

TRAWL CATCH SHARE PROGRAM ELECTRONIC MONITORING (EM)  
WORKSHOP REPORT

Portland, Oregon

February 25-27, 2013

Executive Summary.....	Pages	ii – viii
General Feasibility Evaluation	Page	ii
1. Consider adopting goals and objectives.	Page	ii
2. Provide guidance on developing a scoping package, including	Page	iii
a. initial alternatives for public review and comment	Page	iii
b. an option for electronic monitoring co-ops	Page	iv
c. consideration of adopting other workshop information requests.	Page	iv
3. Provide comments on PSMFC study	Page	vi
4. Consider adopting a regulatory process for moving forward.	Page	vii
5. Respond to other workshop recommendations.	Page	viii
Detailed Report.....	Pages	1-18
Full Table of Contents	Page	1
Attachments.....	Pages	19-45

Pacific Fishery Management Council

March 2013

TRAWL CATCH SHARE PROGRAM ELECTRONIC MONITORING (EM)  
WORKSHOP REPORT

**Executive Summary – Findings, Recommendations, and Requests, Organized by Council Action Item**

**General Feasibility Evaluation**

Finding (General Feasibility Evaluation)..... Page 5

**Finding:** Participants at the workshop believe that it is reasonably likely that electronic monitoring (EM) will be found to be technically and economically viable as a substitute for the use of human observers in the function of compliance monitoring for the catch share program.

**1. Consider adopting goals and objectives.**

Recommendation (Regulatory Objectives to Adopt)..... Page 4

**Recommendation.** The regulatory objectives for this action are closely tied to the purpose and need and would be intended to further the policy goals and objectives of the Magnuson-Stevens Act (MSA) and the groundfish fishery management plan (FMP) including Amendment 20. The regulatory objectives for this action pertain to catch share program compliance monitoring and, as proposed by workshop participants, would be to:

1. reduce total fleet monitoring costs to levels sustainable for the fleet and agency;
2. reduce observer costs for vessels that have a relatively lower total revenue;
3. maintain monitoring capabilities in small ports;
4. increase national net economic value generated by the fishery;
5. decrease incentives for fishing in unsafe conditions;
6. use the technology most suitable and cost effective for any particular function in the monitoring system; and
7. reduce the physical intrusiveness of the monitoring system by reducing observer presence;

while

8. maintaining current individual accountability for catch and preserving equitable distribution of monitoring coverage among members of the fleet,
9. supporting the collection of biological information necessary for managing the fishery, for stock assessments, and to meet other needs for scientific data, with no degradation relative to pre-trawl catch share program standards,<sup>1</sup>
10. taking into account agency budgets and abilities to support any new policy,
11. maintaining capabilities for ACL management (e.g. for non-quota species), and
12. following an implementation path most optimal for the fishery.

---

<sup>1</sup> Finding a way to describe information need for scientific purposes is quite difficult. Section 2.c of Executive Summary for an information requests related to this objective.

Note: These regulatory objectives are for an action to develop an EM program for trawl catch share program compliance monitoring, not for the collection of scientific data. The first seven items in the above list are direct regulatory objectives, i.e. reasons for considering EM. Items eight through twelve in this list are constraints, i.e. the Council would not be undertaking this action in order to achieve items eight through twelve but rather in pursuing the first seven objectives will be bounded by the concerns listed in items eight through twelve. These objectives do not displace the original objectives for the trawl catch share program (Amendment 20 objectives) or the groundfish FMP.

**2. Provide guidance on developing a scoping package, including**

**a. *initial alternatives for public review and comment***

Recommendation (Strawman Programs) ..... Page 11

Strawman alternatives were provided during the workshop. Those alternatives have been modified based on the following recommendations and are provided in revised form in in [Attachment 2](#).

**Recommendations.**

- The workshop participants did not feel it useful to focus on alternatives which would require a minimum of four years to perfect, however, attention to structuring the program to facilitate rapid adoption of new improved technologies and procedures as they become available should be considered as part of the current process.
  
- For all sectors, the issue of the necessity of a ban on night fishing needs to be explored further. There is currently a regulatory ban on night fishing in the whiting fishery (Section 661.131(f)<sup>2</sup>). There is some reason to believe that images may be clearer at night, with appropriate lighting, than during the day. The Pacific States Marine Fisheries Commission (PSMFC) study may provide an opportunity to do needed research. For the bottom trawl fishery in particular, ability to fish at night is crucial, especially in winter months in the north when there may only be 8 or 9 hours of daylight. With respect to any ban on night fishing, it would be haul back, rather than setting, that would be the issue. Ability to night fish might be considered as a criterion around which an alternative is developed.
  
- Include a retention option which would allow the discard of small sized sablefish and lingcod to meet conservation objectives. Vessel revenue might be increased if this were combined with a proposal being considered under trawl rationalization trailing actions, which would give survival credit for discards.

---

<sup>2</sup> “Vessels fishing in the Pacific whiting primary seasons for the Shorebased IFQ Program, MS Coop Program or C/P Coop Program shall not target Pacific whiting with midwater trawl gear in the fishery management area south of 42°00’ N. lat. between 0001 hours to one-half hour after official sunrise (local time).”(660.131(f))

- If halibut are allowed to be discarded at-sea, the option in the initial strawman that specifies that all halibut are assumed dead would not reflect what occurs in the fishery. Another approach would be to use the historical observer information to estimate a likely average halibut mortality rate by gear type and fishery and to update those estimates over time based on observer data from more recent observations. Individual accountability would still provide an incentive to avoid halibut catch, however survivability would be based on fleetwide averages, therefore there would be less direct incentive to modify fishing strategies and handling techniques to minimize the mortality rate on each haul or set.
- Adding objectives for each strawman would be useful.
- The strawmen should note that compliance with monitoring is required only while participating in the IFQ fishery.
- Before implementing EM, obtain a clear agreement on what counts against quota when there are operational discards in a whiting fishery.
- Consideration needs to be given to how the West Coast system might be coordinated with requirements for Alaska programs.
- Workshop participants believe there would be utility in convening a workgroup to continue development of the alternatives and has recommended that the appointment occur at the June Council meeting.

***b. an option for electronic monitoring co-ops***

Recommendation (Electronic Monitoring Co-ops (EMCs)) Page **Error! Bookmark not defined.**

**Recommendation.** EMCs are a potentially innovative approach which warrants further consideration.

***c. consideration of adopting other workshop information requests.***

Information Request (Observer Coverage and Sampling)..... Page 6

**Information Request.** With respect to the perspective of personnel at the Northwest Fisheries Science Center (NWFSC) that were provided in the [preliminary feasibility matrices](#), participants have the following questions:

- (1) What level of observer coverage will be necessary to compliment shoreside sampling if EM is adopted?
  - a. What is the minimum observer coverage needed to obtain necessary biological data?
    - i. How much biological data was collected prior to trawl rationalization? What was the biological sampling rate?
    - ii. How much biological data are acquired now that trawl rationalization has been implemented? What is the biological sampling rate?
  - b. What is the minimum observer coverage needed to respond to other requirements (protected resources, Endangered Species Act (ESA), etc. requirements)?
- (2) When NWFSC filled out the feasibility matrices, what was the premise with respect of the amount of biological observer coverage expected for each segment of the fishery?
- (3) For vessels delivering to motherships, is catch composition and biologically sampling data collected or needed off of the catcher vessel or is/can these data be collected off of the mothership processor? How often are these data collected from catcher vessels?
- (4) What percentage of the time do observers actually sample catches on whiting catcher vessels?

Information Request (Diagram of Sector Operational Differences)..... Page 9

**Information Request.** It would be useful to have a diagram of the relevant operational differences for the various sectors in relation to EM requirements and monitoring risks. The compliance monitoring situation for pot and longline vessels may be different from one another and should be considered separately. Similarly each segment of the fleet may have different conditions. For example, mothership catcher vessels are out for longer periods of time without returning to shore, as compared to shoreside whiting vessels, therefore there might be different data storage requirements and different data transfer procedures. Another example is that for shoreside whiting catcher vessels there may be a greater likelihood of discards than for vessels delivering to motherships because for the shoreside vessels fish is taken onto the catcher vessel while for mothership catcher vessels the codend is generally transferred directly to the mothership.

Information Request (Comparison of Pre- and Post- Catch Shares Info) ..... Page 13

**Information Request.** Observers have now collected two years of data on activities for the mothership whiting and shoreside whiting catcher vessels. Observer information was not available during the cameral monitoring that was done on whiting vessels under exempted fishing permits (EFPs) of the previous decade. A summary of that information would be useful for the design of an EM system.

Information Request (Preliminary EM Cost Assessment) ..... Page 13

**Information Request.** While it is difficult to make cost estimates without knowing program design specifics and participation rates, it might be useful to develop estimates that bracket a reasonable ranges of assumptions. With multiple uncertainties bracketing might be difficult but may provide information that will help assess tradeoffs during program design.

Information Request (Analysis of Night Data)..... Page 13

Ask for an evaluation of video quality for whiting hauls delivered in darkness under the whiting EFP and an assessment of whether there is enough of such video to have confidence in EM at night on whiting vessels.

**3. Provide comments on PSMFC study.**

Recommendations (Study Design) ..... Page 17

**Recommendations.**

- Dungeness crab should not be retained in the study.
- It would be advantageous to experiment with deck lighting at night for whiting and non-whiting (including fixed gear). The biggest problem may be lighting on the water to evaluate and potentially enumerate net bleeding and other forms of operational discard.
- Video from the study should be used to evaluate the effectiveness of image recognition software.
- Study halibut viability and correlate to length of tow, time on deck, water, and air temperatures along with standard IPHC viability criteria.
- Experiment with EM without observer interference.
- Evaluate cameras under normal discard behavior conditions.
- Attempt to discern individual fish to species and include lengths of fish discarded.
- Subsample video to provide a statistical analysis of subsampling protocols.
- A variety of fishing vessel types (i.e., gear types) and sizes need to be included in the study.
- The study should include at least one vessel rigged with a fish discard conveyer equipped with a camera to test that configuration.
- Consult with the observer program for its protocols on what counts as a discard.

**4. Consider adopting a regulatory process for moving forward.**

Recommendation (Calendar) ..... Page 18

**Recommendation:** The following is the draft process that workshop participants recommend the Council consider for moving forward with an EM program.

<u>Dates</u>	<u>Process Considerations</u>	<u>Comments</u>
	<ul style="list-style-type: none"> <li>PSMFC continues preliminary planning for 2013 season and in anticipation of likely Council guidance.</li> </ul>	
Apr 2013	<ul style="list-style-type: none"> <li>Consider results of EM workshop and recommendations</li> <li>Adopt goals and objectives.</li> <li>Provide guidance on development of scoping package.</li> <li>Request <i>special studies</i>, as needed.</li> <li>Consider results of the 2012 PSMFC EM study.</li> <li>Provide comment on the 2013 PSMFC EM study design.</li> <li>Adopt regulatory process plan.</li> </ul>	Consider whether any regulatory changes should be pursued, if the NMFS/PSMFC field project demonstrates potential feasibility (for just whiting catcher vessels?)
Spring 2013	<ul style="list-style-type: none"> <li>NMFS/PSMFC finalize 2013 study design (starting in April – w/Council meeting results).</li> </ul>	
June 2013	<ul style="list-style-type: none"> <li>Full scoping session on EM.</li> <li>Appointment of workgroup on this issue.</li> </ul>	
Summer 2013	<ul style="list-style-type: none"> <li>Execute at-sea and shoreside field studies</li> </ul>	
Sept 2013	<ul style="list-style-type: none"> <li>Review results from <i>special studies</i> and provide guidance on alternative development (if necessary).</li> </ul>	
Nov 2013	<ul style="list-style-type: none"> <li>Consider initial results of NMFS/PSMFC 2013 field season</li> <li>Adopt alternatives for analysis.</li> </ul>	
June 2014	<ul style="list-style-type: none"> <li>Consider full analysis of alternative.</li> <li>Select preliminary preferred alternative.</li> </ul>	
Sept 2014	<ul style="list-style-type: none"> <li>Select final preferred alternative.</li> </ul>	
Sept 2014 through 2015	<ul style="list-style-type: none"> <li>Secretarial approval process and implementation, including               <ul style="list-style-type: none"> <li>regulation drafting and paperwork reduction act submissions,</li> <li>securing contracts for video review,</li> <li>commercial installation and testing, and</li> <li>observer program adjustments.</li> </ul> </li> </ul>	

**5. Respond to other workshop recommendations.**

Recommendation (Narrow Scope of Work) ..... 7

**Recommendation:** Participants acknowledged the extensive EM work conducted to date and recommended the scope of future work be narrowed based on the workshop recommendations.

## Trawl Catch Share Program Electronic Monitoring (EM) Workshop Report

The Pacific Fishery Management Council held a [workshop](#) on the potential use of electronic monitoring (EM) in the trawl fishery catch share program, February 25-27, 2013. The workshop was chaired by Dan Wolford, Council Chairman, and there were 54 people in attendance, including 32 invited participants. A complete [list](#) of those in attendance is provided at the end of this document. This report provides a summary of central workshop discussion points along with findings, information requests, and recommendations.

### Workshop Report Contents

Executive Summary – Findings, Recommendations, and Requests, Organized by Council Action Item .....	ii
Trawl Catch Share Program Electronic Monitoring (EM) Workshop Report.....	1
Location of Findings, Recommendations, and Information Requests.....	1
Workshop Materials, Including Agenda and Terms of Reference .....	2
Initial Presentations.....	2
Workshop Objective 1: Regulatory Goals and Objectives .....	3
Workshop Objective 2: Feasibility and Key Questions.....	5
Workshop Objective 3: PSMFC 2013 Field Study Design .....	14
Workshop Objective 4: Possible Regulation Amendment Process for Consideration of Electronic Monitoring .....	17
Attachment 1 – Draft Purpose and Need Statement .....	19
Attachment 2 – Electronic Monitoring Strawmen .....	20
Attachment 3 – Electronic Monitoring Cooperative for Compliance.....	26
Attachment 4 – Shoreside Whiting EFP (2010) .....	28
Attachment 5 – Shoreside Whiting Electronic Monitoring Statement of Work (2010) .....	35
Attachment 6 – List of Workshop Invited Participants(*) and Attendees .....	44

### Location of Findings, Recommendations, and Information Requests

Workshop Objective 1: Goals and Objectives	
Recommendation (Regulatory Objectives to Adopt).....	Page 4
Workshop Objective 2: Feasibility and Key Questions	
Finding (General Feasibility Evaluation).....	Page 5
Information Request (Observer Coverage and Sampling).....	Page 6
Recommendation (Narrow Scope of Work) .....	Page 7
Information Request (Diagram of Sector Operational Differences).....	Page 9
Recommendation (Strawman Programs) .....	Page 11
Information Request (Comparison of Pre- and Post- Catch Shares Info) .	Page 13
Information Request (Preliminary EM Cost Assessment) .....	Page 13
Information Request (Analysis of Night Data).....	Page 13
Recommendation (Electronic Monitoring Co-ops) .	Page <b>Error! Bookmark not defined.</b>
Workshop Objective 3: PSMFC 2013 Field Study Design	
Recommendations (Study Design) .....	Page 17
Workshop Objective 4: Possible Regulation Amendment Process for Consideration of Electronic Monitoring	

**Workshop Materials, Including Agenda and Terms of Reference**

All workshop materials, including handouts at the workshop and powerpoint presentations, are available electronically from the Council EM webpage <http://www.pcouncil.org/groundfish/trawl-catch-share-program-em/>. For anyone viewing this report electronically while connected to the internet, hyperlinks are provided to those materials. Additional background materials, including a number of white papers on EM recently released by NMFS, are also available from the Council EM webpage.

**Initial Presentations**

The workshop started with a number of presentations on past and present work on EM.

Presentation Agenda Item	Description
<p><i>Agenda Item B.1: Electronic Monitoring in the Shoreside Hake Fishery 2004 to 2010 - Howard McElderry</i></p> <ul style="list-style-type: none"> <li>• Electronic Monitoring in the Shoreside Hake Fishery 2004 to 2010 <a href="#">Attachment 1 –Cameras for Whiting</a></li> <li>• Powerpoint: <a href="#">Electronic Monitoring in the Shore-Side Hake Fishery 2004 to 2010</a></li> </ul>	<p>Report on seven years of experience with EM in the Pacific coast whiting fishery. Over the life of the program, there were improvements in both monitoring system performance and fishery compliance as a result of several factors including improved technology, maturing operational systems, and improved feedback and reporting processes.</p>
<p><i>Agenda Item B.2.a: NFWF Funded Project (Fishermen’s Marketing Association) - Pete Leipzig</i></p> <ul style="list-style-type: none"> <li>• National Fish and Wildlife Grants to the Fishermen’s Marketing Association: <a href="#">Attachment 1 – FMA Project</a></li> <li>• Powerpoint: <a href="#">Summary of National Fish and Wildlife Foundation Grants to the FMA</a></li> </ul>	<p>Evaluated ability of individuals to identify species based on video images and ability of software to detect in video images motions indicating a possible discard from trawl vessels.</p>
<p><i>Agenda Item B.2.b: – EM for Fixed Gear Vessels – Morro Bay Project - Michael Bell</i></p> <ul style="list-style-type: none"> <li>• Electronic Monitoring Pilot Study Report for West Coast Groundfish Trawl ITQ Program <a href="#">Attachment 1 – Fixed Gear Vessels – Morro Bay</a></li> <li>• Introduction to Economic Model and Summary of Monitoring Concepts for the West Coast Groundfish IFQ Program <a href="#">Attachment 2 – Cap Log Report</a></li> <li>• Powerpoint: <a href="#">Electronic Monitoring Pilot Studies on Fixed Gear Vessels in Central California</a></li> </ul>	<p>Compared counts of sablefish and grouped rockfish discarded, as detected from three different sources (observers, fishermen logbooks, and EM) and noted instances of unusable video due to poor lighting.</p>

Presentation Agenda Item	Description
<p><i>Agenda Item B.2.c: NFWF Funded Project (Sea State) and Image Analysis Programming - - Karl Haflinger and Eric Torgerson</i></p> <ul style="list-style-type: none"> <li>• Sea State, February 13, 2013, EM Workshop Presentation Description <a href="#">Attachment 1 – Sea State Project</a></li> <li>• Powerpoint: <a href="#">Overview of NFWF Grant to Develop Video Monitoring for Full-Retention Fisheries</a></li> </ul>	<p>Worked on developing software to detect activities on deck indicating that video should be examined to determine if discarding occurred and to mark those sections of video to facilitate rapid and efficient review.</p>
<p><i>Agenda Item B.2.d: PSMFC Project – 2012 Season Results – Dave Colpo</i></p> <ul style="list-style-type: none"> <li>• PSMFC Project – 2012 Season Results <a href="#">Attachment 1 – PSMFC Project 2012</a></li> <li>• Powerpoint: <a href="#">2012 EM Season Results Pacific States Marine Fisheries Commission</a></li> </ul>	<p>Conducted a video monitoring implementation study for a system using video to detect discards events. 2012 study includes data for whiting and fixed gear vessels. Compared video results to observer results. Evaluated video data quality.</p>
<p><i>Agenda Item B.3: Electronic Monitoring in Alaska – Farron Wallace</i></p> <ul style="list-style-type: none"> <li>• Electronic Monitoring in Alaska – Synopsis for Agenda Item B.3 <a href="#">Attachment 1 – EM in Alaska</a></li> <li>• Powerpoint: <a href="#">Monitoring Technology in Alaska</a></li> </ul>	<p>Conducted a feasibility study for automated image processing techniques to identify and capture serial catch events and obtain length measurements of catch using stereo cameras; and a feasibility study (“EM light”) for collection of temporal-spatial catch and effort data in the small boat commercial groundfish and halibut fleet. Report to NPFMC scheduled for June 2013.</p>
<p><i>Agenda Item B.4: Northeast Region Pilot Program – Melissa Hooper</i></p> <ul style="list-style-type: none"> <li>• Northeast Region Pilot Program - <a href="#">Supplemental Attachment 1 – NER Pilot</a></li> <li>• Powerpoint: <a href="#">Northeast Region Pilot Program</a></li> </ul>	<p>Pilot project has focused on building capacity and exploring methods for estimating weight and identifying to species in a quasi-full retention fishery. Target fishery currently has 30% observer coverage.</p>

## Workshop Objective 1: Regulatory Goals and Objectives

### *Presentation*

Mr. Jim Seger presented background information, a draft purpose and need statement, and strawman goals and objectives developed by Council staff ([Agenda Item C.1, Attachment 1 – Strawmen P&N, G&O](#)). A list of Magnuson Stevens Act (MSA) and groundfish fishery management plan (FMP) goals and objectives was also contained in this attachment, along with the current catch share program language on catch monitoring. The purpose and need statement from that document is provided in this report as [Attachment 1](#). The workshop participants neither modified nor explicitly endorsed the purpose and need statement. The goals and objectives, as revised and recommended by workshop participants, are provided below in this section.

### *Discussion*

Participants agreed that reducing the costs associated with catch accounting should be the focus of the EM program rather than the collection of biological data. Biological data may be collected through other means, e.g. onboard observer coverage at a lower than 100 percent coverage levels. The social and economic benefits of the program that are beginning to show up may be threatened as the cost of observers begins to shift to industry with the ending of the observer cost subsidies. Ultimately, costs must be lowered enough to ensure that the program is sustainable. However, cost reduction itself is not the only objective, since this could be achieved, to adverse effect, through substantially greater consolidation of the fleet. Fewer vessels would mean fewer ports; and the loss of trawlers can result in loss of support businesses that benefit other vessels (ice, fuel etc.) creating a negative ripple effect within the port community. In addition to cost reduction, EM can also enhance flexibility (because vessels do not have to wait for the arrival of observers) and make participation more practical for smaller vessels less able to carry observers.

At the same time, one workshop participant noted that while cost reduction is a concern motivating this workshop, there are costs other than observer costs that can be reduced and observer presence provides confidence in the data. However, it was also noted that observer data is not perfect: observers take breaks, sleep, get sick, misidentify species, etc.

There was extensive discussion on the need for biological data. Even without 100% observer coverage, full retention would provide significant opportunity for collecting data during shoreside sampling. At the same time, there is other data which can only be collected at-sea. Determining the amount of data collection “needed” for science is difficult. Frequency of encounter, variation in the data, and tolerance for uncertainty, among other factors, influence the assessment of need. Generally speaking, more information is better, but at some point the value of additional information is relatively small and the costs of collecting that additional information may be high. In this state of uncertainty, participants generally agreed that the baseline for the collection of scientific data should not be 100% observer coverage. Full observer coverage is in place because of the need for 100% catch monitoring, not for the collection of scientific data. One possibility might be to use the pre-trawl catch share observer level as a baseline (about 20% coverage). However, it was noted that a baseline level of scientific data collection is not necessarily a measure of the need for such data.

It was suggested that because of the need to integrate a number of tools, this should not be considered just an EM policy but consideration of a general fishery monitoring policy. While needs for scientific information must be met, participants agreed that the focus of EM should be on full catch accounting.

**Recommendation.** The regulatory objectives for this action are closely tied to the purpose and need, and would be intended to further the policy goals and objectives of the Magnuson-Stevens Act (MSA) and the groundfish fishery management plan (FMP) including Amendment 20. The regulatory objectives for this action pertain to catch share program compliance monitoring and, as proposed by workshop participants, would be to:

1. reduce total fleet monitoring costs to levels sustainable for the fleet and agency;

2. reduce observer costs for vessels that have a relatively lower total revenue;
3. maintain monitoring capabilities in small ports;
4. increase national net economic value generated by the fishery;
5. decrease incentives for fishing in unsafe conditions;
6. use the technology most suitable and cost effective for any particular function in the monitoring system; and
7. reduce the physical intrusiveness of the monitoring system by reducing observer presence;

while

8. maintaining current individual accountability for catch and preserving equitable distribution of monitoring coverage among members of the fleet,
9. supporting the collection of biological information necessary for managing the fishery, for stock assessments, and to meet other needs for scientific data, with no degradation relative to pre-trawl catch share program standards,<sup>3</sup>
10. taking into account agency budgets and abilities to support any new policy,
11. maintaining capabilities for ACL management (e.g. for non-quota species), and
12. following an implementation path most optimal for the fishery.

These regulatory objectives are for an action to develop an EM program for trawl catch share program compliance monitoring, not for the collection of scientific data. The first seven items in the above list are direct regulatory objectives, i.e. reasons for considering EM. Items eight through twelve in this list are constraints, i.e. the Council would not be undertaking this action in order to achieve items eight through twelve but rather in pursuing the first seven objectives will be bounded by the concerns listed in items eight through twelve. These objectives do not displace the original objectives for the trawl catch share program (Amendment 20 objectives) or the groundfish FMP.

The workshop participants discussed at length the inclusion of the term “sustainable,” in regulatory Objective 1. It is understood that some consolidation is expected relative to current levels but that it is not the intent through the EM program to achieve sustainability through even greater levels of consolidation. At the same time, there needs to be something against which cost cutting is balanced, otherwise costs could be minimized by eliminating the fishery. In this context “sustainability” should be interpreted as providing for a sustainable program from both the fleet and agency perspectives.

Regulatory Objective 7 recognizes that cameras may be considered more intrusive from a privacy perspective and that a special discard chute and camera might have greater physical intrusiveness but focuses specifically on physical intrusiveness associated with observer presence.

---

<sup>3</sup> Finding a way to describe information need for scientific purposes is quite difficult. See the following section for information requests related to this objective, Items (1).

## Workshop Objective 2: Feasibility and Key Questions

**Finding:** Participants at the workshop believe that it is reasonably likely that EM will be found to be technically and economically viable as a substitute for the use of human observers in the function of compliance monitoring for the catch share program.

### Preliminary Feasibility Matrices

The primary focus of this segment of the workshop was to review the preliminary thoughts on feasibility provided by the National Marine Fisheries Service (NMFS) Northwest Fishery Science Center (NWFSC), NMFS Northwest Region (NWR), National Oceanic and Atmospheric Administration General Counsel (NOAA GC) Enforcement Section, and NMFS Office of Law Enforcement (OLE) and to discuss concerns of the invited constituents and the public. Agency thoughts were provided in matrices filled out in advance of the workshop. These matrices asked respondents to consider what functions the current observer program fills for them, whether EM might fulfill that function, and, if not, whether there are other ways that the function might be fulfilled. Respondents were also requested to provide their assumptions about the design of the EM system and to indicate if there are functions that the EM system might serve which are not currently served by observers.

Workshop participants felt that longline and pot gears were different enough with respect to EM that they should be considered separately, particularly when it comes to factors such as the need to monitor catch drop-off.

At the workshop presentations were provided from each of these agency offices, except the NWFSC (due to an uncontrollable circumstance).

### NWFSC

#### *Presentation*

Due to unforeseen and uncontrollable circumstances, staff from the Northwest Fishery Science Center (NWFSC) were unable to attend this workshop, and Mr. Jim Seger, Pacific Fishery Management Council (PFMC) staff, presented the preliminary feasibility matrix ([PFMC EM Workshop Agenda Item D.1.a, Attachment 1](#)).

#### *Discussion*

The initial discussion concentrated on what each table represents and whether their contents are conclusive or open to revision after further deliberations. The group concluded that questions and comments should be made during the workshop and the NWFSC could be asked to provide answers at the April Council meeting.

**Information Request.** With respect to the perspective of personnel at the NWFSC that were provided in the matrices, participants have the following questions:

- (1) What level of observer coverage will be necessary to compliment shoreside sampling if EM is adopted?

- a. What is the minimum observer coverage needed to obtain necessary biological data?
    - i. How much biological data was collected prior to trawl rationalization? What was the biological sampling rate?
    - ii. How much biological data are acquired now that trawl rationalization has been implemented? What is the biological sampling rate?
  - b. What is the minimum observer coverage needed to respond to other requirements (Protected resources, ESA, etc. requirements)?
- (2) When NWFSC filled out the feasibility matrices, what was the premise with respect of the amount of biological observer coverage expected for each segment of the fishery?
  - (3) For vessels delivering to motherships, is catch composition and biologically sampling data collected or needed off of the catcher vessel or is/can these data be collected off of the mothership processor? How often are these data collected from catcher vessels?
  - (4) What percentage of the time do observers actually sample catches on whiting catcher vessels?

The NWFSC matrix shows that there will be higher mortality for halibut under EM, however, while measured or assumed mortality may increase, actual mortality may not change. Halibut size can be measured as it is released through a chute. Using EM could result in more rapid release of halibut with lower mortality, since observer handling would not necessarily be required.

It was noted that, in general, there needs to be consideration and specification of not just the technology but how it is applied.

## **NWR**

### *Presentation*

Mr. Colby Brady reviewed the outcomes of completed EM projects and ongoing investigations ([PFMC EM Workshop Agenda Item D.1.b Powerpoint](#)). He noted the success of the Pacific whiting EFP (2004-2010), Morro Bay fixed gear EM project, and the Canadian commercial fisheries model. Mr. Brady said the NWR agrees with the matrices provided by the Office of Law Enforcement ([PFMC EM Workshop Agenda Item D.1.b&c, Attachment 1](#)).

### *Discussion*

A participant inquired whether EM could identify sorted catch or if EM should only be used to verify maximized retention. Mr. Brady believes a well designed system with cameras focused on a discard chute could work well to measure discards and that a system could be designed to identify the species composition of the discard. He also saw the potential for incorporating a flow scale and image recognition software in the future.

**Recommendation:** Participants acknowledged the extensive EM work conducted to date and recommended the scope of future work be narrowed based on the workshop recommendations.

## **NOAA General Counsel for Enforcement Section**

### *Presentation*

Mr. Niel Moeller, NOAA GC Enforcement Section, made a presentation on legal and enforcement considerations ([PFMC EM Workshop Agenda Item D.1.c, Supplemental Attachment 2 – NOAA GCEL](#)). Mr. Moeller supplemented his prepared remarks by offering four recommendations for implementing and enforcing an EM program:

- 1) Follow the vessel monitoring system (VMS) example and publish type-approval standards for EM technology in the Federal Register.
- 2) Ensure that type-approved vendors are required to provide litigation support to the government in law enforcement proceedings based on EM evidence.
- 3) Write regulations or permits pertaining to EM requirements that use clearly defined terms, and that allow only limited exceptions, if any.
- 4) Provide that State joint enforcement partners have access to EM information, to the same extent as with VMS data.

### *Discussion*

There was a question about whether it would be possible to have a provision which would require vessels to pay for increased review if discrepancies were shown between their logbooks and camera monitoring. The issue brings up due process concerns. Due process concerns might be addressed by analyzing and providing opportunity for the public to comment on the requirement that vessels pay for increased review when discrepancies appear during the regulatory development process.

Questions were asked that centered on the effectiveness of EM and/or observers in prosecuting a case. Mr. Moeller stated that to the best of his knowledge neither had been used, although there was a large discard case that involved turning off the power to the camera. There were a number of potential violations of the 2004-2010 EFPs, however none were prosecuted. Often it was claimed that fish were discarded for safety reasons. Video provide much information but with respect to prosecutions, the main question is whether it provides information pertaining to what needs to be provided. In court, video evidence will likely need to be backed up by expert testimony explaining how the images were collected and what they mean. With respect to observers, the primary litigations issues are around observer harassment, rather than use of observer data to support a prosecution.

## **NOAA Northwest Division OLE**

### *Presentation*

Mr. Dayna Matthews (Northwest Division OLE) presented preliminary thoughts on observer functions and the corresponding capabilities of EM ([PFMC EM Workshop Agenda Item D.1.b&c, Attachment 1](#)).

### *Discussion*

There was a discussion of the data storage requirements and who would bear the costs. The statute of limitations for data storage is five years. The data needs to be available that long. Under the whiting EFPs (2004-2010) OLE stored the data. That eliminated the question of who owned the data, but going forward OLE does not want to store the data. One question that needs

to be answered is where the data would be stored. Currently, the NWFSC West Coast Groundfish Observer Program (WCGOP) holds the data. There might be some kind of a combined responsibility involving the Pacific States Marine Fisheries Commission (PSFMC), as there is today for logbook data.

At present, based on the information available from studies and experience, the OLE presentation indicated that the at-sea whiting and fixed gear fisheries are closer to moving forward than bottom trawl, for which there is no camera monitoring at present.

### **General Discussion on Feasibility**

After presentation of the Federal agency's perspectives, there was a general discussion among all participants during which the following were some of the main points.

- EM program design should be specific to the fishery and objectives for the fishery and there should be an evaluation of the relative benefits of one approach over another (tradeoffs).
- The issue of appropriate accounting for drop-offs (fish which are not brought on board the vessel) needs to be addressed for the fixed gear vessels and trawl vessels. The drop off issue would not be applicable to pot vessels.
- The feasibility matrices need to be looked at as a whole, rather than linearly. For example, just because EM cannot fulfill a function, as reflected in column 3, does not necessarily mean that an adjustment to some other aspect of the system cannot be made such that the move to EM is feasible. Those potential compensatory adjustments are reflected in column 5.
- Consider the feasibility of moving away from a model that proscribes compliance activities to a model that sets monitoring standards that might be met through a variety of technologies and procedures. This will provide more flexibility in the initial design and for future changes.

***Information Request.*** It would be useful to have a diagram of the relevant operational differences for the various sectors in relation to EM requirements and monitoring risks. The compliance monitoring situation for pot and longline vessels may be different from one another and should be considered separately. Similarly each segment of the fleet may have different conditions. For example, mothership catcher vessels are out for longer periods of time without returning to shore, as compared to shoreside whiting vessels, therefore there might be different data storage requirements and different data transfer procedures. Another example is that for shoreside whiting catcher vessels there may be a greater likelihood of discards than for vessels delivering to motherships because for the shoreside vessels fish is taken onto the catcher vessel while for mothership catcher vessels the codend is generally transferred directly to the mothership.

## Consideration of Strawman Electronic Monitoring Programs and Co-ops

### *Strawman Programs*

#### *Presentation*

Mr. Dayna Matthews (Northwest Division OLE) and Dave Colpo (PSMFC) presented electric monitoring strawmen for consideration. Strawmen were provided for each of four groups: midwater trawl mothership sector, midwater trawl shorebased sector, bottom trawl, and fixed gear ([PFMC EM Workshop Agenda Item D.2.a, Attachment 1 – EM Strawmen](#)). The strawmen provided at the workshop provide an excellent basis for Council discussion. The work that Dayna Matthews, Dave Colpo, Steve Freese and others put into developing them was greatly appreciated. Staff should work with the strawmen and provide them to the Council, incorporating the recommendations provided in this section of the workshop report. The strawmen, as modified by the specific recommendations, are provided as an attachment to this report ([Attachment 2](#)).

#### *Discussion.*

Canada has implemented an EM system with paper logbooks, but the development of electronic logbooks (e-logbooks) may have an important efficiency benefit when it comes to reviewing camera information. While PSMFC has developed an e-logbook prototype based on current state logbooks, the data needs for EM with cameras are different and development should start from scratch. E-logbooks need to have information that is somewhat different from the current state trawl logbooks. The development of e-logbooks may also benefit other sectors. There is a longstanding direction from the Council to develop e-logbooks for the fixed gear fishery. It may be useful to consider the data elements and standard format in which e-logbook data will have to be provided and then leave flexibility for others to develop protocols and software that meets that standard.

The EFPs issued for the whiting catcher vessel fleet from 2004 through 2010 may provide a good starting place for designing an EM program. However, those EFPs did not apply to other sectors of the fleet and the whiting fishery now operates under a quota share program which incentivizes different behaviors than did the pre-catch share fishery. Therefore work may be required to adapt previous EFP provisions to today's fishery. The 2010 whiting vessel EFP and a related statement of work is provided as an attachment to this document (see Attachments [4](#) and [5](#)).

For one design approach, the Council might identify as a design criteria a maximum cost that would be acceptable and then develop a program based on that criteria. If such an alternative can be developed then other alternatives could be explored to further lower costs.

An EM program should not be evaluated against an assumption that the existing human observers are providing 100% accurate and complete monitoring. For this first EM effort we should not focus on designing an EM system to perform tasks or meet higher standards than a human observer (though in some cases the EM system will do so, e.g. continuous deck monitoring).

For the nonselective discards<sup>4</sup> allowed under some strawman options, information on retained catch may be used to estimate species composition of the nonselective discards.

Any advance on feasibility of EM for one segment of the vessels participating in the trawl catch share program is likely to benefit the overall fishery, particularly with respect to gear switching and vessels fishing fixed gear. Eventually there may be collateral benefits for the fixed gear limited entry and open access fisheries.

On the one hand, it might be most effective to proceed with EM for some gears within the trawl catch share program while needed protocols and technologies are developed for other sectors. On the other hand, performance standards for EM for all sectors might be developed in regulation, and then implementation could occur as soon as someone brings forward a system that meets those performance standards.

The comment was made that there is no existing design out there that is ready to apply and appropriate to the specifics of this fishery. Looking at the shortcomings that designs for other fisheries would have if applied in this fishery is not likely to move us forward. We need to focus on developing the best approach for this fishery. A potential program that would work should be designed, the costs evaluated, and additional research done on that basis.

It was noted that the results on fixed gear studies report numbers of fish and that this information needs to be augmented with weight estimates, possibly based on length weight relationships—assuming that discard is being allowed. On the other hand, if it is to be a maximum retention fishery, then we only need to be certain of compliance with maximum retention. Maximum retention will probably reduce the costs of video analysis relative to allowing selective discards.

With respect to compliance issues and possible discarding of nonIFQ species, it is important to keep in mind that there are a number of compliance standards to be met including individual quota, but also ACLs for species that are not under the trawl catch share plan.

It is likely easier to develop systems that include “tamper evident” components than “tamper proof” components.

During other discussion, it was noted that there is not a clear agreement on what counts against quota when there are operational discards in a whiting fishery. This needs to be cleared up before implementing EM.

### **Recommendations.**

- The workshop participants did not feel it useful to focus on alternatives which would require a minimum of four years to perfect, however, attention to structuring the program to facilitate rapid adoption of new improved technologies and procedures as they become available should be considered as part of the current process.

---

<sup>4</sup> Discards which are released through net bleeding or other techniques that do not target the discard of particular species in the catch

- For all sectors, the issue of the necessity of a ban on night fishing needs to be explored further. There is currently a regulatory ban on night fishing in the whiting fishery (Section 661.131(f)<sup>5</sup>). There is some reason to believe that images may be clearer at night, with appropriate lighting, than during the day. The PSMFC study may provide an opportunity to do needed research. For the bottom trawl fishery in particular, ability to fish at night is crucial, especially in winter months in the north when there may only be 8 or 9 hours of daylight. With respect to any ban on night fishing, it would be haul back, rather than setting, that would be the issue. Ability to night fish might be considered as a criterion around which an alternative is developed.
- Include a retention option which would allow the discard of small sized sablefish and lingcod to meet conservation objectives. Vessel revenue might be increased if this were combined with a proposal being considered under trawl rationalization trailing actions, which would give survival credit for discards.
- If halibut are allowed to be discarded at-sea, the option in the initial strawman that specifies that all halibut are assumed dead would not reflect what occurs in the fishery. Another approach would be to use the historical observer information to estimate a likely average halibut mortality rate by gear type and fishery and to update those estimates over time based on observer data from more recent observations. Individual accountability would still provide an incentive to avoid halibut catch, however survivability would be based on fleetwide averages, therefore there would be less direct incentive to modify fishing strategies and handling techniques to minimize the mortality rate on each haul or set.
- Adding objectives for each strawman would be useful.
- The strawmen should note that compliance with monitoring is required only while participating in the IFQ fishery.
- Before implementing EM, obtain a clear agreement on what counts against quota when there are operational discards in a whiting fishery.
- Consideration needs to be given to how the West Coast system might be coordinated with requirements for Alaska programs.
- Workshop participants believe there would be utility in convening a workgroup to continue development of the alternatives and has recommended that the appointment occur at the June Council meeting.

---

<sup>5</sup> “Vessels fishing in the Pacific whiting primary seasons for the Shorebased IFQ Program, MS Coop Program or C/P Coop Program shall not target Pacific whiting with midwater trawl gear in the fishery management area south of 42°00′ N. lat. between 0001 hours to one-half hour after official sunrise (local time).”(660.131(f))

**Information Request.** Observers have now collected two years of data on activities for the mothership whiting and shoreside whiting catcher vessels. Observer information was not available during the camera monitoring that was done on whiting vessels under experimental fishing permits (EFPs) of the previous decade. A summary of that information would be useful for the design of an EM system.

**Information Request.** While it is difficult to make cost estimates without knowing program design specifics and participation rates, it might be useful to develop estimates that bracket a reasonable range of assumptions. With multiple uncertainties bracketing might be difficult but may provide information that will help assess tradeoffs during program design.

**Information Request.** Ask for an evaluation of video quality for whiting hauls delivered in darkness under the whiting EFP and an assessment of whether there is enough of such video to have confidence in EM at night on whiting vessels.

### *Electronic Monitoring Co-ops*

#### *Presentation*

Mr. Matthews also presented a concept for an electronic monitoring co-op (EMC) ([Attachment 3](#)). An EMC would be a co-op formed to monitor and provide incentives for compliance with Federal regulations governing EM. Vessels participating in the groundfish trawl catch share fishery would be given the option of meeting the monitoring requirements either through carrying a human catch monitor on their trip or joining an EMC and carrying and using EM equipment.

#### *Discussion*

There was extensive discussion on this issue. The key incentive for participation is that only vessels participating in the co-op would be allowed to use cameras. A remaining question was “What would be the incentive for the co-op to enforce EM criteria on its members?” The incentive structure for a monitoring co-op would be different than for co-ops in which all members mutually benefit and rely on one another to keep bycatch rates down, or otherwise harvest the proper amount of fish. Under such programs, the amounts caught are tracked through government monitoring programs, not by the co-op. This provides the crosscheck which ensures co-op performance. To ensure performance of a monitoring co-op, would there have to be requirements for the co-ops proscribed through regulation, and if so, would there then have to be enforcement and monitoring applied to the co-op? A heavy regulatory proscription might defeat the purpose of the co-op, though an effectively performing co-op might more rapidly respond to compliance problems than could occur through the court system. Are there other methods to ensure co-op performance, such as relying on a quasigovernmental organization to manage the co-op, such as the PSFMC?

An indicator of the potential value of co-ops for encouraging compliance, as an alternative to the court system, is the low rate at which cases of possible violations caught on camera are taken to court. For the EM which occurred under shoreside whiting EFPs, despite some indication of possible violations (18 cases of unreported discards caught on camera were referred for possible enforcement action) there were never any that were taken to court because vessel owners claimed the discards were required for safety reasons.

In addition to compliance advantages, a co-op might also be able to more rapidly adopt new technologies and procedures. EM is not just about cameras, there are a large number of elements which have to be designed to work together.

Another approach to providing a compliance incentive might be to include in the program a blanket adjustment such that, if something inappropriate happens on camera on a particular trip, there would be an additional precautionary deduction from the vessels account – some proportion of the total catch on the trip.

Another factor to consider in evaluating the utility of co-ops is the additional cost to manage them.

**Recommendation.** EMCs are a potentially innovative approach which warrants further consideration.

### **Workshop Objective 3: PSMFC 2013 Field Study Design**

#### **Statistical analysis of risk of missing rare events**

##### *Presentation*

Mr. Dave Colpo presented a statistical analysis of the risk of missing rare events during video review. The study was conducted by Jennifer Cahalan ([Rare Events Simulation Study Presentation](#), starting on slide 4). The EM program may rely on fishermen logbook entries to document catch and discard events, validated with video review. One design element having a substantial impact on costs will be proportion of the video reviewed to audit the accuracy of logbook entries (a 100% census or some lower rate of sampling). An analysis was conducted to indicate the probability that different rates of video sampling would detect the catch of rarely caught species (overfished rockfish species) ([PFMC EM Workshop Agenda Item E.1, Attachment 1 - PSMFC - Rare Events](#)). The study used 2011 observer data for non-hake IFQ trips using bottom trawl, hook and line, and pot gears and focused on six rebuilding species (bocaccio, canary, cowcod, darkblotched, POP, and yelloweye). A simulation exercise evaluated 10%, 25%, and 50% minimum sampling rates applied to a data set with 1,471 observed trips. For this exercise, it was assumed that if a discard was observed that the camera would have detected the event. The analysis indicated that for species that were rarely caught and discarded on observed trips in 2011, even very high video sampling rates, on a fleetwide basis, would have a low probability of detecting a discard events for some species.

##### *Discussion*

If discarding were to increase under cameras (and in the absence of observers) the probability of detection would increase. It was noted that there is management uncertainty for all fisheries and that these results might still be robust when compared to sampling challenges in other fisheries. Additionally, the probability of rare event detection might be increased by increasing the sampling rate on those trips with higher bycatch risk, as indicated by gear, depth, and area of fishing.

The success of an EM monitoring model based on verification of logbook entry through video sampling might rely on a strong penalty structure associated with keeping an accurate log book. Another working model would use EM for accurate catch accounting (e.g., discard chutes equipped with cameras) and compliance (e.g., more cameras to verify the discard chute is being used for all discards).

## **2013 study design**

### *Presentation*

Mr. Dave Colpo presented the 2013 PSMFC EM study design ([PSMFC Project – 2013 Study Design Presentation](#), starting on slide 2, and [PFMC EM Workshop Agenda Item E.2, Attachment 1 - PSMFC 2013 Design](#)). Fixed gear (both pot and line gears) and trawlers are proposed for participation in the study. There are no directed whiting vessels in the study although some bottomfish trawlers are expected to participate in whiting. Currently, there is verbal agreement for 12 vessels to participate. The study might be able to fund as many as about 15 vessels of each gear type. PSMFC is presently looking for more vessels to participate and there still may be opportunity for more vessels to join after April. The study includes full retention of catch except for halibut, salmon, large fish (sharks), and logs/crab pots, etc. (any catch that could be pumped into the hold will be retained<sup>6</sup>). It was recommended that Dungeness crab should not be retained in the study. With respect to geographic coverage the study is being expanded into Oregon and Washington. Funds for the study are available through June 2014.

Archipelago Marine Research Ltd. (AMR) is providing cameras and support for the study. All AMR video will be reviewed by PSMFC with AMR providing support if needed. Saltwater Inc. is providing support for Oregon fixed gear vessels.

Observer data analysis associated with the 2012 study will be presented at the April Council meeting.

### *Discussion*

The group discussed the possibility that the EM work already done on whiting vessels may be sufficient to support moving ahead with EM in that fishery.

It was noted that experience is needed with deck lighting for whiting and non-whiting (including fixed gear) efforts at night. There was some question as to whether night fishing would be an issue in the whiting fishery. Whiting are dispersed at night and there are bycatch concerns with whiting fishing at night. There have been some hauls that were delivered in darkness and monitored with cameras. These hauls could be evaluated for the effectiveness of camera monitoring. It was noted that the challenge with night video monitoring is not with respect to retained catch but with respect to discards, some of which occur through net bleeding. The biggest problem may be lighting on the water to evaluate and potentially enumerate net bleeding and other forms of operational discard. Otherwise, deck lighting on whiting vessels seems sufficient.

---

<sup>6</sup> This is a criterion – catch is not routinely offloaded using a pump.

Question was raised as to the hypotheses being tested through the PSMFC program. The initial focus has been garnering experience using this technology. During the discussion, Mr. Colpo stated that PSMFC might vary retention and discard activities to test EM.

There was a discussion of the value of reviewing the study design within the Council process. Such review provides an opportunity to reduce the probability of design flaws and increase the amount of useful information generated by the study. Absent some sort of a small work group on program design, the Council would likely rely on the SSC for comments at the April Council meeting. It would be better for the SSC to review than to generate hypotheses for testing.

Concern was expressed that the study might miss a geographic quadrant that could hamper implementation. Mr. Colpo stated that the study was reliant on the distribution of effort of the vessels that volunteered to participate but that there was opportunity for other vessels to volunteer.

Video for 2012 has been reviewed but not yet analyzed and there is no plan to test electronic log books as part of this study. This could be added but has not been a priority. Paper log books can be used and then developed into an electronic log book later. The incorporation of electronic logbooks into the program would likely be more rapid, not requiring additional years of study. If there is a marginal cost to evaluate electronic log books, then that should be considered.

Mr. Colpo was asked whether operational discards will be analyzed and enumerated and replied that they will attempt to enumerate fish discarded before coming on deck, although this is difficult in the whiting fishery. They will more precisely enumerate discards off the deck.

It was suggested that to test cameras vessels be asked to operate as if there were no observer, operate as they would have two or three years ago. This would help develop software for detecting activities that might indicate discard events. Such a study design might or might not require an EFP.

Dr. Hamel said the SSC is concerned that they need to evaluate normal discard behaviors, that there needs to be discard behavior along the lines of what would be expected with cameras in place. There is some utility of experimenting with EM without observer interference. If salmon and halibut are being discarded, will there be individual images of those fish? If that can be done, it will begin to indicate what might be done with other species of fish. They are concerned that EM needs to discern individual fish, including lengths of fish discarded. Some subsampling of video will provide a statistical analysis of subsampling protocols. Finally, a variety of fishing vessel types (i.e., gear types) and sizes need to be included in the study. Mr. Colpo indicated he would continue a conversation with Dr. Hamel. Other workshop participants concurred on the need to evaluate cameras based on the behaviors likely to occur in the absence of observers.

During discussion it was suggested that for fixed gear vessels the effect of observers, in contrast to no coverage, could be tested while the vessels are operating in the limited entry fixed gear fishery, where there is only partial observer coverage. A contrast between EM and observers (or no observers) might be investigated using data from fixed gear vessels that gear switch in the trawl fishery and also participate in the limited entry fixed gear fishery.

Workshop participants agreed study design needs to address EM objectives and provide information helpful to decision-makers.

### **Recommendations.**

- Dungeness crab should not be retained in the study.
- It would be advantageous to experiment with deck lighting at night for whiting and non-whiting (including fixed gear). The biggest problem may be lighting on the water to evaluate and potentially enumerate net bleeding and other forms of operational discard.
- Video from the study should be used to evaluate the effectiveness of image recognition software.
- Study halibut viability and correlate to length of tow, time on deck, water, and air temperatures along with standard IPHC viability criteria.
- Experiment with EM without observer interference.
- Evaluate cameras under normal discard behavior conditions.
- Attempt to discern individual fish to species and include lengths of fish discarded.
- Subsample video to provide a statistical analysis of subsampling protocols.
- A variety of fishing vessel types (i.e., gear types) and sizes need to be included in the study.
- The study should include at least one vessel rigged with a fish discard conveyer equipped with a camera to test that configuration.
- Consult with the observer program for its protocols on what counts as a discard.

### **Workshop Objective 4: Possible Regulation Amendment Process for Consideration of Electronic Monitoring**

#### *Presentation*

Mr. Jim Seger presented a draft possible regulation amendment process for consideration of EM ([PFMC EM Workshop Agenda Item F, Attachment 1 – Draft Calendar](#)). The calendar is provided below, as revised based on workshop participant recommendations.

#### *Discussion*

The participants noted that the 2012 PSMFC study results are important to support the actions outlined on the schedule. Further, the 2013 study design should be scientifically robust and support industry operations and regulation development. The schedule must therefore provide for sufficient time for communication between various entities.

EFPs could be used to support Council action and the development of the regulatory package. The process for the 2013-2014 EFPs has already been completed. Consideration for 2015-2016 EFPs is currently scheduled for November 2013 (preliminary) and June 2014 (final). Participants noted that off cycle EFPs could be considered since the proposals do not require additional set-asides (i.e., EFPs would operate under the permit holders QP).

Participants acknowledged that an expedited schedule might be possible if the Council could prioritize implementation by gear type and fishery.

**Recommendation:** The following is the draft process that workshop participants recommend the Council consider for moving forward with an EM program.

<u>Dates</u>	<u>Process Considerations</u>	<u>Comments</u>
	<ul style="list-style-type: none"> <li>• PSMFC continues preliminary planning for 2013 season and in anticipation of likely Council guidance.</li> </ul>	
Apr 2013	<ul style="list-style-type: none"> <li>• Consider results of EM workshop and recommendations</li> <li>• Adopt goals and objectives.</li> <li>• Provide guidance on development of scoping package.</li> <li>• Request <i>special studies</i>, as needed.</li> <li>• Consider results of the 2012 PSMFC EM study.</li> <li>• Provide comment on the 2013 PSMFC EM study design.</li> <li>• Adopt regulatory process plan.</li> </ul>	Consider whether any regulatory changes should be pursued, if the NMFS/PSMFC field project demonstrates potential feasibility (for just whiting catcher vessels?)
Spring 2013	<ul style="list-style-type: none"> <li>• NMFS/PSMFC finalize 2013 study design (starting in April – w/Council meeting results).</li> </ul>	
June 2013	<ul style="list-style-type: none"> <li>• Full scoping session on EM.</li> <li>• Appointment of workgroup on this issue.</li> </ul>	
Summer 2013	<ul style="list-style-type: none"> <li>• Execute at-sea and shoreside field studies</li> </ul>	
Sept 2013	<ul style="list-style-type: none"> <li>• Review results from <i>special studies</i> and provide guidance on alternative development (if necessary).</li> </ul>	
Nov 2013	<ul style="list-style-type: none"> <li>• Consider initial results of NMFS/PSMFC 2013 field season</li> <li>• Adopt alternatives for analysis.</li> </ul>	
June 2014	<ul style="list-style-type: none"> <li>• Consider full analysis of alternative.</li> <li>• Select preliminary preferred alternative.</li> </ul>	
Sept 2014	<ul style="list-style-type: none"> <li>• Select final preferred alternative.</li> </ul>	
Sept 2014 through 2015	<ul style="list-style-type: none"> <li>• Secretarial approval process and implementation, including               <ul style="list-style-type: none"> <li>○ regulation drafting and paperwork reduction act submissions,</li> <li>○ securing contracts for video review,</li> <li>○ commercial installation and testing, and</li> <li>○ observer program adjustments.</li> </ul> </li> </ul>	

## Attachment 1 – Draft Purpose and Need Statement

These circumstances, under which electronic monitoring (EM) was originally rejected, have changed. Fishery managers have now had two years of experience under the program, which has provided a better understanding of how the fishery performs and how fishermen operate under the program. This has reduced some of the uncertainty about potential unintended consequences. Now, increasing information is becoming available on the performance of EM and there is time to more carefully consider the utility of EM relative to human observers. There are a number of needs that an alternative to monitoring with observers may address. First, for vessels, the need to pay for vessel observers is one of the most expensive compliance costs associated with participation in the trawl catch share program. For the first years of the program, NMFS has subsidized observer costs to help the fleet through the period of adjusting to the new management system. Overall fleet profits, and consequently the price of quota, will be below what they might otherwise be if less expensive monitoring is available. Second, small vessels may be disproportionately affected by observer costs. Vessels are billed for observers on a per day basis, and because smaller vessels have a lower total revenue per day at sea [this statement needs to be verified with data] observer costs reduce vessel net revenue disproportionately more than for larger vessels. On this basis, over time it might be expected that quota will migrate to larger vessels and there will be fewer smaller vessels in the fleet—assuming small vessels do not have other countervailing advantages. Third, because of the overhead involved with maintain observer availability in small somewhat isolated ports with relatively low demand for observers, at least one observer company has indicated that it may pull out of at least one of the small ports on the West Coast. Thus, over time, smaller ports may be disadvantaged by the observer requirement, relative to larger ports. Fourth, if overall monitoring costs can be reduced (those borne by both private parties and the public), national net economic benefits may be increased. And finally, the observer fee system puts pressure on vessels to fish in unsafe conditions. Because vessels are billed on per day both for at-sea and for standby time, vessels may incur higher costs for standing down due to marginal weather conditions. In summary, the needs for action are:

- to reduce total observer costs for the fleet as a whole,
- to reduce relative cost burden for small vessels,
- to ensure that vessels operating out of smaller ports have an equitable opportunity to acquire observers,
- to increase national net economic benefits, and
- to reduce the pressure on vessels to fish in poor weather

while at the same time providing for catch monitoring adequate to maintain full functionality of the trawl catch share program, in particular with respect to maintaining individual accountability.

While considering policy adjustments to meet these needs, there is also a need to ensure continued collection of adequate scientific data on the fishery. The effect of any changes in observer coverage on the quantity and quality of other biological and habitat data will need to be considered and appropriate adjustments made. On the one hand, the use of EM may reduce the amounts of some types of data collected by the fishery monitoring system. On the other hand, it is possible that EM might otherwise mitigate some of the potential losses or that the amounts of other types of useful data might be increased.

## **Attachment 2 – Electronic Monitoring Strawmen**

### **Electric Monitoring Strawmen for Consideration**

For these strawmen, the general goals and objectives of the program apply. There may be some additional objectives pertaining to each strawman alternative.

- Midwater Trawl for Catcher Vessels Delivering At-Sea
  - Additional Objective – ensure no selective discarding
  - Others?
- Midwater Trawl for Shoreside IFQ Deliveries
  - Additional Objective – ensure no selective discarding
  - Others?
- Bottom Trawl (Large and Small Footrope, including Flatfish Trawl)
  - Additional Objective – ensure no selective discarding
  - Others?
- Vessels Participating in Trawl catch share Program Using Fixed Gear
  - Additional Objective – For retention option allowing discard of IFQ species, provide species and weight for discarded IFQ species.
  - Others?

## Midwater Trawl for Catcher Vessels Delivering At-Sea

### Maximum Retention / Full Accountability Fishery:

- Non selective discards only (“Non selective” discards are discards made without selecting for species – for example, as a result of bleeding a net.)
- Regardless of why or how the discard happened, the vessel will be held accountable for the discard and deductions will be debited from IFQ vessel accounts.

### Electronic Monitoring Plans (EMP):

- Each camera system application will have elements unique to the vessel (similar to the catch monitor plan for first receiver site licenses)

### System Components:

- Tamper Proof or Tamper Evident System, Secure/Watertight Data Storage, Digital Cameras, Encrypted Data, Sensors, Deck/Stern Lighting, Bridge Monitor, GPS, VMS, Geo Fencing, E-logbook, Maximum Retention, Video Analysis by Sustainable Fisheries Division (SFD) and Pacific States Marine Fisheries Commission (PSMFC).

### System Configuration:

- Consistent with previous standards, i.e. EFP and PSMFC pilot.
- E logbook compatibility

### Data Analysis:

- Responsibility of SFD/PSMFC
- Models to consider
  - (1) A system similar to the one used by Archipelago for the shoreside whiting fishery EFPs. This approach involved an analysis team reviewing all data or subsamples from all vessels from the time of first set to the vessel’s return to port and is labor intensive. See [Attachment 4](#) to Electronic Monitoring Workshop Report.<sup>7</sup>
  - (2) Others options?

### Regulation Considerations:

- Time and Area Restrictions.
  - Option 1: Prohibit night fishing. Currently there is a limited prohibition on night fishing: “Vessels fishing in the Pacific whiting primary seasons for the Shorebased IFQ Program, MS Coop Program or C/P Coop Program shall not target Pacific whiting with midwater trawl gear in the fishery management area south of 42°00’

---

<sup>7</sup> Software analysis model being developed and tested by Alaska Science Center to narrow video review to times when events occurring on the deck with potential species identification through software capable video imagery analysis. Because it is expected that this would require a minimum of 4 years to perfect, EM Workshop participants recommended that it not be included in options for consideration.

N. lat. between 0001 hours to one-half hour after official sunrise (local time).”(660.131(f))

- Option 2: Allow night fishing, with adequate artificial lighting (NOTE: Viability of artificial lighting needs to be demonstrated. Some comment indicates that artificial light conditions may be superior to daylight for video monitoring).
- Use EM as implemented for Amendment 10 as template (see [Attachment 4](#) and [Attachment 5](#) to this report).
- Update equipment specs to reflect upgrades in the technology.
- Use specs approval process to update technology specifications in the future.
- Will need regulations or other administrative process to determine methodology for estimating discards, large and small, for deducting vessel accounts.
- Others?

#### **E-logbook:**

- Verification of randomly selected video against log book entries allows for audit procedure that reduces the need to review 100% of the video data
- Log Book is a self reporting component that along with camera establishes trust and verification of the data. State long books will need to be modified for reporting discards and expanded specifications.
- E-logbook needs to be compatible with camera, i.e. timestamp and GPS
- E-logbook will use state log book as template and convert format from paper to electronic, i.e. same approach used in e fish tickets
- Federal and state regulations will need to be addressed making groundfish log books a Federal Requirement.
- E-logbooks have a significant “value added” component to their development and implementation.

#### **Biological Sampling**

- Presume the pre-IFQ NW Science Center sampling program will continue.
- Observers deployed on a percentage basis, with data extrapolated across the fleet.

Note: Compliance with monitoring requirements would apply only while a vessel is participating in the trawl catch share program.

**Midwater Trawl for Shoreside IFQ Deliveries**

**[Covers both whiting targeting and other targeting with midwater gear (e.g. pelagic rockfish)]**

Same as for “Midwater Trawl for Catcher Vessels Delivering At-Sea” except

[no differences at this time]

## Bottom Trawl

# Large and Small Footrope, including Flatfish Trawl

Same as for “Midwater Trawl for Catcher Vessels Delivering At-Sea” except

- **Maximum Retention / Full Accountability Fishery**
  - Add a suboption to allow discard of small sized sablefish and lingcod.
  
- **Data Analysis – additional comments**
  - Cameras, to date have not proven adequate for species identification let alone length and weight calculations.
  - For trawl, passing under a camera using some type of measurement scale has proven feasible in some controlled experimental environments.
  - Could prove to be extremely labor intensive which increases the cost significantly.
  - Software analysis may provide mechanism for species identification and catch accounting, but years away from implementation
  
- **Halibut viability measures may be needed:**
  - Option 1. All halibut considered dead under the camera option.
  - Option 2. Long-term potential for developing a different type of halibut viability model (additional research required)
  - Option 3. Use the historical observer information to estimate a likely average halibut mortality rate by gear type and fishery and to update those estimates over time based on observer data from more recent observations.
  - Others options?
  
- **Going Forward:**
  - We need PSMFC cameras on bottom trawl vessels this summer! With no history on camera deployment on bottom trawl we are operating at a severe disadvantage.
  - One potential would be a species identification camera/software system deployed in the net itself (a potential application of the research being done by Alaska Science Center, but we are years away).

## Vessels Participating in Trawl catch share Program Using Fixed Gear

Same as for “Midwater Trawl for Catcher Vessels Delivering At-Sea” except

- May only need full retention on
  - Option 1: IFQ species,
  - Option 2: rockfish and sablefish – assuming that cameras can provide some basic species differentiation for other species.
  - SubOption (to combine with either Option 1 or 2): allow discard of small sized sablefish and lingcod.
- There are no fixed gear state logbooks from which to develop an E-logbook.
- Halibut viability measures may be needed:
  - Option 1. All halibut considered dead under the camera option.
  - Option 2. Long-term potential for developing a different type of halibut viability model (additional research required)
  - Option 3. Use the historical observer information to estimate a likely average halibut mortality rate by gear type and fishery and to update those estimates over time based on observer data from more recent observations.
  - Others options?

## Attachment 3 – Electronic Monitoring Cooperative for Compliance

### Creating an Incentive Based Environment for Compliance: Consideration of a Cooperative Agreement Program for Furthering Electronic Monitoring Compliance

**Premise:** Programs which depend upon compliance to achieve program goals and objectives, whether implemented by regulation or as a demonstration pilot are influenced by participant behavior. For example: pilot programs behavior is influenced by whether the participant wants the program to succeed or fail.

Traditionally, compliance has been pursued through either voluntary or regulated behavior. The regulatory approach which includes regulation development, enforcement, and due process can be arduous, time consuming, and expensive for all parties involved. Is there an alternative?

**Cooperatives / Agreements / Contracts:** The success of directing / controlling behavior derived through participants receiving perceived benefits, as seen in the At-Sea Pacific Whiting Fishery Cooperatives and IFQ Shoreside Risk Pools are achieved through the underlying agreements/contracts binding the participants.

**Proposal:** *(This proposal has not been vetted by General Counsel and will require significant legal analysis.)*

1. A regulation which says Compliance Monitoring (100% compliance monitoring for catch reporting) is required to fish in the Limited Entry Trawl fishery to include: MSCV endorsed vessels, Shoreside IFQ Pacific whiting vessels, IFQ bottom trawl vessels, and IFQ fixed gear vessels.
2. The compliance monitoring requirement may be met by either:
  - a. Arranging for the presence of a human compliance monitor on the fishing trip, or
  - b. Joining an Electronic Monitoring Cooperative (EMC) – possibly run by the Pacific States Marine Fisheries Commission and using in lieu of a human compliance monitor, an approved Electronic Monitoring System (EMS) as describes in an Electronic Monitoring Plan (EMP), provided by a certified EMS provider. Provisions for becoming an EMS provider to be developed.
    - i. SubOptions: emulate certified observer provider program (Amendment 10), PSMFC as sole provider, others.
3. Federal Regulations Applying to PSFMC EMC *(list is not exhaustive, will need further development and vetting)*
  - Comply with all Federal and State Regulations
  - Maximized Retention (non selective discards only)
  - Full Accountability
  - Time and Area Restrictions
  - Data Collection Equipment Criteria
  - Data Collection Requirements
  - Vessel Responsibilities

- System Audits, Pass /Fail Criteria
  - Loss of Camera use Privilege Criteria
  - Vessel Operator Performance Standards and Responsibilities
  - Administrative Accountabilities (i.e. conditions for permit renewal)
4. Required Elements of EMC Contract with Vessel (*again, list is not exhaustive, will need further development and vetting*)
- Comply with all Federal and State Regulations
  - Maximized Retention
  - Full Accountability
  - Time and Area Restrictions
  - Data Collection Equipment Criteria
  - Data Collection Requirements / Vessel Responsibilities
  - Vessel Operator Performance Standards and Responsibilities
  - Discard Assessment Protocols and Procedures,
    - based on management and accounting goals and objectives
  - Scale for Assessing Deductions
  - Vessel Account Deduction made on “Best Information Available”
    - used as a proxy for exact poundage
  - Systems Audits, Pass/Fail Criteria
  - Revocation of Cooperative Membership
  - Administrative Accountability
  - Escape Clause

**Industry Cooperative Development Committee:**

As addressed above, the list(s) are not exhaustive, especially regarding behavior that the cooperative would like to see emulated by the participants. In that regard, a committee of industry participants should be convened to:

- (1) Do further provision scoping for consideration/inclusion in the EMC industry agreement contract, and
- (2) Develop a list of vessel operator performance standards and responsibilities, along with
- (3) Proposed accountability measures for those who ignore or underperform said performance standards and responsibilities.

## **Attachment 4 – Shoreside Whiting EFP (2010)**

Draft language for the 2010 EFP, provided to the Council on October 23, 2009 (Agenda Item G.3.b, Supplemental NMFS Report November 2009) and includes provisions to facilitate electronic monitoring, such as maximized retention. This is the type of activity allowed under Amendment 10 to the groundfish FMP. In June 2007 the Council approved a regulatory amendment to obviate the need for continued EFPs. With the implementation of Amendment 20, and its requirement for 100% observer coverage, that regulatory amendment was viewed as no longer necessary.

- 1) **Project Title:** The 2010 Pacific Whiting Shoreside Fishery Maximized Retention and Monitoring Exemption Program
- 2) **Project coordinator:** NMFS Northwest Region, Sustainable Fisheries Division. For further information contact: Becky Renko by mail at 7600 Sand Point Way NE, Seattle, WA 98115, by email at becky.renko@noaa.gov, by fax at 206-526-6736, by phone at 206-526-6110.
- 3) **Purpose of the exemption program and exempted fishing permits (EFP)**

NMFS is in the process of transitioning the Pacific whiting shoreside fishery to an Individual Fishing Quota (IFQ) program with implementation planned for 2011. The purpose of the EFPs are to provide for monitoring of the fishery until the IFQ tracking and monitoring provisions are effective. The EFP would allow vessels to retain unsorted Pacific whiting catch for efficient prosecution of fishery while assuring that there is adequate monitoring at-sea and verification of electronic fish ticket reports.

- 4) **Specific regulations from which an exemption is being requested**

The EFP, if issued, would authorize, for limited purposes, the following activities which would otherwise be prohibited:

Under 660.306 (a)(2) it is unlawful for any person to retain any prohibited species. Prohibited species must be returned to the sea as soon as practicable with a minimum of injury when caught and brought on board. An EFP is needed to allow vessels to retain prohibited species until offloading and to require deliveries to processors participating in the program.

Under 660.306 (a)(10) it is unlawful for any person to take, retain, possess or land more than a single cumulative limit of a particular species, per vessel, per applicable cumulative limit period. An EFP is needed to allow vessels and first receivers to take, retain, possess or land more than a single cumulative limit.

Under § 660.306 (a)(7), it is unlawful for any person to fail to sort, prior to the first weighing after offloading, those groundfish species or species groups for which there is a trip limit, size limit, scientific sorting designation, quota, harvest guideline, or OY, if the vessel fished or landed in an area during a time when such trip limit, size limit, scientific sorting designation, quota, harvest guideline, or OY applied. An EFP is needed to allow Pacific whiting shoreside first receivers to use a hopper type scale to derive an accurate

total catch weight prior to sorting providing that immediately following weighing of the total catch and prior to processing or transport away from the point of landing, the catch is sorted to the species groups and all incidental catch is accurately weighed and the weight of incidental catch deducted from the total catch weight to derive the weight of target species.

**5) Catch information**

The species (target and incidental) expected to be harvested and/or discarded under the program are similar to those observed in recent years. Please see the attached Pacific whiting shoreside fishery summary from 2008 for the expected catch by species.

Pacific whiting shoreside vessels participating with the EFP would be required to dump unsorted catch directly below deck and would be allowed to land unsorted catch providing an electronic monitoring system (EMS) is used on all fishing trips to verify retention of catch at sea.

On shore monitoring conducted by catch monitors would be required under the EFP. Catch monitors are third party employees procured from NMFS-specified providers, paid for by industry, and trained to NMFS standards. Catch monitor duties would include overseeing the sorting, weighing, and recordkeeping process. Catch monitors would also gather information on incidentally caught salmon.

Marine mammal catch will continue to be document on NMFS forms and submitted by the vessels per NMFS reporting requirements for the Pacific Coast Groundfish Fishery. The monitoring program under an EFP could be used to verify that reporting occurred.

**6) Anticipated number of participants**

The estimated number or EFPs that would be issued is as follows:

**Catcher Vessels:** 30-40

**First Receivers:** 12-16

**7) EFP Terms and conditions for Pacific whiting shoreside vessels**

The terms and conditions of EFPs issued to Pacific whiting shoreside vessels would include the following:

Reporting requirements:

- Vessels must have a valid declaration for midwater trawl gear in the Pacific whiting shoreside fishery
- Trawl logbooks must be maintained as required by the applicable state law.
- On each EFP trip "Maximum Retention Fishing Trip" (or "MAX") must be legibly written at the bottom of each logbook page.
- Logbooks must be completed in a timely manner and include:
  - o The estimated weight of all species and their disposition, including, prohibited species.

### Maximized Retention requirements:

- All catch must be brought on board the vessel and retained until offloading, with some exceptions:
  - Pacific whiting removed from the deck and fishing gear during cleaning may be discarded, provided that the total does not exceed one basket from any single haul, with the maximum dimensions of the basket being 24 inches by 16 inches by 16 inches. All catch in excess of the one basket would need to be placed into the fish hold. Discarding species other than Pacific whiting would be prohibited.
  - Large individual marine organisms, such as marine mammals or fish species longer than 6 ft (1.8 m) in length, could be discarded provided the species and the reason for discarding were properly recorded in the required logbook.
  - All incidentally caught marine mammals would need to be documented in the vessel logbook and reported to the NMFS Office of Protected Resources by submitting a completed Marine Mammal Authorization Program mortality/injury report form.
- All prohibited species incidentally caught in a midwater trawl, and required to be retained under this section, would be abandoned to the State of landing immediately upon offloading.
- All groundfish caught in excess of the trip limits would be abandoned to the State of landing immediately upon offloading.
- No vessel could receive payment for any fish landed in excess of any cumulative trip limits.
- All fish from a delivery must be offloaded at only one first receiver.

### EMS requirements:

- Owners of vessels participating in the Pacific whiting shoreside fishery, would be required to arrange for EMS services from a NMFS-approved provider and pay all associated costs.
- Vessels required to procure EMS services may also be required to pay for and carry a third-party observer or an NMFS West Coast Groundfish Observer Program observer.
- The vessel operator would be required to schedule maintenance of EMS equipment.
- One each trip prior to leaving port, the vessel operator must conduct an EMS status check as specified by the EMS provider to confirm that all components of the EMS are functioning properly. The EMS will record the results of this check. If the EMS check identifies a malfunction, the vessel must contact the NMFS-specified EMS provider immediately.
- From 30 minutes before official sunset until 30 minutes after official dawn, each vessel required to have EMS would be required to provide lighting to areas where the trawl nets and fish are handled and fish hold openings, deck spaces, and the trawl ramp so the activities could be clearly recorded by the EMS cameras:
- When aware that EMS is not functioning properly or the power has been interrupted, the vessel operator would be required to immediately contact the EMS service provider.
- The vessel is obligated to monitor the EMS performance and contact the EMS service provider immediately when the system malfunctions. The EMS provider is required to provide technical service within 24 hours of notification.

Prohibited actions:

- Failure to comply with all EFP requirements.
- Failure to maintain the trawl logbook as required by the State of landing and the EFP.
- Delivery of unsorted whiting catch to first receivers that do not hold EFPs.
- Fish with a vessel that does not have properly installed and functioning EMS equipment and an observer when the vessel has been notified of the added requirement to carry an observer.
- Tamper with, disconnect, damage, destroy, alter, or in any way distort, render useless, inoperative, ineffective, or inaccurate any component of the EMS unit.
- Fail to provide notice to NMFS of any interruption in the power supply to the EMS unit or intentionally interrupting the power supply to the EMS unit (failure to provide notice to NMFS OLE will be considered as an intentional interruption);
- Use a gear other than midwater trawl gear.
- Fail to have a valid declaration report for midwater trawl.
- Target a species other than Pacific whiting when the vessel has a declaration for midwater trawl gear in the Pacific whiting fishery.
- Fail to abandon all prohibited species and overage catch to the state of landing
- Fail to bring all catch onboard the vessel and retain that catch until offloading, with the exception of large marine organisms and operational discards.
- Fail to cease fishing and return to port immediately following a discard event of more than one basket of fish.
- Fish for, land, or process fish without observer coverage when a vessel is required to carry an observer under § 660.314(c).

**8) EFP Terms and conditions for Pacific whiting shoreside first receiver**

The terms and conditions of EFPs for Pacific whiting shoreside first receivers would include the following:

Maximized retention requirements:

- Procure catch monitor services from a NMFS approved catch monitor provider and pay all associated costs.
- Catch monitors would be required for all Pacific whiting shoreside fishery deliveries by vessels holding EFPs.
  - Pacific whiting shoreside fishery landings are those landings taken during the primary season by a vessel declared to be using limited entry midwater trawl. Catch monitor would be given notification in person, by personal communications radio, or by telephone of planned facility operations, including the receipt of fish, at least 30 minutes and not more than 2 hours prior to the start of the planned operation.
- Catch monitors would be given free and unobstructed access to the catch throughout the sorting process and the weighing process.
- Catch monitors would be given free and unobstructed access to any documentation required by regulation including fish tickets and scale test results.

- Catch monitors would be given free and unobstructed access to a telephone and facsimile during the hours that Pacific whiting is being processed at the facility and 30 minutes after the processing of the last delivery each day.
- The owner or manager of each Pacific whiting shoreside first receiver would be required to provide reasonable assistance to the catch monitors to enable each catch monitor to carry out his or her duties. Reasonable assistance includes, but is not limited to: informing the monitor when bycatch species will be weighed, and providing a secure place to store equipment and gear.
- The owner or manager of each Pacific whiting shoreside first receiver would be required to adhere to all applicable state and federal rules, regulations, or statutes pertaining to safe operation and maintenance of processing and/or receiving facility.

NMFS-Approved Monitoring plans:

- Each Pacific whiting shoreside first receiver would be required to have a NMFS accepted monitoring plan before being issued an EFP.
- A monitoring plan would be submitted to NMFS by the owner or manager of a first receiver at least 14 days prior to receiving Pacific whiting shoreside fishery deliveries.
- The catch monitoring plan must include the following types of information:
  - Name and signature of the person submitting the monitoring plan.
  - Address, telephone number, fax number and email address (if available) of the person submitting the monitoring plan;
  - Name and location of the first receiver;
  - A detailed description on how the first receiver will meet the weighing and sorting requirements including:
    - The sorting locations and the amount of space for sorting catch, the number of personnel assigned to catch sorting and the maximum rate that catch will flow through the sorting area.
    - Personnel skills and training for sorting catch to federal species groups.
    - The process for weighing catch, including large and small volumes of target and incidentally caught species.
    - The scale makes and models being used to weigh catch during the Pacific whiting shoreside fishery, including the most current test date provided by the Department of Weights and Measures for the state of landing and whether or not the scale met the testing criteria either initially or upon retesting.
  - A description of how the catch monitor requirements would be met, including:
    - How the first receiver operates and maintains a safe processing and/or receiving facility.
    - Who would be responsible for notifying the catch monitor of planned facility operations, including the receipt of fish.
    - How the catch monitor would be given access to the catch throughout the sorting process and the weighing process and to any documentation required by regulation including fish tickets and scale test results.
    - The name and contact information for an individual(s) who will be responsible for assuring that the catch monitor obtains the necessary information from the first receiver.

- A description of when and where prohibited species will be counted.
- NMFS will review the monitoring plans within 14 days of receiving a complete monitoring plan submission. If NMFS does not accept a monitoring plan the first receiver owner or manager may resubmit a revised monitoring plan.

Specifications and management measures:

- An allowance would be made to allow Pacific whiting shoreside first receivers that use a hopper type scale to derive an accurate total catch weight prior to sorting. Providing that immediately following weighing of the total catch and prior to processing or transport away from the point of landing, the catch must be sorted to the species groups and all incidental catch (groundfish and non groundfish species) is accurately weighed and the weight of incidental catch deducted from the total catch weight to derive the weight of target species.

Prohibited actions:

- Receive for transport or processing, catch from a Pacific whiting shoreside vessel without obtaining verification from vessel personnel that the vessel has an EMS from the NMFS provider installed on the vessel
- Process catch without coverage of a catch monitor unless NMFS has granted a written waiver specifically exempting the first receiver from the catch monitor coverage requirements.
- Fail to sort fish to federal species groups.
- Process, sell, or discard any groundfish received from a Pacific whiting shoreside vessel that has not been accurately weighed on a scale and accounted for on an electronic fish ticket report
- Fail to weigh fish landed from a Pacific whiting shoreside vessel prior to transporting the catch away from the point of landing.
- Mix catch from more than one delivery prior to the sorting and weighing of catch.
- Fail to allow the catch monitor unobstructed access to catch sorting, processing, catch counting, catch weighing, or electronic or paper fish tickets.
- Fail to provide reasonable assistance to the catch monitor.
- Forcibly assault, resist, oppose, impede, intimidate, harass, sexually harass, bribe, or interfere with a catch monitor.
- Interfere with or bias the procedure employed by a catch monitor.
- Tamper with, destroy, or discard a catch monitor's equipment, records, photographic film, papers, or personal effects without the express consent of the catch monitor.
- Harass a catch monitor by conduct that: has sexual connotations, has the purpose or effect of interfering with the catch monitor's work performance, and/or, otherwise creates an intimidating, hostile, or offensive environment.
- Require, pressure, coerce, or threaten a catch monitor to perform duties normally performed by processor employees.

## **Attachment 5 – Shoreside Whiting Electronic Monitoring Statement of Work (2010)**

### NOAA Fisheries Electronic Monitoring System Project for the 2010 Pacific Whiting Shoreside Fishery

#### **1.0 Background**

##### **1.1 Overview**

The Northwest Regional office (NWR), and the Office for Law Enforcement (OLE) of the National Marine Fisheries Service (NMFS), National Oceanic & Atmospheric Administration (NOAA), Department of Commerce (DOC) are the government offices responsible for managing the West Coast fisheries and for monitoring compliance with fishery regulations. Within the NWR, the Sustainable Fishery Division (SFD) is responsible for managing the Pacific whiting fishery off the West Coast.

This contract is in support of an at-sea monitoring program administered by SFD in cooperation with OLE for the purpose of compliance information collection. The monitoring program uses an Electronic Monitoring System (EMS) that is designed to be a cost effective means to collect specific types of at-sea fisheries information.

This statement of work describes an EMS project for commercial trawl vessels participating in the Pacific whiting shoreside fishery off the coasts of Washington, Oregon, and California. The overall goal of this project is to refine an EMS system so it can be effectively used to collect at-sea information for monitoring compliance with catch retention and closed area requirements. The EMS would be used to collect vessel information from digital closed circuit television (CCTV), information from global positioning systems (GPS), and information from other on-board sensors. The information will be analyzed and presented to OLE and SFD for assessing the effectiveness of retention requirements and area restrictions and for incorporation into the process for developing a new regulatory program for the Pacific whiting shoreside fishery. The project will include six major objectives: providing industry outreach; supplying an adequate number of EMS units that meet the specifications and performance requirements; successfully installing the EMS equipment on vessels; maintaining the EMS equipment throughout the season with minimal system down time; reviewing EMS information and compiling information by vessel; and providing a final report that can be used to assess the effectiveness of the EMS monitoring. The final report should include a comparison of previous years success, information to assess the level of non-compliance with the terms and conditions of EFPs, and recommendations for future improvements.

From 2004 to 2006, the NWFSC paid for the entire EMS project. During the 2007 season, the cost of EMS was shared between the participating industry members and NOAA Fisheries. All vessels participating in the Pacific whiting shoreside fishery in 2007 were required to pay for the installation, lease, maintenance (in part) and removal of EMS equipment during the entire season. The outreach, maintenance (in part), analysis and production of the results were paid for

by NOAA Fisheries. In 2008 and 2009, all participating vessels were again required to pay for the use of EMS equipment, installation, and removal, plus they were also asked to pay for all EMS maintenance and half of the initial cataloging of information collected from their vessel. The final report and industry outreach were paid for by NOAA Fisheries. In 2010, the vessels and NOAA Fisheries responsibilities would be the same as in 2008 and 2009.

### **Pacific Whiting Shoreside Fishery**

The Pacific whiting shoreside fishery is a midwater trawl fishery in which most vessels fish under exempted fishing permits (EFPs). The EFPs require maximized retention of the catch until the vessel is offloaded in port. Maximized retention encourages full retention of all catch while allowing minor discarding of very large species (>6 feet in length) and small amounts (<150 pounds) associated with fishing operations. Unsorted catch is placed into refrigerated salt water holds and is delivered to land-based Pacific whiting first receivers. Fishing trips typically last one-two days.

Annually, up to 40 vessels deliver their catch to roughly 16 first receivers in seven ports. The major portion of the fleet operates out of three Oregon ports, Charleston/Coos Bay, Newport and Astoria. The remaining portion of the fleet delivers catch to Illwaco, Washington, Westport, Washington, Eureka, California and Crescent City, California.

### **Timeline**

The term of this project is approximately twelve months with the option for a second twelve month term. NOAA fisheries anticipates that there may be a need for EMS in 2011, during the transition to a Individual Fishery Quota program.

In most years, there are two start dates for the Pacific whiting shoreside season, coinciding with the movement of hake along the coast. The first portion of the Pacific whiting shoreside season will begin on April 1, 2010 off the coast of California and represents up to 5% of the overall shore-based allocation. If the fishery reaches 5% of the allocation, the California season is closed until the coastwide season begins June 15, 2010. In 2007 and 2008, there were three seasons because the coastwide fishery was closed early due to bycatch concerns and reopened later in the fall when bycatch limits were increased. The coastwide season primarily occurs off the Oregon and Washington coasts. Participating vessels in the early California season may also participate in the coastwide fishery.

The Pacific whiting allocation is set in the spring each year following the Pacific Fishery Management Council's March meeting where the results of new or revised Pacific whiting stock assessments are considered. The length of the Pacific whiting shorebased fishing season is closely related to increases or decreases in the allocation and well as the availability of non-whiting species that are incidentally taken. In general, the length of the Pacific whiting shoreside season is estimated to approximately 9 weeks.

### **Objectives overview**

The contractor must provide written outreach materials that summarize the 2009 EMS program, that outline the vessel's role in procuring and using EMS in 2010; and that describes what each vessel can expect for service during the fishing season. The contractor must provide EMS units that meet the defined specifications and performance standards for all of the participating vessels. The EMS units must be successfully installed on each vessel in the fleet. The EMS must be maintained in good working order throughout the season such that system down time is minimal. The collected information must be reviewed and an inventory of discard events compiled. The final objective is to provide a report that: allows NWR and OLE to assess the effectiveness of EMS as a management tool; to identify the level of compliance with the EMS requirements defined in the EFPs; and to identify issues that may need to be resolved to improve compliance with EMS requirements. Must establish two workstations where OLE can view EMS data, provide written instructions and a demonstration of the viewing software.

### **Service Requirements**

Each of the objectives described below must be fully met by the contractor. Due to fishery management changes a third season is not expected in 2010, however we are requesting that estimate consider the costs associated with a fall fishery. The contractor must keep the lines of communication open at all times.

#### **2.1 Outreach**

The contractor must provide written outreach materials that:

- Summarize the vessel activity in the 2010 EMS program
- Outline the vessel's role in procuring and using EMS in 2010
- Describes what each vessel can expect for service during the fishing season

#### **2.2 EMS Units to be supplied**

The contractor will provide all the EMS units necessary to supply the entire Pacific whiting shoreside fleet. The units supplied by the contractor must meet the equipment and data capture specifications listed below.

##### **2.2.1 EMS Equipment Specifications.**

At the minimum, the electronic monitoring equipment will include the following components:

- An EMS computer box for logging digital video imagery and other vessel data that has a waterproof, tamper resistant housing with tamper evident seals.
- A system with a removable hard drive that is capable of interfacing with high capacity commercial off the shelf hard drives using either Integrated Drive Electronics (IDE) or Serial Advanced Technology Attachment (SATA) interfaces and capable of storing at least 500 gigabytes of data.

- High resolution closed circuit television network suitable for marine environmental conditions with a sufficient number of cameras to create imagery of all fish hold openings, deck spaces, all manipulation of the net on the trawl ramps such that fish handling and discarding of catch can be clearly observed and documented from all areas aboard the vessel during daylight and under low light conditions at night.
- Sensors for Global Positioning System accurate to within 100 meters.
- Sensors for hydraulic pressure.
- Winch or net drum count sensors.
- 12 volt DC or 110 volt AC capability, with built in Uninterruptible Power Supply that can log all power interruptions, the status of system sensors and the video recording settings at the time of power loss.
- Visible EMS display monitor and audible alarm for notifying vessel operator of EMS system malfunctions or power outages, alarm will sound until cancelled by operator.

### **2.2.2 EMS data capture specifications.**

EMS units will be configured to provide the following data from the time that fishing begins until the vessel returns to any port for offloading:

- Global Positioning System location and date at all times.
- The closed circuit television network shall record at least two frames per second, and create a signal that is transmitted at a minimum of 480 horizontal lines of resolution which will be converted to a digital format of at least 640 x 480 pixels for storage on high capacity hard drives. Conversion of the closed circuit television network to a digital format shall be in a non-proprietary format that can be easily accessed by commercial off the shelf software.
- A record of EMS system performance that includes an operator initiated system check on the status of the power supply, GPS system, each camera on the system, hydraulic pressure sensors, winch or net drum sensors, and the main computer board. The record of any power interruption must include the status of sensor readings from each component just prior to the system shutting down.
- NMFS OLE, or authorized officers or others as specifically authorized by NMFS must be able to directly access information from the EMS system during the fishing season.

### **2.3 Installation of EMS units aboard vessels**

Prior to fishing in the Pacific whiting shoreside fishery and the active data collection, the EMS units must be installed, tested, the system initialized and the EMS computer box sealed with

tamper evident seals. Each vessel must be fully outfitted with EMS equipment and the vessel's crews must be provided with both verbal and written instructions on the proper operation and maintenance of the EMS equipment. The EMS service provider will determine the scheduling of the EMS installation for each vessel and will take into account the vessel's schedules and concerns.

#### **2.4 Maintenance of the EMS**

The contractor must maintain each deployed EMS unit during the fishing season. Following the successful initial installation of EMS equipment, the contractor must offer the following EMS services for the fishing vessels during the length of the project:

**2.4.1** If necessary, the contractor will go to sea with the fisher to demonstrate the EMS equipment and monitor EMS performance.

**2.4.2** The contractor must provide prompt and continuous service for routine maintenance of EMS units; downloading data from EMS computers; and the troubleshooting of EMS units or system components that have been damaged or failed. The EMS service provider must provide technical support in the field within 24 hours from the time of notification of an EMS malfunction aboard a fishing vessel. The contractor must provide routine servicing of EMS units the fishery on an approximately biweekly basis.

**2.4.3** During the fishing season, the contractor must notify NMFS OLE at 800-853-1964 of any and all interruptions in the EMS system within 4 hours of identifying that an interruption has occurred. The notification must identify the affected vessel; the length of the interruption; if known, the cause of the interruption; and if the issue was resolved.

**2.4.4** During the fishing season or during removal of EMS equipment, the contractor must notify NMFS OLE at 800-853-1964 within 4 hours of discovery of all breaks in tamper evident seals or suspected tampering of any component or connection of the EMS unit, including the date that the broken seal was discovered or tampering was first suspected.

#### **2.5 EMS Vessel Review**

On an ongoing basis during the season the contractor will provide OLE with a report that includes information on EMS malfunctions and potential discard events. The contractor will provide OLE with instructions and procedures for the removal of EMS information from vessels. These instructions and procedures must be agreed on by the contractor and NMFS OLE at the start of the project.

**2.5.1** The contractor is responsible for reviewing the EMS information and providing the following information for each vessel:

- A complete inventory of all information retrieved for each vessel, including GPS readings, winch counter data, hydraulic pressure data and video imagery catalogued in a Microsoft Access database format.
- System performance, including the total number of trips, the number of cameras, the quality and completeness of the information, sensor performance and imagery performance.
- EMS malfunctions, including but not limited to: power losses, camera interference, etc. If known, a reason for each malfunction should be provided. As well as, confirmation that notification was provided when system malfunctions occurred.
- Discard events or events that indicate that discarding may have occurred. Discard events shall be classified as follows: operational discards of whiting from deck (if it is possible to identify the amount is as being one basket or less, 150 pounds it should be classified as such), discards of large species (> 6 feet in length), operational discards of non-whiting species from the deck (selective discards), net bleeding, and net flushing. Discard events shall include information including: the location of the event in the data set confirmation that discard events were properly logged by the vessel operator, and an estimate of discard quantity.
- Confirmation that all fishing occurred within permissible locations. If fishing occurred in closed or restricted areas, an inventory of fishing events in restricted areas should be provided. Anomalous events in the data set that may warrant further investigation.

**2.5.2** After all data is reviewed and compiled into the summarized report to NOAA Fisheries, the unaltered hard drives must be returned to OLE. No copies of images shall be retained by the provider after submission of the hard drives to NOAA Fisheries. Raw sensor data and summarized Access tables could retain until all the reporting and outreach/feedback is completed (6-8 months after the fishery).

## **2.6 Final report**

The contractor will provide NOAA Fisheries with a final report within 90 day of the end of the Pacific whiting shoreside fishing season. The final report on the project will provide:

**2.6.1** A clear and straightforward overview of the EMS project.

**2.6.2** Summary of EMS performance and malfunctions, including improvements from previous years and recommendations for resolving performance issues.

**2.6.3** Summary of the fishing activity, including trip departure dates and durations, and spatial and temporal information for all fishing events.

**2.6.4** Summary of discard activity by the magnitude, type of event, and occurrence within the fishing trip.

**2.6.5** A summary of the effectiveness of maximized retention requirements and levels of non-compliance with the terms and conditions of EFPs or federal regulations and recommendations for improvements.

### **2.7 Optional Data Analysis and Reporting**

NOAA Fisheries would like to include optional data analysis and reporting that is estimated at 10 percent of the cost associated with the data analysis and reporting identified under paragraph 2.6 above. This work is not automatically included, but rather it would be specifically authorized by NOAA Fisheries if determined to be needed.

### **2.8 Federal Regulatory Requirements**

**2.8.1** The contractor must comply with the Service Contract Act and Fair Labor and Standards Act.

**2.8.2** The contractor must keep all data confidential.

**2.8.3** Work on this contract may require that the contractor has access to information covered under the Privacy Act. The contractor shall adhere to the Privacy Act, Title 5 of the US Code and any applicable agency rules and regulations.

### **3.0 Performance**

#### **3.1 Performance period**

The period of performance shall be from the award date through the submission of the final report.

#### **3.2 Performance measures**

The contractor's performance will be based on the following measures:

##### **3.2.1 Maintenance of EMS on-board vessels, such that:**

- No more than 5% of data collection potential shall be lost due to EMS down time on any one vessel.
- Vessels are not unduly delayed by EMS malfunctions.

##### **3.2.2 Adherence to the schedule for the analysis of collected data.**

### **4.0 Required skills**

Due to the close working relationship between the contractor and NOAA Fisheries, the sensitivity of this issue, and the large amount of work to be successfully completed in a short timeline, the contractor must have a solid history of successful performance with similar projects in the past. This history shall include the following:

**4.1** The contractor shall have a proven success of deploying EMS in other fisheries of similar scale.

**4.2** The contractor shall have experience implementing and servicing EMS units in the field.

**4.3** The contractor must have knowledge of West Coast fisheries management and current issues, especially in regards to the Pacific whiting fishery.

**4.4** The contractor must have demonstrated experience and ability in resolving liability and privacy concerns inherent in the collection of images on vessels.

### **5.0 Point of Contact**

For the purposes of this contract, the NOAA Fisheries staff point of contact for the contractor for questions, review and acceptance of submitted work will be Becky Renko (206-526-6110). The point of contact will be responsible for task coordination and acknowledgement for the hours and performance of the contractor.

### **6.0 Travel**

Services will require travel as agreed upon by the contractor and the NMFS point of contact. Travel costs which include airfare, hotel and per diem, mileage and other miscellaneous travel expenses will be reimbursed in accordance with government travel regulation approved rates. The contractor shall be required to provide set-up of two enforcement viewing stations; one located in Newport, OR the other in Astoria, OR. Additionally, the contractor shall be required to pick up hard drives from enforcement. Travel costs for these services shall be borne by the contractor.

### **7.0 Materials and equipment**

#### **7.1 EMS equipment**

Owners of vessels participating in the Pacific whiting shoreside fishery, must arrange for EMS services from the EMS contracted provider and pay all associated costs with: the purchase or lease of EMS equipment, installation, removal, maintenance, and for a half the cost of the initial cataloguing of information collected from their vessel.

#### **7.2 Other EMS Supplies**

OLE will provide removable high capacity commercial off the shelf hard drives using either Integrated Drive Electronics (IDE) or Serial Advanced Technology Attachment(SATA) interfaces and capable of storing at least 500 gigabytes of data.

### **8.0 Harmless from Liability**

**8.1** The contractor shall hold the Government, its officers, agents, and employees harmless from liability of any nature or kind, including costs and expenses to which they may be subject, for or on account of any or all suits or damages of any character whatsoever resulting from injuries or damages sustained by any person or persons or property by virtue of performance of this

contract, arising or resulting in whole or part from the fault, negligence, wrongful act, or wrongful omission of the contractor, or any subcontractor, their employees, and agents.

## 9.0 Privacy and Security

9.1 The contractor must maintain confidentiality of all subjects and materials collected during this project.

9.2 Work on this contract may require that the contractor has access to information covered under the Privacy Act. The contractor shall adhere to the Privacy Act, Title 5 of the US Code and any applicable agency rules and regulations

APPENDIX -- Observer providers permitted by the North Pacific Groundfish Observer Program under 50 CFR 679.50(i).

<u>Alaskan Observers, Inc. (AOI)</u> 130 Nickerson, Suite 206 Seattle, WA 98109	VOICE 206/283-7310, 206/283-6604 FAX 206/283-6519 <a href="mailto:aoistaff@alaskanobservers.com">aoistaff@alaskanobservers.com</a> <a href="http://www.alaskanobservers.com">www.alaskanobservers.com</a>
<u>MRAG Americas Inc.</u> 1810 Shadetree Circle Anchorage, AK 99502	VOICE 907/677-8772 FAX 907/677-6022 <a href="mailto:bryan.belay@mragamericas.com">bryan.belay@mragamericas.com</a> <a href="http://www.mragamericas.com">www.mragamericas.com</a>
<u>NWO, Inc. (NWO)</u> P.O. Box 624 Edmonds, WA 98020	VOICE 425/673-6445 FAX 425/673-5995 <a href="mailto:alaska@nwoinc.com">alaska@nwoinc.com</a> <a href="http://www.nwoinc.com">www.nwoinc.com</a>
<u>Saltwater, Inc. (SWI)</u> 733 N. Street Anchorage, AK 99501	VOICE 907/276-3241 FAX 907/258-5999 <a href="mailto:Mary@saltwaterinc.com">Mary@saltwaterinc.com</a> <a href="http://www.saltwaterinc.com">www.saltwaterinc.com</a>
<u>TechSea International (TSI)</u> 2303 W. Commodore Way Suite 306 Seattle, WA 98199	VOICE 206/285-1408 FAX 206/285-1535 Toll Free 877/980-1408 <a href="mailto:info@techsea.com">info@techsea.com</a> <a href="mailto:dave@techsea.com">dave@techsea.com</a> <a href="http://www.techsea.com">www.techsea.com</a>

## Attachment 6 – List of Workshop Invited Participants(\*) and Attendees

Al-Humaidhi, Alia	PSMFC, Data Analyst
Ames, Kelly*	PFMC, Staff
Anderson, David*	Oregon State Police, EC
Batty, Adam	Archipelago Marine Research Ltd.
Bell, Michael*	The Nature Conservancy
Bodnar, Steve	Coos Bay Trawlers Association
Brady, Colby*	NMFS, NWR, GMT
Busch, Rick	Finsight
Chadwick, Dan	Washington Department of Fish and Wildlife, EC
Colpo, Dave*	PSMFC
Cooper, Mark	Cooper Fishing Inc.
Corovano, Kathryn	Saltwater, Inc
DeVore, John*	PFMC, Staff
Easton, Ryan	PSMFC
Erickson, Dan*	Oregon Department of Fish and Wildlife, GMT
Exline, Joe	California Department of Fish and Wildlife, Consultant
Falvey, Dan	Alaska Longline Fishermen's Association
Fredston-Hermann, Alexa	Environmental Defense Fund
Haflinger, Karl*	Sea State, Inc
Haflinger, Michaela	Sea State, Inc
Hamel, Owen*	NMFS, NWFS, SSC
Hanson, Dave	PSMFC, Council Member
Holliday, Mark*	NMFS, Policy Office
Hooper, Melissa*	NMFS, NER
Hull, Dan	NPFMC Council Member and Observer Advisory Committee Chair
Hunter, Travis*	Fishermen's Marketing Association
Joner, Steve	Makah Tribe
Jud, Shems*	Environmental Defense Fund, GAP
Kirchner, Gway*	Oregon Department of Fish and Wildlife, Council Member
Krause, Sandra	PFMC, Staff
Lake, Michael*	Alaskan Observers, Inc.
Leipzig, Pete*	Fishermen's Marketing Association
Leos, Bob*	California Department of Fish and Wildlife, GMT
Longo Eder, Michelle*	Fixed Gear, GAP
Lowman, Dorothy*	Council Member, Vice Chair
MacGregor, Paul	At-sea Processors Association
Mann, Heather*	Midwater Trawlers Cooperative, GAP
Matthews, Dayna*	NOAA OLE, EC
McElderry, Howard*	Archipelago Marine Research Ltd.
McIsaac, Don*	PFMC, Exec Director

McTee, Sarah	Environmental Defense Fund
Moeller, Niel*	NOAA GC, Enforcement Section
Munro, Nancy	Saltwater, Inc
Niles, Corey*	Washington Department of Fish and Wildlife, GMT
Nomura, Vicki*	NOAA, OLE, EC
Paine, Brent*	United Catcher Boats, GMT
Pettinger, Brad*	Oregon Trawl Commission
Seger, Jim*	PFMC, Staff
Torgerson, Eric	Finsight
Waldeck, Dan	Pacific Whiting Conservation Cooperative
Wallace, Farron*	NMFS, AFSC
Watson, Jennifer	NMFS, Alaska Region
Williams, Steve*	Oregon Department of Fish and Wildlife, Council Member
Wolford, Dan*	Council Member, Chair