

Implementing and Improving Electronic Reporting and Monitoring in New England's Groundfish Fishery

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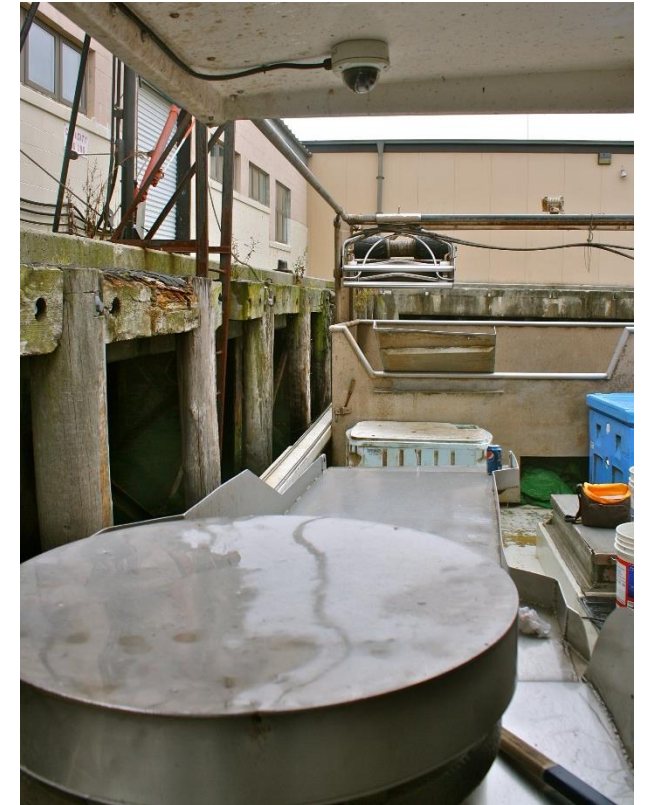
and

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An independent examination of the work done, and that remains to be done, to implement state-of-the-art Electronic Reporting (ER) and Electronic Monitoring (EM) into the commercial groundfish fishery of New England.



Tasks:

- independent review and synthesis of past and present work,
- current and future stakeholder needs for ER and EM data, and
- a roadmap to achieve a technologically-based fisheries data collection system.

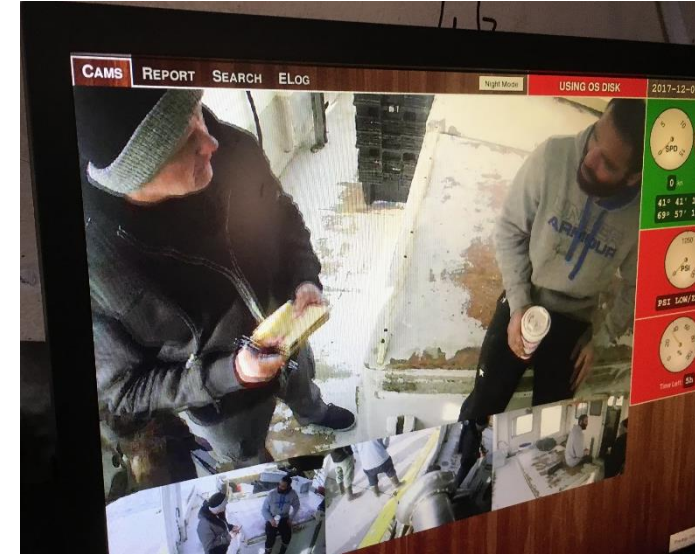
Project “Oversight Group” comprised of representatives from the:

- New England Fisheries Management Council (NEFMC),
- Greater Atlantic Regional Fisheries Office (GARFO),
- Northeast Fisheries Science Center (NEFSC),
- Maine Coast Fishermen’s Association,
- Nature Conservancy, and the
- Commercial Fisheries Research Foundation (CFRF).

Project Stages:

- collection, examination and preliminary analysis of relevant material that could be obtained up-front. Summaries of recent work done throughout the world and the 24 efforts that have focused on New England.
- Inception Report summarized this, provided preliminary findings and a methodology detailing subsequent stages of the project. Feedback from Oversight Group incorporated.

- Intensive period of interviews and meetings in New England with as many relevant stakeholders as possible during November and December 2017.



- 79 people interviewed:
 - 21 Fishermen,
 - 10 representatives from Fishermen's Associations,
 - 30 staff from NMFS,
 - 7 Electronic Monitoring providers and technicians,
 - 5 NGO representatives,
 - 4 NEFMC staff and/or members,
 - a Massachusetts state government representative and
 - an academic.

Electronic Reporting: Pros:

- A societal trend – more-and more aspects of day-to-day life are paperless;
- Many fishermen feel it's just easier than paper reporting;
- Reduces the need for data entry staff;
- Avoids double-handling of data and associated entry errors;
- Avoids dealing with different hand-writing styles;
- Obvious errors can be flagged at the point of data entry;
- Can provide a rapid way to allocate quotas so fishermen can adjust their practices accordingly;
- Can assist with the traceability and eco-labelling of seafood; and
- Consistent with NEFSC's Strategic Science Plan 2016-2021 and GARFO/NEFSC's Electronic Technology Implementation Plan 2015.

Electronic Reporting: Cons:

- The main ER system used here needs a laptop on each vessel and on-vessel support. Sufficient funds exist to outfit only a small subset of fishermen;
- Not as easy to use as it should be – especially for some fishing methods;
- Data transmission relies on memory sticks, staff downloading the data personally, or captains taking laptops home - rather than WIFI, cellular or satellite transmission;
- Some captains less comfortable with computers and are not able to use the technology; and
- Fishermen consider the data to not be as fully used as it could be.

Electronic Monitoring: Pros:

- Should cost less than human observers to collect similar information;
- Removes safety concerns for the observer, crew and vessel;
- Decreases crowding, additional accommodations, equipment and victualling;
- Reduces logistics with allocating, deploying, meeting, loading and delivering observers;
- Potential to cover greater spatial and temporal scales than observer programs with low coverage and so reduce uncertainty.
- Can increase the quantity of data about rare events such as interactions with protected species.
- EM on all trips eliminates observer bias.

Electronic Monitoring: Pros:

- Camera images can provide a longer-term record compared to the memory of a human;
- Can provide multiple “sets of eyes” throughout a vessel simultaneously;
- Allows for additional cameras to be used by captains – such as in the engine room, etc.
- Camera images cannot be easily modified or misinterpreted.
- Currently, fishermen using EM on all trips are permitted access to fish in some areas that are closed and can fish multiple gear types on the same trip.
- EM may facilitate the use of individual discard rates rather than an assumed discard rate.

Electronic Monitoring: Pros:

- Many fishermen say it as an inarguable way to prove their claims of higher biomasses of certain species than is being estimated in stock assessments (previously considered unsubstantiated);
- EM systems should get better, more efficient, quicker and cheaper, whereas the efficiency of human observer programs will likely remain static and probably increase in cost.
- The costliest aspect of EM systems (human-based review of video) may soon be reduced as rapid developments in machine learning applications could make this automatic.
- Can assist the traceability and eco-labelling of seafood;
- Consistent with NEFSC's Strategic Science Plan 2016-2021 and GARFO/NEFSC's Electronic Technology Implementation Plan 2015. .

Electronic Monitoring: Cons:

- Choke species issue. Cameras can record discards of choke species on **all** trips which will eventually exhaust quotas for such species and effectively stop them fishing for species with higher quotas.
- Basic privacy concerns.
- Currently, the cost incentives to use EM are less apparent because the full costs of observer programs are not incurred by the fishing industry.
- Difficult to compare the costs of observer programs versus an EM system.
- General lack of understanding about current EM efforts in the region.
- Fishermen see an inconsistent message from GARFO and NEFSC regarding EM.

Electronic Monitoring: Cons:

- Camera identification of certain species (eg. red versus white hake);
- Cameras cannot take biological samples.
- Problems with estimating catches in high volume, mixed species fisheries;
- Incorporating EM data into infrastructure designed for observer data.
- The current Audit EM project mainly focuses on boats with low discards. Vessels with higher discards are being recruited into the Maximum Retention project which has much smaller participation.
- Some are comfortable with the current system involving only a small amount of ASM observer coverage rather than the potential 100% monitoring that could occur under EM.

Electronic Monitoring: Cons:

- Weights of discards are not directly measured so fishermen must identify, count and lay fish on a measuring strip in front of a camera so that lengths can later be estimated by a technician in the lab. These data are then used with a length-weight key to estimate weights.



Electronic Monitoring: Cons:

- Some concerns about the robustness of the equipment used.
- National issues such as data storage policies, legal custody and/or ownership of video, etc.
- Fishermen are concerned that footage may be used in media campaigns by environmental groups – especially protected species interactions - even if the numbers of such interactions fall below allowable levels.
- Image recognition work to facilitate automatic video review, which should reduce costs, requires thousands of images of fish. (The Bigelow and other projects are currently doing just this.)

Some Key Points:

- **Overall Strategy**
- **Technical Issues**
- **Program Design**
- **Incentives and costs**
- **Privacy concerns**
- **Education and outreach**
- **Choke species reporting**

Way Forward

1. Establish a lead group (ASAP) to strategically plan and implement ER and EM. The group should be run by NOAA and include representation from GARFO, NEFSC, NEFMC, the states, fishing industry, sectors, technical experts and NGOs.
2. This group should facilitate the development of a simplified, easy-to-use, phone- or tablet-based ER system (perhaps like the SAFIS eTRIP application).
3. Fine-tune data-handling and analytical systems to accommodate the data from this ER system.
4. Implement this ER system (noting that some exceptions using paper-based VTRs will be required for those fishermen uncomfortable with the technology - ie. those that cannot use phone or tablet-based Apps).

Way Forward

5. While the above steps are occurring, continue the development of both the Audit-based and Maximum Retention-based EM systems currently being pursued where:
 - a. The Audit system should focus on requiring a modest amount of video review, and be fine-tuned for use on as many gear types as possible; and
 - b. The Maximum Retention system should focus on becoming an “Optimal Retention” system - where EM cameras are used for compliance monitoring on vessels with high volume, multi-species catches. Some vessels may also require a level of dockside monitoring and/or human observer coverage.

Way Forward

6. Continue to resolve other key issues with EM, especially those concerning data-handling and analytical systems, its relative cost, as well as privacy and choke species issues. For the latter, we encourage options that would allow industry using EM to target healthy stocks without exhausting their allocations of choke quotas - and so provide data to better inform science and management.
7. Continue the development of other, more longer-term improvements in EM being cognizant of work going on elsewhere to do the same (like making video review automatic and data transmission and storage more streamlined).

Way Forward

8. Once Step 4 (ER implementation) has become routine for fishermen and government agencies, begin the rollout of EM systems developed under the above steps.
9. Link the ER and EM systems into one ongoing system that should be flexible enough to incorporate additional technological innovations as they occur.
10. While all this is occurring, a dedicated outreach and education program about ER and EM is required to gain support and ownership of the system by all stakeholders.

Questions?
Comments?

