

December 2010

Validating Safety on Commercial Fishing Vessels

Forrest Potter Dwyer
Worcester Polytechnic Institute

Heather Simone Sebastian
Worcester Polytechnic Institute

Michael Anthony Mourkas
Worcester Polytechnic Institute

Follow this and additional works at: <https://digitalcommons.wpi.edu/iqp-all>

Repository Citation

Dwyer, F. P., Sebastian, H. S., & Mourkas, M. A. (2010). *Validating Safety on Commercial Fishing Vessels*. Retrieved from <https://digitalcommons.wpi.edu/iqp-all/520>

This Unrestricted is brought to you for free and open access by the Interactive Qualifying Projects at Digital WPI. It has been accepted for inclusion in Interactive Qualifying Projects (All Years) by an authorized administrator of Digital WPI. For more information, please contact digitalwpi@wpi.edu.

Validating Safety on Commercial Fishing Vessels

An Interactive Qualifying Project
Submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
In partial fulfillment of the requirements for the
Degree of Bachelor of Science

Sponsoring Agencies: United States Coast Guard

Submitted to:

Project Advisors: Professor James Hanlan, WPI
Professor Lauren Mathews, WPI

Project Liaisons: Mr. Jonathan Wendland, USCG
Mr. Jack Kemerer, USCG
Mr. Mike Tork, NOAA

Submitted by:

Forrest Dwyer

Michael Mourkas

Heather Sebastian

Date: 16 December, 2010

Abstract

In 2004, the United States Coast Guard (USCG) and the National Oceanic and Atmospheric Administration cosigned the Memorandum of Agreement on Observer Safety. This document aims to improve the at-sea safety of National Marine Fisheries Service observers who regularly document catch on commercial fishing vessels. Through data analyses and interviews, we determined whether or not the expectations of the agreement have been met. Results of this project will potentially assist the USCG in continuing their mission of improving marine safety.

Acknowledgements

This project was a complete team effort, but it would not have been possible without the help and direction of numerous people and organizations. First we would like to thank the United States Coast Guard (USCG), the National Oceanic and Atmospheric Administration (NOAA), and Worcester Polytechnic Institute (WPI) for providing us with the opportunity to participate in a project such as this. Through this project we were able to apply knowledge gained at WPI to a real world problem. In particular, we would like to thank our ID 2050 instructor Professor Creighton Peet, who prepared us to participate in this Interactive Qualifying Project.

Secondly, we would like to thank Laura Jackson, LCDR John Stone, and Shahzad Aziz for helping us with our data collection needs. We would not have been able to find the necessary information to complete our project if it was not for them.

Furthermore, we would like to thank all of the NMFS Observers and the Commercial Fishermen whom we interviewed. Their insights and experiences allowed us to understand the hazards of commercial fishing, and gave us the necessary knowledge to complete our project.

We would also like to thank everyone from the USCG Commercial Fishing Vessel Safety Division who treated us with the utmost respect and professionalism. Specifically, Mr. David Belliveau, LTJG Ryan Burgess, and Mr. Matthew Hooper, all of whom helped us a great deal during our time at USCG Headquarters. Their impact on our project is undeniable, whether it was helping us find an EPIRB, getting us access to the USCG databases, or even making us laugh at the end of a long week.

Next, we would like to thank our three project liaisons: Mr. Jack Kemerer and Mr. Jonathan Wendland both from the USCG and Mr. Mike Tork from NOAA. They

attended weekly meetings and availed themselves to us if we encountered any problems.

Lastly, we would like to thank our two dedicated project advisors, WPI Professors James Hanlan and Lauren Mathews, who joined us in Washington, D.C. Without their support and guidance our IQP experience would not have been as successful as it was.

Authorship Page

Executive Summary	Forrest Dwyer
1. Introduction	Team
2.1. Fishing Vessels and Harvest Methods	Heather Sebastian
2.2. Evolution of Commercial Fishing Safety Regulations	Forrest Dwyer
2.3. Evolution of Fishery Conservation/Management Regulations	Forrest Dwyer
2.4. National Observer Program	Michael Mourkas
2.5. Memorandum of Agreement	Michael Mourkas
3.1. Objective 1	Michael Mourkas
3.2. Objective 2	Heather Sebastian
3.3. Objective 3	Forrest Dwyer
4.1. Objective 1	Forrest Dwyer
4.2.1. Dockside Safety Exams	Heather Sebastian
4.2.2. At-sea Boardings	Michael Mourkas
4.2.3. Fatalities and Casualties	Michael Mourkas
5.1 Data Synthesis	Forrest Dwyer
5.2 Recommendations	Heather Sebastian
5.3. Conclusions	Forrest Dwyer
Appendix A	Heather Sebastian
Appendix B	Heather Sebastian
Appendix D	Forrest Dwyer and Michael Mourkas
Appendix H	Team
Appendix I	Team
Appendix J	Team
Appendix K	Team
Appendix L	Team

Table of Contents

Abstract.....	ii
Acknowledgements.....	iii
Authorship Page.....	v
Table of Contents.....	vi
List of Figures.....	x
List of Tables.....	xi
Glossary:.....	xii
Executive Summary.....	xiv
1. Introduction.....	1
2. Background.....	4
2.1. Fishing Vessels and Harvest Methods.....	4
2.1.1. Trawlers.....	4
2.1.2. Gillnetters.....	5
2.1.3. Purse Seiners.....	6
2.1.4. Dredges.....	8
2.1.5. Trap and Pots.....	10
2.1.6. Longliners.....	11
2.2. The Evolution of Commercial Fishing Safety Regulations.....	12
2.2.1. Fishing Vessel Safety Bill of 1941.....	12
2.2.2. Alternative Safety Programs Report of 1971.....	13
2.2.3. Movement Towards Mandatory Requirements.....	14
2.2.4. Commercial Fishing Industry Vessel Safety Act of 1988.....	16
2.3. The Evolution of Fishery Conservation/Management Regulations.....	17

2.3.1. Marine Mammal Protection Act of 1972	18
2.3.2. Endangered Species Act of 1973	18
2.3.3. Magnuson-Stevens Act of 1976	19
2.3.4. Sustainable Fisheries Act of 1996	21
2.4. National Observer Program	22
2.4.1 Observer duties while onboard a vessel	22
2.4.2. Vessel Selection	24
2.5 Memorandum of Agreement on Observer Safety	24
2.5.1. Improving Observer Safety	25
2.5.2. Termination of the Memorandum of Agreement	26
2.5.3. USCG Examinations	26
2.6. Summary	28
3. Methodology	29
3.1. Objective 1: Formulate Hypotheses, then Test Them by Collecting and Analyzing USCG/NOAA Data regarding CFVs	29
3.1.1. Hypothesis 1: Dockside Safety Examinations	30
3.1.2. Hypothesis 2: At-sea Boardings	31
3.1.3. Hypothesis 3: Fatality and Casualty Rates on Commercial Fishing Vessels ...	32
3.1.4. Hypothesis 4: Number of Completed Observer Checklists	32
3.2. Objective 2: Conduct Interviews in Order to Supplement Data	33
3.2.1. Interviews with Commercial Fishermen	33
3.2.2. Interviews with NMFS Observers	34
3.3. Objective 3: Develop Practical Recommendations Based on Results	35
3.4. Summary	35

4. Results and Analysis	36
4.1. Objective 1: Formulate Hypotheses, then Test them by Collecting and Analyzing Data Regarding CFVs.....	36
4.1.1. Hypothesis 1: Dockside Safety Examinations	36
4.1.2. Hypothesis 2: At-sea Boardings.....	42
4.1.3. Hypothesis 3: Fatality and Casualty Rates on Commercial Fishing Vessels...	45
4.1.4. Hypothesis 4: Number of Completed Observer Checklists	50
4.2. Objective 2: Conducting Interviews in Order to Supplement Data.....	51
4.2.1. Interviews with Commercial Fishermen	51
4.2.2. Interviews with NMFS Observers.....	53
4.3. Summary.....	54
5. Conclusions and Recommendations	55
5.1. Data Synthesis	55
5.2 Recommendations	56
5.2.1. MISLE Database Training	56
5.2.2. Safety Decals for Commercial Fishing Vessels	57
5.2.3. Research on Expiration Dates of Safety Equipment	58
5.2.4. Inspection Cards.....	59
5.2.5. Observer Training	60
5.3. Conclusions	61
References.....	62
Appendix A: Sponsor Description.....	68
Appendix B: What is an IQP and how does our project qualify as one?.....	70
Appendix C: Memorandum of Agreement	71

Appendix D: Commercial Fishing Industry Vessel Requirements.....	79
Appendix E: Dockside Safety Examination Form.....	86
Appendix F: Pre-Trip Vessel Safety Checklist.....	90
Appendix G: At-sea Boarding Form.....	92
Appendix H: Interview Protocol/Questions for Commercial Fishermen	94
Appendix I: Informed Consent Form for Commercial Fishermen	95
Appendix J: Interview Protocol/Questions for NMFS Observers	98
Appendix K: Commercial Fishermen Interview Summaries.....	99
Appendix L: NMFS Observer Interview Summaries	102
Appendix M: NMFS Fishing Permit Conditions	107

List of Figures

<i>Figure 1: Vessel with Trawl Net (Galiano, 2009)</i>	5
<i>Figure 2: Fixed gillnet below the surface (Japan Coast Guard, 2010)</i>	6
<i>Figure 3: Gillnet on the bottom of the ocean floor (Yaska Fishing Tackle, 2010)</i>	6
<i>Figure 4: Vessel with Seine Net (Galiano, 2009)</i>	7
<i>Figure 5: Vessel reaching its skiff, fish enclosed in the purse seine net (NORMA, 2009)</i> .	7
<i>Figure 6: Dredge (Lisa, 2007)</i>	9
<i>Figure 7: Hauling the dredge onto the vessel (Ruhle, 2007)</i>	9
<i>Figure 8: Long-ling Fishing (Galiano, 2009)</i>	12
<i>Figure 9: Exclusive Economic Zone (New England Fishery Management Council, 2010)</i>	20
<i>Figure 10: The eight NMFS Fishery Management Regions (US Fishery Management Council, 2010)</i>	21
<i>Figure 11: USCG Safety Decal (USCG, 2010 B)</i>	27
<i>Figure 12: Dockside Safety Exam Trends in (a) District 1 and (b) District 5</i>	38
<i>Figure 13: Percentage of Successful Dockside Safety Exams in (a) District 1 and (b) District 5</i>	41
<i>Figure 14: Number of Fatalities on Commercial Fishing Vessels in Districts 1 and 5</i> ...	46
<i>Figure 15: Fatalities, (a) District 1 and (b) District 5 by Vessel Decal Status</i>	47
<i>Figure 16: Number of Casualties in Districts 1 and 5</i>	48
<i>Figure 17: Casualties, (a) District 1 and (b) District 5 by Vessel Decal Status</i>	49
<i>Figure 18: USCG Chain of Command (USCG, 2010 B)</i>	69

List of Tables

<i>Table 1: Total Number of Dockside Safety Exams Conducted in Districts 1 and 5</i>	<i>37</i>
<i>Table 2: Number of Vessels Subjected to Observer Coverage by District and Year</i>	<i>39</i>
<i>Table 3: Results of At-sea Boardings in District 1 categorized by whether or not the boarding resulted in the issuance of at least one violation</i>	<i>43</i>
<i>Table 4: Results of At-sea Boardings in District 5 categorized by whether or not the boarding resulted in the issuance of at least one violation</i>	<i>43</i>
<i>Table 5: Throwable Flotation Devices</i>	<i>79</i>
<i>Table 6: Survival Craft (Cold Water)</i>	<i>80</i>
<i>Table 7: Survival Craft (Warm Water)</i>	<i>80</i>
<i>Table 8: Survival Craft (Great Lakes)</i>	<i>81</i>
<i>Table 9: Distress Signals</i>	<i>81</i>
<i>Table 10: EPIRBs</i>	<i>82</i>
<i>Table 11: Fire Extinguishers < 65'</i>	<i>82</i>
<i>Table 12: Fire Extinguishers > 65'</i>	<i>83</i>
<i>Table 13: Minimum Number of Fire Extinguishers > 65'</i>	<i>84</i>
<i>Table 14: First Aid Equipment and Training</i>	<i>85</i>
<i>Table 15: Communication Equipment</i>	<i>85</i>

Glossary:

The following is a list of definitions for technical terms and for acronyms used in the report.

Definitions

Anadromous – A type of fish that migrates from saltwater to spawn in freshwater such as salmon or shad (Anadromous, 2010)

Bycatch – At-sea discards of targeted (intentional) and non-targeted (unintentional) marine species

Casualty – A vessel loss

Fatality – A person who died or went missing while participating in commercial fishing

Skiff – A small boat often used to support a fishing vessel (NORMA, 2009)

Acronyms

ASPR – Alternative Safety Programs Report

BMIN – Bureau of Marine Inspection and Navigation

CFIVSA – Commercial Fishing Industry Vessel Safety Act

CFV – Commercial Fishing Vessel

CGBI – Coast Guard Business Intelligence Database

DSE – Dockside Safety Examination

EEZ – Exclusive Economic Zone

EPIRB – Emergency Position Indicating Radio Beacon

ESA – Endangered Species Act

EVIC – EPIRB Visual Inspection Card

FVSB – Fishing Vessel Safety Bill

FVSITF – Fishing Vessel Safety Initiative Task Force

MISLE – Marine Information for Safety and Law Enforcement Database

MMPA – Marine Mammal Protection Act

MOA – Memorandum of Agreement on Observer Safety

MSA – Magnuson-Stevens Fishery Conservation and Management Act

NEFMC – New England Fishery Management Council

NMFS – National Marine Fisheries Service

NOAA – National Oceanic and Atmospheric Administration

NOP – National Observer Program

NPFVOA – North Pacific Fishing Vessel Owners’ Association

PFD – Personal Flotation Device

PTVSC – Pre-Trip Vessel Safety Checklist

SFA – Sustainable Fisheries Act

SPV – Small Passenger Vessel

USCG – United States Coast Guard

WPI – Worcester Polytechnic Institute

Executive Summary

The dangers of the commercial fishing industry have long been known and are well documented. Much of this danger can be credited to the harsh environment in which commercial fishing takes place; however, the marine environment itself is not the only culprit. Human error, mechanical failures, and overall vessel condition also contribute to the dangers of commercial fishing.

Starting in 1977, certain commercial fishing vessels (CFVs) in the United States have been required to carry observers employed by the National Marine Fisheries Service (NMFS). One of the goals of at-sea observer programs is to document the catch during an entire trip. Vessels are selected for observer coverage randomly in order to keep samples statistically valid. Meeting this necessary goal of documenting catch, while also keeping observers as safe as possible, is a serious challenge. The safety of observers and commercial fishermen is paramount, and both the United States Coast Guard (USCG) and NMFS recognized this challenge and decided that extra measures would need to be implemented in order for this issue to be addressed.

To improve observer safety, the USCG and the National Oceanic and Atmospheric Administration (NOAA) cosigned the Memorandum of Agreement on Observer Safety (MOA) in 2004. The MOA adds provisions which detail how the two agencies work together (Appendix C - Article V) to enhance at-sea safety for both commercial fishermen and observers. One way safety has improved is through mutual support of existing USCG and NMFS regulations which are aimed at improving at-sea safety. An example of this support is when the NMFS made the USCG Commercial Fishing Vessel Examination Decal mandatory for all CFVs selected to carry observers. For a fishing vessel to legally fish, once selected for observer coverage, the vessel must

have a current USCG Safety Examination Decal and must also pass a Pre-Trip Vessel Safety Checklist (PTVSC) developed by NMFS. Successfully passing both the USCG Commercial Fishing Vessel Examination and PTVSC, helps verify that the vessel's safety equipment is up-to-date and ensures that observers only work on vessels that are well maintained.

CFV casualty data has been collected by the USCG for many years. In USCG District 1 (the northeastern United States), casualty data has been collected for some 350 years. Yet, since the MOA is relatively new, the NMFS and the USCG have not had the opportunity to review the 2004 MOA to assess its efficacy.

The goal of this project was to complete research on the MOA, its provisions, and its expectations, to determine if they have been met and are effective in reducing casualties on CFVs. Our first step towards this goal was to complete thorough background research on the topic of commercial fishing. This research included the regulations that govern commercial fishing, as well as the different types of vessels and gear. Next, we formulated three objectives, which we felt would allow us to complete this goal. Our first objective was to formulate hypotheses, and then test them by collecting and analyzing USCG and NOAA data regarding CFVs. Second, we wanted to conduct interviews with commercial fishermen and observers in order to supplement our data analyses. Our last objective was to make recommendations based on the findings from our first two objectives and present them to the USCG and NOAA.

To accomplish these objectives we focused specifically on USCG Districts 1 and 5 which extend geographically from Maine through North Carolina. We completed four data analyses on topics such as dockside safety examinations, at-sea boardings, fatalities, casualties, and observer checklists. Interviews with CFV captains and NMFS observers

from the two districts supplemented our quantitative data analyses, and pinpointed specific issues that needed attention.

From our data analyses and interviews we concluded that the expectations of the MOA have been met, and that observers are now safer on CFVs. We have based this conclusion on several factors, including: the increase in the number of dockside safety exams conducted, the increase in the number of CFVs receiving safety decals, and the decrease in the number of at-sea boarding safety deficiencies found. In addition to this conclusion, we made recommendations to the USCG to potentially improve commercial fishing safety. These recommendations focused on several aspects of commercial fishing, and not just the MOA. We recommended training for the personnel who enter information into the USCG's database, as well as changes to the training given to observers. We also recommended stricter enforcement of the mandatory safety decal policy, and changes to the PTVSC. We believe that these recommendations for the USCG and NOAA have the potential to make both commercial fishermen and observers safer while at sea.

1. Introduction

For many countries fish is a major food staple, but the difficulties in bringing this commodity to the consumer are not widely understood. The reality is that commercial fishing is one of the most dangerous occupations in the world (CDC, 2010). As Sir Walter Scott (1816) said in *The Antiquary*, “It’s no fish you are buying – it’s men’s lives.” While commercial fishing has never been considered a “safe” occupation, changing conditions in the industry have added to the dangerous nature of the job.

The conditions in the United States are no different from the conditions worldwide, with the commercial fisherman fatality rate currently thirty times higher than the national average (CDC, 2010). Ideally, fishermen would bring in large catches in a short amount of time, all without venturing too far from port. However, the current situation that fishermen face is far from ideal. Advances in the technology of commercial fishing, such as fish-finding sonar and global positioning systems, have allowed for huge catches leading to diminishing populations of near-shore fish. Fishermen are now forced to go farther and farther away from shore, thus putting great strains on themselves and their vessels. Additionally, although there are safety regulations for commercial fishing vessels (CFVs), without close monitoring, vessel owners and captains may not comply with all safety requirements. Although non-compliance with safety regulations may make fishermen’s lives seemingly “easier”, it also exposes them to potentially deadly risks that they could otherwise avoid.

The United States Coast Guard (USCG) and the National Marine Fisheries Service (NMFS) recognize that commercial fishing fatalities and vessel casualties are a serious problem, and have begun to address this issue in several ways. One way this issue is currently being addressed is through the Memorandum of Agreement on Observer

Safety (MOA) which was jointly signed by the USCG, the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries), and NMFS in December, 2004 (NOAA and USCG, 2004). The purpose of the MOA is to “enhance compliance with existing requirements” and “promote safe working conditions for observers.” To achieve this goal, the USCG and NOAA Fisheries repurposed the National Observer Program (NOP) to fit the MOA’s objectives.

Since March, 1977, the NMFS has required certain CFVs to carry observers in order to document catch and conserve American fisheries (NOAA Fisheries, 2010 B). Now, under the MOA, vessels are required to undergo a Dockside Safety Examination (DSE) before they are permitted to carry an observer. Although these safety regulations are now in effect, preventable fatalities and casualties are still occurring on CFVs. It is apparent that fatality and casualty rates are beyond acceptable and, therefore, additional measures need to be taken.

However, since the MOA is relatively new, minimal research has been done pertaining to the effectiveness of its provisions, such as the mandatory DSE (J. Wendland, personal communication, November 2, 2010). Realizing this, the USCG has decided that an in-depth analysis should be done on the subject of these provisions. This project focused specifically on USCG Districts 1 and 5 which extend geographically from Maine through North Carolina. The reasoning behind this is that the majority of NMFS observers operate within these two districts, which are often ranked as the most dangerous in the country (M. Tork, personal communication, November 2, 2010).

This project determined if the expectations of the MOA and its provisions have been met, in terms of making commercial fishing safer. Based on these findings, we recommended several changes to potentially make commercial fishing safer. To

accomplish this goal, our team analyzed data on marine casualties taking place onboard CFVs with and without observer coverage. This analysis utilized DSE reports, fatality and casualty data, as well as first hand information from NMFS observers and commercial fishermen. The results of this project give insights into how to prevent fatalities and casualties, and will potentially aid the USCG in creating a safer environment for the men and women who make their living on CFVs.

2. Background

In this chapter, we discuss the different types of CFVs and associated gear types used in Districts 1 and 5. We also discuss the types of injuries and casualties encountered on these vessels. Also provided is a chronological overview of both commercial fishing safety regulations and conservation efforts, detailing why both arose, and their impact on the commercial fishing industry. Understanding the history of this dangerous and fiercely independent industry is the first step towards improving the problem of preventable fatalities and vessel casualties (M. Tork, personal communication, November 2, 2010).

2.1. Fishing Vessels and Harvest Methods

In USCG Districts 1 and 5, there are four main types of CFVs: trawlers, gillnetters, purse seiners and dredgers (M. Tork, personal communication, November 12, 2010). Also present, but to a lesser degree, are: traps and pots, longliners, and handline vessels. Among these different vessels and gear types there are both common and unique dangers.

2.1.1. Trawlers

Trawlers (Figure 1) are most often classified by the fishing method they use or the type of fish they catch (Turner, 2005). Bottom trawlers operate by dragging their nets (trawls) across the bottom of the ocean, and aim to catch bottom dwelling fish and other organisms, such as clams (Monterey Bay Aquarium, 2010). An associated hazard with these vessels is that they can often disturb ocean floor habitats. Trawlers also tend to haul

in large quantities of bycatch, which can result in damaged equipment, and can make the vessels less productive and more harmful to the environment.

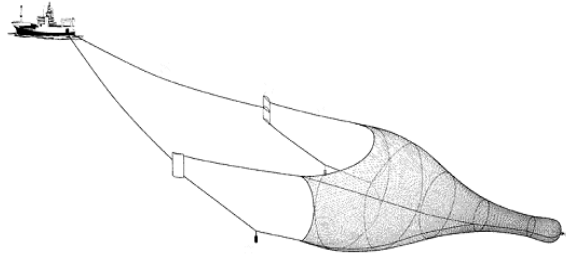


Figure 1: Vessel with Trawl Net (Galiano, 2009)

2.1.2. Gillnetters

Gillnet (Figures 2 and 3) vessels use a floating net wall to capture schools of swimming fish. The net is virtually invisible to fish, leading to this method's effectiveness. Fish try to swim through the nets, and if they are large enough, their heads get stuck in the meshes of the net and the rest of their body cannot fit through (MCS, 2010). In most cases, the fish try to back up out of the net, which entangles their gills, making escape nearly impossible. The mesh size of the net varies depending on the size and species desired for catch. Since these fishermen deal with extensive amounts of netting, one hazard that presents itself is the danger of entanglement. Yet, the most common injury to fishermen stems from contact with sting ray stingers. This happens while removing the fish from the netting (Ruhle, 2005). These types of vessels are so successful in catching fish that they tend to haul in large amounts of bycatch in addition to intended species.

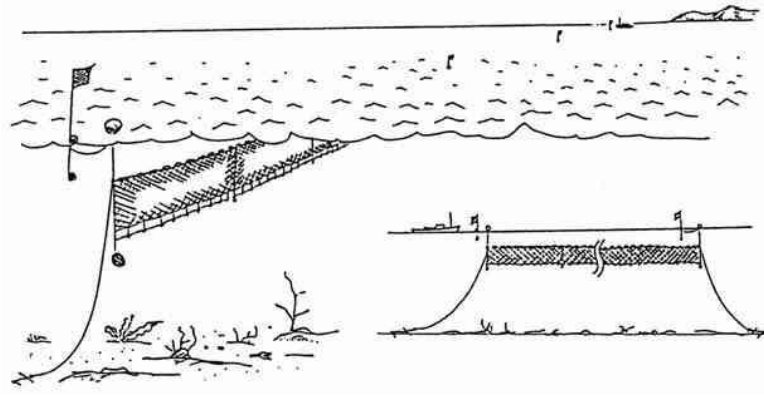


Figure 2: Fixed gillnet below the surface (Japan Coast Guard, 2010)

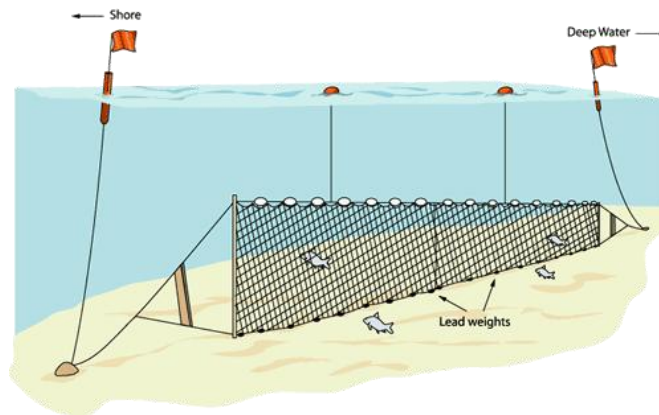


Figure 3: Gillnet on the bottom of the ocean floor (Yaska Fishing Tackle, 2010)

2.1.3. Purse Seiners

Purse seining vessels (Figures 4 and 5) operate by encircling schools of fish with a large net wall, and then drawing the net together underneath the fish so that they are completely surrounded (pursed) (MCS, 2010). Vessels use a buoy or a skiff to anchor one end of the net while the vessel encircles the fish, ultimately returning to the starting point (NORMA, 2009). Boat sizes for seine-net fishing vary, but typically the larger the vessel, the more powerful the equipment onboard (Encyclopedia Britannica, 2010). Main

equipment usually includes a power block mounted on a crane behind the wheelhouse which stores enormous lengths of net and rope. Mechanical failures of the power block and other machinery can cause serious injuries for those onboard. It is also easy for crewmembers to get caught up in the nets and ropes while the machinery is being operated.

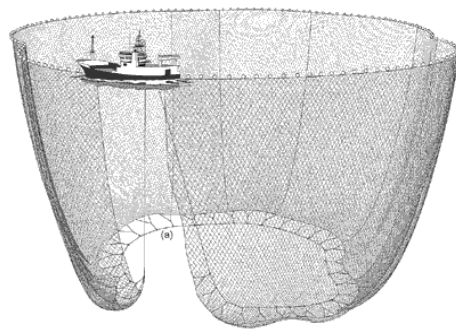


Figure 4: Vessel with Seine Net (Galiano, 2009)

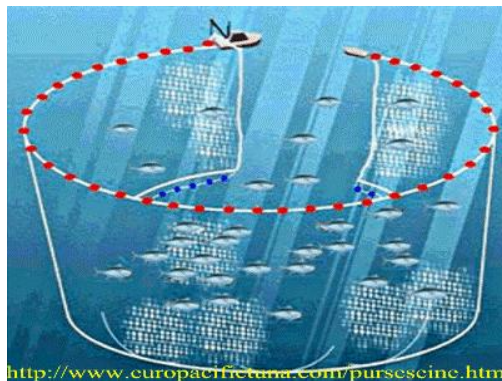


Figure 5: Vessel reaching its skiff, fish enclosed in the purse seine net (NORMA, 2009)

2.1.4. Dredges

Dredge fishing (Figures 6 and 7) is similar to trawl fishing; however, these vessels aim to catch bivalve mollusks such as oysters, clams and scallops from the seabed (MCS, 2010). Dredging involves dragging a heavy frame with an attached mesh bag along the sea floor to catch species living on or in the mud or sand (Monterey Bay Aquarium, 2010). According to Ruhle (2007), probable hazards associated with dredge fishing include:

- Weight of dredges;
- Swinging dredges in rough weather;
- Small crew size (no one in the wheel house at times);
- Being struck by a dredge and knocked overboard;
- Strain on equipment;
- Parting cables;
- Chance of catching a live torpedo, mine or bomb;
- Lack of crew experience and training;
- Rough weather conditions.

From these hazards, the most common accidents and injuries onboard dredging vessels include: lacerations, gear entanglement, and Carpel tunnel syndrome (Ruhle, 2007). Other injuries occur from the fatigue the fishermen face from: working long shifts, strenuous work on deck, and shucking shellfish.

Other drawbacks of these vessels are that they can tear apart habitats developed on the ocean floor, and also haul up significant bycatch (Ruhle, 2007). Due to an individual quota management scheme, set up by the New England Fishery Management

Council (NEFMC) (see section 2.3.3), the Sea Scallop Fishery has become increasingly safer. This is because vessels have a fixed quota and, therefore, are not in direct competition. The NEFMC places restrictions on crew size and the number of days allowed at-sea. This permits fishermen to choose better days, based on the weather, to go out to sea.

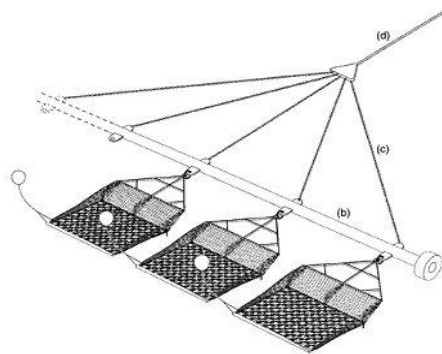


Figure 9. Scallop dredges assembled on tow bar

Figure 6: Dredge (Lisa, 2007)



Figure 7: Hauling the dredge onto the vessel (Ruhle, 2007)

2.1.5. Trap and Pots

Traps and pots are most typically used to catch crabs, shrimp and lobsters. With trap and pot fishing, weather tends to be one of the greatest hazards to fishermen (Spinazzola, 2005). Trap and pot fishermen generally operate between October and April, when water temperatures are at their coldest. However, weather is not the only danger. Vessels associated with trap and pot fishing are often small, leaving little deck space open for maneuverability. Typical injuries and possible hazards for these vessels include:

- Severing fingers;
- Tangling appendages in the rope when setting the traps/being pulled overboard; from entanglement;
- Severing fingers or severe lacerations when untangling snarls in the rope;
- Fish poisoning and infection from being poked by bones in the bait;
- Tripping and falling/falling over board;
- Recoil from extremely taught rope.

In addition to these injuries, fatigue also tends to be a common obstacle in this fishery (Spinazzola, 2005). While the number of crew members depends on the size of the vessel, a typical crew ranges from three to five members, in addition to the captain. Crewmembers take turns standing watch at night and are still expected to fish the following day. This takes a toll on their bodies, often resulting in a lowered level of alertness and a greater risk of injury.

2.1.6. Longliners

Longliner vessels catch their fish by setting out miles of buoyed line with baited hooks (Figure 3). Since the hooks are equally spaced on the line, bycatch is minimized (Stolpe, 1999). This is because fishermen use a “one-at-a-time” method of catching fish, which allows them to determine what they have hooked before bringing it onboard. Therefore, if the fishermen realize they have undesirable species on the line, they can release it with little harm done. Just as the name suggests, the greatest risks from longline fishing tends to be the lines and ropes, as well as the hooks (George, 1993). For instance, the line can become entangled on a fisherman’s leg or a swinging hook can catch his/her clothing while the line is being set. Another factor that presents a danger to longline fishermen is the trip location and duration. The closer fishermen stay to shore, and the fewer days they are out braving the rough sea, the safer they tend to be. Although trip length varies based on the size of the vessel, typical long-line fishing trips last around 10-30 days.

A predecessor to longliners is handline fishing, which is one of the oldest fishing methods, but only used to a lesser degree for commercial fishing. Handline fishing is simply catching fish with lines and hooks (MCS, 2010). While these fishermen do not deal with heavy equipment or extensive nets and ropes, there are still dangers present. Appendages can get caught in the line with a large fish hooked (WaayCool Handlines, 2010). Also, when fish are caught, they tend to be convulsive. This presents the danger of injuries from hooks left in fish whilst on deck. Another hazard these fishermen face is being struck by a marlin’s bill while reeling it in.

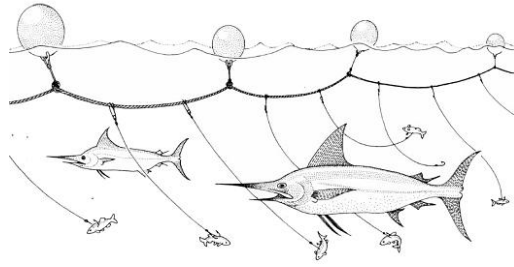


Figure 8: Long-ling Fishing (Galiano, 2009)

2.2. The Evolution of Commercial Fishing Safety Regulations

Commercial fishing has a rich heritage, one which is often ingrained in fishermen and passed down through generations (M. Tork, personal communication, November 2, 2010). Over the years, this fact has led many fishermen to accept the inherent risks associated with fishing. To help lower these risks, the USCG is tasked with protecting commercial fishermen and their vessels (USCG, 2009). This is done through search and rescue operations and the enforcement of issued safety regulations. Legislators have been proposing safety regulations for over a century, yet, due to significant opposition, few of these bills have successfully been put into effect.

2.2.1. Fishing Vessel Safety Bill of 1941

In the 1800s and early 1900s, several pieces of legislation were enacted for different types of watercraft (Spitzer, 1999). However, none of these bills specifically targeted CFVs. In 1941 the Fishing Vessel Safety Bill (FVSB) was introduced to Congress by Representative Thomas A. Flaherty of Massachusetts, becoming the first bill to directly address commercial fishing. The bill sought to place vessels under the

jurisdiction of the Bureau of Marine Inspection and Navigation (BMIN). Prior to the introduction of this legislation, CFVs were only required to carry fire extinguishers, flame arrestors, life preservers, and ventilation systems. Although an improvement, the requirements were minimal, and did not fully address CFV safety. The FVSB attempted to give a much needed expansion to the list of required safety equipment, adding bilge pumps and water-tight bulkheads, among other things, to the list.

Furthermore, the two most important stipulations of the bill were for annual vessel inspections and operator licensing (Spitzer, 1999). However, the FVSB was ultimately unable to pass through Congress. The first reason for this was the outbreak of World War II which occupied Congress, taking attention away from the FVSB. Yet, the most significant reason that the FVSB failed was due to opposition from the commercial fishing industry. The problem of industry opposition to restrictive legislation remains today, as many commercial fishermen oppose requirements for the safety and emergency equipment which could save their lives. Because of this, passing legislation or even getting fishermen to adhere to the existing regulations can be a difficult task.

2.2.2. Alternative Safety Programs Report of 1971

Due to the opposition from the commercial fishing industry, among others, CFV safety standards remained largely inadequate during the 1950s and 1960s (Spitzer, 1999). CFVs became so dangerous during this time period that Congress had to call for a report detailing ways to reduce the casualties. The USCG was mandated to produce the Alternative Safety Programs Report (ASPR), and gave its finding to Congress in 1971. The findings of the ASPR concluded that the lack of adequate safety regulations was a

leading cause of casualties on CFVs. The report also made several recommendations, many of which would have already have been in place had the FVSB been passed some thirty years prior.

The ASPR also included an interesting comparison of CFVs to small passenger vessels (SPVs) (Spitzer, 1999). In 1956, Congress passed the Small Passenger Vessel Safety Act which essentially required SPVs carrying over six passengers to be inspected. As a result of the legislation, deaths onboard SPVs dropped from an average of twenty-nine per year to five per year. Because of the dramatic decrease in deaths, the USCG decided that implementation of inspections for CFVs could provide similar results.

However, the USCG report and recommendations were never utilized, largely due to an alternate proposal created by the NMFS (Spitzer, 1999). The provisions of the NMFS proposal were much less stringent than those developed by the USCG, involving a voluntary safety program rather than a mandatory one. Also, since the NMFS provisions called for a voluntary program, implementation costs were predicted to be substantially less than for the USCG recommendations. Elements of this voluntary program remain today, as seen in the use of voluntary DSEs (see section 2.5.1).

2.2.3. Movement Towards Mandatory Requirements

Finally, in the 1980s CFV safety received serious attention, though this was only as a result of several accidents which highlighted the safety deficiencies present on CFVs (Spitzer, 1999). The first two accidents happened simultaneously in 1983, while the third took place in 1985 (Walbeck, 2000). While fishing on Valentine's Day in 1983, two fishing vessels, *Altair* and *Americus*, suddenly went missing in the Bering Sea.

Altogether, fourteen fishermen lost their lives as a result of the tragedy. The vessels

shared the homeport of Anacortes, Washington, causing a public outcry in the city for an explanation. A joint investigation launched by the USCG and National Transportation Safety Board (NTSB) eventually cited lack of stability as the cause of both accidents (Spitzer, 1999). Next, the investigators made recommendations that stability standards and analyses should be required for modified or new CFV.

However, the Commandant of the USCG did not agree, and the standards were not put in place (Spitzer, 1999). Instead, the Fishing Vessel Safety Initiative Task Force (FVSITF) was charged with developing a new program for CFV safety. The task force proposed two measures to make vessels safer. First, voluntary standards were published for ship designers and builders. These standards addressed issues such as stability and fire safety, albeit on a voluntary level. Second, a safety guide was jointly developed by the USCG and the North Pacific Fishing Vessel Owners' Association (NPFVOA). The safety guide was meant for use by crewmembers, and was eventually implemented in early 1987. However, this was almost four years after the sinking of *Altair* and *Americus*, illustrating just how long it can take safety measures to be formulated, let alone implemented as a requirement.

The next event to bring safety concerns to the headlines was the sinking of the CFV *Western Sea* (Spitzer, 1999). In 1985, all six crewmembers were lost when *Western Sea* sank while fishing off Kodiak, Alaska. There was no hint that anything had gone wrong, until the body of crewmember Peter Barry was found. The shocking nature of the vessel's accident caused many to question the safety measures in place on CFVs. As a result of their son's death, Robert and Peggy Barry called on Congress and other government officials to institute mandatory safety standards. In 1987, a bill motivated by the Barrys was introduced to Congress by Michael Lowry of Washington State. The bill

dealt with licensing, training, safety equipment, and inspection of CFVs. Despite the bill's good intentions, it was thrown out in favor of another bill, H.R. 1841. This new bill did not mandate licensing and inspection as was the case with the Barry's bill. This decision was mostly due to testimony from the head of the FVSITF, who said that the USCG did not support licensing and inspections. H.R. 1841 was modified over the next several months, and eventually became the Commercial Fishing Industry Vessel Safety Act of 1988.

2.2.4. Commercial Fishing Industry Vessel Safety Act of 1988

When the Commercial Fishing Industry Vessel Safety Act (CFIVSA) was passed in 1988, it became the first bill to adequately regulate CFV safety (USCG, 2006). The act required the USCG to issue regulations for safety equipment standards, as well as operating procedures on commercial fishing industry vessels. In order to draft these regulations, the USCG formed the Fishing Industry Advisory Committee in 1988 (Spitzer, 1999). The Advisory Committee met over a span of two years before finally releasing new regulations in 1991. However, due to confusion and debate, several important areas were not regulated at that time. Examples included stability requirements for vessels under 79 feet and the required provision of survival crafts for vessels operating near the Exclusive Economic Zone (EEZ) boundary lines (see section 2.3.3). In the years following the act's implementation, casualties and fatalities dropped 20%, showing how important proper safety equipment is. When the requirements were first published, fishermen opposed the measures, yet, after seeing the drastic drop in casualties and fatalities, fishermen adopted the regulations into their fishing habits. Since 1988, new

requirements have been added to the CFIVSA to keep up with changes in industry practices and equipment, and to further address safety issues within commercial fishing.

As a result of the CVIFSA, all of today's CFVs are required to carry certain safety equipment while at-sea (USCG, 2006). The most important requirements are for personal flotation devices (PFDs), Emergency Position Indicating Radio Beacons (EPIRBs), and distress signals. The type and amount of safety equipment required varies depending on:

- Type and length of vessel
- Area of operation
- Seasonal conditions
- Number of people onboard
- Whether the vessel is documented or state registered
- The date the vessel was constructed or converted

For a complete list of safety requirements see Appendix D.

2.3. The Evolution of Fishery Conservation/Management Regulations

During the early 1970s, CFV regulations began to focus more on the conservation and management of fisheries. NOAA Fisheries Service issues and enforces the management regulations dealing with the commercial fishing industry (NOAA Fisheries, 2009). These regulations prevent both overfishing and illegal fishing, all in an attempt to keep commercial fishing a viable industry.

2.3.1. Marine Mammal Protection Act of 1972

The Marine Mammal Protection Act (MMPA) was the first of the conservation regulations, and was passed by Congress in 1972 (NOAA Fisheries, 2009). The MMPA is narrowly focused, intended only to prevent marine mammal extinction due to human activity. Congress' goal in passing the MMPA was to prevent marine mammal populations from becoming so diminished that they would no longer be sustainable. In the event that populations ever fall below sustainable levels, federal agencies must take action to reverse the depletion. The commercial fishing industry is directly affected by the MMPA since CFVs were partially responsible for the decline in marine mammal populations. The MMPA also includes a moratorium on takes of marine mammals in U.S. waters. NOAA enforces this moratorium by making sure commercial fishing operations do not adversely affect marine mammals.

2.3.2. Endangered Species Act of 1973

Continuing the increase in conservation efforts was the Endangered Species Act (ESA) which was signed into effect on December 28, 1973 (NOAA Fisheries, 2009). The purpose of the ESA was to build upon the MMPA by conserving all endangered species, not just marine mammals. NOAA is tasked with enforcing the ESA through the protection of marine and anadromous fish species such as salmon, steelhead, sturgeon, shad, and halibut. Under some circumstances, Incidental take permits exempt fishermen from take prohibitions covered under the ESA. Issued by NOAA Fisheries, incidental take permits allow for a specified number of unintentional interactions with protected animals. However, these interactions must be closely monitored and documented

regularly. Although the MMPA and ESA are necessary, both have been controversial. As a result of these acts, commercial fishing has become more expensive, more difficult, and arguably more dangerous.

2.3.3. Magnuson-Stevens Act of 1976

Next, in 1976, Congress passed the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (NOAA Fisheries, 2010 A). The act took effect on March 1, 1977 and became the primary law governing marine fisheries in the United States. The MSA allowed for marine conservation through the creation of the Exclusive Economic Zone (EEZ). The EEZ is an area controlled by the U.S., and gives special rights for the exploration and harvest of marine resources. One specific purpose of the EEZ is to reduce foreign fishing so that domestic fishermen have less competition.

Geographically, the EEZ begins three nautical miles from the U.S.' coastline and continues out to sea for 200 nautical miles (NOAA Fisheries, 2010 A). The water stretching from the U.S. coast to the three nautical mile boundary is governed cooperatively by NOAA and the respective coastal state. The boundary lines of the New England region of the EEZ can be seen below in Figure 9. Collectively, the EEZ encompasses over eleven million km², or almost twice the total land area of the U.S. (Food and Agriculture Organization of the United Nations [FAOUN], 2005). The shaded areas seen below in Figure 10 collectively represent the entire EEZ.

Overall, the EEZ is broken down into eight sections called Regional Fishery Management Councils (RFMCs) (US Fishery Management Council, 2010). These RFMCs govern the North Pacific, Pacific, Western Pacific, New England, Mid-Atlantic,

South Atlantic, Caribbean, and Gulf of Mexico regions. A map of the eight different regions can also be seen below in Figure 10. These RFMCs are necessary because of the different species and fishing styles found in each region. For example, the Western Pacific region features species such as tuna which must be internationally regulated due to migratory habits. On the other hand, the New England region features mostly groundfish, such as cod and halibut, which often face overfishing. To deal with variables such as overfishing, regions must develop fishery management plans (FMPs) and management measures.



Figure 9: Exclusive Economic Zone (New England Fishery Management Council, 2010)

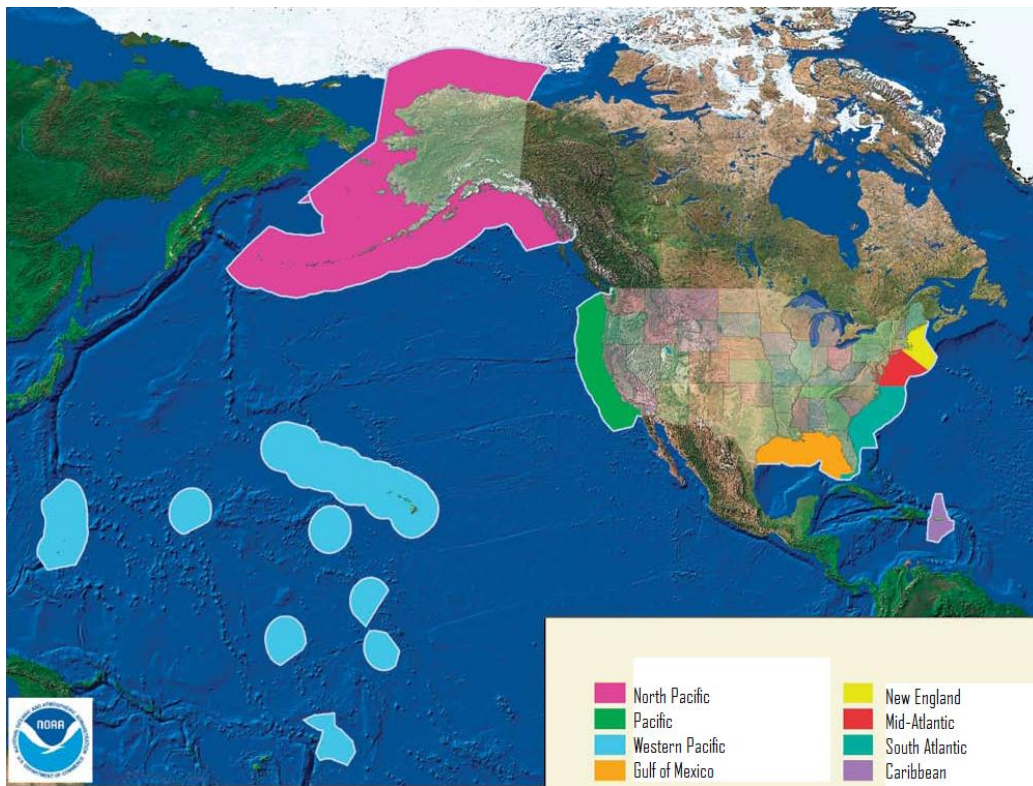


Figure 10: The eight NMFS Fishery Management Regions (US Fishery Management Council, 2010)

2.3.4. Sustainable Fisheries Act of 1996

In 1996, several amendments to the original MSA were passed by Congress. Together these amendments were known as the Sustainable Fisheries Act (SFA) (NOAA Fisheries, 2009). The amendments arose due, in part, to bycatch in fisheries. The SFA required NOAA Fisheries to expand their actions pertaining to science, management, and conservation. In particular, this meant an increase in observer coverage so that bycatch could be better monitored.

2.4. National Observer Program

The NOP was formally established in 1999 by the NMFS, though NMFS has been using observers since 1972 (NOAA, 2009). The NOP was created to satisfy NOAA's conservation obligations from the MSA, ESA, and MMPA. Specifically, NOAA must collect data on commercial fishing activities that affect marine resources. Funding for the Observer program is provided by the NMFS which allocated \$90 million to the program in 2009 (Schwaab, 2009). The main purpose of the NOP is to aid in fishery conservation (NOAA Fisheries, 2009). The NMFS accomplishes this goal by deploying fishery observers on CFVs. Although trained and managed by the NMFS, observers in the Northeast U.S. are employed by private observer contractor services. Examples include Accuracy Integrity Service based in New Bedford, Massachusetts, East West Technical Services based in New Britain, Connecticut, and Marine Resources Assessment Group based in Essex, Massachusetts. These contractor services are required to carry a minimum of \$3 million of liability insurance coverage in the event that an observer is injured.

2.4.1 Observer duties while onboard a vessel

Every year NMFS observers spend approximately 60,000 days at-sea in forty-two different fisheries throughout the U.S., including the Pacific Islands and American Samoa (M. Tork, personal communication, November 12, 2010). While onboard a vessel, an observer has numerous duties including biological sampling and the collection of: gear characteristics, catch, and biological and weather data. Biological sampling and collecting data on catch composition (kept and discarded) are a vital component of stock assessments.

The duties of observers are decided by a predetermined list of priorities that are based on specific management needs for a particular fishery or area (NOAA Fisheries, 2009). These needs may be determined by the MMPA, the ESA, or by the RFMCs. While onboard a vessel, an observer on a single day trip will document all of the hauls made during that trip. During multi-day trips, observers will take occasional hauls “off” to allow for proper rest and meals.

In general, there are two types of hauls: observed hauls and unobserved hauls (NOAA Fisheries, 2009). During an observed haul, the observer collects data on all species brought onboard. This includes both kept and discarded species, as well as trash. During an unobserved haul, on the other hand, the observer only gathers kept catch data from the captain or first mate on watch during the haul. In other words, discarded species are not recorded. While onboard, an observer can encounter a situation where protected species are unintentionally caught during normal fishing operations. Any take or interaction with a marine mammal, seabird, or turtle takes priority and must be thoroughly documented by the observer. This documentation includes photographs for the purpose of identifying the species, as well as gender determination. Scars, markings, and health of the species are also taken into account. Documenting and sampling takes of protected species may result in an unobserved haul. Under the MMPA, all takes must be reported by the vessel operator or captain, even when an observer is onboard.

Another duty that an observer has is to measure gear and evaluate equipment characteristics (NOAA Fisheries, 2009). Detailed measurements of mesh size, net length, and anchor weight are taken to get a better understanding of how they affect fishing efforts and the catch. These data can then be used to develop new management strategies based on gear restrictions or modifications.

While on a vessel an observer will also collect economic data from the vessel owner (NOAA Fisheries, 2009). The observers are looking for information on expendable costs such as fuel, bait, and gear. The goal of this activity is to identify the costs and how they impact commercial fishing. This is necessary since federal mandates require that long term benefits outweigh the short term costs of regulations. Overall, the data gathered by observers is critical for the effective management of fisheries.

2.4.2. Vessel Selection

Observers are assigned to vessels randomly via a statistically valid process to ensure that the information gained is representative of a particular fishery (NOAA Fisheries, 2009). The NMFS deployment procedures also ensure that no individual vessel is subjected to excessive observer coverage. When a vessel is selected for coverage, several notification methods may be used: 1) The observer can choose to contact the vessel owner directly, 2) a vessel may be randomly selected from a list and then sent a selection letter or, 3) the vessel may be required to call in before every trip and either be assigned an observer or receive a waiver.

2.5 Memorandum of Agreement on Observer Safety

The MOA is a joint document between the USCG and the NOAA Fisheries Service which was created in 2004 (NOAA and USCG, 2004). The document was signed by the two organizations since both share a mutual interest in safety at-sea. Currently, under the MOA, the USCG and NOAA work together to improve safety regulations and

observer safety through improved communication and support. Under this partnership, NOAA is obligated to notify the USCG of any proposed changes to observer health and safety regulations. Likewise, the USCG keeps NOAA apprised of any proposed changes to safety regulations that may directly or indirectly impact NOAA's observer programs. The following sections detail the different provisions of the MOA, which aim to improve at-sea safety for all observers on CFVs.

2.5.1. Improving Observer Safety

Under the MOA, all NMFS observers must complete a course on marine safety taught by an instructor that has completed USCG approved Marine Safety Instructor Training (White, 2010). In addition, observers must demonstrate the ability to handle emergency situations that might be encountered while at-sea. This training requirement benefits both fishermen and observers, and can make the difference between surviving an at-sea emergency and not surviving the emergency. The bulk of observer safety training usually takes place over a two to three day period during the observer's initial three week training. Although safety is discussed in many of the topics taught during their three week training, the two or three day period is dedicated to just safety training. Throughout the course, observers learn numerous survival techniques that could potentially save their lives as well as others'. For example, observers learn how to don an immersion suit in sixty seconds or less, how to swim while wearing an immersion suit, how to properly launch and board a life raft, and how to get into a life raft while in the water.

Proper training was recognized by the NOAA Fisheries Service as being vital to the safety of observers, so in September 2005, the NMFS developed Observer Safety

Training Standards. These standards not only outlined what topics must be covered during all NOAA Fisheries observer trainings, but they also outlined how the various subjects would be taught. In addition, the standards also address instructor qualification/certification.

2.5.2. Termination of the Memorandum of Agreement

Under the MOA between the USCG and NOAA (2004), one of the signing parties cannot change a section of the document without the other party agreeing to the change. Furthermore, any changes must be agreed upon with written consent from both parties. If one party decides to discontinue participation in the MOA, then a ninety day notice must be given to the other signing organization.

2.5.3. USCG Examinations

As part of the MOA, and through the development of the Observer Health and Safety Regulations, before a vessel can carry an observer it must successfully complete a USCG DSE (USCG, 2010A). If a vessel has been selected to carry an observer, but does not have a valid DSE decal, the vessel cannot leave the dock until it rectifies this situation. Needless to say, a vessel cannot fish without leaving the dock, making this a severe punishment of which fishermen generally take notice. The examination is available to all commercial fishermen and can be performed voluntarily at any time. These inspections are educational, and can help fishermen comply with federal regulations. For an example of a DSE Form, see Appendix E. The USCG safety examination was put in place both for the benefit of commercial fishermen, as well as to

enforce federal regulations. In order to encourage participation, no punishment or legal action can come from these voluntary safety examinations. The safety examinations are also intended to discourage unsafe working environments and improve operational procedures, as well as raise safety awareness. Once complete, the examiner will fill out a safety examination form for the vessel owner. If the vessel is in full compliance with the federal safety regulations, then it receives a USCG safety decal (Figure 11), and if in a fishery with observer coverage requirements, is cleared to legally fish.



Figure 11: USCG Safety Decal (USCG, 2010 B)

Another check performed by observers is a Pre-Trip Vessel Safety Checklist (PTVSC) (Christensen, 2010). This check is required by NOAA policy before an observer deploys on a vessel. The PTVSC focuses on the vessel's safety equipment used for life saving and firefighting. For an example of a PTVSC form, see Appendix F. These

checks are done while the vessel is in port, to ensure that the required safety equipment is present and in working condition for an emergency situation. Similar to an invalid decal, if a vessel does not comply with regulations or provisions, it cannot legally fish until the owner fixes the regulatory discrepancies. Even if a vessel has a current safety examination decal, it still must successfully pass a PTVSC before it deploys with the observer onboard. The reason for this is that items that were onboard and up-to-date when the decal was issued may be outdated or even missing when the observer actually gets around to covering the vessel. In addition, the checklist also serves as a safety orientation for the observer. A safety orientation is required, by the USCG, for all new crew members, including observers.

Finally, the USCG conducts at-sea boardings of CFVs (USCG, 2009). At-sea boardings are similar to DSEs in that both inspect the vessel for hazards and compliance with regulations. Yet, unlike dockside safety exams, at-sea boardings are done non-voluntarily and are meant to enforce regulations (Appendix G). Deficiencies found on a CFV during an at-sea boarding can result in numerous penalties including fines and/or termination of the current trip.

2.6. Summary

In summary, there are numerous types of CFVs used in Districts 1 and 5. All of these types of vessels have different risks associated with them which add to commercial fishing's inherent danger. Furthermore, when compared to commercial fishing's long history, regulations and requirements have only just begun to address the issue of safety on CFVs.

3. Methodology

The goal of this project was to determine if the expectations of the MOA and its provisions have been met, and determine whether or not to recommend changes. To achieve our goal, we created the following objectives:

- To formulate hypotheses, then test them by collecting and analyzing USCG/NOAA data regarding CFVs;
- To conduct interviews with commercial fishermen and observers in order to supplement data analyses;
- To develop practical recommendations based on findings from the first two objectives, which may improve the effectiveness of the MOA.

This chapter details the methods that we used to complete each objective, and the rationale for our choices. In all cases, we focus on Districts 1 and 5, because these two districts have some of the highest fatality and casualty rates, and feature the most CFVs subjected to observer coverage.

3.1. Objective 1: Formulate Hypotheses, then Test Them by Collecting and Analyzing USCG/NOAA Data regarding CFVs

Our first objective was to test a number of hypotheses which we formulated in order to see if the expectations of the MOA have been met. We achieved this objective by collecting and analyzing USCG/NOAA data regarding CFVs. The databases we utilized were the Marine Information for Safety and Law Enforcement (MISLE) and Coast Guard Business Intelligence (CGBI). All of the USCG's information on items such as bridges, vessels, and waterways are stored on the MISLE database.

Information in MISLE is either added to the database in the field or back at the Unit Headquarters. In the first case, USCG field personnel use special PDAs to enter

information which is later synced and uploaded to MISLE. This normally occurs during activities such as at-sea boardings, where the boarding agent will update his/her PDA as the boarding progresses. This method generally leads to the most accurate data.

The primary reason for using CGBI was that it allowed us to access the data stored in MISLE in a manner better suited for data analysis. CGBI is essentially the USCG's electronic data warehouse which collects and stores information daily from over twenty-five other databases including MISLE. Within CGBI we were able to launch reports called "cubes" which allowed us to categorize the data into exactly what we were looking for. For example, for our second hypothesis we launched the "MISLE Law Enforcement Sightings and Boardings" cube, and for our third hypothesis we launched the "MISLE Fishing Vessel Summary" cube. Within these cubes, we refined our search allowing us to narrow our results. Typical filters that we used included: type of vessel, vessel decal status, and district. Using the information from these databases, we completed four analyses in order to test our hypotheses.

3.1.1. Hypothesis 1: Dockside Safety Examinations

The first hypothesis that we tested pertained to the December 2005 NMFS policy which required valid safety decals for all CFVs subjected to observer coverage. We hypothesized that if the NMFS decal policy was effective, then the number of vessels receiving DSEs would be higher after its implementation.

To test this hypothesis we conducted two analyses. First, we compared the number of DSEs conducted annually before (2002-2005) and after (2006-2009) implementation of the policy. We used 2002 as a cutoff year for this analysis since prior

to that year data were unreliable, and in some cases inaccessible due to a database changeover at the USCG. Second, we examined the number of safety exams administered during the specified years and determined whether or not a safety decal was issued to the vessel. This second analysis was also accomplished using data from the MISLE and CGBI databases.

Through these two analyses, we were able to determine how effective the NMFS policy is at encouraging vessels to acquire safety decals, as well as assessing the success rate of those vessels at attaining safety decals.

3.1.2. Hypothesis 2: At-sea Boardings

For our second analysis, we hypothesized that if more vessels received safety decals, then fewer at-sea boardings would result in safety deficiencies. This is because if a vessel has a safety decal, then all deficiencies at that time should have been corrected in order to receive the decal. Therefore, if an increasing number of CFVs had decals, when the USCG boards those vessels at-sea, the vessels should still be in compliance.

To test this hypothesis we compared the number of boardings conducted annually, resulting in one or more safety deficiencies before (2002-2005) and after (2006-2009) the implementation of the decal policy. The same cutoff year of 2002 remained for this analysis. We also noted the vessel's decal status (valid or expired) to see if that had any effect on the number of deficiencies found. By conducting this analysis we were able to expand on our first analysis, and determine how effective safety decals are at reducing safety deficiencies.

3.1.3. Hypothesis 3: Fatality and Casualty Rates on Commercial Fishing Vessels

Our next hypothesis was that, if CFVs had valid safety decals, then their fatality and casualty rates would be lower than those of vessels with invalid decals. This is because the more times a vessel is inspected, hypothetically the safer it will be. In this case, a thorough inspection such as the DSE should make CFVs safer.

To test this hypothesis we first compared the fatality and casualty rates of Districts 1 and 5 to each other. Next, we compared the fatality and casualty rates of vessels based on their safety decal status. To accomplish this analysis we used data from the CGBI database which was used to find the number of vessels with valid/invalid decals. From this analysis, we were able to further determine the effectiveness of safety decals.

3.1.4. Hypothesis 4: Number of Completed Observer Checklists

Next, we hypothesized that if observer checklists were truly effective, then, even if a vessel initially failed a checklist, the captain or owner of the vessel would correct the situation. This is because, if a vessel fails a PTVSC, the vessel cannot legally fish until all violations are fixed. By determining how many vessels are failing then rectifying PTVSCs, we will determine how effective the PTVSCs are.

To test this hypothesis, we again used NOAA data regarding CFVs, and first determined the number of observer checklists completed annually from 1998-2009. Since the NMFS requires that observer vessel selection be random, not all vessels are in sufficient condition to have an observer onboard. This means that many vessels fail their initial checklist examinations. Therefore, we examined the number of CFVs which failed

their initial checklist exams, and then went on to complete an exam by correcting their deficiencies. Through this analysis we were able to determine how effective the observer checklists are at promoting safety, and how seriously they are being taken by commercial fishermen.

3.2. Objective 2: Conduct Interviews in Order to Supplement Data

Our second objective was to gather qualitative data through telephone interviews. Information gained from these interviews was then used to supplement the data analyses from our first objective. Subjects for our interviews included both NMFS observers, and CFV captains, all of whom deal with the MOA and its provisions on a daily basis. This gave us a much better perspective than simply using quantitative data. The following two sections detail the protocols and topics covered during our interviews.

3.2.1. Interviews with Commercial Fishermen

The commercial fishermen that we interviewed have many years of experience, and have had observers onboard numerous times between 1998 and 2009. The reason for this specific timeframe is that we wanted to interview subjects who have operated before and after the MOA signing. Subjects for these interviews were referred to us through Mr. Mike Tork, a Fisheries Biologist employed by NOAA. For these interviews we followed a specific protocol (Appendix H), and we were able to:

- Determine if commercial fishermen feel safer since implementation of the MOA and the NMFS decal policy;
- Determine if there are any aspects of the MOA, its provisions, or the PTVSC that

commercial fishermen feel should be changed;

- Determine how carefully commercial fishermen observe safety regulations and provisions.

Due to the individuality and independence commercial fishermen, we understood that our subjects may not have wanted to express their honest opinions. To avoid any fear of unfavorable consequences, we made it clear to the commercial fishermen that our interviews would be confidential, no names would be used in our final report, and that their identities would not be revealed. To aid in this process, an informed consent form (Appendix I) was drafted by the team and approved by WPI's Institutional Review Board. The informed consent form outlined the interview process and discussed how the information would be kept confidential. By using this form we were able to increase the chance that our interview subjects felt secure in providing us with truthful responses.

3.2.2. Interviews with NMFS Observers

In addition to our interviews with commercial fishermen, we also interviewed several NMFS observers. While in Washington, D.C. we interviewed seven observers with experience ranging from one year to over twenty. The information we gathered from observers was personal, as these subjects' experiences have put the MOA's provisions to the test in real world situations. For these interviews with observers we followed a specific protocol (Appendix J), and were able to:

- Determine if observers feel safer since implementation of the MOA and Health and Safety regulations;

- Determine if there are any aspects of the MOA, its provisions, or the PTVSC that observers feel should be changed.

3.3. Objective 3: Develop Practical Recommendations Based on Results

Our third and final objective was to develop practical recommendations for the MOA and its provisions. To accomplish this we compiled all of the information gained from our data analyses and interviews. Using these sources of data we determined if any changes can or should be made to the MOA, its provisions, or USCG regulations. We made our recommendations with the goal of making the MOA and its provisions more effective at promoting safety on CFVs. Therefore, recommendations were still made if they could further improve safety for CFVs. Lastly, the recommendations that we made were limited to those that we deemed practical for all parties involved.

3.4. Summary

By completing these objectives through interviews, observations, data extraction, and data analysis, we were able to provide the USCG and NOAA Fisheries with information regarding the effectiveness of the MOA. With this information, the USCG and NOAA will be able to decide if new regulations need to be put in place to improve safety on CFVs.

4. Results and Analysis

Presented in this chapter is the information which we collected to determine if the expectations of the MOA and its provisions have been met. We obtained our information through data analyses and interviews, and the results of our methods follow below.

4.1. Objective 1: Formulate Hypotheses, then Test them by Collecting and Analyzing Data Regarding CFVs

In order to test our hypotheses, we conducted several data analyses using data from both the USCG and the NOAA Fisheries Service. By completing the analyses, we were able to test our hypotheses and make recommendations to the USCG and NOAA.

4.1.1. Hypothesis 1: Dockside Safety Examinations

For our first analysis, we hypothesized that, if the enforcement of the NMFS decal policy was effective, then the total number of vessels receiving DSEs would be higher after the policy's implementation. Therefore, we expected to see a noticeable increase in DSEs after 2005. This is because, in 2006, it became a requirement for all vessels carrying an observer to have a valid DSE. To complete this analysis we compared the number of DSEs conducted annually before (2002-2005) and after (2006-2009) implementation of the policy. Highlighted within Table 1 in blue and red are the total number of DSEs conducted before and after the NMFS policy respectively.

Table 1: Total Number of Dockside Safety Exams Conducted in Districts 1 and 5

YEAR	District 1	District 5	Both Districts
2002	405	265	670
2003	313	290	603
2004	662	283	945
2005	739	235	974
Total Before NMFS Policy	2,119	1,073	3,192
2006	1,173	545	1,718
2007	781	405	1,186
2008	1,157	397	1,554
2009	1,101	462	1,563
Total After NMFS Policy	4,212	1,809	6,021

From this comparison, a clear difference is shown; after implementation of the NMFS decal policy, the number of DSEs nearly doubles in both districts. This increase is especially apparent in Figure 12.

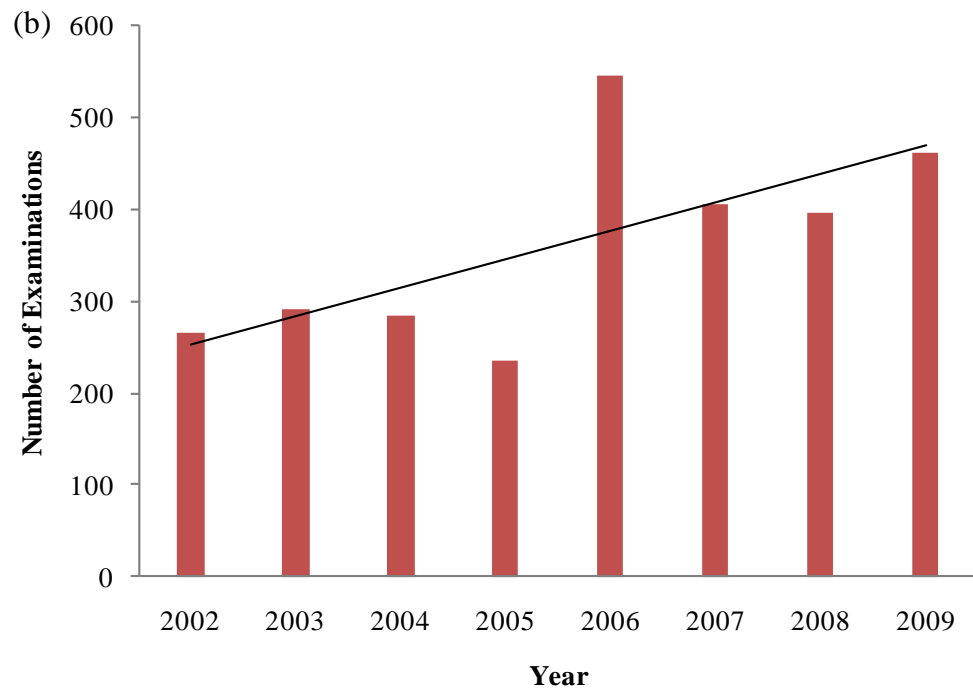
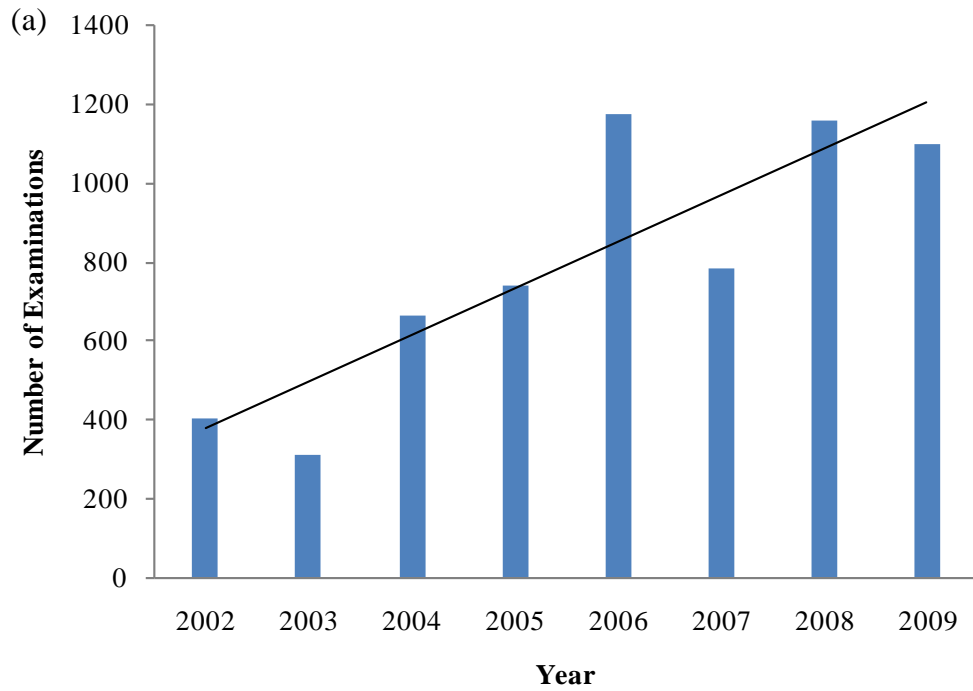


Figure 12: Dockside Safety Exam Trends in (a) District 1 and (b) District 5

Furthermore, the increase takes place during a time period when the total number of fishing vessels declines. Since 2000 in Districts 1 and 5, the number of vessels subjected to observer coverage (Table 2) has decreased 5.5%, from 5,750 to 5,431.

Table 2: Number of Vessels Subjected to Observer Coverage by District and Year

Year	Vessel Population	District 1	District 5
2000	5,750	4,634	1,116
2001	5,823	4,779	1,044
2002	6,005	4,946	1,059
2003	5,876	4,806	1,070
2004	5,959	4,838	1,121
2005	6,071	4,778	1,293
2006	5,896	4,649	1,247
2007	5,745	4,520	1,225
2008	5,513	4,342	1,171
2009	5,431	4,296	1,135

One trend to note in Table 1 and Figure 12 is the decrease in the number of DSEs conducted in 2007. This decrease can be attributed to the previously mentioned increase in DSEs conducted throughout 2006. All decals issued in 2006 were valid for two years; therefore the 1,173 vessels which received a safety decal in 2006 did not need to renew their DSE in 2007. This probably explains why the number of DSEs decreased back to a number similar to that of 2005. This fact accounts for the decrease in 2007, and also explains the increase in 2008, when the vessels from 2006 were required to renew their decals. Also, in June 2008, the expiration dates of the decals were changed from two years, to one year. This also accounts for why the data from 2009 resembles that of 2008. As Figure 13 shows, the trend lines for both Districts 1 and 5 show an increasing number

of DSEs starting in 2002. This increase is especially apparent in 2006, when over 400 more CFVs received DSEs.

Next, we quantified the percentage of DSEs administered during the specified years in which a safety decal was issued to the vessel. Exams that did not issue safety decals indicate that the vessel failed the examination. In the four years before the policy in District 1, the percentage of vessels receiving safety decals from DSEs averaged 34%. In the four years since the policy, that percentage has increased to 55%. Compared to 2004, CFVs are currently almost twice as successful at receiving safety decals. However, CFVs in District 5 did not experience the same increase. As Figure 13 shows, before the policy, about 70% of vessels successfully completed DSEs. After the policy was implemented, this percentage only rose to 78%. Yet, both of these numbers are higher than the current percentage in District 1, meaning that less change was necessary.

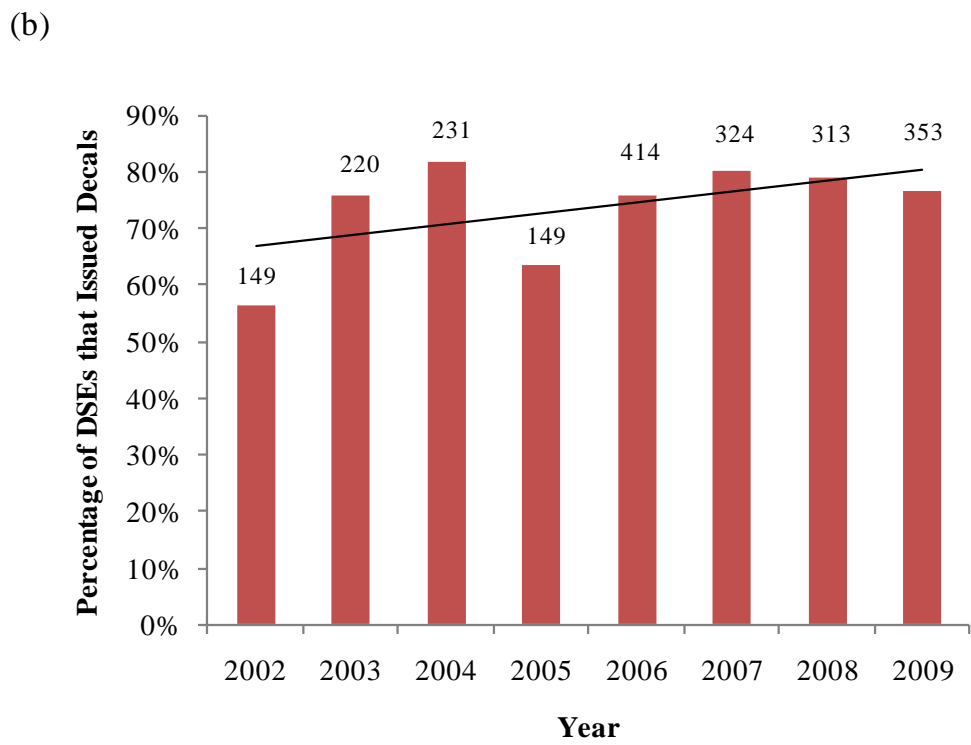
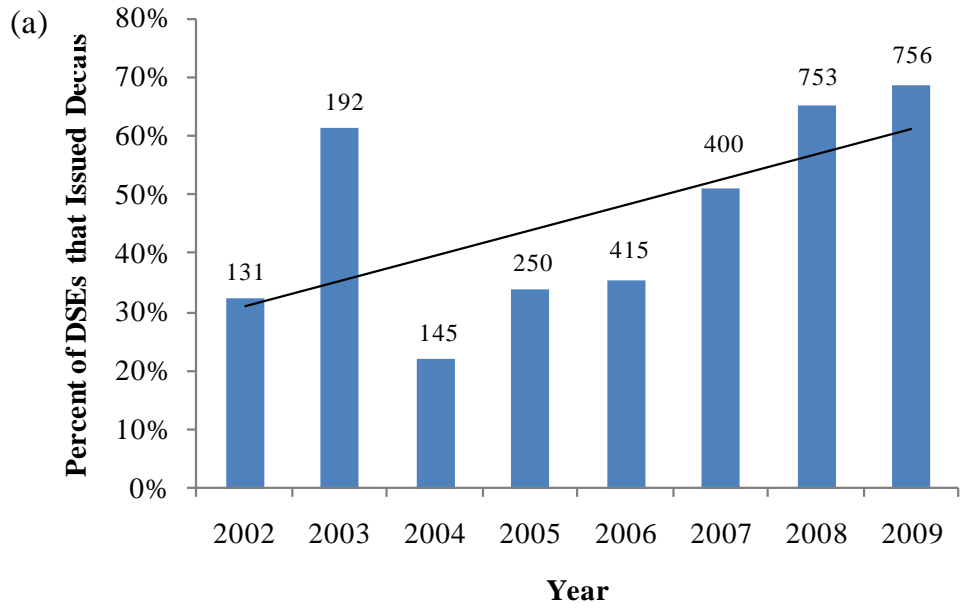


Figure 13: Percentage of Successful Dockside Safety Exams in (a) District 1 and (b) District 5

The data support our hypothesis, that the number of vessels receiving safety decals is higher after the policy change than before it. This suggests that the NMFS decal policy has been effective at increasing participation in the DSE program. This is evidenced by the doubling of the number of DSEs conducted in both Districts 1 and 5 from 530 to 1053 in District 1, and 268 to 452 in District 5.

While completing this first analysis, we dealt with several issues. For example, not all of the DSEs conducted were entered into the MISLE database correctly. Therefore, when we used the filter of “Fishing Vessel” to refine our search, the data set may have been incomplete. This is because the examiner who entered the data might not have specified if the vessel that he/she examined was a CFV or not. Another aspect that was sometimes left “unspecified” was whether or not a decal was issued to the vessel. In the case of our analysis, we had to discard all unspecified boarding results, since we could not ascertain whether or not a safety decal was issued.

4.1.2. Hypothesis 2: At-sea Boardings

For our second analysis, we hypothesized that, if more vessels received safety decals, then fewer at-sea boardings would result in safety deficiencies. To complete this analysis, we took the total number of at-sea boardings and divided them into groups based on where they took place, in this case either District 1 or District 5 (Tables 2 and 3). We also grouped the data to represent the outcome of the boarding, either no violations, or one or more violations.

Table 3: Results of At-sea Boardings in District 1 categorized by whether or not the boarding resulted in the issuance of at least one violation

YEAR	No Violations	One or More Violations	Total
2002	469	240	709
2003	786	440	1,226
2004	1,000	433	1,433
2005	1,345	469	1,814
Total Before NMFS Policy	3,600	1,582	5,182
2006	1,779	608	2,387
2007	1,552	464	2,016
2008	1,751	498	2,249
2009	1,658	523	2,181
Total After NMFS Policy	6,740	2,093	8,833

Table 4: Results of At-sea Boardings in District 5 categorized by whether or not the boarding resulted in the issuance of at least one violation

YEAR	No Violations	One or More Violations	Total
2002	190	95	285
2003	357	186	543
2004	752	414	1,166
2005	683	338	1,021
Total Before NMFS Policy	1,982	1,033	3,015
2006	653	343	996
2007	528	276	804
2008	534	307	841
2009	780	252	1,032
Total After NMFS Policy	2,495	1,178	3,673

Since the total number of at-sea boardings fluctuated over our target time span, we decided to compare annual percentages. We discovered that, in District 1 before the NMFS decal policy, 1,582 of the 5,182 at-sea boardings (31%) resulted in the vessel having at least one safety violation. In the four years since the implementation of the NMFS decal policy, only 2,093 of 8,833 at-sea boardings (24%) resulted in the vessel having at least one safety violation. This equals a decline of 7% in the number of at-sea boardings resulting in safety violations, and corresponds to a drop of almost one fourth.

The change in District 5 is not as easily seen, and was much less drastic. Before the NMFS decal policy, 1,033 of 3,015 at-sea boardings (34%) resulted in the vessel having at least one safety violation. In the four years since the implementation of the NMFS decal policy, 1,178 of 3,673 at-sea boardings (32%) resulted in the vessel having at least one safety violation. This equals a decline of 2% in the number of at-sea boardings resulting in safety violations, and represents a percentage change of only 6%.

However, this result was not totally unexpected. Looking back to our first analysis, it is apparent that, in District 5, the number of CFVs attaining safety decals only rose by 8% after implementation of the MOA and its provisions. In District 1, the increase was 20%, which implies that District 1 would feature a large drop in at-sea boarding deficiencies. District 5 on the other hand, does not have this large an increase in issuance of safety decals, and therefore the decrease in at-sea boarding deficiencies is less apparent.

Next, we examined whether or not the boarded vessels had a valid decal at the time of the at-sea boardings. This comparison turned out to be uninformative for both Districts 1 and 5. In District 1, 72% of vessels without decals and 74% of vessels with

decals were found to have no deficiencies. Similarly, in District 5, 67% of vessels without decals and 68% vessels with decals were found to have no deficiencies.

While using CGBI and MISLE for this analysis, we had to determine whether or not the violation issued was a safety deficiency. For this analysis we determined that a “safety deficiency” was any deficiency, except for those regarding security, fisheries, and pollution prevention. First, we filtered the data to just fishing vessels, then we examined fifty of the remaining cases by hand. Of those fifty, none had violations not pertaining to safety, so we decided that the number of vessels with non-safety violations could be considered negligible for the purposes of our analysis. The same problem remained from the first analysis of whether or not the vessel had been classified as a fishing vessel.

4.1.3. Hypothesis 3: Fatality and Casualty Rates on Commercial Fishing Vessels

For our third analysis we hypothesized that, if CFVs had valid safety decals, then their fatality and casualty rates would be lower than those of vessels with invalid decals. Our first analysis to test this hypothesis involved the annual number of fatalities onboard CVFs in Districts 1 and 5. This comparison (Figure 14) shows the overall fatality trend between Districts 1 and 5 from 1998 to 2009, and does not note a vessel’s decal status. From this figure, it is possible to see the general downward trend of fatalities in both districts.

For the part of this analysis regarding fatalities we discovered that it was difficult to see any trends in the initial data. We attributed this to the large numbers of casualties that have occurred from a single vessel sinking or going missing, for instance the tragic

loss of two fishermen aboard the CFV *Patriot* in 2009 which impacted the data for that year. Therefore, to help smooth the graphs, we decided to only count one fatality per event. Additionally, some problems with the casualty data may have occurred from a vessel not being classified as a total vessel loss.

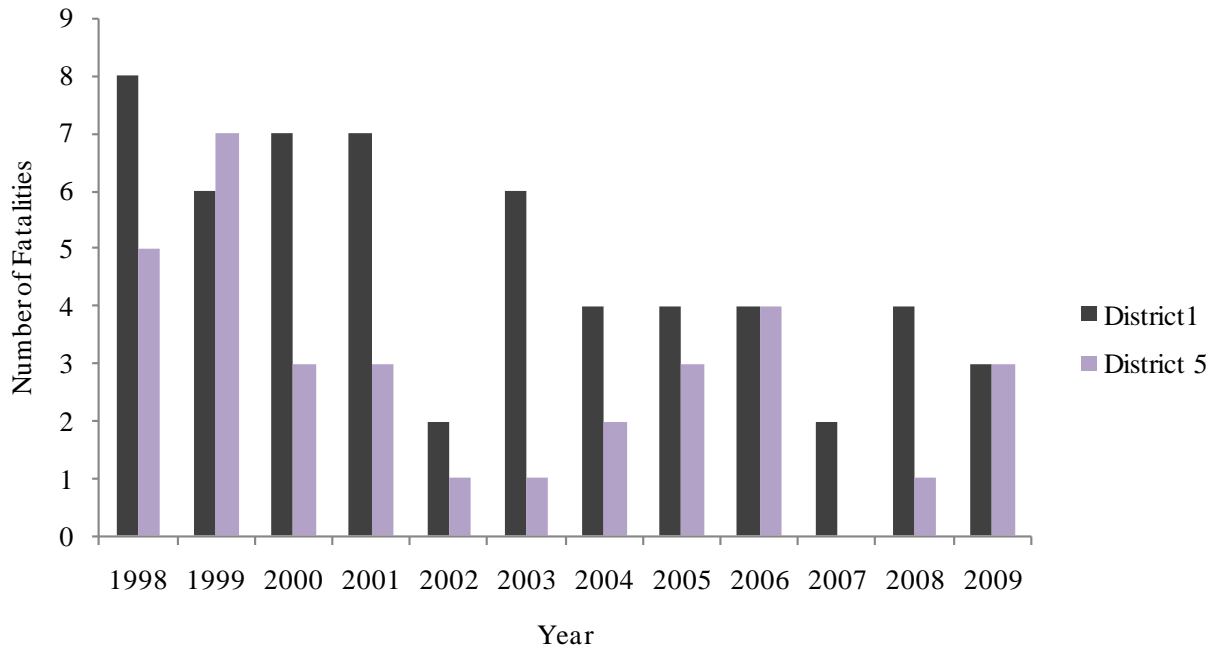


Figure 14: Number of Fatalities on Commercial Fishing Vessels in Districts 1 and 5

For our next analysis we introduced the safety decal as a variable. We examined the number of fatalities on vessels with a valid safety decal compared to vessels without a valid safety decal (Figure 15). From these figures several trends can easily be seen. In District 1, 1998 is the only year where the number of fatalities with a decal is greater than the number of fatalities on vessels without decals. District 5 is a similar story, where 2003 is the only year with higher fatality rates on vessels with valid decals. In all of the

other years, the number of fatalities on vessels with valid decals is much lower than on vessels without decals.

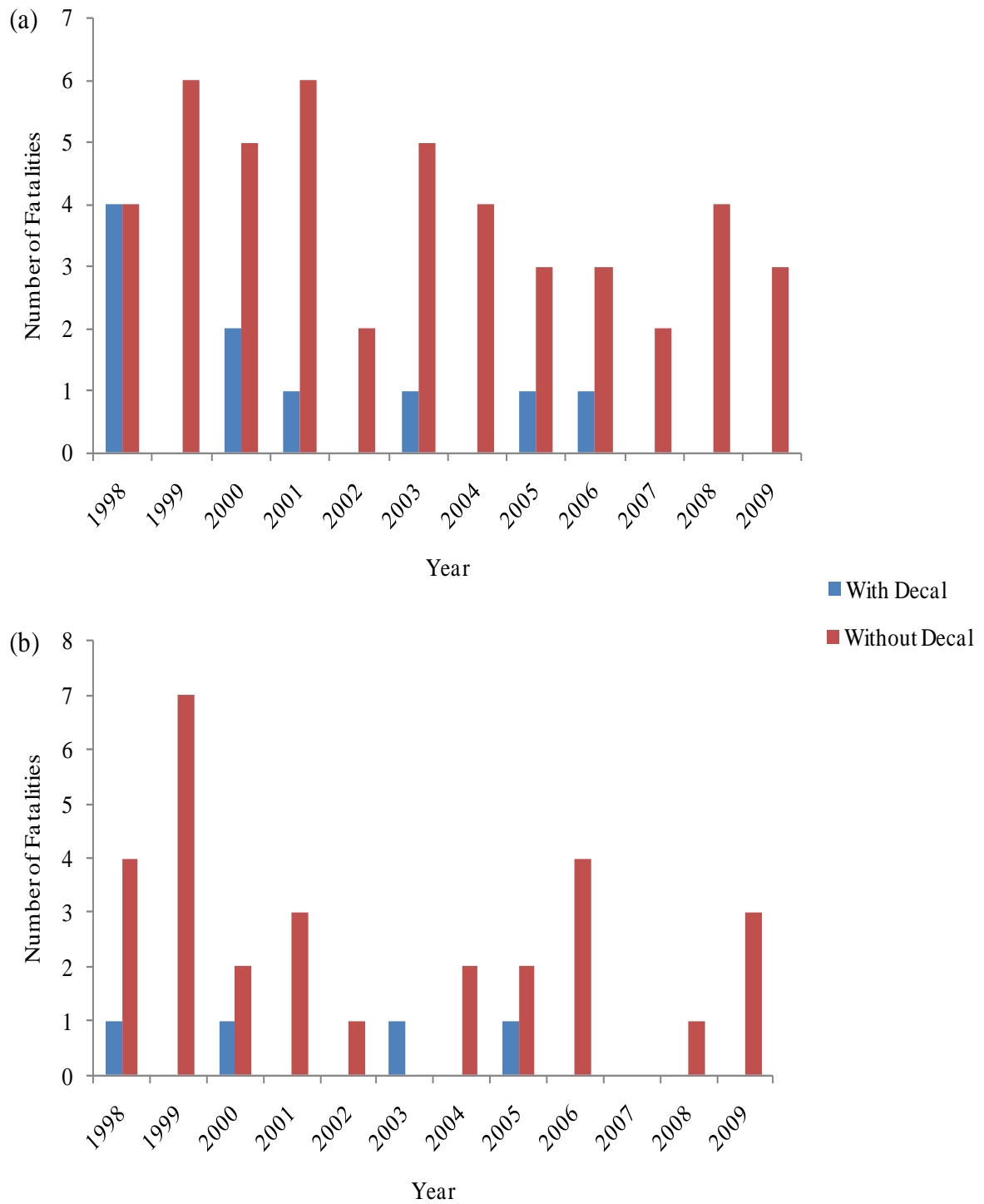


Figure 15: Fatalities, (a) District 1 and (b) District 5 by Vessel Decal Status

After looking at the number of fatalities on CFVs based on decal status, we examined the number of casualties, also known as a total vessel loss. Again, this was done to see if there were any overall trends in the data. To start off, we examined the number of total vessel losses occurring from 1998-2009 (Figure 16).

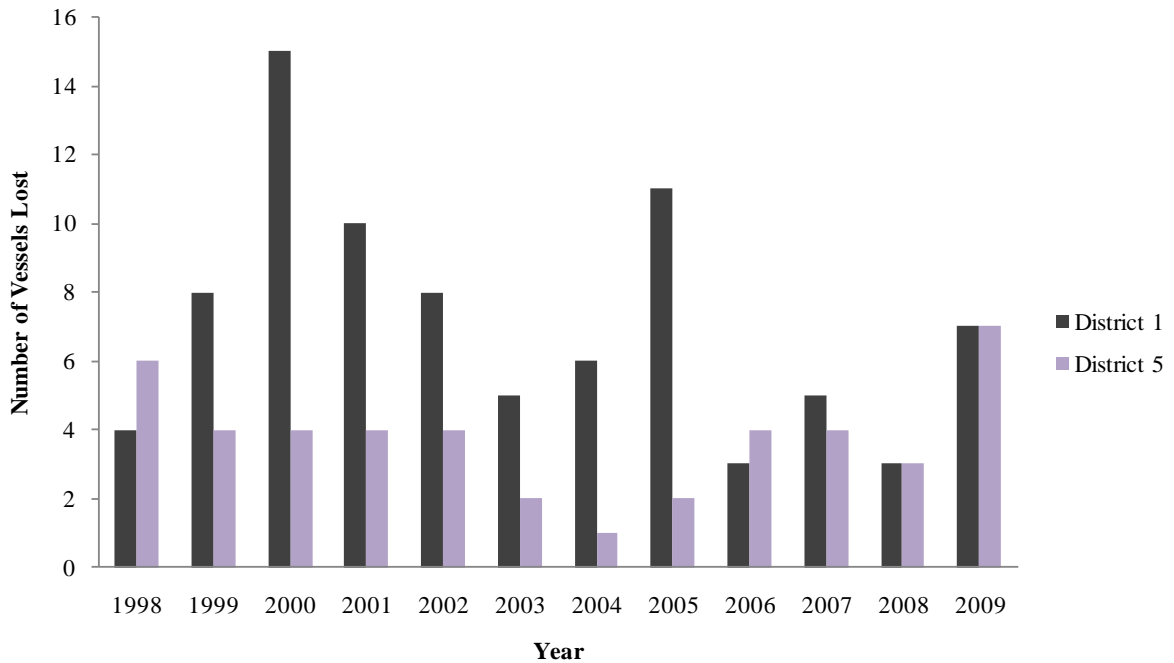


Figure 16: Number of Casualties in Districts 1 and 5

This analysis proved to be uninformative, as no meaningful trend could be extracted. Therefore, we decided to compare number of vessel casualties with and without valid safety decals (Figure 17).

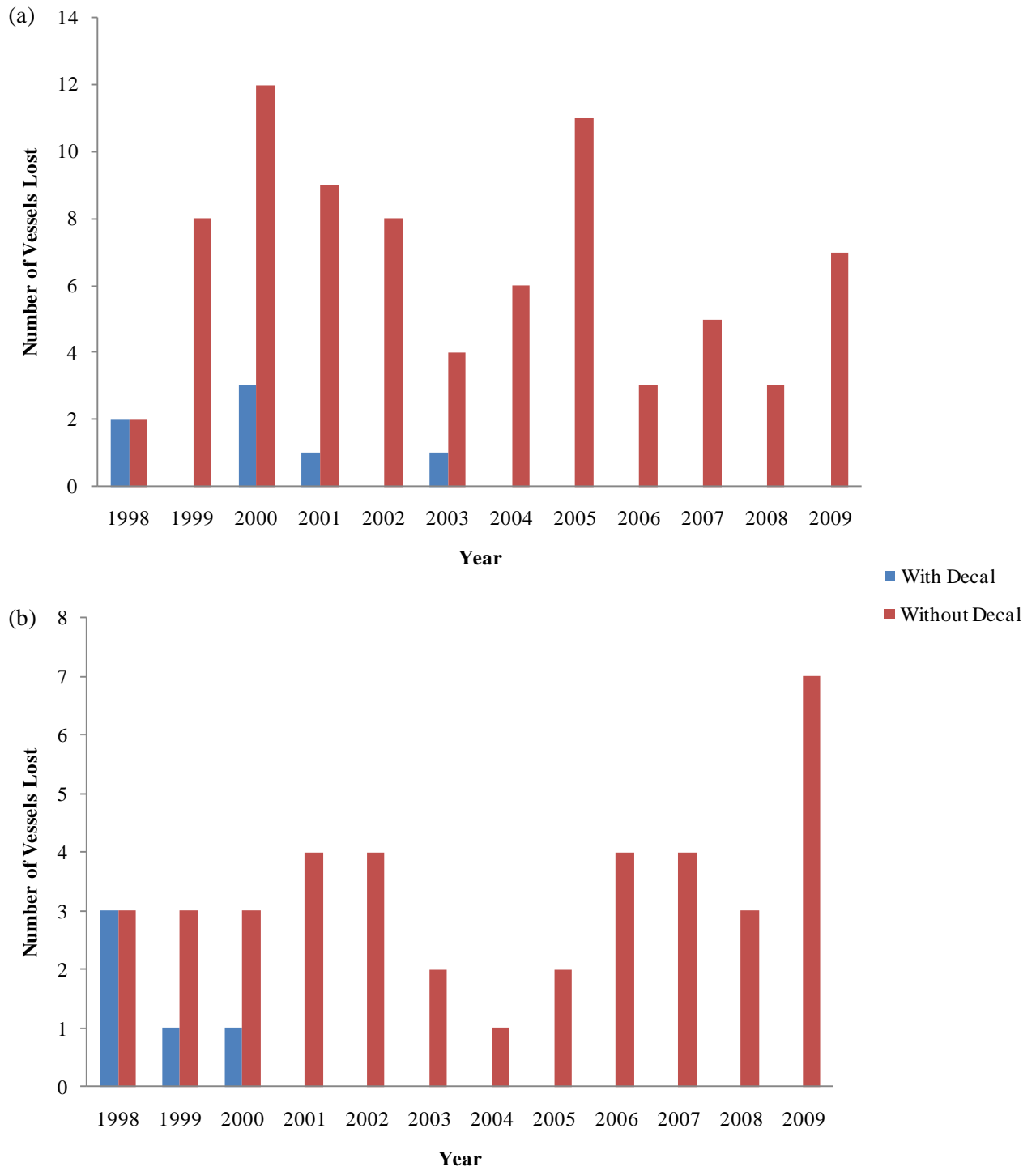


Figure 17: Casualties, (a) District 1 and (b) District 5 by Vessel Decal Status

Both figures clearly show that in the last six years, vessel casualties have rarely occurred on vessels with valid safety decals, and that an overwhelming proportion of casualties are occurring for vessels without safety decals.

Overall, for this analysis, our data has suggested one main point. We believe that vessels with valid safety decals are measurably safer than those vessels without decals. Of course, the safety decal itself is not the only factor to consider. The argument can be made that the “type” of captain who gets a decal for his vessel is already going to be safety conscious. Although we agree with this statement, it is also pertinent that these decals are mandatory for all vessels subject to observer coverage. Therefore, all types of captains, and not just the safety conscious ones, are receiving safety decals for their vessels.

4.1.4. Hypothesis 4: Number of Completed Observer Checklists

For our fourth analysis we hypothesized that, if PTVSCs were truly effective, then, even if a vessel initially failed a checklist, the captain or owner of the vessel would correct the situation. From the NOAA data that we were given, we ascertained that a total of 14,375 PTVSCs were completed from May 2006 to November 2010 for CFVs with valid safety decals. An additional 3,739 checklists were completed during that same time for vessels without safety decals. Of those 18,114 PTVSCs, only 151 resulted in safety deficiencies being found. This equates to less than 1% of all PTVSCs conducted.

However, we were unable to obtain reliable data prior to 2006, and therefore could not effectively test our hypothesis.

4.2. Objective 2: Conducting Interviews in Order to Supplement Data

As part of our second objective, we decided to interview some of the people in the commercial fishing community who interact with the MOA and its provisions on a daily basis. Our interviews involved two main groups of people, commercial fishermen and NMFS observers. The information obtained from these interviews with commercial fishermen and observers (Appendices K, L) proved extremely useful and supplemented our data analyses well.

4.2.1. Interviews with Commercial Fishermen

The first interviews that we conducted were with three commercial fishermen introduced to us by Mr. Mike Tork. These fishermen were all experienced, and averaged twenty-seven years as CFV captains. Since one of the fishermen had retired before the MOA was implemented, we were unsure if he would be able to answer our questions pertaining to the effectiveness of the agreement. However, he was able to answer the questions, as he was still active in crew training and safety checks. He believed that fishing had become safer and specifically cited widespread use of DSEs for this. He also told us some of the dangers of fishing and spoke of changes he thought should be made.

However, the two other fishermen did not believe that fishing had become safer since the implementation of the MOA and its provisions. One mentioned that fishing was inherently dangerous, so no matter what regulations were put in place, there would always be risks involved. Therefore, he did not believe that the MOA had been ineffective, but rather, that no measures could ever make commercial fishing safer. Specifically he cited the dangerous weather conditions that fishing generally takes place in, and that nothing could be done to control them. The other fisherman concluded that

NMFS fishing regulations had driven profits down so much that it had affected vessel maintenance. He believed that, until the regulations were addressed, fishing would not become safer. The fisherman told us that he used to haul his CFV out of the water annually, but could not afford to do so anymore. Instead he said that every two or three years would now have to suffice. This poses a potential hazard, as crucial vessel maintenance is performed while a vessel is out of the water. Leaving a vessel in the water for two or three years allows growth to accumulate on the hull, potentially resulting in stability issues or compromised hull integrity.

Several of the fishermen also expressed concerns about observers checking safety equipment, specifically EPIRBs, during PTVSCs. The subjects we interviewed believe that fishermen are, in general, hesitant to touch their EPIRBs. Yet, since observers are not allowed to touch the EPIRBs, it is the fishermen who must physically show the observer that the device has not expired. This can pose a problem, as many fishermen do not feel comfortable doing so. Instead, one of the fishermen felt that a valid safety decal should be sufficient enough for all of a vessel's safety equipment to be deemed safe.

Overall, the fishermen felt that fishing was a job, and that they should be given an opportunity to make more profits. Since commercial fishing was hit hard by the economic downturn, many fishermen left the profession. The fishermen whom we interviewed felt that only the truly dedicated fishermen were left, and that they should be granted more independence for their perseverance.

4.2.2. Interviews with NMFS Observers

For our second group of interviews, we were given a list of seven NMFS observers from Mr. Mike Tork. These observers ranged from having one to twenty years of experience with an average of seven years. Of the seven observers, six responded that on at least one occasion having had to terminate or delay a vessel's trip, most commonly because of expired EPIRBs and safety decals. The majority of our subjects believed that these common deficiencies were a result of a lack of awareness from captains and crewmembers regarding expiration dates of their safety equipment. Despite this, two observers said that safety awareness had improved with the implementation of the MOA, and that most commercial fishermen were now more safety-conscious.

Next, we discovered that, of the seven observers, three had been in at least one emergency situation. One observer reported having had to be towed back to port due to smoke from the engine room. Another had experienced the vessel he was on almost sinking. Finally, a third observer had been on a vessel that that suffered a catastrophic engine failure, and drifted from Canada to Rhode Island in a severe winter storm. All three of these observers believed that their safety training was effective in preparing them for these situations. The other four believed that their training would be helpful in an emergency situation. One observer provided several insights into how the training could be further improved, citing more hands-on training, and active involvement of the USCG in observer training. None of the other six observers mentioned any changes they would like to see made to the training program.

Overall, of the five observers who have worked before and after the signing of the MOA, four believed that the MOA had made commercial fishing safer. Their main

reason for this conclusion was the mandatory safety decals for all vessels subject to observer coverage.

4.3. Summary

Using the results from our data analyses and interviews detailed above, we were able to accomplish our final objective, which was to develop practical recommendations to further improve commercial fishing safety. We synthesize our insights, and provide recommendations in the following chapter.

5. Conclusions and Recommendations

To achieve our goal for this project, we formulated four hypotheses regarding the impact of DSEs, at-sea boardings, and safety decals. These hypotheses were tested by conducting a number of data analyses and supplemented using information from ten interviews. The results of the analyses are covered in the previous chapter. The conclusions about our hypotheses, as well as recommendations, are presented below.

5.1. Data Synthesis

From our research and analyses, we believe that the MOA has been instrumental in making commercial fishing and observing safer. Like many other industries in the United States, the commercial fishing industry has been affected by recent economic troubles. Through our interviews, we have learned that these economic factors play directly into CFV safety and, despite this; we believe commercial fishing has become safer.

Our arrival at this conclusion was based on several factors. In Districts 1 and 5 in 2006, the number of DSEs increased by 79%: from 974 to 1718. Though there may be more than one factor contributing to this increase in DSEs, it is likely that the NMFS decal policy was indeed effective at requiring CFVs to receive safety decals. However, this number has remained relatively the same since 2008, potentially meaning that the same vessels are continuing to receive decals, but other CFVs subject to observer coverage still do not have valid safety decals. Unfortunately, with the data available to us, we were unable to ascertain exactly how many CFVs required to have safety decals still do not have them.

Furthermore, the analysis we conducted regarding at-sea boardings suggests that CFVs are becoming more compliant with safety regulations. Since the implementation of the NMFS decal policy in District 1, the number of vessels receiving safety deficiencies has decreased by 7%. For vessels with valid safety decals in District 5, that number has decreased a total of 10%. These trends can be seen in Tables 4 and 5 respectively.

Another piece of evidence which supports our conclusion can be seen in Figures 16 and 18. The number of fatalities and vessel losses is drastically lower on vessels with valid safety decals. Between 1998 and 2009, in District 1, vessels without safety decals accounted for 92% of all vessel losses. Similarly, during that time span in District 5, 89% of all vessel losses were of vessels without safety decals.

5.2 Recommendations

Our investigation led us to develop five recommendations that we feel would have a positive impact on the commercial fishing industry if they were implemented. We believe the recommendations will further improve safety for crews and observers while onboard CFVs. Although our data suggests that the expectations of the MOA and the NMFS decal policy have been met, fatalities and vessel casualties are still occurring, and other changes could be implemented to prevent them.

5.2.1. MISLE Database Training

For our first recommendation, we considered a problem that we faced numerous times while working on this project: incomplete and/or incorrect data entered into the MISLE database. Through informal interviews, we ascertained that the units in charge of entering data into MISLE occasionally are poorly trained, or simply opt not to enter

information that could be important for future analyses. While there is currently an optional online training course for the people who input the data, this alone is not sufficient. Therefore, we recommend that the USCG implement a policy requiring anyone who enters information into MISLE to successfully complete the online training course. Once the training is complete, a test could be administered to show the competency of users at inputting data. This will ensure that data is not only entered correctly, but also that it can be used effectively once stored in the database.

Also, a list of required fields should be drafted to allow for a greater depth of information, and more accurate research in the future. For instance, when we were collecting data on DSEs, there was an option to filter out all exams with an “unspecified” result. Yet, there are only two possible results of a DSE, as a vessel can only pass or fail an exam. If a field as simple as this becomes required, it could dramatically increase the informational value of the MISLE database.

5.2.2. Safety Decals for Commercial Fishing Vessels

Another recommendation we have after completing this project is in regards to CFVs and safety decals. As it stands right now, safety decals are only required for vessels which are subject to observer coverage, a requirement that stems from the observer health and safety regulations. As part of this requirement, a valid safety decal is required for these vessels to obtain a fishing permit (Appendix M); however, this policy remains largely unenforced. It is then left up to the observer to verify that the vessel in question does in fact have a valid decal. This can lead to a situation where an observer is forced to “tie the boat up,” thereby making it illegal for the vessel to fish. This situation can be difficult for all involved, and usually strains the relationship between fishermen and

observers. This type of occurrence could potentially be curtailed, if a vessel's decal status was effectively verified in order for it to receive a permit.

Also, as part of Coast Guard Authorization Act of 2010, all vessels operating outside of three nautical miles will be required to have a valid safety decal. This includes all vessels, and not just those CFVs subject to observer coverage. After completing our third analysis, we have come to see the beneficial effects of this policy, and believe it is likely to result in further decreases in fatalities and casualties. With our analysis, we discovered that vessels with safety decals experience fewer fatalities, and are lost much less often than those CFVs without safety decals. Hopefully our analyses will be able to dissuade any argument against the mandatory safety decal provision in the Authorization Act.

5.2.3. Research on Expiration Dates of Safety Equipment

Our third recommendation takes into account the concerns that we heard from multiple fishermen during our interviews. These concerns reflect the economic struggles of the commercial fishing industry. Profits have become so low for some CFV owners and captains that they are being forced to choose between paying their mortgage and maintaining their CFV. When fishermen incur more out of pocket expenses, the first thing they tend to neglect is vessel maintenance, which can severely hinder the safety of a vessel and its crew. For example, fishermen have to pay approximately \$1000 per year to have their vessels' life rafts repacked. Some captains would like to see life rafts be repacked every two years instead of annually, in order to cut the associated costs in half. In order to better understand how expiration dates of safety equipment impact

commercial fishermen, we recommend that more research be done on the topic. This research could potentially be conducted by a future IQP with the USCG, and could determine if changing expiration dates for items such as life rafts could reduce costs without compromising vessel safety.

5.2.4. Inspection Cards

While interviewing observers and fishermen, both parties agreed that the Electronic Position Indicating Radio Beacon (EPIRB) Visual Inspection Card (EVIC) is extremely effective. The EVIC, which an observer may utilize and fill out after checking an EPIRB, is valid for ninety days. This means that, during those ninety days, the EPIRB does not have to be checked by an observer doing their pre-trip checklist. This keeps both the captain and the observer safer by eliminating the need to access the roof of the wheelhouse in the early morning to check the EPIRB. However, life rafts tend to also be stored with the EPIRBs on top of the wheelhouse. The captains and observers whom we have interviewed expressed their opinion that a card similar to the EVIC should be implemented for life rafts. Many of them believe that checking EPIRBs and life rafts is a task as dangerous as the fishing that they participate in. Implementing a card for life rafts would potentially save observers and fishermen the stress and danger of climbing on an icy roof in the early morning. A stipulation could be added that the life raft card would only be valid during winter months. Therefore, during times when it is not dangerous to go on the wheelhouse, observers would still have to do so. Whether, the life raft expiration date is added to the EVICs, or is issued to the vessel separately, either option would make completing the pre-trip safety checklist a safer duty.

Another recommendation we have regarding inspection cards is as follows. An observer with twenty years of experience told us that it used to be standard procedure that, upon completion of a DSE, the inspector would give the vessel owner or captain a list of the expiration dates of their safety equipment. We suggest that this practice once again be implemented, since safety deficiencies usually result from a lack of awareness of expiration dates. Putting all of the expiration dates on one sheet of paper that stays in the wheelhouse, instead of relying on documentation scattered around the vessel, will help increase awareness, and potentially increase compliance with safety regulations.

5.2.5. Observer Training

During our interviews with observers, we ascertained that all of our subjects believed that observer training had drastically improved, and was currently effective. However, from the information gained from these interviews, we believe that training could still be improved to help increase safety. As part of their training, observers currently, participate in group training trips onboard CFVs. We believe that, while on these trips they should be shown firsthand the dangers that exist on CFVs. If they see the dangers that come while onboard and how they arise, they will be better suited to avoid them in real world situations. One observer explained the hazards presented by the doors that some fishing vessels have on their stern. The doors weigh approximately 800 pounds each, and can swing around while the vessel is in motion. He said that the sound alone of these doors colliding with the vessel is enough to teach an observer never to get caught between them.

Also, since the USCG is such a well trained and safety-conscious organization, observers could potentially benefit from having USCG liaisons present during their safety training. This would supplement the hands on approach recommended above, and would provide a more complete training process for observers.

5.3. Conclusions

In conclusion, for this project we researched the different types of CFVs operating in USCG Districts 1 and 5, and discovered that, no matter what the type of vessel or gear onboard, each has their own inherent dangers. Despite these inherent risks, through the USCG and NOAA's implementation of the MOA and subsequent provisions, such as the NMFS decal policy, commercial fishing safety has improved. Through the analyses we have conducted, our data has suggested that commercial fishing has become safer. However, we also recognize that more can be done to further improve safety. While commercial fishing safety is improving, it is still the most dangerous occupation in the United States. As a result of our interviews and analyses, we have formulated recommendations, that take into account both fishermen' and observers' concerns. Our intention is that our work will contribute toward, making commercial fishing a safer enterprise for both fishermen and observers.

References

Centers for Disease Control and Prevention (CDC). (2010). *Commercial Fishing Safety*.

Retrieved 9/24, 2010, from <http://www.cdc.gov/niosh/topics/fishing/>

Christensen, L. E. (2010). *Coast Guard Highlights Fishing Vessel Safety in Prince*

William Sound. Retrieved 9/24, 2010, from

<http://www.deepwaterhorizonresponse.com/go/doc/780/513963/>

CIS. (2009). *ICE, CBP, and USCG Budget Hearing*. Retrieved 10/3, 2010, from

<http://www.cis.org/CIS/ICE-CBP-USCG-BudgetHearing>

Dictionary.com. (2010). *Anadromous*. Retrieved 10/12, 2010, from

<http://dictionary.reference.com/browse/anadromous>

Encyclopedia Britannica. (2010). *Seiner*. Retrieved October 8, 2010, from

<http://www.britannica.com/EBchecked/topic/532875/seiner>

Food and Agriculture Organization of the United Nations. (2005). *Fishery Country*

Profile Retrieved from ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI_CP_US.pdf

Galiano, R. (2009). *Commercial Fishing Vessels*. Retrieved October 7, 2010, from

http://njscuba.net/artifacts/ship_fishing.html

George, J. P. (1993). *Longline Fishing*. Retrieved 11/19, 2010, from [http://books.google.com/books?id=02rxdKs6ntoC and pg=PA76 and lpg=PA76 and dq=dangers+of+longline+fishing and source=bl and ots=e4pKrlzsD- and sig=3lbAXdQb33sLwm-ZPSRMcyN_E1I and hl=en and ei=ATnlTP7ZDcP6lwf52o2ODA and sa=X and oi=book_result and ct=result and resnum=2 and ved=0CBwQ6AEwAQ#v=onepage and q=dangers%20of%20longline%20fishing and f=false](http://books.google.com/books?id=02rxdKs6ntoC&pg=PA76&lpg=PA76&dq=dangers+of+longline+fishing&source=bl&ots=e4pKrlzsD-&sig=3lbAXdQb33sLwm-ZPSRMcyN_E1I&hl=en&ei=ATnlTP7ZDcP6lwf52o2ODA&sa=X&oi=book_result&ct=result&resnum=2&ved=0CBwQ6AEwAQ#v=onepage&q=dangers%20of%20longline%20fishing&f=false)

Japan Coast Guard. (2010). *Conditions in Sea Areas Around Japan*. Retrieved 11/19, 2010, from http://www.kaiho.mlit.go.jp/syokai/soshiki/toudai/navigation-safety/download/down_bc/english/part1.htm

Lincoln, J. (2008). *Commercial Fishing Safety*. Retrieved September 18, 2010, from http://www.cdc.gov/niosh/blog/nsb042808_fishing.html

Lisa, Anna. (2007). *Help Save the Seaside: Lyme Bay Reefs*. Retrieved 11/19, 2010, from <http://greengirlsglobal.com/blog/tag/marine>

MCS. (2010). *Commercial Fishing Methods*. Retrieved 11/19, 2010, from <http://www.fishonline.org/information/methods/>

Monterey Bay Aquarium. (2010). *Fishing Methods*. Retrieved 11/19, 2010, from http://www.montereybayaquarium.org/cr/cr_seafoodwatch/sfw_gear.aspx

New England Fishery Management Council. (2010). *New England Fishery Management Council*. Retrieved 11/1, 2010, from <http://www.fisherycouncils.org/USFMCsections/USRFMCnefmc.pdf>

NOAA Fisheries. (2009). *The Northeast Fisheries Observer Program: An Introduction*, NOAA Fisheries. *print*. NOAA Fisheries Brochure

NOAA Fisheries. (2010). *Magnuson-Stevens Fishery Conservation and Management Act Reauthorized*. Retrieved 10/10, 2010, from <http://www.nmfs.noaa.gov/msa2005/>

NOAA Fisheries: Office of Science and Technology. *National Observer Program*. Retrieved 10/10, 2010, from <http://www.st.nmfs.noaa.gov/st4/nop/>

NOAA, and USCG. (2004). *Memorandum of Agreement on Observer Safety*. Retrieved 9/23, 2010, from www.st.nmfs.noaa.gov/

NORMA. (2009). *NORMA FAQ*. Retrieved 11/19, 2010, from <http://www.norma.fm/faq.htm#Purse%20Seine%20Fishing>

Porter, R. D. (2010). Fisheries Observers as Enforcement Assets: Lessons From the North Pacific. *Marine Policy*, 34(3), 583-589.

- Quimby, B. (2010). *The Killer Catch: Ground Fishing in the Atlantic the Deadliest by Far*. Retrieved 11/10, 2010, from http://www.pressherald.com/news/the-killer-catch-groundfishing-in-atlantic-the-deadliest-by-far_2010-09-17.html
- Reiter, M. N., Podber, T. R., and Blanck, B. N. (2008). *Commercial Fishing Safety and EPIRB Use*. Unpublished IQP Report. Worcester, MA: Worcester Polytechnic Institute.
- Ruhle, K. (2005). Gillnetting for Monkfish in North Carolina and Virginia. 2005
- Ruhle, K. (2007). The Sea Scallop Fishery Along the Mid-Atlantic and New England Coasts. 2007
- Schwaab, E. C. (2009). NOAA Fisheries Service Business Report 2009. 2009, , 11/10.
- Scott, W. (1816). *The Antiquary*. Edinburgh, Scotland: Archibald Constable and Co.
- Spinazzola, B. (2005). Risk Assessment Northern Offshore Lobster Trap Fishery. 2005.
- Spitzer, J. D. (1999). *Dying to Fish: Fishing Vessel Casualty Task Force*.
- Stolpe, N. E. (1999). *New Jersey Fishing*. Retrieved October 8, 2010, from <http://www.fishingnj.org/techll.htm>

Turner, J. (2005). *Fishing Vessels*. Retrieved September 18, 2010, from
<http://www.fao.org/fishery/topic/1616/en>

US Fishery Management Council. (2010). *Regional Management of Councils*. Retrieved
10/27, 2010, from
<http://www.fisherycouncils.org/USFMCsections/USRFMCintro.pdf>

USCG. (2006). *Federal Requirements for Commercial Fishing Industry Vessels*. print.
USCG Brochure

USCG. (2009). *Missions*. Retrieved 10/5, 2010, from <http://www.uscg.mil/top/missions/>

USCG. (2010 A). *About the Fishing Vessel Safety Program*. Retrieved 9/24, 2010, from
<http://www.uscg.mil/d1/prevention/CFVS.asp>

USCG. (2010 B). *2010 Authorized Vessel Safety Check Decals*. Retrieved 08/03, 2010,
from <http://www.uscgboating.org/news/default.aspx?ArticleId=335>

WaayCool Handlines. (2010). *Fishing With Handlines*. Retrieved 11/19, 2010, from
http://www.waaycool.com/wc_fishing.html

Walbeck, N. (2000). *Anacortes American: Our Century*. Retrieved 11/1, 2010, from
<http://www.skagitpublishing.com/ourcentury/1980-1989.html>

White, C. (2010). *Feature Release: Survival Through Education*. Retrieved 09/24, 2010, from <http://www.d7publicaffairs.com/go/doc/21/509471/>

Wivagg, K. A., Ruksznis, A. B., Curylo, E. A., and Caison, R. J. (2006). *Commercial Fishing Vessel Safety*. Unpublished IQP Report. Worcester, MA: Worcester Polytechnic Institute.

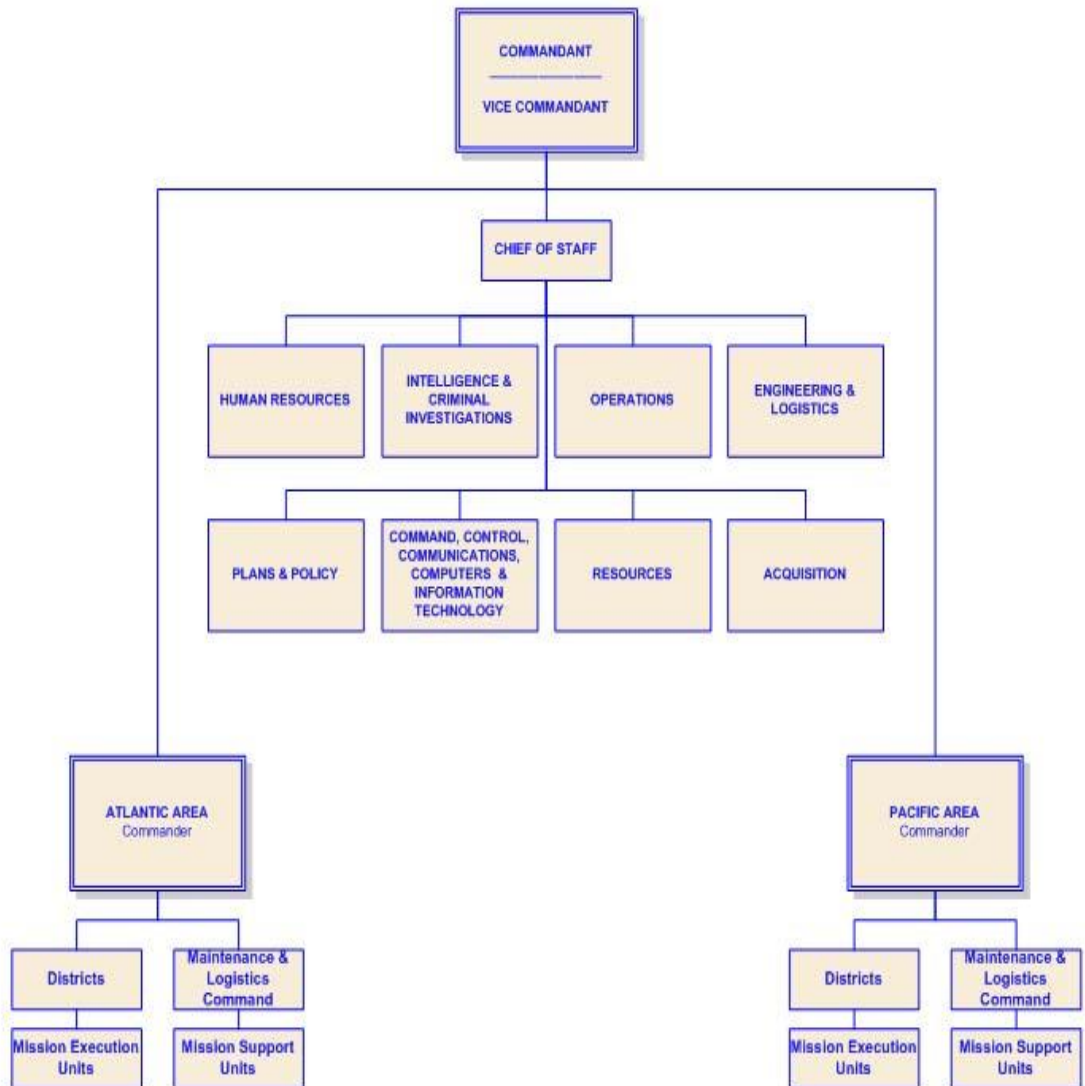
Womack, J. (2007). *Mid-Atlantic Surfclam and Ocean Quahog Fisheries*. 2007

Yaska Fishing Tackle. (2010). *Gill Net Introduction*. Retrieved 11/19, 2010, from <http://www.yaskafishing.com/gill.asp?types=introduction>

Appendix A: Sponsor Description

This project is being sponsored by the United States Coast Guard (USCG). The USCG is a branch of the United States armed forces, yet is also a part of the Department of Homeland Security (USCG, 2009). Their mission is to carry out three basic roles, which are further subdivided into eleven statutory missions. The three roles are maritime safety, maritime security, and maritime stewardship. The eleven statutory missions, as defined by law, are divided into homeland security missions and non-homeland security missions. The USCG has approximately 42,000 men and women on active duty. Also, 7,000 civilians serve the USCG, and even though they are not on active duty, they play a key role in the success of the USCG's missions. Some of the common activities that the men and women of the USCG participate in are: search and rescue missions, marine fisheries enforcement, inspection of foreign vessels, as well as the prevention of illegal immigration. According to a Budget Hearing in 2009, the House Subcommittee of Border, Maritime, and Global Counterterrorism allocated \$9.96 billion to the Coast Guard for the 2010 fiscal year (CIS, 2009). Below you can refer to the chain of command for this well structured organization.

U.S. COAST GUARD



Approved 4/1/2007

Figure 18: USCG Chain of Command (USCG, 2010 B)

Appendix B: What is an IQP and how does our project qualify as one?

WPI classifies the Interactive Qualifying Project as students addressing a “problem that lies at the intersection of science and technology with social issues and human needs. Generally, these projects involve some analysis of how technology affects, and is affected by, individuals and communities” (WPI, 2010 Interactive Qualifying Project). Our project is working with the United States Coast Guard (USCG), validating the safety on commercial fishing vessels. The USCG is devoted to maritime safety, security and environmental protection. In association with the National Oceanic and Atmospheric Administration (NOAA), the two organizations signed a Memorandum of Agreement (MOA) to help keep observers onboard commercial fishing vessels safer. The primary objective of the observers is to collect data regarding the catch that fishing vessels bring in (Memorandum of Agreement, 2004). Since commercial fishing is the most dangerous profession in the United States, this project most definitely addresses both social issues and human needs. By using science and technology to improve commercial fishing safety, our project will qualify as an IQP.

Appendix C: Memorandum of Agreement



NOAA FISHERIES AND UNITED STATES COAST GUARD



MEMORANDUM OF AGREEMENT ON OBSERVER SAFETY

Article I – General Information

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) and the United States Coast Guard (USCG) share mutual interest in fishing vessel safety and the enhancement of at-sea observer safety.

NOAA Fisheries places fisheries observers on fishing vessels under the authority of the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act, the Marine Mammal Protection Act, and other fishery and wildlife statute of the United States, to collect scientific data required for the conservation and management of living marine resources. This Memorandum of Agreement (Agreement) establishes a protocol to ensure the safety and support of fisheries observers nationwide.

NOAA Fisheries recognizes the leadership position of the USCG in the area of fishing vessel safety, and as such, has adopted the provisions of the Commercial Fishing Vessel Safety Examination Program as a mandatory requirement for all observed fishing vessels, as part of the NOAA Fisheries Observer Health and Safety Regulations (50 CFR Part 600.725 and 600.746). These regulations were developed to identify specific requirements to enhance the adequacy and safety of fishing vessels that are required to carry fishery observers.

Article II – Parties

The parties to this Agreement are NOAA Fisheries and the USCG.

Article III – References and Authorities

NOAA Fisheries is authorized to enter into this Agreement pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, 16 USC § 1801 *et seq.*, as amended; Marine Mammal Protection Act, 16 U.S.C. 1361 *et seq.* as amended; and Endangered Species Act, 16 U.S.C. 1531 *et seq.* The Coast Guard is authorized to enter into this agreement pursuant to 14 USC 93(a)(20), 141(a), and 147.

Article IV – Purpose

The parties have entered into this Agreement to enhance compliance with existing NOAA Fisheries and USCG requirements regarding safety aboard observed fishing vessels and to coordinate on other activities designed to promote safe working conditions for fisheries observers.

Article V – Responsibilities of Parties

a. General

NOAA Fisheries and the USCG will work in close cooperation and support each other's activities with regard to the safety of fishing vessels required to carry fisheries observers.

b. NOAA Fisheries

NOAA Fisheries will, to the extent practicable:

1. Promote the USCG Commercial Fishing Vessel Safety Examination Program by implementing the Observer Health and Safety Regulations.
2. Support the USCG's goal of increasing the effectiveness of its Commercial Fishing Vessels Safety Examination program as it relates to NOAA Fisheries observer programs.
3. Cooperate with the USCG to better enforce the Observer Health and Safety Regulations.
4. Work with NOAA Fisheries Regional Fishery Management Councils to develop regulations that link issuance of federal fishery permits to the requirements of the Observer Health and Safety Regulations for observed fisheries.
5. Facilitate the exchange of information with the USCG pertaining to compliance with the Observer Health and Safety regulations.
6. Establish regional notification procedures for providing timely information to the USCG on marine casualties and safety incidents on observed vessels. (See Appendix A)
7. Assist in the development of possible new Commercial Fishing Vessel Safety Examination requirements.
8. Implement regional or fishery-specific vessel safety checklists for observers to complete when they board vessels that participate in observer programs.

9. Promote USCG safety programs by distributing educational materials through observer programs.
10. Require all observer trainers who teach elements of the safety curriculum to complete a USCG approved Marine Safety Instructor Training course.
11. Require all NOAA Fisheries observers to participate in marine safety training and demonstrate competency in emergency response skills.
12. Work with the USCG to create a mutually acceptable method for keeping the USCG informed of observer deployments.
13. Keep the USCG informed as to any changes in the Observer Health and Safety regulations.
14. Identify a point of contact for each observer program to coordinate USCG requests regarding the exchange of information and other support.

c. United States Coast Guard

The USCG will, to the extent practicable:

1. Assist NOAA Fisheries in promoting the commercial fishing vessel safety decal examination program for commercial fishing vessels that participate in observed fisheries.
2. Assist NOAA Fisheries enforcement, as appropriate, in investigating and enforcing NOAA Fisheries' Observer Health and Safety Regulations.
3. Provide, within a reasonable time, qualified USCG commercial fishing vessel safety examiners or USCG Auxiliary commercial fishing vessel safety dockside examiners to carry out dockside examinations for each commercial fishing vessel that is expected to carry a fisheries observer.
4. Update the commercial fishing vessel safety decal data in the Marine Information for Safety and Law Enforcement (MISLE) database as frequently as possible, and will work with NOAA Fisheries to enhance the database to provide information critical to observer programs in compliance with the Privacy Act (5 USC 552a).
5. Participate in providing safety training for NOAA Fisheries personnel, observers, and observer trainees.
6. Identify a point of contact, within each USCG district, and establish a process for periodically reinforcing the exchange of information regarding observer issues and other requests.

7. Recognize the NOAA Fisheries observers have a different status than that of the crew during USCG boardings.
8. Provide official communications support for NOAA Fisheries observers when primary communications protocols are unsuccessful.
9. Assist NOAA Fisheries in developing regional protocols and procedures for life-threatening emergency communications to ensure around the clock response protocol for all observer programs.
10. Keep NOAA Fisheries informed as to any changes in USCG policy or regulations that impact observer program operations.

Article VI – Public Affairs

Each party will keep the other notified of all public affairs opportunities, including news releases and major speeches that involve the other agency concerning observer health and safety issues.

Article VII – Points of Contact

USCG:

Office of Compliance
 Commandant (G-MOC-3)
 2100 Second St, S.W.
 Washington, D.C. 20593-0001
 PH: 202-267-0490
 FAX: 202-267-0506

NOAA Fisheries:

Office of Science and Technology (F/ST)
 National Observer Program
 1315 East-West Highway
 Silver Spring, MD 20910-3282
 PH: 301-713-2328
 FAX: 301-713-1875

Article VIII – Subsidiary Agreements

Consistent with the purpose and provisions of this Agreement, NOAA Fisheries and USCG Districts may develop subsidiary agreements. No provision of any such subsidiary agreement will alter the spirit or letter of this Agreement. Copies of such subsidiary agreements will be forwarded to the Commandant, USCG, and the Assistant Administrator for Fisheries.

Article IX – Amendments and Review

This Agreement may be amended at any time by the mutual written consent of both parties.

Article X – Other Provisions

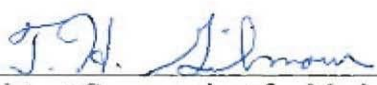
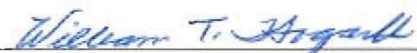
Nothing in this Agreement is intended to conflict with current law or regulation or the directives of the United States Coast Guard, the Department of Homeland Security, the National Oceanic and Atmospheric Administration, or the Department of Commerce. If the terms of this Agreement are inconsistent with such authority, then that term shall be invalid, but the remaining terms and conditions of this Agreement shall remain in full force.

Article XI – Effective Date

The terms of this Agreement will become effective upon the signature of both the approving officials of the respective agencies entering into this agreement on the later of the two signature dates.

Article XII – Termination

This Agreement may be revoked by either party, by providing written notification to that effect to the other party. Each party agrees to provide a written notification 90 days prior to termination whenever possible.

<p>FOR THE UNITED STATES COAST GUARD</p> <p>T. H. GILMOUR Rear Admiral, U.S. Coast Guard</p> <p></p> <p>Assistant Commandant for Marine Safety, Security and Environmental Protection</p>	<p>FOR THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p>DR. WILLIAM T. HOGARTH.</p> <p></p> <p>Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration</p>
---	--

21 December 2004
Date

21 December 2004
Date

APPENDIX A

UNITED STATES COAST GUARD, DEPARTMENT OF HOMELAND SECURITY

MARINE CASUALTIES AND INVESTIGATIONS

Definitions

(These definitions are consistent with those contained in 46 CFR Part 4)

Marine casualty or accident:

- a. The term “marine casualty or accident” shall mean any casualty or accident involving any vessel other than public vessels if such casualty or accident occurs upon the navigable waters of the United States, its territories or possessions or any casualty or accident wherever such casualty or accident may occur involving any United States' vessel which is not a public vessel. (See Sec. 4.03-40 for definition of Public Vessel)
- b. The term “marine casualty or accident” includes any accidental grounding, or any occurrence involving a vessel which results in damage by or to the vessel, its apparel, gear, or cargo, or injury or loss of life of any person; and includes among other things, collisions, strandings, groundings, foundering, heavy weather damage, fires, explosions, failure of gear and equipment and any other damage which might affect or impair the seaworthiness of the vessel.
- c. The term “marine casualty or accident” also includes occurrences of loss of life or injury to any person while diving from a vessel and using underwater breathing apparatus.

Serious marine incident:

The term serious marine incident includes the following events involving a vessel in commercial service:

- a. Any marine casualty or accident as defined in Sec. 4.03-1 which is required by Sec. 4.05-1 to be reported to the Coast Guard and which results in any of the following:
 1. One or more deaths;
 2. an injury to a crewmember, passenger, or other person that requires professional medical treatment beyond first aid, and, in the case of a person employed on board a vessel in commercial service that renders the individual unfit to perform routine vessel duties;
 3. damage to property, as defined in Sec. 4.05-1(a)(7) of this part, in excess of 100,000;
 4. actual or constructive total loss of any vessel subject to inspection under 46 U.S.C. 3301; or

5. actual or constructive total loss of any self-propelled vessel, not subject to inspection under 46 U.S.C. 3301, of 100 gross tons or more.
- b. A discharge of oil of 10,000 gallons or more into the navigable waters of the United States, as defined in 33 U.S.C. 1321, whether or not resulting from a marine casualty.
- c. A discharge of a reportable quantity of a hazardous substance into the navigable waters of the United States, or a release of a reportable quantity of a hazardous substance into the environment of the United States, whether or not resulting from a marine casualty.

Individual directly involved in a serious marine incident:

The term “individual directly involved in a serious marine incident” means an individual whose order, action or failure to act is determined to be, or cannot be ruled out as, a causative factor in the events leading to or causing a serious marine incident.

Notice of marine casualty:

- a. Immediately after the addressing of resultant safety concerns, the owner, agent, master, operator, or person in charge, shall notify the nearest Marine Safety Office, Marine Inspection Office or Coast Guard Group Office whenever a vessel is involved in a marine casualty consisting in--
 1. An unintended grounding, or an unintended strike of (allison with) a bridge;
 2. an intended grounding, or an intended strike of a bridge, that creates a hazard to navigation, the environment, or the safety of a vessel, or that meets any criterion of paragraphs (a) (3) through (7);
 3. a loss of main propulsion, primary steering, or any associated component or control system that reduces the maneuverability of the vessel;
 4. an occurrence materially and adversely affecting the vessel's seaworthiness or fitness for service or route, including but not limited to fire, flooding, or failure of or damage to fixed fire-extinguishing systems, lifesaving equipment, auxiliary power-generating equipment, or bilge-pumping systems;
 5. a loss of life;
 6. an injury that requires professional medical treatment (treatment beyond first aid) and, if the person is engaged or employed on board a vessel in commercial service, that renders the individual unfit to perform his or her routine duties; or
 7. an occurrence causing property-damage in excess of \$25,000, this damage including the cost of labor and material to restore the property to its condition before the

occurrence, but not including the cost of salvage, cleaning, gas-freeing, drydocking, or demurrage.

b. Notice given as required by 33 CFR 160.215 satisfy the requirements of this section if the marine casualty involves a hazardous condition as defined by 33 CFR 160.203.

Substance of marine casualty notice:

The notice required in Sec. 4.05-1 must include the name and official number of the vessel involved, the name of the vessel's owner or agent, the nature and circumstances of the casualty, the locality in which it occurred, the nature and extent of injury to persons, and the damage to property.

Responsibilities of individuals directly involved in serious marine incidents:

a. Any individual engaged or employed on board a vessel who is determined to be directly involved in a serious marine incident shall provide blood, breath or urine specimens for chemical tests required by Sec. 4.06-10 when directed to do so by the marine employer or a law enforcement officer.

b. If the individual refuses to provide blood, breath or urine specimens, this refusal shall be noted on Form CG-2692B and in the vessel's official logbook, if one is required.

c. No individual may be forcibly compelled to provide specimens for chemical tests required by this part; however, refusal is considered a violation of regulation and could subject the individual to suspension and revocation proceedings under part 5 of this chapter and removal from any duties which directly affect the safety of the vessel's navigation or operations.

Appendix D: Commercial Fishing Industry Vessel Requirements

Table 5: Throwable Flotation Devices

Vessel Length	Device Required
Less than 16 feet	None
16 feet to less than 26 feet	1 throwable cushion, or 1 orange 24-inch life buoy with 60 feet of line
26 feet to less than 65 feet	1 orange 24-inch ring life buoy with 60 feet of line
65 feet or more	3 orange 24-inch ring life buoy with 60 feet of line, at least one device must have 90 feet of line

Table 6: Survival Craft (Cold Water)

Vessel Area	Type	Device Requirement
Beyond 50 miles of the coastline	All	Inflatable Liferaft with SOLAS A Pack
Between 20-50 miles of coastline	All	Inflatable Liferaft with SOLAS B Pack
Beyond Boundary Line, between 12-20 miles of coastline	All	Inflatable Liferaft with Coastal Pack
Beyond Boundary Line, within 12 miles of coastline; Inside Boundary Line; or Lakes, Bays, Sounds, Rivers	36 feet or more in length	Inflatable Buoyant Apparatus
Beyond Boundary Line, within 12 miles of coastline; Inside Boundary Line; or Lakes, Bays, Sounds, Rivers	Less than 36 feet in length	Buoyant Apparatus

Table 7: Survival Craft (Warm Water)

Vessel Area	Type	Device Requirement
Beyond 50 miles of the coastline	All	Inflatable life raft with SOLAS A Pack
Between 20-50 miles of coastline	All	Inflatable life raft with Coastal Pack
Beyond Boundary Line, within 20 miles of coastline	All	Life Float
Inside Boundary Line; or lakes, bays, sounds, or rivers	All	None

Table 8: Survival Craft (Great Lakes)

Vessel Area	Type	Device Requirement
Great Lakes, cold waters	36 feet or more	Inflatable Buoyant Apparatus
Great Lakes, cold waters	Less than 36 feet	Buoyant Apparatus
Great Lakes, beyond 3 miles of coastline, warm waters	All	Buoyant Apparatus
Great Lakes, within 3 miles of coastline, warm waters	All	None

Table 9: Distress Signals

Vessel Area	Device Requirement
Oceans, over 50 miles from the coastline	3 parachute flares, 6 hand flares, 3 smoke signals
Oceans, 3-50 miles from the coastline	3 parachute flares, 6 hand flares, 3 smoke signals
Coastal Waters	Night: one S.O.S. electric light, Day: 3 approved smoke signals, or 3 approved flares for both day and night

Table 10: EPIRBs

Vessel Type	EPIRB Required
36 feet or more in length	406 MHz Category I
36 feet or more in length with flotation material	406 MHz Category I or 406 MHz Category II
Less than 36 feet in length	406 MHz Category II

Table 11: Fire Extinguishers < 65'

Length (feet)	No Fixed Fire Extinguishing System in Machinery Space	Fixed Fire Extinguishing System in Machinery Space
Less than 16	1 B-I	0
16 to less than 26	1 B-I	0
26 to less than 40	2 B-I	1 B-I
40 to less than 65	3 B-I	2 B-I

*One B-II extinguisher may be substituted for two B-I extinguishers.

Table 12: Fire Extinguishers > 65'

Space	Type	Quantity/Location
Safety areas, communicating corridors	A-II	1 in each main corridor not more than 150 feet apart (OK in stairways)
Pilothouse	C-I	2 in vicinity of the exit
Service spaces, galleys	B-II or C-II	1 per 2500 sq. feet or fraction thereof, suitable for hazards involved
Paint lockers	B-II	1 outside the space in vicinity of the exit
Accessible baggage and storerooms	A-II	1 per 2500 sq. feet or fraction thereof, in vicinity of the exits, either inside or outside space
Workshops and similar spaces	A-II	1 outside the space in vicinity of the exit
Internal combustion propelling machinery	B-II	1 for each 1000 BHP or fraction thereof; not less than 2 or more than 6
Electric propulsion motors or generator unit of open type	C-II	1 for each propulsion motor generator unit
Auxiliary spaces	B-II	1 outside the space in vicinity of the exit
Internal combustion machinery	B-II	1 outside the space in vicinity of the exit
Electric propulsion motors or generator unit	C-II	1 outside the space in vicinity of the exit

Table 13: Minimum Number of Fire Extinguishers > 65'

Gross Tonnage (Over)	Gross Tonnage (Less Than)	Minimum Number
0	50	1
50	100	2
100	500	3
500	1000	6
1000	Unlimited	8

*Vessels over 300 gross tons are also required to be fitted with either a B-III semi-portable or a fixed fire extinguishing system in the machinery space.

Table 14: First Aid Equipment and Training

People Onboard	People Certified in First Aid (FA) and CPR
3 to 16	1 in FA and 1 in CPR
17 to 49	2 in FA and 2 in CPR
50 or more	4 in FA and 4 in CPR

Table 15: Communication Equipment

Operating Area	Comm. Equipment
0 to 20 miles (from coastline)	VHF 156-162 MHz band
20 to 100 miles (from coastline)	VHF 156-162 MHz <i>and</i> 2-4 MHz band Radiotelephone transceivers
more than 100 miles (from coastline)	VHF 156-162 MHz <i>and</i> 2-27.5 MHz band Radiotelephone transceivers

Appendix E: Dockside Safety Examination Form

USCG COMMERCIAL FISHING VESSEL SAFETY EXAMINATION			
Vessel Name:		I.D. Number:	
Call Sign:	Other Identifier:		
Hull Color:	Trim Color:	Superstructure Color:	
Vessel Length:	Gross Tonnage:	Maximum POB:	
Hull Type: <input type="checkbox"/> Wood <input type="checkbox"/> Aluminum <input type="checkbox"/> Fiberglass <input type="checkbox"/> Steel <input type="checkbox"/> Other (specify):		Vessel Type: <input type="checkbox"/> Fishing Vessel <input type="checkbox"/> Fish Tender <input type="checkbox"/> Fish Processing Vessel	
Year Built:		Year Converted:	
Propulsion: <input type="checkbox"/> Outboard <input type="checkbox"/> Inboard <input type="checkbox"/> Inboard/Outboard		Horsepower:	Number of Shafts:
Decal Info: <input type="checkbox"/> Initial Issue <input type="checkbox"/> Renewal If a renewal, date last decal issued: _____		Fishing Equipment: <input type="checkbox"/> Long Line <input type="checkbox"/> Multi-Rig <input type="checkbox"/> Troll <input type="checkbox"/> Gill Net <input type="checkbox"/> Tender <input type="checkbox"/> Trawl <input type="checkbox"/> Purse Seine <input type="checkbox"/> Trap <input type="checkbox"/> Bottom <input type="checkbox"/> Other (specify):	
Fuel: <input type="checkbox"/> Gas <input type="checkbox"/> Diesel <input type="checkbox"/> Portable <input type="checkbox"/> Fixed (vented)		Number of Fuel Tanks:	
Lube Oil Capacity (gal):	Hydraulic Oil Capacity (gal):	Fuel Capacity (gal):	
Route: <input type="checkbox"/> Inland <input type="checkbox"/> Waters Inside Coastal Waters <input type="checkbox"/> Coastal Waters			
Boundary Line: <input type="checkbox"/> Inside <input type="checkbox"/> Outside <input type="checkbox"/> <3nm <input type="checkbox"/> <12nm <input type="checkbox"/> <20nm <input type="checkbox"/> <50nm <input type="checkbox"/> >50nm <input type="checkbox"/> >100nm			
Applicable Waters: <input type="checkbox"/> Warm <input type="checkbox"/> Cold			
Owner:		Contact Person:	
Owner Address:		Contact Address:	
Owner Phone:		Contact Phone:	
Exam Requested Due To:	<input type="checkbox"/> 4100 Boarding <input type="checkbox"/> Owner <input type="checkbox"/> Family Member <input type="checkbox"/> Observer Coverage <input type="checkbox"/> Exemption <input type="checkbox"/> Other (specify):		
How did requester hear about program?			
A voluntary dockside examination has been completed on this vessel but a Commercial Fishing Vessel Safety Decal cannot be issued due to the deficiencies listed below and on the <u>Continuation Sheet</u> . (Deficiencies are listed by citation number with an explanation of the item(s) not in compliance, or identification of any particularly hazardous condition(s)):			
When these deficiencies are corrected, please call _____ to schedule a re-examination.			
Examiner's Name:		Examiner's Unit:	
Date of this Exam:		Location:	
CONGRATULATIONS! Your vessel has been examined and is in compliance with all applicable safety regulations. Commercial Fishing Vessel Safety Decal Number _____ has been issued. The decal is valid until the date indicated on the Decal provided the vessel safety equipment remains serviceable and the operating conditions described above are not exceeded. The Decal is to be removed from the vessel if the vessel is sold. <i>This form should be kept on board your vessel so it can be shown to the Coast Guard if your vessel is boarded.</i>			
Issuing Examiner's Signature:			Date Issued:
Vessel Representative's Signature:			

Official Use Only

HOURS	Exam:	Travel:	Training:	Training Travel:
--------------	--------------	----------------	------------------	-------------------------

Department of Homeland Security
 United States Coast Guard
 CG-5587 (6/08) Previous editions may be used.

EXAMINER COPY

GENERAL VESSEL REQUIREMENTS

Vessel Name:		I.D. Number:	
BRIDGE & DOCUMENTS			
33 CFR 173 46 CFR 67	Registration/Documents/Markings	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
47 CFR 80.405	FCC Ship Station License	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 CFR 28.165	Injury Placard (All Vessels)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 CFR 155.450	Oil Pollution Placard (Vessels \geq 26 Feet)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 CFR 151.59	MARPOL (Garbage) Placard (Vessels \geq 26 Feet)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 CFR 151.57	Waste Management Plan (Ocean Going Vessels \geq 40 Feet)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 CFR 151.55	Garbage Log (Ocean Going Vessels \geq 400 Gross Tons)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 USC Chap 51	Load Line Certificate (Fish Tenders or Fish Processors)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 USC 8304	Licensing/Manning (Master/Mate/Chief Eng. on Vessels \geq 200 Gross Tons)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 USC 8103	Citizenship (Master & crew requirements met)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 CFR 28.225 33 CFR 88.05	Inland Navigation Rules on Board (Inland Waters Only; Vessels \geq 39.4 ft)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 USC 1602 33 USC 2020 72 COLREGS	Dayshapes (Two black cones, apex to apex; per Rule 3(d), dayshapes & fishing lights not required if fishing gear does not restrict maneuverability)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 USC 1602 33 USC 2020 72 COLREGS	Navigation Lights: Side Lights (112.5°), Stern Light (135°) & Mast Head Light (225°) Anchor Light (360°; for vessels \geq 39.4 Feet) Red over White (360° other than trawling; see Rule 3(d) for exceptions) Green over White (360° trawling; see Rule 3(d) for exceptions)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 USC 1602 33 USC 2020 72 COLREGS	Sound Producing Devices: <input type="checkbox"/> Vessels < 39.4 ft: Means of Making an Efficient Sound Signal <input type="checkbox"/> Vessels 39.4 ft – 65.6 ft: Audible ½ Mile, Whistle & 7.9” Bell <input type="checkbox"/> Vessels 65.6 feet – 328.1 ft: Audible 1 Mile, Whistle & 11.8” Bell	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
33 CFR 164	Navigation Safety Requirements (Vessels \geq 1600 Gross Tons)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
LIFESAVING			
46 CFR 28.145	Visual Distress Signals	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 CFR 28.110 46 CFR 28.135 46 CFR 28.140	<input type="checkbox"/> Immersion Suits <input type="checkbox"/> PFDs Number of Immersions Suits On-Board: _____ Number of PFDs On-Board: _____ <input type="checkbox"/> Marking with name and retro-reflective tape <input type="checkbox"/> Properly maintained	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 CFR 28.115 46 CFR 28.135 46 CFR 28.140	Ring Life Buoys: <input type="checkbox"/> Marking with name and retro-reflective tape <input type="checkbox"/> 60 Feet of Line <input type="checkbox"/> 90 Feet of Line <input type="checkbox"/> Properly Maintained	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 CFR 28.120 46 CFR 28.125 46 CFR 28.130 46 CFR 28.140	Survival Craft: Number Survival Craft Onboard: ____ Total Survival Craft Capacity: ____ Type: <input type="checkbox"/> Inflatable Raft <input type="checkbox"/> Rigid Liferaft <input type="checkbox"/> IBA <input type="checkbox"/> BA <input type="checkbox"/> Life Float Pack Type: <input type="checkbox"/> SOLAS A <input type="checkbox"/> SOLAS B <input type="checkbox"/> COASTAL SERVICE <input type="checkbox"/> Hydrostatic Release & Date: _____ <input type="checkbox"/> Float Free <input type="checkbox"/> Proper Storage	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	
46 CFR 28.150 46 CFR 25.26 46 CFR 28.135 47 CFR 80 46 CFR 28.140	Emergency Position Indicating Radio Beacon (EPIRB): Bracket Category: <input type="checkbox"/> One <input type="checkbox"/> Two Hydrostatic Release exp. date: _____ Battery expiration date: _____ NOAA Registration exp. date: _____ Beacon ID: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	

GENERAL VESSEL REQUIREMENTS

Vessel Name:

I.D. Number:

ENGINE ROOM/MISCELLANEOUS

46 CFR 28.155 46 CFR 28.160 46 CFR 25.30	Fire Extinguishing Equipment: BI: _____ BII: _____ BIII: _____ Other: _____ <input type="checkbox"/> Pre-engineered <input type="checkbox"/> Fixed System <input type="checkbox"/> CO2 Cylinders For Fixed System Located Outside Engine Room	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.140	Unobstructed Escape Routes	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 25.35	Flame Arrestor (gas power)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 25.40	Ventilation (gas power)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
33 CFR 159.7	Marine Sanitation Device <input type="checkbox"/> Type I <input type="checkbox"/> Type II <input type="checkbox"/> Type III <input type="checkbox"/> None	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
33 CFR 155.330	Non-Oceangoing Vessels Are Able To: <input type="checkbox"/> Retain oily mix on board <input type="checkbox"/> Discharge to a facility	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A

VESSELS GREATER THAN 100 GT, USE SUPPLEMENT 1 (CG-5587B)

ADDITIONAL REQUIREMENTS FOR DOCUMENTED VESSELS OPERATING BEYOND THE BOUNDARY LINE OR WITH MORE THAN 16 PEOPLE ON BOARD

BRIDGE

46 CFR 28.210	First Aid/CPR <input type="checkbox"/> First Aid Kit/Medicine Chest <input type="checkbox"/> First Aid Manual <input type="checkbox"/> Individual Certified in First Aid <input type="checkbox"/> Individual Certified in CPR	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 26.03-4 46 CFR 28.225	Navigation Publications <input type="checkbox"/> Charts for Safe Navigation <input type="checkbox"/> Extracts of Publications Used <input type="checkbox"/> Tidal/Current Tables <input type="checkbox"/> CG Light List <input type="checkbox"/> US Coast Pilot	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 USC 10601	Crew Contracts (Vessels ≥ 20 Gross Tons)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.230	Magnetic Compass/Compass Deviation Table	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.235	Anchors & Radar Reflectors	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.245 47 CFR 80 33 CFR 26.03 46 CFR 28.375	Communication Equipment <input type="checkbox"/> VHF <input type="checkbox"/> SSB <input type="checkbox"/> HF <input type="checkbox"/> Cell Phone <input type="checkbox"/> 3 Hour Emergency Power Supply	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.260	Electronic Position Fixing Device (Vessels ≥ 79 feet) <input type="checkbox"/> GPS <input type="checkbox"/> SATNAV <input type="checkbox"/> Other	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.240	General Alarm System <input type="checkbox"/> Tested <input type="checkbox"/> Flashing Red Light in Engine Room	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.250	High Water Alarms (Vessels ≥ 36 feet) <input type="checkbox"/> Tested in all floodable spaces	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.265	Emergency Instructions (Must be posted on vessels with ≥ 4 POB)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.270	Instructions, Drills, & Safety Orientation <input type="checkbox"/> Drills Conducted <input type="checkbox"/> Drills Witnessed <input type="checkbox"/> Safety Orientation Provided <input type="checkbox"/> Qualified Drill Conductor Name: _____	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
33 CFR 155.1030	SOPEP (Vessels > 400 Gross Tons traveling over international waters)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 16	Drug Testing Program (Credentialed Crew on Vessels > 200 Gross Tons)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 4.06-15	Alcohol Testing Does vessel carry devices or have arrangements to accomplish testing within 2 hours after a serious marine incident?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A

ADDITIONAL REQUIREMENTS FOR DOCUMENTED VESSELS OPERATING BEYOND THE BOUNDARY LINE OR WITH MORE THAN 16 PEOPLE ON BOARD

Vessel Name:		I.D. Number:
LIFESAVING		
46 CFR 28.205	Fireman's Outfits (if more than 49 POB): <input type="checkbox"/> SCBA (Two 30 minute SCBAs) <input type="checkbox"/> Boots (2 sets) <input type="checkbox"/> SCBA Spare Bottles (Two 30 minute bottles) <input type="checkbox"/> Gloves (2 sets) <input type="checkbox"/> Lifeline (2 lines) <input type="checkbox"/> Fire Axe (2 axes) <input type="checkbox"/> Rigid Helmut (2 helmets) <input type="checkbox"/> Protective Clothing (2 sets) <input type="checkbox"/> Flashlight (2 lights)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.205	SCBAs (required only if vessel equipped with ammonia refrigerant) <input type="checkbox"/> SCBA (Two 30 minute SCBAs) <input type="checkbox"/> SCBA Spare Bottles (Two 30 minute bottles)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
ENGINE ROOM		
46 CFR 28.215	Guards for Exposed Hazards	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.255	Bilge Pump, Piping & Dewatering Systems	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
MISCELLANEOUS		
47 CFR Subchapter W	GMDSS (Vessels \geq 300 Gross Tons; see NVIC 3-99 for exemptions) <input type="checkbox"/> Radio Operators License <input type="checkbox"/> DSC equipped VHF, MF, & HF radios <input type="checkbox"/> SART (Search & Rescue Transponder) <input type="checkbox"/> NAVTEX receiver <input type="checkbox"/> 406 MHz EPIRB (in addition to requirement in 46 CFR 28.150)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
	DSC (For any vessel with a DSC-capable radio, verify the MMSI is properly programmed); MMSI (9 characters) is:	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
33 CFR 161.12 33 CFR 164.46	AIS (Fish Tenders & Fish Processors \geq 65 feet operating within a VTS or on an international voyage)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
50 CFR 600.730	Safe Boarding Ladder (Vessels with more than 4 feet of freeboard)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
46 CFR 28.300 46 CFR 28.400	Vessel Constructed Or Had A Major Conversion After 15 Sep 91 & Carry More Than 16 POB (If YES, use Supplement 2; CG-5587B)	<input type="radio"/> Yes <input type="radio"/> No
46 CFR 28.500	Vessel \geq 79' Not Required Load Lines & Constructed Or Had A Major Conversion/Alteration To Fishing/Processing Equipment After 15 Sep 91 (If YES, use Supplement 2, Subpart E; CG-5587B)	<input type="radio"/> Yes <input type="radio"/> No
	Vessel Has Capacity To Carry \geq 10,500 gallons (250 BBL) Of Oil Or Hazardous Materials (If YES, use Supplement 3; CG-5587B)	<input type="radio"/> Yes <input type="radio"/> No
46 CFR 28.700 46 CFR 28.720	Fish Processor <input type="checkbox"/> Must have a Certificate of Compliance* <input type="checkbox"/> If built or converted after 27 Jul 90 must be classed* * From ABS, DNV, or approved 3 rd Party, Not Coast Guard	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
	STCW Requirements (Fish Processors more than 200 Gross Tons)	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A

CFVS EXAMINATION BOOKLET GUIDELINES

This booklet is to be used to record voluntary examinations of commercial fishing industry vessels. It provides a summary list of Coast Guard requirements to examiners and owners/operators of commercial fishing industry vessels. This booklet should be used in conjunction with the regulations or other aids developed by the Coast Guard to assist in understanding of the regulations. Examiners should retain the "Examiner Copy" of the first page, continuation sheet and the checklist pages for their records. The "Vessel Copy" of the first page and continuation sheet should be left with the vessel.

PRIVACY ACT STATEMENT for VOLUNTARY DOCKSIDE EXAMINATIONS on COMMERCIAL FISHING VESSELS

PRIVACY ACT STATEMENT: Required by Public law 93-579

AUTHORITY: 46 USC 4502, 46 USC 4504, 46 USC 4507, 46 USC 6104 and 14 USC 89

PRINCIPAL PURPOSE(S): To document the Voluntary Dockside Examiner's report, enhance fishing vessel safety and promote public awareness and education. Information may be retained on file indefinitely.

ROUTINE USE(S): This information is to be used for uniform Coast Guard reporting and administration of Voluntary Dockside Examination data. It will be used to record the number of vessels and level of compliance with Coast Guard regulations.

MANDATORY OR VOLUNTARY DISCLOSURE: Providing any information during the course of a voluntary dockside examination is voluntary. Failure to provide information necessary to ensure compliance with applicable regulations may prevent issuance of the safety decal. Providing a vessel document/certificate of number by the operator of a vessel is mandatory. Failure to provide vessel documentation/registration may prevent issuance of the safety decal.

Appendix F: Pre-Trip Vessel Safety Checklist

PAPERWORK REDUCTION ACT STATEMENT: The information provided on this form will be used by the National Marine Fisheries Service to ensure that observers can be deployed effectively, efficiently, and safely on fishing vessels in order to collect information that is used in analyses that support the conservation and management of living marine resources and that are required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the National Environmental Policy Act (NEPA), the Regulatory Flexibility Act (RFA), Executive Order 12866 (EO 12866), and other applicable law. The public reporting burden for this form is estimated to average 2 minutes per response, including the time for completing, reviewing, and transmitting the information on the form. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to: Amy Van Atten, National Marine Fisheries Service, Northeast Fisheries Science Center, Northeast Fisheries Observer Program, 166 Water Street, Woods Hole, MA 02543-1026. Providing the requested information is mandatory under regulations at 50 C.F.R. 600.746. The information on this form will be kept confidential as required under Section 402(b) of the MSA (18 U.S.C. 1881a(b)) and regulations at 50 C.F.R. Part 600, Subpart E. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number. This is an approved information collection under OMB Control No. 0648-0593 through 09/30/2012.

Vessel name 02/01/10

Trip ID

Hull number

Date landed (MM/DD/YYYY)
 / /

**Northeast Fisheries Observer Program
 PRE TRIP VESSEL SAFETY CHECKLIST (PTVSC)**
For each item shade in the appropriate box. Y = yes, N = no, NR = not required. If the item is required for this particular trip but not on board, or service date is expired, shade in the "No" box. Shade = ■ Please provide comments.

Y N NR

Vessel walk through: note general condition of vessel. *See back of sheet for examples

Current USCS Commercial Fishing Vessel Safety Examination Decal

*Required for all vessels
 Safety Decal Number Exp (MM/YY)

Emergency Position Indicating Radio Beacon (EPIRB)

*Required for all vessels operating beyond 3 miles
 Hydrostatic release service expiration (MM/YY)
 Battery expiration (MM/YY)

Life raft(s)

Hydrostatic release service expiration (MM/YY)
 Raft service expiration (MM/YY)

*Required to be sufficient for everyone on board, including observer.
 *Not required for vessels within 12 mi. of coast, ≤ 3 people and length <36'.

Immersion suits and personal flotation devices

*PFDs are required to be worn by the observer while out on deck
 Are there enough for everyone on board? Keep yours easily accessible.

Radio(s)

Fire extinguishers

Vessels <26' with outboard motor(s) and portable fuel tanks = not required

Emergency signaling flares *Check expiration dates

<3mi. = night light and smoke or 3 day/night flares; >3mi. = 3 parachute, 6 hand held, 3 smoke

First aid material

Life rings

Vessels <26' = cushion, >26' = 1 life ring buoy, >65' = 3 life ring buoys.

Are safety drills conducted on this vessel? (May include fire, flooding, life raft deployment, abandon ship, etc.) Please ask captain.

Will one be conducted while you are onboard? Comments? (on back)

Will an underway wheel watch be maintained during this trip? Comments? (on back)

Were there any stability concerns/issues, either because of behavior or vessel design, during this trip? *See back of sheet for examples. If yes, please comment on the back.

Did you provide any additional comments on back?

Please provide comments and your signature on the back of this sheet.

*The following is a list of examples that you should/could check while doing a vessel walk through. They are listed here to assist you in determining the relative safety of a particular vessel. The list is not comprehensive, but one that is intended to start you thinking.

- Does the vessel seem well maintained? Is it neat, clean and being maintained by a careful and prepared crew?
- Any visible hydraulic leaks?
- Is the vessel being used for the purpose it was originally designed? Have significant changes been made?
- Do obvious hazards exist? Note potentially hazardous areas/conditions. ALWAYS USE CAUTION AROUND WINCHES.
- Identify water tight doors. Can they be secured in case of severe weather or emergencies?
- Are the hatches or passageways blocked or difficult to get to?
- Does the deck gear appear to be in good working condition? Identify unsafe areas. Note overhead wires or rusted/worn shackles or blocks.
- Is the vessel long overdue for a haul out (excessive growth at waterline or hull paint in poor condition)?
- How often is the bilge pump going on?
- How is the fish hold covered? Is hatch readily available and in good condition? Are there other openings in the deck and are good hatches in place or readily available?
- Would anything prevent you from abandoning ship from the living quarters?
- What are the escape routes from every part of the vessel you might find yourself?
- Visualize egress for all possible scenarios (fire, flooding, capsized, dark, etc.) and mentally note landmarks.
- What are the most combustible items on board and where are they stored?
- Are there any exposed exhaust pipes/manifolds that might pose burn hazards?
- Is there heavy equipment on deck that is not latched down?
- Are there any exposed drive chains, pulleys or belts?
- Would you be able to access the life raft if conditions were icy or the wheelhouse was on fire?
- Wood hulls: Rust stains between planks?(may indicate weak fasteners). Protruding planks or inconsistencies in the hull? (may indicate broken frame/fasteners). Wood rot present? (if yes, likely to be worse in unseen areas).
- Are there safety issues involved with boarding?
- Is the number and size of the scuppers sufficient to be effective? Do they become plugged during fishing practices?
- Is there a station bill posted and is your role clear during all shipboard emergencies?
- Are there emergency instructions, or did the captain (or designee) give safety orientation, explaining the following: survival craft embarkation stations; survival craft assignments; fire/emergency/ abandon ship signals; procedures for rough weather; procedures for recovering man overboard; procedures for fighting fire; essential actions required of each person in an emergency?

***Required to conduct at least 1 of the following: 1) orientation, 2) safety instructions or 3) safety drills.**

*The following are examples of things to consider related to the vessel design or fishing practices in determining general concerns with vessel stability.

- Note the roll period of the vessel. Generally a boat with a quick, snappy roll is more stable than a boat that has a slow or sluggish roll period. A boat that seems to hesitate on its side, before righting, could be unstable.
- Does the vessel list excessively?
- Do the fishing practices involve a pattern of towing heavy bags or dumping the catch to one side of the vessel?

Comments

Stability

WHEN WAS THE LAST TIME YOU CHECKED YOUR PERSONAL SAFETY EQUIPMENT?


Please check the method you used to verify the EPIRB hydrostatic release and battery expiration dates:

- Visual inspection; record card number and date issued below
- EPIRB Visual Inspection Card (EVIC); record card number and date issued below
- Approved USCG documentation (comments required)

EVIC card number Date issued (MM/YY)

Observer signature _____ Date _____

Appendix G: At-sea Boarding Form

 COMMERCIAL FISHING VESSEL BOARDING REPORT		BOARDING DATE (MM/DD/YY)	BOARDING TIME (24-HOUR)	ACTIVITY NUMBER	
VESSEL TYPE		VESSEL TYPE CODE:			
<input type="checkbox"/> Fishing <input type="checkbox"/> Fish Tender <input type="checkbox"/> Fish Processing Vessel					
VESSEL NUMBER		VESSEL NAME			
HULL IDENTIFICATION NUMBER		VESSEL MAKE			
VESSEL MODEL		YEAR	PROP TYPE	<input type="checkbox"/> Outboard <input type="checkbox"/> Inboard Gas <input type="checkbox"/> Manual <input type="checkbox"/> Inboard Diesel	
LENGTH: Ft. In. NET TONS		HP	HULL TYPE	<input type="checkbox"/> Aluminum <input type="checkbox"/> Fiberglass <input type="checkbox"/> Steel <input type="checkbox"/> Wood	
CFVS DECAL #	FLAG	ENGINE COMPARTMENT:	<input type="checkbox"/> Open <input type="checkbox"/> Closed	POBs	
DATE ISSUED (MM/YY): / /		FUEL COMPARTMENT:	<input type="checkbox"/> Open <input type="checkbox"/> Closed	PFDs	
OWNER'S NAME (LAST, FIRST, MI)	<input type="checkbox"/> 1 Mr. <input type="checkbox"/> 2 Ms.	CONSTRUCTION:	<input type="checkbox"/> Open <input type="checkbox"/> Closed	<input type="checkbox"/> Owner was Operator <input type="checkbox"/> Owner on Board, Not Operator <input type="checkbox"/> Owner Not on Board	
STREET ADDRESS/MAILING				TELEPHONE NO.	
CITY, STATE & ZIP CODE				FEDERAL FISH PERMIT #	
DRIVER'S LICENSE NUMBER & STATE		SOCIAL SECURITY NUMBER		BIRTH DATE (MM/DD/YY)	
OPERATOR'S NAME (LAST, FIRST, MI)		<input type="checkbox"/> 1 Mr. <input type="checkbox"/> 2 Ms.	TELEPHONE NO.		
STREET ADDRESS/MAILING				OPERATOR PERMIT #	
CITY, STATE & ZIP CODE				FISHERY PLAN CODE	
DRIVER'S LICENSE NUMBER & STATE		SOCIAL SECURITY NUMBER		BIRTH DATE (MM/DD/YY)	
OBSERVED IN USE:	<input type="checkbox"/> Inside Boundary Line <input type="checkbox"/> Outside Boundary Line <input type="checkbox"/> Inland Nav. Rules Apply <input type="checkbox"/> COLREGS Apply	ACTIVITY:		LATITUDE	
BODY OF WATER:		LOCATION:	LONGITUDE		
TYPE OF FISHING INVOLVED IN:		HOW VESSEL IS RIGGED:			
REQUIREMENTS FOR ALL VESSELS (Fishing Vessels with a current CFVS Decal: Check items in blue)					
140	Life Preservers & Other PFDs	46 CFR 25 & 28.110	141	Ring Life Buoys	46 CFR 28.115
142	Survival Craft	46 CFR 28.120	143	Stowage of Survival Craft	46 CFR 28.125
144	Survival Craft Equipment	46 CFR 28.130	147	Distress Signals	46 CFR 28.145
148	Emergency Position Indicating Radio Beacons (EPIRBs)	46 CFR 25.26 & 28.150, 47 CFR 80	149	Fire Extinguisher Equipment	46 CFR 25.30 46 CFR 28.155 & 160
176	Material Condition SAT UNSAT MSO Follow-up recommended		177	Stability/Stability Instructions	46 CFR 28.530 & 46 CFR 28.65(b)(5)
105	Sound Producing Device	33 USC 2033, Rule 33	138	Backfire Flame Control	46 CFR 25.35
139	Ventilation	46 CFR 25.40-1	145	Lifesaving Equipment Markings	46 CFR 25 & 28.135
146	Maint/Insp of Lifesaving Equipment	46 CFR 28.140	150	Injury Placard	46 CFR 28.165
151	Waste Mgmt Plan (oceangoing vessels > 40 ft)	33 CFR 151.55 & .57	152	Marine Sanitation Devices	33 CFR 159.7
153	Copy of Nav Rules (inland waters only) (vessels > 39' 4")	33 CFR 88.05 46 CFR 28.225	154	Navigation/Anchor Lights Sunset/Sunrise (24-Hour)	33 USC 2020 & 2026 Rules 20 & 26
155	Oil Pollution Placard (vessels > 26 ft)	33 CFR 155.450	156	Garbage Placard (vessels > 26 ft)	33 CFR 159.59
157	FCC SSL	47 CFR 80.405	158	Load Line Certificate	46 USC 5102
159	Vessel Numbering & Registration	33 CFR 173 46 CFR 67.121 & .123	173	Document/Official Number	46 CFR 67
199	Provide Boarding Ladder	50 CFR 600.730(c)			
REQUIREMENTS FOR DOCUMENTED VESSELS OPERATING BEYOND THE BOUNDARY LINE OR W/MORE THAN 16 POBs					
168	High Water Alarms	46 CFR 28.250	171	Instructions, Drills & Safety Orientation	46 CFR 28.270
160	Fireman's Outfit & SCBA	46 CFR 28.205	161	First Aid Training & Equipment	46 CFR 28.210
162	Guards for Exposed Hazards	46 CFR 28.215	163	Navigational Information	46 CFR 28.225
164	Compasses & Deviation Tables	46 CFR 28.230	165	Anchors & Radar Reflectors	46 CFR 28.235
166	General Alarm System	46 CFR 28.240	167	Communication Equipment	46 CFR 28.245 & .375 33 CFR 26.03
169	Bilge Pumps, Piping & Dewatering System	46 CFR 28.255	170	Electronic Position Fixing Devices	46 CFR 28.260
172	Emergency Instruction	46 CFR 28.265	199	Provide Boarding Ladder	50 CFR 600.730 (c)
178	Coaming Height	46 CFR 28.560 (b)	179	Deadlight Covers	46 CFR 28.560 (f)
180	Non US Master Violation	46 CFR 12110 (d)	181	75/25 Crewing Standards	46 USC 8103
119	Negligent/Gross Negligent Operation	46 USC 2302	120	Intoxicated Operations	46 USC 2302 (c)
174	Fisheries Violation(s)		175	Unsafe Conditions - Terminated Use	46 CFR 28.65
182	No Violation		183	Law Enforcement Action Taken	
DIST	UNIT	PHONE NUMBER	BOARDING OFFICER'S NAME (Print)		RANK/RATE
U.S. DEPT. OF HOMELAND SECURITY, USCG, CG-4100F (Rev. 04-08)			BOARDING OFFICER'S SIGNATURE		

NOTE: See reverse side of this page for instructions on processing violations.

ALL PREVIOUS EDITIONS ARE ABSOLUTE
OPERATOR COPY

Commercial Fishing Vessel Boarding Report

PROMOTE FISHING VESSEL SAFETY

The Coast Guard requests your cooperation in promoting the safety of life and property on the nation's waterways. By observing the prescribed laws and regulations and by following safe boating practices, you can help reduce the number of lives lost or injuries sustained and prevent damage to property. Fishermen are strongly encouraged to take advantage of the Voluntary Docksides Examination (VDE) Program. The VDE can save you time and money and more importantly may increase your chances of surviving a marine casualty.



PURPOSE OF BOARDING

The Coast Guard is the primary maritime law enforcement and safety agency of the United States. Under statutory authority Coast Guard boarding officers may, at any time, go onboard vessels subject to the jurisdiction of the United States and make inquiries, examine ship's papers, and inspect, examine and search the vessel for the detection, prevention, and suppression of violations of U.S. laws. The Coast Guard is also authorized to make seizures and arrests and use all necessary force to compel compliance while conducting boardings.

The Coast Guard enforces regulations related to commercial fishing, recreational boating safety, boating while intoxicated, pollution prevention, vessel documentation and registration, and many other areas including and without limitation criminal laws such as possession and distribution of illegal drugs, illegal weapons, stolen boats, alien smuggling as well as custom laws. Additionally, the Coast Guard checks for compliance with applicable U.S. Fisheries regulations and agreements. All this is done through an active boarding policy in which boarding teams follow established procedures for going on board U.S. and foreign vessels subject to U.S. jurisdiction.

QUESTIONS?

Owners/Operators who have questions concerning Coast Guard Fishing Vessel boardings conducted at sea or would like to schedule a "NO fault / NO penalty" docksides examination, please contact your local USCG unit, or via the Internet at <http://www.fishsafe.info/contactform.htm>.

REMEMBER: Voluntary docksides examinations can save you time and money. The presence of a valid examination decal can greatly reduce the at-sea boarding time spent on safety checks.

IMPORTANT NOTICE TO OWNER OR OPERATOR:

If you receive a "NOTICE," correct the discrepancy as soon as possible. A completed Voluntary Docksides Examination will reduce the likelihood of being assessed a monetary civil penalty. Continued operation without required safety equipment may be an invitation to a serious accident. It may also result in additional penalties for repeated violation of Federal Law.

PROCEDURES

A copy of this form will be mailed to the responsible Coast Guard District Commander who will review all applicable information to determine if civil penalty action should be commenced. Should civil penalty action be considered appropriate for the violation(s) noted, you will be notified in writing by the Coast Guard Hearing Officer of the charges against you, the maximum penalty which may be assessed, the procedures used in assessing and collecting the penalty, the amount of penalty appearing appropriate, and your rights in the proceeding. Within 30 days of receipt of this notification you may request a hearing or provide, in writing, any information or material in lieu of a hearing that denies, explains, or mitigates the violation. Any information you submit will be used in the determination whether to assess a penalty, close the case without action, remit or mitigate the penalty, or take other action under the applicable statute.

If, after you have been provided notice and an opportunity to a hearing, a civil penalty is assessed, you will be notified of the amount of the penalty assessed. You may appeal the assessment to the Commandant of the Coast Guard within 30 days of receipt or the Coast Guard may begin proceedings to collect the penalty in a Magistrate's or District Court.

For most violations, the maximum penalty is not more than \$6,500.00 for each violation. The maximum criminal penalty for violations is not more than \$6,500.00 or one-year imprisonment or both for each willful, or grossly negligent violation. However, the civil and criminal penalties available for cases involving pollution prevention violations are substantially higher.

PRIVACY ACT STATEMENT

Required by Public Law 93-579

AUTHORITY:

46 U.S.C.2302, 46 U.S.C.4507, 46 U.S.C.12309, 46 U.S.C.12122, 14 U.S.C.89

PRINCIPAL PURPOSE(S):

To document boarding officer's report, to assess civil penalty action (if appropriate), to facilitate collection of any civil penalties assessed, and to give boat owner/operator written notice of boarding. Information will be retained on file for 3 years and will be considered in the event of future violation(s).

ROUTINE USE(S):

Information may be used to locate a violator and otherwise to assist in the collection of assessed civil penalties. Information is available to other law enforcement agencies as permitted by law.

MANDATORY OR VOLUNTARY DISCLOSURE: Providing a vessel registration/certificate of number by the user of a vessel is mandatory. Failure to provide vessel registration, upon being boarded by a Coast Guard officer, may subject the owner to a penalty or fine. Providing a Social Security Number, Drivers License number, and date of birth is voluntary.

Appendix H: Interview Protocol/Questions for Commercial Fishermen

For our interviews with commercial fishermen, we began by introducing ourselves as Worcester Polytechnic Institute students. We told the fishermen that we were conducting a research project on the effectiveness of the MOA and National Observer Program in reducing fishermen casualties. Furthermore, we mentioned that all the information we gathered would be confidential, and that no names would be included in our final report. To accomplish this we used an informed consent form approved by the WPI IRB. Below is the list of questions we asked during our interviews with commercial fishermen.

- How long have you been a commercial fisherman?
- How long have you been a captain?
- What type of vessel do you usually work on?
- What type of gear or equipment do you typically utilize to bring in a catch?
- What are the greatest dangers that you encounter while fishing?
- What do you find to be the most common safety deficiencies found on vessels?
- Have you ever had an NMFS observer onboard? If so, what years?
- Has fishing become safer since the implementation of the MOA and/or NMFS Decal Policy?
- Are there any changes you would like to see made to the National Observer Program or the MOA? What are they and why?
- Are there any changes you would like to see made to USCG safety regulations? What are they and why?

Appendix I: Informed Consent Form for Commercial Fishermen



The University of
Science and Technology.
And Life..

Informed Consent Agreement for Participation in a Research Study

**Principal Investigators: James Hanlan
Lauren Mathews**

**Contact Information: Tel. 508-831-5438 Email: jphanlan@wpi.edu
Tel. 508-831-5936 Email: lmathews@wpi.edu**

**Student Investigators: Forrest Dwyer
Michael Mourkas
Heather Sebastian**

**Contact Information: USCG Headquarters
2100 2nd Street, SW
Washington, D.C. 20005
Tel. 202-372-1202 Email: Forrest.P.Dwyer@uscg.mil
Tel. 202-372-1204 Email: Heather.S.Sebastian@uscg.mil
Tel. 202-372-1203 Email: Michael.A.Mourkas@uscg.mil**

Title of Research Study: Validating Safety on Commercial Fishing Vessels

Sponsor: United States Coast Guard

Introduction:

You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study:

In this project we will determine the effectiveness of the Memorandum of Agreement on Observer Safety at reducing casualties and fatalities of observers and commercial fishermen. Furthermore, we will provide recommendations for new or changed regulations.

Procedures to be followed:

You will be interviewed regarding your opinions and experiences with NMFS observers as part of the National Observer Program.

Risks to study participants:

Coast Guard intervention is one area that could lead to participants feeling emotional discomfort. Participants may feel that their responses will be shared with the Coast Guard and then used to target them. This will not happen because of measures described in the sections below.

Benefits to research participants and others:

There are several benefits for this research. First the research has the potential to make commercial fishing safer for all those involved, including study participants.

Record keeping and confidentiality:

Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators, the sponsor or its designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

Compensation or treatment in the event of injury:

No physical injuries will result from this study, nor should any economic or social impacts occur. You do not give up any of your legal rights by signing this statement.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact:

Forrest Dwyer, Michael Mourkas, or Heather Sebastian, USCG Headquarters, 2100 2nd Street, SW Washington, D.C. 20005 (Tel. 202-372-1202). You may also contact the chair of the WPI Institutional Review Board (Professor Kent Rissmiller, Tel. 508-831-5019, Email: kjr@wpi.edu) or WPI's University Compliance Officer (Michael J. Curley, Tel. 508-831-6919, Email: mjcurley@wpi.edu).

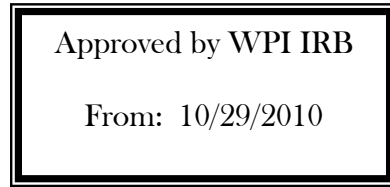
Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit. Data obtained in this study will become the property of the investigators and WPI. If you withdraw from the study, data already collected from you will remain in the study.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

Study Participant Signature

Date: _____

Study Participant Name (Please print)



Signature of Person who explained this study

Date: _____

Appendix J: Interview Protocol/Questions for NMFS Observers

- How long have you been an NMFS observer?
- Roughly how many trips have you taken?
- Do you typically work on a certain type of vessel? If yes, which type(s)?
- Do you typically work in a specific area or region? If yes, which area(s)?
- Have you ever had to cancel a trip due to a vessel's condition?
- Have you ever had to cancel a trip due to crew behavior or state?
- What do you find to be the most common safety deficiencies found on vessels?
- Have you ever encountered an emergency situation while observing?
- Has observing become safer since the implementation of the MOA and/or NMFS Decal policy?
- Are there any changes you would like to see made to the National Observer Program or the MOA? Why?
- Are there any changes you would like to see made to USCG safety regulations? Why?

Appendix K: Commercial Fishermen Interview Summaries

Interview #1 with a Retired Commercial Fisherman

Date: December 2, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Michael Mourkas, Heather Sebastian, Retired commercial fisherman via telephone

Secretaries: Michael Mourkas, Heather Sebastian

- Felt the greatest dangers were no knowledge of how to use the safety/survival equipment, as well as no new boats (age and fleet are huge dangers)
- Most common safety deficiencies he felt were stability issues; with changing captains (changing hands) on the same vessel, which brings piping issues and gear changes
- Within his job now, he checks safety equipment such as EPIRBs. About 50% of the fleet in his port is more safety conscious
- When he was a fisherman and had an observer onboard, he had no problems with him/her; the observer would explain the liabilities, stand out of the way and stay away from his gear
- He feels that the MOA and NMFS policy are working and fishing is becoming safer. They have done a lot to make the vessels safer, especially the Dockside Safety Exams (DSEs).
- With regards to changes, he feels that monthly safety drills should be mandated because there is a huge lack of knowledge on how to use the safety equipment. When it comes time to use this equipment in an emergency situation, there is no time to read the directions. There's also knowledge on how to properly test or change the batteries on EPIRBs is lacking which is one reason fishermen tend to be afraid of them.
- He feels that the 2012 CG Authorization Bill will help to resolve issues of stability

Interview #2 with a Commercial Fisherman

Date: December 2, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Michael Mourkas, Heather Sebastian, Commercial fisherman (via telephone)

Secretaries: Michael Mourkas, Heather Sebastian

- Felt that the greatest danger to commercial fishermen is the government: this is an economical era and fishermen are being forced to cut back on quotas. He agrees with safety regulations, but cut backs are dangerous because they detract from the maintenance of the vessels. Fishermen don't want to be ruled by regulations made

- by the government. These haul outs lead fishermen like him to take as little insurance as possible out on his boat. They “built these fish stocks and now they’re being taken away.” Fishermen aren’t going to stop fishing.
- He feels that maintenance is the most common safety deficiency because of how expensive it is. They are forced to check their life rafts yearly and it costs them \$1,000 to do so.
 - He’s had hundreds of observers on his vessels, both before and after 2004/2005 and doesn’t feel like fishing has become any safer. Doesn’t feel as if the MOA and NMFS policy have been effective. He is concerned with how much power the observers are given to cancel a trip. Also doesn’t feel as though the observers should check the EPRIBs.
 - He doesn’t have any issues with the USCG, as he feels as though it is the most professional government agency there is, but it’s the regulations he doesn’t like. He would rather the DSE be sufficient enough and that the observer should not touch his things (like the EPIRB), as he doesn’t like people working with his safety gear.
 - When the CG issues him a DSE yearly, he feels as though the CG should do a safety check right there because the “CG guys are well-trained and thorough enough” to do so. They also could give some safety instructions while giving the DSE, to show the fishermen where things would be most effective, instead of just checking if they have said safety equipment.
 - He agrees with safety and he has safety drills with his crew to ensure their safety, but doesn’t think anything should be mandated.
 - Just as there is an EPIRB sticker that lasts 90 days, he feels there should also be a life raft sticker that would last for two years if the raft is under ten years old.
 - Feels that there are only “true fishermen” left and while he has a lot of respect for the CG, it is not necessary to force anything upon these fishermen. As he said, it’s “not a perfect world, but if you pay attention you should be fine.”

Interview #3 with a Commercial Fisherman

Date: December 3, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Michael Mourkas, Heather Sebastian, Commercial fisherman (via telephone)

Secretaries: Michael Mourkas, Heather Sebastian

- Felt that the most dangerous part of commercial fishing was that it was real easy to slip and fall on something or overboard
- Fishing could be dangerous for those that work alone while on a fishing vessel
- One common problem is vessels not being used for their intended purpose, potentially causing stability problems
- Believes that EPIRBs should be correlated with the vessel monitoring system (VMS) to give a better reading on where the vessel is
- Has had multiple observers on his boat with no problems
- Would like to see crew training available for low cost

- Has kept safety equipment up to date even before the MOA because if he had been boarded he would've been sent back to port
- Likes the safety decal because it gives people another opportunity in the year to check their equipment to see if it's still up to date.
- Fishing hasn't gotten safer after the MOA because it's inherently dangerous
- The more environmental regulations there are, the less money commercial fishermen make which means the less money that they will spend on maintenance
- Fishing isn't just about the fish it also a job for fishermen
 - Government needs to decide if it wants a high fish stock with no fishermen or a balance of both

Appendix L: NMFS Observer Interview Summaries

Interview with NMFS Observer Jason Dean

Date: November 30, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Jason Dean (via telephone)

Secretary: Heather Sebastian

- NMFS observer for seven years
- Over 1,000 days at-sea
- Estimated 75% of observing work done on offshore trawlers
 - Also spent time on purse seiners, gill netters
- Has been deployed throughout New England
- Never had to terminate a vessel trip
 - Voyage delayed once (crew had to repack life raft)
 - Never felt unsafe with crew
- Only violation issued was due to expired USCG safety decal
- Believes the most common safety deficiency on commercial fishing vessels is the hydrostatic releases for EPIRBs and life rafts. Also the EPIRB and EPIRB batteries tend to expire
- Never been in an emergency situation while observing or had to abandon ship, although while he has been onboard vessels, crewmembers have:
 - Split head open
 - Hydraulic fluid sprayed into eyes (had to be life flighted off vessel)
 - Vessel had to be towed back to port after black smoke from engine
- Feels that observing is much safer now than it was before the MOA and NMFS decal policy. Described the difference as night and day, and attributed this to:
 - improved training
 - USCG safety decal
 - Life rafts
 - Automated External Defibrillators
- The biggest change he wanted to see was the implementation of a life raft certification system
 - Rafts are located on wheelhouse roof with EPIRB and can difficult to inspect
- Also wanted to see entire checklist be valid for 30 days

Interview with NMFS Observer Charles Pitts

Date: November 30, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Charles Pitts (via telephone)

Secretary: Forrest Dwyer

- Observer for 7 years, 5 of which have been with NOAA
- Over 900 days at-sea
- Has observed on almost all types of vessels
- Deployed mostly in New England occasionally as south as New Jersey
- Has had to terminate one trip
 - Crew wouldn't let him check EPIRB
- Believes that the most common safety deficiency is the hydrostatic releases on EPIRBs and Life Rafts
- Has never encountered an emergency situation while observing
- Does not believe that observing has become safer since the MOA and NMFS regulations
 - Safety decals do not take into account the hull condition of a vessel
- Believed that implementing a certification program for life rafts would be a good idea

Interview with NMFS Observer Jason Orifice

Date: December 1, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Jason Orifice (via telephone)

Secretary: Heather Sebastian

- Will have been an observer for 7 years this coming May
- Approximately 1500-1800 days at-sea
- Mostly works on George's Bank draggers, some scallopers, trawlers,
 - Also worked on gill netters, fly netters, seiners
- Has had to cancel 2-3 trips due to safety violations
 - 2 in North Carolina
 - 1 or 2 in New Bedford due to Safety Decal
- Believes the most common safety deficiency is an invalid decal
 - Often times equipment has recently expired
 - EPIRB certification also a problem
- Gives the captain the choice to either delay the trip, cancel the trip, or fix the violation
- Has run into problems with issuing dates being confused for expiration dates, which leads to a violation

- Captains are often afraid to touch the EPIRBs due to fear of breaking them, and many believe that only the USCG is allowed to maintain the EPIRBs
- Has encountered many emergency situations while observing
 - Captain tried to surf 21' vessel over 23' waves, almost capsized
 - Pipe burst in engine room and flooded vessel, captain had to hot wire bilge pumps, vessel came close to sinking
 - A Captain wouldn't let him leave the wheel house to perform observer duties
 - While fishing at George's Bank vessel suffered catastrophic engine failure, drifted down to RI with 50 knot winds
 - Lost chunk of eye 6 hours into an 8 day trip
- Doesn't believe that the MOA or PTVSC could have avoided these emergency situations
- Believes that the training observers get is excellent and prepares them well

Interview with former NMFS Observer Cara Sands

Date: December 1, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Cara Sands (via telephone)

Secretary: Heather Sebastian

- Was an observer for 1+ years, now works in NMFS office
- Worked an average of 12 sea days per month during that time
- Mostly worked on draggers and scallop vessels and 1-5-day trips on gill nets
- Deployed mostly to New Jersey
 - Several down south and off Long Island
- Never had to cancel or delay a trip
- Most common deficiencies:
 - Safety decals
 - Life Raft
 - Hydrostatic releases
 - EPIRB batteries
- Has experienced resistance to checking EPIRB dates
- Never had an emergency situation
 - Expected one crewmember of drinking (later fired)
- Graduated from the 2-day observer training program
 - Goes back every 18 months to stay well prepared

Interview with former NMFS Observer Narayan Elasmr

Date: December 1, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Narayan Elasmr (via telephone)

Secretary: Heather Sebastian

- Has been an observer since April 2009
- 195 Days at-sea
- Mostly on Trawl vessels and draggers
- Typically operates out of New England and Long Island
- Never had to cancel or delay a trip
- Believes that the EPIRB Visual Inspection Cards are great

Interview with NMFS Observer Rob Bland

Date: December 3, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Michael Mourkas, Rob Bland (via telephone)

Secretary: Heather Sebastian and Michael Mourkas

- Has been an observer for 6.5 years
- 950 Days at-sea
- Mostly draggers, yet has been on multiple kinds of vessels
- Typically operates out of Massachusetts on vessels operating in the George's Bank area
- Has had to delay a trip, but deficiency was easy to fix, and within a couple of hours trip was back on
- Most common deficiencies:
 - Safety decals
 - Life Raft
 - No problems with the EPIRBs
- Believes that commercial fishing is safer after the MOA signing
- Fishermen are more aware of their safety equipment and expiration dates
- Sometimes Mr. Bland would point out a deficiency and the fishermen would be stubborn and say something to the effect of, "you're just trying to keep us in."
- If a deficiency is found by the Coast Guard during an at-sea boarding they will just send the fishermen in anyways
- Says that the EVIC is a good program
- Observer checklist questions are straight forward
- Since the boats are so old maybe the hulls should be checked for strength, and the vessel for stability
- Mandatory safety drills might be a good idea to do during the dockside safety examination

Interview with NMFS Observer Paul O'Donnell

Date: December 3, 2010

Location: USCG Headquarters, Washington, D.C.

Attendees: Forrest Dwyer, Heather Sebastian, Michael Mourkas, Paul O'Donnell (via telephone)

Secretaries: Heather Sebastian and Michael Mourkas

- Has been an observer for 20 years
- 5000+ Days at-sea
- Has sailed on every kind of vessel there is, even lobster boats which observers don't cover anymore
- When asked the question, "What is the most dangerous type of fishing?" He said that they are all dangerous with their own inherent problems/dangers
- If he had to pinpoint the most dangerous he said scallopers due to metal dredges swinging overhead, a lot of heavy parts, and that people could get dragged into the water or lose a limb
- Hasn't had to cancel a trip, delayed one because the safety decal had expired
- Fishermen forget when their equipment is about to expire so when he does his safety checklist he gives the captain a list of the dates when the equipment expires. Most of the time the captain is surprised to see the dates and is glad to have the information
- He thinks that the EVIC cards are a brilliant idea
- Believes the most common deficiency is expired equipment, most of the time the captains just don't know the equipment is going to expire
- Thinks that captains should be given a list of all of the expiration dates of their equipment
- Since the safety decal is mandatory now, fishermen are more aware of safety
- Most insurance companies now also actually require:
 - A safety decal
 - Up to date records
 - Captain and crew safety drills
- Some captains now go out to sea and conduct safety drills to increase awareness
- Fishermen are the "last cowboys" and the USCG are the government, fishermen are happy to see them when they need the USCG but can be like a "big brother" because they are always watching
- Members of the commercial fishing industry are starting up safety training programs
- USCG is trying to become more "industry friendly"
- State boats are federally regulated
- Have the USCG put a list of dates of expiration on a piece of paper during the dockside safety examination
- Adding the life raft to the EVIC card is a great idea
- Have a USCG representative at the observer safety training sessions
- Have more experienced people go out on the group training trips showing them not just what to do but also what not to do
- Keep the examples safe but realistic dangers on a commercial fishing vessel

Appendix M: NMFS Fishing Permit Conditions

Permit Conditions and Information

1. This permit authorizes fishing operations for the vessel as named and described on the reverse side and such vessel's owner(s) as named. This permit must be maintained upon such vessel at all times. Federal Northeast fishing permit(s) cannot be assigned or leased to another fishing vessel. This permit supersedes any federal Northeast fishing permit previously issued to the vessel named. This permit may be suspended or revoked if the vessel named on the reverse side is not operated in accordance with federal fisheries laws and regulations.
2. The permit(s) listed on the reverse side are effective on the effective date(s) shown. Each permit continues in effect until the expiration date printed on the reverse side, unless otherwise suspended, sanctioned or revoked. Any change in the vessel's information, including but not limited to, vessel ownership must be reported to the Regional Administrator within fifteen (15) days of such change(s). Failure to report change(s) in permit application information within this time period shall render this permit null and void. Application for a new permit must be made if the permit expires, ownership changes, or permit is rendered null and void for any reason including revocation.
3. Note to American Lobster trap permit holders: your maximum trap allocation listed on the reverse side is the most restrictive (lowest) of the historical participation trap areas for which your vessel is eligible and that you selected, and any open access trap areas you designated for the particular permit year listed. The maximum trap limit printed on the reverse side does not preempt more restrictive state trap limits. Inquiries regarding federal lobster regulations should be directed to the State, Federal Constituent Programs Office at (978) 281-9234.
4. Note to Limited Access permit holders: limited access permits must be renewed annually by the last day of the permit year unless a Confirmation of Permit History has been issued. Failure to renew a limited access permit in any permit year bars the renewal of the permit in subsequent years. If a vessel's limited access permit for a particular fishery is voluntarily relinquished, no limited access permit for that fishery may be reissued or renewed based on that vessel's history or to any other vessel relying on that vessel's history. If the vessel named on the reverse side is lawfully replaced by another vessel that meets the criteria set forth at 50 CFR 648.4, all limited access permits for which the replacement vessel qualifies will be issued to the replacement vessel and this permit will be rendered null and void.
5. As a condition of the issuance of this permit, the vessel owner agrees not to fish for, catch, possess, or land any fish for which the vessel would be authorized under this permit, from any waters (including state waters), in any subsequent fishing year unless the limited access permit(s) has been lawfully renewed, relinquished, or otherwise removed from the vessel. This condition does not apply to American lobster permits.
6. Inquiries regarding reporting loss of permit or submission of other information required to support a permit application should be directed to the Fisheries Statistics Office at (978) 281-9370. Inquiries regarding pertinent federal fishing regulations, other than American lobster, should be directed to the Sustainable Fisheries Division at (978) 281-9315.
7. The fishing and permit history of a vessel is presumed to transfer with the vessel whenever it is bought, sold, or otherwise transferred, unless there is a written agreement, signed by the transferor/seller and transferee/buyer, or other credible written evidence, verifying that the transferor/seller is retaining the vessel's fishing and permit history for purposes of replacing the vessel. Access to confidential data or catch records from any previous owner will not be granted to the buyer unless there is written evidence specifying that the seller has authorized that the buyer has been given access to the vessel's landings and catch records.
8. The Northeast Regional Administrator of the National Marine Fisheries Service requests that you carry a Northeast Fisheries Observer Program certified observer. If you have been contacted by a NMFS employee or designated contractor to carry an observer, it is illegal to engage in fishing activities without the observer on board. Minimum safety standards must be met and a valid US Coast Guard Commercial Fishing Vessel Safety Examination decal is required to carry an observer.