

Draft 2016 Electronic Monitoring Pre-Implementation Plan

Draft resulting from the July 30-31, 2015 EMWG meeting

1. Introduction

The North Pacific Fishery Management Council (Council) has established an intention to integrate electronic monitoring (EM) tools into the Observer Program for the fixed gear small-boat groundfish and halibut fisheries. The Council's intent is to develop EM to collect data to be used in catch estimation for this fleet. The Council has set an interim goal of pre-implementation in the small boat (40-57.5 feet length overall) longline fleet in 2016, focusing on vessels that have trouble carrying an observer. This document describes the EM pre-implementation plan for 2016.

This pre-implementation plan was developed and refined through a Council committee, the fixed gear EM Workgroup (EMWG). The EMWG provides a forum for all stakeholders, including the commercial fishing industry, agencies, and EM service providers, to cooperatively and collaboratively design, test, and develop EM systems that are consistent with Council goals to integrate EM into the Observer Program.

The overall goal of this pre-implementation plan and the cooperative research is to assess the efficacy of EM (in combination with other tools) for catch accounting of retained and discarded catch, and to identify key decision points related to operationalizing and integrating EM systems into the Observer Program for fixed gear vessels in a strategic manner. The experience and results from the data collected during this pre-implementation phase will inform decisions and future Council alternatives for integrating electronic monitoring into the Observer Program. Under the current best-case scenario timeline, the Council is scheduled for initial review of an analysis to integrate EM in October 2016, with final action following in December. Under this timeline, regulations would be prepared in 2017, and the integrated program would be implemented for the 2018 fishing year.

2. Management Objective

The management objective identified by the Council is to estimate at-sea discards.

3. The EM Selection Pool

The EM selection pool includes the vessels that meet the Council's criteria for EM and who opt into EM. It may be that not all vessels in the EM Selection Pool will carry cameras for all of their fishing activity.

Qualifying Criteria & Process:

- **Criteria:** The 2016 EM selection pool will focus as a first priority on vessels 40-57.5 feet length overall where carrying a human observer is problematic, due to bunk space or life raft limitations¹.
- **Process:** NMFS sent a letter to all hook and line vessels from 40-57.5 feet length overall, and requested that vessels indicate their interest in being in the EM pool by July 27, 2015 (see Attachment 1). Following discussion of the EM Pre-implementation Plan at the October Council meeting, a final letter will be sent to vessels that have expressed interest, detailing the specific

¹ 170 unique vessels were given temporary exemptions for limited life raft capacity in 2015 and conditional release for life raft or bunk space in 2013 or 2014.

rules governing EM deployment for 2016. At that time, vessels that have already expressed interest will be given a final deadline (likely later October/early November) to continue with EM program participation, or return to the human observer pool. Vessels agreeing to the EM program rules, and accepted by NMFS, will be placed in the zero observer selection pool for the duration of the 2016 season.

- **EM Pool Size:** As of July 30, 2015, 56 vessels have opted in to the EM selection pool. A maximum of 60 boats is recommended for the EM selection pool size, to allow for a few adjustments in and out of the pool, as participants are made aware of the specific rules governing EM deployment.

4. EM Deployment Model

Past experience has shown that deployment of EM systems on vessels for a single trip yields lower results, as compared with EM deployments on vessels for an extended duration. This is because of the cost of EM system installation and removal and the time needed to ‘burn in’ operational procedures such as EM system care and on-board catch handling that improve with time. Therefore, unlike the trip selection model used for observer deployments, vessels selected for EM-based monitoring will carry EM systems for a pre-determined time period.

EM Equipment Deployment:

- **4 Deployment Time Periods:** EM equipment will be deployed in 4 time periods during the calendar year: Jan-Feb, March-June, July-Oct, and Nov-Dec (a 2-4-4-2 month quarterly deployment pattern). This time distribution fits well with the fishing patterns of the small boat fixed gear fleet. The February/March break avoids bisecting the early part of the IFQ fishery, and June/July is a natural break when IFQ vessels switch to State fisheries. Positioning the EM deployment period breaks in this way will hopefully avoid chokepoints and fishing disruptions for moving cameras between vessels.
- **Pre-registration requirement:** Vessels need to register in advance for the upcoming selection period to indicate if they are going to fish, and their fishing plans for the upcoming time period.
 - Vessels would NOT be required to log each of their trips into ODDS.
- **Target Coverage Level:** In each deployment time period, 30% of vessels that are fishing would be required to carry EM. If equipment is available, vessels could choose to carry EM for longer (i.e., the program would allow for higher coverage on an ad hoc basis).
- **Selection for deployment:** Vessels will be chosen by random selection of vessels from the group of boats that pre-registered. We will do randomly with replacement.

Time Period	Unique Vessels*	Number of Vessels Selected at 30% coverage
Jan-Feb	3	1
Mar-Jun	38	12
Jul-Oct	36	11
Nov-Dec	2	1

*Numbers calculated based on 56 vessels that opted in by the July deadline.

5. Service Ports

In 2013, the 40’ to 57.5’ LOA fleet made landings in 19 ports across Alaska, with the top four ports of Homer, Juneau, Sitka, and Kodiak accounting for 65% of all landings. The top 6 ports for vessels that have trouble accommodating an observer were: Kodiak, Sitka, Seward, Homer, Dutch, King Cove.

- **Service Port Locations:** There will be two service ports in 2016, Sitka and Homer.
- Other ports where other vessels in the EM Selection Pool are either home-ported or do deliveries include: Seward, Kodiak, Juneau, Petersburg, and Sand Point. There may be some basic tech support offered in the secondary ports, but primarily staff out of Homer would support Seward and Kodiak, and staff out of Sitka would support Juneau and Petersburg. Staff personnel would fly out to service Sand Point.

6. Budget

.....To be completed following the Sep 8 EMWG teleconference

7. EM Hardware

In 2016, vessels participating in the EM program will use EM equipment designed and supplied by the Archipelago Marine Research, Ltd. (AMR). The EM system consists of a control center to manage the data collection, connected to an array of peripheral components including CCTV cameras (generally 2 or 3, depending on the deck configuration), GPS receiver, gear sensors (hydraulic pressure transducer, drum rotation sensor if appropriate), and a communications transceiver. An additional camera will also be installed to determine if a seabird streamer line was used during setting.

*placeholder to update pending results of stereo camera discussion – there are three rail stereo cameras available for testing in 2016.

8. Operator Responsibilities on Vessels Carrying EM Systems

- **EM system installation:** Vessels selected from the EM Pool must have an installed, functioning EM system for the specified monitoring period. During the EM system installation, it will be the vessel owner's responsibility to assist with planning the best wiring routes and installing the hydraulic oil pressure and engine oil pressure sensors with the assistance of the EM technician.
- **EM system operation.**
 - **Onboard Power:** The EM systems that will be used in 2016 can accommodate DC power from 12-32 volts, or use AC power from an inverter or gen set. It will be the vessel owner's responsibility to work with the EM technician to identify a stable power supply and maintain power to the EM system at all times when underway. To avoid battery drain, the EM systems will be allowed to power down to sleep mode when the engine is off.
 - **Function Test:** Prior to leaving port, the vessel operator must turn the system on and conduct a system functionality test following the instructions in the VMP. If the functionality test identifies a malfunction, the vessel operator must contact the EM service provider immediately to resolve the issue. The EM service provider will determine if the malfunction is critical or non-critical. A critical malfunction is one that prevents the data collection objectives from being achieved.
 - **Non-Critical EM System Malfunction:** If the malfunction cannot be fixed in a timely fashion, the vessel operator may depart on the scheduled trip, but must follow the service provider's instructions to trigger video recording manually. The vessel operator must also submit the hard drive from that trip within 48-hours of landing or on the next business day if the fish is landed on a weekend.

The vessel operator may not depart on a second trip without a functioning EM system unless approved by the EM service provider.

- **Critical EM System Malfunction:** If the malfunction is a camera defined as “critical” in the vessel must remain in port for up to 48 hours to allow the EM service provider time to effect repairs. If the problem cannot be fixed within the 48 hour window, the vessel may receive a release and depart on the scheduled trip. The malfunction must be fixed prior to departing on subsequent trips.
- **Equipment breakdown at sea:** If the system passes the function check prior to leaving port, and remains continuously powered during the trip, the operator would NOT be required to return to port in the event of a breakdown. However the malfunction must be fixed prior to departing on subsequent trips. If a vessel has repeat problems with EM system reliability or video quality, that vessel may be removed from the EM pool for a period of time and placed in the human observer pool.
- **Hard Drive Capacity:** The vessel operator must ensure that the system has adequate memory to record the entire trip before departing port. The vessel operator must carry one or more spare hard drives, sufficient to record the entire trip, as a back-up.
- **Video quality:** The vessel operator will be required to check the monitor before each set and to wipe water and slime off the camera lenses to maintain video quality. Video quality for each set will be recorded on the vessel score card.
- **First Trip Quality Control Review:** Operators of vessels selected for EM coverage will be strongly encouraged to make their first landing at an EM service port to allow for a quality control visit.
- **Catch handling:**
 - **Discard control points.** The vessel operator will be responsible for ensuring all catch is handled within view of the cameras as described in the VMP. A deck camera will be used to ensure that all discards are done in view of the rail cameras.
 - **Seabirds:** An additional camera will be installed to determine if a seabird streamer line was used during setting. Vessel operators will be required to hold incidentally caught seabirds up to the camera for 2-3 seconds and ensure that certain key parts of the animal, such as the beak, are captured by the cameras. Goals of 2016 would be: 1) determining presence/absence of mitigation measures; 2) test different triggers associated with the setting of gear to turn the seabird cameras on (instead of just having them on all the time); 3) if birds are caught and there are images of birds, have a seabird expert look at those images to see if they can identify the species & verify if the presentation times are acceptable.
- **Effort logbooks:** Vessel operators will be required to keep a simple logbook and write down their hook size, spacing, skate length, and the number of skates on each set. They will not be required to record catch information, other than what is already required in IPHC or other logbooks. The effort log is shown in Figure 1.
- **Exit Survey:** Goals of exit survey: 1) capture “user experience”; 2) vessels costs or impacts; 3) how much time does it take to have EM on the boat (installation, cleaning lens, changes to fishing practices, etc).
- **Vessel Monitoring Plan:** each participating vessel is required to have a vessel monitoring plan, which will identify the specific practices required for each vessel’s unique configuration. **Need subgroup to identify components of VMP.**

- Data logger (sensor only):** A limited number of volunteers from the EM selection pool will be asked to test data loggers. The goal would be to evaluate the ability to use sensor-only data to validate the number of sets (effort) for boats which are in the EM Selection Pool, but which are not selected to carry EM equipment for a time period in which they are still fishing. Boats would fill out the EM effort log, which would be compared with the data logger information.

Figure 1: Sample effort log for the EM pre-implementation plan.

2015 EM Program Effort Logbook

Vessel Name:		Vessel Number:		Did you catch rockfish? Y N						
Trip Start Date (mm/dd):		Start Port:		Did you retain and land all rockfish? Y N						
Offload Date (mm/dd):		Offload Port:		Did you haul at night? Y N						
Did the EM system function normally the entire trip? Y N				Gear ID	Gear Type	Length of Skate (feet)	Hook Size	Hook Spacing (ft)	No. Hooks Per Skate	
If no, please describe any problems:				A						
				B						
				C						
				D						
Set		Haulback		Seabirds Caught?	Did you discard legal-sized halibut?	Haul Start Location		Gear ID	No. Skates Set	No. Skates Lost
Date (mm/dd)	Start Time	Date (mm/dd)	Start Time			Lat	Long			
				Y N	Y N					
				Y N	Y N					
				Y N	Y N					
				Y N	Y N					
				Y N	Y N					
				Y N	Y N					
				Y N	Y N					
				Y N	Y N					

Shaded areas are not required if you are completing and sharing your IPHC logbook with EM program staff.

9. Dockside Monitoring

No dockside monitoring is proposed for 2016, other than quality control and maintenance visits to the vessel.

10. Data Turnaround Times

Hard drives will be collected by field support staff at least on a monthly basis and mailed PSMFC for review. Vessel operators not landing in a service port may be required to follow simple procedures to retrieve the hard drive, and mail it to PSMFC at the appropriate time.

11. Incentive Systems

In 2016, participants in the EM program will be tracked through the use of a Vessel Scorecard (do we have an example from 2015 we can include?). The goal for 2016 is to be able to collect feedback on the performance of the vessel with respect to the operator responsibilities, and the quality of data coming from off the vessel. The intention would be to use the 2016 vessel scorecard to evaluate potential

incentive systems, and consider how performance in 2016 could be used as a criterion for allowing vessels to continue to participate in the EM program in 2017.

12. Data review procedures

[This section needs to be reviewed with the data review subgroup. Does this need to be in the proposal to the Council?]

We recommend that PSMFC review all EM data collected to assess data completeness and determine how many trips and hauls were captured on a monthly basis, and the video quality of those hauls. This information would be entered on the vessel score card (EM review stages 1-4 below). Depending on the deployment model selected, PSMFC will have the ability to randomly select a number of hauls to be reviewed from those captured and of reasonable quality to provide reliable species ID information (Stage 5).

The information collected by PSMFC will include:

- 1) **Metadata**
 - a. ADFG permit #
 - b. Date drive retrieved
 - c. Field assessment notes (Saltwater/Archipelago notes when drive was picked up)
 - d. Logbook: Y/N
- 2) **Initial review to answer the following:**
 - a. Is sensor data complete? Y/N
 - b. Is imagery/video complete? Y/N
- 3) **Trip data**
 - a. Port code
 - b. Date/time/location start of trip
 - c. Date/time/location end of trip
- 4) **Haul data**
 - a. Date/time/location start of haul
 - b. Date/time/location end of haul
 - c. Imagery quality:
 - i. Useful or
 - ii. Something else
- 5) **Video review- for selected hauls:**
 - a. Time to review
 - b. All fish species IDs to lowest level
 - c. All fish counts
 - d. All fish disposition (discarded at rail; retained at rail)
 - e. All other species (Birds, inverts, mammals)
 - f. For halibut:
 - i. Injury key/Release condition
 - ii. Release method

13. Catch Accounting

Steps & decision points needed to use EM data in catch accounting

NMFS is not yet using EM data being collected through the EM Cooperative Research Plan in catch accounting. However, the goal during pre-implementation is to make the necessary infrastructure modifications and catch estimation programming changes to incorporate EM data into the catch accounting system so that it is available for inseason management. EM data processing occurs at three

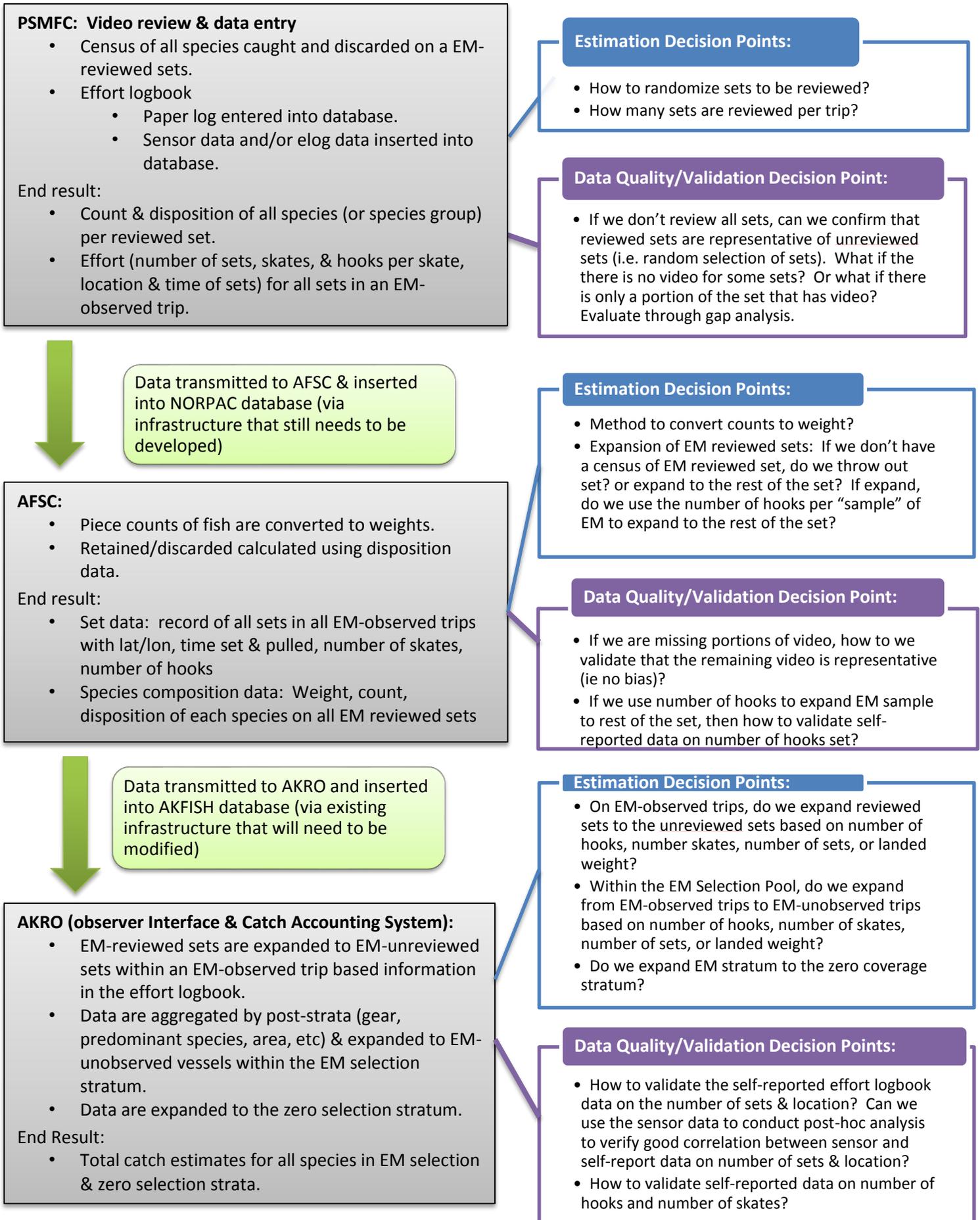
locations: Pacific States Marine Fisheries Commission, Alaska Fisheries Science Center (AFSC) and the Alaska Regional Office (AKRO). Figure 2 illustrates the data processing steps that need to occur during each of these phases as well as the data transfer that will need to occur between these entities. On the right-hand side of the figure, we have noted estimation decision points (in blue) and data quality/validation decision points (in purple) that need to be taken into consideration as the data estimation process is implemented.

In an attempt to use consistent terminology, we have defined the layers in the EM sampling hierarchy:

EM sampling terminology

- **EM Selection Pool:** the vessels that meet the Council’s criteria for EM and who opt into EM. It may be that not all vessels in the EM Selection Pool will carry cameras for all of their fishing activity.
 - **EM-unobserved vessels:** the vessels that are in the EM selection pool, but who are not selected to carry EM for a time period.
 - **EM-observed vessels:** vessels in the EM selection pool that are selected to carry EM for a time period.
 - **EM-observed trip:** the trips taken by EM-observed vessels where they are carrying EM.
 - **EM reviewed sets:** the sets within an EM-observed trip that are selected for EM review. The number of EM reviewed sets could be all or some portion of the sets within an EM-observed trip.
 - **unreviewed sets:** the sets within an EM-observed trips where the video is not reviewed. This could be because there was incomplete video for the trip, or due to sub-selection and sampling of the sets within an EM-observed trip.

Figure 2. Roadmap & decision points for using EM data in catch accounting.



Deriving weight from EM data

To inform the decision point about how to derive weight of fish from EM data, an analysis comparing different approaches will be completed. We plan to use data collected during 2015 EM Cooperative Research Plan for these comparisons. The analysis of method 1 will use data from the research and development project. The analysis of method 2 will use data from the IPHC survey data.

Method 1: Obtain length from EM and convert length to weight using standardized length/weight ratios from observer data

Options for getting length from EM:

- Use stereo cameras mounted at the rail to get length
- Use a chute (either a graduated chute or a camera chute)
- Vessel operators hold fish in front of a “measuring board” and length is determined when the video is reviewed (note – this approach is not currently being tested in the CRP).

Method 2: Obtain piece counts from EM and apply average weight by species to piece counts using other sources of information.

Options for sources of information on average weights:

- AFSC observer data
 - Use current year data
 - Use multiple years of data
- Survey data
 - Longline survey
 - IPHC survey
 - Trawl survey
- Results from research studies

14. Other EM research in 2016

[Should this be part of Pre-IMP Proposal, or a separate document?]

Within the confines of the budget, we recommend extending EM testing in 2016 to fixed gear vessels outside of the EM Selection Pool, for planning and “next step” priorities.

- EM Selection pool = 60 hook and line boats from 40-57.5.
- Stereo camera testing – part of the EM selection pool 60 vessels, or separate pool?
- Hook and line vessels <40ft LOA: put out a call for volunteers for *up to 5 boats*. Goal would be to start working on logistics of small boats in 2016 if we can find some boats willing to participate in 2016.
- Hook and line vessels >58ft LOA options (discussed but no decision):
 - ?? – pull 3 boats >58ft out of T trip selection and have them carry stereo cameras
 - ?? - XX number of boats would be given the opportunity to participate in EM and carry EM. But they would stay in the Trip Selection, log their trip in ODDS, and carry human observers if selected.
- Pot vessels: continued research through the NPFA/SWI grant. NMFS will provide guidance on data for the project.