

GROUND FISH MANAGEMENT TEAM REPORT ON ELECTRONIC MONITORING-
FINAL PACIFIC HALIBUT DISCARD MORTALITY RATES AND DISCARD SPECIES
LIST

SSC conditional endorsement of the proposed EM DMRs

The Groundfish Management Team (GMT) presented our proposed methodology on electronic monitoring discard mortality rates (EM DMRs) for Pacific halibut on bottom trawl trips to the Scientific and Statistical Committee (SSC). The SSC conditionally endorsed the GMT's proposed EM DMRs based on time-on-deck, subject to further investigation of three requests described below ([Agenda Item F.11.a, Supplemental SSC Report, November 2017](#)).

The Council may consider selecting Option 2, the GMT's proposed EM DMRs as the final preferred alternative (FPA) at the current time; however, they should note that there could be slight future adjustments pending completion of the SSC requests. If necessary, any resulting adjustments are expected to be relatively minor, because the overall methods and results would be qualitatively identical. Since these adjustments would be science updates that do not require regulatory changes, the National Marine Fisheries Service (NMFS) confirmed that selection of the GMT's proposed EM DMRs as the FPA at this time would not be problematic. If the finalized EM DMRs, pending completion of the SSC requests, were not ready until mid-season in 2018, they could be retroactively applied to shorebased individual fishing quota (IFQ) accounts from earlier months in 2018.

The GMT recommends that the Council select Option 2, implement a vessel-specific DMR rate for each halibut discarded under EM using the SSC-approved GMT model, for bottom trawl trips.

SSC Requests

The following three requests were made by the SSC:

1. The analysts estimate and evaluate an additional model that includes gear type so the Council can consider using this alternative model for assigning DMRs.
2. The analysts determine and correct for bias in the average DMR assigned by this approach relative to the average DMR calculated using conditions noted by observers.
3. The analysts adjust the survival rates in the model used to calculate an overall DMR such that fish categorized by observers as "excellent" have an average overall calculated DMR of 20 percent and the DMR for fish that are out of water for a long time approaches 100 percent mortality on average.

The primary focus of the SSC requests was to resolve the negative bias that was detected during validation testing of the GMT's proposed EM DMRs to the West Coast Groundfish Observer Program (WCGOP) DMR estimate (62 percent and 68 percent, respectively) for observed EM trips. The sample size of fish on observed EM trips was small (n=94), and WCGOP cautioned against using it to inform option 3 of a 68 percent fleet-wide DMR ([Agenda Item E.6.a; Supplemental NMFS Report 1; September 2017](#)).

Accordingly, following the SSC review, the GMT conducted a cross-validation test (Table 1) using 2015-2016 observer data for all observed bottom trawl trips, including those that did not use EM, to better evaluate potential bias with the GMT’s proposed EM DMRs (i.e., built the model using 2015 data and tested versus 2016 data, and vice versa).

These cross-validation tests based on much larger sample sizes (>6,000 halibut per year) indicate the GMT’s EM DMR methodology is unbiased (i.e., the errors were non-directional) and provide a reliable means to estimate fleet-wide DMRs. The GMT will share these results with the SSC, as their concerns with potential bias based on the validation tests using observed EM trips appears to have been an artifact of a low sample size (n = 94 halibut).

Table 1. Cross-validation tests conducted after the SSC review to better evaluate if there is potential bias associated with the GMT’s EM DMR methodology when using the larger sample size observer dataset (n>6,000 halibut per year). This broader, more robust validation testing indicates the SSC concerns with the negative bias based on the validation tests from observed EM trips was an artifact of a low sample size (n=94 halibut).

	GMT EM DMR (Time-on-deck model)	Observer Viability-based DMR
2015 Model Applied to 2016 (n=6,490)	0.52	0.56
2016 Model Applied to 2015 (n=6,239)	0.55	0.50

Gear options if desired for further analysis

Following the SSC review, the GMT further discussed SSC request #1 (i.e., inclusion of gear type in modeling). Based on these discussions, the GMT concluded that the Council would need to make a policy decision to consider further investigation of more complex models that include gear type in addition to time on deck, haul time, and fish length.

In other words, the Council could be satisfied using the simple time-on-deck model as originally proposed. If the Council wanted to further pursue evaluation of bottom trawl gear types, then the SSC would review the resulting technical results.

Although models that include gear type have not yet been thoroughly analyzed, the time-on-deck viability distributions are very similar (Figure 1), indicating there might not be significant differences; however, this a subjective comparison, and including gear as a covariate could potentially improve the model and resulting EM DMRs.

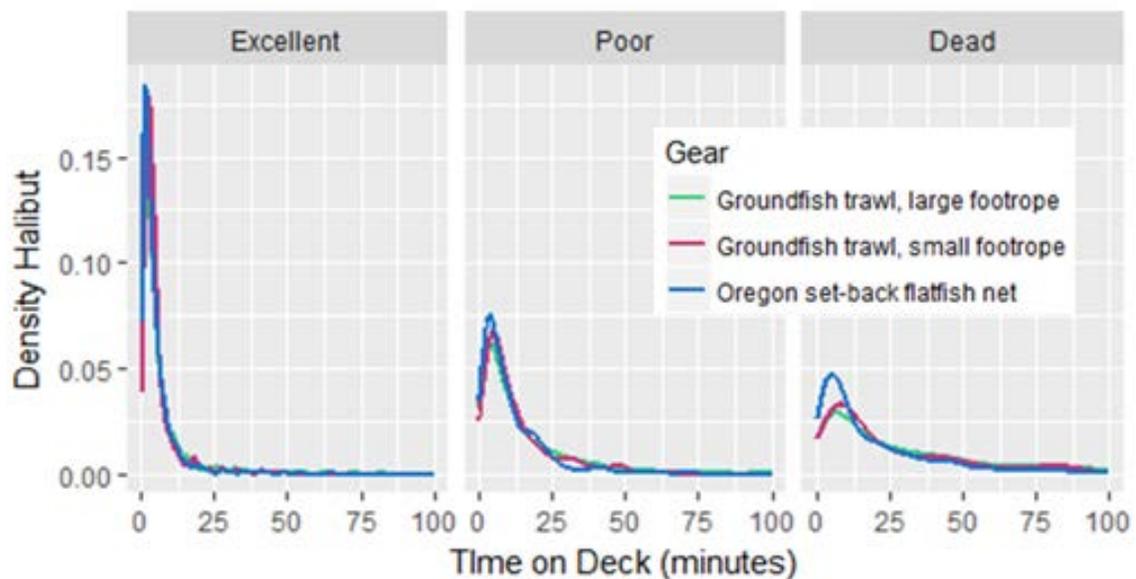


Figure 1. Observer density (“proportion frequency”) distribution comparisons of halibut viability by time-on-deck and gear type. This subjective comparison does not appear to indicate that gear type has much influence on DMRs.

If the Council would like to further investigate the effects of bottom trawl gear type to EM DMRs (in response to SSC request #1), the GMT provides the following gear options:

Gear Option 1: Use the original time-on-deck EM DMR proposal, with the same method for all bottom trawl gears.

Gear Option 2: Include bottom trawl gear type in model evaluations and have the results reviewed by the SSC.

Gear Option 3: Forgo further model evaluations of gear type and instead separate the GMT’s proposed EM DMRs by bottom trawl gear type, which is simple and has already been completed.

If the Council would like to further investigate the effects of bottom trawl gear type to EM DMRs, the GMT recommends that Gear Option 2 would be the preferred approach compared to Gear Option 3.

Binning the GMT’s proposed EM DMRs

During our joint November meeting with the Groundfish Electronic Monitoring Policy Advisory Committee (GEMPAC) and Groundfish Electronic Monitoring Technical Advisory Committee (GEMTAC), we discussed whether the GMT’s proposed EM DMRs should be applied based on the nearest second as recorded by video reviewers or if the same DMRs could be used for broader time bins (e.g., 0-5 minutes). **To estimate DMRs as precisely as possible, the GMT recommends implementing the proposed DMR to the nearest second (as opposed to the minute as described in [Agenda Item F.11.a, GMT Report 1, November 2017](#)).**

Bottom trawl EM DMR methodology conclusions

In conclusion, the GMT believes that our proposed EM DMRs would be an unbiased and reliable method for estimating fleet-wide DMRs, and would provide incentive for trawlers to get credit for getting fish back in the water quicker. We fully support the International Pacific Halibut Commission (IPHC) recommendation that this provides a good starting point, and that future research, updating, and adaptation would be beneficial for future consideration, but we do not have any specific recommendations. Again, we recommend the Council consider our proposed EM DMRs as the FPA for bottom trawl trips.

The remainder of this report pertains to timeframes and follow-on actions for the Council's consideration in adopting EM DMRs. Furthermore, we discuss our recommendation for modifying the discard species list as described in [Agenda Item F.11.a, NMFS Report 1, November 2017](#).

Implementation time frames

As described above, the GMT's proposed EM DMRs could be applied to shorebased IFQ vessel accounts relatively quickly (i.e., one month or less after Council adoption and finalization of the SSC requests), pending some modifications of catch accounting formulas. Additionally, the EM DMRs could be applied retroactively to 2018 IFQ accounts after we resolve the SSC requests.

However, the GMT stresses that our proposed EM DMRs should not be used in season unless they will also be used by the WCGOP for final mortality estimates. It is our understanding that WCGOP will need to confirm these methods with the IPHC before implementing the EM DMRs in the annual total mortality report estimates. A formalized letter of support from the IPHC to WCGOP in the immediate future is recommended.

Further, if that understanding is reached, we propose that the vessel accounting system continue to use DMRs based on WCGOP-recorded viabilities when observers are aboard EM vessels. This will allow for continued assessment of the appropriateness of observed viabilities with time-on-deck estimates and control for additional time needed by observers to assess viabilities.

Documentation

If the Council adopts the GMT's proposed EM DMRs, then we recommend they be described in the vessel monitoring plans (VMPs) for EM participants and in the Status of the Pacific Coast Groundfish Fishery [Stock Assessment and Fishery Evaluation](#) (SAFE) document. The SAFE documents all other DMRs.

Best handling criteria for eligibility

There have been discussions about whether or not to require best handling criteria for halibut to be eligible for the GMT's proposed EM DMRs. The IPHC provided guidance in regards to what their preferred best handling conditions would be, but did not see a need to require thresholds for eligibility, unless red flags with poor handling become apparent ([Agenda Item F.11.a, Supplemental IPHC Report 1, November 2017](#)). During our joint session with the GEMPAC/GEMTAC in November, the members appeared to favor requiring best handling criteria for eligibility.

The GMT sees merit in requiring best handling criteria in VMPs from the beginning, as it would create greater incentive to improve halibut survival and could reduce future workload (i.e., not readdressing if problematic).

Buffers for precaution

In our September report ([Agenda Item E.6.a, Supplemental GMT Report 2, September 2017](#)), the GMT had proposed that the Council consider adding buffers for precaution to the GMT's proposed EM DMRs, since there was uncertainty in using this new methodology. However, based on the cross validation results (Table 1) that indicate the GMT's proposed EM DMRs are an unbiased and reliable method to estimate fleet-wide DMR, the GMT no longer believes that buffers for precaution are necessary.

Fish released for safety

During the GEMPAC/GEMTAC meeting, there were discussions on what DMR would be applied to halibut not brought on board, but caught in a net that was then released for safety reasons. Currently, WCGOP has a protocol for estimating the species and weight within a tow not brought onboard. **The GMT recommends that WCGOP work with Pacific States Marine Fisheries Commission (PSMFC) video reviewers to develop a similar estimation protocol for EM vessels that release tows in the water.**

Addressing logistical challenges with less than 100 percent review

In April 2017, the Council modified their FPA from April 2014 for the level of video review to the following:

Sub-Option B2. The level of review should initially be 100 percent, but NMFS would have the ability, in consultation with the Council, to modify the percentage based on performance and the amount of review necessary to verify the accuracy of logbook information, and the performance of individual operators.

While there are currently no plans to change from 100 percent review, the GMT notes that considerations would need to be made in the future as our proposed EM DMRs are reliant on time-on-deck information recorded by video reviewers. If less than the current 100 percent review rate is adopted (i.e., audited discard logbooks), then solutions would have to be developed for un-reviewed halibut discards, as time-on-deck information would not be recorded.

In September, the GEMPAC requested that options start being developed for applying EM DMRs with less than 100 percent video review ([Agenda Item E.6.a, Supplemental GEMPAC Report, September 2017](#)). The GMT offers the following preliminary options that could be further developed by the Council and its advisory bodies in preparation for less than 100 percent video review.

Non-review option A: Use the current 90 percent EM DMR associated with dead viability

Rationale: As there would be no time-on-deck recorded to inform the EM DMR, the default 90 percent could be used.

Non-review option B: Mandatory review/audit for hauls with halibut discards

Rationale: If a halibut is reported on the discard logbook, then that haul would be reviewed so that the time-on-deck information could be acquired by the video reviewer and EM DMRs applied.

Non-review option C: Vessel-specific EM DMR

Rationale: This option could be based on a vessel’s average DMR from observer and/or EM viabilities. This may provide incentive for faster discarding, since rates would be based on past performance. Further, since they would not know which hauls would be reviewed, a vessel would want to discard all halibut as fast and safely as possible, as video review could potentially occur during any haul.

Applicability of DMRs Coastwide

Pacific halibut are currently managed as an individual bycatch quota (IBQ) stock north of 40° 10' N. lat. and as a set-aside south of 40° 10' N. lat. While the main push for development of EM DMRs has been from the northern area, the GMT was asked to comment on the applicability of these rates in the southern area.

The GMT recommends that our proposed EM DMRs be used coastwide since: (1) coastwide discards were used in the modeling that was the basis of our EM DMR proposal (Figure 3); (2) the time-on-deck viability distributions were similar for both north and south of 40° 10' N. lat.; and (3) having a consistent methodology is preferable for all parties.

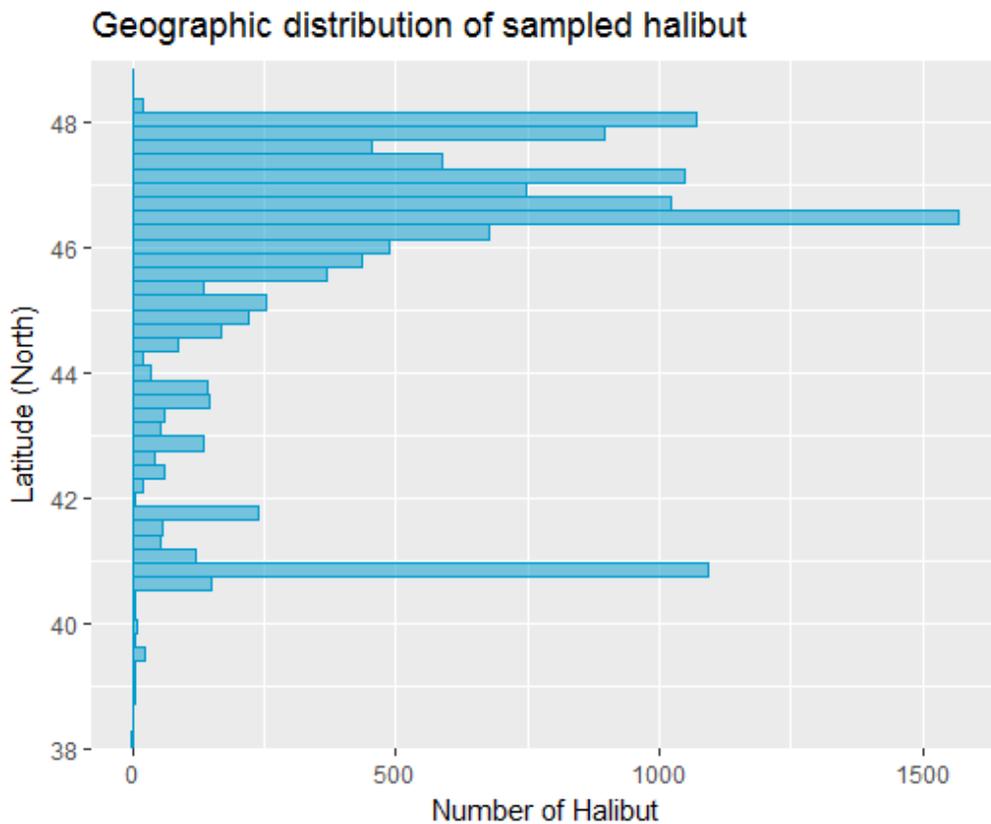


Figure 3. Sample sizes by area of discarded halibut used in the modeling that formed the basis of the GMT’s proposed EM DMRs for bottom trawl trips.

EM DMRs for IFQ mid-water non-whiting trawls

The GEMPAC requested development of EM DMRs for both bottom and midwater non-whiting trawls in April 2017 ([Agenda Item F.2.a, Supplemental GEMPAC Report, April 2017](#)); however,

focus for midwater non-whiting trawls has shifted to allowing retention instead of developing EM DMRs.

Halibut mortality for midwater non-whiting has been low: < 0.05 mt each year from 2011-2016, when the rockfish fishery was less active and only 0.06 mt in 2017 despite a large increase in effort in the midwater rockfish fishery (i.e., >4,000 mt retained to date). During the GEMPAC/GEMTAC meeting, there were discussions of potential options ([described in Agenda Item F.11, Situation Summary, November 2017](#)) for retention of halibut on midwater non-whiting EM trips.

Some vessels were interested in optimized retention and being able to sort catch (the Council's current FPA; option 1), while others desired to fish maximized retention, similar to whiting boats (option 2). Allowing these non-whiting midwater EM vessels to retain these trace amounts could be more beneficial than requiring discarding halibut at 90 percent DMR. NMFS staff has noted that vessels would need to declare either option to WCGOP, to inform video reviewers and to ensure those vessels are in the observer selection pool for scientific coverage under option 1.

The GMT therefore recommends the Council adopt both option 1 and option 2 as FPA for the non-whiting midwater trawl sector.

Influence to halibut discards if the GMT's proposed EM DMRs are adopted

In September 2017, the Council discussed whether adopting the GMT's EM DMRs would result in greater discarding of halibut in general, and specifically, of sub-legal halibut (< 32 in. or < 82 cm), as there has been a shift toward sub-legal halibut bycatch in recent years ([2017 WCGOP Pacific Halibut Bycatch Report](#)).

The GMT does not believe that halibut discards would increase overall or for sub-legal fish if our proposed EM DMRs are adopted. As our proposed EM DMRs would more closely mimic the current approach of assessing viability by observers, the GMT believes that discard behavior would be similar to that with observer coverage.

Discard Species List

As we stated in September 2017 ([Agenda Item E.6.a, Supplemental GMT Report 2, September 2017](#)), **the GMT recommends option 2**, which would allow NMFS to make changes to the discard species list within the VMP after consultation with the Council.

GMT RECOMMENDATIONS FOR EM DMR FOLLOW-ON ACTIONS:

For bottom trawl FPA:

- 1. Council adopt the GMT's proposed EM DMRs (option 2).**

If the GMT's proposed EM DMRs are adopted as the FPA for bottom trawl:

- 2. If the Council would like to further investigate the effects of bottom trawl gear type to EM DMRs, the GMT recommends that Gear Option 2 would be the preferred approach compared to Gear Option 3.**
- 3. To estimate DMRs as precisely as possible, the GMT recommends implementing the proposed DMR to the nearest second.**

4. EM DMRs be described in the VMPs for EM participants and the Groundfish SAFE document.
5. WCGOP work with PSMFC video reviewers to develop a similar estimation protocol for EM vessels that release tows in the water.
6. Council adopt the EM DMRs coastwide.

For non-whiting midwater trawl FPA:

7. Council adopt both options 1 and 2 as FPAs.

For discard species list:

8. Council select option 2.

PFMC

11/19/17