

Subject: Tasker: Electronic Monitoring - Due June 30, 2012

From: Samuel Rauch <samuel.rauch@noaa.gov>

Date: 4/10/2012 8:57 AM

To: _NMFS Regional Admins <nmfs.regional.admins@noaa.gov>, _NMFS Science Directors <nmfs.science.directors@noaa.gov>

CC: Paul Doremus <paul.n.doremus@noaa.gov>, Richard Merrick <richard.merrick@noaa.gov>, Alan Risenhoover <alan.risenhoover@noaa.gov>, Gloria Thompson <gloria.thompson@noaa.gov>, Heather Blough <heather.blough@noaa.gov>, Beth Lumsden <beth.lumsden@noaa.gov>, Rebecca Chiampi <rebecca.chiampi@noaa.gov>, Mark Holliday <mark.holliday@noaa.gov>, Kelly Denit <kelly.denit@noaa.gov>, Chris Rilling <chris.rilling@noaa.gov>, Ned Cyr <ned.cyr@noaa.gov>, Carrie Selberg <carrie.selberg@noaa.gov>, "Menashes, Emily" <emily.menashes@noaa.gov>, David Detlor <david.detlor@noaa.gov>

During the January 2012 NOAA Fisheries Leadership Council meeting in Silver Spring, we participated in an in-depth discussion about the real and perceived challenges and opportunities associated with electronic monitoring. The attached document summarizes the meeting discussion and sets forth the creation of six white papers over the next two months as next steps. These papers, due June 30th, in turn support our goal of developing a strategic way forward to a cost-effective and sustainable fisheries monitoring program for the future.

The Regulatory and Science Boards will monitor the progress of these white papers, and will vet and synthesize their results with the continued assistance of staff from S&T, SF and the Policy Office. If you have questions or need further information please contact Mark Holliday at 301-427-8041.

Sam

--

Samuel D. Rauch III
Acting Assistant Administrator for Fisheries
National Marine Fisheries Service/NOAA
U.S. Department of Commerce
301-427-8000

Attachments:

Electronic Monitoring_v4.docx

27 bytes

Electronic Monitoring (EM) Summary & Next Steps

During the January 2012 NMFS Leadership Council meeting in Silver Spring, the Council participated in an in-depth discussion about the real and perceived challenges and opportunities associated with electronic monitoring (EM¹). The document below summarizes the discussion and sets forth next steps.

Summary

While electronic monitoring (EM) of marine fisheries may never supplant the need for observer coverage, there is growing recognition that the current system of catch monitoring in the United States is neither economically viable nor consistent across fisheries, regions, or regulations. Therefore, a process is needed to examine alternative mechanisms for achieving a cost-effective and sustainable monitoring program. As part of this process, a re-examination of our regulatory framework may be needed to realign our management alternatives and our technical and fiscal monitoring capabilities.

Before delving into the specific benefits and drawbacks of EM, it is important to acknowledge that our discussion of EM is embedded within the larger issues of catch accountability and monitoring. Although the origins of EM certainly pre-date the most recent reauthorization of the Magnuson-Stevens Act (MSA), arguably the addition of rigid annual catch limits and accountability measurements in the 2007 reauthorization have played key roles in elevating and institutionalizing catch monitoring efforts. Of particular importance is Section 303(a)(15) which requires all Fisheries Management Plans to include accountability measures.

While there are many types of catch monitoring systems in place, human observer programs are perhaps the most robust. Collectively, on-board and dock-side observers provide a method to directly monitor catch and bycatch, collect and process biological samples (e.g., species, length, and frequency), and glean socioeconomic data about trip costs and revenues, crews and communities more generally. Although observer programs provide invaluable data, they also have several notable drawbacks. From a logistical and social perspective, there is a certain level of unavoidable intrusiveness – both for fishers and observers. There are also physical safety hazards associated with putting observers on commercial fishing vessels as well as large economic costs. In addition, observer programs may cause a sampling bias in fisheries where the coverage is less than 100%. While this latter challenge can be mitigated by full coverage, there is clearly an added cost associated with this approach.

The aforementioned challenges associated with observer coverage, coupled with the legislative drivers pushing catch accountability, have sparked interest in alternative methods of monitoring. It is within this context that interest in electronic monitoring has grown. Electronic monitoring represents an attractive alternative or supplement to observer coverage that may help to negate

¹ For the purpose of this document, EM is used broadly to mean any electronic tool used to support catch monitoring efforts.

some of the existing barriers and reduce the economic burden associated with catch monitoring. However, straightforward replacement of observers with electronic technologies in neither prudent nor recommended.

Next Steps

To forward the agency's understanding and adoption of EM, NMFS Leadership Council identified six topic areas needing further exploration. These areas of interest need to be evaluated to produce national guidance and recommendations on the goal of creating a more cost-effective and sustainable monitoring program for US fisheries.

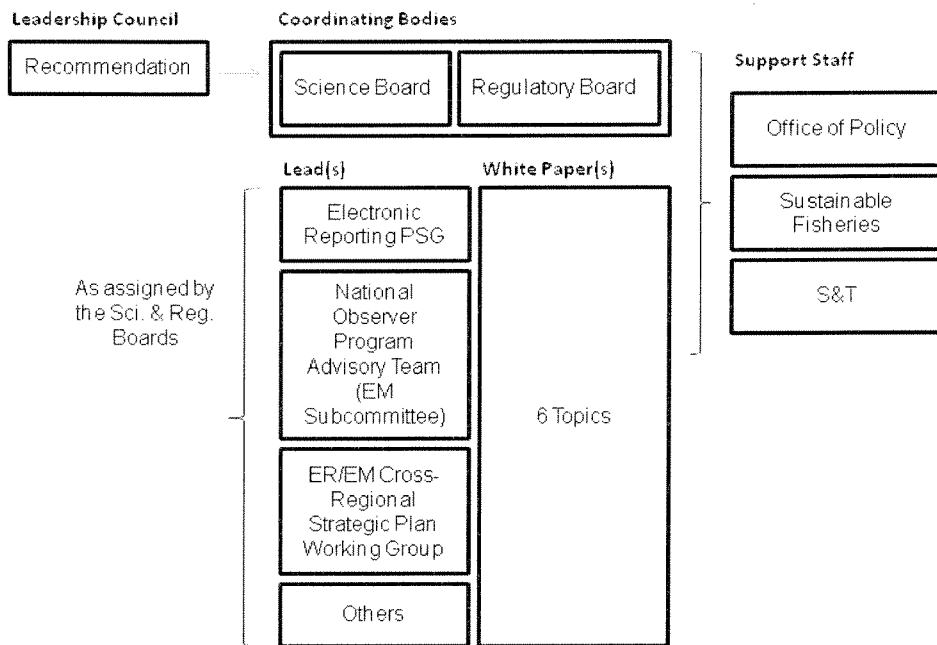
Six white papers as described below will be produced by subject matter experts and presented to NMFS leadership for review and approval. The papers should be from 3-12 pages in length and should make use of appendices for detailed specifications or technical references. Format can vary but must include sections as follows:

1. Objective/Purpose (e.g., statement of the problem, its context and outcome being sought);
2. Background/Synopsis (brief executive summary of each topic/issue, include links to URLs, appendices, other sources for more detailed references);
3. For each topic/issue to be analyzed/evaluated, list options from 1 to n (e.g., brief summary of options considered/proposed) and the most important pros/cons of each. State criteria used for evaluation, such as programmatic, policy, political, economic, biological, funding, staffing impacts and/or or expected cost/schedule/performance impacts; include range of timing, quality, probability of outcomes, products/services accomplished under different options;
4. Preferred Recommendation (from among the options described above specify recommended action/product/decision needed; responsible/accountable party; date/timeline/schedule for action).

Writers are encouraged to refer to the NMFS policy paper guidance at http://home.nmfs.noaa.gov/op/policy_prep.htm

Structure

This process for developing the white papers and policy guidance will be overseen by NMFS' Science and Regulatory Boards with staff support from the Office of Policy, Sustainable Fisheries and Science and Technology.



Assignments

Develop a set of white papers over the next 60 days on the following six topics:

1. **Existing Technologies:** Develop a matrix of existing EM technologies that include the fishery/species, gear, cost, potential sources of sampling bias, and IT infrastructure requirements associated with the specific tool(s). New EM tools are rapidly emerging. To more systematically consider how they can be applied to fisheries management more broadly, S&T will conduct a review of existing technologies and their application(s). The white paper will develop a matrix that specifies the fishery/species, gear types, costs, sources of potential sampling bias, and IT infrastructure requirements associated with the specific tool(s). The paper will also describe the effectiveness of each technology and the pros/cons of possible application(s) in other fisheries. While this paper can include examples from the international and non-fisheries sectors, the primary focus of this paper should be on the technologies that have been piloted and/or are in full use in US fisheries. **LEAD:** Science & Technology (ER/EM Cross Regional Strategic Working Group).
2. **Enforcement:** Describe the challenges and barriers associated with enforcement and adoption of EM. Despite growing interest in EM, there are questions about the extent to

which EM (and the information it provides) is enforceable by law. This white paper will describe the challenges associated with EM, looking specifically at the technological and legal standards they must follow, such as chain of custody, electronic signatures, etc. The paper will also include recommendations as to how to reduce/mitigate or eliminate enforcement concerns to the adoption of EM. **LEAD:** Office of Law Enforcement and GCEL.

3. **Confidentiality Concerns:** Identify the legal and policy implications and barriers for EM as it relates to confidentiality and the new proposed rule on confidentiality. There is concern that EM technologies could present issues related to confidentiality laws and/or regulations. This paper will identify the legal and policy implications and barriers for EM as it relates to confidentiality, including any pending new rules. The paper will also address intellectual property rights of EM-derived data using commercial software, including any policy implications associated with using such proprietary software versus government-furnished software. Lastly, the paper will include recommendations for legal and/or policy changes that will reduce or eliminate confidentiality issues. **LEAD:** Science & Technology, working with General Counsel.
4. **Research & Development:** Describe the research and development needs required to advance agency EM technology standards. Despite the rapid growth of EM in recent years and the myriad of NMFS-sponsored pilot projects, there still no set of EM technology standards suitable for most fisheries. This white paper will describe the research and development needs required to advance an EM set of standards. The paper will provide a brief overview of prior research and development projects, propose a draft set EM standards that could be adopted by NMFS, and assess the completeness of the standards to identify priority areas for new research. While the primary focus on this paper should be on the tools and technologies developed by the agency, the paper should also include a brief review of the technologies that have been developed in the private sector. **LEAD:** ER/EM Cross Regional Strategic Working Group.
5. **Alignment of Objectives:** Develop a process for aligning monitoring needs and regulations. The agency's approach to monitoring fisheries is not strategic and is highly irregular across geographic areas and fisheries. Decisions on coverage, frequency and method of collection are oftentimes not related to technical feasibility, statistical integrity and cost effectiveness. Given the ecological, economic, and social implications associated with the ways that fisheries are monitored, the agency needs to develop a more strategic process to determine the level and type of monitoring (EM or other) that is needed and that can be sustainable and cost-effective. This white paper will lay out an overarching process for Councils, NOAA, states, the industry and private technology developers to align monitoring efforts with regulatory needs. The paper will describe how to develop a monitoring regime for both newly established fisheries/regulations and for mitigating suboptimal regimes in those that already exist. **LEAD:** ER/EM Cross Regional Strategic Working Group

6. **Funding:** Identify options and pros and cons of various means for funding data collection. The cost of monitoring is a major concern to the agency and the fishing industry. This paper will evaluate legal and policy implications of various funding options for EM. The paper will identify opportunities for use of appropriations, industry funding (cost recovery and royalties in LAPP designs) and other funding sources. The white paper will discuss funding options in terms of the environmental, economic, political and equity implications of each. This paper will include the potential impact of each option on the different sectors of the industry (e.g., large-scale, community-based, etc). **LEAD:** Office of Policy

In developing these white papers, the lead offices are asked to focus on the regulatory, policy, and technological implications of each option.

Timeline

A draft of each paper should be developed within 2-months of assignment, vetted through the Science and Regulatory Boards and subsequently briefed to Leadership.

Appendices - Notes from Breakout Groups from Leadership Council January 2012 meeting.

Appendix 1. Notes from the Break Groups

Group A – Regulatory and Management Requirements

What is right balance of EM and Observers?

1. there are several factors that work to make EM difficult to implement
 - a. Reluctance on part of fishermen to adopt.
 - b. Management of some fisheries requires real time data. In some (but not all) cases, EM is difficult to implement in a way that provides real time data.
 - c. Cost – will the govt or the industry pay for EM equipment? Does the govt currently pay for an observer program to achieve necessary monitoring? Might that change? Highly valuable fisheries, especially where catch shares create an incentive for sustainable management and on large vessels, have more options for multiple approaches (eg., observers plus VMS).
2. EM is more than video monitoring; it needs to also include technology such as VMS and electronic log book.
3. Range of options from all EM to all Observers to combinations of both. The optimal “balance” is fishery and region specific. Councils likely have to be involved to find optimal balance for a given fishery in a given region. In general, Councils are interested in the adoption of EM methods, where they are cost-effective and practicable to implement.
4. EM may not work for certain catch accounting requirements. 100% retention may help resolve, but this requirement is not always an option.
5. Enforcement has raised concerns about prosecution based on EM (eg., chain of custody). In addition, some of the NGOs believe that fishermen will always figure out a way to bias the data produced by sole use of EM.
6. Reliability and practicality have to be very high – weatherproofing, robust to “contact”, battery requirements, data requirements, etc. Of course, reliability and robustness may affect cost.
7. Certain functions can only be accomplished by an observer (eg., verification of workability of conservation gear, biosampling, certain species identifications, etc.)

What is critical path?

1. National white paper on role of monitoring (all kinds) in fisheries management.
2. White paper on concerns regarding prosecution based on EM data?
3. White paper identifying way to address concerns of NGO regarding bias.
4. White paper summarizing on-going R&D and state of the art on EM, including video monitoring, electronic logbook, VMS, etc.

Group B – Fish Dependent Monitoring Strategies

There are things that video can do that observers cannot do and vice versa.

Observer programs provide a mechanism to:

- Monitor bycatch and catch;
- Collect socioeconomic data;
- Collect biological samples; length and frequency (esp. with discards);

Observer coverage shortcomings:

- Expensive;
- Awkwardness of placing people on boats;
- Only a paper record;
- Possible biases - result of changes in behavior(s);
- Physical hazard/intrusiveness

Challenge/shortcomings associated with video monitoring:

- Review of the data takes a lot of time;
- Species, size, and aspect are all challenges;
- Video data is huge – need to be planning the infrastructure to restore, maintain, and evaluate the data;
- Transfer of data from independent organization to government;
- Creates a sampling bias if the sampling size is low ;
- Difficult to capture bycatch of protected resources because it is a rare event;

- Small field of view (relative to observer coverage)

Assumption:

- Never to replace observer;
- Full retention is necessary for effective use
- Still need dockside monitoring (e.g. Canada has dockside monitoring – but they don't use it);
- Doesn't work for species that don't come out of the water (e.g. sea turtles);
- Cost is going to be far lower than expected;

Benefits of video monitoring, include:

- Augment observer catch (e.g. halibut fishery in AK);
- Less invasive;
- Potential to reduce change of behavior created with observer coverage.
- Opportunity to monitor underwater takes and interactions.

Additional thoughts:

- What can we do to make more of these projects feasible? Part of the key is in the design of the research projects.
- Need to develop software, length/size measurement tools.
- Need to move forward with what we have right now in the next 1-2 years. (The NE pilot project is trying to do that. Recognize that there are limitations, but we need to have an intermediate solution because the costs are so great.)
- There are examples of video monitoring that we can explore outside fisheries. For example, New York City has an advanced video technology that is software-based (not observers).
- Other examples exist in NZed; some species ID software is being developed;
- In Canada, regulations work for video monitoring. Small boats in NE may be most workable. Possibly a staged implementation process. Keep developing the technology. Get something going in the US fishery. The NW is moving ahead with full retention trawl fishery. We are using self-reported data for bycatch in the recreation sector. We can ground truth these data with headboats. It is more difficult to deal with charter boats and private boats. Potential use of e-monitoring exists in fisheries where there is full

retention. Cameras could work with headboats. Electronic monitoring would be a way to ground truth recreational catch.

- Rock fish retention can be dealt with using video monitoring. We think observer coverage changes behavior.
- Could possibly have cameras on all the boats, but only review a portion. Same as Canada example.
- The “food world” is based on auditing. Short-term cheating possible; but less in the long-term.
- Turtle bycatch in the scallop or shrimp fishery could be monitored (better than observer coverage) – possibly a DIDSON could work underwater.
- Could possibly create an opportunity to deal with underwater observation (trawls, tuna/dolphin) and takes of marine mammals and ESA listed species.
- Look into existing face recognition software;
- Possibly offer a prize to the business that can solve the problem or build software most effectively (it doesn’t need to be a huge amount of money); work with NGOs;
- Costs are split in Canada (Industry - 70%; Gov’t – 30%), but there are also large penalties;
- There is misunderstanding of the costs associated with video monitoring;
- Shift to full retention of catch could make video monitoring more feasible;
- Use lower ratio of observer coverage w/video monitoring to reduce catch.

Pilots and project reports produced by a single company.

Group C – Policy Group

Want to make sure we are on same page with definitions- EM goes beyond just the video camera technology. Here it will be used in the broader term

- Trade secret component vs. third party collection- what is intellectual copyright
- There is a lot of ambiguity with adopting a system and third party standards- it crosses the confidentiality boundary
- The camera recording may record activities that do not have to do with fishing- what are issues relative to access to these? Does adoption of EM bring along decisions about other things we don’t usually have to deal with.

Who pays?

It would be difficult to get it past constituents, but would be nice.

In a situation where want to move equipment from vessel to vessel it would be easier if NMFS owned it.

- The MSA allows third party contractors
- Talking about relatively small coverage zones- have to develop a flexible model
- Yes, We do need additional parties
- Having an independent entity in Alaska seems reasonable
- Either use appropriated funds for industry to use directly or need to collect a fee
- Doesn't seem to be any difference between EM and observers
- Under MSA do we have legal authority to do this?
- For VMS we have authority to impose a requirement- that's how we get at it there—but for VMS everyone in the fishery needs to have it
- For EM maybe only need to put it on a certain percentage of vessels.
- Could say you draw straw to have to take this video equipment on vessel- could assess fee across the fishery We have cost recovery for LAPPs and fee authority for limited access
- This could be a part of administrative cost
- We think we have a direction but this is something we need to have flushed out before we say this work plan requires fees.
- The notion that EM systems are transportable and easily installable is probably not rule
- There are different types of monitoring- like log books that are easily transportable.
- Different choices on what we can use and each technology has different costs- do you capture cost on individual selected or does the burden lie over the entire fleet?

The industry has to play a role in the design of these systems.

- Talking with council is important. Is it common for councils to discuss who pays?
- We have done this for VMS

Who should pay for R&D cost?

- What do we need to address in order to put in effect efficient monitoring system?
- Problem- disparity across country in how observer programs funded, second we don't have a lot of money and we are getting less. Need organized payment mechanisms across country. If need more monitoring the industry can pay more money.
- We should see if we can see if we can get industry to pay for this.
- There are parts of the country with little political clout and industry will end up paying for it.
- If there is a business opportunity we do have a way under coop research and development act (CRDA)- private sector pay for the work- opportunity we have- we would still own the intellectual property
- Letter said see what you are doing for observers- we want our share of subsidy. Federal support for initiation of observer programs.
- Model? Observing is a range of things- we would want to maintain scientific observing- compliance industry must pay for—gets away from unsustainable 100% observer coverage. That cost would hopefully be covered by the 3% or something like Canada DFO pays.
- There are places where you can give industry choices- you can either have an observer on board or camera- could let industry choose which is cheaper for them.
- Maybe choice should be on industry level- allowing a degree of choice is attractive as long as standards are clear.
- We shouldn't observe everything the same, but costs should be consistent.
- Another thing we heard was that enforcement component- if video camera sees violation then fisherman must pay for additional monitoring this would be a penalty.
- It is a performance standard and you have options on how to meet this standard.
- Enforcement side of it needs to be parallel with policy choices. Coercive enforcement.

- Would use video cameras and saw them do something they weren't supposed to do what happens?
- We need to protect the observer but videos don't have same qualifications.
- All observers carry video and 10% video reviewed.
- Incentive to conform to reporting requirement is that you don't know if you will be caught.
- Perhaps no different than NZ model need a consequence model.

What about existing fisheries- we have inequities in approach, do we go back and fix that?

- Sounds good but what about permit fees and no one has become consistent. Our track record is not great.
- Every time we have headquarter guidelines New England and AK complexities and everyone else gets stuck with it.
- Regional flexibility is inherently important.
- In an ideal world to design catch share program need to be clear about management. Decide to ignore that and put it in place and later decide we need more, then it is our responsibility to put more in place.
- How does this effect our way forward- do we have to have lessons learned spelled out?
- Want to maintain some regional flexibility but may result in inequity in who pays.
- The amount of money is probably going to decline so levels of coverage will either go down or someone has to pay for them. There's a transition time.
- NW with catch share is fishermen didn't trust each other so demanded 100% coverage and then realized they couldn't pay for it. So need 100% coverage with affordable system and do scientific coverage the same way.
- The requirement for accounting was met with a tool that could have been fulfilled in a less costly way.
- Wasn't there a discussion about having a full retention fishery? But there was no real buy in.
- Are there lessons about choosing an observer program v. some other tool?

What would be more helpful for gulf and s. atlantic in regards to more cost effective monitoring systems?

- Problem comes back to cost. When you've never really had it and install something see lots of new bad things. Getting fishermen to pay will be difficult.
- The differences are so great. We have little observer coverage and learned to function w/o science. Doesn't seem like SE will change all that much. In SE if we could get video coverage that would be great b/c we never had a lot of observers. Impact of budget will have different effects on different regions.
- RSA – setting aside quota selling quota and using that to pay for research.
- Have had discussions about charging royalties- decision has always been not to do it. Cost recovery is required. The council's responsibility to collect fees upon initial allocation.
- Other thing in SE coming in and closing fisheries down and that's a tough environment to levy new fees.

In terms of informing in the next days do we need someone to take this and turn into an analysis paper or another action?

- Professional specialty group has looked at 21 different- focus looking at videos instead of observers.
- Existing authorities to collect fees?
- Any advice in terms of authority to approve a plan about cost side of it?
 - Don't have a resolution- theoretically could disprove a plan but would have to build a really strong case
 - We have to have a really strong record saying we really can't afford to do it. Hard to say we can't afford it because of our budget.
 - If it's discretionary but subject to appropriations is a problem

Other things:

- Intellectual property- we were pushing a logbook designed by fishermen- it ended up being too complex for anyone to build. Fishermen have to fill everything out by hand. However we develop standards for this stuff.
- Don't think VMS has been foolproof want design of these systems to be pragmatic
- FOIA- problems would be same problems with EM
- Chain of custody and secure archiving to address compliance in future or not.
- Looking at other examples will provide info about things not thought about.

- Required some kind of a market on aquaculture ended up with genetic archive- terrific inventory system. Seemed bad but ended up great
- Industry realizing that if can document they are using fair practices certifies their product. Want to adopt these technologies to help with tracking in order for fish value to increase to consumers.