2017 Electronic Monitoring Pre-Implementation Plan

EM Workgroup Recommendation to Council, September 2016

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 groundfish and halibut fisheries. The Council's intent is to develop EM to collect data to be used in catch estimation for this fleet.

This document describes the EM pre-implementation plan for 2017, and also notes other EM research and development that will take place in 2017. 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, consistent with the Council goal to integrate EM into the Observer Program.

The overall goal of this 2017 pre-implementation plan and the cooperative research is to develop the use 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 and research phase will inform the implementation of EM as an integrated part of the Observer Program. As such, it should be noted that the eventual components of the regulated EM program may have different provisions than those that are proposed in 2017.

Under the current best-case scenario timeline, the Council is scheduled for initial review of an EM integration analysis in October 2016, with final action following in December. Under this best case scenario timeline, regulations would be prepared in 2017, and the integrated program would be implemented for the 2018 fishing year.

Year	Fieldwork / Pre-implementation (Pre-Imp)	Council process, regulations	Observer Program/ Annual Deployment Plan (ADP)
2014	*Fieldwork*	*EMWG develops 2015 Cooperative Research Plan (CRP), discusses alternatives for analysis*	*Oct – 2015 ADP places 10 vessels that are participating in EM research into the no selection pool*
2015	*Feb – SSC reviews CRP* *Jan-Jul – operational and stereo camera field research*	*Feb – SSC, Council review CRP* *Oct – propose a 2016 Pre-Implementation plan to Council*	*Oct – 2016 ADP proposes all EM Pre-Imp vessels in no selection pool*
2016	Jan-Dec – Pre-implementation on 58 longline vessels 40-57.5'. Jan-Jul – EM stereo camera field research on 3-5 longline vessels. Field research on pot vessels.	Oct – initial review for EM analysis to integrate EM into obs program.	Oct – 2017 ADP proposes all EM Pre-Imp vessels in no selection pool
2017	Jan-Dec – Second pre-implementation year for longline vessels >40', and proposed pre-implementation for pot vessels. Potential research on other technology.	Feb – final action on EM analysis Jan-Aug – Develop proposed and final regulations for integrating EM, hold MSA-required hearings in AK, WA, OR	June – Annual Report provides prelim analysis on allocating observer fee between observer and EM deployment Oct – 2018 ADP allocates funding to observers and EM deployment
2018	**Integrated observer/EM monitoring program**		

2. Management Objective

The EM management objective identified by the Council for both hook and line and pot vessels carrying EM systems is to estimate at-sea discards. Retained catch will be assessed through landings reports. The intent for EM is to identify discard species to the lowest taxonomic level possible, or at a minimum to the species level needed for management and stock assessment purposes, while acknowledging that for some species, grouping will still occur.

A secondary objective for hook and line vessels has been established for seabird monitoring in 2017, namely to determine whether seabird mitigation measures are present or absent during setting of longline gear on EM-observed trips.

3. The EM Selection Pool

The EM selection pool in 2017 will include vessels that meet the Council's criteria for EM, and who opt into the EM pool. Not all vessels in the EM selection pool will carry cameras for all of their fishing activity (see Section 4). Vessels which were in the EM selection pool in 2016 need to "opt-in" again.

Qualifying Criteria & Process:

- **Criteria**: The 2017 EM selection pool is open to vessels 40 feet or greater length overall using hook and line and pot gear. First priority will be given to vessels 40-57.5 feet length overall where carrying a human observer is problematic, due to bunk space or life raft limitations.
- **Process**: In June, NMFS sent a letter to all fixed gear (both hook and line and pot gear) vessels 40 feet or greater length overall. In this letter, NMFS requested that vessels indicate their interest in being in the EM selection pool by September 20, 2016. After the October 2016 Council meeting, which will include discussion of the EM Pre-Implementation Plan, a second letter specifying the rules governing EM deployment for 2017 will be sent to vessels that have expressed interest. After receiving this second letter and reviewing the requirements for volunteering, vessels may choose to contact NMFS and "opt out" of the EM program, in which case they will be returned to the human observer pool. Vessels agreeing to the EM program rules, and accepted by NMFS, will be placed in the EM selection pool for the duration of the 2017 season, with no probability of carrying an observer on any trips for the 2017 fishing season. Additions to the EM pool from vessels not meeting the September 20, 2016 deadline may be considered on a case-by-case basis relative to the qualifying criteria and available funding.

EM Pool Size:

Hook and Line Vessels: Up to 90 vessels, ≥40 feet, will be allowed to participate in the longline EM selection pool. First priority in the pool would continue to be given to small longline vessels (40 to 57.5 ft LOA) and vessels that have liferaft or bunk space limitations with carrying a human observer, followed by vessels that were registered for the 2016 EM selection pool. Vessels selected for the longline gear EM program will be moved into the zero selection pool for human observers.

Pot Gear Vessels: Up to 30 vessels, ≥40 feet, will be allowed to participate in the EM pot selection pool, if funding permits. First priority will be given to vessels that have liferaft or bunk limitations with carrying a human observer. Vessels selected for the pot gear EM program will be moved into the zero selection pool for human observers.

4. EM Deployment Model

An issue was identified in 2016 with vessels failing to pre-register for an EM selection period. A number of vessels participating in the 2016 hook and line EM pre-implementation program and in the pot fleet have expressed an interest moving the EM selection process towards a "trip selection" basis, similar to that used for human-observed vessels. As a result, the 2017 Pre-implementation Plan will investigate the trip selection model in order to rest its operational feasibility for the EM pool.

EM Selection Process for Both Hook and Line and Pot Gear Vessels:

- **Pre-Installation of EM on Vessels in the EM Selection Pool:** Vessels opting into the EM Selection pool for 2017 will be contacted by EM port technicians in the late fall of 2016 to schedule EM system installation at an opportunistic time in advance of commencing fishing operations. Pre-installation of EM systems will begin in October 2016 upon approval by the Council of this 2017 EM Pre-Implementation Deployment Plan, and subject to sufficient funding. During this initial contact, the requirement of the 2017 EM program will be explained to the vessel operator and they will be given an opportunity to "opt-out." Based on a review of the vessels that have opted-in, their fishing history and port locations, NMFS and the EM service provider will assess which vessels will receive the complete EM system installs (EM sensors, cameras, and control centers) versus those that may only receive the EM sensor and camera installs without the control center. A maximum of 60 vessels will be pre-wired with complete EM systems, and the remainder will be pre-wired with EM sensors and cameras. The intent is to pre-install EM systems on all vessels in the EM pool, not to exceed the 90 vessels that have been budgeted for. **Vessel operators in the EM pool are encouraged to contact the EM service provider as early as possible to arrange for pre-installation.**

- **ODDS Trip Selection:** The ODDS system, i.e., trip selection, will be used in 2017 to notify the vessel operator if a trip has been selected for EM coverage. Vessels in the EM selection pool with an EM system installed must log each fishing trip into the ODDS system at least 72 hours prior to departing for a trip. On trips selected for EM coverage, the vessel operator must contact the EM service provider, acquire an EM control center or hard drive as needed, and comply with the operator responsibilities in Section 7 prior to leaving for an EM-selected trip. Any vessels in the EM pool that have not yet had an EM system installed must contact the EM service provider for an installation before they can log a trip in ODDS. All vessels will have the opportunity to have a system installed in advance, and once the system is installed they will be added to the ODDS system and able to log trips.

- **Changing Dates on EM Selected Trips:** Vessels wishing to change the date of an EM-selected trip must notify their EM provider directly. The EM provider will coordinate with the vessel and NMFS to either change or cancel the date of an EM-selected trip.

- **Target Coverage Level:** In 2017, the target selection rate will be **30% of logged trips for vessels in the hook and line EM pool,** and **30% of logged trips for vessels in the pot gear EM pool**
    - If equipment is available, vessels could be asked to carry EM for longer (i.e., the program would allow for higher coverage on an ad hoc basis to further test an aspect of EM).
    - A midyear budget review is planned and, if necessary, the coverage level may be adjusted downward dependent on remaining funds.

5. Service Ports

- **Hook and Line Vessels:** There will be three primary service ports for vessels in the hook and line EM pool in 2016: Sitka, Homer and Kodiak.
- **Pot Gear Vessels:** Primary service ports for vessels in the pot gear EM pool will be determined once PSMFC completes the RFP process for an EM provider.
- **Other Ports:** EM services in other ports will be limited to remote support or periodically scheduled visits by primary port technicians, as funding permits. Vessels not available for EM pre-installation during scheduled trips will be required to travel to a primary port for EM installation or service.

6. EM Hardware

Hook and Line Vessels: In 2017, vessels participating in the hook and Line 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 digital IP cameras (generally 2 or 3, depending on the deck configuration), GPS receiver, and gear sensors (hydraulic pressure transducer, drum rotation sensor if appropriate). An additional camera will also be installed to determine if a seabird streamer line was used during setting.

Pot Gear Vessels: In 2017, vessels participating in the pot gear EM program will use EM equipment designed and supplied by PSMFC's designated EM contractor for pot gear. The EM system consists of a control center to manage the data collection, connected to an array of peripheral components including digital IP cameras (generally 2 or 3, depending on the deck configuration), GPS receiver, and a hydraulic pressure transducer.

7. Operator Responsibilities on Vessels Carrying EM Systems

Vessel operators are expected to adhere to the following responsibilities when randomly selected from the EM pool to carry cameras while participating in the 2017 pre-implementation program. The EM Workgroup will use the experience from 2017 to consider how to structure the regulations with respect to these and other responsibilities; a regulated program may have different provisions.

- **EM system installation**: Vessels selected from both the hook and line EM Pools must have an installed, functioning EM system for the period selected for EM coverage. 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.
- **Vessel Monitoring Plan:** the EM service provider will work with each participating vessel to develop a vessel monitoring plan (VMP) which will identify the specific practices required for each vessel's unique configuration. The VMPs will include a cover letter that includes program details, such as the EM system details, operator responsibilities, operator checklist, and trouble-shooting protocols. The VMPs will also include an installation summary defining vessel-specific installations details, system settings, camera locations and views. Additionally, a description of how to conduct a hard drive swap and typical troubleshooting strategies, and contact information for key program resources and participants will be provided. Vessel operators will sign the VMP in acknowledgment of the operator responsibilities and system setup requirements.

- **EM system operation:**
    - **Onboard Power**: The EM systems that will be used in 2017 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 on hook and line vessels 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 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 haul 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:**
    - **Hook and Line Vessels:**
        - **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 2017 would be: 1) determining presence/absence of mitigation measures; 2) 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 and verify if the presentation times are acceptable; 3) ensuring adequate feedback from video reviewers to the vessel if seabird presentation to the camera can be improved.
    - **Pot Gear Vessels:**
        - **Discard control points:** On retrieval of a pot, the crew must ensure that ALL catch is emptied from the pot onto the sorting table. Any fish left in the pot or fish that land on the deck when the pot was emptied must be placed on the sorting table. The crew should process all retained fish first and leave discards on the sorting table until after the retained fish are placed in the fish hold. All fish must be discarded within view of the camera. Discard areas and any variations in handling procedures will be determined at time of the install and noted on the Vessel Monitoring Plan.
        - **Length measurements:** For select boats, the handling procedures might include a method to collect length measurements. A species selected for measurement will need to be placed on the measurement grid individually for a minimum of 3 seconds (long enough to say "happy birthday").
- **Effort logbooks:**
    - **Hook and Line Vessels:** 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 Attachment 1. For vessels already filling out a NMFS or IPHC logbook, a physical copy or high quality photo of the existing logbook will be acceptable.
    - **Pot Gear Vessels:** Vessel operators will be required to keep a simple logbook and write down date and time information for each pot set/haul event. The pot gear effort log is shown in Attachment 2.

8. Dockside Monitoring

No dockside monitoring is proposed for 2017, other than quality control and maintenance visits to the vessel.

9. Data Turnaround Times

Both Hook and Line and Pot Gear Vessels: Hard drives will be collected by field support staff within 2 business days after each selected trip and mailed to 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. Instructions will be provided in the Vessel Monitoring Plan.

Option: Evaluate local EM data review for improvement in turnaround time, and costs.

10. Feedback Systems

Past experience has shown that to obtain high quality EM data, a comprehensive feedback system involving the vessel operator, the EM service provider, and the EM video reviewer's needs to be in place. The 2017 EM program will have four feedback systems. These feedback systems are intended to be educational and adaptive in nature rather than citation oriented.

The first feedback system involves a quality control visit by the EM service provider after the first trip. During the quality control visit, the EM service provider will review the sensor logs and video images, then confer with PSMFC to identify any installation or deck operational changes that need to be made to meet the goals of the program. Quality control visits are not mandatory on the vessels part, but are strongly encouraged.

The second feedback system will use a Vessel Scorecard (Attachment 3) to track the long-term performance with respect to, EM system performance, the compliance with operator responsibilities, and the quality of data coming from the vessel. This data will be used to evaluate normal thresholds for performance. The intention would also be to use the 2017 vessel scorecard to evaluate potential incentive systems. In 2017, PSMFC video reviewers will also provide this feedback on a timely basis to the vessel, through the service provider, to improve catch handling and image quality as necessary.

The third feedback system will use an incident report to document EM system failures at sea.

The fourth feedback system will provide vessel operators with the opportunity to provide feedback on 1) the "user experience"; 2) vessel costs or impacts; and 3) how much time it required to have EM on the boat (installation, cleaning lens, changes to fishing practices, etc).

11. Data review procedures

Hook and Line Vessels: PSMFC will review all EM data collected to assess whether data is complete, how many trips and hauls were captured, and the video quality of those hauls. All review information will be entered on the vessel score card (Attachment 3). The EM Workgroup will provide direction to PSMFC on protocols for reviewing video for species identification.

Option: Evaluate local EM data review for improvement in turnaround time, and costs.

Pot Gear Vessels: PSMFC will review all EM data collected to assess whether data is complete, how many trips and hauls were captured, and the video quality of those hauls. All review information will be entered on the vessel score card (Attachment 3). The EM Workgroup will provide direction on protocols for reviewing video for species identification.

Option: Evaluate local EM data review by the PSMFC's designated EM contractor for pot gear, for improvement in turnaround time, and costs. Review information will be submitted to AFSC via web portal. PSMFC or NMFS will review a percentage of the data collected on pot gear vessels to assess whether data is complete, how many trips and hauls were captured, video quality, and speciate discards. The EM Workgroup will provide direction to PSMFC or NMFS on protocols for data review.

12. Catch Accounting

NMFS is not yet using EM data being collected through the EM Pre-Implementation Plan in catch accounting. However, the goal in 2017 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.

- **For hook and line EM vessels**, in 2017, NMFS will obtain piece counts from EM and will apply average weight by species to the piece counts using other sources of information to derive weight for catch estimation purposes. The 2017 program does not include a provision for measuring species length on hook and line vessels.

- **For pot gear EM vessels** in 2017, NMFS will obtain piece counts from EM and will apply average weight by species to the piece counts using other sources of information to derive weight for catch estimation purposes. The 2017 program may include work to develop the process for measuring species length on pot gear vessels, evaluation of the logistics of collecting data on both retained and discarded catch from pots, and comparison of catch estimates from different estimators.

13. Other EM cooperative research in 2016

Within the confines of the budget, the EM Workgroup recommends continuing with other EM research projects in 2017 such as developing additional EM technologies, and continued progress towards expanding EM into other fixed gear sectors.

Research and development of other EM technologies for the fixed gear fleet

Stereo cameras

In addition to the 90 vessels in the longline EM selection pool, approximately 6 vessels may volunteer to participate in continued testing of stereo cameras. These vessels would be moved into the zero selection pool and be required to carry stereo cameras on all anticipated trips in 2017. Stereo camera vessels will not be part of the random selection process in 2017.

EM lite (sensors but no video)

The Workgroup is considering the utility of deploying sensor systems on vessels that are not deploying cameras, in order to collect positional data about where vessels are fishing. The utility of this information is for catch estimation, when data from EM vessels is applied either to non-selected vessels in the EM pool, or potentially to the broader zero selection pool. In 2017, the Workgroup is also considering testing EM sensor packages (without video components) that could be combined with satellite transmission capacity. The goal would be to determine if this EM configuration could meet a compliance monitoring objective for vessels that want to fish IFQ in multiple areas.

Transmission of EM status data

In 2017, the Workgroup is considering testing mechanisms for transmitting real-time basic EM system health data from vessels at sea, and transmitting full maintenance information and selected image clips, GPS, and/or sensor logs when the vessel returns to dock. The purpose of testing transmission equipment and methods is to evaluate (1) whether there are operational issues with installing equipment to allow vessels to transmit at sea and at the dock, (2) the costs of installation of such equipment and transmitting data, and (3) the utility of such information for enforcement.

Progress towards expanding EM into other fixed gear sectors

Hook and line vessels <40ft LOA

For vessels under 40' LOA, the EM Workgroup has undertaken a demographic study of this fleet including the number of trips, the distribution of vessel lengths, volumes landed, and primary ports. In 2017, the Workgroup will discuss the study and identify priorities for phase in of coverage. This work would support the development of a plan for specific field research in the under 40' fleet in 2018.

14. Budget for all 2017 EM deployment and research

The total available 2017 EM budget is $2,190,630 available from the following sources:

- $ 1,812,014 – NMFS Office of Science and Technology
- $ 121,616 – NMFS Cooperative Research
- $ 257,000 – ALFA NFWF Funds (approximate amount remaining to be spent in 2017)

The 2017 EM funding will support work in 4 major areas:

1. Operation and deployment of EM on hook and line catcher vessels greater than 40 ft LOA in the EM selection pool;
2. Operation and deployment of EM on pot gear catcher vessels greater than 40 ft LOA in the EM selection pool;
3. Funding for EM infrastructure in order to integrate the data from EM into the observer program database for use in catch accounting; and
4. EM research and development projects.

The four areas are described in more detail below. The EM Workgroup also recommends maintaining a reserve of funding to support pre-implementation in 2018. Remaining funds in 2017 may be used to fund a request for proposals for EM work in 2018.

EM operation and deployment on hook and line catcher vessels greater than 40 ft LOA

Description: Operational testing of EM on fixed gear vessels according to the EM Pre-Implementation Plan developed by the EM Workgroup will cover purchasing EM equipment (cameras, wiring, hard drives, etc.), field support for deployment and retrieval of the EM systems, and time for Pacific States Marine Fisheries Commission (PSMFC) employees to conduct review of imagery data.

Available Budget/Projected Spend Plan:

- $750,000 – NMFS Office of Science and Technology
- $257,000 – ALFA NFWF Funds (approximate amount remaining to be spent in 2017)

Total: $1,007,000

Attachment 4 provides a more detailed budget specific to the fieldwork portion of the longline 2017 EM operation and deployment project.

EM operation and deployment on pot gear catcher vessels greater than 40 ft LOA

Description: Operational testing of EM on fixed gear vessels according to the EM Pre-Implementation Plan developed by the EM Workgroup will cover purchasing EM equipment (cameras, wiring, hard

drives, etc.), field support for deployment and retrieval of the EM systems, and staff time to conduct review of imagery data.

Available Budget/Projected Spend Plan:

- $537,000 NMFS Office of Science and Technology EM/ER

Total: $537,000

Attachment 5 provides a more detailed budget specific to the fieldwork portion of the pot gear 2017 EM operation and deployment project.

EM infrastructure and staff support

Description: Provides project management support for PSMFC employees, and costs associated with IT development of changes in NORPAC and integration of EM imagery data in the FMA database.

Available Budget: This will be included in the budget lines for hook and line deployment and pot deployment.

EM research and development

Description: Field support for the R&D of stereo camera EM systems; programming support for the onboard capture of stereo camera imagery data; programming the image processing to obtain species identification and length from stereo camera imagery data; University of Washington production of on-image processing; purchasing and building the next generation of stereo cameras for field testing in late 2016 through the final year of implementation in 2017; and time for PSMFC employees to review imagery data collected during field testing. This project will also support operational testing of RFID tags, chute and stereo camera EM systems deployed onboard pot vessels and potentially catcher processors.

Available Budget:

- $445,224 – NMFS Office of Science and Technology (stereo camera deployment)
- $79,790 – NMFS Office of Science and Technology (EM lite deployment)

Total: $525,014

Attachment 1: Sample hook and line effort log for 2017.

2016 EM Program Effort Logbook

Vessel Name:		Start Port:
ADF&G Number:	Trip Start Date (mm/dd):	Offload Port:
Operator Name:	Offload Date (mm/dd):	Did you haul at night? Y N

Did the EM system function normally the entire trip? Y N If no, please describe any problems:	Gear ID	Gear Type	Length of Skate (feet)	Hook Size	Hook Spacing (ft)	No. Hooks Per Skate
	A					
	B					
	C					
	D					

Set		Haulback		Seabirds Caught?	Did you discard legal-sized halibut?	Gear ID	No. Skates Set	No. Skates Lost
Date (mm/dd)	Start Time	Date (mm/dd)	Start Time					
				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.

Attachment 2: Sample pot gear effort log for 2017.

Pot Cod Fishing Effort Form

Vessel Name _____ Start Port _____
ADF&G Number _____ Offload Port _____
Operator Name _____ Date of Departure _____
Date of Return _____

How much gear do you fish? (e.g., 60 pots) _____

Date	Time start fishing	Time end fishing	Number of Pots hauled	Delivery made (Y/N)

Comments:

Attachment 3: Sample vessel feedback reporting forms.

Sample Vessel Scorecard as completed with field technician

Data Set Details			
Vessel name:		**Operator Name:**	
Data Set Start:	Click here to enter a date.	**ADF&G Number:**	
Data Set End:	Click here to enter a date.	**Current Port:**	

Logbooks Completed		**Requirement**
EM Program Effort Logbook	Y N	Yes
Verified IPHC Logbook (photo or e-log printout)	Y N	Optional
Fish Ticket (photo)	Y N	Optional
Duty of Care		**Comments**
Function test run at the start of each trip?	Y N	
Sensor data complete throughout trip	Y N	
Initial image quality assessment	H M L	
Initial catch handling assessment*	1 2 3	

*Guide to catch handling assessment: 1) All catch was handled out of view; 2) Some catch was handled within view, and some out of view; 3) All catch was handled within view.

Sample Vessel Scorecard as completed by PSMFC reviewer

Data Set Summary			
Vessel name:		**Operator Name:**	
Data Set ID:		**ADF&G Number:**	
Trip Start Date:	Click here to enter a date.	**Start Port:**	
Trip End Date:	Click here to enter a date.	**Landing Port:**	
Number of days on hard drive:			

Trip Assessment			
Effort Logbook Submitted:	Y N	Function test run at the start of each trip?	Y N
IPHC Logbooks submitted:	Y N	Continuous power (with exception of sleep events)	Y N
Fish ticket submitted:	Y N		

Fishing Event Assessment		**Comments**
Seabird Mitigation Devices Used:	Y N	
Seabirds Captured:	Y N	
Extended Presentation?	Y N	
All discarding at control points?	Y N	
Comments:		
Reviewer's Average Data Confidence	H, M, L, U	
Data Confidence Reason	Catch handling – in camera view	
	Catch handling – not in camera view	
	Image quality	

Event Image Quality		**Comments**
Average Image Quality During Haulback	H, M, L, U	
	NA (if image quality high)	
	Obstruction	
	Dirty camera(s)	
	Night lighting	
	Water spots	
	Condensation	
	Glare	
	No video recorded, scrambling or white screen	
	Out of focus	
	Poor camera angles	

Attachment 4: Hook and Line EM Budget Forecast

The following is a forecast of the budget for the hook and line pre-implementation program for 2017. The 2017 program will be funded by a combination of NMFS and industry (NFWF) funds.

Expense Category	NMFS	Industry	Total
Field Program (AMR)			
Labor	158,001	158,200	316,201
EM Products	399,800	80,900	480,700
Travel	35,000	0	35,000
Other Expenses	29,500	15,500	45,000
Subtotal	**622,301**	**254,600**	**876,901**
Data Analysis (PSMFC)			
Labor	117,108	0	117,108
Other	10,000	0	10,000
Subtotal	**127,108**	**0**	**127,108**
Total Budget	**749,409**	**254,600**	**1,004,009**

Attachment 5: Pot Gear EM Budget Forecast

The following specifies projected funding amounts for 2017 pre-implementation of EM in the pot cod fishery. While the total amount available is fixed ($537K), PSMFC is in the process of developing a Request for Proposals (RFP) for pre-implementation of EM in the pot cod fishery in 2017, and the actual amounts by budget category may vary depending upon the outcome of the RFP process for an EM service provider[1].

Expense Category	Budget
Hardware	$179,000
Training (Labor, materials, travel)	$55,000
Shipping	$12,000
Program Labor	$291,000
Project Total	$537,000

[1] The North Pacific Fishery Association and Saltwater Inc., have also submitted a request for NFWF funding for EM pre-implementation in the pot cod fishery in 2017.

Attachment 6: Copy of EM Pre-Implementation Plan Opt-In Letter

May 24, 2016

Dear Vessel Owner,

The North Pacific Observer Program is seeking vessels to participate in the 2017 electronic monitoring (EM) Cooperative Research Program to collect data on board commercial fishing vessels. The goal of the research is to determine whether data collected using EM technologies can be used to estimate catch and whether this can be achieved in a cost-effective and sustainable manner. We request that you let us know of your interest to "opt-in" to the 2017 EM selection pool by September 20, 2016. Any vessel that does not opt-in by September 20 will likely not be eligible for the EM pool in 2017 and will be required to participate in the partial coverage human observer pool per Federal regulations. Temporary exemptions from observer coverage due to life raft limitations or bunk space will not be issued in 2017.

At the February 2016 North Pacific Fisheries Management Council meeting, the Council approved continued development of EM pre-implementation deployment on hook and line and pot vessels. For hook and line vessels, the Council endorsed the expansion of the pre-implementation pool in 2017 to 90 vessels of any length. First priority in this pool would continue to be given to small longline vessels (40 to 57.5 ft. LOA) and vessels that have liferaft or bunk space limitations with carrying a human observer. The Council also endorsed developing EM pre-implementation deployment on 30 pot vessels of any length for 2017. NMFS and the industry continue to seek additional funds to support the EM cooperative research program and the actual number of vessels that will be selected to participate will depend on the amount of funding received.

NMFS will select vessels that meet the 2017 EM pre-implementation pool criteria and have contacted the Observer Program by September 20, 2016 to opt-in. All vessels that are participating in the 2017 EM selection pool will not be required to carry a human observer for the entire 2017 fishing year, however these participants will be required to log their fishing trips into ODDS. Vessels may also be required to use either an electronic or a paper logbook to record basic information such as fishing location, fishing effort (i.e. hook count) and fishing duration.

An EM Pre-Implementation Plan created in 2016 can be found at http://www.npfmc.org/observer-program/. The plan includes specific criteria for vessel participation and other operational details to ensure effective deployment of EM systems, and will be updated in 2017 to reflect a revised deployment periods depending on funding and support capacity. Once the criteria for participating in the 2017 EM cooperative research program are approved by the Council, NMFS will notify vessel owners that are selected for the EM pool with more details about the 2017 EM cooperative research in November 2016 via their email address using an email subscription service (Constant Contact). Vessels will be given an opportunity to opt-out of the EM cooperative research prior to the start of the fishing year, but any vessels that opt-out will be subject to human observer coverage.

All EM equipment in 2017 will be provided through the EM cooperative research program. Pre-installation of EM equipment will begin in late fall of 2016 and continue as necessary. EM system installations can be routinely scheduled in a limited number of primary ports - likely Homer, Kodiak, and Sitka, AK. Secondary ports such as Juneau, Petersburg, Sand Point, King Cove, and Dutch Harbor may have periodic EM installation services on scheduled trips by primary port technicians. Vessels not available for EM pre-installation during scheduled trips to a Secondary port will be required to travel to a Primary port for EM installation services. Once installed, the EM sensors and cameras will remain on the vessel indefinitely to facilitate future participation. Primary and Secondary ports services apply to EM installation and servicing only, there are no restrictions on where a vessel may make landings associated

with this program. If you would like to opt-in to this EM cooperative research in Alaska, please contact Elizabeth Chilton at 206-526-4197 or via e-mail at elizabeth.chilton@noaa.gov by September 20, 2016.

We look forward to working with you in this EM cooperative research effort.

Chris Rilling
Director
Fisheries Monitoring and Analysis Division
Alaska Fisheries Science Center
7600 Sand Point Way NE
Seattle, WA 98115