Review & Evaluation of NMFS Observer Safety Training

Final Report

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Alaska Marine Safety Education Association

REVIEW AND EVALUATION OF NMFS OBSERVER SAFETY TRAINING FINAL REPORT

Alaska Marine Safety Education Association (AMSEA)
2924 Halibut Point Road
Sitka, AK 99835

Phone (907) 747-3287
Fax (907) 747-3259
www.amsea.org

Tax ID 92-0129584
DUNS number 79-837-5341

Prepared by Deb Ajango, Paula Cullenberg, Jerry Dzugan

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Section I
Introduction

I-1. Acknowledgements.

The writers of this report wish to extend our appreciation and thanks to Vicki Cornish, the National Observer Program (NOP) coordinator, for her concern and ceaseless efforts to improve observer safety. Her support, as well as that of Dennis Hansford, for this project was constant and very helpful. In addition, we wish to thank all the regional program managers and instructors from all of the observer programs we visited. Their desire to improve their training and their concern for observers was always paramount. They were very patient and helpful in enduring our questionnaires, interviews, disruptions to schedules, and they always responded in a gracious and timely manner. They should also be commended for allowing us to observe their trainings and making adjustments in their schedules to accommodate our requests.

It was obvious to the reviewers that the motivation behind this project as well as the intent of the observer program professionals – to improve safety for observers – is sincere and a high priority. Suggestions for improvements were always taken in a positive manner. In fact, many suggestions were immediately acted upon and modifications and improvements in the safety training occurred as this report was being written. It was obvious that programs have already put much thought into safety and have developed some effective training techniques. This speaks well to the professionalism and commitment of all NMFS staff. Without the support from NMFS staff, this report would not have been possible.

I-2. Limitations.

The writers have contacted several hundred people who have specific knowledge and experience of observer training and fishing vessel safety during the period of this work, however it was not feasible to be knowledgeable about all nuances of observer safety in every region. On some topics we discovered a range of opinion. Whenever possible we tried to discard "outlaying" facts and opinions, and gave more weight to opinions that were supported by others and were areas of consensus. We observed the main specific observer safety training modules in each region. However we did not attend all the several weeks of other observer training, where some aspects of safety may have been mentioned or reinforced during generally non-safety topics (e.g. species identification). Therefore, the scope of the content of safety topics that was observed in any region should be considered a minimum of what was presented in any safety program.

Additionally, many programs were "moving targets" since they were implementing revisions in the direction of some of the recommendations and suggestion in this report. So what was observed may no longer be standard for the program. Yet another limitation is that an individual instructor may have had a particularly good or bad training session (been short of help for a class, facilitation problems, etc). However the teaching methodologies seen were usually stated to be the standard methodologies used by each instructor.

Finally there are the limitations of the reviewers themselves. The reviewers have expertise in fishing vessel safety, risk management and in managing observer training

programs. However, we realize that not all the recommendations and suggestions within may be practical from an administrative and legal standpoint. We also were very aware of the fact that most regions have unique needs and qualities. However, there were areas of consensus on many topics, and it is obvious that any progress that may be made on any of the recommendations and suggestions will only be made if it is done between regions in a collaborative fashion and if they are administratively and legally possible in each region.

I-3. Layout and design of report.

This report has been organized into eight sections:

I. Introduction;
II. Overview of Project (goals and methods);
III. Executive Summary;
IV. Risk Assessment Findings;
V. Documentation of Current Practices (from site visits, interviews, and questionnaires);
VI. Evaluation of Results;
VII. Recommendations; and
VIII. Appendices.

I-4. Specific steps in proposal delivery, and readers' guide to finding applicable information.

According to the AMSEA Proposal to Review and Evaluate NMFS Observer Safety Training, the reviewers agreed to complete the following steps as part of this project:

1. **By using data from a variety of sources, the reviewers will identify risks/hazards** associated with the commercial fishing industry, observer at-sea work, and the observer safety training exercises. (This includes risk to NMFS.) The reviewers' risk assessment findings are summarized in Section IV.

   The reviewers completed the risk assessment by addressing the following steps:

   - Identify generic hazards associated with the profession (available from National Institute of Occupational Safety and Health, U.S. Coast Guard) ***(addressed in Section IV).***
   - Identify observer duties and potential risks associated with each – i.e. lifting, climbing, work around machinery etc. (obtain statistics on observer injuries per insurance claims, USCG data, information from programs and observers, etc.) ***(addressed in Section IV)***
   - Review all 20 fisheries for the following:
     - Survey fishing industry fatalities/injuries in each of the 20 observed fisheries; identify rate of occurrence, severity, trends, etc. ***(addressed in Section IV)***
     - Vessel types and hazards associated with each ***(addressed in Section IV)***

- Identification of environmental hazards ***(addressed in Section IV)***
  - Weather/water conditions
  - Other environmental/marine hazards
- Subjective hazards – human factors that can contribute to accident/injury (e.g., poor judgment, hours worked, etc.) ***(addressed in Section IV)***
- Safety equipment – used and carried ***(addressed in Section IV and Section V)***
- Level of enforcement of safety regulation on vessels ***(addressed in Section IV)***
- Most common accidents in these fisheries – sources from USCG, workmen's compensation/insurance companies, etc. ***(addressed in Section IV)***

2. The reviewers agreed to **document** the following for each site's training program: (Documentation of all current practices is listed in Section V.)

   a. NMFS personnel responsible for oversight of safety training, and other NMFS personnel involved in the development of safety training curricula or responsible for providing safety training (***addressed in Section V-1)***

   b. The lesson plans currently used to provide observer safety training for both new and long-term observers ***(addressed in Section V-2)***

   c. The use of supplemental teaching resources (***addressed in Section V-3)***

   d. Contracted trainers or other organizations or agencies that are used to provide safety training or supplement NMFS training ***(addressed in Section V-4)***

   e. Vessel safety checklists being used in each program, who is responsible for completing the checklists prior to observer deployments, and what the procedures are for resolving deficiencies ***(addressed in Section V-5)***

   f. Safety equipment and gear issued to observers, and procedures and schedules for maintenance and/or replacement of used equipment ***(addressed in Section V-5)***

   The reviewers also **documented** the following information:

   a. Observer preparations (prior to enrolling) ***(addressed in Section II and Section V-5)***
      - Are observers educated regarding the hazards of the industry?
      - Are observers educated regarding fitness expectations?
      - Environmental conditions?

- What steps are taken to identify observer medical histories or physical/emotional contraindications for acceptance into program?
- Are observers educated regarding social and health issues of working on a vessel?

b. Length of time for safety and survival training ***(addressed in Section V-1 and V-2)***
   - How is length determined?
   - Is it realistic and reasonable?

c. Does it (the safety training) adequately address the risks (that were identified in this report) ***(addressed in Section VI and Section VII)***

d. Are lesson plans used? ***(addressed in Section V and Section VI)***
   - Are they complete?
   - Is the content current and correct?

e. Course content – which safety topics are currently included in the training ***(addressed in Section V)***
   - Are pre-launch vessel safety checklists used?
   - What type of on-the-job safety training is included?
   - Do students receive instruction in equipment use?
   - Do students receive information on health and safety issues?
   - Do students receive information on emergency response and survival equipment use?

f. Competency testing; evaluating student outcomes ***(addressed in Section V)***
   - How is student learning and success measured or evaluated and documented? Are written or performance tests used?
   - Are students reaching stated outcomes? Are tests based on outcomes?
   - Are the quizzes/tests standardized from one instructor to another?
   - How is the course content and overall training effectiveness evaluated?

g. Training for returning observers ***(addressed in Section V and Section VI)***
   - Does it exist?
   - What does it entail? (Is it complete?)
   - How are times/content selected?

h. Training for the trainers ***(addressed in Section V and Section VI)***
   - Are the current observer safety trainers appropriately trained themselves?
   - Is it consistent among all trainers in a region?
   - Is the training they received appropriate?
   - Is it verifiable?
   - How are new trainers trained?
   - Are quality control measures used to ensure trainer currency?

- Determine evaluation for each current observer trainer during practice teaching sessions and other means of student and peer review.

3. The reviewers agreed to **evaluate** the following: (All evaluations are listed and explained in Section VI.)

    a. The effectiveness and appropriateness of the observer safety training curricula currently being used in each NMFS regional observer program ***(addressed in Section VI)***

    b. The effectiveness of each current observer trainer, in the area of safety training ***(addressed in Section VI)***

    c. Feedback provided by observer training class participants (where available), including observer perceptions regarding the adequacy of observer training and the risks associated with various types of vessels ***(addressed in Section V.I)***

    The reviewers also **evaluated** the following:

- The current practices used during safety training, specifically as they relate to risk management. ***(addressed in Section VI)***

- The current NMFS/contractor relationships, specifically as they relate to observer safety, risk management, and/or potential risk to NMFS. ***(addressed in Section II and Section VI)***

4. The reviewers agreed to offer **recommendations**, when appropriate, in the following areas: (A comprehensive list of the reviewers' recommendations is listed in Section VII; a summary of the recommendations is listed in Section II.)

    a. Nationwide observer safety training standards (i.e., identification of core topics) for all NMFS observer programs. ***(addressed in Section VII-1)***

    b. The frequency and type of safety training that observer trainers should participate in. ***(addressed in Section VII-2)***

    c. Revisions or enhancements that can be made to the curriculum and/or methodology used in each region. ***(addressed in Section VII-3)***

    d. The feasibility of a centralized or coastal safety training facility and possible universities or other organizations that may be capable of providing a training facility. ***(addressed in Section VII-4)***

The reviewers also offered **recommendations or suggestions**, when appropriate, in the following areas:

- Equipment needs to improve the safety training ***(addressed in Section VII)***
- Train the trainer needs ***(addressed in Section VII)***
- Lesson plan improvements ***(addressed in Section VII)***
- Evaluation tools (recommendations on how to assess student learning and performance) ***(addressed in Section VII)***
- Recommendations on safety training for returning observers ***(addressed in Section VII)***
- Standards for train the trainer courses, or trainer prerequisites ***(addressed in Section VII)***
- Safety gear issuing and maintenance standards and responsibilities ***(addressed in Section VII)***
- Monitoring safety issues/injuries of observers ***(addressed in Section VII)***
- Collecting feedback on safety from observers ***(addressed in Section VII)***
- Using Lessons Learned from fishing industry accidents in each region ***(addressed in Section VII)***
- Identify process for making sure the system is resilient to changes in staff ***(addressed in Section VII)***

The reviewers also provided an assessment of the overall strengths and weaknesses of observer safety training ***(addressed in Section II and Section VII)***. A list of "best practices" is provided in the Appendices. A list of "practices to avoid" is included in the Appendices as well.

Section II
Executive Summary

History and goal of the NMFS observer training programs

The National Oceanic and Atmospheric Administration (NOAA) Fisheries (referred to throughout this report as the National Marine Fisheries Service, NMFS) deploys observers to collect data from U.S. commercial fishing and processing vessels. Nearly 20 different fisheries are monitored by observer programs annually. Although the number of observers and days-at-sea vary annually, it is estimated that observers spent nearly 56,000 days at sea in 2002.

The NMFS began placing observers on foreign vessels within the U.S. Exclusive Economic Zone (EEZ) in 1973. By 1986, all fishing in the EEZ was transitioning to domestic vessels only, and NMFS began placing observers on domestic vessels in the North Pacific in an industry-funded observer program. Other small-scale domestic observer programs were implemented around the country during the late 1980s, and in 1989, the Marine Mammal Protection Act required 20 to 30 percent observer coverage on vessels in identified fisheries.

NMFS recognized that high rates of vessel incidents off Alaska, coupled with extreme cold water, created a high-risk environment for workers; thus, it mandated that groundfish observers in the North Pacific receive safety-at-sea training. As a result, groundfish observer training began to incorporate all aspects of safety aboard vessels, including at-sea emergency response. Soon, fisheries and marine mammal observer programs around the country were also charged with this task. However, the efforts were not always coordinated and training programs tended to grow independently of one another. This resulted in some inconsistency in safety training, not only nationally, but often within the same geographical regions.

With advice from the U.S. Coast Guard and the North Pacific Groundfish Observer Program, changes were ultimately made in all programs. Sites began issuing personal survival equipment, for instance, and CPR and first aid training were required at several of the sites. Additionally, the pre-voyage training was expanded to include a variety of safety and survival topics, with an emphasis being placed on hands-on methodologies.

In the late 1990s, observer trainers began to make more coordinated efforts to standardize their safety trainings within their regions. In 2000, NMFS began efforts to standardize the safety training for all observers and observer trainers. At that time, the National Observer Program contracted with the Alaska Marine Safety Education Association (AMSEA) to develop and conduct a specialized Marine Safety Instructor Training course for NMFS observer trainers. Additionally, each regional program was asked to identify core topics that were addressed in their trainings. These steps have resulted in increased standardization – and to some degree quality control – in safety topic identification and presentation.

In addition to the changes made in observer training, NMFS realized that potential gaps seemed to exist regarding healthcare coverage (in the event of injury), and in the ensuing years, a number of coverage options have been identified and studied. Further, NMFS

decided to "outsource" observer work in nearly all instances, and today, most observers are employees of one of nine "contractors." (The remaining observers work as university employees or work under individual contracts.)

In summary, during the past 15 years, a variety of changes have occurred within the fishing industry, legislatively, and within observer programs around the country. Though the number of observers (and percent coverage) has fluctuated and likely will continue to fluctuate over time, it is also likely that observers will continued to be used in U.S. fisheries for years to come.

In response, NMFS and its regional observer training sites have made ongoing and substantial efforts to update and improve observer safety training. In fact, since 2000, a number of changes and improvements have been made to the safety training, and nationally, the information presented at each site is more consistent and appropriate than ever before.

Overview of current project, purpose, and goals

It is NMFS's desire to train all observers so that they are adequately prepared to face the risks inherent in their work, and to make better informed decisions regarding personal safety. The challenge is to determine whether or not the current system provides appropriate training so that observers are able to recognize, minimize, and when possible, eliminate or manage the myriad of hazards associated with their environment and profession. This challenge is compounded by the diversity of observer programs; e.g., although the current training programs are similar, observers work in a wide variety of fisheries and environments, and have a wide scope of responsibilities. Consequently, although a nationwide training program would likely have parallel components, the curriculum must be specific to each region.

As a result, an overall goal of this project is to assess the status of the current observer training, specifically as it addresses safety; i.e., injury prevention and emergency response. It is the reviewers' intent, therefore, to evaluate both components of this equation: the quality and effectiveness of the "injury prevention" as well as "emergency response" training that observers receive.

Proper safety training for all observers – regardless of region – should include basic background knowledge and skill-based coursework in the area of recognizing and responding to the potential hazards of their work and living environments. In order for an observer to be appropriately trained, s/he must be able to recognize and must have the ability to minimize and/or manage risks that might be faced in the field.

Additionally, observers should have a basic understanding of correct procedures to follow in the event of an emergency. That is, each observer should be able to follow crisis response steps, and properly use emergency equipment, as appropriate to their fishery and/or vessel. Part of the emergency response training should also include steps to follow

in the event of a minor incident at sea (such as knowing what to do in the event of a non-life-threatening injury).

Upon completion of the observer training program, a successful "graduate" should be able to identify relevant risks associated with the job and geographic area; s/he should be able to recognize hazards before they become crises; s/he should have basic training that will help prevent a hazard from becoming a crisis; and s/he should have basic training that allows him or her to deal with a crisis or injury.

It is therefore the reviewers' charge to evaluate the training based upon these criteria.

A secondary purpose of this project is to identify the risks to NMFS, and to suggest risk management steps that might be taken to minimize potential legal exposure. The reviewers believe the most productive step NMFS can take in this regard is to assess, and at times, improve the risk management of the trainings. By taking prudent and reasonable steps to minimize the potential of incidents, NMFS will be minimizing its potential legal exposure.

Additionally, NMFS could potentially be exposed to a claim of negligence if an observer is injured while at sea, and it is shown that the observer's injury was in part due to inadequate or inappropriate training (by a NMFS employee). By creating a system for identifying what is meant by "reasonable and prudent" training (system development and risk management oversight), by making sure instructors are competent to facilitate the trainings, and by documenting that each student (observer) has successfully completed the training, NMFS will be taking appropriate steps in protecting itself against such a claim. (NMFS might also consider additional steps [such as use of indemnification or release of liability forms] if and when these would be appropriate.)

In response to this secondary charge, identification of risks to NMFS, as well as suggestions for risk management improvements are offered later in this report.

Findings

It is apparent that the safety training has improved through the years. Safety instructors and observers stated overwhelmingly that the information they receive (and equipment issued) is much better today that it has been in the past, especially when compared to that provided 10-20 years ago.

Due to the interaction of instructors, sharing of material, and mutual goals, many of the teaching resources and safety topics are common to all sites. There is consistency in some of the topics presented, especially in the area of survival equipment use.

Additionally, many of the instructors have attended an AMSEA Marine Safety instructor trainer (MSIT) course, which has helped greatly in their understanding of safety as well as their ability to present safety material. This added step has also been a contributing factor in the current attempt to standardize curriculum and methodology.

Even though most of the instructors have attended the AMSEA MSIT, the reviewers believe this course (or its equivalent) should be considered the "entry level" or baseline for observer trainers. Beyond the MSIT experience, few of the safety instructors have received formal training in teaching or in safety education. In addition, the safety instruction that is contracted out (e.g., training provided at the Woods Hole site) lacks standardization in safety practices as well as content when compared to other NMFS-conducted safety trainings. As a result, the quality of presentation (including methodology, depth of knowledge, and accuracy of material) varies widely from program to program.

Regarding the quality and effectiveness of the trainings, the reviewers found that many programs use some hands-on exercises, especially when presenting survival skills and equipment. This is an excellent methodology that helps students assimilate and retain the safety information presented in class. However, due likely to time/resource constraints, and lack of instructor experience, most sites are not able to incorporate hands-on methodology in all subject areas. Instead, many sites resort to lectures and/or videos to present information. While this method is time efficient, it is known to be fairly ineffective for long-term retention of material. It is also a fairly ineffective tool for teaching performance-based skills. As a final methodology, a number of programs incorporate "demonstration" of skills; i.e., the instructor or a student demonstrates the proper use of certain equipment (such as fire extinguishers, hydrostatic releases, and dewatering pumps). While this methodology tends to result in better recall than lecture/video, it is not as effective as providing exercises that require active student participation.

Research has shown that students retain approximately 90 percent of what they do, 30 to 50 percent of what they are shown, and only 20 percent of what they hear. Thus hands-on performance-based exercises are superior teaching methodologies.

By encouraging trainers to increase their focus on improved methodologies, by providing access to the necessary professional development opportunities that exist, and by providing trainers with the time and resource to incorporate these methods into their courses, NMFS can likely expect improved effectiveness of the trainings over time.

The reviewers also attempted to document and evaluate the type of performance testing that is being conducted nationwide. They found that performance standards or skill tests are commonly used for the donning of an immersion suit, and on occasion, entering and righting a raft. Additionally, several sites provided certain "informal" testing of additional skills (e.g., use of PFDs, entering a pool, fire fighting, flares/signaling devices, etc.) where instructors monitored students and offered feedback when possible. However, due typically to instructor/student ratios, time constraints, and/or poor group management skills, feedback regarding student performance was sometimes lacking, incorrect performance was not always corrected, and documentation of success was not always recorded.

In general, the reviewers found that a few skills are tested in all or most regions (such as donning an immersion suit), but for the most part, student performance is not tested universally or formally. More standardized criteria could and should be used to identify what is considered "passing" or acceptable performance. While several sites had students perform certain emergency or survival skills, there was no formal assessment of their performance. Written documentation (of skills tested or performance) was not common.

The reviewers also attempted to document and evaluate the type of testing/assessment of student understanding that is conducted nationwide. Some programs have incorporated quizzes into their trainings, and thus are able to assess (to some degree) student understanding of material. In fact, most programs either use a safety quiz or incorporate safety-related questions into the final exam. No site, however, incorporates comprehensive testing in order to assess understanding of all content areas. While some basic testing is conducted, written test are not used to assess the key points or evaluate whether or not each learning objective has been achieved.

The reviewers found that, based upon verbal interviews of certified and returning observers, there appears to be significant drop in student retention of key safety information once a course ends. While the reviewers did not use a formal testing process to determine student retention and recall (of experienced observers), the reviewers did attempt to assess whether or not experienced observers could recall key learning points of their previous safety trainings. The informal findings include the following: most students were unable to identify the five parts of a mayday; most were unable to identify the majority of contents found in a SOLAS (raft) kit; most were unable to identify the Seven Steps to Survival; and most were unable to identify the proper steps involved in using a hydrostatic release. This is typical of the degree of degradation in knowledge and skills over time found in any type of training.

These informal findings help support the notion that some sort of a "refresher" course of continuing education would likely be beneficial. This is especially relevant given that observer feedback suggests that emergency drills (which would reinforce the skills) are not being conducted on the majority of fishing vessels. While observers might be able to practice certain skills on their own, and on an ongoing basis (such as learning to assess and evaluate vessel hazards, and donning of an immersion suit), other skills would likely be difficult to practice given the lack of equipment, opportunity, and guidance. The same would be true of any information offered during an initial training that is not used or reviewed as part of the observer's at-sea duties.

While all programs provide information on emergency response (i.e., donning of an immersion suit, use of a liferaft, EPIRBS, etc.), the information presented in the area of injury prevention (falls, machinery related injuries, etc.) varies. All programs do include material on vessel orientations and safety checklists, but not all programs formally address risk recognition or risk management for observers. A few programs do provide some information on common at-sea injuries and illnesses. However, most observers (who have been to sea) have said that they believe that it would be very worthwhile to cover this topic in greater depth.

While the far majority of employees, contractors, and observers interviewed seem genuinely interested in observer safety, there is an underlying feeling in some of the observers (as well as instructors) that risk and injury "come with the territory." That is, although most people appear willing to review and practice the safety skills, a very small minority seems to feel that the training is only marginally useful. In fact, when interviewed, a small but significant number of new and returning observers noted that "sometimes things just happen," and they question whether or not the training would make a difference in their safety. However, in debriefings of observers [in the NPGOP program], only two percent felt that safety training was not beneficial.

A factor that might contribute to this "comes with the territory" attitude is the gender and age of many of the observers: in nearly all high-risk industries, young males (which make up a high percentage of observers) tend to have a higher tolerance for risk. Also, maritime work traditionally has a strong sense of fatalism. Although this is not surprising, this type of attitude or "culture" can and often does affect an organization or industry's injury rate. Even though some people believe that this attitude is simply part of the job, it should be noted that an organization and industry's safety culture can be modified over time.

One way in which the "culture" of safety can be modified is by incorporating and encouraging "safe practices" within all safety trainings. For example, some sites did an exceptional job of pointing out hazards and managing risk during training exercises. Not only is this type of role modeling effective in helping shape a safety culture, encouraging students to practice their hazard evaluation and personal risk management skills can improve the observers' ability to do the same in the field. However, many sites did not take advantage of this strategy or methodology to the greatest extent possible. In fact, in some instances, "unsafe" practices were used and not confronted or corrected during training exercises.

The reviewers also found that the relationship between NMFS and the various observer contractors appears nebulous in some instances. For example, there is inconsistency in the purchasing, storage, and issuance of safety and survival equipment that observers take to sea. In some instances these responsibilities belong to the contractors, in other instances NMFS has the leading role. Further, although all programs have some process for assuring that observers have access to immersion suits and PFDs, the ownership and responsibility for maintenance varies. Additionally, although safety equipment (such as PFDs) is issued to observers, at some sites it is up to observer discretion whether or not the equipment is taken in the field. Given the potential for legal liability problems associated with this arrangement, it would be in NMFS best interest to standardize this process to some degree.

The reviewers also noted that while some contractors seem to take an active interest in the observer training, this is not always the case. This is not to imply that contractors do not care about the observers' well being; instead, the reviewers simply noted that some contractors were more involved in preparing observers for at-sea hazards than were

others. For example, there is inconsistency among contractors in the following areas: offering realistic information on the risks/hazards of the work, requiring a baseline fitness level, and gathering pertinent medical and emergency contact information. Because "preparedness" plays such an important role in overall risk management and safety, the reviewers believe a more thorough evaluation of this relationship (and possible modifications) would be worthwhile.

As noted above, the reviewers were asked to offer a list of risks to NMFS, which might include risk of financial harm, worker productivity, and/or reputation. The reviewers believe that NMFS could take some basic steps to minimize their exposure, including standardizing and/or providing oversight of the risk management used during the training exercises; identifying and documenting training standards for the instructors; and documenting observer test and performance results.

Additionally, there appears to be limited use of formal indemnity agreements between NMFS and the various contractors nationwide. While NMFS is currently in the process of clarifying and minimizing liabilities in the event a contracted observer is injured at sea, additional clarification or perhaps indemnification could help protect NMFS in the event of an observer is injured or killed during a training exercise or during travel to/from training.

Summary of strengths

1. The NOP and NMFS employees appear truly motivated to improve the safety training offered to observers. They are to be commended for the steps they have taken in this regard, with the most recent example being their meeting in Galveston, Texas January 20-23, 2004. The reviewers were greatly impressed by the ongoing modifications and improvements were made to each site through this entire review and reporting project.
2. NMFS observer program employees across the country are committed to the well being of observers and to improving their safety training. As a result, it appears that every program has improved the quality and comprehensiveness of its safety training considerably over the last five to 10 years.
3. Many programs communicate, share ideas, and/or share resources. Not only is this exchange of ideas good for the overall quality of the trainings, it has helped standardize the content that is being presented.
4. Overall, the program managers, employees, contractors, and observers welcomed the review and were helpful and courteous to the reviewers. Their positive attitude and openness not only helped the reviewers, it reflects a "safety first" attitude that can enhance the overall quality of the safety training.
5. Program managers and safety training personnel are devoted to their work. Many appear to go above and beyond their duties and/or put in personal time in order to provide the best service/product possible. It is often this type of devotion and diligence that is needed to improve safety trainings and develop a safety culture.

6. Several of the programs have very good working relationships with the contractors who employ the observers. This positive working relationship is an important if not essential component in observer safety and injury prevention.
7. Several of the contractors have made very good progress in providing good deployment decisions, supervision, compensation, and insurance coverage of observers. Although this is not consistent nationwide, most people interviewed believe it is much better today than it has been in the past. Because the contractors are key components in the overall risk management of observers, it is important that contractors embrace observer safety and risk management planning.
8. Most program managers, employees, and/or contractors have positive working relationships with applicable USCG personnel (i.e., vessel inspectors or safety officers). Again, given that the USCG is an integral part of vessel exams, safety at sea, and emergency response, it is important that this positive relationship continues.
9. Most programs appear to have integrated much of the AMSEA curriculum into their safety trainings. As a result, much of the safety-training curriculum is becoming standardized nationwide. Although additional topics and standardization would likely improve the classes, this integration and trend has improved the training considerably.
10. Most of the lead instructors have experience as observers. This gives them credibility in the eyes of new observers; it also allows them to have a realistic understanding of observers' duties, including hazards at sea.
11. Most of the lead instructors have attended an AMSEA MSIT course, a class that not only focuses on marine safety and safety equipment, but one that emphasizes teaching techniques and hands-on methodology. As a result, not only have methodologies become more consistent nationwide, the trainers (many of whom have no other formal teaching background) have improved their presentation styles as well.
12. NMFS tends to be very supportive of observers who refuse to board a vessel (or go to sea) due to safety concerns.

Summary of recommendations

The reviewers were asked to make recommendations in the following four areas:

1. Nationwide observer safety training standards (i.e., identification of core topics) for all NMFS observer programs.

Recommendations:

A) NMFS observer programs should develop and follow a standardized curriculum for their basic core competencies in safety training.

The basic core knowledge and skills that are common in all regions should be identified.

The reviewers believe that the NOP and NMFS have made great strides in this area. In the Galveston meeting of trainers in March 2004, a standardized set of topics, objectives, and certain skill competencies that might be used for core standards were developed.

The reviewers recommend that NMFS continue its work in this area, and begin to create a "system" of oversight that will ensure the consistency and appropriateness of the training, nationwide. Although consistency in safety training content has improved over the years, baseline levels of core competencies and topics of training for observers should be identified, agreed upon, and used by all sites.

A list of additions to the "core topics" has been included in the Appendices for consideration.

B) NMFS should begin gathering injury and close call data nationwide and program wide, specifically as it relates to observer at-sea work and observer safety trainings.

Because there is no single source for collecting this data, it is very difficult to track, analyze, and/or use documentation of past incidents to help strengthen the existing training. While it might be most efficient to require contractors to document incidents, the reviewers believe that NMFS (or a NOP risk management committee) could help create a template so that similar data is collected in a consistent and usable format.

The reviewers realize that gathering this data might face administrative or confidentiality concerns. However, if confidentiality is assured, and there is no negative consequence for reporting, this could be a valuable resource for looking for trends and designing proactive interventions. In fact, the North Pacific Groundfish debriefings are already a collection mechanism for this type of information and could serve as a model.

2. The frequency and type of training for observer trainers.

C) Baseline levels of training for trainers should be identified and only those instructors who qualify under the given standard should be used to present the observer safety material.

Most observer trainers have successfully attended the AMSEA MSIT course, a step that has contributed to the quality and consistency of the training. Completion of this training is not required at most sites, however, and few programs have identified continuing education or professional development opportunities that can be used on an ongoing basis. This however would not preclude the use of a new hire who might work as an assisting instructor until they get qualified. This person would work under the close supervision of a "qualified" instructor, during practical exercises for example.

Not only will this step help standardize the presentation of material from site to site; it will also help improve the quality of instruction. Additionally, by taking steps to ensure that trainers have a baseline, appropriate and documented level of training themselves, NMFS will minimize its legal exposure to a claim that an instructor was unqualified.

D) NMFS should identify options for maintaining the quality and currency of the instructors' professional competencies.

The reviewers believe that it is important for each safety trainer to maintain a certain level of expertise in the areas in which they teach. This might be accomplished through attendance at additional trainings, conferences, or workshops Additionally, the reviewers believe it is appropriate for all programs to assess their safety instructors' competencies. In the event an instructor does not have a strong teaching (or safety education) background, attempts should be made by him or her to gain experience and develop effective instructional methodologies.

Potential professional development opportunities have been identified and are included in Appendix L of this report.

3. Revisions or enhancements that can be made to the curriculum and/or methodology used in each region.

E) Standardized lesson plans should be developed that include learning objectives, measurable outcomes and which are consistent in minimum content, objectives and time allotted.

As stated under recommendation A, the reviewers believe that the NOP and NMFS have made great strides in making some proposals in this area. The reviewers also believe that it is important for the NMFS to take the next step and develop standardized lesson plans for each topic. This will ensure content accuracy and that minimum objectives are covered. Sites might also agree on the minimum time that will be needed to cover each subject, to ensure that objectives are adequately covered. The lessons plans should include a variety of successful methodologies for teaching each topic, but would not be limited to just those methodologies, to ensure that new methods were always encouraged and developed.

This standardization of basic core curriculum would not be intended to limit regions from producing materials on topics that were important in their areas or to limit the ways it might be presented. A list of suggested additions to the core topics and key learning points are provided in the Appendix B. An example of a quality lesson plan (for reference) is included in Appendix P.

F) Optional training modules should be developed that are applicable to some, but not all, sites.

Optional training modules – that is, topics applicable to some but not all sites – should be identified, and the content within each module should be standardized in order to maintain consistency and quality control. A list of potential "optional topics" has been included in Appendix C for consideration.

G) Methods of instruction training should be strengthened in order to improve the effectiveness of the current trainings.

NMFS should encourage and/or provide professional development opportunities to all NMFS safety trainers, specifically in regard to teaching skills and enhanced methodologies. "Best practices" and suggestions for improved methodologies have been included in Appendix J for consideration.

H) Each site should make an effort to improve their assessment of student learning/performance

In order to evaluate the appropriateness and effectiveness of the lessons on an ongoing basis, NMFS should consider standardizing the assessment methodologies used nationwide.

4. The feasibility of a centralized or coastal safety training facility and possible universities or other organizations that may be capable of providing a training facility.

I) NMFS should consider training options on a case-by-case or site-by-site basis.

The reviewers believe that in some instances, trainings could potentially be offered more economically if sites share resources and expertise, and on occasion, combine classes if appropriate and scheduling is not an issue.

J) NMFS should consider using outside experts to either provide the training or provide training to the trainers when in-house resources are limited.

These outside experts could be hired locally (near sites) or could involve a traveling professional when needed by a region. This arrangement could be used on an ongoing basis, or it could be used as a temporary method for mentoring and enhancing the skills of the NMFS trainers. However, outside trainers if used, should adhere to standardized safety training practices and skills performance checklists developed by regional programs, and have oversight by attendance from a knowledgeable representative of the observer program. In addition, if an outside expert has no experience in fishing vessel safety and observers, the observer perspective will need to be brought into the training by someone from the program staff.

USCG personnel are used by most programs to deliver some of the training and this is valuable. They would also be useful in some cases to help check some of the content of other marine safety topics for updating and accuracy when possible.

K) NMFS should consider the concept of "certification" that verifies successful completion of safety training.

Certification would provide some verification of an individual having minimum standards of competency on universally agreed upon basic core competencies.

In addition, the reviewers offer the following additional recommendations and suggestions:

L) Experienced observers should receive refresher training in risk management and crisis response. Experienced observers should be required to pass written and performance tests during the refresher course.

M) NMFS should develop a regular system of oversight of observer safety training.

N) NMFS should identify guidelines for managing risk during trainings.

O) NMFS should develop a system for adopting and enforcing safety-related policies that observers are expected to follow while at sea.

P) NMFS should form a national risk management committee.

Q) NMFS is encouraged to clarify the responsibilities and interplay that exists between NMFS and the various contractors.

R) NMFS is encouraged to continue to work toward defining the legal status of an observer, specifically as it relates to workmen's compensation benefits and coverage.

Section III
Overview of Project – Goals and Methods

Project Goals Defined. The overall results of this project are based on the AMSEA proposal and NMFS scope of work. To a certain degree, the reviewers considered secondary information in their findings, specifically as it affected Section VI (evaluation) and Section VII (recommendations). This secondary information is the result of a meeting that occurred in September 2003, in Sitka, Alaska. At that time, Vicki Cornish, the National Observer Program (NOP) coordinator, and attendant program managers, identified the following as the desired goal and objectives of the observer safety training:

The overall goal of the observer safety training is to prepare observers for risks inherent in working aboard commercial fishing vessels, and to minimize both minor and catastrophic injuries to the observers, trainers, property, and NMFS.

The following were identified as key objectives:

1) Observer programs should provide training so that observers are able to
- Demonstrate awareness of common hazards aboard vessels, to include those associated with the vessels, weather, gear, and crew
- Identify specific methods for preventing common injuries
- Demonstrate competency in maintaining and using personal crisis response equipment
- Identify, locate, and demonstrate competency in using a vessel's crisis response equipment, and demonstrate ability to verify correct installation and currency
- Verify presence and currency of USCG safety decal
- Demonstrate ability to assess risks – both subjective and objective – commonly encountered by observers

Additionally, it was noted that observers were expected to be able to demonstrate continued competency in all of the above-mentioned skills.

These additional objectives were identified as well:

2) Safety trainers are expected to
- Successfully complete a USCG-approved MSIT course
- Demonstrate exemplary safety practices and attitudes during all training exercises

3) Safety trainers should identify and communicate to observers the risks associated with the safety training, and require that observers understand, acknowledge, and assume the risks by signing appropriate liability and release forms prior to participation in training exercises.

Goals of Project, as identified in the AMSEA proposal
As stated, the overall goal of this project is to assess the current safety training that is being provided to observers, and to offer recommendations and/or suggestions for improvement if necessary. As noted earlier in this document, the reviewers agreed to provide information in the following four areas:

- Risk assessment findings
- Documentation of current practices
- Evaluation of current practices
- Recommendations

In order to achieve this charge, the reviewers used a variety of sources to identify the risks associated with observer work in the various fisheries. Additionally, the reviewers attempted to identify reported as well as unreported observer injuries and/or close calls. Once completed, the reviewers were able to compare the actual risks/hazards, as well as injury and fatality statistics, to the current safety information being presented to observers.

The reviewers also agreed to document all current practices used at the various training sites. This included a listing of the topics being presented (including time and quality), lesson plan use, methodology of instruction, methods of assessment, and risk management practices (used during training exercises).

The reviewers also identified whether or not the sites had a formal or systematic approach to its programming (i.e., is there a formal system used to identify topics, training needs, student success, instructor qualifications, etc.). This system approach to risk management and quality control is important in that it is not personnel-dependent. The reviewers' main interest was in knowing whether or not the current safety-training regimen is objective, consistently delivered nationwide, and whether or not it can and will withstand the challenge of time and personnel turnover.

Finally, the reviewers attempted to document the various relationships the sites have with contractors, specifically as the relationships could potentially relate to observer training and/or safety.

After the risks, incidents, and fatalities were identified, and after the reviewers were able to observe trainings at various sites, they were able to make an evaluation of the current trainings, specifically in regard to whether or not the trainings are as effective as possible in addressing the following: risk recognition, risk management, and emergency procedures associated with at-sea observer work.

If and when the reviewers identified gaps in the trainings, or if/when the reviewers were able to identify steps that could be made to improve the quality or effectiveness of the training, recommendations or suggestions were noted.

Goals of each section, and methodologies used to achieve the desired results

Goal of Section IV; Risk Assessment Findings. The goal of Section IV is to identify the most foreseeable risks (potential for harm or damage) associated with NMFS observer programs. That is, the reviewers attempted to identify ways in which observers, trainers, and/or NMFS could be harmed as a result of a safety-training or at-sea incident.

As a result, the reviews collected information on the following:

- Hazards and risks associated with trainings.
- Hazards and risks associated with the various fisheries and environments.
- Injury and fatality data associated with commercial fishing, and where available, associated with observer work.
- Hazards and risks associated with commercial fishermen in general, and to observers specifically.
- Risks to NMFS (potential for financial harm, damage to reputation, loss of worker time/productivity, etc.).
- Unreported observer injuries (from anecdotal statements), and
- Reported and/or unreported close calls (from NMFS, contractor, and/or observer accounts and reports).

Methodology used in Section IV. The reviewers were able to identify and base their training-exercise risks on their observations from site visits. Additional theoretical and generic risks and hazards (associated with all observer at-sea work) were identified as well; these lists were based on anecdotal information gathered from interviews with observers, trainers, and contractors. It is estimated that at least 200 people were heard from in this manner. This information was then compared with data that was available.

Injury and fatality rates and contributing factors were gathered via NMFS incident data, insurance claims from contractors as well as from Workmen Compensation claims, USCG incident reports, National Institute of Occupational Safety and Health (NIOSH), NMFS program managers, the Alaska Fishermen's Fund, and the internet.

Goal of Section V; Documentation of Current Practices. The goal of Section V is to gather information on and document the current practices. This information, in turn, was used by the reviewers to evaluate each site and trainer (Section VI).

In order to assess whether or not the current trainings are appropriate in scope and content, the following information was obtained:

- Identification of topics as they relate to incident prevention as well as emergency action procedures
- Comparison of information presented at each site (including use of lesson plans, depth of content, and time allotted per topic)
- Identification of methods of delivery at each site

Methodology used in Section V. The following methods were used during the gathering and documentation of program information.

1) A pre-visit questionnaire (self-assessment) was developed and sent to each site: Responses were returned to the reviewers and used in the assessment process.

2) As part of the self-assessment, programs provided copies of lesson plans, outlines, quizzes, hand outs, and/or checklists as they were available to be documented.

3) On-site reviews were conducted at eight observer training sites (Anchorage, Seattle North Pacific Groundfish Observer Program, Seattle West Coast Groundfish Observer Program, Honolulu, Long Beach, Miami, and Woods Hole). NMFS-employed observer trainers, returning observers, and new observers were all included in this process.

4) Additionally, a Gainesville OT took part in the Miami site visit. Further, although the reviewers were not able to observe training at the Galveston site, representatives from the Galveston site were interviewed, in person, in Galveston.

5) Due to the fact that the Panama City program did not conduct a class for observers during this contract period, and given the fact that Panama City was in the process of hiring a new training coordinator during this period, the reviewers were not able to observe a training or interview site personnel.

6) Follow-up phone calls and emails were made to program managers and trainers in order to clarify points and in an attempt to document practices accurately.

7) Methodology also included interviews and question/answer sessions with contractor representatives, representatives of the NMFS national observer program office, administrative NMFS representatives from some of the sites, and USCG representatives across the country.

Goal of Section VI; Evaluation of Current Practices and Trainers. The goal of Section VI is to evaluate the current safety trainings (for content, comprehensiveness, and appropriateness of methodologies) and trainers. In the event gaps were identified or weaknesses were noted, the reviewers were able to provide recommendations and/or suggestions in Section VII.

In order to evaluate the trainings and trainers, the reviewers used two processes:

- Trainings were evaluated based on whether or not the topics specifically addressed the risks; whether or not gaps existed; whether or not the methodology used was appropriate in achieving the identified goals; and whether or not the current practices successfully meet the goals and objectives identified by the observer programs.

- Trainers were evaluated based on educationally sound and accepted criteria (e.g., use of a lesson plan or outline, ability to follow a plan, ability to stay on task, understanding of material, etc.)

Methodology used during the evaluation process. The reviewers based their evaluations on several factors that include but are not limited to the following:

- The reviewers' experience and expertise in the areas of program design, marine safety, risk management, and safety education
- The list of goals and objectives as identified by the observer program coordinator
- Information on programmatic effectiveness and evaluation, obtained from the Internet and other written sources
- Information on marine safety and effectiveness of safety training on injury/fatality (data was obtained from AMSEA, the USCG, NIOSH, and the Internet), and
- Information on educational methodologies and effectiveness (obtained from the Internet, AMSEA, and other professional groups and sources).

Goal of Section VII; Recommendations – The goal of Section VII is to address the four items specified in the proposal and scope of work document. These include recommendations for improvements and highlight best management practices regarding:

- Nationwide observer safety training standards for all NMFS observer programs
- The frequency and type of training for observer trainers
- Revisions or enhancements that can be made to the curriculum and methodology used in each region to improve the quality and appropriateness of training, and
- The feasibility of a centralized or coastal safety training facility and possible universities or other organizations that may be capable of providing a training facility.

Methods used during the recommendation process. The reviewers based their recommendations on several factors that include but are not limited to the following:

- The total information gathered as the result of this project
- The stated goals and objectives of each observer program
- The comments and suggestions of NMFS employees and observers
- Their understanding of observer programs, including the realities of potentially limited resources, and
- Their own professional expertise.

Section IV
Risk Assessment Findings

IV-1 Working definitions

Incidents, Accidents, Injuries, and Close Calls. According to the definitions used in this report, an "*incident*" or "*accident*" is any undesired or unexpected event that results in damage or loss. The damage can be physical injury, fatality, or financial. It can also include damage to reputation. Additionally, it should be noted that the term "accident" does not imply casualty or preventability.

An injury is a documentable incident that requires some sort of care or follow-up. According to the Occupational Safety & Health Association, an injury is reportable if one of the following is applicable:

- The injury/illness requires more than simple (e.g., Band-Aids, moleskin) first aid
- The injury/illness requires more than cursory attention
- The injury/illness requires follow up care by an employee or medical personnel
- The injury/illness requires any use of prescription medication (field use included)
- The injury/illness interferes with a worker's participation
- The injury/illness requires an evacuation
- The injury/illness involves a day (or more) of lost work

A close call is an event that did not result in injury and didn't require a significant amount of time or energy but did present the potential for injury or a compromise of safety. An example of a close call includes but is not limited to the following:

- A potentially hazardous situation where those involved express relief when the situation ends without harm
- A situation where safety was compromised but did not result in injury
- An unplanned event that easily could have resulted in injury

Objective and subjective hazards. Objective hazards referred to in this report are those that are not directly influenced by human behaviors or attitudes. Examples of objective hazards in fisheries would include environmental hazards (dangerous sea life, weather) or hazards related to the vessel or operation (fishing gear, hull integrity, machinery, noise).

Subjective hazards are those that are affected by human behavior and attitudes. Examples would be the crew's onboard safety philosophy, fishery management regimes, economics, cultural influences, poor attitude, carelessness, not following directions, overconfidence, etc. Many casualties are influenced by both subjective and objective factors.

Risk versus Hazard. *Risk* is simply the likelihood that injury or damage will occur. It is also used to identify the type of damage that could result (i.e., the risk of physical injury). *Hazards* are conditions or factors (e.g., environmental conditions or human errors) that can influence or accentuate the probability of an incident occurring. In other words, the risks to observers include being injured or dying; the hazards that can affect the risk include rough seas, unsafe vessels, etc.

Contributing (subjective and objective) Factors in Accident Causation. In post-accident investigations, a key to finding out what went wrong is in identifying the various factors that contributed to the incident itself. Once these contributing factors are reviewed, it is easier to understand how and why errors are made. In outdoor work environments, the most common contributing factors have been categorized into the following three areas: potentially unsafe conditions; potentially unsafe acts; and potential errors in judgment. It should be noted that it is the interplay – or overlap – of the three areas that ultimately leads to accidents. Thus, the more factors that exist in each category, the greater the potential there is for overlap or incident.

Potentially unsafe conditions are the objective or environmental factors (hazards) that tend to contribute to accidents. Environmental factors include not only weather and – in the case of observer work – rough seas, but it also includes hazards associated with an observers work surroundings (cramped conditions, machinery, etc.). Specific examples of vessel hazards might be a cable under tension and/or low, icy rails.

Potentially unsafe acts represent actions we take in relation to the conditions identified above – that is, the actions someone takes that ultimately contributes or leads to an injury. Examples of potentially unsafe acts might include standing near a vessel rail without wearing a PFD, or standing near a cable-under-tension.

Potential errors in judgment affect the decisions we make that lead to the acts we take. Typically this has to do with someone's misjudgment regarding the severity of the hazards (the tendency to over or underestimate the danger or the overestimation of one's own abilities). Examples of errors in judgment would be an observer's decision to stand/work near the low, icy rail (due to his/her belief that the danger is minimal or acceptable), or the observer's decision to work directly in the line of the cable under tension (not recognizing the hazard or injury that could result from the cable snapping).

None of the conditions identified in these categories are in themselves "unsafe." However, if there is interplay between these categories, the overall "accident potential" can be increased greatly.

Improved Risk Management through Identification of Objective and Subjective Hazards. Although this strategy of identifying contributing factors by category is most commonly used in accident investigations, it is also used by the National Transportation and Safety Board, the National Aviation and Science Administration, and by other professional organizations to help in risk management planning. The safety offices of these various agencies have learned that this organizational strategy can be used to 1) identify common as well as less-obvious hazards, 2) help in the teaching process (i.e., help workers learn to improve their hazard recognition and assessment skills), and 3) reduce the risks associated with their work.

In the first half of this section, the most common as well as most catastrophic risks and hazards associated with the observer training programs and observer field work are identified. The risks associated with training exercises are based on the reviewers'

observations and interviews during site visits. The risks associated with at-sea work are generic and not specific to a particular fishery. Additional risks and hazards, per fishery, are listed in the latter half of this section.

By itemizing objective as well as subjective hazards, the reviewers were able to better evaluate whether or not the risks are being addressed and managed appropriately. Suggestions regarding risk management are provided later in this report.

As a part of this risk assessment, the reviewers identified the following:

1. Risks to observers, during training (itemized list of risks and hazards)
2. Risks/hazards to observers, during field work (itemized list of generic risks and hazards)
3. Most common risks/hazards associated with the commercial fishing industry in general and observed fisheries in particular
4. Injury and fatality data (as it relates to observers as well the fishermen in general)
5. Risks to NMFS

IV-2. Risks/hazards associated with observer safety training exercises

The most catastrophic risks associated with safety training exercises are risk of drowning during the water skills. That is, one of the greatest potentials for serious injury or death occurs during the pool and/or lake events: e.g., immersion suit donning, entering the water, righting and entering a raft, etc. This risk can be enlarged if/when an observer hyperventilates due to stress, cold water, claustrophobia, and/or respiratory problems. This risk would also be increased if an observer or trainer were to enter the water without wearing proper floatation, especially if the person had poor swimming skills.

The most likely hazards to influence this risk have to do with working in and around deep water (especially if a non-swimmer is involved), very cold water, inappropriate entrance into the water (diving into the pool; becoming tangled under a liferaft, a pier or in ropes, etc.), not following directions, a tendency to claustrophobia, and/or inadequate supervision (e.g., due to a poor instructor/student ratio).

There is also the risk of slipping on a deck and/or pier, or being injured on a nail or object sticking out of dock or in the pool/lake area. (An example of an appropriate risk management measure that would reduce these risks would be to identify a policy that prohibits running on/near the deck/pier as well as requiring that appropriate footwear be worn during lake training exercises.)

In the event an activity is conducted outdoors, environmental hazards (weather, temperature of air/water, lightning, etc.) and the risks they create should be considered as well, and risk management measures should be taken accordingly.

There are also potential serious risks associated with the flare and/or fire extinguishing exercises. The potential for this type of injury is fairly high, even life or limb (including

eye) threatening, given the hazards (flares/fire) and potential and tendency to underestimate the hazard. In other words, the risk associated with these exercises should not be underestimated, should be clearly verbalized to all participants, and appropriate risk management measures (such as appropriate footwear, eye protection, following established safety guidelines, and appropriate supervision) should be followed. The reviewers noted that this risk was increased, on occasion, when inadequate supervision and/or inadequate protective equipment are used during training exercises.

A final risk associated with the training exercises has to do with the potential for injury during travel to/from the training exercises. During our site visits, we noticed that many trainers either transport students or expect them to self-transport to off-site locations in order to conduct field exercises. Given the risk inherent in driving, the potential for injury should not be underestimated. Further, the risks associated with getting on/off a vessel (during dock visits), or other hazards on a vessel, should be noted and addressed as well.

Although the risks identified here can be managed to a great degree, they should not be overlooked. Further, observer trainers should take care to avoid assumptions. That is, the potential for student to underestimate the risks, overestimate their abilities, and ultimately take part in unsafe acts is real and can be considered legally foreseeable. The observer trainers should recognize that beginning students will make mistakes, and this acknowledgement should be built into the risk management plan.

Additionally, the ability to accurately recognize and assess risks – and to make others aware of the risks – can in itself reduce the accident potential. The reviewers believe there is a need in some programs for instructors to be more proactive in identifying risks, aggressively pointing them out to others, and taking more direct actions to manage them.

Summary of risks/hazards associated with training exercises:

- Slips and falls leading to musculoskeletal (including back) injuries
- Injury from striking or being struck by an object
- Immersion incident leading to a near drowning or drowning
- Injury from exposure to hazardous chemicals – including chlorine allergy in pools
- Injury from flames, fires, and/or flares; burns from pyrotechnic demonstrations
- Injury or fatality secondary to an accident while traveling to/from site
- Cuts and bruises from sharp objects and/or machinery

IV-3. Risks/hazards associated with observer fieldwork – generic and theoretical

Observers work in an environment that is difficult to control. They are placed on vessels not of their choice, and are expected to make a determination on the vessels' safety even though they may have little or no experience on fishing vessels. These vessels work in an environment that is difficult to predict (the sea). The living quarters are cramped, the crew is unknown, the hygiene and food quality is variable, and the attitude of the owner/operator/crew may be somewhat hostile (i.e., over having an observer onboard or toward safety precautions in general).

Below, the most common as well as most catastrophic risks and hazards associated with the observer fieldwork are identified. This information is generic in that it identifies risks/hazards associated with any at-sea deployment. Risks/hazards more specific to regions and/or fisheries are identified later in this section. As was the case with above, no statements regarding the level or appropriateness of the risks are included. Further, few statements regarding the management of the risks are included. Suggestions regarding risk management are identified later in this report.

Environmental hazards associated with the various fisheries. Although the observer might have limited capacity in managing or altering environmental hazards, recognition and assessment of the following hazards is prudent.

The weather is an inherent hazard associated with at-sea work. Low ambient temperatures can lead to the risk of hypothermia, which, even in its mild form, will affect one's mental alertness. This, in turn, often leads to poor judgment or unsafe acts. Hot, humid temperatures can lead to hyperthermia problems; the risk of hyperthermia can be enlarged by use of inappropriate clothing, dehydration, and certain medications. Overexposure to the sun, a non-life-threatening condition, can lead to dehydration, sunburn, sun sickness, and/or cornea burns.

Waves and rough seas are hazards that can lead to slipping and/or falling on deck or overboard. Rough seas also contribute greatly to seasickness, which can lead to dehydration and decreased alertness. Waves and rough seas, coupled with vessel considerations, can also lead to vessel stability problems.

Hazards associated with observer work also include injury from a variety of sea life. Observers interviewed as part of this project reported a number of close calls associated with bites and/or stings during their sampling work. Several observers predicted that someone (i.e., observer) will suffer a shark bite, sooner or later.

IV-4. Hazards associated with vessels and on-board work – generic and theoretical

The risks associated with vessels and on-board work include illness, injury, or death secondary to the following:

- Slipping/falling on deck (or overboard)
- Falling through an open hatch
- Being struck by an object (including but not limited to a taut/broken cable)
- Getting clothing and/or a body part caught in machinery/netting/hooks
- Injury from fire (see fire below) or icing on board
- Working in or around hazardous chemicals including gases
- Improper lifting, or being required to lift objects that are too heavy
- Cuts from sharp objects
- Living on a contained vessel, with limited options for escape,
- Vessel collisions (with other vessels and/or objects) and/or

- Capsizing or vessel sinking
- Fire (also above)
- Lack of watertight doors and hatches resulting in downflooding and sinking

Nearly all of the above risks are enlarged if/when an observer lacks appropriate nourishment, hydration, sleep, and/or rest. The risks are also enlarged if the observer is required to work in rough seas or on an unsafe or poorly maintained vessel, or if the observer works without using proper safety precautions (or using safety equipment).

Although the observer has limited control over some of the vessel hazards, recognition and assessment of these hazards is prudent and can in fact lower the probability of injury. The fact that the observer is not in a position to make decisions regarding the vessel's operation – yet at times may be the most highly trained in survival with varied experience at sea – is a great paradox in this area of risk.

Additional hazards associated with on-board living can include but would not be limited to those posed by living in cramped quarters, fires from cooking, significant change in eating habits, poor hygiene options, and/or poor vessel maintenance. These hazards can be exacerbated as the result of language barriers, alcohol/drug use (by observer or crew), and/or the crew's attitude towards carrying an observer. It should be noted that observers are continually at risk of injury secondary to crewmember mistakes such as a crew falling asleep during watch, or a navigation error.

During a debriefing in Seattle that was visited by one of the reviewers, the following risks were identified by the observers by vessel compartment:

DECK: Weather, wave action, cables parting, winches- getting caught in, hydraulics, plugged scuppers, debris (fish, gear) on deck, open hatches, watertight doors, birds (underfoot, in the way), other crewmembers.

STATEROOM: falling out of bunk, low headroom, hygiene, 2nd hand smoke, personal heaters, ventilation, general clutter.

GALLEY: wet floors, unsecured pots of food, hot stoves, unsecured knives on counter, unsanitary conditions, 2nd hand smoke.

FACTORY: Conveyer belts, diverter boards, headers, sump pumps, Freon, ammonia, lack of lock out/tag out procedures when compared to shoreside facilities, machinery guards missing (more rare), unsanitary conditions, fish slime, rockfish spines, hydraulic doors smashed on body, open hatches during off loads, watertight doors left unsecured.

WHEELHOUSE: Captain's moods and personality, unsecured chairs/gear, access stairs, trap doors, easier to become seasick.

Finally, it was noted during our interviews that a risk of injury exists secondary to work observers might end up doing that is not specifically associated with their job duties.

Specifically, it was noted that observers sometimes find themselves helping a crewmember if/when the crewmember is struggling or if/when the observer has down time. Although most observers noted that they are not supposed to partake in these activities, they also acknowledged that by not helping crewmembers, they believe they could potentially be damaging their relations with crew; thus, in order to improve relations, they'll help when they can. The reviewers believe that due to this conundrum, NMFS would be wise to address this issue in greater detail.

IV-5. Risks/hazards associated with travel to/from training or point of departure – generic and theoretical

As was noted above, there is a risk of injury to the observer during his/her travel to or from the training program. Several of the observers also noted that there is a risk associated with boarding a vessel (taking the "leap of faith" as one observer called it). Further, many observers were not clear as to whether or not they would be covered (under their contractor and/or a workmen's compensation claim) in the event of a travel-related injury. In fact, who pays claims (workmen's compensation, Jones Act compensation, vessel owner, contractor out of pocket) varies from contractor, to region to insurance company.

As a result, it might be beneficial for NMFS to help observers understand where their (NMFS's) responsibilities start and end (in relation to the training and observer work). Although it appears that NMFS would not bear any responsibility in managing this risk, the reviewers note that legal claims commonly result from alack of clear expectations, delineation of responsibilities, and/or insufficient medical coverage on the part of the injured party.

IV-6. Summary of generic risks associated with observer fieldwork:

- Exposure to respirable particles (breathing in poisons, bad fumes, smoke, etc.) and/or injury from exposure to surface absorbed hazardous chemicals
- Low back stress/injuries secondary to lifting
- Injury due to repetitive behaviors/motions
- Slips and falls leading to musculoskeletal injuries
- Injury from striking or being struck by deck machinery
- Injury due to entanglement in netting/machinery
- Immersion – injury or fatality secondary to drowning (vessel loss or MOB)
- Thermoregulation – injury or fatality secondary to core temperature problems
- Injury from flames, fires, explosions, and/or flares
- Sea sickness
- Other on-board illnesses, as the result of poor hygiene and/or contagions
- Tissue injury secondary to cuts and/or burns
- Injury as the result of an incident/accident during travel to/from deployment
- Injury as the result of embarking/disembarking vessel

IV-7. Summary of generic and theoretical subjective and objective factors that can increase the potential of observer injury:

Environmental hazards (i.e., hazards that exist in the natural world around us, as well as hazards that exist in our working environments):

- Rough seas
- Inclement weather
- Cold water
- Sea life (e.g., sharks, jellyfish, etc.)
- On-board vessel hazards (nets, cables, low rails, etc.)
- Lack of fresh water, adequate food, and appropriate hygiene options
- Remote environments – Although remoteness in itself is not necessarily an unsafe condition, the remote location of observer work should be considered and built into the matrix. That is, due to the limited medical assistance available on-site, and due to the extended period of time it would take to get an injured patient to definitive care, the long-term (emotional, physical, and financial) consequences of an injury at sea will likely be greater than they would be if the same incident occurred near an urban (hospital) setting. Further, a minor injury at sea might be ignored and thus exacerbated due to the inconvenience of seeking medical attention.

Potentially Unsafe Acts:

- Unsafe speed (e.g., rushing to complete a task, choosing to lift a heavy object without help rather than wait for a second lifter, etc.)
- Unsafe positioning (e.g., working too close to a cable, rail, or sharp object)
- Improper procedure (improper ergonomics, using a tool incorrectly)

Potential Errors in Judgment:

- Facing a new or unexpected situation
- Misperception (underestimating a hazard)
- Distraction
- Fatigue and the affect of fatigue on decision making
- Miscommunication or poor communication (e.g., not understanding a crewmember or captain's directions)
- Under or overestimating abilities

IV-8. Risks and injury / fatality rates in observer fisheries, based on data and anecdotal reports.

Commercial fishing is one of the most hazardous industries in the U.S. according to the U.S. Department of Labor (DOL). For decades, it had the highest fatality rate of all industries. From 1984 through 1988, which represents the five years before the Fishing

Vessel Safety Act was passed, and preceded most observer programs, there were 519 deaths and 1,117 fishing vessel losses nationwide. In the last five years (from 1999 to 2003), there were 291 deaths and 528 vessel losses in the U.S., according to the United States Coast Guard.

While mandated equipment and safety training have been at least in part responsible for the fact that commercial fishing no longer holds the claim of most hazardous job, (it now ranks second highest), it is still more dangerous than police, fire, construction or other occupations traditionally thought of as hazardous.

In 2002, according to Department of Labor (DOL) statistics, commercial fishing had a fatality rate of 71 per 100,000 workers. In the 1980s and 1990s in some fisheries in which observers were deployed, the rate was as high as 350 per 100,000 workers, according to National Institute of Safety & Health (NIOSH) data. This contrasts sharply with the average fatality rate in U.S. workplaces of 4 per 100,000 (DOL). Even though improvements in fishing vessel safety have occurred, *the fact remains that fishing is still almost 18 times as hazardous as the average occupation in the U.S.*

Added to this is the fact that observers work in an unstable environment far from rapid medical care or rescue. Observers at times must contend with crewmembers that may resent their presence or be of a completely different culture and language. The vessels they work on have no hull and machinery standards, and the vast majority of operators of these vessels have no minimum competency or experience requirements. Despite the fact that observers spend much time at sea, their legal status as seamen seems to be in question.

The Occupational Safety & Health Administration (OSHA) has very little oversight for most commercial fisheries. Further, the agency charged with overseeing fishing safety, the USCG, had little historical experience in fishing vessel safety until the Commercial Fishing Vessel Safety Act final rules were published in the early 1990s. Coincidentally, this was about the same time that fishery observer programs began to expand nationwide.

The USCG's voluntary dockside safety exam and decal program has been used by NMFS, via the Magnuson-Stevens Fishery Conservation and Management Act, as a safety requirement for vessels carrying observers. Unfortunately, there have been problems with compliance and enforcement in some regions. For example, in some areas (e.g., Florida), USCG examiners must travel hundreds of miles to conduct a dockside exam. In fisheries that have low observer coverage, vessel owners have less motivation to get a decal. Since demand for decals is low, it can be difficult to get and pass an exam once a vessel has been selected to carry an observer. In some instances, it has been difficult to find a qualified examiner.

It is important to remember that the purpose of the dockside exam program is to ensure that certain safety equipment is carried; hull and machinery safety is not looked at during this exam, and the exam does not reflect the general condition of the vessel.

In fact, a 2002 study, conducted by the Association of Professional Observers (APO), illustrates observers' concerns over the effectiveness of the decal program in general. Of the 74 responding experienced observers, more than 65 percent had spent more than 180 days at sea. Fifty percent stated that they had little or no confidence that a vessel with a dockside exam sticker was actually "safe." Fifty-three percent of respondents felt "unsafe" on a vessel (due to the vessel's condition) at some time, even though the vessel had a valid decal. The APO survey had several other findings relevant to the perception of safety. Observers identified the following conditions on at least one vessel they had worked:

Condition	**Percent of respondents**
Vessel appeared poorly maintained	80.5 %
Food quality questionable/unsanitary conditions	51.2 %
No one on watch	48.8 %
Inexperienced crew	48.8 %
Decks cluttered with gear	41.5 %
Lost power regularly	26.8 %
Hatch doors won't seal or left open regularly (Open watertight doors was identified as a main probable contributing factor in the loss of the F/V Arctic Rose)	22.0 %
Communicable disease risk	17.1 %
Regular ammonia or other chemical leaks	14.6 %
Not enough emergency exits	14.6 %
Alarms not working	12.2 %
Drug/alcohol use by captain at sea	7.3 %
Deck load and weather (hazard)	7.3 %
Lost or used safety equipment with no replacement onboard	4.9 %
Extreme fatigue with visible effects on complacency	4.9 %
Fires	2.4 %

It is interesting to note that not all observers reported their concerns to their contractors. When observers provided *written* feedback on safety concerns, 63 percent of the time the "unsafe" conditions were directed to NMFS; only 35 percent of the time were they directed to the contractors. The reviewers can only speculate as to the reasons behind this discrepancy.

In fact, if and when an observer offered *verbal* feedback or concerns regarding safety, he or she tended to voice these concerns to various parties. More than 92 percent of polled observers verbally reported safety concerns: 50.7 percent of respondents directed their concerns to the captain, 28.2 percent to the contractor, and 15.5 percent to the observer program. Only 2.8 percent of concerns were reported to the USCG, and 1.4 percent were reported to NMFS enforcement. Some of these concerns may have been double reported. Unfortunately, if and when concerns are voiced to a variety of people, it is very difficult to track and categorize the feedback. Further, it is difficult if not impossible to document whether or not changes were made as a result. From this, it appears that much useful documented data is being lost through the use of only verbal reports.

Orientations for new crewmembers and monthly drills are mandated for documented fishing vessels of any crew size that fish beyond the Boundary Line. The USCG acknowledges, however, that most vessels are not conducting these important emergency monthly drills, especially in regions of the U.S. that have had little access or participation in Drill Instructor training. Alaska and the Northwest have had the best access and the most number of people trained in Drill Instruction, and therefore are more likely to follow these requirements to a greater degree.

Due to the fact that the greatest observer coverage area in the U.S. includes Alaska and the Pacific Northwest, it can be assumed that most of the APO survey respondents represented this area of the nation. Nonetheless, the APO survey also found that only 60.8 percent of observers said they received a safety orientation "most" or "all" of the time. Further, only 31.5 percent stated that they had worked on vessels that "mostly" or "always" conducted drills.

Commercial fishermen and fatality rates. Although observers perform different work than commercial fishermen, they are exposed to many of the same hazards since they work at the same worksite. If a vessel collides, capsizes, sinks, or catches fire, the crewmembers and observers are all at the same risk. The same is true regarding the potential for fatal deck injuries or man overboards. For this reason, it would be useful to look at the fatalities in fisheries by USCG district to see which regions have the higher risk of fatalities. Unfortunately, the USCG does not categorize casualties by fishery, so it is very difficult to determine fatality rates accurately by observed fishery. Fatality numbers are, however, collected according to district, with primary causation data included. The following chart shows the causes of fatalities in the commercial fishing industry in the U.S. from 1995 to 2000 (USCG data).

FATALITIES AND CAUSES BY USCG DISTRICT 1995-2000*

District #	Sinking	MOB	Fire	Capsize	Collide	Deck	Dive	Total
1 – Maine to N.J.	19	20	0	2	3	5	6	55
5 – N.J. to N. Carolina	21	5	0	3	2	1	0	32
7 – S. Carolina to East Coast Florida	15	12	0	8	0	2	1	38
8 – Gulf of Mexico	11	43	3	5	6	10	1	79
9 – Great Lakes	3	1	0	0	0	0	0	4
11 – California	15	9	0	18	0	4	1	47
13 – Washington & Oregon	8	9	0	11	0	2	3	33
14 – Hawaii	2	4	4	0	1	1	3	15
17 – Alaska	22	19	1	27	0	6	2	77
Total	116	122	8	74	12	31	17	380

* Source USCG. Analysis by AMSEA.

The chart shows that man overboard (MOB) is the most frequent cause of fatality to commercial fishermen (32 percent), followed by sinking (30.5 percent). This would indicate that “safe deck practices” (e.g., “one hand for the boat”) should be emphasized in observer training programs.

Further, according to NIOSH calculations in Alaska, fishermen wearing a Personal Flotation Device (PFD) were nine times as likely to survive an emergency. One might extrapolate from this that encouraging observers to wear PFDs on deck (and emphasizing training in the rapid use of emergency equipment) should be important components of observer safety education.

FATALITIES AND VESSEL LOSS BY USCG DISTRICT 2003*

District #		Vessel losses	Fatalities
1	Maine to N.J.	1	14
5	N.J. to N. Carolina	7	3
7	S. Carolina to East Coast Florida	15	6
8	Gulf of Mexico	18	18
11	California	6	3
13	Washington & Oregon	9	5
14	Hawaii	1	1
17	Alaska	22	7
Total		79	57

* Source USCG. Analysis by AMSEA.

As a trend, fatality rates are (and have been) high in the Northeast and Gulf of Mexico. Interestingly, Alaska fatalities are on a ten-year downward cycle but continue to be high.

Fisheries that face poor economic conditions appear to be at higher risk for loss. When fisheries become less lucrative (due to more restrictive management regimes, lower prices, or a weakened resource, for instance), expenses on safety and hull and machinery maintenance are often deferred. Further, operators tend to push the limit of safety in terms of weather, hours worked, procedures, and amount of fishing gear carried. Vessels may also convert to fisheries they were not designed for. These are just a few of the factors that will tend to greatly increase the risks to observers. For this reason, any fishery that is severely economically depressed should be assumed to be at higher risk that the casualty data may indicate.

Fatality rates among observers. There has been one documented observer fatality at sea (in the North Pacific groundfish program on the F/T Aleutian Enterprise in 1990). There are, however, numerous examples of close calls that, had circumstance been slightly different, could have resulted tragically. The following are some examples of close calls that could have easily ended in an observer fatality:

In 2002, an observer on the F/V Galaxy experienced an explosion and fire. The observer survived for more than an hour in the Bering Sea without an immersion suit. This observer was unconscious and had just slipped beneath the water before she was rescued. She survived by the thinnest of margins.

In 2001, the F/V Arctic Rose and all 15 crewmembers were lost in the Bering Sea. An observer had just departed the vessel two weeks before the sinking.

Several NMFS program managers and observers from around the nation, including Florida, noted additional cases where observers had just returned from vessels that subsequently sank. Other cases included observers who were scheduled to go out on vessels but did not; these vessels subsequently sank. Even as this report was being

finalized, a Canadian fishing vessel sank in British Columbia with four people on board. The only person who survived was the fisheries observer.

Other examples of incidents that could have but did not result in serious injury or fatality included an observer who fell overboard, observers who have fallen between boats, falls into holds, reports of near capsizing, and observers getting hit (with gear) while on deck. In fact, many program managers and observers commented (during interviews) that the fact that there had only been one observer fatality to date was simply a matter of luck.

Training's impact on fatality rates. The integration and quality of emergency safety training for observers is especially important when one looks at the significant impact safety training has on survival rates. In this context, Alaska data from NIOSH is illustrative: The overall fatality rate in Alaska fisheries from 1990 to 1999 was 120 per 100,000 workers. However, fishermen who had taken Alaska Marine Safety Education Association (AMSEA) Drill Instructor safety trainings had a fatality rate of only 37 per 100,000 workers, an almost four-fold decrease.

It is also interesting and relevant to note that of the fatalities who had received prior training, most had attended the training more than five years before the incident. In fact, studies by Perkins (of the U.S. Public Health Service) show an even higher survival rate if/when fishermen have been recently trained. (The concept of recency-in-training is discussed again when the reviewers offer suggestions regarding observer refresher courses, Section VII.)

Objective and subjective hazards and injuries associated with commercial fishing.

On the vessel itself, the work and living quarters are crowded with fishing gear and equipment and the working surface is unstable and slippery due to sea conditions and fish slime. Work hours are long; there are no days off for days or weeks at a time in some cases. There is also exposure to heat and cold extremes, ice, dangerous marine life, open hatches, seasickness, sharp objects, smoke, poor diet and working around machinery in close quarters.

Further, vessel working and living spaces tends to be small, and the social and sensory options are severely limited. There is no "walking home" from a "bad day on the job" for an observer. Long work hours, a fishery in the economic slumps, and crews made up of people from different cultures, are some examples of potential subjective hazards.

The cultural backgrounds of fishing crews vary. This increases the potential for miscommunication in an emergency. In an emergency people revert to their first language when speaking. The amount of fatalism in a culture can also impact safety attitudes and therefore safety culture. Differences in culture can also mean different foods and other habits that could lead to misunderstandings and cause conflict in the small space of a fishing vessel. However, no evidence of major safety problems due to cultural differences in everyday shipboard life was noted in our interviews. This speaks positively to the flexibility, tolerance and professionalism of observers.

All of these subjective and objective hazards contribute to what is called the "accident equation". That is, the more hazards that exist, the greater the probability for incident. In the observers' world, the number of inherent hazards is great; therefore, it is important for observers to learn to recognize and manage as many of the risks as possible. As such, hazard recognition, risk assessment, and personal risk management should be considered an important part of the observer safety training.

Injury rates in commercial fishing – general overview. Injury rates in observed fisheries are difficult to document with consistency, as there is no thorough or singular collection mechanism or database that tracks these numbers. The USCG keeps few records on injuries in commercial fishing, so this source is of very limited value. Commercial fishermen are not covered by workmen's compensation insurance plans, so data through that source is unavailable. Data from an operators' crewmember insurance (which is not universal) would be very difficult to gather due to the many insurance companies that exist, and the related privacy issues.

However, several unique data collection resources based on Alaska fisheries (Alaska Fisherman's Fund and Trauma Registry) indicate that commercial fishermen have a higher injury rate than other industries. Although musculoskeletal injuries (including strains, sprains, carpal tunnel, and back injuries) are common across fisheries, the specific types and rates of injury suffered differ according to fishery. The injury statistics included in this report are listed by fishery or region.

Data on observer injuries – general overview. As is the case above, injury statistics specific to observers are also difficult to calculate due to the lack of a singular collection mechanism or database. Instead, the reviewers attempted to identify observer injury numbers through a variety of sources, including insurance claims, incident reports, and interviews.

Observers are covered by several insurance plans, and though this multi-coverage system can prove valuable for providing compensation in the event of an injury, it creates myriad problems in data collection via claims. For example, contractors must verify to NMFS that they carry state workmen's compensation, Longshore and Harbor Workers Compensation, and a Marine Employer's Liability (MEL) policy (for compensation under the Jones Act). Further, some observer's costs are covered (or reimbursed) "out of pocket" by the contractor for amounts below the deductible. In addition, the vessel owner may also have insurance to cover the observer. And finally, some observers are employed by universities or are independent (employed by NMFS). In these latter cases, contractors are not used and insurance coverage varies. Given these options and circumstances, it is not surprising that there is no single source for obtaining injury data based on insurance claim findings.

Further, in looking at workmen's compensation claims (specifically for observers), it was found that there are inconsistencies in reporting. Some observers' claims (submitted by

the contractor) included illnesses as benign as “colds and sniffles” while other contractors claimed only more serious injuries.

Additionally, there appears to be differences in how each region gathers claim data. State workmen’s compensation in Alaska, for example, collects data on injuries even when they have not reimbursed claims and refer them onto a MEL policy for payment. On the East Coast and the Gulf, insurance brokers and contractors were unable to recall any MEL claims; yet many of the claims in the Northwest are through MEL. Moreover, the reviewers noticed that some of the injuries reported by experienced observers interviewed did not show up in the data anywhere. Thus, it appears that some injuries go unreported altogether.

Due to these significant reporting inconsistencies, the injury data within this report should be viewed as samplings rather than a comprehensive surveillance. A more accurate accounting will have to wait until a consistent method to capture the injury data is designed and implemented. Despite this, some general trends in injuries are possible to see.

Despite the lack of solid and consistent data on observer injuries, it is revealing to note that of the 39 experienced observers who were interviewed as part of this study, 16 (41 percent) suffered an injury that required medical attention or was a reportable event. In fact, there was no lack of anecdotal incidents among this group of experienced observers. Unfortunately, it was difficult to identify trends of injuries (or close calls) by fishery as many of the observers had worked in various fisheries and in several regions.

What does seem to be consistent from the available data is that the most common injury suffered by both fishermen and observers are musculoskeletal (i.e. strains and sprains), especially of the back. Most back injuries appear to be caused by either falls or lifting. Tendonitis and carpal tunnel syndrome were also highly reported. It is important to note, that cumulative injuries (i.e., those that result over long periods of time) are often unreported and not accurately tracked. Consequently, the statistics on these types of injuries might be higher than indicted.

Hearing loss may be another example of a cumulative injury that might or might not be reported to the greatest extent possible. Due to the noise of engines, generators, music through loudspeakers, motors, machinery, etc., vessels are often a cacophony of noise. Studies have demonstrated that hearing loss is endemic on vessels ranging in size from small open skiffs with outboards, to the largest factory trawler/processing vessels. However, the lack of claims in this area suggests that these injuries are potentially underreported.

IV-9. Risks assessment and injury data – by program / fishery

Information about the following programs was gained via interviews (in-person, telephone, and/or email) with a number of sources, including but not necessarily limited to the following: experienced observers; NMFS program personnel; observer contractors; insurance companies; USCG fishing vessel safety personnel; and fishermen in these fisheries.

For each program, the reviewers attempted to identify the following information:

1. The type of fishery and observer coverage
2. The type of vessels used and hazards associated with the vessels
3. The environmental hazards associated with the area or fishery(ies)
4. The subject hazards associated with the area/fishery (i.e., hazards that change due to human variables)
5. The safety requirements vessels must follow (including the type of survival equipment vessels must carry, and the likely training that crewmembers will have), and the level of enforcement (of the above requirements)
6. The injury and fatality rates of the area/fishery (if/when available)

The reviewers have assigned each of the observer fisheries with a risk rating of low, moderate or high. The criteria used to make these determinations include documented fatalities and or injuries in that fishery, the high or low number of subjective and objective hazards noted, and interviews with Coast Guard fishing vessel examiners who concurred with the ratings in this document. These ratings are only intended to give a summary of safety in a particular fishery, and as a relative comparison to each other.

NORTH PACIFIC GROUNDFISH OBSERVER PROGRAM

1. Type of fishery and observer coverage

The North Pacific supports the largest observer program in the country, and the second largest in the world. With 36,000 sea days in 2002, this region accounts for 64 percent of the nation's at-sea days for observers. The fishery takes place in all seasons.

Vessels greater than 125 feet in length are required to have 100 percent observer coverage; vessels from 60 to 125 feet have 30 percent coverage requirements. Observers can be at sea from two or three days to up to 60 days. Observers in this region also work at groundfish shore plants in coastal Alaska.

2. Vessel types and hazards

Observers in this region work on trawl, longline and fixed-gear (pot and jig) vessels in the Bering Sea/Aleutian Island region and the Gulf of Alaska. The vessels range in size from 60 to over 250 feet, and in one case up to 680 feet. Some of the largest and most

complex fishing vessels in the world work these waters. Deck and machinery spaces are crowded with cranes, fishing gear, cables, and processing equipment.

These vessels operate within the three- to 200-mile federal waters, and are at times more than 1,000 miles from the nearest USCG air rescue station (which is in Kodiak, Alaska). These vessels also work in some of the worst environmental conditions, including frequent and sudden storms and icing.

The vessels range in type from 100-year-old wooden schooners to converted freighters and oil supply ships from the Gulf of Mexico. The "Americanization" of the fishing fleet in the late 1970s led to a great increase in capitalization; this, in turn, resulted in many vessel conversions (from a non-fishing-industry purpose to that of fishing). Some of these converted vessels were well suited to the conditions found in Alaska; others were not.

3. Environmental hazards

The southern Bering Sea sees the mixing of warmer Pacific waters and air from the south with cold arctic waters and air from the north. This results in very changeable and sudden severe weather on both sides of the Aleutians. The sea conditions, combined with a cold environment, distance from rescue, and very productive fisheries, put many vessels in harms way. Immersion in the cold water of this region can debilitate a survivor quickly.

On the north side of the Aleutians, the shallow Bering Sea, combined with the extreme and changeable weather, produces very rough sea conditions that test the stability, design, and integrity of vessels. The build-up of ice on vessel rigging has led to capsizings, and is a foreseeable risk every winter.

The Gulf of Alaska, on the south side of the Aleutians also suffers from extreme and rapidly changing weather conditions.

Essentially, groundfish is a year-round fishery – in the Bering Sea, currently the longline cod fishery opens Jan 1, blackcod in March, trawling, January 20 and then goes off and on the rest of the year. Fishing in the Gulf of Alaska is also spread throughout all four seasons.

4. Subjective hazards

In general, these fisheries are among the healthiest in the nation economically. In fact, they are some of the richest in the world. The resources are well managed for sustainability and the groundfish fishery is being "rationalized" to remove overcapitalization. The blackcod longline fishery is on an Individual Fishing Quota (IFQ) regime. As a result, fishermen are able to choose their weather for fishing, which has led to an apparent decrease in vessels and lives lost.

The work still has its subjective hazards, however. For example, some crewmembers are expected to work up to 17-hour days, for days on end (which seems especially true in the

trawl fishery). Observers, therefore, are also subjected to long and erratic hours of work for weeks at a time. Fatigue, cramped, and noisy working conditions have been known to contribute to casualties.

Trawl vessels and at-sea processors can have workers from other cultures, such as Central America and Eastern Europe, which can lead to communication and cultural problems. Many of the vessels in these fisheries, especially in the trawl and at-sea processing fleets, are owned by large companies based in Seattle. Generally, the larger companies tend to have a more proactive safety philosophy. Some even have their own trainers who go from vessel to vessel, and safety training is encouraged. But the safety philosophy on individual vessels can still differ, depending on the captain. Even captains who thought they were safety conscious have noted post-incident that there was "room for improvement" in terms of safety. Many of the multi-fatality vessel losses in Alaska have been from this fleet.

5. Safety requirements and level of enforcement

All vessels in these fisheries are required to have the full compliment of safety and survival equipment, including liferafts, immersions suits, and EPIRBs. This fleet must also follow Drill Instructor training requirements. Due to many high-profile casualties in Alaska fisheries, significant efforts have been made through the years to improve not only enforcement of safety regulations, but the safety training of crewmembers as well. In fact, it is estimated that close to 10,000 crewmembers in this region – many in observed fisheries – have received safety training to date.

Due to the high number of vessel losses and casualties in this region, the USCG has had an active enforcement regime in place here since the early 1990s. In fact, Alaska was the first to enforce most aspects of the Commercial Fishing Vessel Safety Act of 1988. Dockside exams are regularly conducted in Seattle and many Alaska home ports. Additionally, boardings are often conducted on vessels at-sea. Violations are written and terminations take place for serious offenses. As a result of these efforts, this region is seen as having one of the highest rates of safety compliance in the U.S.

Nonetheless, although the vessels in the North Pacific are some of the best equipped and regulated nationwide, these fisheries do not experience 100 percent compliance with certain mandates. Several observers, in post-deployment affidavits, have noted the lack of drills, and/or expired exam decals, fire extinguishers, and liferafts.

Debriefing data – from 1998 to 1999 – indicate that observers were familiar with the location of 83 to 97 percent of the vessels' survival equipment. This suggests that safety orientations were conducted for the majority of deployments. However, only 28 percent of observers indicated that drills were regularly practiced. Although it could be that drills simply weren't conducted during observer deployments, these numbers – at minimum – indicate that drills were not routinely practiced while observers were on board.

The reviewers also found that, even though observers are expected to look for (and record) certain safety infractions (such as expired decals), this may not happen one hundred percent of the time. According to a USCG fishing vessel coordinator in Anchorage, interviews with observers they conducted found one case in which several observers have been on the same vessel during the time when a liferaft had been expired. However, the safety curriculum in this region has been greatly strengthened in regards to observer safety checks once onboard and this should decrease the already small number of these oversights.

6. Fatality & injury data

According to USCG data, the heavily observed groundfish fishery had 39 fatalities between 2000 and 2002, which represented 61.5 percent of all worker-related fatalities in Alaska during this period. This high number of fatalities is fairly indicative of the region's fatality rate over time. In fact, the groundfish fishery has had the only documented observer fatality (1990, F/V Aleutian Enterprise) and has had two well documented near misses in the last several years (F/V Galaxy and F/V Arctic Rose).

This region appears to have the highest number of injuries in the nation, but also has the highest number of at-sea days as well. These numbers may also be the result of better reporting. On a single vessel, for instance, during one winter fishing season, 15 workplace injuries were reported. These injuries included strains, crushed fingers, fractures, and a concussion, according to the USCG.

Alaska Fishermen's Fund. Some of the injury data to fishermen from this region was obtained from the Alaska Fishermen's Fund (AFF). AFF is a unique, state self-insurance pool (for commercial fishermen), where two-thirds of fishermen's annual state license fees go into an account. The account, in turn, can be used to pay up to $2,500 for qualified injuries that have occurred secondary to commercial fishing. However, this fund will only pay after all other resources (such as Medicare, personal health insurance, and vessel insurance) have been exhausted.

Since observers do not have commercial fishing licenses, they do not pay into or benefit from this fund. Although AFF has the largest database on injuries in Alaska fisheries, and fishermen and observers work in the same small environment, their tasks are often different. Yet they also may be exposed to some of the same risks (eg. machinery, etc.)

For commercial fishermen overall, Alaska Fishermen's Fund (AFF) data follows:

Alaska Fishermen's Fund Claim Data, from 1999 to 2003
(This data is for fishermen working with gear types requiring observer coverage and does not include observer injuries.)

	Cuts	Tooth injuries	Fractures & Dislocation	Burns	Amputation	Infections	Respir-atory disease	Musculo-skeletal	CTS *see below	Strains	Bruis Crush
Longline	102	3	26	6	3	16	14	8	11	217	
Trawl	20	2	2	1	1	6	3	0	0	14	
Total	122	5	28	7	4	22	17	8	11	231	

Source: Alaska Fishermen's Fund
* Carpal Tunnel Syndrome

Fishermen's fund data is based on crew fishing license whether participating in a state or federal fishery. Halibut longline is not an observer fishery but is included in the figures above. However the gear types, vessels and methods are similar to other types of observer longline fisheries.

The leading cause of injury in these claims is musculoskeletal injuries (including sprains, strains, fractures, dislocations, and Carpal Tunnel Syndrome - CTS), and the second cause is tissue injuries (including cuts, burns, infections, and bruising/crushing injuries). Interestingly, this data mirrors that of nearly all other outdoor-related professions (such as wildlife biologists, geologists, logging, and guiding). Further, it should be noted that this might not reflect all injuries, as many are never reported to Alaska Fishermen's Fund.

Both observers and fishermen are expected to do lifting chores as part of their jobs and this can lead to strains, which is the leading cause of injuries. Both groups also use knives, although fishermen could be expected to be more at risk for cuts due to their more frequent use and being around more sharp objects (gaffs etc.). The environment of the vessel might expose both groups equally to infections and respiratory disease. In any case, there are limitations to extrapolating this data to reflect injuries to observers.

Alaska Trauma Registry. The Alaska Trauma Registry tracks traumatic injuries that are seen by employees of clinics and hospitals around the state. According to the Alaska Trauma Registry, commercial fishing led the state in occupational injuries (second to construction). Unfortunately, the data presented in the registry does not reflect observer injuries. However it does give another perspective of the risks associated working in the small environment of a vessel in fisheries in this region.

Alaska Trauma Registry (1991 to 1999), injuries to commercial fishermen

Cause of injury	Nature of injury	Body region injured
Machinery (205)	Fractured bone (309)	Upper extremity (203)
Falls (163)	Open wound (77)	Lower extremity (189)
Struck by object (100)	Burn (32)	Head (96)

Source: Alaska Trauma Registry

Observer injury data. Although there is no formal data collection system that lists and categorizes all observer injuries, the reviewers did find worthwhile data in workmen compensations claims. Interviews with experienced observers also noted common risks.

For example, some of the risks and hazards that observers in these fisheries reported as common include the following: weather & stability; being hurt on deck; moving parts, in the factory and on deck; icy decks; slipping; being on deck alone; lack of watch-keeping; mechanical or structural failure, leading to fire; and sinking. Observers also stated they consider getting off and on the boat (in port) as potentially hazardous. At times, in fact, they are "doing a death leap, and just hoping," as one observer stated. Further, observers noted that on processing vessels, ammonia leaks are a potential hazard and have been experienced. Many observers stated that they felt the distance they work from medical treatment should be considered a risk as well.

North Pacific Groundfish Observer Injury Types
(from workmen's compensation claims of four contractors)**
(June 28, 1999, to December 15, 2002)

Cuts/ lacerations	Musculoskeletal	Contusions	Colds/flu, Infection	Teeth	Hives, rash, allergy	Misc.	Total
5	110 (59 were back strains)	28	68	14	7	14	268*

*Note: Totals will not add up to 268 since some claims had several causes or multiple injuries. Thirty-three claims noted time lost on job.
** This data reflects all data collected by workmen's compensation, even if paid under MEL and not paid out by workmen's compensation.

It can be seen from the preceding chart that musculoskeletal injuries are the leading cause of injuries (41 percent) in this program. Further, cuts were less common for observers

than they were for fishermen. However contusions were reported at about the same rate (10 percent). In interviews with 11 experienced observers who had worked in this fishery, three had been injured.

Alaska National Insurance statistics from the years 1995 to 2000 show observers filed 194 claims for injuries. Forty-two (22 percent) of these were the result of lifting baskets. Alaska National Insurance has noted that the size of the blue baskets that the groundfish observers use is a major cause of back strains – they can hold about 60-70 pounds of fish. The NPGOP notes that a smaller sized basket would inhibit some sampling work by observers such as density studies. The block and tackle system is being promoted. Flat bed scales were also noted as a solution, but due to their expense and frequency of breakage, and since they are cumbersome to carry, they are not often used.

The number (if not rate) of injuries and fatalities reported in this region are among the highest in the nation. This program also has the highest number of observers as well. Although observers in these fisheries tend to work on the largest vessels that fish Alaska waters, due to the vessels' complexity, the severe environments, and the number of close call reports, this region should be considered high risk.

ALASKA MARINE MAMMAL PROGRAM

1. **Type of fishery and observer coverage**

The marine mammal observer program in Alaska observes Category 2 gillnet salmon fisheries. Fishing takes place from May to September, and vessels are generally at sea for 12 hours or less. There is less than five percent observer coverage.

2. Vessel types and hazards

There are two types of vessels and types of gear used in this program: drift gillnetters and setnetters.

The gillnet fishery is operated from open skiffs or from drift gillnetters up to 40 feet and with cabins. Some may travel some distance to get to the fish, and may fish as far as 12 miles from shore but they are generally within three miles.

Setnet vessels include open skiffs with no interior spaces. A few may have small cabins. They work close to the beach, near river mouths, and occasionally a little upriver. These vessels may also travel less protected waters to get to a fishing site. Observers may work from other vessels however, and are not always in the commercial fishermen's boat itself. In general, both of these vessel types work relatively close to each other in their respective fisheries.

Since this fishery involves smaller, faster, and sometimes open boats, the risks of quickly capsizing, swamping and being thrown out of the boat are higher. Because of the suddenness in which these incidences occur, the habit of wearing a Personal Flotation

Device is of more immediate concern. Although gillnet fisheries have few fatalities in any given year, the potential for casualties are still high given the small size of the vessels, the distance from search and rescue, and the quickness in which problems can develop.

3. Environmental hazards

The small vessels that work in these fisheries are subject to the same sudden, changeable, and severe weather patterns as those faced by Alaska's larger vessels. However, these vessels usually fish for short periods of time, close to shore and only in the summer months. Shallow waters, tidal actions, river bars and nets filled with fish are common to the environment and make these vessels susceptible to swamping. The coldness of the water can also quickly debilitate a survivor.

In addition, there are many opportunities on gillnetters to be exposed to stings from jellyfish, which often fill the nets. Although the risk of being stung is greater for the fishermen, it is a potential hazard to an onboard observer.

This fishery usually takes place in very remote sites and is only accessible by small plane. In the event of an injury, help would be hours – and potentially days – away. Setnet fishermen often live in tent camps or rough cabins on beaches (near salmon streams). Consequently, this is one of the only fisheries in the U.S. where bears can be considered a hazard.

4. Subjective hazards

This region has been severely economically impacted for the past several years (due to low prices, brought on by farmed salmon and other factors). The resulting stress can and often does affect a fisherman's behaviors and judgment, and can sometimes contribute to poor decision-making. Moreover, the fishing season is short, in some cases only a few weeks in length, and the work is intense, calling for long working hours. These subjective factors can ultimately affect the observers' well being.

Observers often are forced to hang over the vessel's side in order to get samples. Given the small vessels and potentially rough conditions, there is a higher relative probability that observers in this fishery will experience an overboard event. (This is considered a subjective hazard due to the need for observers to perform without error.)

5. Safety requirements and level of enforcement

In this program, vessels are not required to carry immersion suits unless they travel beyond river mouths that are more than two miles across. In all other cases, only Personal Flotation Devices are required. EPIRBs are not required unless vessels travel beyond three miles from an ocean beach. Further, the vast majority of these fisheries are not required to carry liferafts. The observer program issues additional safety equipment (e.g. immersion suits and personal satellite rescue beacons).

Safety training is not required for the majority of these vessels because they are largely undocumented and remain within the federal Boundary Line. In fact, many of these vessels operate right on the regulatory lines for survival equipment and thus "straddle" the requirement for safety equipment.

The setnet fishery generally does not have an observer in the fishermen's skiffs (at least out of Kodiak). Instead, observers watch and collect data from a second skiff. Consequently, NMFS requirements are enforced for observer skiffs, and the operators are required to follow all NOAA small boats safety protocols and meet safety decal requirements. The observer program also issues immersion suits for the observer vessels.

Since the vessels in these fisheries operate in remote parts of the state, enforcement and receiving a safety decal can be challenging due to the lack of USCG personnel available.

6. Fatality and injury data

The statewide Alaska gillnet fisheries had eight fatalities between 2000 and 2002, though it usually averages one commercial fishing fatality in this fishery every year or two. (The eight fatalities represent 20.5 percent of all commercial fishing fatalities in Alaska during this period.) The main contributing factors include net entanglement, groundings, and collision, which occur more commonly in this than other fisheries.

Alaska Fishermen's Fund Claim Data, from 1999 to 2003
(This data is for fishermen working in gillnet fisheries and does not include observer injuries.)

	Cuts	Tooth injuries	Fractures & Dislocation	Burns	Amputations	Infections	Respir-atory disease	Musculo-skeletal	CTS *see below	Strains	Bruises, crushing inj
Gillnet	30	3	17	0	2	11	4	12	3	165	31

Source: Alaska Fishermen's Fund

Again, musculoskeletal injuries (including strains, fractures. Dislocations and Carpal Tunnel Sundrome – CTS) are by far the leading type of injury. Factors that contribute to these injuries include pulling the net, handling large quantities of fish, and poor ergonomic practices.

Injuries to observers are not available by the program.

Due to the all above factors, this fishery would likely be ranked moderate to high risk.

WEST COAST GROUNDFISH OBSERVER PROGRAM/ At-Sea Hake Observer Program

This region includes the At-Sea Hake Observer Program and the West Coast Groundfish Observer program. Vessels in this program fish from California to Washington.

Of the observers (from this region) interviewed, three of the ten (30 percent) suffered on-the-job injuries that needed medical attention. Several of these observers had multiple injuries from several events. Most injuries included muscle strains and ligament tears to wrist and back. These injuries could not be segregated by fishery

AT-SEA HAKE

1. **Type of fishery and observer coverage**

Fleet size: 13 processing vessels to 680 feet (seven catcher/processors 200 to 300 feet) with 125 to 150 crew/processors) and six mothership processors with 28 catcher vessels (70-90 feet). Season of operation: May through August and November. The trawlers are of mixed vintage. Catcher boats are larger trawlers in the 90-120 foot range with three or four crew passing cod end to the processors. These vessels fish within 40 miles from shore. Observer coverage is 100 percent on the motherships and catcher processors. The catcher boats in this fleet have no observer coverage.

2. **Vessel types and hazards**

Although these vessels fish offshore, the vessels are large, the water temperature is moderate, and the fishery is economically healthy. The hazards in these vessels would be related to the complicated gear on these vessels and the long work hours. Trawlers can have stability problems and there are lines with great tension when trawl nets are brought onboard.

3. Environmental hazards

Exposure to offshore weather and cold water are risks. Also the larger vessels lack maneuverability in a man overboard emergency. There are also potential stability problems.

4. Subjective hazards

There is less capitalization and pressure to fish. The better weather months are generally fished. This fishery is better off economically than most.

Cross cultural crews from Hispanic and Asian countries may be potential language and cultural problems. Corporations with more of a corporate safety philosophy operate the larger, processing vessels.

5. Safety requirements and level of enforcement

Liferafts, EPIRBS and immersion suits are required. Personnel are safety trained. All of the larger processing vessels need a certification of compliance. They are load lined and therefore have additional oversight in the classification societies that issue their certificates.

The USCG reports this fishery has good safety regulation compliance. Operators are generally safety conscientious. The few safety violations that occur are quickly resolved. Very few problems are found during USCG boardings at-sea according to the regional fishing vessel safety program manager.

6. Fatality and injury data

There have been no observer fatalities in the past five years. However, there are many injuries with, strains being the leading cause. Injuries have been noted that have also occurred from blunt trauma and cuts on the processing line according to the USCG. The processing line is a very automated process, so there is minimized contact with sharp objects. However, there is anecdotal evidence that larger processors can suffer many injuries in a season.

Experienced observers felt that the risks were from back injuries, being caught in machinery, cables snapping (which some had seen several times), falls/slips, carpal tunnel, tendonitis, hearing loss, human fatigue, and vessel hull integrity. Injury data from state workmen's compensation was not made available to us upon request

This fishery could be comparatively rated low to moderate risk.

WEST COAST GROUNDFISH OBSERVER PROGRAM

1. Type of fishery and observer coverage

In this fishery, the crew size can range from one to five people; a crew of three is most common. Vessels fish for rockfish, Dover sole, and sablefish (among others) from California to Washington. Vessels stay within 50 miles of shore. Observer coverage is 10 percent of the limited-entry vessels, which presently number around 200. There are about 1,000 total vessels in various West coast fisheries.

2. Vessel types and hazards

The program deploys observers on vessels that use trawl, longline, pot, 'stick' and other various types of gear. They range in length from 16-foot skiffs to 110-foot trawlers. Experienced observers stated that the hazards on these vessels include machinery (getting caught in machinery); cables snapping (which some had seen several times); loud, continuous stimulus (leading to hearing loss); and vessel hull integrity. Hazards also include MOBs on small vessels and capsizing.

Because these vessels fish year-round, weather and sea conditions must be considered environmental hazards. Additional hazards commonly faced include rough offshore waters as well as risks associated with crossing bars into port.

4. Subjective hazards

Trip lengths can vary between one-day trips on the smaller, nearshore vessels to four to five days on larger trawlers. Each trip can be labor intensive. There is much sorting of species by weight, causing fatigue to both the crew and the observer.

Economically the groundfish fishery is under some duress. A recent buyout program, for instance, eliminated 92 vessels in this limited-entry fleet (which had been close to 400 vessels). Currently, this fishery has many single owner vessels and are not corporate owned.

Experienced observers noted that risk of injury (secondary to human error) exist from improper lifting, slips/falls, and getting caught in machinery. Further, errors due to fatigue were considered a real risk.

5. Safety requirements and level of enforcement

Immersion suits, liferafts, and EPIRBs are common on vessels that travel certain distances from shore. Most trawl vessel operators have had safety training, but the USCG estimates only about 10 percent conduct the required monthly drills.

Most of the limited entry trawl vessels in this fishery have safety decals, which may be due, in part, to the observer coverage requirements. Additionally, a number of the trawl vessels in this region get boarded and checked, mainly because they are the only vessels working on this section of coast.

6. Fatality and injury data

According to the USCG, about 30 percent of annual fatalities (one or two people a year) in the Washington/Oregon region are from the trawl fleet. Main contributory factors include man overboard events and capsizings (which occur during bar crossing).

In 2003 there were no fatalities in the trawl fleet. Further, this fishery reported only one vessel loss, which was due to a grounding (secondary to a mechanical problem).

Injury data from state workmen's compensation was not made available to us upon request.

Based on the hazards noted above, the trawl fishery might be considered a moderate risk fishery.

SOUTHWEST REGION

The Southwest region covers two separate fisheries: drift gillnet and pelagic longline.

Four out of seven experienced observers from this program who were interviewed, said they had been injured. Injuries included cuts, injury to the knee, a hernia, and dislocated shoulder. These injuries were not separated by fishery.

Further, the NMFS program manager in this region identified eight observer injuries during a four-year period in the late 1990s and early 2000s. As the chart below shows, once again the leading cause of injuries was strains (40 percent of all injuries). No distinction was made between injury and fishery.

Eardrum (during pool training)	Cuts	Tooth chip (from fall)	Stings (bee and stingray)	Eye (fuel in eye)	Strains/hernia
1	1	1	2	1	4

Note: injuries add up to more than eight since some reports had multiple injury types on same claim

CALIFORNIA/OREGON DRIFT GILLNET FISHERY

1. Type of fishery and observer coverage

A drift net trip usually lasts around a week, though deployments can last from six to 20 days. Most fishing takes place from October to December. Roughly 55 of 75 total vessels carry observers, with 21 percent total fleet effort being observed.

2. Vessel types and hazards

The drift net fishermen (mainly out of San Diego) use 40- to 60-foot boats, which are made of wood, fiberglass or steel. Many are older and in moderate condition. The boats stay fairly close to shore (usually 15-50 miles), and the crew is small (one to two people).

3. Environmental hazards

These are smaller vessels fishing in open ocean conditions, which can be rough at times.

4. Subjective hazards

Economically, this fishery has diminished over the past few years. As a result, associated subjective hazards (listed previously) can potentially affect the crew (and observers') safety.

The workers in this fishery are mainly from Italian heritage. Many have been in the business a long time, and thus have quite a bit of experience. Most speak English as a second language. Historically (i.e., fisheries from the 1920s to 1980s), the Italian crews have been hostile toward observers, and though this has improved through the years, they are not necessarily pleased to have observers on board. Many complain about the rules and regulations, and the crew's wives tend to complain about having women observers on board. The potential animosity that can result from these factors could be considered a subjective hazard.

On small vessels, observers are expected to use a bucket system as opposed to a marine toilet (or "head"). This is true even on larger Vietnamese vessels. The "bucket method" is preferred to (and less hazardous than) "hanging over the side"; however, observers in this fishery identified "hanging" as a fairly common practice. Being on deck alone with a bucket is also a risk.

In the past, drinking or drug use was a concern on some driftnet vessels. Observers also pointed out that these small vessels often work in and around shipping lanes. One observer has had two experiences in which large freighters nearly collided with his vessel. Other observers have recalled similar close calls along this busy coast.

5. Safety requirements and level of enforcement

Due to the distance from shore and cold water temperature of the California current from the north, these vessels are required to carry immersion suits, liferafts and EPIRBs. Lots of hydrostatic releases on liferafts are rigged improperly according to the Coast Guard. There appears to be very little training in this fleet. (Probably fewer than 50 percent were trained.) The larger boats tend to do more training with their crews.

Enforcement is more passive and done opportunistically.

6. Fatality and injury data

There have been no fatalities in this fishery in last few years.

This could be considered a moderate risk fishery.

CALIFORNIA PELAGIC LONGLINE FISHERY

1. Type of fishery and observer coverage

Pelagic longline vessels fish from Southern & Central California to Hawaii. The main fishing season is September through June, and swordfish and tuna are the target catch. A longline trip is generally 40 to 50 days. There are 20 vessels that are observed with a 12 percent level of coverage.

2. Vessel types and hazards

A number of these vessels – generally steel, most of which are around 15 years old – work 200 to 1500 miles off shore. There are roughly 24 longliners in this fishery. The vessels range from 60 to 85 feet in length and have a crew size of up to six.

Inherent vessel hazards include sharp fishing and gaff hooks, snagging and overboard events, and lines under tension.

3. Environmental hazards

Because these vessels fish fairly far offshore, vessels and workers can be subject to harsh weather. Additionally, cuts from swordfish (and sharks) should also be considered a risk of this fishery.

4. Subjective hazards

Language challenges are not uncommon. The Vietnamese workers are very compliant with NMFS and are extremely agreeable to all questions and inquiries, perhaps to the point that they do not communicate their concerns. The OTs at the Long Beach site, in fact, stated that they believe the Vietnamese crewmembers occasionally say yes when they do not really understand the question.

Given this information, a foreseeable hazard in this fishery is the potential problems in communication, between crewmembers and observers, in the event of an at-sea emergency. The USCG does have Vietnamese interpreters who could potentially be used in these instances.

Although the Vietnamese might have difficulty communicating with observers, they seem to behave very respectfully toward them. It seems that they recognize that there are rules that must be obeyed, and they very seldom argue or complain about them. The crewmembers do not vocalize their problem with having women observers on board as well (which is considered taboo during certain times of the month).

Due to the number of vessels working in this region, the risk of collision is also a concern in this fishery. Further, a few crews recently have been jailed after getting caught fishing in Mexican waters.

This fishery is subject to closure due to sea turtle interactions. The financial consequence of these closures can potentially lead to deferred maintenance, which, in turn, could affect crew and observers' well being.

5. Safety requirements and level of enforcement

Due to their distance from shore, these vessels are required to carry immersion suits, survival craft, and EPIRBs. While operators are generally compliant with safety

regulations, they sometimes do not understand the mandates unless the rules are clearly articulated to them.

One problem that exists within this fishery has to do with the fact that observers often put a vessel over the six-person liferaft limit. That is, most of these vessels have six crewmembers, and thus they carry six-person rafts. When an observer boards, the vessel is no longer in compliance with the regulations and must make adjustments.

This fishery is enforced rather passively. In other words, vessels are occasionally boarded offshore by USCG cutters, depending on the cutter's mission that day. Vessels closer to shore, on the other hand, tend to get boarded or inspected more frequently.

6. Fatality and injury data

There has been one fatality in this fishery during the last few years (a longline and weight under tension hit a crewmember who bled to death). Injury data on this fishery was unavailable.

This could be considered a moderate risk fishery.

HAWAII PELAGIC LONGLINE FISHERY

1. Type of fishery and observer coverage

Vessels in this fishery operate 50 to 1,200 miles offshore and fish year around. From 1994-2000 the coverage averaged 4.5 percent; since 2000 the coverage level has been 20 percent. This program had the second largest number of observer at-sea days in 2002 and represented nine percent of total sea days in the U.S. observer program.

2. Vessel types and hazards

This fishery includes 110 vessels that operate in the Western and Central Pacific. Vessels are 50 to 110 feet in length. Although some of the vessels are in somewhat poor condition (according to local NMFS personnel), the overall condition of the fleet has improved over the last 10 years.

According to observer feedback (representing 996 trips), a number of vessel hazards (combined with subjective/human errors, below) have been identified for this fishery. These included open hatches (6), exhaust leaks (5), hydraulic leaks (5), as well complete boat breakdowns that resulted in drifting.

3. Environmental hazards

Vessels in this program fish far from port and are at sea for significant lengths of time. As a result, crews are forced to deal with emergency situations and cannot count on rapid help from the USCG. Further, during storms or in bad seas, vessels must ride out the

weather. In fact, an observer in this fishery was seriously injured as a result of being washed overboard by a large wave.

As a result, the potential risk from vessel loss due to these environmental factors and/or hull integrity is relatively higher in this fishery.

4. Subjective hazards

Many of the crews of these vessels are Korean, Vietnamese, Hawaiian, and/or South Pacific, and English is not their first language. As was noted in the California pelagic longline fishery, this lack-of-common-language can make communication (between crew and observers) potentially more difficult, especially during an emergency.

As noted above, subjective hazards in this fishery have contributed to several close calls. In addition to the incidents identified earlier, observers also noted in their debriefings three collisions since 1994. In one very recent case, the vessel ran into a large island due to a navigation error.

5. Safety requirements and level of enforcement

Vessels in this fishery are required to carry liferafts, EPIRBs and immersion suits. Due to the fact that these vessels travel far from port and are quite dispersed at sea, the USCG has had a difficult time enforcing these requirements. The crews of these vessels are very diverse, making the understanding of the safety requirements a challenge.

6. Fatality and injury data

There was a single vessel loss and fatality in this fishery in 2003. Additionally, between 1995 and 2000, the USCG documented 15 fatalities in this region. The main contributing factors, as noted earlier in this document, include man overboard and fires.

The Hawaii observer program has kept track of observer injuries during the last 10 years, and the following chart lists the injuries by type and cause.

Hawaii observer injury statistics from February 1994 to April 2003

Cuts/ Puncture	Teeth	Fractures, dislocations	Falling	Skin rash	Infection	Respiratory disease	Food illness	Strains	Bruises, crushing injurie
7	1	2	8	7	2	2	6	13	8

This data, like most of the data presented earlier, shows strains and sprains to be a leading concern (secondary, it appears, to falling). Food-related illnesses and skin rashes seem to be of higher concern in this fishery as well. This may be partly due to the fact that observers often eat unfamiliar foods and work in warm, damp climates. The relatively low number of injuries is due to the low number of observers in the first few years of the program, according to the program managers.

This fishery could be considered moderate risk.

NORTHEAST FISHERIES SCIENCE CENTER

This center is responsible for six different fisheries observer programs from Maine to North Carolina. These include the New England Groundfish Trawl fishery, the Atlantic Sea Scallop Dredge fishery, the New England and Mid-Atlantic Gillnet fisheries, and the Mid-Atlantic Trawl fishery.

Observer injuries. Although the reviewers were able to obtain some injury data as a result of interviews with this region's observers, the data was not specific to the fishery. Of the seven experienced observers interviewed, three had experienced work-related injuries: one of which was fish poisoning which went systemic; a second involved a tendon/foot injury from stepping wrong which required therapy; the third involved a hernia (of unknown cause) that has affected the observer's ability to work. Because these observers had worked in other regions, it is not known if all injuries occurred in the Northeast.

Additionally, the following injury data was pulled from observer workmen's compensation claims during a three-year period. All except one of the injuries was a state workmen's compensation claim. The other claim was a federal workmen's compensation claim. There were no known MEL claims.

Observer Injuries, from 2000 to 2003
Reported to Workmen's Compensation in Northeast Region

Eye injury (gaff hook)	Frostbite (on deck)	Knee injury (water on knee)	Back injuries (due to falls)	Boil on knee
1	1	1	3	1

These same observers provided insight as to "perceived risks" associated with the industry. That is, when asked what they felt the risks were specific to this fishery, one said sinking, another said being around gear as it was being hauled, a third said stability.

Injuries to commercial fishermen. The reviewers were able to obtain some basic injury data for commercial fishermen from this region, although not for specific fisheries. Specifically, USCG records injury data only if/when they are asked to intervene. These injuries tend to be of a more serious or life threatening nature, and as a result cannot be considered an accurate reflection of the majority of injuries in this region.

The following is a list of documented injuries (in District 1, New England) for 2003:

Type of injury	Number
Cuts	3
Hand injury-crushing	2
Fracture	2
Strains/hernia	2
Infection	1
Eye	1
Total	17

Of these fishing injuries, four were the result of falls, and two were caused by gear entanglement. Additionally, as noted earlier in this section, this region experienced 17 fatalities in 2003. Leading contributors to the fatalities included capsizings, sinkings, collisions, and MOBs.

If any additional injury or fatality data is available for a specific fishery, it is included below.

NEW ENGLAND GROUNDFISH TRAWL

1. Type of fishery and observer coverage

Vessels in the New England Groundfish Trawl fish north to the Canadian border, out to Georges Bank, and many points south. Crew size is three to six people. There is two to four percent observer coverage.

2. Vessel types and hazards

Most vessels in this fishery are 50 feet to 100 feet in length. Of vessels greater than 45 feet in length, 59 percent are over 20 years of age and 14 percent are over 40 years of age.

These crews fish hard bottom, which increases potential hang-ups and capsizing. Large rocks sometimes get in the trawl net and end up on the deck. Further, there is no onboard processing, so vessels often travel with large, heavy loads.

This fishery is severely restricted to days fished, and fishermen are suffering economically. As a result, delayed maintenance is fairly common. Some operators are buying cheap boats in poor condition. Further, vessels that were designed for a specific fishery are often converted and used in a fishery in which they were not intended. For example, several lobster boats have been converting to trawl, which in turn has led to potential stability problems.

3. Environmental hazards

This fishery takes place when openings allow; thus, fishing occurs in all conditions. During harsh winter weather, icing is fairly common. Further, the vessels travel far off shore and are exposed to variable sea conditions.

As is the case with some of the other regions, crewmembers in this fishery are often working in isolated areas. Vessels cannot return to port quickly and are forced to wait out poor weather. Crews are forced to deal with emergency situations and cannot count on rapid help from the USCG.

Vessel traffic along the coast, conversely, is quite busy; thus, the potential for collisions must be considered a potential hazard.

4. Subjective hazards

Long workdays and difficult conditions in this fishery often result in fatigue and sleep deprivation. As a result, the potential for human error is fairly high.

Crewmembers are often of mixed cultural backgrounds such as Portuguese. Consequently, the potential for language or communication problems are relatively high for this fishery.

5. Safety requirements and level of enforcement

Vessels in this fishery are required to carry immersion suits, liferafts, and EPIRBs. Typically, operators and crew are familiar with the requirements, and there is good compliance with the regulations. Local Drill Instructor and safety training courses have been available for some time, however. As a result, it is likely that a fair number of workers are somewhat familiar in the proper use of the gear.

Enforcement of equipment mandates in this region is spread thin, due mainly to the widely dispersed nature of the fleet. According to the USCG, the safety decal program is not always strictly enforced as well. The USCG in this district has noted that, at times, recent homeland security issues have superceded fishing vessel safety as a priority.

6. Fatality and injury data

There is no injury or fatality data available for this fishery (other than the statistics that are included at the beginning of the Northeast section).

This should be considered a moderate- to high-risk fishery.

ATLANTIC SEA SCALLOP DREDGE FISHERY

1. Type of fishery and observer coverage

Vessels in this fishery operate 35 to 50 miles off shore, on the continental shelf. By law, crew size is seven, at most. There is 25 percent observer coverage in this fishery.

2. Vessel types and hazards

The Atlantic Sea Scallop Dredge fishery consists of 250 vessels of about 85 feet in length.

When a vessel moves through a closed area, fishing gear and dredges must be stored onboard. Not only is it hazardous to move this equipment, the equipment is occasionally brought on deck in bad weather. During normal fishing conditions this gear (dredge) is brought on board every 30 minutes or so. If two dredges are being towed as most boats do, then a dredge could come on board every 15 minutes. The hazards are great enough that observers are instructed to stay off the deck until the dredge is unloaded. In the event a vessel reaches an open area of fishing in rough water, the heavy gear is often launched in rough seas. Lack of watertight hatches and doors can lead to downflooding and sinking. Overloading can lead to capsizing. Couplings, winches and cables under strain can break during haul back of gear.

3. Environmental hazards

Due to the environment in which these vessels fish, getting gear caught on the bottom and capsizing occasionally occur. Heavy vessel traffic along this busy coast should also be considered a hazard of the fishery.

4. Subjective hazards

Economically, this fishery is doing well, with new capitalization taking place. As a result, many vessels are fairly well maintained.

Recently, the fishery management plan reduced crew size from 11 to seven. This move appears to have been counterproductive to safety, according to fishermen interviewed for this study. According to these fishermen, although crew size has been reduced, the poundage caught has been maintained through increased productivity. As a result, crewmembers are more often fatigued, a fact that might help explain the recent increases in collisions.

Occasional reports of drug use on some vessels should also be noted as a hazard in this fishery.

5. Safety requirements and level of enforcement

Vessels in this fishery are required to carry immersion suits, liferafts, and EPIRBs. Local Drill Instructor and safety training courses are difficult to find in the area, however. As a result, knowledge of proper emergency procedures is likely limited. In 2003, for instance, one crewmember went overboard, and three additional crewmembers jumped in after him – a poor way to respond to an overboard situation in cold waters.

The level of enforcement in this fishery is similar to but greater than the enforcement provided in the trawler fishery, mainly because these vessels operate in a more defined area. Many of the boats have dockside exam decals, and there appears to be good decal compliance in this fleet.

6. Fatality and injury data

Historically, scallop fishing has been hazardous. Of the 14 deaths reported in the New England – New York area in 2003, seven were from two lost scallop boats. In a three-week period in early 1999, 11 scallop fishermen died, and four clam/conch fishing vessels were lost. Scallop vessels often capsize due to bottom hang-ups or vessel stability. In fact, many of this region's vessel losses are due to scallop vessel capsizings and sinkings.

Additionally, of the seven observer injuries reported to workmen's compensation in the period from 2000 to 2003, roughly 50 percent were from this fishery.

This could be considered a moderate to high-risk fishery.

NEW ENGLAND AND MID ATLANTIC GILLNET FISHERY

1. Type of fishery and observer coverage

Most of the vessels in the fleet are documented and fish up to 50 miles off shore, from Maine to North Carolina. It is a year around fishery. Crews are small, sometimes consisting of the captain and an observer (on smaller vessels). Trip duration is typically a single day, but on occasion may last two or three days. There is two to five percent observer coverage.

2. Vessel types and hazards

This fishery has about 1,500 relatively small vessels 24 to 50 feet in length, with a few reaching 80 feet. Most boats are made of metal, wood, and/or fiberglass and include open skiffs as well as vessels with a house.

In this fishery, setting gear is fairly risky. Further, net entanglement should be considered a risk. Because many of these vessels retrieve gear by backing into weather and seas, the stern is exposed to swamping.

3. Environmental hazards

Oregon Inlet in North Carolina is one of the mid Atlantic's most hazardous bars. Shoaling is a constant problem that requires continued dredging. Weathers warnings are available, so vessels can often escape from the roughest conditions.

Heavy vessel traffic along this busy coast should also be considered a hazard.

4. Subjective hazards

Economically, this fishery is maintaining. Often, locally owned and operated vessels, primarily family run, are used. Although the vessels are in decent shape, these family relationships can, at times, create an awkward situation for observers.

5. Safety requirements and level of enforcement

Except for the smaller, inshore boat, most vessels in this fishery are required to have immersion suits, liferafts, and EPIRBs. There is not a lot of active safety training in the fishery, however. Drill Instructor and safety training is often unavailable or difficult to find. As a result, it is likely that some of the fishermen are not well versed in using safety gear.

Enforcement of and compliance with safety requirements in this fishery is mixed. For example, many vessels do not comply with the dockside exam program. (Since gillnet boats can just have a state permit, for instance, it is difficult to send out a mailing advising of the safety exam.) Further, anecdotal evidence suggests that many vessels falsify drill logs. The greater enforcement effort appears to be placed on the offshore fleet.

6. Fatality and injury data

No gillnetter fatalities or vessel sinkings have been reported in the last five years.

This could be considered a low- to moderate-risk fishery.

MID ATLANTIC TRAWL

1. Type of fishery and observer coverage

The Mid-Atlantic trawl fishery is very diverse. Although many vessels fish well off shore (reaching 80 to 100 miles, near the edge of continental shelf), smaller boats work within six miles of the coast. Squid and whiting are the basic target in this year-round fishery, which has less than five percent observer coverage.

2. Vessel types and hazards

Mid-Atlantic Trawl vessels are typically steel western rigs that range from 35 feet to about 160 feet (most are in the 45- to 80-foot range). As has been noted previously, some of the vessels have been converted for use.

Both fresh and freezer boats are used. As a result, freezing injuries (from freezer ice) has occurred and should be noted as a hazard. These trawlers have swinging net doors and other potentially hazardous deck equipment.

At times trawlers can get hung up on the ocean floor/debris; however, this risk is not as great as that noted in the scallop dredge fishery. Big catches, however, (as with croaker and weakfish) can lead to heavy loads and stability hazards.

3. Environmental hazards

Bad weather can be problematic in this year-round fishery. Icing can happen in winter, and heat challenges can occur in summer. For example, temperatures can reach 130 degrees in the engine room, 90 degrees on deck, and can also fall below zero in the freezers. A crewmember can work back and forth in these extremes many times in a day. Because there is no IFQ, weather windows are often pushed to reach a fishing quota.

Further, the semi-remote location of this fishery can be somewhat hazardous. Because it takes a day to get to some parts of the fishery range, fishermen are forced to deal with weather and problems, often with little or no assistance.

As is the case with other fisheries in this region, heavy vessel traffic along the busy coast can be hazardous.

4. Subjective hazards

Economically, the Mid-Atlantic fleet is relatively well off, though it has been down the last few years. (Summer flounder is one of the healthier stocks.) Vessels work on a quarterly basis, and excess quota can be carried over to next quarter.

Some of the duties associated with this fishery can be considered hazardous, especially if proper procedures are not used. For example, fishermen must often lift 25-pound fish boxes above the head. Work hours can be long, sometimes 20 to 70 hours straight, though many vessels use an eight-hour-on, four-hour-off schedule. Consequently, observers are usually required to work long, arduous hours as well.

Crewmembers are typically older than those in other fisheries, and qualified workers are often hard to find. (Younger people, for example, go into lobstering.) However, though the workers are fairly experienced, they are not experienced in emergency or survival training. In fact, there is an overall disregard toward safety in much of this fleet. Crewmembers often do not do drills, nor are they knowledgeable about the location (or

proper use) of survival gear. EPIRBs are not tested regularly, and contents of liferaft survival kits are often unknown. Additionally, few of the crewmembers are certified in first aid, though some have taken CPR.

5. Safety requirements and level of enforcement

Required gear for offshore vessels includes liferafts, immersions suits, and EPIRBs. Although many of the vessels do indeed carry this equipment, (as noted above) many crewmembers are not practiced in their use.

At-sea boardings are used to verify that the major survival equipment items are present, and the USCG is fairly thorough in enforcing safety equipment regulations. Nonetheless, it appears that a number of the offshore vessels have old and/or expired decals. Further, the USCG does little to ensure that drills are conducted.

The USCG in this district seems to have placed an increased emphasis on homeland security on this coast recently. As a result, fewer voluntary exams have been conducted in the last few years, and the USCG seems to be losing some of its expertise in this area. Dockside exams, instead, are being done more by USCG auxiliary. The USCG has also been training more lately to provide more dockside exam expertise.

6. Fatality and injury data

There is no injury or fatality data specific to this fishery.

The risk associated with this fishery should be considered moderate to high, mainly due to winter fishing.

SOUTHEAST FISHERIES SCIENCE CENTER

Although Alaska is often considered commercial fishing's most dangerous venue, USCG data (from 1995 to 2000) show that more fishermen die in the Gulf of Mexico than in any other region. Further, the Gulf led the nation in fatality statistics (18) again in 2003. Many of the deaths were on shrimp vessels, and man-overboard was the most common cause. Often, however, this region does not seem to have a self-perception as being high risk. This might be in part due to the warmer waters in the area. The lowered self-perception of risk might also be due to the fact that most fatalities in the Gulf are single fatality events rather than headline/movie-making multiple fatality catastrophes.

The Southeast region contains five observed fisheries: directed shark gillnet; pelagic longline; shrimp trawl; rock shrimp; and calico scallop. Although there have been no observer fatalities in this program, the reviewers were able to find some incidents of injuries.

According to Johnson Controls, the contractor for the area, there have been reports of four major and four minor injuries since 1998. These injuries were for the most part not categorized by fishery.

Major injuries, by type and cause:

- 2003 – While eating a piece of ham, a bone lodged in an observer's throat. There was no significant injury. However, the boat returned to dock and the observer was taken to hospital where the bone was removed. The observer returned to duty shortly thereafter.
- 1998 – An observer was on the bow of a boat adjusting an antenna for a satellite phone. He slipped and fell, sustaining deep tissue trauma to his right hip.
- 1998 – An observer was struck by a treble hook under one of his eyes. The blow resulted in a laceration.
- 1998 – An observer's boot rubbed against leg. The act caused an abrasion and set him up for infection.

Minor injuries, by type and cause:

- 2001 – An observer fell off a wet ladder rung (from a hold) resulting in strain to right rib area.
- 2000 – An observer bit a fishbone, causing pain in his/her teeth.
- 2000 – While gaffing for tuna, a worker nicked an observer's foot and hand, causing minor scratches.
- 2000 – An observer's leg abrasion caused minor infection. The initial injury was caused from the boot.

Some injury data is included under specific, observed fisheries.

SOUTHEASTERN SHRIMP OTTER TRAWL & SHRIMP/CALICO SCALLOP BOTTOM TRAWL FISHERY

1. Type of fishery and observer coverage

This is a year around fishery with most effort occurring May through December. There is less than one percent observer coverage.

2. Vessel types and hazards

The typical vessel in this fishery is 70 feet in length with a crew of three. Vessels operate coastal, to about 100 miles offshore. There are 6,000 federally documented and an unknown number of state registered vessels in this fishery.

3. Environmental hazards

Sudden thunderstorms and waterspouts can occur suddenly, at any time of the year; hurricanes sometimes occur during the late summer months.

4. Subjective hazards

Several factors converge to make this fishery fairly hazardous.

For instance, shrimp prices are at a historic low, and the USCG has noted a decrease in vessel maintenance, which is typical in economically poor fisheries. Further, many of the vessels are old and wooden; without regular maintenance, they quickly degrade. Steel vessels, on the other hand, have more corrosion due to the climate. As a result, a number of the vessels in this fishery are in poor condition.

It can be difficult to find qualified crew for these vessels. The pay is low and the work monotonous. One can be at sea for many days. Therefore many workers are hired from Mexico and Central America to be shrimp "headers." This cultural mix can lead to communication challenges (though many of the boat owners speak Spanish). There is also a large presence of Vietnamese and Cajun workers in some of the fleets.

During interviews, drug and alcohol use were identified as potential hazards and concerns. Concerns about drug/alcohol use and abuse were cited in this fishery more than any other region. One of the interviewed workers estimated that substance abuse is present on up to 40 percent of the vessels.

5. Safety requirements and level of enforcement

These vessels can fish more than 50 miles offshore. Therefore, vessels that fish more than three miles from shore are required to have liferafts and EPIRBs. Immersion suits are not required on these vessels if south of 32 degrees north latitude. Given that the observer is the only one carrying an immersion suit, challenges could potentially occur should a vessel experience an emergency. Several years ago one crewmember killed another during a struggle over a life vest during a vessel sinking.

Compared to other regions, this fishery was late in getting vessel compliance with regulations. There appears to be more distrust between the USCG and fishermen here than seen in other regions, so communication between the two groups is not forthcoming at times. However, efforts have been increasing, and the situation has improved over time.

6. Fatality and injury data

There is no observer fatality and injury data specific to this fishery. However, the reviewers gathered basic information from Miami observers who had observed on Gulf shrimp vessels. In one instance, an observer reported waking up with headaches –

possibly due to ammonia leaks onboard, CO build-up, and/or diesel fumes. (CO may be a bigger problem on smaller boats; ammonia on larger vessels.) Other observers noted that getting slime in the eyes with a subsequent infection has been a problem as well.

This should be considered a high-risk fishery.

SOUTHEAST ROCK SHRIMP

1. Type of fishery and observer coverage

This is a diverse fishery that fishes many types of shrimp. The crews tend to be professional workers.

This fishery takes place roughly 40 miles off the East Coast of the U.S., as well as 130 miles off the west coast of Florida. Vessels target penaeid shrimp near-shore, and rock and penaeid shrimp offshore. Trawling takes place at night and crewmembers sleep during the day. Observing started working this fishery in 2001, and there is currently less than one percent observer coverage.

2. Vessel types and hazards

Vessels in this fishery are roughly 76 feet in length and typically steel hulled. There are approximately 250 operators who hold rock shrimp permits and fish with otter trawls. Otter trawl involves lines under tension.

3. Environmental hazards

Workers in this fishery sometimes encounter hazardous marine organisms, including scorpion fish and some shark species.

Further, this fishery can experience sudden thunderstorms and waterspouts at any time of the year; hurricanes occur during the late summer months.

4. Subjective hazards

Many of the vessels in this fishery are fleet owned, though some family operations exist. Economically the fishery is doing very poorly. Consequently, decisions are sometimes made with financial concerns in mind.

5. Safety requirements and level of enforcement

Vessels that fish beyond three miles (in Federal waters) are required to have EPIRBs and liferafts; vessels are not required to carry immersion suits. Safety training is not widely available in this area, and many crewmembers have little education in this regard.

Most vessels that were chosen to carry an observer already had a safety decal. Any uncorrected safety issue (above and beyond the safety check list) results in a vessel being removed from the observer selection list. As a result, the better boats in the fleet carry observers.

6. Fatality and injury data

There is no observer fatality and injury data available, specific to this fishery. This might be called a moderate- to high-risk fishery due to distance off shore and poor economic condition.

SHARK DRIFT GILLNET/STRIKE NET (PANAMA CITY)

1. Type of fishery and observer coverage

Crew comprised of two to six people. There is 100 percent observer coverage.

2. Vessel types and hazards

Only eight to 12 vessels from 20 to 35 feet in length

3. Environmental hazards

Vessels operate within 3 miles of shore but are smaller vessels that are more at risk in rough weather. They can experience sudden thunderstorms and waterspouts at any time of the year and hurricanes during the late summer months.

4. Subjective hazards

Hazards include getting snagged by the net, cuts, overboard incidents. Hazards involving work related to limited deck space are also present.

5. Safety requirements and level of enforcement
Immersion suits not required South of 32 degrees North latitude (Georgia). Availability of safety training is thin.

6. Fatality and injury data

According to Johnson Controls, the contractor for the area, they have only reported two injuries since the start of this program in 1998:

- 2002 – Sprain to left knee stepping down onto the deck of vessel while offshore.
- 2003 – Contusion to lower back after falling against some vessel equipment during rough weather.

There is no other observer fatality and injury data available, specific to this fishery. This might be considered a low- to moderate-risk fishery but the small size of the fishery makes it difficult to determine.

PELAGIC LONGLINE OBSERVER PROGRAM

1. Type of fishery and observer coverage

Vessels fish hundreds of miles offshore. They operate year around but are subject to closures. Observer coverage is between five and eight percent.

2. Vessel types and hazards

Includes 150-200 vessels from 25 to 65 feet in length in general.

There's been several close calls where observers were to be put on a vessel, didn't go, and the boat subsequently went down.

3. Environmental hazards

Thunderstorms, waterspouts, hurricanes in season. Unpredictability of weather, winds, waves from these great distances offshore add to hazards.

Large live swordfish, tunas and sharks are brought onboard these relatively small decks.

4. Subjective hazards

This fishery is in poor shape economically, potentially resulting in fishermen accepting more risk. Observers are on deck long hours. There is a cultural mix in the fishery potentially raising communication concerns.

5. Safety requirements and level of enforcement

Immersion suits are not required on these vessels if south of 32 degrees north latitude. EPIRBS are required beyond three miles and survival craft for these far offshore vessels. Few boats do monthly safety training.

Enforcement by USCG is limited by having only two personnel assigned to the dockside exam sticker program for the whole east coast of Florida. Thus some vessels exams require lengthy travel times. Although there is a lack of examiners, they are responsive and are willing to contact selected vessels to arrange for examinations, when provided with a list from program manager.

Liferaft capacity is an issue when vessel is carrying a full crew.

6. Fatality and injury data

Injuries in this fishery:

- 2001 – Strain to right rib area after falling into deck freezer.
- 2003 – Strained left ankle observing haulback. Stepped wrong on deck during weather.

There is no other observer fatality and injury data available, specific to this fishery. This could be considered to be a moderate risk fishery.

SHARK BOTTOM LONGLINE OBSERVER PROGRAM (UNIVERSITY OF FLORIDA-GAINESVILLE)

1. Type of fishery and observer coverage

This is a large directed coastal shark bottom longline fishery. These boats don't go far off shore. As a result, there are always other boats in the area that can provide help. There is about two percent observer coverage.

2. Vessel types and hazards.

Vessels are 35 to 60 feet in length. They operate with crews of two to three (up to five) and travel from three to 70 miles offshore year around.

3. Environmental hazards

They can experience sudden thunderstorms and waterspouts at any time of the year and hurricanes during the late summer months.

4. Subjective hazards

On-deck shark attacks are a possibility when it gets hectic. Observers have to be aware of large, live sharks, as there is a risk of getting bit by sharks when onboard. People tend to hang over the side instead of using the head. There has been anecdotal evidence of drug use leading to violence (no observer involved).

Back injuries (large fish) and dehydration are probably big concerns.

5. Safety requirements and level of enforcement

Most will be documented and EPIRB and survival craft will be required depending on distance from shore. Emergency drills would be required if documented. Immersion suits are not required south of 32 degrees north latitude (Georgia). Availability of safety training is thin.

6. Fatality and injury data

Shark bite injuries have occurred on these vessels to fishermen. This fishery also reported a man overboard (on a vessel that is known for fishing in rough water). Further, gear injuries and injuries from getting hooked have also been seen. This might be considered a low to moderate risk fishery.

Summary of risks (and injuries/fatalities) per fishery
In the development of training curriculum and need for attention as well as any injury prevention measures, it is critical that observer programs have access to correct, current and complete data about observer injuries, hazards and fatalities.

In order to address overall causes of injuries and their rates, injury and fatality date data should be collected consistently and nationally. Injury categories should be standardized across the country with injury and cause and classed by fishery. Currently, the definition is different in each region, i.e. the Northeast has everything separated out, Alaska and the Northwest have everything under the observer program in the groundfish fishery in which the injury took place.

In addition, a standardized method to collect close call data would be helpful. Additional hazards could be identified and a proactive method be developed to minimize them.

Since the most catastrophic loss is loss of life, and observers work in a very dangerous industry and environment, emergency survival training should continue to be strengthened to include measurable objectives and tested competencies. The topics and skills included in the training should be directly related to what causes fatalities in a region.

The greatest risk to life in commercial fishing is the person overboard incident. Safe deck practices and the wearing of personal flotation devices should be encouraged or required.

The predominant injury seen by observers across the country are strains and sprains related to heavy lifting. Proper lifting methods should be encouraged, taught and practiced in all observer training. Programs may also find it useful to examine if heavy lifting tasks can be reduced or adjusted – i.e. NPGOP pulley system or designing work to use smaller sample sizes.

Fisheries that are in poor economic health should be considered potentially higher-risk fisheries. The economic viability of different commercial fisheries can change rapidly. Vigilance must be maintained in order to keep ahead the changing economics and fortunes in specific fisheries that may affect risks to observers.

IV-10. Risk to NMFS

The greatest risk to NMFS appears to be the risk of financial loss and/or damage to reputation in the event of an injury to an observer and/or observer trainer. A secondary risk would involve the amount of time, energy, and focus NMFS employees would likely need to spend on responding to a crisis (i.e., providing medical and/or emotional support, paperwork, accident investigation, etc.).

The exposure NMFS has in regard to legal claims or suits will be measured, to a great degree, on whether or not negligence is involved. The risks identified above, and the potential for a claim of negligence, could and/or would be enlarged if any of the following were to occur:

- Inadequate or incorrect material is presented during the safety training
- Unqualified observers are allowed to work at sea
- Unqualified trainers are hired or used to facilitate observer safety training
- Inadequate or poorly maintained equipment is used during safety training
- Inadequate or poorly maintained equipment is issued (or at-sea use) by NMFS
- Ambiguous or improper rules/policies are used during the safety training
- Ambiguous or improper rules/policies are imposed by NMFS but are not enforced
- Ambiguous or improper lines of responsibility (duty) exist

In order to make sure NMFS receives the best advice possible (regarding exposure to legal liability), the reviewers believe it would be prudent for NMFS to consult an attorney. Without attempting to offer legal advice, the reviewers have identified the following list as possible steps that could be used to help minimize the risks to NMFS.

1) Provide appropriate content in the observer training (which might include but would not be limited to topic selection, time allotted per topic, and methodologies used);

2) Take steps to ensure that only “qualified” observers go to sea (i.e., identifying baseline levels of success, evaluating observers based on the given criteria, and allowing only “passing” observers to be selected for deployment;

3) Incorporating proper risk management measures into the training exercises; and

4) Use only “qualified” trainers to present the material.

Additional suggestions regarding legal liability risks are included later in this report.

A secondary area of potential concern is in regard to the relationships that exist between NMFS and the various contractors. While the relationship itself seems appropriate, the potential for problems exists in that clear separation of duties and responsibilities is not always evident. Because the delegation of responsibility is not always clear, the ambiguity could ultimately create legal challenges.

Further, because NMFS uses "guest presenters" (e.g. USCG personnel) and conducts activities off NMFS property (e.g., at pools, docks, etc.), NMFS could potentially be exposed to legal claims/suits in the event 1) an incident occurs as a result of a guest's actions and/or 2) an incident occurs off NMFS property.

The use of clear and well-written legal documents can help minimize the risks associated with contractual relationships (as well as the risks associated with working with non-NMFS employees or while off site). For example, NMFS might consider using an acknowledgement/assumption of risk and/or release of liability form to help protect themselves from a claim of negligence.

Because this type of risk management is outside the scope of the reviewers' expertise, however, the reviewers believe NMFS should consider hiring or consulting with an attorney (who specializes in this type of law) in order to review and comment on the appropriateness of the documents currently in use.

6. Summary of risk/hazard assessment

In summary, there are risks inherent to the training and deployment of observers. Inherent risks are risks that cannot be eliminated. While NMFS has no legal obligation to protect observers from inherent risks, it does have the responsibility to recognize, assess, and manage those risks to the best of its ability. It also has a legal obligation to avoid enlarging the risks. Finally, NMFS shares responsibility with the observers and with the contractors in helping observers become prepared for their at-sea deployments.

The most obvious risks to observers and trainers – associated with the current training exercises themselves – include risk of injury or fatality secondary to drowning, slips, falls, cuts, burns, and/or travel to/from the training sites.

The most obvious risks to observers associated with their at-sea work includes injury or fatality secondary to vessel loss or MOB, slips/falls, cuts/burns, repetitive tasks, inappropriate lifting, inadequate water/food, challenging living quarters/environment, and/or travel to/from deployment sites, as well as getting on/off the vessel.

Additionally, the most obvious objective risks associated with commercial fishing (generically) tend to be injury or fatality secondary to dangerous weather/sea conditions as well as hazardous on-deck working environments (nets, machinery, cables, etc.) and vessel conditions (instability issues, fire hazards, etc.). Subjective factors that seem to contribute to most fishing fatalities have to do with poor maintenance/control of a vessel, MOB (due to human error); factors that tend to contribute most often to fishing injuries appear to be slips/falls, repetitive use, and/or improper lifting (which lead to musculoskeletal injuries) as well as tissue (skin) injuries (often due to improper procedures, getting caught in machinery/netting, etc.).

The most obvious risk to NMFS associated with training and deployment of observers appears to involve financial harm (or damage to reputation) secondary to claims of

negligence and/or secondary to ambiguous relationships with contractors, guest presenters, and off-site land managers.

Recommendations for managing or minimizing the above risks are identified later in this report.

Section V
Documentation of Current Practices

The following section provides documentation of the current practices being used at the various sites. Specifically, the reviewers gathered information in the following five areas:

1) Program oversight and system management;
2) Documentation of topics (including time devoted to safety training, methodologies, and use of lesson plans) at each site;
3) Use of supplemental teaching resources (i.e., quizzes, checklists, teaching aids, etc.);
4) Use of contracted instructors; and
5) Documentation of contractor/NMFS relationships, and delegation of responsibilities

The reviewers first identify what information was gathered per category, and some information is provided as to the importance of each. The rest of the section is laid out by category: that is, the reviewers provide a brief summary of the overall findings (summary of all sites) as well as a site-by-site listing of practices for each of the five areas.

1) Program Oversight and System Management: Roles and responsibilities in development and oversight of training(s). The intent of this sub-section is to gather information on whether or not there is any type of "management system" in place to ensure that proper decisions are made, external ideas are considered, nothing is overlooked, and objective and ongoing evaluation takes place. Some of the questions the reviewers addressed include:

- Is there a formal system for making decisions (e.g., identification of topics, depth of topics, performance standards, criteria for student success, etc.)? Or are decisions simply made by one or two people? Are attempts made to get "external input" before decisions are made?
- Who are the trainers at each site? What type of background are the trainers required to have? Are "guest" presenters used?
- Is there any type of oversight of the training (i.e., is there an objective person or group who is able to provide checks/balances of decisions; is there any type of formal evaluation of the training that includes a review of the appropriateness of content, methodologies, and risk management)?
- Are there any risk management guidelines for facilitating the training exercises? Or is it assumed that instructors will "be safe?"
- Are periodic reviews conducted? If so, do they include people from outside the organization?

2) Documentation of topics per site, including use of lesson plans. The intent of this sub-section is to learn more about which topics are being presented at each site, how thoroughly they are being covered (including times), whether or not "key learning points" (i.e., goals and objectives) are being identified for each topic, and which methodologies are used most. Some of the questions the reviewers addressed include:

- What topics are covered at the site, what are the key learning points per topic, and how much time is devoted to the safety training?
- Are lesson plans available for all topics? Are the lesson plans complete? That is, do they identify objectives, time allotments, sequencing, and methodologies?

- If lesson plans are on-site, are they used/followed? If lesson plans are not available or are not used during a presentation, do instructors use any type of outline?
- What types of methodologies are used to present the various topics? Specifically, which topics are presented using hands-on techniques?

3) Use of supplemental teaching resources (quizzes, checklists, teaching aids, etc.). The reviewers used the documentation in this section to develop a better understanding of the tools each site uses to enhance their trainings and methodologies. For example, the reviewers noted whether or not a site used a variety of aids (or focused on a single type). Programs were asked to identify the methods/tools used to assess student success (such as quizzes and/or checklists) as well. Similarities and differences between sites were noted, and results were used to help create the list of "best practices" (provided in the Appendices).

The findings from this section, in turn, helped reviewers in their evaluation of the quality of presentation as well as the amount of assessment being done.

The reviewers used the following questions to guide the documentation process:
- What, if any, visual teaching aids are used in the classroom (i.e., posters, videos, overheads or PowerPoint)? Are any auditory aids (audio tapes) used?
- In the event that tapes are used, which ones are used, and how much of the training is based on their use?
- Does the site use a variety of props, or do OTs tend to focus on a single type.
- What teaching "props" are available in the classroom, in the field, and/or throughout the course? That is, are examples of survival equipment available? Are props simply available in the classroom, or are they actually used to enhance student learning?
- What type of assessment is done to gauge student learning and success? What type of assessment is done to measure student performance? Does each site clearly identify what is meant by success?
- Do students know what is expected of them? Are they given a list of "expected outcomes" or performance criteria?
- Are checklists used (including but not limited to vessel checklists) to help students remember key points?

4) Use of contracted trainers or agencies. The intent of sub-section four is simply to identify which sites use contracted (non-NMFS) trainers to present the safety material. In the event contracted trainers are used, information regarding the selection process (as well as oversight of the safety training) was gathered as well. Mainly, the reviewers were interested in knowing whether or not a system exists to assess or ensure the content and quality of the safety training provided by contracted OTs.

5) Documentation of contractor/NMFS relationships, and delegation of responsibilities. The intent of this section was to get a better understanding of the interplay between NMFS and the various contractors at each site. Given that this relationship – at least to some degree – can have an affect on the well being of the observer, the reviewers attempted to obtain information in the following areas: what

safety equipment is being issued and what type of oversight is involved; what, if any, steps are taken (by the contractor) to prepare the observer for at-sea work (that is, what attempts are made to educate the observer regarding at-sea hazards); what, if any, fitness requirements are there for observers; are any steps made to obtain medical histories or emergency information. Additionally, the reviewers attempted to note what role (if any) NMFS has in the hiring of observers. Finally, some information was obtained regarding the use of indemnity agreements and/or release of liability forms at each site.

The information in this section was used to identify potential problems that might exist, not only in regard to observer safety, but also in regard to legal exposure to NMFS.

V-1. Oversight and system management – overall findings

1a. Overview of all NMFS observer training programs. It is not uncommon for an organization to make management decisions based on the best judgment of a few (or one) employees. These same employees often then are asked to assess their decisions; however, there are no clear guidelines or criteria upon which to base their assessment.

If/when the decision-makers are "experts" in their fields, this approach can potentially work. They may have enough knowledge and expertise that they are able to consider all potential consequences of each choice, and they can accurately and objectively assess their actions after the fact. If, on the other hand, employees are required to make decisions outside of their areas of expertise, chances are good that errors – small or large – will occur. As a result, it is important for this latter group to obtain information from outside their inner circles in order to make the best decisions possible. It is also prudent for this latter group to occasionally ask an outside source to provide feedback on their decisions and actions.

Most of the trainers who facilitate the observer courses are experts in the area of marine science and research, data collection, and/or some other fishery specialty. They are not, however, experts in teaching, nor are they experts in marine safety or injury prevention / industrial safety.

As a result, it is important that a "management system" is used to guide decisions about the safety training. This "system," in turn, should be used to identify core topics that should be covered, and it should provide guidance as to "how" they should be covered. It is also important that decisions about "student success" (i.e., what is meant by student success, what skills should students be required to perform, and to what standard should they perform them) and risk management are not left to the instructors (who, as noted, are likely experts in marine science, but are not experts in safety education).

As stated, the intent of this sub-section is to gather information on whether or not there is any type of management system in place to ensure that proper decisions are made, external ideas are considered, nothing is overlooked, and objective and ongoing evaluation takes place.

Until recently, there has been little agency-wide approach in the development and oversight of the safety training offered at the various sites. The reviewers recognize, however, that NMFS and the National Observer Program (NOP) have made significant strides in this area in the last few years. In fact, the NOP Advisory Team (NOPAT– which includes representatives from each site as well as the national office in Washington, DC) has taken an active role in soliciting external advice and in providing leadership in the development of a coordinated management system. The NOPAT was established in 1999 by NMFS leadership to address observer issues of national importance.

For example, in 2001, and again in January 2004, a number of NMFS's trainers and the NOP coordinator met in an attempt to identify what each site was including in its safety training and formalize core topics (the 2001 list is identified later in this section). These gatherings have contributed greatly to national consistency in safety training content and methodology. As a result of these efforts, each site has modified and improved their curricula and methods.

The 2001 meeting ultimately sparked discussion on whether or not the curriculum should be standardized nationwide, and/or whether or not "core topics" should be identified and required.

While each of the above steps has led to increased standardization in the trainings, there continues to be no formal oversight of the trainings, at the national levels. Currently, the National Observer Program has no direct authority over the regional programs. Instead, national policies and procedures are developed by consensus through the NOPAT. No specific person or group has been identified as having authority in curriculum selection or modification on a national level. In some cases, at the regional level, individual trainers appear free to modify their trainings they see fit.

1b. Site-by-site documentation of all NMFS observer training programs. The following information is a brief summary of how each site identifies core topics, modifies its safety training, or of any formal oversight that is used for quality control. This information is taken from the self-assessment questionnaires as well as interviews during site visits.

The documentation, per site, addresses the following:

- Is there a formal system for making decisions (e.g., identification of topics, depth of topics, performance standards, criteria for student success, etc.)? Or are decisions simply made by one or two people? Are attempts made to get "external input" before decisions are made?
- Who are the trainers at each site? What type of background are the trainers required to have? Are "guest" presenters used?
- Is there any type of oversight of the training (i.e., is there an objective person or group who is able to provide checks/balances of decisions; is there any type of

formal evaluation of the training that includes a review of the appropriateness of content, methodologies, and risk management)?
- Are there any risk management guidelines for facilitating the training exercises? Or is it assumed that instructors will "be safe?"
- Are periodic reviews conducted? If so, do they include people from outside the organization?

Anchorage: North Pacific Groundfish Observer Program and Alaska Marine Mammal Observer Program (Alaska Region)

The safety training offered through the Anchorage site is carried out by the University of Alaska Anchorage's North Pacific Fisheries Observer Training Center (OTC). The OTC operates via a grant from NMFS to provide observer training to all programs conducted in the EEZ off Alaska. As a result, the OTC employees train groundfish observers, marine mammal observers, and State of Alaska shellfish observers. Marine mammal observer training had previously been done via a separate contract, but it has now been added to the scope of the NMFS grant in 2004.

Four trainers, all of whom are supervised by the OTC director, conduct groundfish and marine mammal observer safety education. Trainers at the OTC are approved by NMFS as being qualified to teach the groundfish observer training, and all OTC trainers are required to attend the AMSEA MSIT. Further, trainers are required to observe a training prior to conducting one on their own. Attendance of refresher courses is up to the discretion of the director. Refresher courses are intended for each OT for every three years of service.

All curriculum used by the OTC is created jointly with the NPGOP and the Marine Mammal Observer Program, and the programs have worked cooperatively in the development of their safety trainings (which is based, or is very similar to the AMSEA curriculum). Representatives from NPGOP and the OTC meet at least twice each year to review the training, and potential changes are discussed during the meetings. Although the sites are authorized to identify topics, the curriculum must ultimately be approved by NMFS prior to their adoption and use.

Additionally, the Anchorage OTC (in cooperation with Seattle NPGOP) has attempted to create a formal quality control system that helps evaluate the effectiveness of the safety training. For example, OTC-trained observers are asked to rate the training they received, and questions about the quality and appropriateness of the safety training are included. OTC employees track the answers and look for trends or areas of concern. Potential changes in the training can come about as a result of the student responses. All groundfish observers are asked to fill out a post-deployment survey during their debriefing. These surveys ask observers to assess their overall training after they have had at-sea experience. The results of these surveys are available to relevant personnel.

Although the Anchorage OTC and NPGOP work together to develop and evaluate the safety training program, except for the fact that much of the curriculum is based on

AMSEA resources, "outside expertise" has not traditionally been included in the development of curriculum or the review process. Most of the evaluation of the safety training appears to be done "in-house" and/or by the observer trainers themselves. However the OTC has contracted with Kit Van Meter to provide a comprehensive curriculum and assessment review of the groundfish training. This review is intended to be an aid to both the OTC and NPGOP training centers. An initial meeting with Kit took place in Anchorage on April 8-9, 2004 with more activity planned for later this summer.

Anchorage also uses "visiting" personnel from the USCG Marine Safety Office on a regular basis. OTC and USCG representatives have worked together to ensure that the USCG instructors follow a set curriculum.

Gainesville: Shark Bottom Longline Observer Program (SE Region)

The training offered at the Gainesville site is conducted by a single (University of Florida) employee. No NMFS employees work out of this site. As per the OT job description, the designated trainer must attend the AMSEA MSIT. There is no formal requirement regarding OT continuing education, however, and the OT is not required to attend refresher courses.

The Gainesville program is fairly small and has developed a positive working relationship with the Miami observer program, allowing training ideas to be shared between employees from these two sites. Additionally, the Gainesville OT has attempted to seek input from other observer programs as well. According to the OT, much of the safety training is based on AMSEA curriculum.

Although the current OT has taken steps to solicit input regarding the training offered at this site, there is no formal system in place to identify training topics, assessment criteria, and/or risk management practices. Further, there is no formal system for modifying or evaluating the safety training on an ongoing basis although changes, and additions are discussed with two full time observer trainers prior to each training session. There appears to be no formal guidelines regarding risk management practice as well.

Gainesville uses an "outside" or "visiting" instructor (USCG personnel) on occasion; however, the visitor(s) is not given a lesson plan, the visiting instructors are told exactly what to go over and their lesson plans are reviewed prior to their arrival. The Gainesville OT provides a written account of what is to be addressed, along with phone conversations to make sure the appropriate topics are discussed.

Galveston: Southeastern Shrimp Otter Trawl Fishery (SE Region)

Three trainers currently conduct the training offered at Galveston: one in-house and two who have been contracted. The OTs are required to have attended the AMSEA MSIT or a USCG Drill Instructor course. There is no requirement regarding OT ongoing education, and OTs are not required to attend refresher courses.

As is the case with Gainesville, the Galveston program is quite small and isolated; thus, there are built-in challenges regarding the ease in which "outside" ideas can be collected and used. Galveston selects its curriculum by working with the SE center and via the various courses and trainings that instructors (OTs) attend. The Galveston lead OT and her supervisor are charged with curriculum identification and oversight.

Galveston uses a "visiting" instructor (such as personnel from the USCG) on occasion, but the visitor(s) is not given a lesson plan, and there is no system for ensuring that key learning points are covered. The Galveston OT does, however, provide guidance as to which topics s/he would like covered.

Galveston does not use a formal quality control system. That is, there is nothing in place to systematically evaluate the appropriateness or overall effectiveness of the safety curriculum/training on a regular basis. Additionally, Galveston has not historically sought "outside expertise" to provide input regarding its safety training and/or risk management practices.

Honolulu: Hawaii Pelagic Longline Observer Program (SW Region)

The training offered at the Hawaii site is conducted by a number of OTs, each of whom has attended AMSEA MSIT. Although AMSEA MSIT is not a formal requirement, the program has made a concerted effort to formalize the training that all OTs receive. There is no requirement for continuing education of trainers, however, nor is there a requirement that OTs attend refresher courses.

Honolulu has selected its curricula based primarily on AMSEA MSIT. Although there is a single trainer at Honolulu who has been charged with curriculum development and oversight, input is taken from all trainers at the site. As is the case with other sites, the lead trainer's supervisor provides little input in the development and oversight of the training. The trainers at Honolulu have been fairly active in soliciting input from other observer sites and trainers, and have been modifying their training on a regular basis.

As is the case with most other sites, Honolulu has not historically engaged in soliciting outside expertise regarding their safety training. Instead, new ideas and input tend to be the result of the OT attendance at trainings, workshops, and/or conferences. The Honolulu OTs also interact with OTs from other sites, and some new information or ideas are brought into the program as a result.

Honolulu uses "visiting" instructors (such as personnel from the USCG and liferaft repacking company) on a regular basis. While the visitor(s) is not given a lesson plan, and there is no system for ensuring that key learning points are covered, the person who is commonly used appears to work off of a lesson plan, and key points are addressed.

Honolulu does not use a formal quality control system. That is, there is nothing in place to systematically evaluate the appropriateness or overall effectiveness of safety curriculum/training on a regular basis.

Long Beach: California / Oregon Drift Gillnet Observer Program and West Coast Pelagic Longline Observer Program (SW Region)

The training at the Long Beach site is conducted by two trainers, one of which is the "training coordinator," the second of which is in charge of data collection. Although there are no specified prerequisites for the safety trainers, both have attended AMSEA MSIT and an AMSEA MSIT refresher course. There is no formal requirement for continuing education of trainers, nor is there a requirement that OTs attend refresher courses.

The Long Beach training coordinator is responsible for the development and modification of the safety training curriculum. While there is no formal system for identifying topics and success criteria, the trainer regularly seeks input from the site's second trainer as well as from trainers from other sites. Little curriculum input is provided via the training coordinator's supervisor. Additionally, the Long Beach program bases a significant portion of its training on the AMSEA curriculum. As is the case with most programs, Long Beach has not historically engaged in having outside experts review its training or risk management practices.

Long Beach occasionally uses a "visiting" instructor such as personnel from the USCG as part of its safety training. Although there is no formal system in place to identify visiting instructor qualifications, steps have been made to formalize this procedure.

Long Beach, like many of the other smaller programs, does not use a formal quality control system. That is, there is nothing in place to systematically evaluate the appropriateness or overall effectiveness of safety curriculum/training on a regular basis.

Miami: Pelagic Longline Observer Program (SE Region)

The Miami safety training is provided by two in-house trainers, one of whom has overall responsibility for the training curriculum. While there is no formal hiring prerequisite for the OTs, both instructors have attended the AMSEA MSIT. There is no formal requirement regarding continuing education, nor are the OTs required to attend refresher courses.

Although only one of the site's OTs has been charged with the development and modification of the curriculum used, this person currently seeks input from the second trainer as well as from various trainers across the country. The training coordinator's supervisor provides little curriculum input. Much of the Miami safety training is based on AMSEA curriculum.

Miami does use a "visiting" instructor (USCG personnel) on a regular basis; however, the visitor(s) is not given a lesson plan, and there is no system for ensuring that key learning points are covered. Miami noted, however, that they are working to improve this process.

Miami does not use a formal quality control system. That is, there is nothing in place to systematically evaluate the appropriateness or overall effectiveness of the safety curriculum/training on a regular basis.

Panama City: Shark Drift Gillnet Observer Program (SE Region)

Panama City has typically used two and sometimes three safety trainers. Additionally, the program has historically attempted to coordinate efforts with the Miami program. There is currently no prerequisite for instructor training, though attempts are made to ensure that trainers have attended the AMSEA MSIT. Further, there are no requirements for continuing education, nor are trainers required to attend refresher courses.

Panama City is another small, somewhat isolated program that is faced with built-in challenges regarding the ease in which "outside" ideas can be collected and used. There is no single person or group responsible for the curricula used at the Panama City site; instead, the program has generally relied on the OTs to provide expertise. The OTs, in turn, have selected material from the AMSEA curriculum and have applied it to their fishery. Additionally, the program coordinates with Miami personnel and tries to use the same curriculum as the Miami program.

Panama City occasionally has its observers attend training offered at other OT sites in the region (i.e., Miami). There is no documentation indicating that the program uses "visiting" instructors.

Panama City does not use a formal quality control system. That is, there is nothing in place to systematically evaluate the overall appropriateness and/or effectiveness of its safety curriculum/training.

Seattle: North Pacific Groundfish Observer Program (Alaska Region)

The North Pacific Groundfish Observer Program (NPGOP) uses three employees to present its safety curricula. All trainers are required to attend the AMSEA MSIT. Additionally, each instructor is required to observe a training prior to teaching a course him/herself. Further, the program also encourages its instructors to attend a variety of continuing education workshops or courses. There is no formal requirement that instructors complete refresher courses.

As stated in the Anchorage OTC summary, all curriculum used by the NPGOP is created jointly with the OTC, and the two programs have worked cooperatively in the development of their safety training (which is based, to a great degree, on the AMSEA curriculum). Representatives from NPGOP and the OTC meet at least twice each year to review the training, and potential changes are discussed during the meetings. Although the sites are authorized to identify topics, the curriculum must ultimately be approved by NMFS prior to their adoption and use.

Seattle NPGOP does use a "visiting" instructor (USCG personnel) on a regular basis; this person is used to present an "outside" perspective, as well as other specific safety-related topics. The USCG speaker follows the same lesson plan used at the OTC.

Additionally, the NPGOP (with input from the OTC) has attempted to create a formal quality control system that helps evaluate the effectiveness of the safety training. In addition to soliciting information verbally from observers once they return from their deployments, the program also gathers information via a "survey" that observers complete; the survey rates how well they think their training prepared them for the realities of at-sea work. NPGOP employees track the answers and look for trends or areas of concern. Potential changes in the training can come about as a result of the student responses. The results of these surveys are available to relevant personnel. These programs, including the OTC in Anchorage, have some of the most experienced and well developed instructional programs.

Seattle: West Coast Groundfish Observer Program (NW Region)

The NWFSC, located in Seattle, collects scientific data on the west coast fisheries (Washington, Oregon and California) and heads up two observer programs: the West Coast Groundfish Observer Program (WCGOP) and the At-Sea Hake Observer Program (A-SHOP). Observers in WCGOP are given a two-week training, of which roughly 16 hours is used for safety education. Observers employed in the hake program are current groundfish observers. To work in this fishery, hake observers have to be groundfish observers in good standing and trained or briefed in the year they are deployed. During their three-day briefing, hake observers receive an hour safety refresher and are required to don immersion suits.

The West Coast Groundfish Observer Program (WCGOP) program employs two OTs to facilitate its safety trainings. In addition, an observer trainer from NPGOP assists the WCGOP program. Although it is not a requirement that the OTs attend an AMSEA MSIT, all three have completed the instructor course.

The lead OT at the site is informally in charge of the curriculum development and modifications. He, in turn, seeks and obtains input from the other trainers and other sites.

Additionally, USCG personnel are used to present specific topics; however, there is no formal system for ensuring that the information presented will be in alignment with the needs of the WCGOP.

The WCGOP does not currently use a formal quality control system to assess the appropriateness or effectiveness of its curriculum/training on an ongoing basis.

Woods Hole

The Woods Hole training site is somewhat unique from the other NMFS training sites. NMFS employees are present at the site, however, the program contracts with an outside entity to deliver safety training to its observers.

The overall responsibility of the Woods Hole safety training has been given to a single NMFS employee who attends but does not present the safety sessions. This person works with the training contractor, through a Statement of Work (SOW), to develop and/or modify the curriculum. Additionally, the NMFS employee has been active in gathering input from other NMFS observer sites and personnel.

Historically, two University of Rhode Island instructors conducted most of the safety training for the Woods Hole program. A "visiting" (retired URI instructor) was also used to present information on stability and hazards associated with gasses and confined space. The instructors were not required to attend the AMSEA MSIT; they were, however, expected to have a background and expertise in marine safety.

As of this writing, the Woods Hole safety training has been taken over by McMillan Offshore Survival Training, a private training company in New England. The lead instructor for this program has completed MSIT training and has also co-taught several MSIT courses with AMSEA.

Woods Hole uses the SOW and the contractor/COTR relationship to monitor and assure quality for all aspects of this contract. In addition, they have contracted with Kit Van Meter to provide ongoing feedback on how to make their observer training more effective.

V-2. Documentation of topics - overall findings (including hours devoted to safety training, methodologies and lesson plans)

2a. Overview of all NMFS observer training programs. In order to evaluate whether or not the various trainings are appropriate and effective, the reviewers first attempted to document what was being presented at all of the sites. That is, they identified which topics were covered, they noted how in-depth each was presented, they attempted to identify key learning points, and they noted whether or not instructors were guided by lesson plans.

Identifying the extent that programs are actually using lesson plans is dependent on the definition of a "lesson plan." The reviewers based their observations on whether or not lesson plans included the following: identification of topic, including key concepts; need-to-know statement; instructional goals and defined outcomes / measurable objectives; outline and sequencing of information; identification of methodology; time allotment; equipment needs; and personnel needs.

The information gathered in this "documentation phase" was ultimately used to help the reviewers assess to what degree there is overlap (in curriculum) between sites; they were also able to use the information to identify potential "gaps" in the training.

Identification of "core" topics. According to documentation from that (2001) meeting, and according to the questionnaires site representatives completed in 2003, the following topics have been identified as "core." That is, each site has stated that it includes information on the following topics – to at least some degree – in every safety training:

1) Hypothermia;
2) USCG safety regulations, including safety exam decals;
3) Gear hazards associated with the fishery;
4) Biological hazards associated with the fishery;
5) Boardings;
6) First aid;
7) Seasickness;
8) Harassment;
9) Drug and alcohol issues;
10) Sampling safety (including ergonomics);
11) "One hand for the boat";
12) Scope of duties;
13) Psychological health;
14) Safety orientations and checklists;
15) EPIRBs;
16) Immersion suits;
17) Communication equipment; and
18) Appropriate clothing.

This list does not indicate the extent to which each program addressed the topic, nor is indicative of whether or not hands-on methodologies are used. In fact, the reviewers found that the depth of coverage for these topics varied significantly by site. Further, while the quality (e.g., comprehensiveness, methodologies, time allotted, etc.) of presentation (per topic) is not the same from site to site, strong overlap exists.

According to written documentation and to the reviewers' site visits, most programs also included at least some information on these additional topics: fire fighting and fire extinguishers; MOB; rafts and SOLAS survival kits; de-watering pumps; safety at sea; vessel stability; incident reporting; and helicopter rescue.

Some of the programs included information on conflict resolution; sleep deprivation; a "typical day at sea" and/or discussion with experienced observers; and a dockside visit or vessel walk-through.

Additionally, the inclusion of medical emergencies or first aid & CPR varied. While all programs included or required at least some training, the extent and method of presentation varied significantly. For instance, several programs either contract with the

American Red Cross (for eight hours of training) or require observers (via NMFS and/or the observer's contractor) to complete the training (and receive certification) through an outside agency prior to deployment. In addition to this requirement, many programs offer from 15 to 60 minutes of first aid, specific to common at-sea injuries.

Further, the reviewers noted that very few programs actually have comprehensive lesson plans written for all of the safety topics they present. In fact, no program was able to document 18 complete lesson plans, which would be appropriate given that 18 core topics have been identified. However, many programs have lesson plans for some of the topics; still others have components of lesson plans, and these components have been incorporated into the various trainings. The reviewers acknowledge that many programs were adding more comprehensive lesson plans during the course of this study. The reviewers also add that more use of the AMSEA MSIT manual, which already has comprehensive lesson plans on many of these core items, will make this work easier.

The reviewers also noted that several of the programs are sharing resources. As a result, while one program is developing new lesson plans, these are being distributed to other programs for use. This type of cooperation appears to have helped solidify the standardization as well as quality of course content.

On average, most programs devote roughly 16 hours (two full days) to safety training. While many programs separated these two days from the rest of the training (during the site visits), the reviewers realize that this separation was likely the result of their time-limited visits. It appears that the safety component is typically spread (at least so some degree) throughout the full observer training course.

The reviewers would like to acknowledge that the list of "core topics" has changed from the start to the end of this reporting period. Although the list of 18 core topics, above, and the documentation that follows is an accurate reflection of the safety trainings presented in 2002 and 2003, a new list of "core topics" [from a 2004 meeting in Galveston, Texas] is included in Appendix "A".

2b. Site-by-site documentation of topics
(including hours devoted to safety training, methodologies, and lesson plans)

Site-by-site documentation. As noted above, each site has stated that the eighteen core topics are included – to at least some degree – in their trainings.

While the following text provides a brief description of the safety-related topics covered at each site (during a typical observer course), it does not include an evaluation on the quality of the material or methodology. (Section VI – Evaluation, provides an assessment of the quality and effectiveness of the presentations. Additionally, "best practices," [topics that are presented very well] are identified later in this document as well.)

The following information is based on either direct site visit observations or by a site's course outline or other documentation. The summaries include (when possible) a listing of the following information per site:

- Identification of topics (above and beyond the core topics that all sites are including) typically covered per observer safety training
- Use of lesson plans and/or outlines
- Hands-on exercises that require student participation and/or performance
- Number of hours devoted to safety in a typical observer class
- First aid & CPR certification requirements

As a final point, the reviewers would like to acknowledge that at times it was challenging to get an accurate assessment of a "typical" training per site (i.e., hours devoted to safety, methodologies, and use of lesson plans). That is, the information gathered per site via questionnaires, verbal interviews, site visits, and follow-up emails was sometimes conflicting and/or inconsistent. The reviewers attribute these variations, in part, on the fact that the site visits did not always take place during full two- to three-week OT classes for new observers. Additionally, the reviewers were not always able to be present for an entire training; instead, most visits were conducted over a two- or three-day period.

Anchorage OTC

The Anchorage OTC offers training to a variety of observers (e.g., marine mammal observers, and groundfish observers). As a result, the training lengths and course content varies.

The Anchorage OTC, in conjunction with the NPGOP, reviewed and revised lesson plans in 2003, and lesson plans are available for many of the 18 topics. Although the formal lesson plans were not always used during safety trainings, written outlines of various topics were available and typically used.

According to written documentation submitted by the Anchorage office and the reviewers' observations (from March and December 2003 site visits), in addition to the 18 core topics, the following are included in the OTC groundfish observer safety training: seven steps; abandon ship; flooding; fire; cold-water near-drowning; evacuations and helicopter rescue; MOB / stay rules; escape plans; vessel hazards; casualties at sea and fatality statistics; fatigue/sleep deprivation; station bills; nutrition, sanitation, and infections; embark/disembark; transfers at sea; hazmat; liferaft; fire extinguisher; flares; signaling devices; radio use and maydays; survival kits; SOLAS; GPS; and signaling devices. There are some slight inconsistencies noted for the Seattle NPGOP training and what is noted for the OTC. Back care, lifting techniques, 4:1 pulley system, sleep deprivation, etc. are also included in the OTC training. Attempts are made to coordinate and standardized the training at the OTC and the Seattle NPGOP. The same curriculum is taught from, and more recently instructor exchanges and co-visits have taken place to ensure that the training program is similar in content. In addition, regular collaboration takes places to ensure continuity in the two sites.

Anchorage cannot include fire fighting or flare practice, nor a dockside visit vessel walk-through in its typical groundfish observers training program due to the inaccessibility to a vessel and its urban location. The marine mammal observer training does include small boat safety.

Hands-on exercises are typically used during the following topics: Donning an immersion suit; entering the water; righting and entering a raft; PFDs; HELP/HUDDLE positions and chain swim.

The Anchorage OTC includes between 12 to 19 hours of safety instruction, depending on the course and clientele. The typical groundfish observer class includes 15 hours of safety training.

Eight hours of first aid & CPR training is required by NMFS in its marine mammal observers program; however, this training occurs outside of the OTC class. Groundfish observers have no requirement for first aid & CPR certification.

Gainesville

A site visit was not made to the Gainesville training program. However, the reviewers were able to observe and interview the Gainesville lead OT as a result of a course that was coordinated between the Gainesville and Miami training programs in May 2003. As a result, the following information is based on statements and documentation provided by the Gainesville OT.

The Gainesville program stated that it has lesson plans for its safety topics; however, the actual lesson plans were not included in Gainesville's paperwork or documentation. As a result, it is unclear if lesson plans are complete or if they are available for all topics. It is apparent, however, that the program does use outlines and a number of teaching resources from the Miami program. The Gainesville OT stated that the site's curriculum is very similar to Miami's, except that the Gainesville site does not provide pool training.

According to written documentation, the following topics above and beyond "core" topics identified above are included in the Gainesville observer safety trainings: safety at sea, casualty statistics; seven steps to survival; liferafts; survival packs; vessel hazards; fatigue/sleep deprivation; nutrition, sanitation, and infections; simulated orientation; GPS; MOB devices; heavy weather, stability, and signaling devices.

According to written documentation, hands-on exercises typically used during the training include the following: immersion suit donning and PFD fitting. Simulated use of radios is also used as a methodology. Additionally, USCG personnel present information on fire fighting and dewatering pumps.

The Gainesville program includes 12 hours of safety education in its observer training; this does not include pool time, which is not currently a part of the training. The program would like to add pool skills to its curriculum in the future.

Gainesville has not historically included or required first aid and CPR certification; however, the program has recently added this as a requirement.

Galveston

Galveston did not conduct an observer course during this contract period. As a result, the reviewers were not able to observe a training session. The reviewers were, however, able to conduct an on-site interview with the training coordinator and an OT. The following information, therefore, is based on the interview and written documentation.

The program does not use formal lesson plans. Instead, outlines are used.

According to written documentation, the following topics (above and beyond the 18 "core" topics identified above) are typically included in an observer safety training: safety at sea; casualties/fatalities at sea; seven steps to survival; rafts; abandon ship; survival kits; helicopter rescues; vessel stability; drills; MOB; fire fighting; dewatering pumps; emergency radio use; heavy weather; flares; cold water near drown; and vessel orientations.

According to written documentation, the following hands-on exercises are used during the following topics: immersion suit donning (and water entry); HELP/HUDDLE positions and chain swim; PFDs; liferaft care and maintenance, righting and entering; and mayday demo (if time allows).

The safety training lasts 12 to 16 hours.

Observers are required to obtain certification in basic first aid & CPR; this is included as part of the safety training.

Honolulu

The Honolulu program has recently created a number of (draft) lesson plans for several of its safety training topics, including proper lifting; immersion suits; liferafts; vessel walk-through; waterfront training (flares, fire extinguishers, dewatering pump); seven steps; EPIRBs; stay rules; and PFDs. When lesson plans are not used, outlines are often available.

According to written documentation, interviews (from a June 2003 visit), as well as the reviewers' observations from a December 2003 visit, the Hawaii observer program addresses the following topics (above and beyond the "core" topics): stability; water survival skills; dewatering pump; hydrostatic releases; fire extinguishers; nutrition, sanitation, and infections; pre-cruise orientation; liferafts and SOLAS kits; safety at sea;

seven steps to survival; “STAY” rules; personal survival; HELP/Huddle positions and chain swim; emergency radio procedures (maydays); signaling devices (including mirrors, flares, and smoke); conducting drills; risk assessment and hazard evaluation (including non-life-threatening injury statistics); and life at sea. Basic information was provided on fire fighting. A vessel “walk through” was also included in the observer safety training.

Hands-on exercises are used during the following topics: use of fire extinguishers; dewatering pumps; vessel orientation and walk-through; donning and immersion suit; entering the water; HELP/HUDDLE positions and chain swim; righting and entering a raft; radio use and maydays.

The Honolulu program does not appear to consistently include the following as stand-alone topics: sleep deprivation; abandon ship; cold-water near-drowning; station bills; transfers at sea; simulated orientations; survival skills; GPS, or MOB devices.

The Honolulu training is roughly 16 hours in length.

Honolulu recently began including eight hours of basic first aid and CPR (above and beyond the 16 hours of safety training); however, this has not been a consistent part of the observer training over the years.

Long Beach

The Long Beach observer training site does not use comprehensive lesson plans, though outlines for topics are available and are used. Additionally, the Long Beach program has been working to create or secure lesson plans from other sites.

According to written documentation, as well as observations taken from a site visit (a briefing for returning observers, August 2003), the following topics (above and beyond the “core” topics) are included in a typical training: seven steps to survival; MOB; abandon ship; cold-water near drown; evacuations; emergency radio (and maydays) procedures; dewatering pumps; USCG fishing vessel safety and vessel exams; fire prevention and control; fishing vessel stability; liferafts; pre-cruise vessel safety and orientation; dockside tour; typical day at sea; and incident reporting.

Hands-on exercises are used during the following topics: donning an immersion suit; entering the water; righting and entering a raft; PFD use; HELP/HUDDLE position and chain swim; radio use and maydays. Further, the following exercises are sometimes included in the safety training: dockside visit and dewatering pump.

The following topics do not appear to be consistently integrated in a Long Beach observer safety training: stay rules; water survival skills; fire extinguishers; fatigue/sleep deprivation; station bills; nutrition; transfers at sea; pyrotechnics; survival kits; MOB devices; and signaling devices.

The Long Beach site includes 18 hours of safety training in a typical course.

Observers at this site are required to obtain basic first aid and CPR certification prior to deployment.

Miami

The Miami training site has some comprehensive lesson plans available for use during its safety training program. Most of these lesson plans are the same ones used by the Seattle NPGOP and Anchorage OTC. In some instances, basic outlines are used instead of lesson plans.

According to written documentation and per the reviewers' observations during a May 2003 visit, the following topics (above and beyond the "core" topics) are included in the Miami observer training program: casualties at sea and fatality statistics; emergency procedures and station bills; survival at sea; HELP/HUDDLE positions; signaling devices (including flares); MOB; vessel stability; fires and fire fighting; radio use and distress calls (including maydays); rafts; and dewatering pumps.

Hands-on exercises were used during the following topics: donning an immersion suit; entering the water; righting and entering a raft; PFDs; HELP/HUDDLE positions and chain swim; radio use and maydays; signaling devices and flares; and fire fighting (conducted outdoors, with mock extinguisher). Recently, Miami has added extinguishing pan fires as part of its fire fighting training.

Miami includes 18 hours of safety training.

Observers are required to obtain Red Cross first aid & CPR (outside of the 18 hour safety training) prior to deployment.

Panama City

Panama City did not conduct an observer course during this contract period. As a result, the reviewers were not able to observe a training session. Additionally, the Panama City program is going through a transition in that the previous training coordinator left her position. As a result, the reviewers were unable to personally interview anyone from the site. The following information is based solely on written documentation.

Although lesson plans were not included in the self-assessment, Panama City states that it uses lesson plans in its trainings. It is not clear how many lesson plans are available, nor is it known how complete they are.

According to written documentation, Panama City includes the following topics (above and beyond the "core" topics) in its observer safety trainings: fatigue/sleep deprivation; nutrition, sanitation, and infections; GPS; a simulated orientation; and a dockside exam.

Hands-on exercises are used during the following topics: immersion suits and EPIRB testing.

Panama City includes 18 hours of safety training.

Red Cross first aid and CPR training/certification is required outside of the observer program.

Seattle NPGOP

The NPGOP uses a number of comprehensive lesson plans that have been created jointly with the Observer Training Center in Anchorage. These include sleep deprivation; on-board emergencies; hazard assessment and safe lifting techniques; abandon ship and sea survival; first aid. Additionally, basic outlines were included for the following: station bills; MOB; hypothermia; fire; flooding; Mayday; abandon ship; EPIRBs; immersion suits; liferafts; seven steps to survival; and personal health and safety.

As per written documentation as well as reviewers' observations (February and June 2003 visits), the following topics (above and beyond the "core") appear to be consistently included in the Seattle NPGOP: back injuries, proper lifting techniques, and 4:1 pulley system; sleep deprivation and personal health; philosophy of safety; identifying at-sea and deck hazards; reporting an incident; rafts; seven steps to survival; SOLAS kits; GPS interpretation; cold-water near-drowning; and abandon ship.

Hands-on exercises were used during the following topics: donning an immersion suit and entering the water; HELP/HUDDLE positions and chain swim; righting and entering a raft; and fitting and using PFDs.

The Seattle NPGOP includes 16 hours of safety training in its observer groundfish program.

The Seattle NPGOP encourages but does not require its observers to have first aid & CPR certification.

Seattle WCGOP

Seattle WCGOP uses complete lesson plans for roughly half of the topics covered during its safety training. This includes a lesson plan titled "Preparations for Emergencies at Sea." The plan includes the following sub-topics: psychology of survival, seven steps to survival, survival equipment, and personal survival kits. A second lesson plan is titled: Safety Equipment/Orientation. Sub-topics include: EPIRBs; liferafts; and vessel orientations. A lesson plan was also included on cold-water near-drowning and hypothermia.

As per written documentation and reviewers' observations during a February 2003 visit, the following topics (above and beyond the "core" topics) are included in the WCGOP

observer safety training: seven steps to survival; drills; rafts (hydrostatic release; launching, righting, and entering); flares; cold water near drown; HELP/HUDDLE positions; PFDs; maydays; SOLAS kit contents; abandon ship; station bills; and vessel stability.

Hands-on exercises were used during the following topics: donning an immersion suit and entering the water; righting and entering a raft; fire/abandon ship drill; hand-held flare demo; hypothermia prevention (and proper clothing); HELP/HUDDLE positions, chain swim, and EPIRB use.

The WCGOP program includes 13 hours of training from the NMFS OTs, plus additional training from USCG personnel. The program also includes four hours of conflict resolution training.

The WCGOP requires observers to obtain first aid and CPR certification before deployment. The certification is not part of the NMFS training.

Woods Hole

In the past, formal lesson plans were not used at the Woods Hole site. The past contracted safety trainers (University of Rhode Island), however, did use their own fishing vessel safety curriculum guide, which includes comprehensive formal lesson plans. These lesson plans cover safety equipment and survival procedures, fire prevention and control, and medical emergencies at sea. Lesson plans did not seem to be available for all 18 core topics.

According to written documentation and observations from an August 2003 site visit, the following topics (above and beyond the "core") are included in the Woods Hole observer training program: specific hazards associated with the work, environment, and the vessel; safety equipment and radio distress calls; signaling devices (including flares); liferafts and SOLAS kit; PFDs; survival kits; abandon ship; station bills; helicopter rescue; dewatering pump; stability; fires and fire fighting. Woods Hole also included information on hazards associated with gases and confined space, as well as navigation, two topics not traditionally covered within the other observer programs.

Although hypothermia is identified as a "core" topic (listed as being addressed by all programs), it was not covered in any depth during the reviewer's visit. Also, seven steps to survival, medical emergencies at sea, and on-board drills were not covered in any depth.

Hands-on exercises were used during the following topics: fire fighting; hand-held flares and smoke signals; donning of immersion suits; HELP/HUDDLE positions and chain swim; righting and entering a raft; and entering the water. An interactive group exercise was also used to present charting and navigation material. Also, a group exercise involving the dewatering pump was conducted.

In the past, Woods Hole allotted 10 hours for safety training. Currently 16 hours are devoted to safety training, with 20 hours being considered for all future safety training.

The Woods Hole observer program requires observers to obtain basic first aid & CPR certification on their own.

V-3. Use of supplemental teaching resources – overview

The above text lists the safety topics that are covered at the various observer training sites, but it does not differentiate the methodologies used, nor does it identify the types of teaching resources that were used to improve the quality of the instruction.

The following section identifies some of the supplemental educational resources that are used to help present the material. Examples of supplemental teaching might include but would not be limited to the following: guest (expert) presenters; videos; visual aids or teaching props in the classroom; overheads or PowerPoint displays; and/or handouts, including summaries of key points, checklists, etc.

As was the case above, an evaluation of the appropriateness or effectiveness of the teaching aids is not included in this section. An assessment of teaching resources and listing of best practices is included later in this document.

3a. Overview of all NMFS observer training programs. All of the programs that the reviewers visited used supplemental teaching resources to some degree. Further, most programs that did not receive a site visit included written resources in their self-assessment paperwork.

The most common examples of supplemental teaching resources used are videos. In fact, every program that was visited supplemented their lectures with at least one video; some sites used many. Additionally, most sites include guest presentations from (or visits to) USCG personnel. USCG presentations often included demonstrations (often of dewatering pumps, flares and/or other signaling devices) as well.

Most sites also used written resources as well. While some sites provided handouts and/or checklists as primary aids (and actively used or read from them during the training), other programs used them as secondary aids and referred to them infrequently.

3b. Site-by-site documentation The following is a summary of the supplemental teaching resources (all aids other than lecture) that were used during the site visit or were included in a program's self-assessment paperwork. The supplemental resources include but are not limited to the following:

- Use of PowerPoint, overheads, or other visual aids
- Use of handouts
- Use of relevant case studies
- Use of videos

- Use of (and availability of) props
- Use of checklists
- Use of quizzes, testing, and/or performance testing
- Other

Anchorage OTC

The following supplemental teaching resources are or have been used in the Anchorage OTC groundfish observer safety trainings:

- PowerPoint presentations and/or overheads were used for several of the topics.
- Uses a manual that includes a health and safety section.
- The following handouts are used/available: USCG safety decals; safety protocols; hydrostatic release and a safety checklist.
- A few case studies were provided for educational purposes. The Galaxy case study was used in depth.
- Videos were used to present the following material
    - survival at sea
    - mayday
    - immersion suits
    - abandon ship
    - hydrostatic releases
    - hypothermia
    - MOB
    - SAR / helicopter rescue
- The following items/props were available in the classroom: immersion suits; PFDs, a liferaft, radio (parts), a hydrostatic release (old version), raft canister (old version) dummy signaling devices, a SOLAS A kit, and an EPIRB. During the pool exercises, immersion suits, PFDs and a raft were available/used as well.
- Although a few safety-related questions are included in the Anchorage OTC final exam, the program does not use a quiz specific to safety. Some formal performance testing is conducted during the water exercises (and donning a suit in 60 seconds, entering a liferaft) and additional but more informal performances take place.
- The marine mammal observer training incorporate hands-on training in small boat handling and safety. The program also requires observers to pass a swimming test.
- Supplemental teaching materials are similar in many cases to those developed at the NPGOP in Seattle.

Gainesville

Although a site visit was not made to Gainesville, the following information was obtained via an interview with the Gainesville OT (who was co-teaching a Miami course) and the Gainesville self assessment paperwork.

The following supplemental teaching resources are or have been used in the Gainesville observer safety trainings:

- Gainesville uses PowerPoint slides to supplement a number of safety topics. (Many of these slides have been borrowed from the Miami program.)
- The following handouts are included in the Gainesville courses: seven steps to survival (from AMSEA); psychology of survival; immersion suits; PFDs; liferafts; SOLAS kit equipment lists; EPIRBs; on-board emergency instructions; procedures for making a distress call; fire fighting; drills; hydrostatic release; and dewatering pump.
- Gainesville uses case studies in its trainings.
- The following videos are used during the Gainesville safety training:
    - casualties at sea (The Wave)
    - FV Cape Beaver and FV Margaret Jane
    - liferafts
    - helicopter evacuations
    - stability
- Gainesville incorporates the following props/teaching aids into its safety training: immersion suits; PFDs; liferaft; personal survival kit; SOLAS B pack; and a 406 EPIRB.
- The Gainesville program provides a checklist for survival and SOLAS equipment lists.
- Gainesville has observers complete a Safety at Sea quiz. It does not appear that formal performance testing is conducted. However, classes tend to be small enough that instructors can usually assess student performance informally during the training.

Galveston

The reviewers were not able to attend a training at the Galveston site. According to an interview with the site coordinator and OT, and according to the program's self-assessment documentation, the following supplemental teaching resources are or have been used in the Galveston observer safety trainings:

- Galveston uses overheads, videos, flip charts, handouts, and props to supplement presentations. (The program does not use PowerPoint at this time.)
- Galveston uses the following handouts to support their trainings: hypothermia and heat loss; and multiple pages from an observer training manual (identified below). Within these pages, the following topics are addressed: seven steps to survival; liferafts; donning an immersion suit; safety at sea; transfers; radio

communications; advice to women; living conditions; observer conduct; safety decal; Galveston NMFS, Coast Guard, contractor, and emergency contacts; and observer status codes. Training on the following are also included: hydrostatic release; care, maintenance and water entry relative to immersion suit; water entry (PFD, HELP, Huddle position and chain swim); required equipment and righting liferaft; fire extinguisher use; and EPIRB signal relay.

- Galveston incorporates relevant case studies into their trainings.
- The following videos are used during observer trainings:
    - signaling devices
    - emergency radio procedures
    - MOB
    - dewatering pumps
- Galveston has the following props/aids available for its training exercises: PFDs; immersion suits; dewatering pump via USCG; liferaft; 406 and mini B EPIRB's, signal mirror, and fire extinguisher. A safety checklist and gear check-off sheet (provided in the manual) is used.
- Galveston uses an "Observer Training Manual" in its courses. This manual includes handouts on a variety of safety topics.
- Although quizzes are used to help assess student understanding of material, none was included in the self assessment documentations). It does not appear that formal performance testing is conducted.

Honolulu

The following supplemental teaching resources are or have been used in the Honolulu observer safety trainings:

- Honolulu uses PowerPoint and overheads to supplement several of the presentations. A white board was used occasionally.
- The following handouts were used during the Honolulu safety training: first aid and CPR; a laminated safety equipment and survival procedure reference; liferafts (including deployment of, hydrostatic releases, and list of survival equipment); SOLAS equipment lists; and hydrostatic releases.
- The Honolulu lead OT is familiar with a number of relevant case studies, which were incorporated throughout the training.
- The following videos are used during the Honolulu safety training:
    - Red Cross first aid & CPR
    - casualties at sea
    - Rambo Goes to Sea (risk assessment)
    - visual distress signals
    - liferafts
    - emergency radio procedures
    - ergonomics and back care
- The following props/items are used during the Honolulu trainings: laminated "seven steps" cards; strobe and mirror (in classroom); immersion suits (classroom and pool); PFDs (classroom and pool); EPIRBs (classroom and pool); hand-held

flares and smoke signals (used dockside); dewatering pump (used dockside); whistle (used dockside); fire extinguisher (used dockside); laminated cards for use during distress call exercise; hand-held microphones; and raft (including canister and hydrostatic release) and SOLAS kit during pool exercise. The teaching props available in the classroom were minimal when compared to props used at other sites.

- Additionally, a longline vessel was used to present a walk-through exercise. During the vessel walk-through, observers had access to an EPIRB; a safety decal; a station bill; PFDs; fire extinguisher; a raft, canister, cradle, and hydrostatic release; immersion suits; radio; drill log; and flares. They were also able to observe/identify vessel hazards.
- Honolulu uses the following checklists: skill/drill check-off sheet and placement checklist (including check for vessel safety equipment).
- Honolulu incorporates safety questions into the quizzes used in class. Additionally, several verbal quizzes were used (methodology) at the end of various subjects/topics.
- Honolulu does have a checklist that identifies the skills that observers are expected to learn. However, other than requiring observers to participate in pool exercises (and don a suit in 60 seconds), there is no formal performance testing conducted.
- The Honolulu program uses experienced observers to enhance a question/answer session on "realities of life at sea," including safety considerations for the observer.
- The Honolulu program uses incident data (injuries [non-fatalities] and close calls) from its own program and Hawaii waters during its risk assessment and hazard evaluation talk.

Long Beach

The following supplemental teaching resources are or have been used in the Long Beach observer safety trainings:

- A PowerPoint presentation (borrowed from Miami, see below) was used to support several of the topics.
- Slides (photos, not PowerPoint) of vessels, including environmental and vessel related hazards were shown. Slides of "safe" and "unsafe" vessels were included. Slides also included of on-board living conditions, food, sanitation, etc. A laser pointer was used to emphasize key points.
- Handouts were not used; however, a "field manual" was handed out to observers. Within the manual are pages related to the following: vessel examination checklist; observer duties; and harassment. Long Beach also had the following handouts available: Additional handouts on "seven steps to survival," hypothermia, flares, EPIRBs, distress (mayday) broadcasts, fires, abandon ship, and conflict resolution.
- Videos were used to present the following topics:
    - USCG dockside exam

    - distress calls and maydays
    - inflatable liferafts
    - casualties at sea
    - safety equipment and survival procedures
- Long Beach had the following equipment available in the classroom: PFDs, Type I, II, and III (including new SOSpenders™, CO_2 canisters, and float jacket); one immersion suit (and wax); and food and water from a survival kit.
- Immersion suits and PFDs were also available during the pool session. Additionally, observers were required to inflate SOSpender™ CO_2 cartridges during the pool session.
- A vessel safety examination checklist is used.
- Long Beach used a few debriefing reports from the previous year to identify concerns.
- There is no documentation to suggest that Long Beach uses a written quiz to assess student understanding or recall of safety information. Other than requiring observers to participate in pool exercises (and don a suit in 60 seconds), there is no formal performance testing conducted.

Miami

The following supplemental teaching resources are or have been used in the Miami observer safety trainings:

- A Safety at Sea PowerPoint presentation was used throughout the training. This presentation was comprehensive, covering multiple topics. Some of the slides were available as handouts as well.
- Additionally, an active PowerPoint presentation was used to visually demonstrate the proper sequence of a hydrostatic release.
- The following handouts are used/available: survival kits; dewatering pumps; EPIRBs; Safety at Sea training manual; pre-trip safety checklist; station bill; marine safety guide and regulations; laminated copy of safety tips and equipment; and medical emergencies.
- Case studies were incorporated in the training for educational purposes.
- The following videos were used as instructional resources:
    - causality at sea/need to know (edited; 1-2 minutes)
    - Saving Fisherman's Lives (which included fishing vessel safety requirements)
    - survival skills; hypothermia
    - safety equipment and emergency procedures
    - stability
    - emergency medical procedures
    - fire
    - emergency distress calls
    - inflatable liferafts
- The following additional items/props were used/available during the course: multiple immersion suits; EPIRBs; multiple PFDs; mayday distress calls (tape

recordings); flares; raft (in canister/cradle); and a partial SOLAS kit (missing parts have recently been replace so that the current kit is complete); radios (used at dockside during the mayday exercise); dewatering pump (USCG demo); hand and aerial flares, smoke signals (USCG demo); mirrors; raft (launched in a pool); proper clothing (used during clothing demo); fire extinguishers (used during fire fighting exercise); mayday radio calls (used during classroom discussion of mayday); raft in canister/cradle (front of room); hand-held radios, microphones (used during interactive maydays with USCG personnel).

- A written quiz is used to assess student learning. Observers are required to participate in pool exercises (and don a suit in 60 seconds); however, there is no formal performance testing conducted in non-pool (or suit) activities.
- A general release of all claims, from Barry's Marine Center, is available/used for the pool/facility exercises.

Panama City

Because no site visit could be arranged during this reporting period, and because the training coordinator's position was vacant during much of the reporting period, the reviewers were unable to obtain information on Panama City's use of supplemental teaching resource.

Seattle NPGOP

The following supplemental teaching resources are or have been used in the Seattle NPGOP observer safety trainings:

- The Seattle NPGOP uses a PowerPoint presentation to support its safety training. The presentation covers a number of topics.
- Seattle NPGOP uses a manual that includes a health and safety section. Within this section are a number of handouts on observer safety, including but not limited to: boarding, personal health, harassment, illnesses and accidents on board, emergencies (MOB, cold water near drown, fire, flooding, abandon ship, mayday, immersion suits, rafts, survival kits, EPIRBs), seven steps to survival, and federal requirements for fishing industry vessels greater than 60 feet). Additionally, an observers "log book" includes handouts on safety decals and a vessel safety checklist.
- A handout on ammonia leaks was handed out as well.
- The Seattle NPGOP incorporates relevant case studies into its training.
- The Seattle NPGOP uses the following videos during the observer safety training:
    - ergonomics / proper lifting
    - first aid at sea
    - survival at sea (seven steps to survival, etc.)
    - liferafts, and
    - immersion suits
- Seattle NPGOP had the following props available either in the classroom or during the training: immersion suits; PFDs; pulley system; raft; items from a

SOLAS kit; neoprene gloves; magazines and books on safety at sea; observer logbook and manual (which includes multiple handouts, checklists, etc.)
- The Seattle NPGOP uses a vessel checklist.
- The Seattle NPGOP incorporates quiz questions in the observer final in order to assess student retention or recall of safety related information. Some formal performance testing is conducted during the water exercises (and donning a suit in 60 seconds, entering a liferaft) and additional but more informal performances take place.

Seattle WCGOP

The following supplemental teaching resources are or have been used in the Seattle WCGOP observer safety trainings:

- The WCGOP program used PowerPoint presentations to support a number of safety topics.
- The WCGOP program provides/uses a nine-page handout from the AMSEA MSIT manual, including one on liferafts, hydrostatic releases, liferaft (SOLAS) contents, care and maintenance of immersion suits, EPIRB inspection procedures, hypothermia, station bill, and mayday distress broadcast.
- Relevant case studies were integrated into the learning, with stories presented by instructors as well as experienced observers.
- The WCGOP program uses videos to demonstrate marine casualties.
- The WCGOP program incorporates a number of props, both within and outside of the classroom. These include immersion suits, raft, vessel (for orientation, walk-through, and drill exercise), flares, EPIRB; SOLAS kit (contents);
- The WCGOP program provides students with a pre-boarding checklist.
- The WCGOP program uses a written marine safety and survival test. Formal performance testing is conducted during pool exercises (and don a suit in 60 seconds). Additional informal performance testing is conducted in the following areas: demonstration of the HELP/HUDDLE positions; participation in a vessel emergency drill; completion of a safety checklist; participation in a vessel orientation; correctly don at least two types of PFDs; donning of an immersion suit, while in water, within two minutes; demonstrate two proper entry techniques while donning immersion suit; demonstrate righting a raft; and demonstrate how to test an EPIRB.

Woods Hole

The following supplemental teaching resources are or have been used in the Woods Hole observer safety trainings:

- The Woods Hole program has access to a PowerPoint projector, TV/VCR, and chalk board.
- Woods Hole uses handouts on the following topics: hypothermia and first aid; maydays; immersion suits; maps and navigation;

- The instructors incorporated relevant (and local) case studies and personal experiences appropriately. Additionally, experienced observers were asked to contribute personal stories.
- Woods Hole included the following videos during their training:
    - emergency signals and flares
    - EPIRBs
    - radio distress calls
    - USCG helicopter rescue, and
    - fires and fire fighting
- A variety of props were available throughout the Woods Hole safety training. This included immersion suits, PFDs, a liferaft (pre-inflated), a helicopter basket, EPIRBs, signal mirrors, dummy flares, chemical lights, SOLAS kit, and other miscellaneous safety equipment. Also, an F/V model was available for a stability exercise/demo that was conducted during the training.
- Woods Hole also has quality navigational aids and chart as teaching props.
- Woods Hole uses a Pre-trip Vessel Safety Checklist. Observer "bonuses" are partially based on whether or not the checklist is turned in post voyage.
- The Woods Hole program uses written safety quizzes (including take-home quiz) to help assess student learning. The Woods Hole program has a performance "self" check list that observers are asked to complete. However, other than requiring observers to participate in pool exercises (and don a suit in 60 seconds), there is no formal performance testing conducted.

V-4. Documentation of contracted trainers or agencies – overview

4a. Overview of contractual relationships used nationwide. As noted earlier in this document, nearly all observer training sites use NMFS employed or certified instructors (OTs) to conduct the observer safety training. There are, however, three programs that have or are currently using contracted trainers to present the safety material to observers: These include the Woods Hole program, which contracts out all safety training; Galveston, which contracts two trainers; and Panama City, which is not currently conducting courses, but which has hired contracted trainers in the past.

The relationship between the OTC and NPGOP is a unique cooperative agreement/grant. Unlike a contract, the grant builds in a certain degree of flexibility to the system in terms of setting up and providing training. The OTC trains in close coordination and cooperation with the NPGOP. The training by the OTC is in parallel in terms of content and procedure with NPGOP. However the OTC also conducts marine mammal, crab and scallop observer training and provides other services as needed such as newsletters, video production, etc. No one at OTC is a NMFS employee.

Additionally, some sites either contract with the American Red Cross to present first aid & CPR training or require observers to obtain this certification on their own.

4b. Site-by-site documentation of contracted trainers or agencies. The following text simply identifies which sites use contracted (non-NMFS) trainers to present the safety material. In the event contracted trainers are used, information regarding the selection process (as well as oversight of the safety training) was gathered as well. Further, the reviewers attempted to ascertain whether or not a system exists to assess or ensure the content and quality of the safety training provided by contracted OTs.

Anchorage OTC

Trainers at the Anchorage OTC are not NMFS employees; however, they are approved by NMFS as groundfish observer trainers and also provide marine mammal observer training. A formal system for approving OTC trainers is in place. Additionally, the OTC trainers work cooperatively with the NPGOP employees in the development of the safety training curriculum.

Gainesville

The Gainesville OT is an employee of the University of Florida. NMFS is responsible for approving this position and ensuring that a qualified OT is in place.

As is the case with the Anchorage OTC, the Gainesville OT works with other sites and OTs in order to ensure that the safety trainings (at Gainesville and compared with other NMFS trainings) are similar.

Galveston

Galveston uses two (of three) contracted trainers. One of the contracted trainers has successfully completed the AMSEA MSIT; the second contracted trainer has successfully completed a USCG drill instructor course.

Galveston does not have a formal system in place for identifying hiring prerequisites or instructor selection (for contracted safety trainers).

Honolulu

Contracted trainers are not used at the Honolulu site.

Long Beach

Contracted trainers are not used at the Long Beach site.

Miami

Contracted trainers are not used at the Miami site.

Panama City

According to Panama City's self-assessment documentation, contracted trainers have been used to present safety material.

Given the current transitional status of the program, however, it is not clear if contracted trainers or NMFS employees will be used in the future. Further, there is no formal system in place for identifying hiring prerequisites or instructor selection (for contracted safety trainers.)

Seattle NPGOP

Contracted trainers are not used at the NPGOP site.

Seattle WCGOP

Contracted trainers are not used at the SWCGOP site.

Woods Hole

The Woods Hole program contracts out for all of its safety training. The contract has most recently been with the University of Rhode Island (URI) Sea Grant Program. The previous contractual relationship has expired, and a new safety training contract is currently held by a private company, McMillan Offshore Survival Training (whose lead instructor is AMSEA trained).

The Woods Hole training coordinator stated that while the bid will go to an entity with documented experience and expertise in the field of safety training, trainers are not required to have observer experience. Additionally, trainers are not required to have attended an AMSEA MSIT or equivalent.

While observer experience and a MSIT do not need to be adopted as prerequisites for hire, the reviewers note that the lack of these credentials could lead to problems in the standardization (in content and methodology) of material presented. In fact, the reviewers noted that the URI trainers had more inconsistencies in content and methodology (when compared with other sites) than all other trainers, though they were not serious.

V-5. Documentation of contractor/NMFS relationships, including delegation of responsibilities

The intent of this section was to get a better understanding of the interplay between NMFS and the various contractors at each site. Given that this relationship – at least to some degree – can have an affect on the well being of the observer, the reviewers attempted to obtain information in the following areas: what safety equipment is being issued and what type of oversight is involved; what, if any, steps are taken (by the contractor) to prepare the observer for at-sea work (that is, what attempts are made to

educate the observer regarding at-sea hazards); what, if any, fitness requirements are there for observers; are any steps made to obtain medical histories or emergency information? Additionally, the reviewers attempted to note what role (if any) NMFS has in the hiring of observers. Finally, some information was obtained regarding the use of indemnity agreements and/or release of liability forms at each site.

The information in this section was used to identify potential problems that might exist, not only in regard to observer safety, but also in regard to legal exposure to NMFS.

5a. Overview of NMFS observer training programs. When the National Marine Fishery Service initially started working with observers, the observers were hired directly by the federal government. Through the years, however, this situation has changed so that today, nearly all observers are employed by entities known as "contractors" or "observer providers". The exception to this rule appears to be in the Southeast area of the country, where a few observers do not work through contractors and are instead employed via Purchase of Service agreements with the federal government or, observers are hired directly by the University of Florida.

During the reviewers' site visits, there were nine separate contracting agencies used nationally. These include Atlantic Inspection Services (A.I.S.), Inc.; Alaskan Observers, Inc.; Data Contractors, Inc.; Frank Orth & Associates; Johnson Controls, Inc.; NWO Inc., Pacific States Marine Fisheries Commission; Saltwater, Inc.; A.I.S. Inc.; and TechSea International.

Although the reviewers did not review the contracts, from verbal accounts, the written contracts between NMFS and the contractors (in all but the NPGOP) appear to delineate the relationships in a number of areas. For example, the contractors, as observer employers, are responsible for selecting and hiring observers. They are also responsible for addressing at-sea injuries and/or breach of employment duties by the observer. (It should be noted that there is no contractual relationship between NMFS and the contractors that exist in the NPGOP. Contractors used in this program are approved by NMFS following the federal groundfish regulations.)

NMFS, on the other hand, is responsible for "training" observers; i.e., for identifying educational needs regarding data collection and personal safety, and for ensuring that observers receive this training "in house" or by way of contracted trainers. If and when NMFS identifies guidelines or policies associated with observer background, fitness, behaviors, and or equipment requirements, these stipulations are written into the contracts. NMFS then selects contractors based on their stated or proven ability to meet the contract goals and guidelines.

There are, however, certain areas of responsibility that seem blurred or ambiguous, with the main one having to do with selection, issuance, and maintenance of observer safety/survival equipment. Some contractors, for example, select, store, and issue equipment. In other instances, NMFS employees take on this role. Also, the gear issued appears to vary from site to site. (Although NMFS provides a list of the types of items a

contractor is expected to purchase, there are no clear procedures used to identify the equipment that observers are required to carry at sea. Further, the reviewers noted that some sites issue equipment above and beyond the basic NMFS requirements.) In even other instances, observers are allowed to keep equipment from one deployment to the next; thus, observers are given some basic responsibility to inspect and maintain the gear.

This lack of standard procedure could ultimately lead to confusion regarding duty, and thus, legal liability. Further, if there is no clear system for monitoring the quality of the gear and providing maintenance when necessary, an observer could potentially be issued sub-standard equipment that could ultimately compromise their well-being and safety.

A second area in which some discontinuity exists has to do with NMFS versus the contractors' roles as employer. For example, while most observers are employed through a contractor, as noted above, some observers are hired by NMFS (and work under a Purchase of Service agreement) or are employed by another entity altogether (e.g., the University of Florida). Additionally, in some programs, the contractor conducts the hiring, but NMFS personnel review the applicant list and provide recommendations.

A third area where there is some ambiguity is in regard to policy decision-making, specifically as it applies to observer behaviors and rules. For example, although NMFS does not employ most observers, site managers have noted they would at times like to impose certain "policies and procedures" regarding observer safety. That is, they believe it would be in the observers' best interest if they (the observers) were required to adhere to certain rules during their at-sea deployments. While the reviewers recognize that these rules might in fact help reduce injuries and/or fatalities, they also note that, in order to minimize legal ambiguity, it might be best to create a "policy decision-making system" that includes or at least goes through the observers' employer (the contractor). Such a system could help delineate responsibilities and enforcement roles, and could identify consequences for infractions.

A fourth area of potential ambiguity is in the area of crisis response. The reviewers found, during their interviews with OTs, site managers, observers, and contractors, that it is not always clear who will be responsible for a few of the steps associated with an emergency action plan in the event an observer is seriously injured or killed (during a training or while at sea). This issue will be addressed to a greater degree in Phase II of this project.

5b. Site-by-site documentation. Contractors and/or NMFS employees at each site were interviewed regarding the hiring/supervisory situation (specific to observers). This included questions specific to the interview process, workmen's compensation issues, emergency equipment responsibilities, and use of liability forms. Specifically, the following questions were asked of all sites/contractors:

- Which contractor(s) is (are) used at this site?
- What actions take place prior to hire/deployment? That is, are observers given a good idea of the risks associated with the job? Are NMFS employees involved (to any extent) in the hiring of observer candidates?

- What, if any, fitness requirements are there for employment? Is fitness tested or verified? Are medical exams required? Is medical history or emergency information gathered?
- What equipment is issued to observers? How is it selected/issued/maintained? How is equipment stored/tracked?
- What equipment do observers take to sea?
- How are vessels selected and deployments assigned?
- Are liability or indemnification forms used?
- Do all observers receive health insurance coverage during the training?

Seattle NPGOP

- Observers trained at Seattle NPGOP can be employed by five contractors: Alaska Observers, Inc., Data Contractors, Inc., NWO, Inc., TechSea International, and Saltwater, Inc.
- The contractors used in the NPGOP are responsible for the initial selection and screening of observer "candidates." Once appropriate candidates are identified, the list is sent to the Seattle NPGOP. NPGOP the does the final selection of approval for all groundfish observers.
- All candidates approved are required to obtain physicals before deployment.
- The NPGOP collects emergency contact information for all NPGOP observers.
- Vessels 60 to 125 feet have 30 percent observer coverage. These vessels pick the time they want to take an observer. The observer programs would like to be able to pick the time to get better coverage in areas without data however. Vessels 125 feet or more have 100 percent coverage. Community Development Quota (CDQ), America Fisheries Act (both of which are cooperative quota regimes) vessels, and Atka mackerel fleet have 200 percent observer coverage.
- The NPGOP employs its own equipment manager. This person is responsible for selection, maintenance, tracking, and distribution of all equipment, safety and data collection. This manager believes that, by coordinating equipment through a single source (vs. five contractors), there is greater consistency and oversight of equipment. Additionally, because the single-source outlet can purchase in bulk, she believes they have greater ability to provide observers with proper fitting equipment.
- The NPGOP equipment manager has developed a written set of "standards" that identify selection, maintenance, and testing criteria. That is, after contacting various experts, USCG, manufacturers, etc., the Seattle equipment manager has identified what equipment observers should take to sea, and how/when equipment should be inspected, maintained. The equipment manager believes this system exceeds manufacturer standards.
- The NPGOP manager is responsible for issuing equipment to Alaska sites (Anchorage, Dutch Harbor, and Kodiak), which means she is also responsible for making sure the Anchorage OTC has the equipment it needs.
- Observers from the Seattle NPGOP are issued the following equipment: immersion suits, strobe lights, whistles, PFDs, flotation coveralls, flashlights hear

hats, back braces, knee pads, ear plugs (muffs), and a pulley system (to assist with lifting).

- Observers are not issued personal EPIRBs, though the site is considering adding them to the gear list. Additionally, site representatives noted that observers are issued PFDs, but many observers are not taking these into the field. As a result, the site is purchasing a variety of types/sizes to encourage greater use.
- The equipment manager noted that not all of the equipment returns to Seattle. In some instances, after deployment, it is returned to Alaska sites (Dutch Harbor, Kodiak, and Anchorage) instead. (Anchorage has 50 sets of equipment; Dutch has 20; and Kodiak has 20.) Equipment managers at each site are responsible for inspecting and re-issuing. In the event an observer will return to sea after only a few days, s/he can keep the same equipment.
- The NPGOP has also incorporated a tracking system. All equipment is now tracked by hand, and testing and expiration dates are noted. The NPGOP is attempting to create a computer tracking system so that at any given time, the manager will know where a piece of equipment is and/or who returned specific items.
- No liability/indemnity waiver is used during training. All training is on site, even the in-water practice.

Anchorage OTC

- Observers trained in Anchorage are employed by one of four contractors: Alaska Observers, Inc., NWO, Inc., TechSea International, and Salt Water, Inc.
- The contractors are responsible for interviewing and hiring the observers. Each of the contractors has a website, where viewers are able to read basic descriptions of observer work as well as hazards associated with the work.
- Observers are required to pass a physical prior to deployment.
- The Anchorage OTC is responsible for storing and maintaining equipment. Groundfish observer safety gear circulates through the program, depending on an observer's departure and return points.
- All groundfish observers are issued the same gear regardless of where they train. However, observers do have some discretion as to what pieces of gear they take with them to sea. This allows them some flexibility in making travel arrangements, etc, but may leave them without important safety gear such as PFDs or hard hats.
- Observers from the Anchorage OTC are issued the following equipment: immersion suits, strobe lights, whistles, PFDs, flotation coveralls, flashlights hear hats, back braces, knee pads, ear plugs (muffs), and a pulley system (to assist with lifting).
- No gear is issued to marine mammal observers at the OTC. Instead, the marine mammal observer contractor purchases and issues this gear.
- The Anchorage OTC has observers fill out release of liability forms (from the University of Alaska) prior to pool exercises (which is on UAA property). This process will start in May of 2004. UAA General Council and Risk Assessment team recently approved the use of this sort of document.

Gainesville

- The University of Florida employs the observers that are trained at the Gainesville NMFS site. As a result, in the event of an injury, observers would be covered under UF workers' compensation.
- UF personnel are responsible for interviewing and hiring all observers. The Gainesville OT and PI (both UF employees) are directly involved in the interview and hiring process. (UF has a cooperative agreement with NMFS that funds the program.)
- UF does not require observers to pass a physical prior to deployment. Drug testing is not required. Neither UF nor NMFS collects detailed medical histories (this will be implemented next season); however, emergency contact information is collected. It appears that the NMFS OT would end up being a direct link in the Emergency Action Plan.
- Safety equipment is selected by researching different companies and brand names, talking with other safety trainers about what they use and personal experience (of the OT and the observers). Gear is stored in the museum offices and in a storage shed on campus.
- Gainesville issues the following equipment to observers: whistles, strobes, and first aid kits, flashlight, 121.5 EPIRB. Also, below the Georgia border line, observers are issued Type I PFDs; observers who work north of this border are issued immersion suits. All observers are encouraged to take one or both of these items. Gear is checked out after training and is returned at the end of the season.
- HMS at NMFS randomly selects vessels, and the results are passed onto the OT in Gainesville. Vessels selection is dependent on a number of parameters.
- Liability forms are not used.
- Observers receive health benefit coverage during the trainings.

Galveston

- Johnson Controls, Inc. (JCI) is the contractor at the Galveston site.
- JCI hires all observers; however, typically resumes are reviewed by NMFS prior to an observer being hired by JCI.
- JCI does not have short-term observers sign contacts.
- It does not appear that Johnson Controls provides comprehensive (written and verbal) information regarding at-sea hazards prior to hire. Johnson Controls has observers complete a medical form prior to hire, but this information is not passed along to NMFS observer trainers. JCI says that collection of physical and medical histories is not part of the contract. NMFS does, however, require observers to complete a basic medical form, which is then stored in a locked area. The NMFS form is not reviewed unless there is an emergency at sea.
- Galveston included an equipment list (for issued gear) in its self-assessment. The following safety equipment is issued to observers: first aid kit; PFDs (2); glow stick; whistle; strobe; safety flares (3); hard hat; flashlight; EPIRB; immersion

suit. Observers are also issued satellite phones (and are expected to call in three times per week.)
- NMFS selects, issues, maintains, stores and tracks all safety equipment.
- Observers are expected to conduct their own safety orientation (by using a vessel checklist); that is, the contractor does not conduct one prior to the observer deployment. Observers do not board vessels deemed "unsafe" unless the safety issues/concerns are corrected.
- Galveston uses a liability form (taken from the AMSEA manual) during their trainings.
- Observers are covered under JCI's workmen's compensation plan during their training.

Honolulu

- Saltwater was the contractor at the Honolulu site at the time of the site visit; however, NWO will be contracting with NMFS in the near future.
- Saltwater is fully responsible for hiring all observers. The interview process appears thorough, and observers receive written and verbal information regarding at-sea hazards. Saltwater requires observers to obtain physicals prior to deployment, and they collect observer medical histories and emergency contact numbers. Observers are not required to take a drug test.
- NMFS is responsible for providing a list of the type of equipment that is to be purchased, but the contractor is responsible for selecting and purchasing the equipment. (NMFS reimburses Saltwater for these costs.) The contractor asks for input from local experts prior to making purchasing/selection decisions (types of EPIRBS, PFDs, immersion suits, etc.).
- Observers are expected to carry EPIRBs, PFDs, and immersion suits while at sea.
- Saltwater tracks, stores, and maintains all equipment. Immersion suits are sent out once per year for maintenance. Other repair needs are sent to local shops and/or professionals.
- Once the observer's deployment ends, the gear stays on the boat, and the contractor picks it up. The contractor then attempts to give the same equipment back to the same observer.
- Before the observer goes to sea, the contractor completes a vessel safety check. This includes a check of the safety sticker, check and test of the EPIRB, check of fire extinguishers, first aid kits, and check for currency of flairs. The contractor also checks to see whether or not the vessel has too many people per raft, that the raft is secured properly, and the hydrostatic release is current.
- No liability or indemnification forms are used for either the training or on the vessel.

Long Beach

- Frank Orth Associates (FOA) is the only contractor used in this area.
- Job information (observer duties and work environment) is conveyed via websites, though not a great deal of information is presented on at-sea hazards.

Interviews are conducted via telephone. FOA representative states that hazard information is discussed at that time. Also, because so many people apply (200) for so few jobs (15 to 50 per year), the contractor stated that s/he could be quite selective.

- Observers are required to get physicals and drug testing. The doctor gets a written description of observer work, and the doctor also decides if observer is fit for the duties. Only basic information and the doctor's signature are forwarded to the contractor. The contractor does not receive detailed medical histories.
- Observers are issued PFDs, immersion suits, and EPIRBs (406). This year, SOSpenders™ were purchased, and the Long Beach trainers are considering making it a requirement for observers to wear them.
- When Frank Orth became the contractor, the NMFS equipment that had been purchased for observer use was given to the company for dispersal. FOA now stores and maintains the equipment. FOA is also responsible for identifying equipment needs and for purchasing equipment when current equipment needs replacing. NMFS reimburses them for costs.
- FOA is responsible for storing the equipment when it is not in use. Immersion suits are sent out for inspection once a year.
- The contractor is able to keep current on the safety backgrounds and concerns of the various vessels. In the event a vessel is considered "unsafe," an observer is not placed on the boat.
- FOA requires observers to sign liability waivers. (The Long Beach site, however, does not use release of liability forms.)

Miami

- The contractor used for Miami observers is Johnson Control, Inc. (It should be noted that some observers trained at the Miami site are also independent employees, contracted by NMFS. See below.)
- Johnson Control does the hiring, but according to the Miami OT, NMFS personnel has input on the hiring process. The NMFS representative is able to review the applicants and make recommendations to JC. This relationship (NMFS input on hires) appears to occur in Panama City and Galveston (both JC areas) as well.
- The NMFS representative at Miami does not believe observers are required to have a physical prior to at-sea deployment, nor are medical histories collected. The contractor, JCI, confirmed this.
- Miami observers are issued the following equipment: Immersion suits, 121.5 EPIRBs, mirrors, whistles, strobes, first aid kits, gloves, PML lights, and zipper wax, foul weather gear and boots.
- The gear is purchased, maintained and issued at the Miami site. An equipment list is used to identify whom the equipment is issued to, and the gear is tracked using an Excel file/program.
- Miami (NMFS) hires eight (contracted) observers without going through a contractor. These observers are employed under a Purchase of Service (POS) agreement and hired on an as-needed (short-term contract) basis. Although new

observers cannot be hired using a POS, the current observers can continue to be employed under this arrangement.

- The NMFS employed observers are interviewed and hired by NMFS personnel (supervisor of OT). Because these observers are not regular NMFS employees, NMFS personnel in Miami are not certain if/when the observers are covered under the Department of Interior workmen's compensation process in the event they are injured during the training, during travel to/from training, or injured. during travel to/from a deployment. Observers are not required to have personal insurance, nor are they encouraged to obtain personal insurance.
- No emergency action plan in place to guide a post-incident response in the event one of the contracted observers is seriously injured or killed. There is also no system for contacting the family.
- Observers hired via the POS are not required to obtain a physical. The site asks for medical history information, but it is not collected in any great depth. Basic emergency contact information is collected and stored in the Miami OT office.

Panama City

- The contractor for Panama City observers is Johnson Control. Due to the transition at the Panama City site, the reviewers were unable to interview employees regarding this site's interactions with the contractor.

Seattle WCGOP

- The WCGOP observers are employed by Alaskan Observers, Inc (AOI). AOI is under contract with Pacific States Marine Fisheries Commission (PSMFC), which is in a cooperative agreement with NOAA-NWFSC.
- AOI is responsible for the initial screening of observers to assure that they meet the minimum qualifications to attend training. In addition, AOI provides observer trainees background about the fishery and what risks the job entails.
- As part of their employment with AOI, all observers are required to pass a physical examination prior to deployment. Observers are responsible for maintaining their personal emergency contact information via an on-line database.
- The safety equipment issued to observers is selected via internal staff decisions as well as references with other programs. The equipment is issued, maintained, stored, and tracked by PSMFC (the observer program). It is expected that all equipment issued will be taken to sea.
- Observers from the WCGOP program are issued the following equipment: Stearns immersion suits (with strobe), 406 EPIRBs, PFDs, lights (for PFDs), whistles, gloves, hard hats, ear plugs, knee pads, back braces, gloves, first aid kits, headlamps, and foul weather gear. Observers are allowed to choose their own PFDs, as long as they are USCG approved.
- Vessels are selected on a random basis, and observer assignments are made on a random basis.
- No liability or indemnity forms are used during training.
- All observers receive health insurance coverage during their training.

Woods Hole

- The contractor for the last several years has been Atlantic Inspection Services (AIS).
- Prior to hire, observers are required to submit resumes, interviews are conducted (by phone or in person), and background checks (criminal) are completed. Prior to deployment, observers must provide proof of current First Aid and CPR, successful completion of three weeks of training (including 16 hours of safety), and completion of a training trip with an experienced observer.
- Vessels are selected by observers (usually), though occasionally the program coordinator is involved. Also, vessels are sometimes selected randomly.
- The following safety equipment is issued to all observers: Immersion suit (with strobe/whistle), exposure work suit, EPIRB, mirror, zipper case, foul-weather gear, gloves, and a portable liferaft (if needed).
- The safety equipment is selected and purchase by the contractor with oversight from NMFS.
- The safety equipment is stored on site (at Woods Hole), and is tracked by the contractor and NMFS.
- Liability or indemnification forms are not used.
- All observers receive health insurance coverage during the training

Section VI
Evaluation of Curriculum, Training and Trainers

The following section will include an assessment of the following items:

1. ***The appropriateness and effectiveness of safety training curriculum***
2. ***The effectiveness of current trainers, especially in the area of safety training.***
3. ***Assessment of current practices used during training exercises***
4. ***Adequacy of the training, as per input from observers***

VI-1. The appropriateness and effectiveness of the training(s)

Section one, the evaluation of the appropriateness and effectiveness of the current training, has been subdivided into two, separate sections:

- **Section 1a** provides the reviewers' evaluation of the appropriateness of the training content (curriculum). That is, the reviewers will provide an assessment as to the appropriateness of the topic selection (are topics appropriate? Are any missing?), and the material presented (is it presented in-depth? Is each subject allotted an appropriate amount of time?). Section 1a does not include an evaluation of the methodology used, nor is it an evaluation of the effectiveness of the trainings. An assessment of the effectiveness will be provided in Section 1b; methodology will be evaluated later in this document.

- **Section 1b** provides the reviewers' evaluation of the effectiveness of the training; that is, is the training having the desired results? In order to assess training effectiveness, the reviewers' compared the training content (including emphasis areas) to the real hazards associated with the work, to the documented injuries to observers, and to the most likely emergency situations observers would likely face. To some degree, the reviewers' based their evaluation on the desired goals and objectives (of the observer safety trainings) provided by the National Observer Program coordinator.

In all, the reviewers attempted to fairly evaluate whether or not the current observer safety training does the following:

1. Adequately prepares observers for foreseeable at-sea hazards (that is, provides education in the area of hazard recognition and risk assessment)
2. Provides appropriate information regarding injury prevention strategies (based on most common and/or likely injuries)
3. Provides information on fatalities (including fatalities statistics and causes in a given fishery) and fatality prevention strategies, and
4. Provides education and practice opportunities in the area of crisis response and survival situations that observers might face.

1a. Appropriateness of the safety curriculum. In order to evaluate the appropriateness of the training, the reviewers based their findings on the following criteria/questions:

1. Is there consistency in the curriculum (content) presented nationally?
2. Is there a system in place for identifying core topics?
3. Of the material presented, are all topics relevant?
4. Which, if any, topics are covered appropriately by most or all programs?
5. Are any topics missing?
6. Are topics covered in appropriate depth?
7. Are topics given the appropriate amount of time?

1. Is there consistency in the curriculum (content) presented nationally?

While there is significant overlap in the safety curriculum covered by various programs, the comprehensiveness, content, and methodology used to present core safety-related topics varies greatly from program to program. For example, while all sites stated that they covered "sampling safety," a number of sites did not identify any objectives for this topic; the amount of time used to present the material varied from 15 to 60 minutes, depending on site; fewer than half of the programs include hands-on methodologies during their presentations; and most sites did not formally assess student progress or success.

The reviewers also note that the use of comprehensive lesson plans, including goals and objectives, is inconsistent, and the lesson plans that exist differ among sites. The reviewers believe that this factor greatly contributes to the variations noted above.

In 2001, a list of "core" topics was identified by the NOP. That is, each site was asked to identify which safety topics it addressed in its training, and steps were taken to "standardize" the lists nationwide. This list is included in Section V.

As the reviewers have noted throughout this document, while each site covers most if not all of the topics on the list, some sites have added additional topics (such as MOB, fire fighting, at-sea rescues, etc.). Given the limited amount of time available for the safety training, any time a topic is added, the amount of time per topic will be affected.

In 2004, after discussions in Galveston, Texas, the NOP re-wrote the list of "core" topics, and site managers agreed to include the core topics in their trainings. (The list of topics from this gathering is included in the Appendices.) Further, during the 2004 meeting, the site managers discussed potential time allotments per topic, and key objectives were identified. This step should help greatly in standardizing the curriculum, including the amount of time allotted per topic, and the depth of coverage each subject receives.

2. Is there a system in place for identifying core topics?

The reviewers note that the NOP has made significant strides in their effort to identify core topics and improve each site's safety training. For instance, NOP should be applauded for their recent meetings (Sitka, Alaska, 2003; Galveston, Texas, 2004), each of which was conducted with an underlying goal of standardizing the curriculum and programming nationwide. Further, the reviewers recognize that one of the goals of this project is to identify whether or not the various programs are in sync, and whether or not additional steps can be made to improve the trainings. If this type of effort and cooperation is continued on an ongoing basis, a more professional oversight system will ultimately become reality.

The reviewers also note that while great strides have been made in identifying which topics are or should be covered in a training (i.e. identification of "core" subjects, noted above), there is no formal system for maintaining standardization or consistency of trainings on an ongoing basis. As a result, the reviewers encourage the NOP to either schedule additional meetings (similar to above) on an ongoing (perhaps biennial) basis, or establish a small group that provides ongoing oversight of the safety training (such as a risk management advisory committee).

Regionally, the NPGOP/OTC programs have come closest to developing a true "system" for identifying key topics. That is, representatives from the programs meet on a regular basis, and the curriculum is evaluated for appropriateness and comprehensiveness.

3. Of the material presented, are all topics relevant?

No frivolous material is currently included in the trainings, and none of the identified topics should be eliminated from the trainings.

4. Which, if any, topics are covered appropriately by most or all programs?

While improvements can be made in the method of delivery in many instances, most programs are presenting survival topics appropriately.

Specifically, all programs have a strong emphasis in the area of crisis response. This includes survival behaviors and equipment as well as the inclusion of practical exercises in the following areas: PFDs, immersion suits, HELP/HUDDLE positions, and righting and entering a raft. Pool sessions will be included next season and have been conducted during joint Miami training. Only the Gainesville program does not include pool/lake exercises.

All programs also appear to cover USCG safety regulations, including decal exam, in an appropriate amount of time and depth.

Additionally, most programs are now requiring observers to become certified in first aid and CPR prior to deployment. While additional information (specific to common

observer injuries) would be beneficial, this consistency in training has assured that observer candidates receive appropriate training in the subject.

5. Are any topics missing?

While most of the programs include "identification of at-sea hazards," the information presented is not consistent in content or depth, even when considerations are made regarding the various fisheries and risks associated with each. Further, while fatality statistics are often offered, some sites do not provide observers with any injury data (most common injuries [including trends] associated with commercial fishing generally and observer work specifically). Although some programs provide information on close calls and/or accident (injury) causation, most programs do not include this in any depth. Not only it is usually considered beneficial to identify injury rates and types in prevention training, It is also beneficial to identify close calls as well as the factors (objective and subjective factors) that contributed to all incidents.

Consequently, the reviewers believe that "injury prevention and personal risk management" (which would include information on injury statistics, causations, and prevention strategies) should be included to the list of core topics and be given the same amount of emphasis as the survival skills are given.

The reviewers also note that it would probably be prudent for observers to receive more comprehensive and appropriate training in first aid and CPR. Further, although it might not be feasible at this time, a short course in wilderness first aid (or first aid for mariners) – as opposed to the more common "street/urban" first aid that is usually taught – would be quite relevant and beneficial. Although a number of programs are now starting to require observers to be certified in first aid and CPR (prior to deployment), this is not yet a requirement of all observer programs.

Second, during this reporting period some sites did not include topics that the reviewers believe should be "core" or integral to observer safety training. For example, while MOB, abandon ship, and fire safety is included in some of the trainings, not all of these subjects are included in all of the trainings. (None of these topics is included in the 2001 list of "core" topics.)

The reviewers' suggested list of "core" topics (i.e., topics that should be included in all of the trainings at all of the sites) is included in the appendices.

6. Are topics covered in appropriate depth?

Because standardized lesson plans are not used nationwide, each site currently addresses topics in the depth that they believe is appropriate. The reviewers noted, for instance, that the same topic might be covered in 15 minutes at one site and 60 minutes at another site. At the sites where lesson plans are not used (or followed), or where lesson plans are incomplete, the depth in which material is presented appears to be dependent on the OTs' knowledge and expertise. Also, the reviewers noted that when lesson plans or outlines

were not used, instructors tended to deviate from the topic and/or miss pertinent information on occasion. Finally, the depth in which a topic is covered was sometimes dependent on the amount of time available.

In summary, although most "core" topics were "covered" at most sites, key learning points (including objectives) are not always included. In these instances, the reviewers believe the "depth of coverage" may be considered inadequate. Additionally, because a number of instructors were not given guidance as to time frames or depth of coverage for topics, the amount of time given to a subject may vary among classes. Time and depth may be dependent on the instructor's knowledge of the topic, the instructor's fondness (or dislike) for the topic, and/or the amount of time the schedule allowed.

In order to help assure that each subject is covered appropriately, the reviewers believe comprehensive lesson plans should be written for each of the core topics. The lesson plans should identify all learning objectives, and guidelines regarding "depth of coverage" should be provided. OTs nationwide should then use these lesson plans. Regions would still be able to add on fisheries specific extras as needed.

7. Are topics given the appropriate amount of time?

The answer for this question is directly related to the information provided above. That is, the amount of time allotted per topic varies greatly across the board and is dependent on topic, site, instructor, and scheduling (i.e., if/when a site was falling behind schedule, topics were sometimes presented in an expedited manner).

Specifically, a number of programs spent minimal time presenting the following subjects, each of which was included in the 2001 "core" topic list: 1) hazard recognition and risk assessment (including vessel hazards and biological/chemical hazards); 2) sampling safety (e.g., proper lifting, ergonomics); and 3) psychological health. That is, each of these three topics was often presented in roughly 30-45 minutes or less. Given the importance of these topics on injury prevention, it is likely that observer candidates are not able to assimilate (and apply) this information in such a short amount of time.

Although fire fighting, flares, station bills, and dewatering pumps were not included in the 2001 list of core topics, these topics were included in a number of the trainings. The amount of time varied greatly, however. For example, some programs included hands-on exercises, which were fairly time consuming; other sites spent minimal time (30-45 minutes, mainly in lecture, discussion or via video) on the subjects. Given that these topics address "skills" that an observer would be expected to perform, if a site truly hopes that students can perform adequately in these areas, it is likely that it must allot enough time to include hands-on methodologies.

The reviewers fully acknowledge that the trainers are being asked to present a lot of information in a small amount of time. As a result, in order to maintain the overall observer training schedule (including data collection, etc.), many OTs tend to rely on lectures and videos. While these methods are fairly time effective, they do not typically

result in high assimilation of material, nor are they effective methods when performance skills are desired or required.

In summary, the reviewers believe that NMFS should identify time minimums per topic, and each site should be required to adhere to the minimums. Further, it would be beneficial for the instructors to develop a wide repertoire of methodologies so that each can present the material in the most time efficient and student-centered method possible in the time allotted.

1b. Evaluation of the effectiveness of training. In order to evaluate the effectiveness of the trainings (i.e., does the current training effectively prepare observers for the hazards associated with at-sea work; does it prepare them for at-sea emergencies; has the current training had any effect on the rate of injuries or fatalities?), the reviewers compared the risks, hazards, injuries, and fatalities associated with the work (identified in Section IV) with the current trainings (identified in Section V) provided at each site.

Additionally, although formal and overall goals/outcomes of the observer safety training are not clearly noted at any site or in any lesson plan, desired goals/outcomes (of observer safety training) were provided by the NMFS national observer program coordinator, Vicki Cornish, and some regional managers and trainers, during a September 2003 meeting. As a result, the reviewers took this list (provided below) into consideration.

According to the NOP coordinator, it is hoped that the observer safety training will ultimately result in the following:

Desired goal of observer safety training. The overall goal of the observer safety training is to prepare observers for risks inherent in working aboard commercial fishing vessels, and to minimize both minor and catastrophic injuries to the observers, trainers, property, and NMFS.

Desired objectives of observer safety training. The following have been identified as desired key objectives:

1) Observer programs should provide training so that observers are able to

- Demonstrate awareness of common hazards aboard vessels, to include those associated with the vessels, weather, gear, and crew
- Identify specific methods for preventing common injuries
- Demonstrate competency in maintaining and using personal crisis response equipment
- Identify, locate, and demonstrate competency in using a vessel's crisis response equipment, and demonstrate ability to verify correct installation and currency
- Verify presence and currency of USCG safety decal
- Demonstrate ability to assess risks – both subjective and objective – commonly encountered by observers

These additional objectives were identified as well:

2) Safety trainers are expected to
- Successfully complete a USCG-approved MSIT course
- Demonstrate exemplary safety practices and attitudes during all training exercises

3) Safety trainers should identify and communicate to observers the risks associated with the safety training, and require that observers understand, acknowledge, and assume the risks by signing appropriate liability and release forms prior to participation in training exercises.

Specifically, in section 1b, the reviewers evaluated the training using the following criteria/questions:
1. Do student outcomes, per topic, match stated objectives?
2. Are methodologies appropriately matched with the desired outcomes?
3. Is the current training effective in preparing observers for the hazards associated with at-sea work?
4. Is the current training effective in improving observer knowledge and practice of injury prevention strategies?
5. Is the current training effective in preparing observers for at-sea emergencies?
6. Has the current training made a difference in observer injury or survival rates?

1. Do student outcomes, per topic, match stated objectives?

As noted in Section V, several sites are now starting to use lesson plans to guide their trainings. However, as also noted in Section V, no program has comprehensive lesson plans written for all 18 of the core topics. Further, even where lesson plans are used, some plans do not identify clear, measurable objectives for each topic. As a result, no program has clear and measurable objectives identified for all 18 core topic areas.

As documented in Section V, the reviewers also found that while a number of sites have started testing students in a few areas, no site conducts comprehensive testing in all 18 core topics.

Skill tests were used very infrequently except in the areas of donning of an immersion suit, entering the water, and righting/entering a raft. Further, although most sites have identified criteria for a successful "end result" specific to these skills, they did not provide explicit guidelines for identifying a successful progression (i.e., end results requirements were noted, but key performance steps were not identified). For example, the reviewers noted several instances in which students performed intermediate skills incorrectly, yet the students' behaviors were not confronted or corrected, and because the students ultimately achieved the end result, the performance was apparently considered "passing."

The reviewers noted also that, although some hands-on methodologies were used to help present information in the areas of fire fighting, flares, dewatering pumps, and maydays, little formal testing was done to assess student performance in any of these topics (or the skills associated with each).

Additionally, the reviewers found that while some programs ask students to complete quizzes, or they incorporate safety-related questions into the final exam, assessment tools are not being used as effectively as possible, several topics (and key learning points) are not being tested at all, and few tools are used to measure whether or not "cerebral" information (i.e., thinking and reasoning skills) can be applied properly. For example, although students were sometimes tested for their ability to recall the seven steps of survival, no testing was conducted to see if the steps could be used appropriately (e.g., in a simulated exercise or case study.).

In summary, although observers are typically told what they need to know in the area of species/data, and they appear to be consistently tested on their ability to identify species and or record data, the same type of expectation and testing is not embraced when it comes to observer understanding of safety and/or ability to perform safety-based skills. Because clear, measurable objectives are often lacking, and because testing of student knowledge and performance is minimal, the reviewers found that it was often difficult if not impossible to measure or know whether or not student success was achieved in a number of areas.

The steps that have been taken to standardize the core curriculum and identify key learning objectives (per topic) should help greatly in this respect. Once objectives are identified per subject, sites should follow up by creating assessment tools that can accurately gauge whether or not students have achieved the objectives. (Additional information on assessment tools is provided later in this section.)

2. Are methodologies appropriately matched with the desired outcomes?

Although a variety of techniques are used to present information at the various sites, there are four main methodologies used nationwide: lecture (and discussion), videos, demonstration, and hands-on practice of skills.

Typically, lectures, discussion, or videos are used to present information in the following areas: hazard recognition and assessment; seven steps to survival; hypothermia and at-sea medical emergencies; stability; station bills; EPIRBs; fires and fire fighting; MOB; helicopter rescue; abandon ship; and hydrostatic releases. SOLAS kits were often presented and contents were available as a teaching prop, but the information was usually presented in a lecture or demonstration format.

A mixture of methodologies, including demonstration (and at some sites, hands-on practice) was used to present the following topics: radio calls and maydays; distress signals (mirrors, flares, smoke); dewatering pumps; and vessel orientations / walkthroughs.

Hands-on methodologies are most often used during immersion suit exercises (donning and entering the pool) and righting and entering a raft. Most (but not all) sites also include some hands-on training to help teach observers about PFDs, HELP/HUDDLE positions, and chain swim.

Because assessment tools are not consistently used to assess student success or the teaching methodologies, the reviewers based their evaluation of methodology appropriateness on research of educational techniques.

Research shows that when performance-based outcomes are desired, hands-on methodology (and repetition) is the most effective tool in getting students to achieve these results. Additionally, research supports the notion that, in crisis situations, people tend to react according to habit and/or will respond by using habitual behaviors (kinesthetic memorization). Consequently, any and all skills that NMFS would like observers to master should be taught using hands-on methodologies. To improve the probability that observers will perform emergency skills correctly in a crisis situation, observers should be given the opportunity to practice skills correctly, multiple times.

Research also shows that the more applicable the information is to the students' lives/situations, the more likely the information will be accepted and assimilated (thus the importance of "need to know" statements and relevant case studies). During site reviews, it was noted that most instructors include a "need to know" statement in their presentations (86 percent – see appendix R). The reviewers not only applaud the trainers for this including this important component, they believe the trainers could likely include need-to-know statements as well as relevant (and recent) case studies to an even greater extent.

Further, research suggests that lecture is fairly ineffective in influencing higher cognitive development (reasoning), yet lecture is often the "method of choice" when observer trainers present injury prevention (reasoning) skills. Research also notes that judgment (specific to decision making) can be improved by using and discussing relevant case studies (or similar methodologies). Moreover, research notes that student learning is enhanced most when exercises are debriefed. The reviewers found, during site visits, that case studies of marine incidents are regularly presented during trainings, but they are not always evaluated for errors in judgment and/or other factors that may have contributed to the mishap. Additionally, the reviewers also found that, at times, exercises were not debriefed and put into context for the observers. In other words, while information in the area of accident causation and injury prevention is presented, modified methodologies would likely improve the quality of the training.

In summary, the reviewers believe that if the trainings took steps to limit the use of lecture/videos, and increase the use of appropriate experiential techniques (including but not limited to multiple repetition of key skills, use of need to know statements, case studies, and debriefing), it is likely the current methodologies would be more effective in achieving their stated goals and outcomes.

3. Is the current training effective in preparing observers for the hazards associated with at-sea work?

Based on a comparison of current practices (Section V) to the actual risks/hazards associated with observer work (Section IV), the current training appears to be fairly effective in preparing observers for at-sea risks/hazards. That is, it appears that students are given some basic information on objective hazards associated with their fisheries (e.g., environmental, vessel, and work hazards). Nonetheless, the training could likely be improved with a few, fairly minor changes.

As noted above, the reviewers documented that objective hazards are identified and presented to observers at most of the sites. The methodology of presentation is typically lecture (and sometimes discussion and/or video), however. Also, subjective factors (i.e., human errors that contribute to accidents and injuries) are typically not discussed in great depth, and accident causation is rarely discussed.

Additionally, at several of the sites, the "hazard recognition" information is quite basic and cursory, and students are given very few visual cues (i.e., photos, slides, site visits, etc.) to help them understand and assimilate the hazards.

The reviewers also noted that most sites do not use methodologies that require students to "apply" their newly learned hazard recognition and risk assessment skills (even in the confines of a classroom environment). That is, even though "hazard recognition and risk assessment" is a new skill for most students, observers are not given the opportunity to practice the skills before going to sea.

At some sites, observers are given information on at-sea hazards as the result of a discussion period and/or question-and-answer period that is facilitated by experienced observers. The reviewers note that this is an excellent methodology for providing real-life and relevant information, and new observers often commented that it was helpful and worthwhile.

It should also be noted that observer contractors provided some basic information on at-sea hazards. While the amount of information provided appears to vary widely (most contractors provide at least basic information on web sites; however, some contractors also provide a fairly comprehensive verbal accounting of at-sea life and vessel hazards), it is beneficial for the observers to receive key learning points through a variety of methods, from a number of sources.

In summary, the reviewers believe that it is likely that observers develop basic level of understanding of the risks/hazards associated with at-sea work. If methodologies are modified (for example, more visual tools are used, and students are given opportunities to practice their new-found skills), it is probable that the sites could more effectively prepare observers for at-sea hazards and work.

4. Is the current training effective in improving observer knowledge and practice of injury prevention strategies?

The reviewers believe that most programs are moderately to minimally effective at providing information on at-sea injuries and injury prevention as part of the training. That is, while most sites provide information on known as well as potential observer injuries (cuts, bites, stings, back injuries, sea sickness, etc.), because there is no formal system for collecting and sharing data on observer injuries (including national numbers, categories of most-common injuries, and/or trends over time), the information is likely incomplete. In fact, the reviewers noted that there is minimal information presented specific to most-common injuries, circumstances surrounding injuries, and applicable prevention techniques. Instead, most programs focus on "fatalities at sea," and the only data usually provided is in the area of the number of deaths (and potential causes) per region or fishery.

Further, most of the information presented (in injury types and prevention) is provided via lecture, discussion, and/or video. The exception to this finding is that a few programs include information on back (lifting) injuries, and students are given the opportunity to practice appropriate lifting techniques.

In summary, the reviewers recommend strongly that NMFS initiate a comprehensive injury data-collection system whereby the data can be tracked and shared nationally on an ongoing basis. Not only could the number and type of injuries (to observers) be tracked, contributing factors could be noted, trends could be documented (including number and types of injuries per vessel type and/or per fishery; injury rates per time of day; injury rates per day at sea [i.e., during a deployment]; injury rates for new versus experience observers, etc.), and the data could be presented during trainings. Applicable injury prevention strategies could then be identified and included as well. (As noted earlier in this report, currently it is very difficult to get reliable and usable statistics easily. As a result, it is quite challenging to develop an intervention strategy based on the findings.)

The reviewers also believe (based on research, as identified above) that if methodologies are modified, it is likely that observers' ability to accurately recall injury data and appropriately perform prevention skills would improve.

5. Is the current training effective in preparing observers for at-sea emergencies?

The reviewers believe that the training is moderately to very effective in achieving this goal. Research appears to support the notion that experiential survival and/or crisis response training is indeed effective in preparing people for emergencies, especially when refresher training is maintained. (Specifics on a study by Perkins, of the Alaska Public Health Service, and Lincoln of the NIOSH Alaska field research station, are included below.)

Further, the observers believe that, when experiential methodologies are used to teach observers emergency-response skills, the training is likely quite effective in preparing

observers for at-sea emergencies. When lecture, video, or non-experiential techniques are used, however, the training is likely moderately effective, at best. (The effectiveness of experiential training, over passive teaching techniques, has been demonstrated by a number of education studies.)

As noted, some studies suggest that even basic training does indeed have a positive effect on a person's ability to function appropriately in an emergency. Some of these studies can be found in work conducted by John Leach (University of Lancaster), the National Outdoor Leadership School, and the Wilderness Medical Associates. Also note the Perkins study that follows below. The main similarity between the studies is that, in an emergency situation, people are more likely to perform appropriately if they have received training in crisis response.

If this information is applied to the observer training, one might conclude that – given the emphasis on and time devoted to emergency response training – observers are more likely to perform appropriately in an emergency as a result of the training than they would be if they did not receive the training. If experiential education research is applied as well, one could conclude that the more hands-on the methodology, and the greater the repetition of skills, the more likely an observer would perform appropriately in an emergency.

The reviewers note that, anecdotally, this supposition is supported: most observers stated that they believed the immersion suit exercise (donning) was beneficial. Nearly all observers believed they would be able to don a suit quickly and correctly in an emergency.

Nonetheless, the reviewers acknowledge that there are very few documented instances when observers have had to practice using the emergency and/or survival skills/equipment in the field.

In summary, the reviewers believe it is likely that the training has had a positive effect on observers' preparedness for at-sea emergencies. Like any prevention methodology, however, results and verification are difficult to obtain. The reviewers add that it would likely be beneficial for the training programs to introduce more hands-on methodology into the classes; additionally, it would be beneficial for NMFS to consider developing a data-collection system that might provide better documentation of the training's true effectiveness in close call and emergency situations.

6. Has the current training made a difference in observer injury or survival rates?

As noted above, there have not been enough documented cases of close calls or observer incidents to make a compelling argument for or against the effectiveness of the training on observer survivability; however, anecdotal evidence and similar studies suggest that the training has made a difference, at least in observer injury rates.

After observing the various trainings, interviewing new and experienced observers, and after examining case studies of observer incidents, it is likely that the training has heightened the awareness (of risks/hazards) in observers, at least to some degree. As a result, the reviewers believe it is fair to conclude that because of the training, observers are likely better equipped to avoid hazardous situations, thus potentially avoiding injury and reducing injury rates.

New observers have often noted that the casualty videos and anecdotal stories in their initial trainings, in fact, have helped them be more aware of the risks. There have even been cases of observer candidates not finishing the training after learning more about the risks (which were greater than anticipated).

Additionally, as noted above, certain studies can likely be used to make a case that the training has had a positive effect on observer injury and/or survival rates.

For example, in 1995, Ron Perkins of the Public Health Service in Anchorage studied the effectiveness of marine safety training in the commercial fishing fleet in Alaska. He wanted to find out if training in survival equipment made a difference in the survivability of fishermen during emergencies at sea.

Perkins studied two groups of fishermen: one had been trained in AMSEA's standardized Emergency Drill Instructor course; the second (control) group had not been trained. After analyzing the data, Perkins found a very high correlation between the trained group and survivability (i.e., low fatality numbers) (P=0.034*)*. (A similar correlation between the non-trained group and survivability did not exist.) From this study, one might conclude that standardized safety training (that includes emergency procedures and practice in the use of survival equipment) would also benefit to observers in the case of a catastrophic incident.

Summary: evaluation of effectiveness of training. Overall, observer training programs can be commended for the quality of the safety training provided to observer candidates. Due to the efforts of NMFS, safety training has become more of a priority and is included in all observer training programs. As a result, observers at times are the best-trained personnel on fishing vessels. NMFS also deserves credit for the time and expense it has devoted to improving the training, particularly over the last few years.

In summary, the reviewers believe the current safety training is moderately effective in preparing observers for at-sea work/hazards, preventing injuries (or reducing rates), and preparing observers for at-sea emergencies. Training could be considered highly effective by implementing the following three points:

1. Develop an injury data-collection system. Each site asks observers (during post-deployment interviews) to note incidents and injuries, and the results can be found under Section IV: Risk Assessment Findings, Risk Assessment and Injury Data by program fishery. It is hard to determine how formal the system is for identifying the types, rates, and causation of observer injuries. It would be helpful if there were some consistency

between regions regarding how injuries were documented so the causation factors could be determined. In informal interviews conducted with experienced observers (39) during site visits, the reviewers found that 41 percent stated that they had been injured on the job. From this, the dangerous nature of working on vessels, documented workmen's compensation claims, and program statistics, it is known that injuries do occur to observers. Further, there does not always seem to be tracking of circumstances surrounding incidents, and this data is not always presented as well as it could in all regions during the observer safety training.

As noted earlier, the reviewers believe the observer programs would benefit greatly if NMFS could initiate a comprehensive injury data-collection system whereby the data can be tracked and shared nationally on an ongoing basis. Not only could the number and type of injuries (to observers) be tracked, contributing factors could be noted, trends could be documented (including number and types of injuries per vessel type and/or per fishery; injury rates per time of day; injury rates per day at sea [i.e., during a deployment]; injury rates for new versus experience observers, etc.), and the data could be presented during trainings. Applicable injury prevention strategies could then be identified and included as well.

2. Expand methodologies (methods of instruction) used to present material. It appears that some of the safety instructors nationwide need more training and experience to present the safety curriculum in a creative, stimulating and thought-provoking manner. Instead, a high number of instructors resort to a lecture and videotape format for disseminating information. While these techniques are often more time efficient than experiential methods, they are not *content* effective. There is much research to support the notion that hands-on training results in higher retention as well as more appropriate crisis response behaviors.

The instructors who have taken AMSEA's MSIT class have been modeled and trained in student centered hands-on training methodologies, and a number of these trainers incorporated the methodologies they learned into their courses. The challenge at this point is to see that these more efficient training methodologies are assimilated and incorporated into all observer safety trainings, as often as possible. Currently there is no way to verify if the effective methodologies modeled in MSIT training, are being used.

3. Make better use of stated (and measurable) objectives, and more effective methods for assessing student progress, proficiency, and level of understanding. The methods of assessment used at the various sites are informal, lack standardization, and at times, are virtually non-existent. As a result, it is difficult to accurately evaluate the effectiveness of the training observers receive. Improved assessment techniques cannot only help gauge student progress; it can be used to help identify missing topics and/or areas of weakness within the training itself.

Assessment tools should typically be based on stated objectives. That is, quizzes and/or performance tests should be written to evaluate whether or not students actually reach the (measurable) objectives. Although some sites have identified some objectives, no site has

identified objectives for all 18 core topic areas. In order for each site to improve the evaluation of their own trainings, they should first take steps to formally list the objectives per topic.

VI-2. The effectiveness of current observer trainers specifically in the area of safety training

Safety programs and instructors vary widely in effectiveness, but most are in the "fair to very good" range. With better standardization, more of an emphasis on "student-centered" as opposed to "teacher-centered" training, tighter safety training standards, as well as professional development opportunities, it would not be difficult to change the range of instructor effectiveness to "very good to excellent."

The reviewers' evaluation is based on the following criteria/questions:

1. Do OTs have appropriate backgrounds/experience and/or understanding of observer work?
2. Do OTs have appropriate knowledge and understanding of material?
3. Do OTs have appropriate training in teaching methodologies?
4. Do OTs use appropriate methodology to achieve the desired results?
5. Do OTs have appropriate training in assessment methodologies?

In addition to the above criteria/questions, the evaluation of trainers was based, in part, on the criteria found using the Instructor Evaluation Criteria format. A compilation of all observer trainer's results can be found in Appendix R.

1. Do OTs have appropriate backgrounds/experience and/or understanding of observer work?

At most sites, trainers have worked as observers. As a result, these trainers have a solid understanding of observer work, and they are able to not only address relevant points, they are credible instructors.

At some sites, however, the trainers are not required to have worked as observers. (Woods Hole, for instance, has used contracted trainers who have no personal experience working as observers.) While these trainers might have appropriate at-sea experience, they do not necessarily have a solid understanding of observer work. In the instances where non-observers are used as trainers, it might be beneficial for the non-observers to be teamed with an OT who has observer experience. A second suggestion would be for non-observer trainers to receive some sort of comprehensive education regarding observer work (specific to that fishery), including (but not limited to) hazards/risks associated with the vessels, duties, and environment. (The reviewers would like to add that while an effective safety instructor could likely make up for lack of observer experience, an ineffective but experienced observer would likely make a poor safety trainer.)

Additionally, several of the trainers have not worked as observers for several years. As a result, they may not always be up-to-date on current conditions of the vessels (or fisheries), nor may be able to offer recent or relevant case studies as they relate to hazards, risks, crews, working conditions, boardings, etc. As noted in the above paragraph, in these instances, it might be worthwhile to ensure that the OTs receive applicable and up-to-date information regarding the risks/hazards associated with the vessels, observer duties, and the environments.

2. Do the trainers have appropriate knowledge and understanding of material?

Based on the reviewers' observations, it appears that most trainers have appropriate knowledge and understanding of most of the topics they teach. It was only in a few instances where the reviewers noted that "incorrect" information was actually presented.

Where a number of instructors are lacking is in their depth of knowledge. That is, while they are qualified to present the core curriculum, many of the instructors do not have a solid understanding of the "whys" behind the information, nor are they always able to answer follow up questions from students.

In particular, the reviewers noted that the topics where several instructors seem to lack depth of knowledge (where additional professional development) include accident causation (how accidents happen, objective/subjective factors), first aid and hypothermia, EPIRBs, SOLAS kits, liferafts, and dewatering pumps. Additionally, most instructors lack information regarding current injury statistics (numbers, types, trends, and contributing factors).

As noted later in this report, NMFS could address this problem by providing additional or continuing education to OTs (e.g., refresher courses, workshops, newsletters, etc.) or by hiring safety training experts (to conduct the safety trainings or to mentor the OTs). Further, in the event an OT lacks expertise in only one or two subject areas, s/he might consider bringing in a qualified "guest presenter" to supplement the teaching in that specific area.

In summary, the reviewers believe that for an instructor to be appropriately versed in the content of the safety training, some may need greater training than is provided in a one-week MSIT course. Not only may they need to attend additional trainings and/or study on their own, they will likely need to instruct at least once a year in order to develop adequate experience and expertise.

3. Do OTs have appropriate training in teaching methodologies?

As noted in Section V, most OTs have attended the AMSEA MSIT. As a result, those instructors (which are the majority of OTs) have had 48 hours or more of training specific to marine safety and safety education. Additionally, the MSIT course not only provides information specific to marine safety education, the training also includes background information, role modeling, and practice in the area of teaching methodologies.

As a result, the reviewers believe that the training most OTs have received (or are required to have) in the area of educational methodologies is appropriate but minimal. While most OTs have an appropriate understanding of safety education and risk management, if their only formal background in teaching methodologies includes a 48-hour training (plus field experience as observers), they may likely have only basic and minimal skills as educators. This is especially true if they do not receive follow-up training and/or teach a course shortly after their MSIT.

As noted previously in this document, one of the most effective methodologies for teaching performance-based skills includes experiential or hands-on techniques. Students who have the opportunity to practice skills (with corrective feedback) over time are more likely to be able to perform them appropriately and consistently. Further, the use of case studies, in conjunction with discussion and debriefs, is considered an effective technique for improving judgment and decision-making in the area of risk management.

The reviewers observed that most sites use some limited experiential techniques in their trainings, and most did not use case studies as effectively as they could have. (Experiential techniques were most often used to teach proper use of immersion suits, PFDs, and righting and entering a raft.) The reviewers add that OTs have attempted to incorporate more experiential techniques in their trainings, and they should be commended for these changes. The reviewers believe that a number of the trainings (or sessions within training) have been only moderately effective, however, mainly due to the OTs limited background and knowledge of teaching methodologies.

4. Do OTs use appropriate methodologies to achieve the desired results?

The reviewers' evaluation of (appropriateness of) methodologies used is directly related to the information presented above. That is, the use of experiential methodologies used in the various trainings is desired but limited. As a result, the methodologies used are likely moderately effective (at most) in achieving the desired results. This fact is likely due to 1) the OTs background and expertise in education (i.e., limited "bag of tricks,") 2) the amount of time available to teach each subject, and 3) the limited resources available at some sites.

The reviewers believe that while the safety trainings could be enhanced through improved teaching methodologies, they also acknowledge that experiential methods (especially those that require performance and practice) tend to require more time than lectures or videos require. Further, in order for students to practice using survival equipment, a number of props (and in some cases, space) are required.

Given the challenge that all training programs face (in finding the time, money, and resources to present all safety, species-identification, and data-collection information, and in finding the time and money to provide additional training to OTs), it is understandable that a number of programs simply resort to using time effective and less costly methods (such as lectures and videos) to present a number of topics. Nonetheless, if NMFS hopes

to improve the outcome of the safety training (i.e., the observers' ability to identify and assess risks/hazards, reduce injuries, and be prepared for at-sea emergencies), they will likely need to make changes in this area.

5. Do OTs have appropriate training in assessment methodologies?

Based on a review of the tests and quizzes used (nationwide), and based on observations from site visits, the reviewers believe that the OTs training in assessment methodologies is limited and could be improved. For instance, while most OTs have attended the AMSEA MSIT, the MSIT includes minimal training in the area of assessment (other than some basic performance testing methodologies). In fact, according to the reviewers' interviews, very few of the OTs have received any type of formal training in the area of assessment techniques.

It is important to note that the ability to write a quality quiz, create test questions that truly measures student success (i.e., understanding of material), or to identify pass/fail criteria for performance-based skills is not innate and must be learned. Because few of the OTs have received training in this area, it is not surprising that most are lacking in this regard.

The reviewers believe that NMFS could address this issue by either providing training opportunities for OTs (in the area of assessment), by hiring a qualified professional who can create assessment tools that can be used nationally, or by including some combination of the two.

Summary: effectiveness of trainers. Overall, the reviewers were impressed with the professionalism and sincerity of the OTs, most of whom take their roles (as safety trainers) very seriously. Not only are the OTs skilled in developing an appropriate rapport with observer candidates, they are also obviously concerned with well-being of the students – not only in the classroom, but also during their at-sea deployments.

In all, the reviewers believe the trainers are moderately effective in their ability to provide safety training to observer candidates. As noted above, the reviewers also believe the effectiveness of the trainers could be enhanced significantly if continuing education opportunities are used to:

1. Provide greater depth of knowledge in a certain areas,
2. Improve knowledge and understanding of teaching methodologies, specifically as they can be applied to the training topics, and
3. Improve assessment methods.

A second approach to addressing OT effectiveness would be to hire safety trainers who specialize in marine safety and safety education. These trainers, in turn, could be used to supplement the safety trainings, be in charge of the safety trainings, and/or to serve as trainers or mentors to the current OTs.

The reviewers note that the training and professional background of OTs will likely have a significant influence on the desired training outcomes. For example, because quality data collection is a priority in observer work, OTs are expected to have a significant background and expertise in the area of marine or fisheries science and/or data collection. Consequently, OTs are very qualified to help observer candidates learn how to identify species and record data.

In turn, because OT are not currently required or expected to have extensive training in education methodologies (including assessment), marine safety, or safety education, it is reasonable to believe that the quality of safety training is not as good as the training observer candidates receive in the area of species identification and data collection.

In summary, while the reviewers believe that the current OTs are moderately effective in facilitating the safety trainings, they also believe that if NMFS would like to see the quality and effectiveness of the trainings and trainers improved, they will likely need to support the trainers with increased professional development opportunities and/or financial resources.

VI-3. Assessment of current practices used during training exercises, (specific to safety and risk management practices)

Historically, the safety trainings provided to observer candidates developed according to regional needs. The National Observer Program (NOP) has encouraged programs to standardize the trainings in the area of curriculum (core topics) and methodology. Additionally, most sites have acknowledged that it would likely be prudent and reasonable to standardize some of the current practices that are used during training exercises, specifically as they relate to risk management.

As a result, the reviewers used the information provided in Section IV (risks/hazards associated with training exercises), Section V (current practices), site visits, and their knowledge and expertise in the area of risk management to evaluate whether or not appropriate risk management practices are being used at the various sites. Specifically, the reviewers attempted to address and answer the following questions:

1. Do trainers recognize the foreseeable as well as less common risks and hazards associated with each training exercise?
2. Do trainers verbalize this information (risks/hazards) to the students in order to heighten their awareness?
3. Are appropriate risk management steps taken (in each training exercise) to address and manage/minimize the risk/hazard? Are these followed consistently?
4. Are trainers good role models for teaching proper risk management (i.e., do they practice what they preach)?
5. Does each site have stated policies that are used to identify obvious “dos” and “don’ts” as they relate to safety?
6. Do trainers have knowledge of injury data associated with training exercises (in their program, in other NMFS programs, in any similar type training exercises)?

7. Do trainers have adequate understanding of "how accidents happen" (i.e., incident causation, typical patterns, contributing objective and subjective factors)?
8. Do trainers have an adequate background in leading beginners (i.e., are they familiar with typical and foreseeable beginner mistakes and/or actions)?
9. Is there any type of oversight group that is able to help identify risks, hazards, and appropriate risk management practices?

1. Do trainers recognize the foreseeable as well as less common risks and hazards associated with each training exercise?

Overall, the reviewers believe that most OTs are skilled at recognizing the most common and foreseeable risks/hazards associated with the trainings. That is, OTs recognize the injuries that can result secondary to pool exercises, lake exercises, flare/fire fighting exercises, and vessel visits. They also are able to recognize most of the hazards associated with the in-class exercises.

The reviewers also believe that a number of OTs are less skilled at recognizing some of the less obvious risks/hazards associated with the training exercises. For example, several of the OTs did not seem adept at recognizing the types of errors that beginning students will often make when faced with new (and potentially dangerous) learning situations. (Examples might include the beginner's tendency to break rules, such as diving into a pool or handling live flares even though they have been told not to). Further, several OTs had not considered the consequences of having a claustrophobic or severely asthmatic student don an immersion suit and/or enter cold water.

In summary, it appears that most OTs have simply not spent the time formally identifying the risks/hazards that are associated with the various trainings. The reviewers believe that if OTs (at each site) listed, in writing, all of the potential risks/hazards associated with each and every training exercise, and if these lists were shared across sites, all OTs would likely become more skilled at recognizing foreseeable as well as less-common hazards associated with the trainings.

2. Do trainers verbalize this information (risks/hazards) to the students in order to heighten their (student) awareness?

The "warnings" that OTs provided (to observers) were rather inconsistent. For example, most OTs verbalized risk/hazard information at least to some degree (e.g., students were told they would be training in a pool/lake, hazards associated with flares were usually identified, etc.). Some OTs and sites, however, provided fairly in-depth warnings while others merely "mentioned" risks/hazards, almost as if in passing.

For the most part, trainers appropriately verbalized risks/hazards related to donning an immersion suit and entering the water.

At some sites, potentially inadequate warnings were provided during the following exercises: righting and entering a raft; flares; fire fighting; and on-vessel tours/orientations. On some occasions, the reviewers noted that students were not warned about the potential of getting caught under a raft or tangled in the raft lines. Further, not all students were warned about the potential for flares to drip; not all students were warned to remain low while approaching a fire, nor were they told to avoid turning their backs to the fire. Finally, not all students were warned of the hazards associated with the vessel tours. These included the risk of injury that can occur while getting on/off the vessel; further, students were not clearly warned of the hazards associated with the sharp, rusty metal on one of the vessels.

Further, while some OTs did an excellent job getting students to recognize and identify the hazards, many simply pointed them out. While "pointing out" hazards is important, it is similar to a lecture in that it is a minimally effective methodology for teaching hazard recognition and risk assessment skills. On the other hand, by having students point out and assess the risks/hazards associated with each training exercise, OTs could effectively provide opportunities for students to practice these new skills.

3. Are appropriate risk management steps taken (in each training exercise) to address and manage/minimize the risk/hazard? Are these followed consistently?

Good student/teacher ratios are important. At times, however, instructors became preoccupied with a single student, and the remaining students continued with the exercise virtually unsupervised. Although the ratios were never "broken," the actual oversight provided was sometimes minimal.

For the most part, students are given notice regarding pool exercises. This was done early in the course. Most OTs also reminded students of pool exercises the day before the training. Although students were not specifically asked to identify concerns (nor were they asked to identify potentially hazardous medical conditions), by giving notice well in advance, students did have the opportunity to bring up concerns to OTs. An improved practice might be to ask students to bring any and all concerns to the attention of the OT.

In all but a few instances, students were required to wear a PFD or immersion suit while in the water. The reviewers also noted, however, that the trainers did not always adhere to this rule, and OTs often entered water without wearing a PFD or suit.

Lifeguards were used at most pools. Additionally, emergency and safety equipment (such as throw rings and backboards) were also available.

During lake exercises, appropriate safety and first aid equipment was kept nearby. "Rules" regarding "out of bounds" and in-water behaviors were not always clearly articulated, however. Further, non-verbal communication options (such as, I'm in trouble, or, get out of the water, now), were not always identified.

As noted earlier, hazard recognition and risk assessment is a valuable risk management tool. While most OTs included some hazard identification prior to starting an exercise, improved methodology and a greater emphasis in this area would likely be beneficial.

Although there are no clear "rules" to guide outdoor exercises, OTs seem to realize that there are times when outdoor exercises would be inappropriate if not dangerous. These instances might include but would not be limited to cases of lightning, extreme wind and/or extreme cold.

At some sites, gloves were worn during flare exercises. Further, at some sites closed-toed shoes were required during fire-fighting exercises and/or during visits to vessels. These risk management practices were not required at all sites, however.

Although most OTs asked observer candidates to buckle their seatbelts when transport (in NMFS vehicles) was required, it was sometimes stated in such a tone that the statement could be considered a suggestion. Further, OTs rarely checked that this was done, and the reviewers noted that on more than one occasion, students did not "buckle up" during travel.

Further, the reviewers noted that on at least one occasion, a vessel orientation was conducted on a rather poorly maintained (rusty) boat. As a result, the potential for injury (including tetanus) was probably not addressed to the degree it could have been.

4. Are trainers good role models for teaching proper risk management (i.e., do they practice what they preach)?

If/when OTs recognized the value role modeling can serve in safety education they tended to "practice what they preach," and follow all "rules" they imposed on observers. Further, although nearly all OTs identified at least basic rules or guidelines that observers were expected to follow during the exercises, the manner in which the guidelines were presented did not always mirror the importance of the rule. That is, although OTs were able to clearly articulate (to reviewers) the importance of certain rules, this level of importance (including the "why" behind the rule) was not always evident to students.

In order to get students' attention, for instance, a "need to know" statement is often needed. If/when students see information as relevant and applicable, they are more likely to pay attention and assimilate material, and a "need to know" statement can be extremely beneficial. Need to know statements (specific to risk management) and explanation behind rules were not always offered, however. As a result, the reviewers noted that some students did not pay close attention during the pre-session warnings. (Presentation of "need to know" statements [including creative and effective ways to present them] is an area where a number of OTs could improve.)

Further, there were a few times when trainers asked observers to follow one set of rules while they followed a different set. The main example of this discrepancy (that occurred at more than one site) seemed to involve OTs who entered water without wearing a PFD

or immersion suit. While the reviewers recognize that the lack of a flotation device might be beneficial in an emergency situation, this reasoning was never explained to the students. Thus, students were left to make their own conclusions regarding the importance of flotation aids.

In summary, OTs provide decent role modeling that could be improved to excellent with little effort. Basically, if OTs make a greater effort to present exemplary risk management behaviors (including incorporating "need to know" statements, emphasizing the "why's" behind their rules, and remaining diligent in practicing what they preach), they would enhance the overall effectiveness of the safety trainings. In the event the OTs believe it is prudent to follow one set of rules while observers are expected to follow a second set, the reviewers believe it would be beneficial if the reasoning behind this discrepancy is clearly verbalized to students.

5. Does each site have stated policies that are used to identify obvious "dos" and "don'ts" as they relate to safety?

While programs conducted the majority of their training exercises in a professional manner, few of the programs used any written guidelines to help manage the risk. As a result, there were times when the supervision or facilitation of an exercise could have been more effective (as noted above).

It appears that the most common method for identifying "dos" and "don'ts" involves instructor discretion (i.e., OTs use their judgment to decide what is/isn't appropriate) and verbal communication. By allowing instructors to make decisions about risk management, each site is assuming that the OT is appropriately skilled in risk management. In the event an OT forgets to mention a rule or overlooks a hazard, there is no backup system for making sure the information reaches the students. Not only does this increase the potential for unsafe behaviors (subjective hazard), it also increases the risk to NMFS (regarding legal liability).

By identifying and using standard practices when conducting the activities, programs will often improve the overall quality of their training sessions. Although some people fear that this approach creates an environment that is "rule heavy" (which, if not followed, could increase the potential for a claim of negligence), in actuality, many high-risk industries (such as aviation, oil and mining, etc.) embrace the use of standard operating procedures (including use of safety checklists) in all that they do.

The reviewers believe it would be in NMFS best interest to identify specific risk management practices that it would like each site to use/follow. Each site, in turn, should identify a process for making sure that OTs as well as students are familiar with the rules. For the most part, the rules should not be dependent on instructor discretion; instead, the rules should be created with the input from each site as well as potential outside experts.

6. **Do trainers have knowledge of injury data associated with training exercises (in their program, in other NMFS programs, in any similar type training exercises)?**

The reviewers found that most OTs are not aware of any injury data that identifies rates or types of injuries associated with the training exercises. The reviewers recognize, however, that there have been very few injuries that have occurred during the safety trainings. As a result, it is not surprising that this type of information is not available or used.

However, the reviewers also noticed that "close calls" have occurred during the trainings (in fact, close calls were noted during site visits), yet close call data (which can often be used to predict incidents) is not collected or used in any way.

Further, although marine safety trainings are offered worldwide, there is no system for identifying or using injury or close call data that has been collected as a result.

In summary, while it is not surprising that injury data is not available or shared among OTs, the reviewers encourage the NOP to consider creating a system for gathering this type of information for future use. Not only would it be helpful to identify injuries – by type, rate, trends, and causation – it would also be worthwhile to identify close call data. This information, in turn, could be used to improve the risk management of exercises over time.

7. **Do trainers have adequate understanding of "how accidents happen" (i.e., incident causation, typical patterns, contributing objective and subjective factors)?**

As noted earlier in this document, most OTs appear to have basic risk recognition skills. Additionally, a number of OTs seem to have a basic understanding of accident causation. Nonetheless, few OTs have had any formal training in this area. Instead, most were expected to rely on self-learning and self-training when it comes to "how accidents happen" and risk management.

Further, the reviewers found (through interviews) that a number of OTs do not have a clear grasp of foreseeable student errors (i.e., inappropriate actions and/or errors in judgment) that could ultimately contribute to an incident or injury.

As a result, the reviewers believe that it would be worthwhile to encourage OTs to enhance their understanding of accident causation, especially as it would apply to training activities. This process might be achieved via a variety of continuing education opportunities, such as refresher courses, workshops, video training, and/or newsletters.

8. Do trainers have an adequate background in leading beginners (i.e., are they familiar with typical and foreseeable beginner mistakes and/or actions)?

This question is directly related to the information provided above. Although nearly all OTs have experience in "leading beginners," most OTs have had little to no formal training in learning to manage risk for beginners.

The reviewers believe that OTs might benefit from some basic training in the area of "adventure education," (which, in essence, is what safety training is). Adventure education is a teaching approach where students are asked to step out of their comfort zones, take risks (emotional or physical), and try new skills. It does not have to involve danger or the outdoors however.

The significant research that has been done in the area of adventure education suggests that students learn best when they are in an "optimal arousal" zone (i.e., stress is present but not too great). The research also notes that when students are under- or over-stimulated, they are 1) more likely to make mistakes and 2) less likely to retain the information.

If this information is applied to the safety trainings, it is important to note that students will be less likely to make mistakes and are more likely to assimilate the information if OTs are able to 1) recognize student comfort zones, 2) recognize stress indicators, 3) be familiar with the controlled and purposeful incorporation of risk into activities. Although some of this information can be (and is) learned through experience, OTs could likely enhance their trainings if they were more familiar with these concepts earlier on.

Further, the reviewers noted that many OTs are not fully aware of the types of foreseeable mistakes new observer candidates will likely make (in their trainings as well as during deployments). These errors, however, is somewhat predictable, and this knowledge could potentially help prevent incidents/injuries.

In summary, most OTs have learned to lead beginners (and manage risk for them) as a result of trial and error. Because many of the OTs have taught the safety trainings for years, they are skilled at recognizing common beginner errors, and they have learned to effectively present adventure education activities.

The newer OTs, on the other hand, do not seem to have this background or training. Further, unless the experienced OTs take the time and effort to mentor new trainers, it is likely that the new trainers will be left to develop this skill and knowledge on their own.

In order to expedite the development of the OTs, and in order to minimize the potential that injuries will occur under the watch of a new OT, it would likely be beneficial for the NOP to offer some sort of applicable training opportunities to the newer trainers.

9. Is there any type of oversight group that is able to help identify risks, hazards, and appropriate risk management practices?

The reviewers wanted to know whether or not risk management is typically left to an OT, a site, or is addressed systematically on a national level.

As previously indicated, it appears that many sites leave risk management (hazard identification, risk assessment, and chosen practices) up to individual OTs, though some sites have agreed-upon practices that are followed by all OTs. Most sites do not, however, have a formal process for articulating all risk management practice to new OTs. Instead, OTs are expected to share information with one another (e.g., new OTs might be required to observe a training conducted by a more-experienced OT). Unfortunately, this type of approach is prone to errors, and key pieces of the risk management plan are often overlooked and/or are not passed along in a timely or orderly manner.

Overall, the reviewers found that there is no formal group, per site or nationally, that has been charged with risk management oversight. The NOPAT, however, has provided some advice in this regard, and the group appears poised to take on the charge of risk management oversight.

Summary of current trainings. The reviewers rate the current training exercises (in regard to risk management) as adequate, but improvements can be made. That is, no significant concerns were noted; however, with a few changes, the reviewers believe the risk management practices could be enhanced. The reviewers believe the following are the main contributing factors.

Lack of formal risk management plans, per site. This would include identification of risks/hazards per activity and appropriate management practices to address the risks. It would also include a system for making sure that OTs and students are aware of the plans.

Need for enhanced OT training, to include basic information on adventure education (purposeful incorporation of risk into educational activities), information on foreseeable student errors, and emphasis on role modeling. While all OTs have some training in these areas, enhanced training would likely improve the overall quality of the risk management.

VI-4. Adequacy of the training as per observers' input

The results presented in this section are based on the following two sources:

- Feedback from observers (new and experienced), obtained during site visits
- Feedback from observers, obtained from an APO survey
- Feedback from observers, obtained from a 1999 needs-assessment survey
- Feedback from observers from the North Pacific Groundfish Observer Program

Summary of observer interviews.

At least 39 experienced observers were interviewed around the nation during the site visits. These 39 were a part of over 200 individuals interviewed that were knowledgeable about observer risks. In addition, the APO surveys and NPGOP debriefing data accounted for feedback from several hundred other observers. According to observers, the greatest hazards identified were muscle strains, falls, loss of vessel, various marine bites and stings, and machinery. It is obvious that some of these hazards, such as loss of vessel, are being addressed during training. Other hazards such as lifting and falls do not seem to be as thoroughly addressed. More experienced observers tended to see more subject areas that should be covered.

In a survey of 866 debriefings in the North Pacific Groundfish program from 1999 to 2002, less than four per cent of returning observers felt that the training they received in vessel and personal safety was "not enough". Interviewed observers also stated that they believe the safety training they received was "adequate". It was obvious that there is general satisfaction with the level of safety training, even though not all the hazards are perhaps being addressed in the training. In interviews with observers, the reviewers noticed that the more experienced an observer was, the more hazards they tended to acknowledge. These experienced observers had seen or heard of more close calls, or had been injured themselves. With more time at sea, they had more opportunity to experience what could go wrong.

The APO survey discussed earlier in Section IV noted that 77 percent of those responding thought safety training should take place annually; 13.5 percent felt it should take place biennially; and 8.1 percent felt it should take place only during the basic three-week observer training course. Topics observers thought should be included use of survival equipment (89%), specific vessel hazards (72.6%), safety requirements for vessels (64.4%), and injury prevention (50.7%).

Findings from NPGOP surveys. The North Pacific Groundfish Observer Program has attempted to collect data regarding the perceived risks and close calls as noted by observers. The data below was collected during observer (post-deployment) debriefings; the following summary includes data collected from June 2000 to June 2003. The following data was from observers working on near shore processing vessels in the North Pacific groundfish sector.

In all of the NPGOP debriefings from 1999 to 2002, 89 percent of experienced observers felt the training was adequate; eight percent felt it was inadequate; and two percent said they believed it was too extensive.

Below, survey questions are identified, followed by observer responses:

Did you have any safety concerns while working at this plant?

Sixty observers (90 percent) answered No, and seven observers (10 percent) answered Yes. The main concerns noted included ammonia/Freon leaks (three responses), struck by equipment hazards (three responses) and a watertight integrity hazard (one response).

Who showed you the safety equipment in this plant?

Eighty-five percent (57) replied Yes (someone had shown them the safety equipment). Fifteen percent (4) were not shown safety equipment.

Were you told what to do in an emergency?

Ninety-one percent (58) replied Yes; nine percent (7) replied No.

Were you warned of potential safety hazards in the plant?

Sixty-four percent (43) replied Yes; 36 percent (24) replied No.

Are there any additional safety concerns about which you would like to comment?

Ten percent (6) had additional comments (which follow), and 92 percent (55) had no other comments. Safety concerns that were identified included no safety drills, overhead crane hazards, crossing boat to dock hazard, carbon monoxide hazards, poor hygiene/cleaning in plant, and gloves/fingers getting caught under the diverter board.

Were you subjected to any impediments at this plant?

Eight percent (8) replied Yes; 92 percent (55) replied No. Some of the impediments identified included having no communication with NMFS for 10 days, verbal harassment/intimidation (3), theft (3), and not getting a room change – sleep was impossible.

Summary. It was interesting to note that even though vessels varied widely in how well they pointed out hazards and what to do in an emergency, observers still often noted that they had no safety concerns. This suggests that observers potentially did not always know what the risks were. This might be especially true of new observers who had not worked at sea previously. This would give support to the efforts of the NPGOP and of other regions, to continue to stress the importance of observers conducting their own safety orientations, when the crew from the vessel does not provide them.

The data demonstrates that observers are somewhat concerned about injuries caused from ammonia leaks and being struck by objects (especially during crane operations); however, neither of these hazards are discussed in any depth during the safety training.

Section VII
Recommendations

As per the initial proposal and Scope of Work (as identified in the AMSEA/NMFS contract), the reviewers have organized their recommendations in the following sequence:

Area #1: Safety training standards (core curriculum) for all NMFS observer programs.

Area #2: The frequency and type of safety training observer trainers should participate in.

Area #3: Revisions or enhancements that can be made to the curriculum and/or methodology used in each region

Area #4: The feasibility of a centralized or coastal safety training facility and possible universities or other organizations that may be capable of providing a training facility

Additional Recommendations and Suggestions

Addressing the needs of returning observers

- Identifying training requirements for returning observers
- Consideration of certification

Addressing quality control issues, such as national oversight of safety training

- Identifying national oversight options
- Identifying and/or modifying tools for assessing trainings

Addressing national safety standards, specific to risk management

- Guidelines for managing risk during training
- Suggestions for identifying/implementing policies
- Suggestions for oversight/issuance of safety equipment
- Creation of a national risk management committee

Reducing risk of legal liability exposure to the National Marine Fisheries Service

- Completion and/or passage of FOCA
- Clarification of relationship between NMFS and contractors
- Suggest using/hiring an attorney who specializes in this area

VII-1: Safety training standards (core curriculum) for all NMFS observer programs.

A) NMFS observer programs should develop and follow a standardized curriculum for their basic core competencies in safety training.

The reviewers believe that NMFS has made great strides in standardizing observer safety trainings of basic universal core topics, and by the end of this project period (March 2004), each site appears to have come to agreement on using a standardized set of topics

for their safety trainings. (The list of NMFS "core topics," as identified in the 2004 meeting in Galveston, Texas, is included in Appendix A).

The reviewers recommend that NMFS create a standardized curriculum of core competencies and a management system that will ensure the consistency and appropriateness of the training, nationwide. Although consistency in safety training content has improved over the years, base levels that clearly identify what is meant by observer readiness or "student success" should be identified, agreed upon, and used by all sites. This process would mean that there is national agreement as to what safety training all observers need (regardless of fisheries) prior to deployment: this training, in turn, would be considered "core" at each and every site. Each topic should be standardized for objectives and measurable outcomes, depth of content, time allotted, and assessment guidelines. In the event a site wishes to add to the core, or address a topic in even greater depth than is required, the additional information should also include objectives, outcomes, content outlines and assessment guidelines. The added content can be considered an "optional module" (see below).

A standardized set of core skills or competencies would be an important development. The reviewers believe that if NMFS could document that each observer was seen to perform basic safety skills, it would be an excellent training technique and provide better protection for NMFS. A list of proposed skills was developed at the Galveston meeting in March 2004. It can be found in Appendix F. Some of these skills are already practiced in observer training, and most of the rest are explained if not actually practiced. By demonstrating the skills to the instructor, a greater level of retention would be gained.

By identifying core competencies, standardized performance skills checklists could be developed. In this way, skills that should be practiced in a specific pattern and method would be taught the same way in every region. This is very important since observers change regions and to prevent confusion in skills, it would be most helpful if observers practiced skills the same way for better retention. Appendix G is an example of a performance checklist with pass/fail criteria. This skills checklist would also be helpful for "guest" instructors or changes in teaching personnel to follow.

The reviewers wish to point out that the content within a topic (such as vessel hazards) can differ from site to site, according to fishery variations. In this regard, the same lesson plan can be used across sites while the details specific to an area can still be addressed. What is most important is that each site and all OTs have a more formalized system for identifying key learning points, for identifying "minimum" timeframes per topic (regardless of site or fishery), for making sure that all important information is covered, and for accurately assessing whether or not students have actually reached the objectives for each and every topic.

Further, while each site should be free to choose methods of delivery to a great degree (i.e., "how" to present the material), NMFS should encourage OTs to use experiential methodologies as often as possible in order to improve the effectiveness of the trainings.

Given that standardization in lesson plans, delivery, and assessment could be burdensome or unrealistic for some programs (due to time and/or resource constraints), it is important that the changes are not adopted in intent only. In order to avoid "lip service," the reviewers recommend that NMFS develop a system for ensuring – on an ongoing basis – that all sites are adhering to the changes and are able to follow the agreed-upon lesson plans. This might include documentation of delivery, audits, site visits (from other OTs, advisory board committee members, or an outside reviewer) or some other form of checks and balances that can help gauge the quality and consistency of the training nationwide. In the event a training site identifies problems or concerns, the management system could help identify solutions.

As indicated in Section V of this report, most of the trainers who facilitate the observer courses are experts in the area of marine science and research, data collection, and/or some other fishery specialty. They are not, however, experts in teaching, nor are they experts in marine safety or safety education.

While it is apparent that NMFS has made significant strides in its effort to provide national input and oversight in this area, in order to ensure that the safety trainings are standardized on a national level, the reviewers recommend that a national advisory team or committee is used to 1) help identify core curriculum, 2) help identify methods for assessing student success per topic, 3) help assess whether or not the safety trainings are actually achieving the desired results, and 4) help identify suggestions for improvement if and when the system is not working. It is suggested that representatives from each site/region be included on the team; OTs should be represented (that is, the group should not consist of management positions only); and outside expertise and input should be sought as often as necessary.

B) NMFS should begin gathering injury and close call data nationwide and program wide, specifically as it relates to observer at-sea work and observer safety trainings.

The reviewers also recommend that NMFS begin gathering injury and close call data, specifically as it relates to observer at-sea work and observer safety trainings. As has been noted in this document, because there is no single source for collecting this data, it is very difficult to track, analyze, and/or use it to help strengthen the existing training. while there may be confidentiality issues to resolve, the reviewers believe that NMFS (or a NOP risk management committee) could help create a template so that similar data is collected in a consistent and usable format across the programs. Appendix S are suggestions for collecting injury and close call data.

Gathering incident data will enhance the curriculum since it will help ensure that the injuries and close calls that occur are being addressed in the training. For example, data and interviews tend to point out that back injuries due to lifting and sea motion are a problem to observers in some programs. Yet currently, only a few observer programs teach proper lifting techniques. Gathering information on injuries will help keep the curriculum data driven if injuries can be compared to what is actually being taught. Appendix N is an example of a debrief form that could be used to ensure that the

adequacy of the training met the reality of the work at sea. Appendix T is a sample injury/illness reporting form.

VII-2. The frequency and type of training for observer trainers.

A) Baseline levels of training for trainers should be identified and only those instructors who qualify under the given standard should be used to present the observer safety material.

Most observer trainers have successfully attended the AMSEA Marine Safety Instructor Training course, a step that has contributed greatly to the quality and consistency of the training. Completion of this training is not formally required at most sites, however, and few programs have identified continuing education or professional development opportunities that can be used on an ongoing basis.

In order to ensure that all OTs are qualified to teach the safety trainings, the reviewers believe that baseline levels of training for trainers should be identified, agreed upon, and enforced. OTs would not necessarily need to document successful completion of the training prior to their employment, but they would need to complete an instructor course prior to leading observer safety training.

It is recommended that only instructors who qualify under the identified standard be used to present the observer safety material (whether the OTs are NMFS employees or contracted trainers). Not only will this step help standardize the presentation of material from site to site, it will also help improve the quality of instruction. Additionally, by taking steps to ensure that trainers have an appropriate (and documented) level of training, NMFS will minimize its legal exposure (to a claim that an observer injury/fatality was the result of inappropriate training and/or unqualified instructor.)

The reviewers recommend that the AMSEA MSIT, or its equivalent, is considered a prerequisite for OTs. Appendix I is a suggested instructor course outline.

Further, the reviewers suggest that once an OT candidate has completed a training course, s/he should be assessed for any additional professional development needs in the following areas:

- Methods of instruction
- Techniques of adventure education and/or experiential education
- Accident prevention and risk management
- Marine safety and survival skills
- Methods of assessment and testing

Justification for including these topics can be found earlier in this document. That is, given the risks, hazards, injuries, and current practices used, the reviewers believe these areas of training will be most helpful in enhancing the level of instruction and achieving the desired results.

The reviewers believe that NMFS should also identify options for maintaining or enhancing the quality and currency of the instructors' professional competencies. It is important for NMFS to identify methods whereby trainers are able to maintain a certain level of expertise over time. This might be accomplished through attendance at additional trainings, conferences, workshops, or other. In fact, the reviewers believe it would beneficial for the NOP to identify as many continuing education options as possible that might enhance OTs depth of knowledge, teaching methodologies, and/or understanding of accident causation. This might include a comprehensive listing of newsletters, websites, magazines, videos, and/or books that would be considered "recommended reading." The options might also include applicable and suggested professional trainings or conferences.

B) NMFS should identify options for maintaining the quality and currency of the instructors' professional competencies.

The reviewers suggest that OTs receive at least 24 hours of continuing education every two years. The professional development training might include but would not be limited to any of the following areas:

- Enhancing methods of instruction
- Techniques of adventure education and/or experiential education
- Accident prevention and risk management
- Learning to lead: learning to manage risk for beginners
- Marine safety and survival skills (advanced topics)
- Enhancing methods of assessment and testing

Successful completion of training hours should be documented. Approved training options (e.g., workshops, conferences, etc.) could be identified via the national advisory committee. Appendix L contains a list of potential resources for professional development.

In order to increase the likelihood that OTs are able to benefit from the professional development opportunities, NMFS would also likely need to provide time (within an employee's schedule) and/or financial assistance.

By clearly identifying what constitutes a quality safety instructor, by identifying the steps it takes to get there, by encouraging continuing education in order to maintain a level of expertise, and by providing appropriate support in this regard, NMFS will create a system of quality control that will enhance the level of the safety trainings for observers and will minimize potential exposure to legal liability at the same time.

Appendix D has suggestions for improving teaching methodology. Appendix E has suggestions for improving non-performance assessment methods.

VII-3. Revisions or enhancements that can be made to the curriculum and/or methodology used in each region.

A) Standardized lesson plans should be developed that include learning objectives, measurable outcomes and which are consistent in minimum content, objectives and time allotted.

As stated under area #1, the reviewers believe that NMFS has made great strides in this area, and by the end of this Phase 1 project period (May 2004), each site appears to have come to agreement on using a standardized set of topics for their safety trainings.

The reviewers believe that use of standardized lesson plans of core knowledge/competencies (i.e., identical lesson plans, to be used by all sites) would be greatly beneficial. As noted earlier in this report, although some sites use lesson plans for some of the topics, no site uses lesson plans for all of the topics. In addition, the reviewers noted that some of the lesson plans currently in use attempt to cover what could or should be considered two or three core topics. As a result, it is not clear how much time should be used to address each of the sub-topics, it is not clear how in-depth an OT should address each sub-topic, and measurable objectives for each of the sub-topics are not clear and identifiable. The lack of clear and measurable objectives, in turn, makes it very difficult to assess student success per sub-topic. Appendix P has an example of a lesson plan format that could be used.

Given the risks and hazards associated with observer work (risk of injury, risk of facing crisis/survival situations, etc.), and in order to adequately prepare observers for at-sea hazards and emergency situations, the reviewers suggest that the following information should be presented (to at least some degree) at each site:

- *Risk/hazard recognition and assessment* – This would include information about the typical hazards associated with the specific fishery, such as environmental conditions, boat and machinery related hazards, food/water issues, and common errors in judgment or unsafe acts observers can expect to make/see. Finally, most common injuries, fatalities, and close calls associated with the fishery should be included.
- *Personal risk management* – In addition to identifying the risks/hazards associated with the work, observers should be able to identify steps/behaviors that can minimize (or potentially enlarge) the chance of injury or fatality.
- *Vessel orientations* – While each site already addresses this topic to some degree, the reviewers believe it is important for OTs to emphasize pre-launch safety steps – vessel orientation and walk-throughs, location of escape routes, location of emergency equipment, location of on-board hazards, and completion of checklists.
- *Personal care and hygiene* – Although most sites address this topic to some degree, the reviewers believe it is important to emphasize hydration, nutrition, sleep, drugs, etc., and the potential challenges associated with at-sea living. Suggestions for addressing these needs should also be offered.

- *Environmental problems* – Although many sites address hypothermia in their trainings, the reviewers believe it is important for observers to be able to recognize and prevent problems associated with heat/cold, dehydration, cramps, sun injuries, and sub-acute as well as acute (cold-water immersion) hypothermia. The training should include the treatment (as well as assessment) of temperature and/or environmental problems as well.
- *Basic marine first aid* – Although most sites now require Red Cross First Aid and CPR prior to deployment, the reviewers believe the safety training should also include recognition, assessment, and treatment of non-life threatening injuries and illnesses common to observers. This module would be above and beyond the information provided in the first aid class, and could be based on observer injury data.
- *Dealing with at-sea emergencies* – Given the importance of emergency response planning, the reviewers believe the following topics should be addressed, at least to some degree:
    - Common reactions to a crisis – survival psychology
    - Seven steps to survival – general steps to take in emergencies
    - Personal survival kits – contents of, use, relevance to observers
    - PFDs – types, use, care, pros/cons of each, demo and practice/skills
    - Immersion suits – types, use, care, demo, and practice/skills
    - Cold water survival – drowning and near-drown causes; HELP and Huddle positions, discussion, demo and practice/skills
    - Rafts – contents of SOLAS kit, launching, righting, entering, skills
    - Maydays – components of, demo, practice/skills
    - Marine radios (types, use, demo, practice) and/or satellite phones
    - Signaling devices – flares (types, pros/cons, use, care, demo, and [when practical] hands-on practice)
    - EPIRBS (types, pros/cons, use, care, demo, practice)
    - Abandon ship – station bills, proper procedures, hazards
    - MOB and MOB recoveries
    - Stability- basic recognition
    - Vessel safety instructions and emergency drills
    - Fire fighting (basic)
    - Flood control and damage control (basic)
    - Rescue at sea - USCG helicopter operations (basic)

The reviewers acknowledge that most of these topics are already a part of all of the regions' trainings. Not all of these topics need to be addressed in depth, and hands-on practice is not required for all topics. Nonetheless, we believe that the topics on this list are appropriate and necessary if NMFS hopes to address the most foreseeable as well as catastrophic risks associated with observer work. As a result, the reviewers suggest that key learning points for each of the above topics is identified, and the key learning points are included in all trainings.

B) Optional training modules should be developed that are applicable to some, but not all, sites.

The reviewers also suggest the NMFS consider identifying and using optional training modules above and beyond the required list of core topics – that is, topics applicable to some but not all sites. The optional modules would be selected based on regional (or fishery) needs and might simply include additional material (e.g., a greater depth of content) to already-existing core topics. In the event an optional module is desired, key learning points should be identified, and the content within each module should be standardized in order to maintain consistency and quality control.

The reviewers believe the following topics should be considered for inclusion as optional modules if appropriate:

- Accident causation – how accidents happen
- Harassment, conflict resolution, and communication skills
- Hazardous materials – CO, hydrogen sulfide, ammonia
- Ergonomics (as a stand-alone topic, in greater depth than is currently presented)
- Wilderness first aid
- Basic navigation and/or GPS
- Shore survival

Appendix C contains suggested optional topics including key learning points.

C) Methods of instruction training should be strengthened in order to improve the effectiveness of the current trainings.

Although most OTs have attended the AMSEA IT (or similar training), which includes a focus on methodologies, the reviewers believe enhanced methods of instruction would be one of the greatest steps NMFS could make in improving the overall quality and effectiveness of the safety trainings.

As noted earlier in this report, hands-on techniques and student-centered methodologies are methods of choice for achieving a high level of student understanding, improved cognitive reasoning, and strong performance skills. Due, in part, to the fact that OTs do not have great depth in creative methodologies, many instructors rely on lectures, videos, and/or discussions to present material. While the reviewers acknowledge that OTs at times choose the more instructor-centered techniques due to time and resource constraints, it should also be noted that creative, inexpensive, and effective methods can be used within a classroom. In fact, many of the OTs would benefit as the result of fairly simple modifications and enhancements to their presentation styles.

In order to achieve these desired results, the reviewers recommend that NMFS require that all OTs receive training in methods of instruction (MOI) prior to becoming a lead instructor. This could include but should not be limited to the MOI training OT

candidates would receive in an AMSEA MSIT. OTs that have not attended an AMSEA MSIT would need to receive MOI training through some other means.

Additionally, NMFS should encourage and/or provide professional development opportunities to all NMFS trainers, specifically in regard to teaching skills and improved methodologies. A list of "best practices" (from the site visits) has been included in Appendix J of this document; these practices were considered particularly effective and should be considered for adoption at all sites. A summary of "practices to avoid" (also from the site visits) is included in Appendix K as well.

D) Each site should make an effort to improve their assessment of student learning/performance in order to evaluate the appropriateness and effectiveness of the lessons on an ongoing basis.

The reviewers also believe it would be beneficial for each site to help OTs improve their assessment skills. While additional training in the area of assessment methodology would likely be worthwhile, another approach might be to consider standardizing the following:

- Written quizzes to assess student understanding of material, to be based on each topic's objectives,
- Written case studies to assess cognitive reasoning skills, to be based on objectives,
- A performance checklist for each skill, identifying pass/fail criteria, and, if appropriate, timed test standards or other performance guidelines (see samples in Appendix G) to help determine student success.

Specifically, the reviewers believe it would be beneficial for the national advisory committee (or similar group) to identify core competencies, with critical performance thresholds clearly identified. These competency areas would identify key injury prevention skills (mainly cognitively based) as well as crisis response training (including cognitive as well as performance-based skills) that each and every observer would be expected to master.

In this regard, the reviewers suggest that NMFS consider standardizing assessment methodologies to the point that a national final exam (written and performance, covering all overall safety training goals and objectives) can be used. In the event a nationally accepted final exam could be created and implemented, NMFS could be even more assured that all observers have successfully achieved a similar and accepted level of success prior to deployment. Again, the national exam would only cover agreed upon universal core knowledge and skills. Regions would have the ability to add their own components for applicability to their region.

Further, nationally standardized testing could be used to help in the development of confidence and assurances that all observers, at all sites, are receiving similar training. An observer who has successfully completed the safety training at one site could, in turn, be

prepared to work in another fishery once any additional, required regional modules have been completed.

VII-4. The feasibility of a centralized or coastal safety training facility and possible universities or other organizations that may be capable of providing a training facility and the issuance of safety certificates.

A) NMFS should consider training options on a case-by-case or site-by-site basis.

The reviewers recommend that NMFS does not move toward a single, centralized training facility at this time. While there would be benefits associated with such a move, the costs associated with the change would likely be greater than the benefits. The reviewers do believe that the possibility of using a single training facility should be re-considered on an ongoing basis.

The reviewers, instead, believe NMFS should consider training options on a case-by-case or site-by-site basis. In some instances, trainings could potentially be offered more economically if sites share resources and expertise, and on occasion, combine classes. Further, the reviewers believe NMFS should consider using outside experts to either provide trainings or provide training to the trainers, if needed. These outside experts could be hired locally (near sites) or could involve a traveling professional. This arrangement could be used on an ongoing basis, or it could be used as a temporary method for mentoring and enhancing the skills of the NMFS trainers.

The reviewers recognize that some of the recommendations and suggestions offered in this document could prove challenging, if not insurmountable, in the smallest programs. Some areas of the nation (such as the Southeast) could potentially benefit from more centralization and/or shared resources. In the case of the Gainesville, Panama City, and Galveston programs, for instance, a small number of staff are responsible for a wide variety of duties, and the time and resources devoted to observer training is a small percentage of the overall budget and workload. As a result, consolidation of resources into a single, regional training center might be a workable option for improving training effectiveness and efficiency.

B) NMFS should consider using outside experts to either provide the training or provide training to the trainers when in-house resources are limited.

The reviewers also believe that the use of regional instructors could be a viable option, especially in the smaller programs around the country. That is, while the local NMFS personnel (and/or OTs) could take part in the safety trainings offered at their sites, only one or two designated safety instructors would actually be used to teach the safety training topics. By using this approach, NMFS would not need to spend the time and resources ensuring that all sites have a qualified OT on staff; instead, only one or two qualified safety trainers from that area would be needed. Although this option would require additional funds for travel and accommodations, the costs might ultimately be worth it.

At least one program has stated that training staff is overworked and does not have the time needed for safety training if delivered in-house. Thus a fourth option for helping reduce the burden on smaller programs is through the use of an independent and/or traveling instructor who is not an employee of NMFS. This set-up might be similar to what sites have done by bringing in Red Cross instructors for a day. The chosen trainer(s) could be selected based on his/her proven experience in presenting marine safety material. To ensure that local knowledge, expertise, and credibility is available, each site could include a local OT to supplement the training and ensure applicability to the observer's work situation. This could also be a solution to those programs with trainers on staff who were not comfortable with presenting safety and survival topics. The purpose of this recommendation is to offer an alternative if "time away" from other duties is not possible. One program already uses this model.

C) NMFS should consider the concept of "certification" that verifies successful completion of safety training.

Finally, NMFS might want to consider the concept of a "certification" that specifically verifies successful completion of the safety training. This idea was popular amongst observers who work in differing regions, but was not considered a good idea among some experienced observer programs.

The main disadvantage of an overall "certificate of completion of safety training" recognized from one region to another, is that specific safety issues in each region may be missed by the student. However, if the certification was just for basic, universal core competencies (such as donning an immersion suit, righting a liferaft, etc.) that may not be a problem. Even at that, there is evidence that these skills degrade after just a few months from date of initial training. Therefore by the time the observer transferred to another region, the refresher training would still be valuable. Also, by taking training in the new region, the specific regional safety issues would be presented to each observer.

A certificate in core universal safety competencies would also only be of benefit in programs that have most of their safety training scheduled in just a few days. Many of the programs have safety training spread throughout their two or three week schedule. Allowing students with the "safety certificate" to "opt out" of training for an hour or two here and there throughout the several weeks of training would not seem to be of any benefit and could be disruptive.

If the above issues were not problems, then a certificate of having completed universally agreed upon core basic competencies might be of value.

Certificates that document successful completion of a course are becoming widely used in a variety of industries. In order for the certificate to be meaningful, however, assurances would need to verify that all students, nationwide, are receiving the same level of training in the universal core competencies, and all successful students are reaching the

same level of competency. (If standards and measurements are not used, the certification would simply be considered a "certificate of attendance.")

If NMFS decides to adopt the recommendations and suggestions identified in this report (such as standardizing the trainings as well as standardizing the testing process), the "safety certificate" would be a fairly easy next-step to implement and could prove beneficial.

This process could also be used to assure that observers are "current" in their certifications when they go to sea. That is, because the certification would only be valid for a given time, observers would be required to seek "recertification" of their safety training once the initial certification lapses. In other words, this system would provide fair assurance that observers receive continued safety training on a regular basis.

In summary, the reviewers believe there are a number of training (provider) options NMFS might consider. Overall, the reviewers believe that the quality and effectiveness of the safety trainings could be improved mainly through 1) standardization of the core universal competencies 2) standardization of the assessment methodologies used to evaluate core universal student outcomes, and 3) improvements in the quality of instruction, mainly through a greater emphasis on creative and varied methodologies using "student centered" as opposed to "teacher centered" techniques. While the reviewers believe that these steps can be made at each site, they also recognize that these modifications could prove too difficult, especially at the smaller sites. In the latter cases, instead of asking each site to spend time and energy addressing each of the three areas of improvement (noted above), it might be more workable to combine resources or "outsource" the safety component of their observer trainings. However, even with such outsourcing, standardization, effective methodologies and instructional quality, will still be important issues that will need to be assured.

VII-5. Additional recommendations and suggestions

A) Experienced observers should receive some form of refresher training in the areas of risk management and crisis response.

Observers taking refresher training should be required to pass written and performance tests during the refresher course.

Although many observers practice data collection on a regular basis, they do not practice or review safety education on any consistent basis. Not surprisingly, research has shown that people's abilities tend to diminish if/when skills are not refreshed or practiced. In fact, an unpublished follow up to the Perkins study (identified in Section IV) was conducted by Lincoln in 2001. The results of the study showed that the effectiveness of safety training in preventing a fatality was only effective for roughly five years (post training). Consequently, and as suggested above, the reviewers believe that experienced observers should receive some sort of refresher safety training. The reviewers believe it would be appropriate for observers to attend periodic safety reviews or workshops, or,

they should be required to receive at least 24 hours of approved continuing education over a two to three year period.

The former suggestion (periodic safety trainings) might simply involve attendance at a "refresher course" offered at a NMFS site. Specifically, the refresher would include safety topics (likely identified by the national advisory group), would emphasize hands-on methodologies (injury prevention as well as survival skills), and would likely be one to two days in length.

The reviewers suggest that NMFS consider asking returning observers to take a pre-test prior to attending the refresher course. The purpose of the pre-test would be two-fold: 1) to measure retention (of information taught in the original safety training), and 2) to help students refresh their cognitive skills (injury prevention, decision making, and risk management) so that the majority of the refresher course could be spent on performance-based training. Over time, pre-test results can be used to improve the safety training as a whole. If sites see trends (consistent areas of weakness or misunderstanding), appropriate modifications can be made in the main observer safety trainings, and/or continuing education opportunities can be identified that might address these weaknesses.

Finally, the reviewers believe that experienced observers should be required to pass written and performance tests, similar to the testing process conducted in the original training. While the testing process might not be as extensive in the refresher, observers should be required to master key objectives (cognitive and performance skills). Only observers who "pass" the refresher course would be allowed to work at sea.

A second suggestion for refresher options might include workshops or trainings offered by groups other than NMFS or traditional OT sites. For example, it might be considered appropriate for an observer to attend an AMSEA course, or a standardized course offered by APO or some other similar organization.

The reviewers also believe it might be appropriate to require up to 24 hours of continuing education as an alternative or supplement to the refresher course. That is, although a single refresher course might be the preferred method for ensuring observer training (and could be offered at some sites), if it is not reasonable to require all observers at all sites to complete a refresher course every two years, continuing education might be a viable alternative. In these instances observers would be able to select their training options from a list of "approved" methods (approved by the NOPAT). This process would be similar to the type of continuing education hours many professional industries require of workers.

B) NMFS should develop a regular system of oversight of observer safety training.

In order to make sure the nationally standardized system is working, the reviewers believe it is important for NMFS to develop a regular system of oversight. The goals of this system would be four-fold: 1) ensure that the standardized lesson plans and assessment tools are appropriate and being used; 2) assess OT effectiveness, and provide

feedback and suggestions when needed; 3) identify and share best practices (as well as practices to avoid); and 4) evaluate the trainings for their effectiveness in preparing observers for at-sea deployments.

In order to see that these four goals are achieved, different strategies could be applied. For example, in order to assess whether or not lesson plans are being followed, assessment tools are used, and in order to provide feedback on OTs, visiting observer trainers from other regions or from outside resources could be used. Further, each site can place an emphasis on objective self-assessment (of best practices and weaknesses), and the information can be shared system-wide.

The reviewers also suggest that NMFS modify its post-course evaluations and post-voyage debriefs to include questions that will more accurately assess the adequacy of the safety training. That is, a greater emphasis should be made to collect information on 1) injuries, 2) close calls, 3) the adequacy and effectiveness of the training and training methodologies. Although some sites are collecting information in these areas, the reviewers believe it would be beneficial for all sites to collect, share, and use this information on an ongoing basis.

Additionally, once NMFS establishes a system for gathering incident data and observer feedback (specific to whether or not the safety training adequately prepared them for their at-sea deployments), they should also create a system for reviewing the information, and modifying the trainings as appropriate.

Oversight of safety training can also be accomplished by having different regions conduct "peer reviews" with each other during co-instruction or observations following agreed upon peer review standards. This could assure that differing regions were following core competency procedures and techniques. It would have the additional benefit of regions learning different effective teaching techniques from each other.

C) NMFS should identify guidelines for managing risk during trainings.

The reviewers strongly suggest that NMFS identify guidelines for managing risk during trainings. These guidelines would identify what NMFS considers appropriate safety practices for every practical exercise. Examples of this might include but would not be limited to the following:

- Identifying protective equipment requirements (e.g., wearing gloves and closed-toed shoes/boots during flare exercises)
- Identifying teacher to student ratios for all exercises
- Requiring that appropriate first aid and emergency equipment is available on site
- Requiring the appropriate communication equipment is available on site
- Requiring that seat belts be worn in NMFS vehicles
- Requiring that all students participate in a hazard evaluation prior to the exercise start

Many examples such as these can be found in the AMSEA MSIT manual. The guidelines should likely be developed with input from all regions. Each site, in turn, would be expected to follow the guidelines, whether NMFS personnel are leading the trainings or a contracted employee is used.

D) NMFS should develop a system for adopting and enforcing safety-related policies that observers are expected to follow while at sea.

The reviewers also encourage NMFS to create a system for adopting and enforcing policy that observers are expected to follow while at sea. Not only should it be clear how new policies will be developed and implemented, the system should also include steps for modifying or deleting policy.

E) NMFS should form a national risk management committee.

In order to address both of the above issues, the reviewers recommend that NMFS creates a national risk management committee. This team would be likely charged with the following duties:

- Recommendations and oversight of safety guidelines (specific to how safety trainings are conducted), and annual review of the policies and procedures
- Oversight and input on training venues (e.g., off-site locations, concerns associated with transport, etc.), ratios, and safety equipment used during the training exercises
- Recommendations and oversight of the training content (topics); providing input on areas of need, and/or ideas for evaluation and improvements
- Recommendations and oversight of assessment tools used to measure student success; input on safety checklists, performance criteria, and written quizzes and tests
- Annual review of program accidents/incidents, and close call data
- Input and oversight of instructor (OT) requirements and trainings, with input on on-going training ideas
- Input on observer refresher course requirements and training ideas for experienced observers
- Review of communication and feedback within the program

The reviewers suggest that each region has representation on this committee. Additionally, NMFS should consider expertise outside of the NMFS organization, which might include but not be limited to professional educators, risk managers, marine safety experts, and/or an attorney who specializes in risk management and/or liability.

If the risk management group is agency-wide, it should agree to review the risk to observers (who are not NMFS employees but contracted workers). If agency-wide, it should consider risk management from the special needs and concerns of an observer program. Appendix O has suggestions for a Risk Management Committee.

F) NMFS is encouraged to clarify the responsibilities and interplay that exists between NMFS and the various contractors.
Although the reviewers are not qualified to provide legal advice, they believe it is appropriate to offer some suggestions that might in turn reduce risk to NMFS in the area of legal liability.

Specifically, the reviewers believe it would be in NMFS best interest to clarify the responsibilities and interplay that exists between NMFS and the various contractors, including what's working well (at some sites) and what can be improved. This might include but would not be limited to the following:

- identification and enforcement of policy that observers are expected to follow (e.g., who sets policy, how is it enforced, who is responsible for enforcement, and what are the consequences for infractions);
- the selection, maintenance, and issuance of safety equipment;
- the use of legal contracts, including use of waivers and indemnification forms; and
- emergency roles (which is addressed in the Phase II report).

G) NMFS is encouraged to continue to work toward defining the legal status of an observer, specifically as it relates to workmen's compensation benefits and coverage.

The reviewers also encourage NMFS to continue working to define the legal role of an observer, specifically as it relates to workmen's compensation benefits and coverage. The reviewers believe it would be in NMFS' best interest to continue working toward some sort of comprehensive coverage (e.g., the proposed "Fisheries Observer Compensation Act") that will help provide financial support in the event of a serious injury to an observer. Based on the reviewers' findings (from interviews with observers, NMFS personnel, and contractors), it appears that a significant number of observers do not currently understand their rights (or coverage options); further, it appears that not all observers are covered at all times (including during training and/or during travel to or from trainings and deployments).

In order to address the concerns identified in this section ("risks to NMFS"), the reviewers recommend that NMFS contract with an attorney who specializes in this type of risk management**.** Although it is likely that NMFS has access to legal counsel on a regular basis, in order to appropriately address some of the risks identified here, it would be beneficial to work with someone who has expertise in a specialized area of the law.

Section VIII
Appendices

A) List of current core topics (from Galveston, Texas, 2004)

B) Suggested additions to the core curriculum, including key learning points

C) Suggested optional topics, including key learning points

D) Suggestions for improving teaching methodologies

E) Suggestions for improving assessment methods – non-performance based

F) List of current skill requirements (from Galveston, 2004; edited by C. Brown)

G) Example of performance checklist, including pass/fail criteria

H) Example of potential observer checklists

- Pre-voyage vessel orientation check
- Assessment of objective and subjective vessel hazards

I) Suggested instructor-course curriculum

J) Best instructional practices (from site visits)

K) Instructional practices / methods to avoid

L) Potential resources for instructor professional development

M) Modified course evaluation (i.e., with questions specific to safety training)

N) Modified debrief form (i.e., with questions specific to adequacy of training vs. reality of at-sea work)

O) Suggestions for national Risk Management Committee

P) Example of exemplary lesson plan

Q) How to Write a Lesson Plan (paper)

R) Summary of OT evaluations (from site visits)

S) Suggestions for collecting injury and close call data

Appendix A

List of current core topics (from Galveston, Texas, January 2004)

General Health and Safety
- First Aid
- Infections

Survival Training
- Seven Steps to Survival
- Survival Kits

Safety Concerns on Fishing Vessels
- Scope of Duties
- Seasickness
- Fatigue/Sleep Deprivation
- Harassment
- Conflict Resolution
- Drug/Alcohol Issues
- Appropriate Clothing
- Hypothermia
- Cold Water Survival Skills
- Embark/Disembark
- Sampling Safety
- Hazardous Marine Organisms
- Vessel and Rigging Hazards
- Gear Hazards
- "One Hand for the Boat" (deck safety)
- Man Overboard (MOB)
- Abandon Ship

Safety Regulations and USCG Procedures
- USCG Boardings & Helicopter Evacuations

Safety Orientation
- Pre-trip Safety Checklist
- Simulated Orientation or Dockside Tour

Safety Equipment
- Personal Flotation Devices (including Immersions Suits)
- Liferaft/Hydrostatic Release/SOLAS kits
- EPIRB
- Fires and Fire Extinguishers
- Communication Equipment and Mayday Calls
- Signaling Devices & Pyrotechnic Devices (Flares)

Appendix B

Suggested additions to core curriculum, including key learning points

1.0 Introduction to personal risk management and safety at sea
- 1.1 Learning to recognize risks/hazards associated with at-sea and/or observer work
  - 1.1.1 Environmental hazards associated with the fishery
  - 1.1.2 Vessel-related hazards associated with the fishery
  - 1.1.3 Potentially hazardous acts that could lead to injury
  - 1.1.4 Most common errors in judgment associated with observer work and/or crew that can lead to injury
- 1.2 Common injuries, incidents, and close calls associated with at-sea work
- 1.3 Injury prevention techniques applicable to most common injuries

2.0 When things go wrong – crisis response
- 2.1 Common responses to emergencies
  - 2.1.1 Learning to modify a crisis response
  - 2.1.2 Learning to work under stress
  - 2.1.3 Survival strategies – seven steps to at-sea survival
  - 2.2 Learning to deal with at-sea emergencies
    - 2.2.1 Minor emergencies and appropriate responses
      - 2.2.1.1 Sea sickness
      - 2.2.1.2 Personal conflicts
      - 2.2.1.3 Minor injuries
      - 2.2.1.4 Safety concerns
      - 2.2.1.5 Other
      - 2.2.1.6 Reporting to contractor, USCG, or NMFS
  - 2.2.2 Serious emergencies and appropriate responses
    - 2.2.2.1 Harassment
    - 2.2.2.2 MOB
    - 2.2.2.3 Learning to use an immersion suit
    - 2.2.2.3 Abandoning ship
    - 2.2.2.4 Using a liferaft
    - 2.2.2.5 Fires and fire fighting
    - 2.2.2.6 Floods and dewatering pumps
    - 2.2.2.7 Serious medical emergencies
      - 2.2.2.8 Other
      - 2.2.2.9 Reporting to contractor, USCG, and NMFS
  - 2.2.3 First aid and CPR
    - 2.2.3.1 Learning to assess the scene/situation
    - 2.2.3.2 Assessing and managing life threatening conditions
    - 2.2.3.3 Assessing and managing non-life threatening conditions
    - 2.2.3.4 Communicating with appropriate personnel

3.0 Preparing for At-Sea Work

- 3.1 Vessel orientations and relevance of safety exams
  - 3.1.1 Identifying on-ship hazards and creating a personal risk management plan
  - 3.1.2 Appropriateness and requirements regarding at-sea drills
  - 3.1.3 Identifying emergency roles and station bills

Appendix C

Suggested optional topics, including key learning points

Accident causation and personal risk management

a. Students should be able to identify the difference between objective and subjective hazards
b. Students should be able to list several objective hazards associated with at-sea work
c. Students should be able to list several subjective hazards (human errors) associated with at-sea work

Students should be able to come up with a personal risk management plan, appropriate to the hazards they will likely face while at sea

Hazardous materials – CO, hydrogen sulfide, ammonia

a. Students should be able to identify the hazardous materials associated with applicable vessels
b. Students should be able to list ways to minimize exposure
c. Students should be able to recognize if/when a problem exists
d. Students should be able to list steps to take in the event of an exposure

Ergonomics (as a stand-alone topic, in greater depth than is currently presented)

Wilderness first aid

a. Students should be able to identify the most common injuries observers experience while at sea
b. Students should be able to identify the most catastrophic injuries an observer could face while at sea
c. Students should be able to assess both life-threatening as well as non-life-threatening injuries
d. Students should be able to accurately create a plan of action, appropriate to the injury and remote environment

Harassment, conflict resolution, and communication skills

Shore survival

Basic navigation and/or GPS

Appendix D

Suggestions for improving teaching methodologies

Specific to OT development

- MSIT course for all trainers.
- MSIT II refresher course to focus on improved methodologies, assessment.
- Ongoing listserve or newsletter devoted to creative teaching methodologies.
- Hiring an educational consultant or specialist to offer on-going tips, courses, or who would travel to various sites to help with enhancing methodologies.
- Develop a system that includes a greater degree of mentoring and evaluative feedback regarding methodology.
- Local courses.

Specific to in-class use

- Greater use of case studies, including small group discussion to identify subjective and objective factors that contributed to the incident
- Greater use of injury data, and inclusion applicable of risk management (prevention) strategies
- Increased use of debriefings, with a focus on emphasizing key learning points and improved judgment
- Increased use of "need to know" statements, including use of personal accounts that reinforce the need to know
- Increased use of on-going assessment methodologies (i.e., periodic questions and/or methods, used throughout a presentation, to assess student understanding)
- Greater use of sequential presentation (e.g., introduction material, followed by quality demonstration with verbal instructions, followed by student practice, followed by debrief)
- Greater use of focused feedback (i.e., individual corrective and reinforcing feedback, provided throughout a skill)
- More student-centered activities, including experiential methods to present in-class material

Appendix E

Suggestions for improving assessment methods – non-performance based

The following list includes ideas for testing student understanding of material. This list can be especially helpful if/when OTs do not have the time or resources for individual performance testing.

- Use of case studies (real and fictional) – have students identify what went wrong (i.e. contributing objective and subjective factors that, in sum, "caused" the incident.).
- By using a picture/video, have students identify as many hazards as possible (i.e., there are 10 hazards in this photo; how many can you find?) Have students identify steps that would minimize risk for each.
- Identify the top three injuries and causes; top three fatalities and causes. Identify risk management steps that can be taken to minimize each.
- Have students identify the leading cause of fatality in their fishery. Have them identify three of the most likely factors that contribute to the fatalities.
- What would you do in the following situation … (followed by several challenging predicaments)
- Use of visual aids (chart/picture, etc.) to assess the proper steps/sequence for launching a raft, including use of a hydrostatic release
- Using information of a vessel in distress, have students document proper steps and information of a mayday
- Identify two pros and two cons of four different signaling devices: have them identify why/when they might use each.
- Using a visual aid, have students identify the errors in the following pictures (flares, signaling devices, MOB, fire fighting, etc.)

Appendix F

List of skill requirements (Jan. 2004; revised draft by Cheryl Brown)

Safety Skills	Observer Name	1	2	3	4	5	6	7	8	9	10	11	12	13
Participate in role play that demonstrates at least one conflict resolution														
Demonstrate proper lifting techniques														
Complete a pre-trip safety checklist on board a vessel (or simulate completion of a checklist if a vessel is not available)														
Perform and/or participate in a vessel (or simulated) orientation														
Demonstrate the correct use and adjust the fit of a PFD														
Demonstrate how to inflate the PFD														
Demonstrate proper donning of an immersion suit within 60 seconds														
Demonstrate proper jumping techniques for entry into the water wearing an immersion suit														
Demonstrate the HELP position with a PFD on in the water														
Demonstrate the HUDDLE position with a PFD on in the water														
Demonstrate the chain swim with a PFD on in the water														
Demonstrate the proper securing and release of the hammer type hydrostatic release														
Board a liferaft from the water (with or without assistance)														
Demonstrate righting a liferaft														
Demonstrate the function of at least one piece of equipment in a SOLAS A kit														
Demonstrate the proper technique for testing an EPIRB														
Describe (or if possible demonstrate) the five steps in the proper use of extinguishers to fight a fire														
Demonstrate the five most important components of a proper MAYDAY call, using a dummy microphone														
Comments:														

Appendix G

Examples of a performance checklist, including pass/fail criteria for use by instructor or evaluator

Donning Immersion Suit

Step	Does	Does not
1. Shakes suit from snapped shut storage bag and sits *		
2. Inserts feet first with plastic bags or w/o shoes *		
3. Kneel or stand		
4. Insert weak or non-dominant arm first *		
5. Place hood on head *		
6. Insert strong or dominant arm *		
7. Arch back and pull zipper with steady pull *		
8. Secure face flap *		
9. Completes all 8 steps within 60 seconds *		

* Students must complete all critical steps marked with (*).

Squat Lift

Step	Does	Does not
1. Place weak leg forward and one foot flat on floor *		
2. Bend body at 30 to 50 degrees- lock back *		
3. Be sure upper body comes up before back *		
4. Keep heels on the ground *		
5. Use leg, butt and abdominal muscles *		
6. Keep weight close to body *		
7. Communicate to partners about what you are doing *		

* Students must complete all critical steps marked with (*)

Portable Fire Extinguisher

Step	Does	Does not
1. Sound alarm *		
2. Check gauge *		
3. Pull pin *		
4. Test for function before approaching fire *		
5. Aim at base of fire *		
6. Squeeze trigger *		
7. Rapidly sweep base of fire *		
8. Do not turn back on fire *		

* Students must complete all critical steps marked with (*)

Appendix H

Example of observer vessel safety checklist:
Assessment of objective and subjective hazards during vessel orientation (SAMPLE)

1. ___ Exam Sticker. Valid two years from month issued.

2.___ Station bill placard of emergency assignments for all onboard. Your duties.

3.___ Liferaft(s). Location, capacity including observer, service date valid, hydrostatic release date not expired, your assigned raft.

4.___ Immersion suits, lifejackets. Location, accessibility in an emergency, proper size, light.

5.___ Liferings or man overboard recovery device(s). Location. Use.

6. ___ Flares including smoke. Location, expiration dates, use.

7. ___ EPIRB(s). Location. Use. Expiration date of battery and hydrostatic release.

8. ___ Fire extinguishers. Location. Use. Service date.

9. ___ First aid materials/medicine chest. Location. First aid texts. Trained crew.

10. __ Radio. Location. Distress channel. How to find location.

11. __ Emergency instructions location and read.

12. __ Vessel hazards: hatches open/closed. Watertight doors properly sealed. Low or potentially unsafe rails. Overhead objects. Sharp objects. Potential for falls.

13. __ Personal risk management plan. Personal escape route clear. Find route in dark. Personal survival equipment available and accessible at all times?

14.__ Greatest potential for an injury (to you) on this vessel or voyage. Plan for minimizing the risk.

Appendix I

Suggested instructor course curriculum:
i.e., basic training requirements, gained through AMSEA MSIT (or equivalent) plus additional modules the reviewers believe would be beneficial

1. Course introduction
    - 1.1 Goals/objectives of training
    - 1.2 Successful course completion requirements
    - 1.3 Scheduling
    - 1.4 Orientation to curriculum and rules
    - 1.5 Introduction to instructors/students as resources
    - 1.6 AMSEA history
    - 1.7 Teaching Topics
    - 1.8 Liability release
    - 1.9 Other practical aspects, classroom, building etc.

2. Emergency priorities
    - 2.1 Seven priorities (7 Steps to Survival)
    - 2.2 Psychological reactions
    - 2.3 Personal survival kits

3. Learning theory
    - 3.1 Learning definition
    - 3.2 Learning dynamics
    - 3.3 Areas affected by learning
    - 3.4 Barriers to learning
    - 3.5 Learning retention rates

4. Immersion suit use
    - 4.1 Donning techniques
    - 4.2 Care and Maintenance
    - 4.3 Features and styles
    - 4.4 Regulations
    - 4.5 Stowage
    - 4.6 Jumping

5. Lesson plans
    - 5.1 Need statements
    - 5.2 Learning objectives
        - 5.2.1 Three qualities of good objectives- write objectives
        - 5.2.2 Advantages of performance based objectives
        - 5.2.3 Performance evaluations
        - 5.2.4 Performance objective verbs
        - 5.2.5 Write 2 lesson plans
    - 5.3 Assessment and evaluation of objectives

6. PFD Types
    - 6.1 Identify types and characteristics
    - 6.2 Care and maintenance
    - 6.3 Donning and size
    - 6.4 Requirements
    - 6.5 Jumping with PFDs

7. Cold Water Survival Skills
    - 7.1 “Stay” rules
    - 7.2 Effects of alcohol

8. Liferafts
    - 8.1 Types
    - 8.2 Features
    - 8.3 Regulations
    - 8.4 Launching
        - 8.4.1 Hydrostatic release
        - 8.4.2 Manual release
        - 8.4.3 Procedures
        - 8.4.4 Maintenance
        - 8.4.5 Mounting
    - 8.5 Righting
    - 8.6 Entering
    - 8.7 Safety during practice
    - 8.8 SOLAS kits

9. Conducting effective demonstrations
    - 9.1 Importance of demonstrations
    - 9.2 Review of retention rates
    - 9.3 Characteristics of good
    - 9.4 Write lesson plan including demonstration

10. Methods of Instruction
    - 10.1 Varieties
    - 10.2 Effectiveness
    - 10.3 Factors that influence choice
    - 10.4 Use at leas two methods of presentation

11. Pool/open water practicum
    - 11.1 Liferaft righting/entering
    - 11.2 PFD type performance
    - 11.3 HELP/Huddle practice
    - 11.4 Immersion suits- jump, don in water, swim
    - 11.5 Water survival techniques
    - 11.6 Teaching and safety tips

12. Man overboard
    - 12.1 Recovery procedures
    - 12.2 Recovery equipment
    - 12.3 Prevention
    - 12.4 Write MOB station Bill
    - 12.5 MOB drill on vessel

13. Emergency signals
    - 13.1 Radio s and channels
    - 13.2 Distress call types and practice
    - 13.3 Use of cell phones
    - 13.4 EPIRBs types, use, maintenance
    - 13.5 Pyrotechnic type, use, safety in training, practicum

14. Firefighting
    - 14.1 Causes- parts of
    - 14.2 Extinguisher types and use
    - 14.3 Extinguisher agents
    - 14.4 Plan of attack
    - 14.5 Class B fire practicum

15. Hypothermia
    - 15.1 Causes and types
    - 15.2 Physiology
    - 15.3 Sign & Symptoms
    - 15.4 Treatment
    - 15.5 Prevention

16. Cold-water near-drowning
    - 16.1 Causes and types
    - 16.2 Physiology
    - 16.3 Sign & Symptoms
    - 16.4 Treatment
    - 16.5 Prevention

17. Practice teaching scenarios
    - 17.1 Self-assessment
    - 17.2 Assessment by group
    - 17.3 View own videotape
    - 17.4 Instructor Criteria Evaluation

18. Onboard emergency plans
    - 18.1 Safety Orientations
    - 18.2 Safety Instructions
    - 18.3 Write Four Emergency Drills – how to conduct
    - 18.4 Safety during drills

19. Abandon ship
    - 19.1 When to
    - 19.2 What to take and do
    - 19.3 Hazards
    - 19.4 Alarms

20. Flooding
    - 20.1 Causes
    - 20.2 Damage control (DC)
    - 20.3 Practice DC methods

21. Planning and assessment
    - 21.1 Planning a course, costs, scheduling
    - 21.2 Guest Instructors
    - 21.3 Assessment methodologies
    - 21.4 Importance of proficiency skills assessment
    - 21.5 Liability, waivers, negligence and risk assumption

22. Stability
    - 22.1 Define terms
    - 22.2 Signs of decrease in stability
    - 22.3 Stability in day-to-day operations
    - 22.4 Demonstration of principles on USCG model

23. USCG dewatering pumps
    - 23.1 Assembly
    - 23.2 Performance characteristics
    - 23.3 Operate pump

24. Helicopter rescues
    - 24.1 Preparation
    - 24.2 Safety considerations
    - 24.3 Communications
    - 24.4 Basket use

25. Cross cultural communication
    - 25.1 Other non-verbal communication methods
    - 25.2 Areas of differences due to culture
    - 25.3 Ways to overcome problems

26. Classroom interactions
    - 26.1 Use of questions
    - 26.2 Physical needs
    - 26.3 Problem students

27. Fishing vessel safety regulations

28. Putting on a course/safety

29. Final written assessment, evaluations and debrief

30. Introduction to How Accidents Happen
    - 30.1 Current theories
    - 30.2 Role of objective/environmental factors
    - 30.3 Role of subjective/human factors
    - 30.4 Interaction of contributing factors in accident potential
    - 30.5 Risk-benefit analysis
    - 30.6 Relevance of accident potential in reducing injuries
    - 30.7 Tips for presenting "accident potential" material

31. Learning to Assess and Manage Risk for Others
    - 31.1 Defining and identifying real vs. perceived risk
    - 31.2 Recognizing physical risks—the threat of physical harm
    - 31.3 Recognizing additional risks—emotional harm, embarrassment
    - 31.4 Preparing for an exercise
    - 31.5 Dealing with unforeseen or unexpected circumstances
    - 31.6 Understanding legal liability
    - 31.7 Effective leadership

32. Review of Observer Safety Curriculum
    - 32.1 Deciding what's important/needed – making material relevant and applicable
        - 32.1.1 Learning to recognize risks/hazards associated with at-sea and/or observer work
        - 32.1.2 Common injuries, incidents, and close calls associated with at-sea work
        - 32.1.3 Injury prevention techniques applicable to most common injuries
        - 32.1.4 When things go wrong and Emergency Action Plans
        - 32.1.5 Learning to deal with minor at-sea emergencies and appropriate responses
        - 32.1.6 Identifying on-ship hazards and creating a personal risk management plan

33. Teaching tools
    - 33.1 Types of audiovisuals
    - 33.2 Advantages and disadvantages
    - 33.3 Tip for effective use

Appendix J

Best instructional practices (from site visits)

Anchorage's USCG guest presenter (C. Medlicott). Professional presentation of USCG's role and interaction with vessels and observers. Very good example of balancing the positive as well as hazardous aspects associated with at-sea work.

Anchorage's USCG guest presenter stayed on task. The topic agenda was clarified ahead of time with the OTC personnel.

Hawaii's walk-through of a vessel. Very good example of a walk through that was used as a vessel orientation. Good job pointing out hazards as well as hazardous areas. Students able to get experience viewing a quality vessel, as well as location of emergency and safety equipment. Although the vessel used is considered above average in quality and maintenance, it provided a good example of what observers should hope/strive for.

Hawaii's discussion on risk assessment and hazard evaluation, as well as non-life threatening injuries and use of own data (observers and local) on incidents, injuries, and close calls. In addition to providing observers with data on commercial fishing fatalities (by cause and by region), this site provided actual statistics – including case studies and incident reports – of regional incidents over a 10-year period.

Hawaii – having two other instructors demo the proper way to don a suit while a third instructor talks through group through the process. Very good teamwork and role modeling. Good use of providing verbal instructions of what's "going to" happen; verbally talking through the process as it's happening (pointed out steps as instructors donned suits); and finishing by reviewing key points. Well prepared and organized. Good time management.

Hawaii – use of personal stories and case studies. Lead instructor had numerous applicable and pertinent stories that were shared with students. The stories added great value to "need to know."

Hawaii – use of verbal and written quizzes, as well as games, at the end of a topic in order to summarize key points and assess student understanding or recall of material. At the end of most topics, some sort of verbal review of key points or game was used to 1) reiterate key points, and 2) assess student ability to recall key points.

Long Beach – use of slides to show visuals of life at sea, environmental hazards at sea, and on-vessel hazards. Very good visual presentation of different vessel types (including hazards), different environmental conditions (high seas, rain, sun, etc.), on-board living conditions, etc.

Long Beach – inclusion of safety briefing at the start of the safety training. Identified exits, emergency procedures, evacuation plan, etc. Good role modeling of hazard

awareness and risk recognition. Getting students to become aware of surroundings (and emergency procedures and exits) in the classroom can be used to reinforce similar behaviors while at sea.

Long Beach – inclusion of SOSpenders™ in class discussion as well as pool exercise. Given the probability that observers will have access to these (and may be more apt to use these), extra effort was made to make sure observers were familiar with them and had the opportunity to try them in water. Instructor made sure new PFD types were available to all students, and students were able to deploy the cartridges during pool session. Very good hands-on learning session.

Miami – professional PowerPoint presentation. Professional visuals of safety material provided an overall impression that the instructors and site takes safety seriously. Good visuals and clear slides are easy to read and make good visual teaching aids.

Miami – use of active PowerPoint to present hydrostatic release. Nice visual aid that shows the proper use of hydrostatic release.

Miami – use of visual props to enhance learning. For example, during discussion RE EPIRBs and safety decals, PowerPoint of current and expired equipment shown. Equipment then handed out (in class) for additional visual inspection. Rather than simply tell students what to look for, or provide a slide of an expired decal, the site had and used equipment that had expired stickers. Good use of hands-on aids.

Miami – Mayday exercise. While at port, students identify a potentially real emergency. Using walkie-talkie type radios, each student was required to make a mock mayday call to USCG personnel. USCG asked for information as they would via a real distress call. Excellent real-life, hands-on exercise.

In-class props – Miami, Seattle, and Woods Hole. Nice variety of safety gear.

Use of debriefs following field exercises Research shows that debriefing (reflecting on) experiences significantly enhances development of judgment (vs. no debriefing/reflecting).

Vessel safety checklist – NPGOP. Observers are given a copy of the checklist and encouraged to complete. The checklist asks observers to make notations regarding the following items: safety examination decal; location of liferafts; immersion suits and PFDs; life rings; flares; EPIRBs; fire extinguishers; first aid materials; radios; hazardous areas; completion of the safety orientation. Anchorage also does this now.

Seattle and Anchorage NPGOP have a Health and Safety section of observer manual

Seattle NPGOP – having emergency equipment available during training exercises.

Seattle NPGOP – exercise used to help students become more observant. Students asked to walk the halls and document everything they could find that had to do with safety (fire extinguishers, fire alarms, AED, posters, posted emergency procedure sheets, etc.), including any expiration dates. Helped to reinforce the need to become better aware of one's surroundings/environment.

Seattle and Anchorage NPGOP training – emphasis on injuries secondary to chronic use and/or lifting. Incorporation of ergonomics demonstration and exercise, including demo (and gear issue) of 4:1 mechanical advantage system.

Also, emphasis on injuries specific to the observer and observer work. Rather than generic "medical emergencies at sea" talk, incorporated a number of common real-life injuries, including prevention and treatment.

Seattle WCGOP – risk management during flare demo. All safety equipment was present, including gloves, goggles, fire extinguishers, and water buckets. Very clear directions offered. Safety stressed. Clothing checked for melting hazards. Close-toed shoes required. Students practiced one at a time. First aid kit nearby.

Seattle WCGOP – role play of vessel drill, with student role playing. Used a method known as a "fishbowl," with non-participating students watching from the outside. "Drill in progress" sign posted nearby. Very good vessel orientation provided prior to start of exercise.

Seattle WCGOP – immersion suit donning (practical skill). Students (including experienced) ended up donning the suit seven times during the training, including a time don in the dark. Safety precautions (e.g., plenty of space) incorporated for risk management.

Woods Hole – nice use of pre-edited tape. By showing only snippets, key points were made, but redundant information was not presented.

Woods Hole – use of take-home quiz. Specifically, use of case studies on quizzes, and review of casualties as group discussion.

Woods Hole – use of actual case studies with student discussion as methodology. Students broken into groups, asked to identify mistakes and contributing factors.

Woods Hole – use of model for stability demo.

Multiple programs – showed full sequence of tying off raft painter, releasing from cradle, carrying canister to water's edge, and deploying raft. Great demonstration of entire sequence.

Appendix K

Instructional practices and methods to avoid

The following practices were observed at one or more sites. These are to be avoided.

Live flares left in classroom, unsupervised during break.

Guest lecturers who are not given a lesson plan or objectives, not told much about the group, not filled in on where the group is (overall), etc.

Using videos immediately after lunch.

Leaving the room (instructor) for extended period of time during videos.

Skipping key points while showing the workings of a piece of equipment. For example, having an EPIRB (or visual) available, but not pointing out key features, such as dates, battery check, etc.

Demonstration of HELP with arms placed laterally (outside) of legs. This position increases heat loss from lateral torso / sides, and underarms.

Lack of knowledge of (and lack of hands-on example of) newer (applicable) equipment, such as inflatable PFDs.

Immersion suit donning, hood donned last.

Water entry, collar inflated prior to entry.

Poor time management during concurrent field exercises. That is, having two or three groups participate in various activities concurrently (good use of time), but having one group end significantly earlier than others, and not filling the "empty" time. Instead, having students stand around and wait for next station.

Poor time management during pool session. Given the limited time, spending significant portion of pool rental time talking about a topic that could have been covered prior to or after pool exercise. Consequently, students given minimal time in water, to practice water exercises.

Lack of space during exercises. For example, lack of space during immersion suit donning. Too many students participating at once in too small a space.

Lack of supervision during key (required) skills. For example, students were expected to don immersion suits, however, direct and individual feedback was not provided. As a result, observers practiced incorrect procedures without ever being corrected. This same sequence occurred during water entry (legs not crossed, wrong hand over head,

observer flipping up-side-down), but no corrective feedback or stoppage of exercise occurred.

Explaining a skill in the classroom, but providing no demonstration of skill prior to (or during) student participation. On several occasions, instructors explained how to do something (e.g., right a raft, HELP position, etc.) while in the classroom. However, there was no visual demonstration of the skill prior to observers having to try the skill. In some instances, instructors yelled instructions from the pool edge, but no proper demonstration of skill was ever given.

Instructor in water with no PFD, even though students were required to wear PFDs (poor role modeling).

Lack of appropriate risk management:

- No or little forewarning of hazards associated with trainings.
- Not pointing out and/or emphasizing hazards associated with righting a raft.
- Holding flares vertically (not horizontally), not forewarning about slag drip.
- Lack of gloves used during flare and smoke signal exercises.
- Lack of eyewear, lack of close toed shoes during flare/smoke exercises and/or fire fighting exercises.
- Lack of supervision during field exercises. On two separate occasions (two separate sites) there were close calls with flares being ignited close to face.
- Lack of backup during fire fighting exercises. Turning back to fire, not coming in low. On at least one occasion, inappropriate procedure demonstrated by instructor. On other occasions, students practiced incorrectly without proper feedback.
- Lack of buddies; i.e., buddy system not used during pool/lake exercises, fire fighting exercises, etc.

Lack of "screening" or inquiry as to applicable medical histories prior to exercises. Few programs took steps to determine whether or not participants were claustrophobic, had asthma (or other respiratory conditions), could swim, etc., prior to engaging in pool or lake exercises.

What to watch for – common practices that could be improved.

Lack of introduction of topics. Although some instructors mentioned "this is what we'll talk about next," few OTs actually provided an introductory briefing (this is what we'll be covering, these are the key points we'd like you to learn.).

Lack of stated objectives. Although some programs have written objectives, very few programs articulated these to students. When observers were questioned/interviewed, few could identify what the key learning points were supposed to be from various topics.

Lack of “need to know” statements. Often the “need to know” was assumed. That is, instead of specifically telling students “you need to know this information for this reason,” OTs instead assumed that observers would understand why topics were important.

Lack of clarification and communication with guest speakers. Common that guest presenters (USCG personnel, etc.) did not know what material had been covered prior to their talk (resulting in repetition); did not know the observers backgrounds (incorrect assumptions made at some sites); providing contradictory information (making statements in class that directly contradicted something the OT had previously said).

Appendix L

Resources for instructor professional development

Trainings:
AMSEA Marine Safety Instructor Training (MSIT)
Marine Emergency Drill Instructor course

Miscellaneous:
Mentoring (in house), peer co-instruction
Use of outside expertise
Use of videotapes (taping presentations) and debriefs
International Fishing Industry Safety and Health Conferences
Attendance at the Wilderness Risk Management Conference
Wilderness medicine training (classes, workshops)
International fisheries observer conferences

Print resources:
AMSEA *Marine Safety Instructor Training Manual*
Beating the Odds on Northern Waters
AMSEA newsletter *Marine Safety Update*
Proceedings of the International Fishing Industry Safety and Health Conferences
Safety at Sea International (magazine)
NIOSH *Intelligence Bulletins* (e.g., Commercial Fishing Fatalities in Alaska: Risk Factors and Prevention Strategies. September 1997)
Wilderness Risk Management proceedings
Leadership and Administration of Outdoor Pursuits
NPFVOA *Vessel Safety Manual*
Regional fishing journals for casualty stories

Internet sites:
www.uscg.mil/news/fvsafety .....U.S. Coast Guard fishing safety
www.offsoundings.com .....Marine Safety news
www.amsea.org.....Marine Safety Instructor news
www.cdc.gov/niosh/injury/traumafish..... Fishing injuries in Alaska
www.ntsb.gov/publictn .....Vessel casualty studies
sname_intranets@eih.com .....Stability model and overheads
www.npfvoa.org.....Fishing vessel safety news
www.apo-observers.org ..... Observers website

Appendix M

Modified course evaluation (with questions specific to the safety training) – SAMPLE

Evaluations are an integral part of our program. In order to maintain quality control during safety training and better serve observer candidates, we must continually receive specific performance feedback to let us know how we're doing.

Please take the time to complete this evaluation of your instructors, your course and yourself. Use the following scale: 1 = not at all or unacceptable, 10 = very much so or exceptional. Circle the appropriate number and add any written comments to the back of this page.

Instructor name_____

1. How would you rate each instructor's overall performance? (Please rate each instructor separately) 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

2. Did you feel free to say something if/when you were uncomfortable?
1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

3. How receptive was the instructor to questions/comments/concerns from the students regarding safety, judgment or decisions that were made?
1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

4. How satisfied were you with information/answers that were given?
1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

5. How sensitive was the instructor to the students' safety and well-being?
1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

6. How sensitive was the instructor to his or her own safety and well-being?
1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

7 .How closely did this instructor stick to the course curriculum identified in the schedule? 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 ..... 8 ..... 9 10

8. Please identify an area or areas where this instructor could improve.

9. What types of behavior did the instructor role model particularly well?

10. Please identify an area or areas where this instructor could improve.

11. What types of behavior did the instructor role model particularly well?

Please rate the thoroughness and quality of the following topics that were presented. Use the following scale: 1 = poor, 10 = excellent or N/A if not presented.

First Aid	N/A	1	2	3	4	5	6	7	8	9	10
Infections	N/A	1	2	3	4	5	6	7	8	9	10
Risk Assessment and Hazard Evaluation	N/A	1	2	3	4	5	6	7	8	9	10
Seven Steps to Survival	N/A	1	2	3	4	5	6	7	8	9	10
Survival Kits	N/A	1	2	3	4	5	6	7	8	9	10
Scope of Duties	N/A	1	2	3	4	5	6	7	8	9	10
Seasickness	N/A	1	2	3	4	5	6	7	8	9	10
Fatigue/Sleep Deprivation	N/A	1	2	3	4	5	6	7	8	9	10
Harassment	N/A	1	2	3	4	5	6	7	8	9	10
Conflict Resolution	N/A	1	2	3	4	5	6	7	8	9	10
Drug/Alcohol Issues	N/A	1	2	3	4	5	6	7	8	9	10
Appropriate Clothing	N/A	1	2	3	4	5	6	7	8	9	10
Hypothermia	N/A	1	2	3	4	5	6	7	8	9	10
Cold Water Survival Skills	N/A	1	2	3	4	5	6	7	8	9	10
Embark/Disembark	N/A	1	2	3	4	5	6	7	8	9	10
Sampling Safety	N/A	1	2	3	4	5	6	7	8	9	10
Hazardous Marine Life	N/A	1	2	3	4	5	6	7	8	9	10
Vessel and Rigging Hazards	N/A	1	2	3	4	5	6	7	8	9	10
Gear Hazards	N/A	1	2	3	4	5	6	7	8	9	10
“One Hand for the Boat” (deck safety)	N/A	1	2	3	4	5	6	7	8	9	10
Man Overboard (MOB)	N/A	1	2	3	4	5	6	7	8	9	10
Abandon Ship	N/A	1	2	3	4	5	6	7	8	9	10
USCG Boardings & Helicopter Evacuations	N/A	1	2	3	4	5	6	7	8	9	10
Pre-trip Safety Checklist	N/A	1	2	3	4	5	6	7	8	9	10
Simulated Orientation or Dockside Tour	N/A	1	2	3	4	5	6	7	8	9	10
PFDs (including Immersions Suits)	N/A	1	2	3	4	5	6	7	8	9	10
Liferaft/Hydrostatic Release/SOLAS kits	N/A	1	2	3	4	5	6	7	8	9	10
EPIRB	N/A	1	2	3	4	5	6	7	8	9	10
Fires and Fire Extinguishers	N/A	1	2	3	4	5	6	7	8	9	10
Communication Equipment and Maydays	N/A	1	2	3	4	5	6	7	8	9	10
Signaling Devices including Flares	N/A	1	2	3	4	5	6	7	8	9	10

If you have successfully completed this course, you will likely soon work on a vessel as an observer. Please rate your current ability to adequately assess and minimize risk on a vessel. 1 2 3 4 5 6 7 8 9 10

Do you think that the safety training will help reduce some of the hazards in the workplace? YES SOMEWHAT NO If yes, in what way?_____

What could you have done to learn more in this class? _____

Appendix N

Modified safety debrief form (SAMPLE)

1. Was the safety training you had helpful? YES SOMEWHAT NO
If useful, in what way ?

2. In what way could the safety training have been more useful?

3. What unsafe conditions have you observed?

4. What "close calls" did you or others experience?

5. Did you suffer either a reported or unreported injury?(Circle one)
No injury unreported injury reportable injury

(skip # 6 through # 8 if not injured)

6. Describe injury and extent of injury (e.g. strained back, sore for a few days)

7. Describe how it happened (e.g. trying to lift overloaded sampling basket)

8. How could it have been prevented? (e.g. lightening the load, lifting correctly).

Now that you have worked at sea, please let us know what you think we can do to more adequately prepare observers for at sea work. Please use the following to guide you:

What can be done to improve the training in the following areas:

9. Risk assessment and hazard evaluation?

10. Personal risk management?

11. Working in a challenging environment?

12. Vessel safety orientations, safety checklist, refusing a vessel?

Appendix O

Suggestions for a national risk management committee

The following information identifies some of the more common components of a risk management committee. Included are typical duties as well as suggestions for composition and schedule.

Composition of a Risk Management Committee. A risk management committee is a group of professionals that should represent a wide area of interests in a given industry and/or risk-management field. In the case of an NOPAT committee, each member should be established as exemplary in a given area, such as teaching (using experiential methodologies), safety education (accident causation), marine safety, commercial fishing, observing (e.g. APO), wilderness medicine, and/or the law.

This committee should be used to offer a pool of experienced experts who can provide meaningful insight into and feedback about situations or policies.

A committee can be comprised of a number of members; however, some members should be non-NMFS employees. That is, the membership should include professionals who can bring in an "outside" perspective. Non-NMFS members would probably not be paid for their time or contributions. (Though NMFS might choose to pay for travel and/or accommodations.)

Charge of a Risk Management Committee. In addition to addressing ongoing issues (as brought forward by committee members, OTs, or observers) the committee would likely be charged with the following responsibilities:

- Annual review of policies and procedures (specific to the safety trainings and training exercises)
- Annual review of training venues
- Annual review of program accidents/incidents
- Review of instructor training requirements, with input on training ideas
- Review of communication and feedback within the program

Potentially, it might be decided that each member is required to participate on at least one outing/site visit (including a follow-up written report) annually or biennially. This visit would likely take place during a safety training, and the feedback would be used to help assess whether or not there is continuity among sites.

The committee should probably have at least two scheduled meetings a year, however, one of the meetings could be conducted via telephone. The agenda for each meeting should be available in advance and made available to OTs. This would allow OTs to submit ideas in the event a site has a concern or proposal. Minutes should be kept, and NMFS should consider making them available to OTs or observers.

Appendix P

Example of exemplary lesson plan

LIFTING & MOVING Sample AMSEA lesson plan

Goal: Reduce injuries through proper lifting and moving techniques

Need to know: Strains and sprains, especially of the back, are the leading cause of observer injuries.

75 percent of lifting injuries are caused by lifts from below knuckle height. Most injuries in fisheries are strains and sprains to the back.

Objectives: After the presentation, the student should be able to:
1. State the three general steps to spine health.
2. Demonstrate the six steps for safely lifting.
3. List two things to avoid when lifting.
4. Demonstrate the four rules for reaching.
5. Demonstrate the five rules for sitting.
6. List two rules for exercising

I. Three steps to spinal health
- A. Exercise regularly
- B. Control your bodyweight
- C. Warm up your muscles before using them

II. Six rules for lifting and moving
- A. Estimate the weight
  1. Two or four people are better than three.
  2. Pair up weak and strong lifters rather than match a weak and strong lifter.
  3. If more than 60 pounds, two people should lift.
  4. Slide, don't lift when possible.
- B. Know your limits – lock spine in its normal position
- C. Two lifts can be employed.
  1. Power lift – harder to learn.
  2. Squat lift
     - i. Place weak leg forward and one foot flat on floor.
     - ii. Bend body at 30 to 50 degrees- lock back.
     - iii. Be sure upper body comes up before back.
     - iv. Keep heels on the ground.
- D. Use leg, butt and abdominal muscles.
- E. Keep weight close to body.
- F. Communicate to partners about what you are doing.

III. What to avoid

A. Lifting above the waist and bending backwards.
B. Avoid carrying heavy objects with just one arm. If needed, bend from the hips, not the waist.

IV. Four Rules for Reaching

A. Lock the back
B. When reaching overhead, avoid swayback position
C. Never twist back when reaching.
D. Try to avoid reaches more than 15 to 20 inches.

V. Four Rules for Pushing and Pulling

A. Use effort from between your body's waist and shoulders.
B. Keep back straight and locked. Don't bend over and round the spine.
C. If below the waist level, push/pull from the kneeling position.
D. If you have a choice, push rather than pull.

VI. Five Rules for Sitting

A. Sit no more than 45 minutes at a time
B. Use a lumbar roll behind the small of your back.
C. Keep feet flat or crossed at ankles.
D. Don't slouch
E. Bend from the hip, not the waist when leaning forward.

VII. General Rules for exercising.

A. Work at your own level. Some people are more flexible than others.
B. Exercise should not cause pain.

VIII. SUMMARY: INSTRUCTOR DEMONSTRATES ALL FOUR LIFTING, REACHING, PUSHING AND SITTING POSITIONS.

EVALUATION:

A. Skill test: Using a standardized skills check-off list, students demonstrate proficiency of skills for lifting, reaching, pushing and sitting. Empty or lightly weighted cardboard or fish boxes can be used to demonstrate skills
B. Written test: Quiz students on the following: State the three general steps to spine health; identify how and why improper lifting techniques contribute to the high rate of observer injuries; using a case study (written or video), identify incorrect as well as correct lifting procedures that were presented.

Appendix Q

How to write a lesson plan

The key to a successful presentation is in having a PLAN. The plan for presentation is called a Lesson Plan. The lesson plan has six key components.

SIX COMPONENTS OF A LESSON PLAN

1. ***INTRODUCTION***

   Before you begin your lesson plan, you need to introduce yourself, your relevant background and expertise and your material. However, do not go on and on and on! The group at your presentation wants to hear about the subject matter.

   Also be sure to INTRODUCE THE TOPIC. You need to help your audience focus on what is about to be presented. Introduction of topics do not have to be done just by saying them. You can also introduce a topic by using a *short* relevant video clip, having someone give a short testimonial, conducting some role playing, relating a personal story or a number of other different and creative methodologies.

2. ***OBJECTIVE(S)***

   The objective of a lesson plan is simply WHAT YOU WANT YOUR AUDIENCE TO GET OUT OF YOUR PRESENTATION!

Objectives are the beginning point of your thinking process about what you are going to do. Objectives are usually written by completing the following sentence:

"After this presentation, the listener should be able to……"followed by the appropriate <u>action</u> verb.

Three rules for objectives:

A. Verbs used for objectives *should be* ***very specific***, such as "list", "identify", "compare". Examples of verbs that are too vague are "know", "learn", and "assimilate" *Avoid using vague verbs in your objectives.* If the verb in your objective is vague, your objective will be vague and this will result in your presentation being vague.

To test whether or not you have done a good job getting your audience to get your point, you may need to do an evaluation or an assessment. They only way you can conduct an assessment is if you have framed your objectives *specifically*. You can effectively test whether your students can "*Demonstrate* the eight steps to donning an immersion suit." But how do you test if your students "*know* how to don an immersion

suit? Choosing the correct verb to use in your objective is the critical building block to your teaching.

Some *good examples* of specific learning objectives are:

"By the end of this presentation the student should be able to *list* the five main components of a lesson plan."

"By the end of this presentation, the student should be able to *state* the percentage of recreational boating fatalities that are fishermen."

"By the end of this presentation, the student should be able to *demonstrate* the 3 main steps in securing an infant in a car seat."

"By the end of this presentation. The student should be able to *don* an immersion suit within 60 seconds without injury to self, others or suit"

Some *bad examples* of *specific* learning objectives are:

"By the end of this presentation, the student should be able to *know* the components of a lesson plan."

"By the end of this presentation, the student should be able to *think* about the risks of drowning during recreational fishing."

"By the end of this presentation, the student should be able to *learn* how to correctly secure an infant in a car seat."

"By the end of this lesson, the student should be able to *know* about putting immersion suits on."

B. Objectives should have a ***measurable standard.*** In other words, after the presentation is done, the learner should be informed about how they are going to be evaluated. If the objective you tell them says they are going to *demonstrate* a skill, the student will know how they will be tested and you will be reminded about how you are going to evaluate them. You can see how using specific verbs helps in this process. Also giving a specific *standard* helps. For example, stating a certain number of items that should be remembered, e.g. "…write the seven steps to survival in proper priority" gives the student a standard of what they are expected to learn. It is very helpful therefore to *give your students the objectives at the beginning of the presentation.* Then they will know exactly what to expect and listen for.

C. Objectives should have ***reasonable conditions***. In other words, can you really achieve your objective in the time and resources you have available? Are the objectives reasonable and appropriate for your learners? Finally, the objective may at times, also need to state the conditions the performance will take place under (The

student will be able to demonstrate the eight steps in properly donning an immersion suit *in under 60 seconds and without damage to suit, self or others)*

Hints on writing objectives:

- Outline the information you want to cover first. It is sometimes easier to identify your objectives when the information is all laid out in front of you.
- Make sure you do not have too many objectives to cover in too short a time. In a five-minute presentation you will probably only have time to cover ONE objective.
- Use the objective to "tell them what you are going to be telling them".
- Once again, make sure those objectives are *specific, have a measurable standard and contain reasonable conditions.*

A list of some poor, good and better verbs to use for objectives, follow:

POOR VERB	GOOD VERB	BETTER VERB
Know	List	Inspect
Understand	Identify	Operate
Learn	Cite	Demonstrate
Think	Explain	Test
Comprehend	Recognize	Enter
Experience	Describe	Start

3. NEED TO KNOW

This can be a short statement, video clip, photo or other technique that is used to help focus the audience and remind them of *why they are listening to you.* In other words, why is this subject important to them? The need statement is "the hook". It's what captures their imagination to want to participate in your presentation.

Need statements are especially important in adult groups, who need to have more purpose for obtaining information, than children. However need statements are important for all groups. Think of creative ways to make need statements make a big impact (but not cause a negative reaction either)!

Hint: If you cannot think of a need statement for your subject, you might want to ask yourself why you are teaching this subject! Get back in touch with WHY this topic is important.

4. BODY OF THE LESSON

This is "tell them" part of the lesson. Now you are covering the subject matter. The subject matter has to be *organized* at this stage in a way that can be understood. If you do not have it organized in your own mind, it certainly will not be received as being organized to anyone else. If it's not organized, it will not be understood and if its not understood your objectives will not be covered.

The body is often written out in outline form. Key words remind you of what to cover. The lesson plan should not be written out in long sentences and paragraphs. Otherwise you will be too tempted to just read your lesson word for word: a very boring and un-stimulating instructional technique that should *never* be used.

5 SUMMARY

This is your opportunity to "tell them what you've told them". The information in your objectives should be reviewed to help it be remembered. It also helps bring a natural closure to your presentation.

Hint: You do not always have to make the summary yourself. Your audience can make the summary by having them repeat or list the main points. By saying or writing it they will also retain the information longer. Even better, if the subject matter is suitable, have them demonstrate the activity you want them to learn for even longer retention.

6. ASSESSMENT

A final note regards the assessment and evaluation of your teaching. The way you validate the effectiveness of your teaching is during a student assessment. This assessment may take the form of a written test, a demonstration or even by the evidence of a change in behavior. In an assessment you are judging your own teaching as much as your student's learning. Therefore it is very important that your objectives are designed and written so that they can be assessed. Active, as opposed to passive verbs that are used in writing objectives, are much more likely to be able to be assessed.

Sample lesson plan outline format follows:

YOUR NAME_____ PRESENTATION TOPIC_____

TIME NEEDED_____ EQUIPMENT NEEDED_____

I. INTRODUCTION: (introduce self and topic)

II. OBJECTIVE(S): (what do you want your students to learn?)
After the presentation the student should be able to_____
_____
(Remember, all the objectives should have a specific performance, a measurable standard and may have conditions if this is applicable)

III. NEED STATEMENT (why do your learners need to know about this topic?)

IV. LESSON BODY (use an outline format in most cases)

V. SUMMARY (review your main objectives)

VI. ASSESSMENT METHOD (how you are going to evaluate if your learners met your objectives)

Appendix R
Summary of Observer Trainer evaluations from site visits

This represents 39 observations conducted on 23 active instructors. Panama City and Galveston did not conduct training during this contract period.

	YES	SOME	NO	N/A
1. Introduces subject.	35 90%	1 3%	3 7%	0
2. State a need to know.	30 86%	1 3%	4 11%	0
3. Lists objectives: each must be a *specific performance,* have a *measurable standard* and state the *condition* of performance.	16 41%	20 51%	3 8%	0
4. Speaks so all students can hear.	31 89%	4 11%	0	0
5. Demonstrates skills so all can see.	27 84%	5 16%	0	-
6. Has A/Vs ready and working.	31 97%	1 3%	0	-
7. Uses more than one sense in presentation. (board/lecture; demo and lecture; etc.).	33 89%	3 8%	1 3%	0
8. Includes students in presentation by asking questions, eliciting information, etc.	26 72%	10 28%	0	-
9. Presents factual information.	36 95%	2 5%	0	0
10. Summarizes talk.	25 71%	6 18%	4 11%	0
11. Covers objectives.	28 72%	11 28%	0	0
12. Presents information in a logical sequence.	37 97%	1 3%	0	0
13. Interacts with students in a positive manner.	35 95%	1 2.5%	1 2.5%	0
14. Did the students appear to understand what was presented?	19 79%	4 17%	1 4%	0
15. Was the content relevant to students' needs?	24 100%	0	0	0
16. Were the practical exercises safe?	16 80%	4 20%	0	N/A
17. Was practice with feedback provided?	7 44%	7 44%	2 12%	-
18. Was a safety attitude and culture maintained during training?	22 88%	3 12%	0	0
19. Were instructors sensitive to cultural learning styles and concerns including words, tone and gestures?	13 87%	2 13%	0	-
20. Were attempts made to build students' confidence?	17 85%	3 15%	0	-
21. Was information personalized with relevant stories and experiences?	16 64%	6 24%	3 12%	0
22. Were individual differences considered and provided for?	14 82%	2 12%	1 6%	-
23. Was the class enjoyable? A positive experience?	22 92%	2 8%	0	0

- Number of N/As was removed from this list to calculate percentages.

Appendix S

Suggestions for collecting injury and close call data

Incident Report Form Instructions:

As defined above an incident includes any unplanned for or unintended occurrence or condition that resulted in, or could have resulted in, a significant injury, illness or other loss. A reportable incident, injury or illness, for the purpose of this project, meets one or more of the following criteria:

- requires more than simple first aid (i.e. a Band-Aid);
- requires more than cursory staff attention;
- requires follow-up care by staff in the field;
- requires follow-up care by a medical professional;
- requires follow-up care by a therapist, psychologist or social worker;
- requires use of prescription medications;
- interferes with the student's or client's active participation;
- requires evacuation from the field;
- requires the loss of a day or more of participation in the program (i.e. a lost day case);
- results in a near miss.

Incidents that do not meet these criteria should not be included in the submitted data. If you are in doubt about whether an incident is reportable or not, please report it.

Age and Gender of observer: Self-explanatory.

Incident Date and Time: Self-explanatory. Used to track incident by season and time of day.

Day of Course Incident Occurred: The number of days the observer was in the field when the incident occurred, i.e.: day seven of a nine-day trip.

Type of Environment: Choose the most appropriate description from the list.

Surface Condition: Choose the two most significant or appropriate descriptions from the list.

Type of Incident : An incident may result in injury, illness, or a near miss. Choose the most appropriate description from the list.

Lost Day Case: A lost day case occurs if a participant or staff missed one or more days of activity beginning with the day following the incident.

Did the patient leave the field?: Evacuations occur when a person leaves the field as a result of an incident. A patient who visited a medical facility post-deployment would not be considered an evacuation.

Evacuation Method: Choose the most appropriate method from list. Describe the method if the category of other was chosen.

Medical Facility Visit: choose “yes” if the patient received treatment at a hospital, clinic, doctor's office, etc.

Type of Injury: Choose the most significant injury from the list.

Anatomical Location of Injury: Choose the most appropriate.

Type of Illness: Choose the most significant illness from the list.

Type of Activity: Identify the activity the person was engaged in at the time of the incident.

Contributing Factors: This is a list of common incident factors or in adventure programming.

Narrative: Describe the incident and provide details: distances, times, sizes, sequence of events, etc., to present a clear picture of the incident.

Names and Signatures: Consider providing the name of the person who completed the form and the name of the administrator who reviewed the form.

Appendix T

Sample Injury/Illness Reporting Form

1. Date_____2. Observer fishery_____

3. Day of work in field observer incident

___ 0000-0400hrs ___0400-0800hrs ___0800-1200hrs

___1200-1600hrs ___1600-2000hrs ___2000-2400hrs

4. Season ___Fall ___Winter ___Spring ___Summer

5. Environment ___Training ___Debriefing ___Transit ___Onboard

6. Type of Injury ___Cut ___Fall ___Strain/Sprain/Hernia

___ Fracture ___Infection ___ Haz Mat ___Contusion ___Burn

__Amputation ___Hives/Rash/Allergy ___Respiratory ___Dislocations

___ Stings/Marine poisons___Other (state)_____

7. Body part(s) affected ___Back ___Chest ___Leg ___Feet

___ Toes ___Arms ___Hands ____Fingers ___Head ___Genitals

___Teeth ___eye(s) ___eardrum ___ Other (state)_____

8. Type of Illness ___ Infection ___Virus/Flu/Cold ___GI ___Seasickness

___ Food poisoning ___

9. Cause ___Machinery ___Falls ___Struck by object ___Lifting

___Other (state)_____

10. Secondary cause (contributing factor)___Fatigue ___Slippery deck ___Weather

___Other (state)_____

11. Evacuation method ___ Coast Guard ___ Air Ambulance ___Surface ambulance

12. Work days lost as a result of injury/illness_____ 13. Total cost of injury $_____