

National Marine Fisheries Report on Implementation of the Pacific Coast Groundfish Electronic Monitoring Program

On June 19, 2019, the National Marine Fisheries Service (NMFS) approved a final rule to implement an Electronic Monitoring (EM) Regulatory Amendment to the Pacific Coast Groundfish Fishery Management Plan. This final rule allows catcher vessels in the Pacific whiting fishery and fixed gear vessels in the shorebased Individual Fishing Quota (IFQ) fishery to use EM in place of observers to meet the requirements of the Trawl Rationalization Program for 100-percent at-sea observer coverage. NMFS is working on a proposed rule that will expand the use of EM to bottom trawl and non-whiting midwater trawl vessels participating in the IFQ fishery. All new measures will take effect in 2021.

As part of the implementation process for the regulatory amendment, NMFS must develop the guidance that will be used by providers and vessel owners to prepare their individual service and monitoring plans, as well as the detailed procedures that will be used by EM service providers to review the EM data in the EM program. This guidance and procedures are contained in the EM Program Guidelines and the EM Program Manual. NMFS provided a draft of the EM Program Guidelines for the Council's review at the September 2019 Council meeting (see [NMFS Report 1 for Agenda Item H.3.b](#)). We are providing an updated version of the EM Program Guidelines in this NMFS Report to address the comments we received from the Groundfish Electronic Monitoring Policy and Technical Advisory Committees (GEMPAC/TAC) and Council on the draft document. Following the November Council meeting, the final guidelines will go through our internal review process and then be posted on our website. We will also publish a notice in the Federal Register notifying the public of their availability, and provide copies to interested service providers.

We are also providing an early draft of the EM Program Manual in this Report for review by the Council and its Advisory Bodies. We understand that there are aspects of the manual that that industry and service providers need to estimate their future costs. We have focused on providing those elements in their entirety in this early draft, specifically the protocol for the service providers' review of EM data. Other sections of the manual are incomplete because they are dependent on databases that have yet to be built. However, these aspects of the manual are not expected to affect fishermen's ability to project their future costs under the EM program. We will be working with providers over the next year to complete these sections of the manual, based on agreed upon formats for databases and reports.

On both of these documents, we are requesting input from the Council and its Advisory Bodies on the following questions:

- 1. Is there any additional information needed by EM service providers in the guidelines or EM Manual to complete their EM service plans and plan their service delivery models?**

2. **Are any of the guidelines or manual not relevant or appropriate for the groundfish EM program?**
3. **Are there other best practices that EM vessels or providers know of that would be helpful to include in the guidelines or Manual?**

EM Program Guidelines

This version of the guidelines has been updated based on comments received from the GEMPAC/TAC at the September 2019 meeting (see [Agenda Item H.3.b Supplemental GEMPAC Report 1](#)). Specifically, the updates include:

- Regulatory requirements have been bolded to differentiate between requirements and best practices.
- Example VMP language has been updated to reflect the latest EFP requirements.

Some of the GEMPAC's comments suggested there is a misunderstanding regarding the purpose of the EM Program Guidelines. We would like to clarify the purpose of the EM Program Guidelines and how they will be used by NMFS and EM service providers and vessel owners. NMFS understands the industry's concerns about additional requirements that may add costs and reduce flexibility in the EM program. The EM Program Guidelines are not requirements, but instead intended to provide more detailed information for providers and vessel owners that NMFS has identified as best practices, which is intended to help guide applicants and reduce the amount of time and effort that both NMFS and the applicants have to put into the application development and approval process. The base practices are not required to have an application approved and NMFS is open to other approaches.

EM Program Manual

Section 1.1 of the manual provides an overview of the roles and responsibilities and data flow in the third party video review model that will take effect in 2021. Section 2.3 contains the standard protocols that are to be used by providers in the EM program to process EM data and submit reports to NMFS. Section 2.3.1 describes the steps in the logbook audit model. We developed this model based on the Council's preferred alternatives, previous discussions with the GEMPAC/TAC, a review of other EM programs, and analysis by Pacific States Marine Fisheries Commission (PSMFC). Key features and decision points are discussed further below.

Logbook Audit Approach

The Council's preferred alternatives outlined the use of a logbook audit model such as that used in the British Columbia groundfish fishery, in which a portion of the video is initially reviewed and compared to the vessel logbook based on a set of criteria. If the logbook and video do not match within established limits, then additional video may be reviewed. This approach has several benefits. It is less costly than a complete review of all video. However, as the entire trip is recorded on video and each haul has an equal probability of being selected for review, it creates a "radar trap"-like incentive to report correctly on all hauls. The extra cost incurred from the review of additional video if the logbook does not pass the initial audit also creates an incentive to report correctly on all hauls. This approach is largely credited with the success of the British Columbia EM program (Stanley et al. 2011).

The sampling rate and business rules for the comparison of the logbook and EM data are key decisions in the logbook audit. They drive the costs of the video review and the quality of the discard estimates from the EM program. The Council's preferred alternative recommended 100% review initially with the level reduced based on performance.¹ This was intended to allow flexibility to adjust the sampling rates based on the performance of the program. At this meeting, NMFS and the Council are discussing the initial sampling rates to be used in 2021.

NMFS has recommended the following sampling rates for each gear type participating in the EM program:

- Shorebased whiting – 100% of hauls
- MSCV – 100% of hauls
- Non-whiting midwater trawl (maximized retention) - 100% of hauls
- Non-whiting midwater trawl (optimized retention) – 25% of hauls, with a minimum of 1 haul/trip
- Bottom trawl - 25% of hauls, with a minimum of 1 haul/trip
- Fixed gear - 25% of hauls, with a minimum of 1 haul/trip

The rationale for these recommended levels are discussed further below. NMFS and the Council may revisit these sampling rates in future years and make adjustments based on the program's performance.

Shorebased Whiting, MSCV, and Non-whiting Midwater Trawl (Maximized Retention)

Shorebased whiting, MSCV, and non-whiting midwater trawl trips practice maximized retention, and so are very fast and less costly to review than other gear types (Smith 2019). In addition, there are on average less than 2 hauls per trip on shorebased whiting and non-whiting midwater trawl trips. A lower prescribed sampling rate on these trips would still result in an actual sampling rate of about 50%, making a lower sampling rate less useful. In addition, PSMFC has suggested that subsampling review on these trips could actually take longer than simply reviewing 100% of the video, because subsampling requires going through the steps associated with reviewing the video twice, including set-up, subsampling, reporting, etc. MSCV trips have a large number of hauls per trip, suggesting a lower review rate could result in some cost savings. However, because MSCV trips are so long and can cover a large area, applying the sampling rate to the trip level may not result in a representative sample of hauls to review. It

¹ At the September GEMPAC meeting, the question was raised whether the Council's motions were intended to mean that the level of video review should start at 100% for all vessels January 1, 2021, and then decline over time, based on an individual vessel's performance. However, after a review of the record on this issue, it is clear to NMFS that the Council intended the program to transition to a lower level of video before the program transitioned to industry-funded, third party video. The regulations were initially intended to go into place in 2017, with PSMFC conducting the video review through 2019, and the program transitioning to third party review in 2020. The Council intended PSMFC to continue to review the video at 100% in 2017, but that NMFS, PSMFC, and the Council, would work on developing the lower levels of video review for 2020, now 2021. The 100% was intended to be a back-stop and allow the Council and NMFS to consider any level of review up to 100%, based on performance. Therefore, the protocol we developed in Section 2.3.1 of the EM Program Manual is based on a logbook audit model and level of video review less than 100%. If this is incorrect, the protocol in the EM Program Manual would need to be revised to start at 100% review.

may be more appropriate to apply an MSCV sampling rate to a finer level, such as to hauls per sea day, which would undercut the cost savings. **Therefore, NMFS recommends that shorebased whiting, non-whiting midwater trawl (maximized retention), and MSCV trips have a 100% review rate.**

Since there would be no subsampling, there may not be a need to use the video to audit the logbook. Instead, the logbook data could simply be replaced by the EM data as the more unbiased discard data source after the video review. This would be different from the current business rules in which the higher of the two numbers is used. Under this change, the vessel account would be credited if the EM estimate is lower and replaces the logbook estimate. Even though the logbook would not be used for an audit, it would still be necessary to initially debit the account in a timely manner. There would still be an incentive to report accurately on the logbook to avoid any unexpected changes in the vessel account balance once EM data is finalized.

Non-whiting Midwater Trawl (Optimized Retention), Bottom Trawl, and Fixed Gear

Trips sorting catch, such as non-whiting midwater trawl trips practicing optimized retention, bottom trawl, and fixed gear trips, take longer and are more costly to review and, therefore, can benefit from the lower audit rate in the logbook audit model. PSMFC conducted an analysis (A. Smith 2019) to examine the effect of different review rates and business rules on the number of trips that would pass the audit, the length of the video review (as an indicator of cost), and the resulting discard estimates. This analysis used EM data from the bottom trawl and fixed gear trips in EM EFP 2016-2018 to model the results of three different review rates (25%, 33%, and 50%) and three different sets of business rules (high, mid, and low). The analysis shows that more stringent business rules and higher review rates result in more trips triggering 100% review and, as a result, discard estimates that are closer to the current estimates under the 100% review in the EM EFP program (Figure 1). Lower review rates and more liberal business rules had the opposite effect. However, the effect on total discard estimates for each species was small (Table B1), because the majority of IFQ species are still required to be retained to ensure accurate species identification, and because there is little bycatch in general on fixed gear trips. Lower review rates resulted in less video being reviewed (Figure 3) overall, but not in direct proportion to the prescribed review rate, because the actual amount of video reviewed depends on differences in the volume of catch, catch composition, image quality, and the business rules applied.

The analysis also showed that many trips fail the logbook audit, even based on the most liberal criteria. This is concerning because if 100% review is triggered frequently, even for vessels that are making good faith efforts to report accurately, it could undercut the incentives of the program and any resulting cost savings. The alternative would be to choose lower levels of review and even more liberal criteria, which would undermine the quality of data for management. However, it is important to note that there has not been an incentive for captains to try to match EM estimates because their performance has had no effect on the level of review or their own costs (PSMFC reviews 100% of hauls in any case and NMFS is funding the video review). Therefore, these results may not be entirely representative of individual vessel performance under the future logbook audit model. To try to understand whether it is likely that individual

vessels could improve their performance and increase pass rates, PSMFC examined individual vessel performance in the EFP data. They found that some vessels do consistently perform better than others. This suggests that with training and effort, individual vessels can improve their performance over time and that better performance may be expected with the right incentives from the logbook audit model

Based on these results, **NMFS is recommending an initial 25% review rate for bottom trawl and fixed gear trips, and non-whiting midwater trawl trips practicing optimized retention.** Unlike whiting trips, there is a substantial difference in review time and, therefore, potential cost savings, in an audit approach for these gear types. In addition, there are enough average hauls per trip to support a subsampling method. Based on 2018 and 2019 observer data, bottom trawl trips have an average of 7-8 hauls per trip and pot gear trips have an average of 13-15 hauls per trip. A review rate of 25% would result in an average of 2 and 4 hauls being selected for review per trip for bottom trawl and fixed gear, respectively. Although a 25% review rate would result in more false passes than a higher review rate, the effect on discard estimates and data quality for management is likely to be small, because the majority of IFQ species are required to be retained. This review rate would also offer greater cost savings to participating vessels. Therefore, we believe that these recommendations balance the need to maintain sufficient data quality from the EM program to ensure individual accountability for catch, which is purpose of the 100% monitoring required by the Trawl Program, while providing cost savings and efficiencies to participating vessels and providers, an objective of the EM program.

Business Rules

We are also recommended that the existing business rules from the EM EFP be maintained for the logbook audit. As a reminder, the business rules and our original rationale for them is as follows:

In developing the business rules, NMFS reviewed the results of the EFPs and other EM programs and identified the following criteria for an appropriate standard.

- The standard should be based on a comparison of weights, rather than counts, because the IFQ fishery and cooperative allocations are managed by weight.
- The standard should allow for some difference between logbook and EM estimates. EM estimates are intended to be an independent, unbiased estimate of discards, but they are still estimates and have some inherent uncertainty. In addition, a small allowable difference creates an incentive for captains to report correctly to have their own data used for management.
- The program data is being used to account for catch of IFQ species, so there is a need to minimize uncertainty in discard estimates and to consider different rules for overfished and non-overfished species.
- The standard should be rigorous enough to minimize uncertainty, but should not be so challenging as to be unattainable.

With these criteria in mind, NMFS developed the following standards for comparison of logbook and EM data. These business rules will be applied to comparisons of logbook and EM discards on fixed gear, bottom trawl, and non-whiting midwater trawl trips (Table 1), and whiting trips (Table 2) to determine which data will be used for debiting allocations of IFQ species.

Table 1. Business Rules for Non-whiting IFQ Trips

| Species/Group | Rule |
|--|--|
| All IFQ species/groups | If a discard is reported on EM, but not in the LB, use the EM estimate. If a discard is reported in the LB, but not by EM, use the LB estimate. |
| Canary rockfish, darkblotched rockfish, bocaccio rockfish South of 40°10'N, cowcod rockfish South of 40°10'N, and yelloweye rockfish, petrale sole, and pacific ocean perch North of 40°10'N (Overfished species*) | If the LB and EM estimate are not equal, use the larger of the two estimates. |
| All other IFQ species/groups | If the absolute difference between LB and EM is 10% or less of the EM estimate, use LB. If absolute difference is greater than 10%, use the larger of the two estimates. |
| All IFQ species/groups | If there is no EM estimate (e.g., due to EM system failure), use LB estimate. |

LB = logbook, EM = electronic monitoring

*Although canary rockfish and petrale sole have been declared rebuilt, they are being managed under rebuilding plans in the current specifications cycle through 2016.

Table 2. Business Rules for Pacific Whiting IFQ Trips

| Species/Group | Rule |
|-------------------------|--|
| Total weight of discard | If a discard is reported on EM, but not in the LB, use the EM estimate. If a discard is reported in the LB, but not by EM, use the LB estimate. |
| Total weight of discard | If the absolute difference between LB and EM is 10% or less of the EM estimate, use LB. If absolute difference is greater than 10%, use the larger of the two estimates. |
| Total weight of discard | If there is no EM estimate (e.g., due to EM system failure), use LB estimate. |

LB = logbook, EM = electronic monitoring

NMFS Audit

NMFS will be charged with ensuring that EM service providers follow protocols for the identification and estimation of discards and the video review. NMFS is intending to use an audit method to do this, by re-reviewing a portion of the trips reviewed by an EM service

provider, for comparison. A description of the sampling rate and business rules for this audit are provided in Section X of the EM Program Manual. We would have an initial sampling rate that would be equal across all vessels. The sampling rate will be applied to vessels, rather than individual providers or reviewers, because that is the sampling unit that matters for management. But NMFS would retain the discretion to review additional trips from any vessel, provider, or reviewer, as necessary. We would likely review at a higher rate at the beginning of the program, as everyone is learning the protocol, to provide feedback to providers and vessels and to establish initial data quality. We would use the same business rules to compare EM-EM as are used to compare EM-LB. If discrepancies are identified, the provider may be asked to re-submit the data or otherwise remedy the issue (remedial training for staff, additional QA/QC procedures, etc.). If a significant discrepancy requires re-review of the video, NMFS would take possession of the video and re-do the review, or substitute its own numbers in the vessel account. NMFS would also review steam time on trips selected for the audit, so no steam time would need to be reviewed by service providers as part of the logbook audit.

References

Smith, A. 2019. Logbook Auditing for EM: Bottom Trawl and Pot Fisheries. Pacific States Marine Fisheries Commission. 15 pp.

Stanley, R.D., McElderry, H., Mawani, T., Koolman, J. 2011. The advantages of an audit over a census approach to the review of video imagery in fishery monitoring. ICES Journal of Marine Science, doi:10.1093/icesjms/fsr058. 7 pp.