They have also been able to draw general conclusions about such fatalities (Lucas & Lincoln, Winter 2010-11):

**TABLE 6: NIOSH General Commercial Fishing Fatality Safety Factors**

<table>
<thead>
<tr>
<th>%</th>
<th>Safety Factors Effecting U.S. Commercial Fishing Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>Occurred following a vessel disaster (sinking, capsizing, fire)</td>
</tr>
<tr>
<td>31</td>
<td>Resulted from falls overboard</td>
</tr>
<tr>
<td>10</td>
<td>Were onboard injuries</td>
</tr>
<tr>
<td>93</td>
<td>Involved at least one of above listed factors.</td>
</tr>
</tbody>
</table>

NIOSH applied their public health approach to a small fishery in a remote part of Alaska and over a decade the collaborating entities were able to virtually eliminate the sources of one of the highest fatality rates in Alaska. This case study best shows the importance of government collaboration, industry partnerships, and quota systems in tailoring solutions to individual fishery needs. The Bering Sea/Aleutian Island (BSAI) crab shellfish fishery had the highest fatality rate of all Alaskan fisheries. The 250 vessel fishery averaged eight fatalities each year between 1990 and 1999. NIOSH data made it possible to zero in on this worst case and develop an innovative regional safety program to eliminate the major causes (Woodley Lincoln & Medlicott, 2009).

The agency partners (Alaska Department of Fish & Game (ADFG), NIOSH, National Marine Fisheries Service (NMFS), and Coast Guard) supporting the fishery and the industry started working together to isolate and eliminate the problem in 1999. Research showed that the competitive derby environment was driving the fishermen to overwork their crews and overload their vessels with too many crab pots, resulting in vessel capsizings and/or crew injuries/fatalities. The Coast Guard brought their VDE and Stability and Safety Compliance Check (SSCC) programs to the communities a dozen times each year and by 2005 had succeeded in reducing fatalities down to an average of one per year (Woodley Lincoln & Medlicott, 2009).

This small scale safety experiment allowed the agencies to see how effective their programs can be when they were able to actually make the vessels accountable and work with them over time. The industry representatives helped apply the solution by promoting vessel participation from within the fishery. Their programs were able to reduce the percentage of vessels with major safety deficiencies from fifty to five over the five-year program (1999-2005). Compliance (decals) improved from 58 to 95% over the same period (Woodley Lincoln & Medlicott, 2009).

In 2005, the crab fishery management introduced and implemented the BSAI crab rationalization (CR) program bringing quotas to the vessels, processor companies and vessel masters. The fishery season expanded and the competitive nature went away eliminating the
direct causes of the historically high fatality rates. Some of the original quota restrictions from the 1990s had been relaxed and the vessel owners were allowed to form cooperatives and lease or sell their quotas to be harvested by another vessel. As a result, fleet inefficiencies of excess catcher capacity have been replaced by a model in which the most efficient vessels harvest the fishery quota. The number of vessels participating in the CR fisheries has dropped by two-thirds (240 down to 80), reducing the future resource requirements to continue the program proportionally (Woodley Lincoln & Medlicott, 2009).

The BSAI case study held even more lessons to improve commercial fishing vessel safety through collaboration with other regulatory agencies. The partnership between the Coast Guard and the ADFG and NMFS led to both agencies adding a requirement for vessels participating in the CR fisheries to have a current VDE decal. The NMFS expanded this requirement to the thousands of vessels required to carry their fisheries observers. These agencies demonstrated an effective way to indirectly regulate the industry.

The importance of having all stakeholders in agreement and working together was also brought home during the BSAI crab fleet case study. The quota system removed the urgency in harvesting the catch, but they found that the pressure can get shifted into a race to get the product to market on pre-established delivery schedules. Vessels owners can make economical decisions to deliver to ports with hazardous icing conditions and end up endangering their vessel and crew much like a derby fishery once did. Vigilance for safety must be maintained in each phase of the fishing process (Woodley Lincoln & Medlicott, 2009).

In 2006, the NIOSH public health approach was applied to the BSAI freezer longliner and trawler fleet. This fleet is referred to as the “head and gut” (H&G) fleet. A decision had been made to reclassify them as fish processing vessels due to recent marine casualties within the fifty vessel fleet. They were older vessels and unable to meet some of the new classification requirements. They worked with the Coast Guard and classification society to allow exemptions under an Alternate Compliance and Safety Agreement (ACSA). They developed a list of special safety measures to address their fishery-specific risks and agreed to abide by them (Rentz, Winter 2010-11). This solution set a precedent and is a model for the Alternate Safety Compliance Program (ASCP) introduced in the 2010 CGAA regulations (Hughes & Woodley, Winter 2010-11).

The federal government has been developing this commercial fishing vessel safety program for over twenty years. Many different agencies have been involved. They have learned to collaborate with each other and with state-level agencies, as well as to partner with industry and non-profit organizations (NPOs). These relationships have allowed them to develop joint operations and reinforcing regulations to become much more effective in improving the safety of the fishermen and their vessels.

The Occupational Safety and Health Administration (OSHA) was created to establish and enforce safety standards in the workplaces of America under the Occupational Safety and Health Act of 1970. They have jurisdiction over commercial fishing vessels operating inside each state’s territorial sea. They have appropriations limitations, like the Coast Guard, and can’t fully cover all the vessels they are charged to inspect. They have developed a policy of inspecting only those vessels with 11 or more employees, according to the NRC study (National Research Council, 1991). They work with the Coast Guard to address areas in which they have authority and the Coast Guard does not (Bouziane, Winter 2010-11).
The National Marine Fisheries Service (NMFS) provides government oversight of the fisheries of the U.S. They provide the research used to set optimal catch limits and work closely with the RFMCs. The NMFS requires most fishing vessels to carry fishery research observers to obtain a fishing permit. Those vessels must obtain a Coast Guard VDE compliance decal before an observer will be allowed on a vessel. The observers are required to complete an annual commercial fishing safety and survival training course. This is an indirect way to regulate commercial fishing compliance with the safety standards (Christensen & Kemerer, Winter 2010-11).

Several states are partnering with the Coast Guard to promote fishing vessel safety. Alaska is one of the states. The Alaska Department of Fish and Game (ADF&G) has made the compliance decal a requirement for certain fisheries before they will issue a fishing permit to a vessel (Woodley Lincoln & Medlicott, 2009). The Coast Guard has even entered into safety memorandums of agreement with tribal leaders to work with tribal fishermen (Christensen & Kemerer, Winter 2010-11). These are more examples of indirect regulation to bring the fishing vessels into compliance and raise the level of public safety onboard.

The North Pacific Fishing Vessel Owners’ Association (NPFVOA) is a non-profit organization created specifically to address safety education and training in cooperation with the Coast Guard in 1985. By 2012 NPFVOA had trained over 40,000 mariners with their Standards of Training, Certification and Watchkeeping (STCW) basic safety training program. They have also published a vessel safety manual and a “Safety and Survival at Sea” series of DVDs to complement their hands-on training classes (Hughes, Winter 2010-11). Their current executive director Karen Conrad commented that another benefit of the efforts to make fishing vessels safe has been the reduction in drug abuse on the vessels (Conrad, 2013).

The Alaska Marine Safety Education Association (AMSEA) is a non-profit organization formed to provide hands-on safety and survival training to fishermen in their homeport for low or no cost. It was founded in the mid-1980s by Alaskan Coast Guard air crews and University of Alaska Sea Grant/Marine Advisory Program employees. They focused on cold-weather marine safety issues, training local instructors, and provided marine safety training gear on loan. They employ a support staff to obtain funding, schedule workshops, maintain gear and coordinate classes. They have trained over a thousand instructors, 10,000 fishing emergency drill conductors, and over 180,000 fishermen around the World (Dzugan, Winter 2010-11).

Alyeska Pipeline Service Company contracts to provide the Ship Escort/Response Vessel System (SERVS). This system was created after the Exxon Valdez oil spill in 1989 to prevent oil spills and provide oil spill response and preparedness capabilities. Commercial fishermen and their vessels are hired and trained as SERVS spill responders. The fishing vessels are also provided commercial fishing vessel safety training(Sodegren, 2013).

The Commercial Fishing Advisory Committee (CFSAC) was created under the CFVSA in 1988 to advocate for the commercial fishing industry to the Coast Guard and Congress. It is made up of 11 members from the industry and the remainder to be representatives from insurance/underwriting, education, safety, owners, engineering, and equipment manufacturing. They can also advise the RFMCs through the Coast Guard non-voting council member (Wendland, Winter 2010-11).
The U.S. Marine Safety Association (USMSA) was formed in 1983 to promote performance, manufacturing, maintenance, service, and training standards for lifesaving and emergency equipment. It is made up of 130 representatives of marine safety and survival industries. They facilitate safety training for the commercial fishing industry and the general public. This is another area in which the NRC recommended that the fishermen needed to be educated (McCauley Hiscock Guddal & Thompson, Winter 2010-11).

The NRC study identified insurance availability and cost as high concerns to commercial fishermen. The cost of insurance reflects the safety record of the industry as a whole. When the industry’s collective safety record is bad, prices go up, competition in the industry drops, there are limiting insurance options, and fishermen can’t afford coverage. In the early 1980s, The American Institute of Marine Underwriters (AIMU) provided over 90% of all marine insurance in the U.S. Those policies made up only 5% of their revenue and accounted for 140% of their annual losses. The government has subsidized vessel insurance in the past. Some fisherman form self-insurance pools and hold their members to higher safety standards than required by safety regulations (National Research Council, 1991).

Some in the industry expected the insurance underwriters to assume a national leadership role and help organize and unite the fishermen to improve the safety of their vessels in order to bring the cost of insurance down. Back in 1978 the National Council of Fishing Vessel Safety and Insurance (NCFVSI) was formed for this purpose. It was one of the identified reasons why the CFVSA was enacted and contained specific wording about insurance underwriting and statistics. The insurance industry did not play a significant role after the Act was passed (National Research Council, 1991).

From the underwriters’ perspective they could not afford to do business with an industry with such a poor track record. They initially expected that fishermen would be required to comply with the regulations and tried to coordinate getting the vessel examined as a condition of being underwritten, much like the NMFS observer or ADFG requirements. They quickly learned that the Coast Guard did not have the resources to conduct VDEs in remote Alaskan sites or conduct frequent law enforcement patrols in those areas (Hill, 2013). They were very concerned about the high accumulative costs of liability for disabling injuries. One insurance broker reported that the NPFVOA had approached him about insurance discounts for their members and he had explained that they only give lower rates after proven performance (Adams, 2013).

Captain Jan Manwaring shared a similar situation involving insurance in a high risk industry; helicopter logging in Alaska, while stationed at the NIOSH Alaska Pacific Office. Government agencies, the Helicopter Associate International (HAI), and insurance underwriters formed a partnership and developed a set of high safety standards. Several helicopter logging companies committed to operate by those guidelines and were able to achieve significant rate reductions (Manwaring, 2013). This precedent demonstrates the value of bringing the insurance industry into the safety coalition in order to help motivate more fishermen to participate in the commercial fishing vessel safety program.
VI. Conclusions, Recommendations or Next Step Actions.

The U.S. commercial fishing industry has operated as a free market system with open access to all comers for hundreds of years. Anyone who had the right equipment could compete for the available fish and make a profession out of it. Either they learned the ropes and developed the skills to operate their equipment and fish or they died due to the harsh and unforgiving marine environment. As long as the fish stocks were plentiful, they could make a living and would stay in the business. When they had a bad year or fish got scarce, the less skilled fishermen left the market for better opportunities on land.

In 1976 with the passage of the Fishery Conservation Management Act (FCMA), the open commercial fishing market was changed significantly. The FCMA created a “gold rush-type” of opportunity. The 200 NM fishery conservation zone (CFZ) was created by the U.S. Ocean policy under the FCMA. The fishing grounds were expanded ten-fold and the market was open under the Americanization policy to any citizen with access to the money, equipment, and skills to harvest the fish. The “rush” was on and it continued for approximately fifteen years, until the early 1990s when the open access era ended.

During the commercial fish rush, even seasoned fishermen were challenged in their efforts to grow their fishing operations to match the opportunities available to them. They dreamed big and invested in larger, multipurpose vessels allowing them to enter a variety of the fishery opportunities. Commercial fishing vessel design, construction and renovation standards were not required and initially some of their vessels were untested experiments. The fisheries were all derby style competitions which pushed crews and vessels to their limits, often under adverse weather conditions. The end products were the high casualty rates experienced by the late 1980s, resulting in an average loss of 250 vessels and 100 lives each year.

By the mid-1980s public safety regulators and other commercial fishing industry stakeholders recognized the unanticipated consequences of the FCMA. They started developing safety standards and policies to prevent such high costs in lives and property. Many within the industry resisted, but the frequent tragedies of whole crews being lost finally drove Congress to act in 1988 with the passage of the Commercial Fishing Industry Vessel Safety Act (CFVSA).

By the early 1990s the CFVSA had generated a number of actions to address the safety concerns. A National Research Council study and recommendations had been completed. The National Institute for Occupational Safety & Health (NIOSH) had initiated a casualty database. The Commercial Fishing Safety Advisory Committee (CFSAC) had been created and was actively educating legislators and resource managers while seeking solutions. A Coast Guard safety outreach and education program was in place with safety and survival standards being taught through voluntary dockside examinations.

The FCMA also brought federal conservation and management to the industry. Eight regional fisheries management councils (RFMCs) were formed to help conserve and manage our dwindling resources. In the early 1990s the RFMCs started using a management tool to give ownership shares of a specific fishery to its historical users. These Individual Fishing Quotas (IFQs) eliminated competition and time pressure, two of the major causes of commercial fishing casualties. Over time the fleets have downsized to match their catching capacity to the available fish stocks. This approach minimizes risk exposure and allows fishermen to work together in cooperatives using the most efficient and effective vessels to harvest the catch.
Government policies are imperfect and need to be refined and maintained over time. The FCMA created a great economic opportunity in the U.S. commercial fishing industry, but it also destabilized it from its natural market state into one expanding to meet its new potential. The federal government established new geographic and managerial boundaries under the act. The safety issues discussed in this report were fallout from the market growth and restructuring to take advantage of the economic opportunities.

The effective construction, design, and safety regulation of U.S. commercial fishing vessels has taken almost a century to be achieved. The effort to regulate such vessels along with other commercial vessels began as they shifted to mechanical power back in the 1930’s. Their wide range of designs and sizes do not fit the model of fully regulated inspected commercial vessels. As a result they have been able to remain unregulated in these areas for many years, in spite of continuous legislative efforts to include them. The CFVSA set some safety and survival standards for these uninspected vessels. However, they have remained unaccountable to them because the burden to act was placed upon the regulating agencies. The 2010 CGAA mandatory dockside examination requirement has shifted that burden to the fishermen for approximately half of the remaining fishing fleet. Current and future collaboration with other federal and state agencies has incorporated such standards into fishing permit requirements for indirect regulation of many more. The remainder of the fleet is made up of smaller vessels working the waters within 3 NM of shore and they are being regulated under the recreational boating requirements of the 2010 CGAA.

Before the government stepped in to actively manage the fisheries and safety issue, the industry was on a course of natural attrition with the losses having reached the level of 250 fishing vessels and over a 100 lives a year. Fishermen were being pressed to make changes in their professional skills to take advantage of economic opportunities. Survival of the fittest was being played out with those who made mistakes or didn’t learn fast enough being weeded out. With time they may have been able to solve their own problems and strike a natural balance, but the cost in casualties to people and fishing vessels was too great.

The industry was overwhelmed with all the changes taking place and was not able or willing to address the growing number of human and vessel casualties. They were not able because of their very nature: being independent operators who go to sea to get away from many of the demands of society. They were not organized and united in their profession in such a way to communicate and respond to the safety issues. They were not willing to let the government step in with the proven solution of making them Coast Guard inspected vessels.

Congress acted to correct its FCMA policies using the limited data available. It authorized the Coast Guard, along with other agencies, to intervene with the CFVSA. The CFVSA established a safety standard. The Coast Guard developed an outreach and public education program to promote safety awareness among the fishermen in order to motivate them to embrace the safety stand. However, it was voluntary. Commercial fishermen are homo civicus and haven’t gotten involved. As a result, the standards have taken twenty years to take effect. In the meantime, many other interventions and players were brought in to help achieve the safety improvement goal.

Commercial fishing vessels should not become Coast Guard inspected vessels. Their fishery-specific needs will be much better meet under the mandatory dockside safety examination program and recreational boating standard which has evolved with the passage of
the Coast Guard Acquisition Act of 2010. The Coast Guard will be stretched to expand its mandatory examination capabilities five-fold over the next couple of years. Additional funding should be provided to grow the capacity, along with the use of the Coast Guard reserve, auxiliary, and privatization through the third-party examination program. Certificates of Compliance data from these exams will fill in many of the gaps in our existing commercial fishing vessel database by 2015. This will assist NIOSH in refining their CFID data and identifying other high risk fisheries to be worked with under the ASC program.

Voluntary dockside examinations (VDEs) are still the evaluation option for the other 35,000 vessels operating inside three nautical miles. They need to be motivated to abandon their complacency. Random law enforcement boarding can provide part of the needed motivation. Collaborative indirect regulatory requirements by other agencies will continue to grow requiring many of them to request VDEs. This will also put more pressure on the Coast Guard examiner pool and require additional funding. The examination process is a multi-year recurring expense to ensure compliance with the safety standards which needs to be addressed by Congress along with their safety policy.

The integrated safety coalition of collaborating government agencies and partnerships with industry and non-profit organizations has played a major role in the seventy percent reduction in commercial fishing fatalities from 1990 to 2010. We need to acknowledge those successes and build on them into the future. The NRC study started the process by defining the safety problem and initiating efforts to start gathering data to improve our understanding of it. Now we have the NIOSH public health approach as a model to identify the remaining high-risk fisheries in order to drive those fatality rates down. The hard work of developing fleet-specific, tailored alternate compliance and safety agreements is ahead.

The ultimate safety goal of the commercial fishing vessel safety program is to bring the industry fatality rates down to the level of other occupations. Technical advances in communications and data analysis will continue to play a major role as a more complete picture of the commercial fishing vessels comes into focus. Additionally, the insurance industry should be included as a partner in attaining the safety goal.

As the concept of rationalization is applied across the fisheries, they will become more efficient and effective and require less catch capacity. This will lead to more significant reductions in the number of vessels needed. It is not unreasonable that the national commercial fishing fleet size could drop by another third to 40-50,000 vessels. This would make the examination requirements much more manageable and reduce regulatory costs and industry operating expenses.
VII. References


Manwaring, C. J. (2013, March 05). NIOSH Manager for the World Trade Center Health Program. (M. Hill, Interviewer)


VIII. Appendices

Appendix A: Acronyms

ACSA – Alternate Compliance Safety Agreements
ACSP – Alternate Compliance Safety Program
ADFG – Alaska Department of Fish & Game
AIMU – American Institute of Marine Underwriters
AMSEA – Alaska Marine Safety Education Association
BSAI – Bering Sea Aleutian Island
CDQ – Community Development Quota
CFID – Commercial Fishing Incident Database
CFSAC – Commercial Fishing Safety Advisory Council
CFVS Commercial Fishing Vessel Safety
CFVSA – Commercial Fishing Industry Vessel Safety Act of 1988
CFR – Code of Federal Regulations
CFZ – Conservation Fishery Zone
CG – Coast Guard
CGAA – Coast Guard Authorization Act
COC Certificate of Compliance
COI – Certificate of Inspection
CR – Crab Rationalization
DHHS – Department of Health and Human Services
EEZ – Exclusive Economic Zone
EPIRB – Emergency Position Indicating Radio Beacon
FCMA – Fishery Conservation Management Act of 1976
Magnuson-Stevens Fishery Conservation and Management Act of 1976
FCZ – Fishery Conservation Zone
FFV – Foreign Fishing Vessel
H & G – Head & Gut
HAI – Helicopter Associate International
IFQ – Individual Fishing Quota
NCFVSI – National Council of Fishing Vessel Safety and Insurance
NGO – Non-Governmental Organization
NIOSH – National Institute for Occupational Safety and Health
NM – Nautical Mile
NMFS – National Marine Fisheries Service
NPFMC – North Pacific Fishery Management Council
NPFVOA – North Pacific Fishing Vessel Owners Association
NRC – National Research Council
NTSB – National Transportation Safety Board
PFD – Personal Floatation Device
PSIS – Port State Info System
RFMC – Regional Fisheries Management Council
SAR – Search and Rescue
SERVS – Ship Escort/Response Vessel System
SOLAS – Safety of Life At Sea
SSCC – Stability and Safety Compliance Check
STCW – Standards of Training, Certifications, & Watchkeeping
USMSA – U.S. Marine Safety Association
VDE – Voluntary Dockside Examination
Appendix B: NIOSH 1990-2009 Graph of Commercial Fishing Fatalities in Alaska

Commerical Fishing Fatalities by Year:
Alaska, 1990-2009 (N=353)
Appendix C: Alaska Fishing Vessel Safety Law Enforcement Boardings and Violations
### Appendix D: Tables

<table>
<thead>
<tr>
<th>Table Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coast Guard Alaska Voluntary Dockside Examination Data Comparison</td>
<td>19</td>
</tr>
<tr>
<td>2. Safety Equipment Standards Covered by 46 USC 4502 for Uninspected Commercial Fishing Vessels</td>
<td>21</td>
</tr>
<tr>
<td>3. 1987 Commercial Fishing Vessel Estimate</td>
<td>22</td>
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<tr>
<td>4. 2010 Commercial Fishing Vessel Estimate</td>
<td>24</td>
</tr>
<tr>
<td>5. Coast Guard Commercial Vessel Inspection and Examination Requirements</td>
<td>26</td>
</tr>
<tr>
<td>6. NIOSH General Commercial Fishing Fatality Safety Factors</td>
<td>27</td>
</tr>
</tbody>
</table>