

Greater Atlantic Regional Fisheries  
Office and Northeast Fisheries  
Science Center

Electronic Technologies  
Implementation Plan Progress Report

May 1, 2017

## **Fisheries Dependent Data Visioning Project**

The Greater Atlantic Regional Fisheries Office (GARFO) and the Northeast Fisheries Science Center (NEFSC) continue work on the Fisheries Dependent Data Visioning (FDDV) project which is the development of a future-state data collection program that ensures more accurate and timely data collections while preserving decades of archived data. As we continue work on the project, we continue to explore ways to track vessel landings through the use of a unique trip identifier that is automated and integrated throughout all of our data collection programs with the end result being a definitive and comprehensive data set representative of fisheries dependent data. Recently, the Atlantic Coastal Cooperative Statistics Program (ACCSP) has joined the FDDV Steering Committee and as such, coordination and collaboration with ACCSP is proceeding with the purpose of harmonizing coastal data collection efforts. ACCSP has been identified as the central repository for both Federal and State fisheries dependent data.

## **Electronic Reporting**

Electronic vessel trip reports (eVTR) has been an approved method of vessel trip report submission in the Northeast since 2011. It remains a voluntary program that has resulted in limited industry acceptance and use. There are varied reasons for the slow adoption including resistance to software applications being installed on vessel computers, distrust of technology, and general uneasiness. Development and expansion of eVTR continues to be a priority in the Region with efforts underway to encourage expansion and support the wide-scale adoption. Recently, the Mid-Atlantic Fisheries Management Council took action to develop an omnibus Framework to require electronic submission of VTRs by the for-hire sector; this is likely to be implemented January 1, 2018. We will encourage the Councils to consider expanding mandatory eVTR requirements when it is appropriate to management objectives. A critical component to the FDDV project is the creation and use of a unique trip identifier which requires the use of eVTR. Agency staff will be engaging with both the NEFMC and MAFMC as to how to proceed with further implementation of eVTR. Electronic reporting remains an integral component and in some cases, a requirement, of an Electronic Monitoring (EM) program and as EM continues to evolve, so too will the adoption of eVTR.

## **Electronic Monitoring**

GARFO and NEFSC continue work in the development of EM programs in the groundfish and herring/mackerel midwater trawl fisheries. These are the fisheries that have been identified as potential candidates for an EM program as an alternative to other types of monitoring programs and as a means to meet monitoring needs or increase monitoring coverage. There are currently three distinct EM projects in the groundfish fishery, each exploring different types of monitoring options and one project in the Atlantic herring and mackerel midwater trawl fishery.

## **Groundfish EM Projects**

### **2016**

The Agency has been collaborating with The Nature Conservancy (TNC), the Gulf of Maine Research Institute (GMRI), Maine Coast Fishermen's Association (MCFA), Cape Cod Commercial Fishermen's Alliance (CCCFA) and several groundfish sectors to develop an EM program as an alternative to the At-Sea Monitoring (ASM) program. Generally, they have been pursuing a model whereby EM is used to verify and validate the reporting accuracy of regulated discards on electronic vessel trip reports (eVTRs) (i.e. the audit model). However, there were a number of unresolved issues with implementing that model, so prior to the beginning of the 2016 fishing year (May 1, 2016), there was interest in using EM to replace human ASMs when selected for coverage. Under this model, video from each trip is reviewed in its entirety and used to identify and enumerate discards of groundfish species. The Agency issued Exempted Fishing Permit (EFPs) to 14 vessels (11 of which actually fished), primarily inshore vessels, across five different fishing sectors. Fishing across the fishery remains relatively low due to reduced quotas, and given the 2016 observer coverage level of 14 percent, there has been relatively few EM trips. As a result, the 2016 EFP did not result in an appreciable amount of data collected to support EM development. However, vessels generally operated according to protocol, EM data was recorded and processed, and improvements were made that warrant more development. This was the first year EM data was used for management purposes. In addition, the NEFSC performed a secondary review of the video in an effort to implement quality control measures on the data and EM service providers.

### **2017**

TNC has requested a renewal of the EFP for the 2017 fishing year to continue efforts to improve the functionality of EM, refine fish handling protocols, and support future implementation of the audit model. The 2017 EFP would be identical to the EFP issued for the 2016 fishing year, and would require the use of EM in lieu of ASMs when selected for ASM coverage. In the 2017 fishing year, the ASM coverage level will be 16 percent. While we don't see this particular EM model as a viable long-term option, for this fishery, it is a means to continue EM data collection towards developing an EM audit model program and expanding general EM participation.

### **Audit Model**

NOAA Fisheries is considering an EFP that would require vessels to run EM on every trip (i.e., 100 percent monitoring), which would be a leap forward in the amount of information available to managers and scientists to support the fishery and EM development. As part of this project, vessels may be granted access to portions of closed areas and certain gear exemptions. We expect 3-5 vessels to participate in the project, but possibly, all of the vessels fishing under the existing EFP (i.e., 17 vessels total).

Additionally, GARFO and NEFSC have started analysis work regarding video review rates and pass/fail criteria to support the EM audit model. To begin the year, 100% of each trip will be reviewed and EM will be used as the source for discards. However, once the preliminary audit model analysis is complete,

we hope to begin reviewing less than 100% of each trip, and use the EM data to validate VTRs as the source for discards. The NEFSC will perform a secondary review of the EM data to support this work and to refine processes for data collection and processing.

### **Maximum Retention Model**

NOAA Fisheries is working with GMRI and the Environmental Defense Fund (EDF) to investigate the “maximized retention model,” whereby EM runs on all trips and vessels retain all allocated groundfish. EM is used to verify compliance of catch retention requirements and an authorized dockside program verifies all landings. This approach has fewer catch handling requirements compared to the audit model and is preferable for large vessels handling high volumes of catch. We are considering an EFP that would grant closed area and gear exemptions. Project goals include; examining discard compliance monitoring in a mixed-species fishery, and developing a pilot dockside monitoring program to verify catch retention and monitor potential changes in fishing behavior. We expect participation from 4-6 vessels in this project given the requirement to be fully monitored. The NEFSC will perform a secondary review of the EM data to support this work and to refine processes for data collection and processing.

### ***Herring and Mackerel***

The New England and Mid-Atlantic Councils have been interested in increasing monitoring in the Atlantic herring and Atlantic mackerel fisheries for the past several years. To address the Councils’ desire to increase monitoring in its fisheries, GARFO and the NEFSC are working with the Councils to develop the Industry-Funded Monitoring (IFM) Omnibus Amendment to allow for industry-funded monitoring in all New England and Mid-Atlantic fisheries and as such, stakeholders, including the commercial fishing industry and environmental advocates, support development of an efficient and cost effective EM and portside sampling program for the midwater trawl fisheries in the IFM Amendment.

In 2016 and 2017, GARFO and NEFSC, in cooperation with Saltwater Inc. (EM service provider), are evaluating the utility of EM aboard midwater trawl vessels participating in the herring and mackerel fisheries. Saltwater, in coordination with NMFS, has installed EM systems and developed vessel monitoring plans (VMPs) for 11 of the 12 active vessels. EM data has been collected on 82 trips (250 hauls), and data reviewed from 40 of those. Through this work, NMFS will evaluate the range of information that can be gathered from EM to support the fishery, verify and categorize slippage events, verify other discard sources, determine the comparability of EM data to NEFOP observer data, and refine EM cost estimates. In an effort to support this work, NMFS has worked with Saltwater to install boom arms for mounting cameras on the sides of certain vessels to increase the field of view during catch pumping operations and are actively meeting with all the study participants to review the project progress, provide viewer feedback forms, and discuss vessel performance evaluations. The industry has been very supportive of this project and they continue to work collaboratively with NMFS and Saltwater to develop a suitable program. The project is set to be complete by the end of 2017.

At its April 2017 meeting, the Mid-Atlantic Council decided to delay action on the IFM Amendment until after the midwater trawl EM project is completed at the end of this year. In contrast, the New England Council took final action on the IFM Amendment at its April 2017 meeting and recommended an EM and portside monitoring program be considered as a monitoring option for midwater trawl vessels participating in the herring fishery in 2018. NMFS has the lead on the IFM Amendment and will be

finalizing the amendment and conducting rulemaking for all New England fishery management plans during 2017 for implementation in 2018.

### **Emerging EM Technologies**

We were awarded FIS/NOP funds to test the performance of new photography technology compared to traditional video-based technology currently used in pilot EM programs in the Northeast region. The proposed project includes one year (12 months) of comparative equipment testing and 3 months for data analysis and report writing. The testing phase would begin in late winter or early spring of 2017, and the data analysis and report writing phase would begin once the testing phase was completed. We propose to outfit vessels currently participating in traditional video-based EM programs with the Advanced Fish Monitoring and Observation Solutions (AFMOS) eEye system: a high definition, automatic rapid still-frame photography technology. This project will test the potential advantages of the AFMOS system compared to traditional video-based technology including: 1) that still images have a wider angle and are higher resolution -- both of which should enhance enumeration and identification of catch and bycatch; and 2) that still image systems have smaller total file sizes, which should reduce the total data storage need, the potential for remote transmission of data, and the overall program cost. There are no independent assessments or comparisons of the AFMOS eEye system to existing systems in the Northeast US, or to any other comparable fisheries, because of the novelty of the eEye system. Therefore, this project is necessary for implementation of an operational program.

The development of EM programs for NE fisheries must consider technological efficiencies and cost-effectiveness in order to provide accurate data for catch monitoring while minimizing costs to NMFS and the fishing industry. EM is intrinsically driven by ongoing technological innovation. Core camera, data storage, and preprocessing analyses are continuously being developed and there is a need for ongoing comparison with existing technologies to determine how these developments might improve active EM programs, including data accuracy and cost efficiency.

GARFO and NEFSC continue to develop EM programs in two fisheries. There are currently three distinct EM projects in the groundfish fishery, each exploring different uses of EM, and one project in the Atlantic herring and mackerel midwater trawl fishery.

EM costs in the Northeast are comprised of a combination of agency staff resources as well as financial contributions provided by various agency funding sources. The majority of costs associated with EM development for groundfish, including EM service provider contracts, system hardware and sensors, maintenance and support, and video review and storage, have been borne by non-governmental organizations (NGOs). These NGOs have been the recipient of several National Fish and Wildlife Foundation (NFWF) grants, and to date, the cost details have not been shared with the Agency. Of the Agency costs to support development in groundfish, it's almost entirely staff time. The majority of costs associated with the Atlantic herring and mackerel EM program (e.g., hardware, video review) are funded through a NMFS Office of Science and Technology grant in the amount of \$995,200, in addition to staff time.

Costs represented in Table 1 reflect Agency personnel costs and are approximations based on estimates of time individual staff members contribute to the development of all EM programs, factored by their compensation costs.

<b>Table 1. EM Program Cost Template for reporting program costs and cost share. Include FTE and contractor costs.<sup>1</sup></b>				
Camera-based Electronic Monitoring	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc)
Planning (technical system design, vessel monitoring plans, support system design)	907,000			
Specifications setting				
Technical software system design QA/QC, metadata, integration				
Commercial off- the shelf/3 <sup>rd</sup> party developer option				
Regulation development and implementation				
<b>Hardware</b>				
Camera(s)				
Sensors				
Media/storage				
Government IT infrastructure				
Software, database dev., software licenses				
<b>Field Support</b>				
Installation				
---Labor				
---Wiring, connections, etc				
Training (labor, materials, travel)				
Maintenance/Repair/Replacement				
Help Desk				
<b>Data Communications &amp; Reporting</b>				
At sea				
Shoreside				
Government IT infrastructure				
Data Retrieval				
Data Validation				
<b>Data Analysis</b>				
Software				
---development				
---license				
Labor				
System maintenance				
<b>Data Storage/Archiving</b>				
Other (specify)				

<sup>1</sup> Provide reference for the program, including brief description and a citation to the implementing rule

The Greater Atlantic Region's electronic vessel trip reporting (eVTR) program began in 2011 and has evolved ever since. It is designed to support application development by external developers and due to the proprietary nature of those applications, no cost information is available. Additionally, the New England Fishery Science Center's (NEFSC) Cooperative Research program developed and maintains the Fisheries Logbook and Data Recording Software (FLDRS) application in support of electronic reporting from vessels participating in their program. Cooperative Research vessels report more detailed information than is currently required by Federal VTR regulations. FLDRS is an approved eVTR application and therefore is used not only for Cooperative Research reporting purposes, but to also satisfy VTR reporting requirements. Table 2 reflects the costs associated with the development and maintenance of FLDRS.

**Table 2. ER Program Cost Template for reporting program costs and cost share. Include FTE and contractor costs.<sup>2</sup>**

E-logbook Monitoring	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line
<b>System Development &amp; Maintenance</b>				
Specifications setting				
Technical software system design QA/QC, metadata, integration	65,000			
System maintenance				
Commercial off- the shelf/3 <sup>rd</sup> party developer option				
Data storage / archiving	15,000			
<b>Hardware and Infrastructure</b>				
CPU, GPS, etc.	22,500			
Telecommunications Satellite, cellular, (specify)	60,000			
Government IT infrastructure				
<b>Field Support</b>				
Installation				
---labor	10,400			
---Wiring, backup power, connections, etc.	7,500			
Training (labor, materials, travel)	15,000			
Data validation	27,000			
Maintenance/Repair				
Help Desk	178,600			
<b>Data Communications &amp; Reporting</b>				
At sea	232,500			
Shoreside	170,000 *			
Government IT infrastructure	125,000			
Data Retrieval	24,000			
Data Validation	170,000			
Data Storage				

\* \$170,000 represents GARFO staff resources used to support eVTR submissions

<sup>2</sup> Provide reference for the program, including brief description and a citation to the implementing rule