



## Implementing EM for Alaska's Pot Cod Fleet Progress Report May 15, 2018



### Introduction

Industry has led the drive to allow electronic monitoring (EM) for Alaska's pot cod fleet, believing that the limited bycatch and the way fish are brought onboard in the pot fishery make it an ideal candidate for EM. In 2013 industry members led by the North Pacific Fisheries Association (NPFA) and Saltwater, an EM and observer service provider, began to test EM's feasibility for the pot fishery. Lessons learned from pilot projects funded by the National Fish and Wildlife Foundation (NFWF) guided the development of NPFA-Saltwater's "Pre Implementation Plan" for pot cod which was supported by NMFS and the North Pacific Fishery Management Council (NPFMC) and has become part of EM implementation for Alaska's fixed gear fleet.

On recommendation of the Council's EM work group, Saltwater monitors the fishing of boats that switch gear and fish both pot and longline. In 2017 it turned out that 10 of the 11 boats carrying Saltwater's EM system fished with both pots and longline. In 2018, 25 boats have been equipped with Saltwater's EM system, and we anticipate that a majority of them will also fish both gears. This fits well with our model of installing EM systems and keeping them on the boats as an alternative to the "plug and play" model being tested in the longline-only fishery.

One of the critical goals of Pre-Implementation is to develop sustainable infrastructure that can support long-term implementation of EM in Alaska. The Pre Implementation model designed and being tested by NPFA-Saltwater focuses on two things: data quality and cost effectiveness. It highlights skipper engagement, the integration of observers into the EM program, cross training of skilled EM personnel, local data review, and a streamlined feedback loop between vessels and the data.



## How is it Working?

### Data Retrieval, Equipment Maintenance, Remote Field Support

To minimize the cost of stationing EM personnel in multiple or only selected ports, the NPFA-Saltwater model emphasizes direct skipper engagement with the EM systems on their boats and data quality. Our approach includes extensive training of skippers on the operations and maintenance of the EM systems, catch handling procedures, data retrieval and mailing by skippers rather than port coordinators, and a strong system of tech support. We have found that *skippers who call a 24/7 support line with questions or problems are often able to resolve issues themselves with coaching from techs*. From experience with a large EM program on the East Coast as well as to date in Alaska, Saltwater has found that the vast majority of system problems can be handled with remote rather than in-port support. This saves money. The Saltwater help line is answered by trained technicians who typically know the boats because they are the same people who did the installations. This is a very different model than the idea of primary and secondary ports and port coordinators.

The boats included in the Saltwater pool are fishing from a wide variety of ports: Petersburg, Yakutat, Cordova, Homer, Kodiak, Sand Point, King Cove, Dutch Harbor, Akutan. To date, a year and a half into the program *no hard drives have been lost or data corrupted using the skipper mail-in approach*. The vast majority of system problems (service calls) have been resolved remotely by the skippers with technical help from our EM group over the phone.

### “Local” Data Review

At the end of each trip skippers send their hard drives (HDDs) directly to Saltwater’s office in Anchorage. The mail generally takes 2-5 days after the boat returns to port. Processing of the data and making copies for PSMFC starts on the day the HD arrives, and is completed within 1-2 days after the HDD is received. The review process itself takes 1-5 days depending on the length of trip, gear type, and amount of gear deployed. At the end of the review Saltwater emails a feedback memo to the boat describing the data quality for that trip. The feedback memo notes if there are onboard problems affecting data quality that need to be addressed (slime on lens, crew blocking view of camera, etc).

*The goal is to get the feedback out to the boat before the boat’s next trip, so any problems can be addressed.* We know from the review if there is a problem with catch handling procedures or system performance and are able to respond to that quickly either through a phone call or an in-port service visit. We believe that a *timely turnaround on data is critical to data quality*. If a skipper or service provider doesn’t know there is a problem, they don’t know to fix it. This can mean lost or poor quality data and a waste of money.

### Integrating Observers into the EM Program

All of the Saltwater reviewers are NMFS-certified observers that have experience onboard vessels. They have been trained by NMFS in sampling protocols and fish identification. We believe their hands-on understanding of the fisheries adds to data quality. The reviewers have been cross-trained, so in addition to reviewing data they provide remote and in-port technical support to boats, data processing, equipment inventory, and the other tasks of managing an EM program. The idea is that *cross-training maximizes the EM staff productivity and saves on costs*. NMFS has approved the use of *current certified observers to rotate between reviewing data and observing on boats*. *We think this promotes data quality, and could be a scalable model as EM increases in the North Pacific*.

Saltwater is working very closely with NMFS on the refinement of review protocols so the EM data streams can be used in tandem with observer data to manage our fisheries. The key question for managers is to understand what’s behind the aggregated numbers that come from EM data review. Correlating EM data with the existing

observer data is not as cut and dried as one might suspect. Onboard observers are trained in protocols for fish ID that often involve having a “fish in hand”. EM does not allow this, so there needs to be different protocols for fish ID and, in some cases, and different species groupings for EM data. The observer/reviewers are adding valuable insights to the refinement of review protocols and the correlation of onboard observer and EM data streams due to their experience with both protocols.

## **Funding**

Funding for the testing of this Pre Implementation model has come from the National Fish and Wildlife Foundation with the support of NMFS and the North Pacific Fisheries Management Council. In 2016 NPFA-Saltwater received a grant of \$595,047 to cover a two year period from Sept 1, 2016 to August 31, 2018. The grant included money to provide:

- EM equipment and field services,
- data review and storage,
- development of review protocols, database design, and a data pipeline to NMFS,
- development of tools to either speed up the review process or increase the data from these boats (digital ruler, event detection).

When it became apparent that the program would not be fully implemented by mid 2018 as originally thought, NPFA-Saltwater applied and received funding (\$445,858) to expand and continue the program to September 1, 2019.

Some of the boats that fish pot cod also switch gear and trawl. Looking ahead to trawl being incorporated into the North Pacific EM program, Saltwater has installed several systems on trawl boats to begin testing the best ways to collect data from those boats.

## **Results**

In 2017 NMFS assigned 11 boats of the 21 pot boats to the NPFA-Saltwater group. These 11 boats accounted for 54 ODDS selected trips and a total of 357 selected sea days. In 2018, NMFS assigned all of the pot boats and boats that fish both pot and longline to the NPFA-Saltwater pool for a total of 25 boats. Those boats have been selected for 41 trips to date in 2018.

As with onboard observers NMFS sets the data fields to be collected and the protocols for review of EM data. The open source review software Saltwater is using has been designed to allow upload into the AKFSC database and catch accounting system. *Data is reviewed and available in season.*

## 2018 Pot Cod A Season Species Counts

<i>Catch Composition</i>	Scientific Name	Counts
Pacific Cod	Gadus Macrocephalus	39588
Snail Shell Unidentified	Gastropod	1192
Sea Urchins-Sand Dollars Unidentified	Echinoidea	747
Tanner Crab Unidentified	Cionoecetes Sp	575
Sunstar Starfish	Solasteridae	427
Irish Lord Unidentified	Hemilepidotus Spp	374
Miscellaneous Unidentified	Non Taxanomic Grouping	318
Crab Unidentified	Decapoda	189
Octopus Unidentified	Octopoda	136
Starfish Unidentified	Asteroidea	87
Brittle Starfish Unidentified	Ophiuroidea	82
Pacific Halibut	Hippoglossus Stenolepis	60
Fish Waste	Non Taxanomic Grouping	50
Flatfish Unidentified	Pleuronectiformes	48
Myoxocephalus Unidentified	Myoxocephalus Spp	47
Fish Unidentified	Osteichthyes	39
Pollock	Gadus Chalcogrammus	32
Yellowfin Sole	Limanda Aspera	26
Dusky Rockfish	Sebastes Variabilis	25
Jellyfish Unidentified	Scyphozoa	22
Hermit Crab Unidentified	Paguridea	15
Lyre Crab Unidentified	Hyas Spp	15
Decorator Crab	Oregonia Gracilis	12
Lingcod	Ophiodon Elongatus	12
Sculpin Unidentified	Cottidae	10
Basket Starfish	Gorgonocephalus	9
Dungeness Crab	Cancer Magister	9
Bering Wolffish	Anarhichas Orientalis	8
Gorgonian	Gorgonacea	8
Kam/Arrow Unidentified	Atheresthes Spp	8
Gadid Unidentified	Gadidae	7
Northern Rockfish	Sebastes Polyspinis	4

Yellow Irish Lord	Hemilepidotus Jordani	3
Ascidian - Sea Squirt - Tunicate Unident.	Asciacea	2
Sablefish (Blackcod)	Anoplopoma Fimbria	2
Sea Anemone Unidentified	Actinaria	2
Greenling Unidentified	Hexagrammidae	1
Korean Horsehair Crab	Erimacrus Isenbeckii	1
Mussels Oysters Scallops Clams	Bivalvia	1
Prowfish	Zaprora Silenus	1
Rockfish Unidentified	Scorpaenidae	1
Skate Unidentified	Rajiformes	1
Spiny Dogfish Shark	Squalus Suckleyi	1
Tiger Rockfish	Sebastes Nigrocinctus	1

## 2018 Pot Cod A Season System Performance Measures

<i>Pot Cod Data Summary</i>	
Vessels	10
Trips	20
Pots	6591
Sampled Pots	2126
Sea Days	75
Average Trip Length (days)	3.75
Logbook Completion Rate	85.00%

<i>Gap Description</i>	Count
GPS data missing	24
Hydraulic sensor data missing	2
Intermittent or inaccurate GPS data	81
No video for unknown reason	2
Power Button Pressed - Assume Engine On	1
Power Cut - Assume Engine On	8
<b>Total</b>	<b>118</b>

<i>Pot Quality</i>	Data Quality Pot Count	Image Quality Pot Count
High	1849	924
Medium	236	769
Low	1	433
Unusable	40	0
No Video	0	0
<b>Total Sampled Pots</b>	<b>2126</b>	<b>2126</b>

<i>Pot Image Quality Factors</i>	Issue Count	Percent of Issues
Water Spots	790	20.80%
Glare	713	18.77%
Dirty Camera(s)	423	11.14%
Camera framing incorrect	401	10.56%
Condensation	386	10.16%

Out of Focus	344	9.06%
Crew Catch Handling In Frame	304	8.00%
Image Quality	235	6.19%
Obstruction	96	2.53%
Deck view degraded	91	2.40%
<i>Additional Factors</i>		
Crew Catch Handling Out of Frame	9	0.24%
Intermittent Gaps in Video Coverage	2	0.05%
Video ends before catch handling (sorting) ends	2	0.05%
Blank/White Screen Recorded	1	0.03%
Power Cut - Assume Engine On	1	0.03%
<b>Total</b>	<b>3798</b>	

<i>Image Quality by Vessel</i>	Issue Count	Percent of Issues
Vessel 1	293	7.71%
Vessel 2	458	12.06%
Vessel 3	238	6.27%
Vessel 4	1	0.03%
Vessel 5	1883	49.58%
Vessel 6	250	6.58%
Vessel 7	1	0.03%
Vessel 8	47	1.24%
Vessel 9	604	15.90%
Vessel 10	23	0.61%
<b>Total Issues</b>	<b>3798</b>	