

Proposed 2016 EM program Elements for 40' to 57.5' LOA fixed gear vessels:

- 1. Management Objective:** The management objective identified by the Council is to estimate at-sea discards. Weights from retained catch would be reported using the fish ticket system. At-sea discards and drop-offs would be estimated based on piece counts with proxy weights applied.
- 2. The EM Vessel Pool:**
 - **Qualifying Criteria:** The 2016 EM pool will focus on vessels where carrying a human observer is problematic due to bunk space or life raft limitations. Vessels interested in carrying EM systems in lieu of an observer will “opt-in”, or volunteer for the EM pool by making application and providing evidence that carrying an observer is problematic because of limited bunk space or life raft capacity. Evidence could include fish tickets documenting fishing trips in 2013 or 2014 where crew size equaled to or exceeding bunk space or life raft capacity.
 - **The Opt In Process:** This would begin in October or November 2015 to allow EM and observer deployment when the season starts in 2016. Vessels owners must notify NMFS of their request to opt in at least 1 month prior to a calendar quarter when they plan to fish and agree to the rules governing the EM program. Vessels accepted by NMFS would be placed in the zero observer selection pool for the duration of the 2016 season. NMFS would inform vessels of the status of their EM application in timely manner. Vessels not in the EM pool will continue to follow the rules for human observer deployment and be selected on a trip-by-trip basis.
 - **Estimated EM Pool Size:** EM pool size is not known at this time. We propose no limit on the EM pool size. The deployment scenario below provides information on coverage strategies that can be scaled to various EM pool sizes based on EM equipment and installation budgets presented in the January 2015 NMFS EM implementation plan
- 3. EM Deployment Model:** The objective of the EM deployment model is to find optimal balance between the amount of equipment needed, the quality of the data gathered, and the field effort in moving equipment around. Other factors include fairness and transparency of the deployment process. Data quality is affected by how representative the monitored portion of the EM pool is, the coverage level, and the “burn in” period allowed for each deployment.

Coverage Levels: The EM pool will have a coverage level independent of the observer pool. The general strategy we propose is to maximize the deployment of EM systems to collect as

much data as possible. Currently, the minimum coverage target for the 40-57 feet fleet is 12% of the total hauls¹. While this could be accomplished by randomly selecting 12% of the active vessels, there is also a possibility that 12% of the vessels would not represent 12% of the overall hauls carried out by the EM pool. Therefore we propose oversampling the number of vessels being monitored to ensure that the minimum coverage level is achieved. Once the data is collected, there would be a process for randomly reviewing the equivalent of 12% or a higher fraction of the hauls that took place in the EM pool. The analysis in support of restructuring the observer program used 30% coverage as a bench mark for all sectors. The EM pool may encompass >40 feet fleet, although these vessels will not be monitored. If this is the case, increasing the number of vessels collecting EM data may improve estimates for the combined pool. Oversampling the number of vessels monitored also allows room for some data collection failure. Note that a data analysis process to detect possible bias in data collection failures would still need to be developed.

EM Equipment Deployment Alternatives: 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 period of time. We therefore are considering two alternatives for deployment duration:

- **Alternative 1: Quarterly Deployment:** This would entail selecting vessels to carry EM systems on a three-month period basis. Vessels opting into the EM pool would have to register their anticipated fishing schedule in at least 30 days in advance of a calendar quarter in order to plan deployments of EM systems. To avoid “gaming” the system, vessels fishing outside of their pre-registered window could be automatically selected to carry EM systems or observers based on a random draw. We propose considering two options for deployment under this approach:
 - Option 1- Random selection. Once vessels have pre-registered for a quarter, a certain percentage would be randomly selected to take EM systems for the quarter.
 - Option 2- Optimized deployment. The maximum amount of systems would be deployed during each quarter. Vessel fishing plans and locations would be used to maximize the number of hauls captured on a quarterly basis.

The NMFS implementation plan considers 30 systems and 80 installs. We propose to allocate ~25 systems and ~65 installs for the 40-57 feet fixed gear fleet, leaving the

¹ The sampling unit for the monitoring option being pursued (Enhanced EM Program) is the fishing event (retrieval operation).

remainder systems and installs for other gear type and applications and well as potential “spot demand” needs during quarterly rotations.

A simple initial modeling exercise, based on data provided by NMFS for the entire 40-57 foot fishery in 2013, provides insight into how these systems and installs could be arranged in the fishery. We assume that the fishing activity of the EM pool would be representative of the entire fleet. So, for example, an EM pool of 100 vessels would represent ~25% of the total fleet. Table 1 shows how many vessels were active for each quarter and we assume that 25% of these would be in the EM pool. From this we can look at how many vessels would carry EM systems if we selected 12, 30 and 40% of the active vessels for each quarter. For example, selecting 30% of vessels per quarter would require an estimated 58 install services and involve deploying 21 systems in Q2 and only 9 in Q1. We can also explore maximizing the available 25 systems throughout the year. Because of changes in activity levels, 25 vessels represents 83% of the vessels in Q1 and only 37% of vessels in Q2. Further analysis taking into account fishing activity patterns for the fleet is needed to understand how many installs could be expected under this option.

Table 1: Initial modeling for deploying EM systems on an EM pool of 100 vessels.

Quarter	Total Active	EM Pool (25%)	Vessels Carrying EM Systems			Maximize 25 systems
			12%	30%	40%	
Q1 (Jan-Mar)	117	30	4	9	12	83%
Q2 (Apr-Jun)	266	67	9	21	27	37%
Q3 (Jul-Sep)	220	56	7	17	23	45%
Q4 (Oct-Dec)	133	34	5	11	14	74%
Installs (upper limit)						
*			25	58	76	TBD

* Estimate represents the maximum number of installs expected. It is possible that the number of installs would be lower if a vessel carries an EM system in consecutive quarters.

- 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. For 2016, we propose having permanent field support services in 3 communities, Sitka, Homer, and Kodiak, and quarterly trips to two out ports for installation services if demand warrants. Vessel operators opting into the EM pool would be required to make their vessel available for EM equipment installation at a designated service port prior to commencing fishing activity if selected. Vessels would not be required to make landings at these ports, just to have the EM systems installed and serviced at these ports.

5. Operator Responsibilities on Vessels Carrying EM Systems: Because of the short time EM systems will be on a vessel, the operator responsibilities must be simple, easy to learn, and focused on providing the data quality and cost effectiveness crucial to program success. We propose the following operator responsibilities:

- **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.
 - **Rockfish:** 2014 and 2015 field work is being evaluated to determine if EM reviewer species ID of rockfish can meet management needs. Industry representatives have proposed full retention of all rockfish with forfeiture of amounts in excess of the allowable bycatch limits as a means to ensure species ID and minimize waste. For 2016, there are two options for rockfish
 - **Option 1**—allow discards at sea
 - **Option 2**- Require full retention. This option would require an EFP.
 - **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.
- **Effort logbooks:** Field work has demonstrated that it is impractical for EM video reviewers try to determine hook size, spacing, and count hooks during the video

review. 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 being used in the 2015 testing plan is shown below for reference.

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.

Figure 1: Sample effort log being used in the 2015 EM operational testing.

6. **Dockside Monitoring:** We propose no dockside monitoring for 2016 other than quality control and maintenance visits to the vessel.
7. **Data Turnaround Times:** Hard drives will be collected by field support staff 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.
8. **Incentive Systems:** Experience with the Canadian EM program has identified the importance of including incentives in an EM program as a means of ensuring the needed data quality and reliability standards are achieved. PSMFC will evaluate each trip based on adherence to operator responsibilities and assign a score to the vessel. Continued eligibility for participation in the EM pool will be dependent on success over a period of time or a number of trips. The score card is being developed as part of the 2015 operational testing.

9. **Data review procedures:** 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

10. Data Archiving: Under the Observer program, the work sheets and logs that a human observer fills out while observing a haul constitute the "permanent record" of the haul and are kept in the Region for a set period of time before being archived indefinitely (3 years?). Under the EM program, we recommend the worksheets and species counts from the EM reviewer as they observe a haul constitute the "permanent record". The EM reviewer log would contain the data, time and location of each set for the whole trip. It would also contain the species Id and other information (halibut release method, condition etc) for a sub sample of hauls selected for full review as dictated by program protocols. The actual video

would be stored for a limited period of time to allow for quality control review by a 2nd party but not stored indefinitely. In Alaska, EM is used for some compliance monitoring situations and the current regulations call for storing the EM video for 120 days. This is a good standard to work from and we recommend EM video data be stored by PSMFC for 120 days for catch accounting and compliance monitoring. If any enforcement issues are identified during the EM review for species Id or compliance, the trip is flagged and the video is turned over to OLE. Cases turned over to OLE have their own rules about video storage and are kept by OLE until the case is resolved.

11. **Future refinements:** Deployment of EM on this fleet is expected to be an evolving process as lessons are learned and information becomes available. Optimization of the deployment and data review strategies cannot be accomplished until the size of the EM pool is known and fleet demographics mapped. As this information becomes available, the deployment strategies used in 2017 and future years should be evaluated.