

## Current Information on Marine Mammals Feeding on Halibut Discards in the GOA and BSAI Groundfish Fisheries

At their 2023 October meeting, the Council requested “*the Interagency Halibut DMR workgroup<sup>1</sup> review methods used to estimate halibut mortality with a particular focus on marine mammal feeding on discards per their recommendation, for all fisheries with marine mammal interactions in the BSAI and GOA.*” This document outlines how marine mammals’ interactions are observed and potential ways to incorporate them into DMRs. Marine mammal interactions are not taken into consideration when the Council’s Halibut DMR Workgroup estimates the annual DMRs that are included in the groundfish specifications.

Halibut discard mortality rates (DMRs) are estimates of the proportion of halibut that survive post-capture (survive after being caught and subsequently discarded). DMRs apply to fisheries in the Gulf of Alaska (GOA) and in the Bering Sea and Aleutian Islands (BSAI) that are subject to the BSAI and GOA Groundfish FMPs. For fishing operations subject to these FMPs, incidentally captured halibut are defined as prohibited species catch (PSC) and “*must be returned to the sea with a minimum of injury except when their retention is authorized by other applicable law*”.

Halibut DMRs are utilized in the CAS (Catch Accounting System) to calculate a final halibut mortality estimate by using one of three methods; 1) the 2- or 4-year average sector rate updated biennially by the Council’s Interagency Halibut DMR Working Group, 2) a haul specific rate based on observer data from halibut sorted on the deck of trawl CPs and motherships when operating in the non-pollock groundfish fisheries off Alaska called Halibut Deck Sorting, or 3) a set rate established by Council’s Halibut DMR Working Group (i.e., 100% for pelagic trawl gear). A detailed description of the first estimation method (above) used by the DMR Workgroup can be found here: [2017-2018 Halibut DMR Recommendations](#); methods for the deck-sorted hauls (second estimation method) are described below.

In November 2019, NMFS implemented regulations (84 FR 55044, October 15, 2019) for catch handling and monitoring requirements to allow halibut bycatch to be sorted on the deck of trawl CPs and motherships when operating in the non-pollock groundfish fisheries off Alaska. Deck sorting regulations were limited to vessels participating in the non-pollock groundfish fisheries. For more information on the Halibut Deck Sorting rulemaking see <https://www.fisheries.noaa.gov/action/non-pollock-trawl-catcher-processor-halibut-bycatch-handling-and-monitoring-requirements>.

Estimation of DMRs for deck-sorting operations fall outside of the annual specification process and these DMRs are not estimated by the DMR Working Group. Instead, to incentivize careful and immediate release of halibut, haul-specific DMRs are estimated in real-time based on observer data and are applied to the weight of discarded catch for that same haul. There are two components of the total halibut mortality estimated in CAS: 1) the weight and mortality of halibut sorted on deck; and 2) the weight and mortality of halibut in the factory. The weight of deck sorted discarded halibut is the observer’s count of all deck sorted halibut multiplied by the mean weight of deck sorted halibut. The weight of halibut discarded from the factory is calculated by extrapolating data from observer’s species composition samples collected in the factory to the flow scale weight (weight of catch processed in the factory). The DMRs used to estimate mortality for these two components are also calculated differently: deck sorted mortality is based on a haul-specific real-time DMR, while factory discard mortality is based on the

---

<sup>1</sup> Jen Cahalan (PSMFC), Jason Jannot (NMFS AFSC), Michael Fey (PSMFC-AKFIN), Krista Melani (NMFS AKRO), Jason Gasper (NMFS AKRO), Ian Stewart (IPHC)

annually specified DMR. These two components are added to generate estimates of discard weight and mortality for that haul.

Observers record mammal interactions on all fishing trips where marine mammals are seen by the observer to be interacting with the fishery. These interactions include a wide range of animal-fishery interactions, including marine mammals “feeding on discards”. Marine mammals’ feeding on discards has been identified as a concern that may affect the mortality of discarded halibut that is not fully accounted for either in deck sorting or the annual DMR process. *Table 1* below represented the observed instances of marine mammals feeding on discards by sector. The number of interactions shows a peak in 2020 that decreased 89% to 2023.

If the observer notices whale predation of the deck-sorted halibut discards for that haul, and the vessel does not stop deck sorting then, during the debriefing process all viabilities for that haul will be changed to U = Unknown for all deck sorted halibut. If all the halibut in the haul have a viability of U, then there is no information to calculate a haul-specific DMR and an annual average DMR for the vessel's other deck sorted hauls is used. If that is unavailable, then the annual average for all other vessels' deck sorted hauls is used. In the case of the annual DMR process the sector specific rate is used in all instances regardless if marine mammals were feeding on discards.

*Table 1 Hauls with Marine Mammals Feeding on Discards by Sector*

Sector	2018	2019	2020	2021	2022	2023
BSAI Nonpelagic Trawl CPs	95	181	295	204	66	33
BSAI Hook and Line CPs	8	5	5	5	8	5
BSAI Pot CPs	24	0	1	0	2	3
BSAI Nonpelagic Trawl CVs	0	0	0	9	1	0
Other	5	1	2	2	2	8

Source: NMFS AFSC Observer Program, data compiled by AKFIN in Comprehensive\_NORPAC

Marine mammal interaction data are not collected as part of the hierarchical sampling that includes species composition and biological sample collections, but rather marine mammal interactions are recorded whenever the observer becomes aware of the presence of marine mammals. Marine mammal interaction data are not a statistical sample with a defined sampling frame. Hence, in some situations although marine mammals are present, there is no record of the interaction (e.g., if the observer is in the factory, the vessel is fishing at night and the mammals cannot be seen, or the vessel’s bulkhead walls obstruct views). Dahlheim et al (2022) used observer data collected in Alaska from 2001 through 2016 to summarize the type and relative extent of killer whale interactions with fisheries in Alaska, and also include a discussion of the limitations of these data. Although this study pre-dates deck-sorting activities, killer whale feeding on discarded catch has been documented in a range of fisheries. Killer whale interactions with commercial fisheries have also been documented in Bolling et al 2023 and Peterson et al 2014. However, to date, the authors are unaware of studies that provide information on a DMR that would be applicable when whales feeding on halibut discarded from trawl vessels.

Based on information from the observer and crew, vessel operators ultimately make the decision whether to cease deck sorting in the presence of mammals. Observers monitor for the presence of marine mammals whenever possible. If observers identify the presence of a marine mammal before or during the deck sorting, and determine they are feeding on halibut discards they can notify the vessel about the presence of mammals, and will continue to collect data as long as the deck sorting practices continue. However, observer sampling stations on the deck may be located in places that prevent observers from

seeing mammal activity. For example, some vessels have high storm walls that prevent a line of sight outboard the vessel.

Over the last few years, NMFS has expressed concern about marine mammals (specifically Orcas) predating on halibut that are deck sorted in the deep-water flatfish (DWF) fisheries in the Bering Sea. In summer of 2020, the non-pelagic CP fleet developed a set of protocols to help address this situation, noting in particular that it is the vessel’s responsibility at all times to look for whales predating on deck sorted halibut and to cease deck sorting when that is occurring (this is not specified in regulations).

The protocol indicates that the vessel crew monitor for the presence of orcas prior to deck sorting, and deck sorting does not occur if orcas are seen in a location where they can feed on deck-sorted halibut. Vessel personnel may also request the observer’s assistance in helping them understand when orcas are feeding on deck sorted halibut so they can suspend deck sorting, specifically, the vessel will request that the observer on duty alert the vessel captain, deck boss, or other designated crew member if they observe orca’s feeding on deck-sorted halibut. It is important to understand however, that in many instances’ observers are not able to detect whether orcas are feeding because their sampling duties require their full attention, the observers are unable to see over the bulwarks, fishing is occurring at night, etc. Hence, observers may not detect the presence of feeding whales.

Due to the lack of systematic collection of marine mammal interactions and the degree that feeding on discards impacts the DMR (e.g., the probability that a discarded halibut is actually eaten), the DMR interagency workgroup is not able to recommend a systematic change to halibut DMRs that would account for the marine mammal interactions. The Council could consider specifying a policy based DMR for hauls where marine mammals are feeding on discards, such as the pelagic trawl DMR of 100%. Table 2 below represents the discarded halibut on hauls where marine mammals were feeding on discards that could be subject to a set rate.

*Table 2 Kilograms of Halibut on Hauls with Marine Mammals Feeding on Discards by Sector, inclusive of halibut sorted from the deck and factory on non-pelagic trawl CPs*

Sector	2018	2019	2020	2021	2022	2023
BSAI Nonpelagic Trawl CPs	14,163	49,592	98,280	66,758	21,054	8,926
BSAI Hook and Line CPs	3,376	660	285	480	2,395	2,361
Other	2,463	128	250	3,700	724	1,275

Source: NMFS AFSC Observer Program, data compiled by AKFIN in Comprehensive\_NORPAC

Establishing a set DMR for hauls with marine mammals feeding on discards does have significant complications under current monitoring protocols; reporting of marine mammals feeding on discards would be disincentivized, vessels fishing at night or with barriers to observing marine mammals would not be properly assessed, and the mortality rate associated with mammal feeding and deck sorting is unknown. Improvements in the accounting of halibut mortality associated with marine mammals feeding on discards may require developing technological solutions, such as additional camera location and, perhaps, testing of camera technology (e.g., infrared). It is important to note that the choice of a new DMR would be a policy decision since currently there are no data supporting a fixed DMR associated with whale predation on discards.

Current regulations at §679.28(l) require that halibut deck sorting activities and the flow of halibut to the observer station and out the discard chute are monitored by video. Some vessels have cameras placed in a location that the viewer can see outboard the vessel at the point of discard. Currently video is only used for compliance monitoring purposes and not associated with haul-level data used for DMR calculation. However, discussions have started among industry members regarding adding an outboard camera to

detect mammal feeding during deck sorting activities. Support for this type of research may partially help assess the extent of mammal interactions with deck sorting and allow the exploration of methods to incorporate video information into DMR calculation and catch accounting processes, if desired.

## References

- Cahalan, J.A., J. Mondragon, J. Gasper. 2014. Catch Sampling and Estimation in the Federal Groundfish Fisheries off Alaska: 2015 Edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 41 p.
- Bolling ZM, Wright SK, Teerlink SS, Lyman EG. 2023. Killer Whale Entanglements in Alaska: Summary Report 1991-2022. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-f/AKR-32, 45p. Available at: <https://repository.library.noaa.gov/view/noaa/56185>
- Dahlheim MEM, Cahalan J, Breiwick JM. 2022. Interactions, injuries, and mortalities of killer whales (*Orcinus orca*) observed during fishing operations in Alaska. Fish. Bull. 120:79–94. doi: 10.7755/FB.120.1.8 Available at <https://spo.nmfs.noaa.gov/content/interactions-injuries-and-mortalities-killer-whales-orcinus-orca-observed-during-fishing>
- NMFS, 2019. Fisheries of the Exclusive Economic Zone Off Alaska; Halibut Deck Sorting Monitoring Requirements for Trawl Catcher/Processors Operating in Non-Pollock Groundfish Fisheries off Alaska. NOAA Fisheries, Alaska Regional Office, Juneau. Available at <https://www.federalregister.gov/documents/2019/10/15/2019-22198/fisheries-of-the-exclusive-economic-zone-off-alaska-halibut-deck-sorting-monitoring-requirements-for>
- North Pacific Fisheries Management Council. Interagency Halibut DMR Workgroup Recommendations for GOA and BSAI Groundfish Fisheries in 2024 and 2025. Available at <https://meetings.npfmc.org/CommentReview/DownloadFile?p=2db719d8-56d3-4b2b-8767-35e05e44c0a0.pdf&fileName=Halibut%20DMR%20Working%20Group%20recommendations%20for%202024-2025.pdf>