Vessel Monitoring Plans - Improving Data Quality

By Jason Bryan and Glenn Chamberlain

Vessel Monitoring Plans (VMPs) will be developed for each vessel participating in the Electronic Monitoring System (EMS) pilot study. Each VMP will outline data collection goals, catch handling by crew, and describe appropriate EMS configuration (including optimal observer position). At the time of distribution the Fisheries Sampling Branch (FSB) and field services staff will review the plan with the vessel captain. This presents an opportunity for the vessel to work with FSB and Archipelago and make adjustments if necessary. Once all parties agree to the new standards, the VMP will be tied to the 30% bonus compensation that participating vessels are eligible for each quarter. The intent of the VMP is to maximize data collection and quality. The partnership will also give the captains and crew an opportunity to become more engaged in the process of data collection on their boat. An electronic and hard copy of each VMP will be provided to captains for their reference.

Estimating Fish Length and Weight of ACE Species

By Jason Bryan and Glenn Chamberlain

FSB and Archipelago are exploring different options to gather length measurements. Total length measurements are commonly used as a proxy for weights in fisheries management and research. Past pilot studies have used a variety of methods to estimate length including: discard chutes, sorting tables, and color coded panels. Discard chutes are commonly used on trawl vessels with conveyors, while panels and tables are often used on gillnet and longline vessels.

Viewers will be using collected video data to compare the estimated time to count and speciate discards versus counting, speciating, and estimating length. Efforts will focus on Annual Catch Entitlement (ACE) species, as those are the important species for quota management. The evaluation will give us an indication of the effort required to obtain lengths, help shape field experiments for the 2011 field season, and set a reasonable sample size for future analysis. Time required to obtain fish lengths will contribute to the potential cost of each EMS system and thus is an important component of this pilot study. FSB will be running field trials where fish are measured onboard, then passed down the discard chute to be recorded and measured on video. The data will help gauge the level of agreement between known and estimated values.

Skate and winter flounder (top), yellowtail flounder and sponge (bottom) on experimental discard chute.
What Kind of Data Do We Get From EMS Technology?

By Kelly Neville and Debra Duarte

A preliminary analysis was conducted on a subset of data to examine how effective EMS technology is at collecting accurate catch compositions, species identification, and catch disposition (kept vs. discarded). Please note the data presented are preliminary, have not been peer-reviewed, and are intended to provide an illustration of the data and its potential use for management purposes, but are not representative of the entire dataset. A formal and comprehensive analysis of the data is underway and will include comparisons to other catch reporting sources (observer, vessel trip reports, dealer, and Study Fleet data).

Interpreted data included observed (Northeast Fisheries Observer [NEFOP] and At-Sea Monitor [ASM] Programs) trips on longline, gillnet, and trawl vessels. Data from NEFOP observers and ASMs (collectively referred to as observer data) are used to verify data collected by EMS technology, particularly for discarded species. Initial results include: 1) agreement in presence or absence of commercially important species including, but not limited to cod, haddock, and pollock, 2) agreement in the longline fishery for catch composition, species identification, and counts of kept and discarded species, and 3) agreement in catch composition and species identification in the gillnet and trawl fisheries.

EMS and observer datasets are in different formats; EMS consists of counts of individual fish by species and observer data of weights by species. Despite this difference, presence of a species group was comparable among the datasets (not accounting for catch disposition). Presence or absence data among datasets are consistent for important commercial species. Table 1 illustrates the relationship between species groups with a high percentage (77-93%) of agreement on 28 trips.

<table>
<thead>
<tr>
<th>Species</th>
<th>EMS count</th>
<th>Observer weight (lbs.)</th>
<th>Weight (lbs.) per EMS count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skates</td>
<td>204,517</td>
<td>208,416</td>
<td>1.0</td>
</tr>
<tr>
<td>Flounders</td>
<td>15,816</td>
<td>9,832</td>
<td>0.6</td>
</tr>
<tr>
<td>Gadids</td>
<td>5,523</td>
<td>31,889</td>
<td>5.8</td>
</tr>
<tr>
<td>Dogfish</td>
<td>5,486</td>
<td>29,932</td>
<td>5.5</td>
</tr>
<tr>
<td>Lobster</td>
<td>991</td>
<td>658</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Table 1

Before exploring how to bridge the gap between EMS counts and observer weights, a look at the dataset illustrating comparisons between EMS counts and observer counts will help verify accuracy in species identification and catch disposition. Figure 1 compares EMS to observer data on a longline trip. The number of kept and discarded Atlantic cod, spiny dogfish, and skate are similar. However, haddock estimates differ among the two datasets regarding kept (EMS = 41, observer = 86) and discarded (EMS = 33, observer = 9) counts. Possible reasons for the difference include an inability of the EMS viewer to identify the species or view the species coming onboard. Ocean pout, spiny dogfish, and skate were recorded as kept in EMS data, but were recorded as discarded in observer data. It is possible these species were obtained by the observer for sampling and discarded out of camera view and therefore assumed kept by the EMS viewer. To rectify these issues we have employed discard “control points” on vessels. Control points designate a specified area for discarding for the crew and observers. Control points provide consistency and allow EMS viewers to enumerate catch and determine disposition effectively.

Determination of species identification and catch disposition are critical to the success of EMS technology. Precision of these data requires clear camera views of fish handling and discarding.

The longline example in Figure 1 demonstrates that adequate species identification and catch disposition is possible with EMS technology.

Contact Us

National Marine Fisheries Service
Northeast Fisheries Science Center
Fisheries Sampling Branch
166 Water Street
Woods Hole, Ma
02543
(508) 495-2128
www.nefsc.noaa.gov/femad/fsb/
How to View EMS Video Data  
By Kelly Neville

Reviewing responsibilities of EMS data are shared by FSB and Archipelago. Viewers use custom software (developed by Archipelago) to document kept and discarded species, catch disposition, and identify specific fishing activities (gear issues, tagged fish, net cleaning, etc.). A detailed viewer manual summarizes the steps for viewing and provides a standard for viewing protocols, sampling, and species identification procedures.

After data retrieval and upload, the first step in EMS viewing is processing sensor data. Sensor data includes time series graphs, spatial plots, and maps. Staff review sensor functionality, check for video gaps, review camera angles to ensure all fishing activity occurs within camera view, note video quality, and identify date, time, and duration of each trip and haul within a hard drive.

Video data is organized by vessel, hard drive number, and trip. Sensor data is coordinated with raw video footage to help identify fishing activity for viewing. While all sensor data is processed, not all video data is reviewed. Reviewed footage is specific to fishing activity only and is prioritized to maximize data quality and viewer time. Trips are prioritized for viewing based upon the following criteria; 1) targeted species (groundfish are priority), 2) video quality (high quality represents clear views of fish and catch handling), and 3) observed trips (priority for comparisons purposes).

The next step is to view the footage and annotate catch items. Catch items are typically entered one by one, with the option of including specific catch item comments if necessary. Annotation is controlled by the keyboard and video speed can be adjusted according to the viewer’s needs. Viewers look for general patterns of catch handling to identify points where fish come onboard, are handled or processed, and stored or discarded. Trawl trips must be watched twice, once for kept species and once for discarded species. Gillnet and longline trips are reviewed twice, but the second viewing is more for catch verification purposes. The general rule for species identification is to use at least two identifying characteristics. Difficulty in identification varies among species. Those species with trademark characteristics such as haddock are easily identified. Flounders and skates are more challenging, as many species share similar characteristics or require handling for effective identification. Fish that cannot be identified to species, are identified to taxonomic family.

In an effort to increase data quality, viewers complete a vessel feedback form to identify camera angle or catch handling modifications that would improve species identification. Feedback is then provided to field technicians and is applied to the vessel. This feedback loop is an effective quality control method to ensure we are collecting high quality data.

Notes from the Marine Resources Education Program  
By the Fisheries Sampling Branch

In March, FSB participated in the Marine Resources Education Program (MREP) training on “Bridging the Gap Between Fishermen, Scientists, and Managers.” The workshop provides the fishing industry an opportunity to meet with scientists, visit different programs to get a better understanding of how data are collected, used, and processed, and understand the importance of Woods Hole as part of the larger marine science community. This year EMS was on display for fishermen to view and we received some great feedback. To help address frequently asked questions the EMS team put together a list of those questions we are asked most often. To see a list of questions and answers addressed during the MREP workshop check us out online www.nefsc.noaa.gov/femad/fsb/ (see the Electronic Monitoring System Pilot Study information box).

Staff

Amy Van Atten  
Fisheries Sampling Branch Chief

Nichole Rossi  
Fisheries Sampling Branch EMS Project Lead

Glenn Chamberlain  
Fisheries Sampling Branch EMS Project Support

Kelly Neville  
Fisheries Sampling Branch EMS Project Support

Debra Duarte  
Fisheries Sampling Branch Report Analysis & Contributing Author

Jason Bryan  
Archipelago Marine Research Ltd. Contributing Author

EMS News

Sign up for the Electronic Monitoring Newsletter, a quarterly periodical that provides information and updates on the EMS Pilot Study. Send an email to Nichole.Rossi@noaa.gov.
2010 EMS Statistics

By the Fisheries Sampling Branch

The data represented below is a rough estimate of EMS data collected in 2010 (first year of the pilot study). The study period included the months of May - December.

EMS groundfish vs. DOF trips collected in 2010

A total of 357 trips, 203 groundfish and 154 declared out of fishery (DOF) trips accounting for 91,689 total hours.

Groundfish trips collected by gear type in 2010

Of the 10 vessels participating in the EMS study, 4 are trawl, 3 are gillnet, and 3 alternate between gillnet/longline.

Video quality for all 2010 groundfish trips

Trips are assigned priority (priority 1 = high quality data) based on video quality and camera visibility. Trips selected for observer or At-Sea Monitoring (ASM) coverage are given high priority for data comparison purposes. Of those priority 1 trips, 94% have been reviewed.

Freeze Frame - Snapshot of a Fishing Year

By Glenn Chamberlain and Nichole Rossi

As part of the EMS Pilot Study, FSB is interested in documenting what a typical groundfish year (2010) looks like for New England vessels. We looked at one participating vessel from each gear type (gillnet/longline, trawl) and examined the number of total trips (based on vessel trip report data) and times of peak activity (see Figure 1).

Getting a sense of how and when a vessel fishes throughout the year will help form and support a management structure for EMS. Frequency and duration of fishing activity will also provide FSB with an estimate of the costs required to support EMS monitoring for a vessel over the course of a year. We will continue to look further into fishing activity as the study progresses to identify trends and cost assessments for EMS technology.

Notes from the Field - Scoping Trip to the Northwest Observing and Electronic Monitoring Programs

By Amy Van Atten

Nichole Rossi and I traveled out west and spent some time with other National Marine Fisheries Service (NMFS) observer programs to gather and exchange information on various topics, from funding to electronic data collection technology. We were looking for new ideas that could possibly be integrated into our program in the Northeast.

Our first stop was to attend a portion of the Groundfish Catch Share Monitoring Program Training in Newport, Oregon. This was their first training to prepare observers for the new catch -share groundfish fishery starting in January 2011. Very familiar! We selfishly took some pleasure (that it was not us) in the back of the room, watching another program scramble to pull off an orchestrated training for a fishery that was still developing. With regulations hot off the press, and little time to adapt training curriculum, lesson plans, testing materials, readings, and gear – it closely resembled our challenges just months ago.

The uncertainty of not knowing entirely how existing programs will merge into the new one and the restless pace of getting contracts awarded, new hires, spending plans, and communication flows in place was like watching a reality show on TV from the safety of your couch - a reality that was just like ours.

During this visit, we collected program materials, including; cost-share funding mechanisms, safety checklist procedures, catch estimation methods and priorities for data collection, scales, computers, debriefing and data processing strategies, and enforcement support. I found the programs
had a lot of similarities and there were items that I could evaluate further for our program to improve data quality and efficiency.

Next, we were off to Seattle, Washington, to meet staff from the Alaska Regional Office and Science Center. The program recently implemented EMS requirements in the Bering Sea pollock Fishery. Amendment 91 was recently adopted which mandated new EMS requirements to effectively manage Chinook salmon bycatch. We toured several catcher processor vessels and got a close up look at their Catch Monitoring and Control Plans (CMCPs). Vessels had multiple cameras stationed along the processing line next to the observer’s sampling station, the combination of monitoring ensures that all salmon bycatch is sorted and weighed.

The level of cooperation that we observed between the industry and NMFS was remarkable as they worked together to achieve a monitoring plan that worked for the regulators, vessel owners, and fish handlers. Everyone wants the numbers of salmon to be right on the money - no guess work, no lost fishing opportunities. The impression that I got was that the industry wants to have confidence in the numbers and have a way to share that information quickly across the fleet so they could mitigate the bycatch with voluntary measures to fully access the targeted resource.

While in Seattle, we also visited the North Pacific Observer Program at the Alaska Fisheries Science Center. There we spoke with the training and electronic data collection system staff. We are terribly envious of their ability to transmit data from sea and impressed at the Atlas System, taking in 300-400 observer hauls worth of data per day.

All in all it was an information-packed trip and Nichole and I gathered tons of relevant data to pass along to other staff members. We are grateful to those NMFS staff members from the Northwest Fisheries Science Center, Alaska Regional Office, and Alaska Fisheries Science Center for taking time to accommodate us; to Marel Company for an informational tour of their facility; and to the captains and crew of the F/V’s Constellation, Arctic Fjord, Pacific Glacier, and Northern Hawk.