

Interagency Halibut DMR Workgroup¹ Recommendations for GOA and BSAI Groundfish Fisheries in 2024 and 2025

Summary

This document provides halibut DMR estimates for in-season management of BSAI and GOA groundfish fisheries in 2024 and 2025 (Table 1), as recommended by the Interagency Halibut DMR Workgroup.

Other updates include:

1. Observer data and corresponding updated annual DMRs through 2022
2. Updates on current research activity related to halibut DMRs
3. Additional workgroup comments and discussion summary

Introduction

Halibut discard mortality rates (DMRs) are reviewed each year as part of the North Pacific Fishery Management Council's (Council) groundfish harvest specifications process and are used for in-season management of halibut prohibited species catch (PSC) relative to limits² established for GOA and BSAI groundfish fisheries. DMRs are currently specified for twelve operational groups with unique combinations of area, gear, and handling characteristics that affect halibut mortality (see listings in Table 1). DMRs are estimated based on observer data for eleven of the operational groupings while for the pelagic trawl fisheries, the DMR is fixed at 100%. Prior to Council specification, draft DMRs are updated by an interagency workgroup that includes staff from Alaska Fisheries Information Network (AKFIN), the Council, International Pacific Halibut Commission (IPHC), National Marine Fisheries Service (NMFS), and Pacific States Marine Fisheries Commission (PSMFC). The workgroup's recommendations are reviewed by the Council's GOA and BSAI Groundfish Plan Teams, and by the Science and Statistical Committee (SSC) along with other annual BSAI and GOA SAFE documents³.

DMR Estimation Methods

A detailed description of halibut DMR estimation methods was provided at the [November 2016 Groundfish Plan Team meeting](#)⁴ and those methods continue to be applied in the current update. Briefly, data are collected by onboard observers who sample halibut according to established protocols including physical examination of individual halibut just prior to the discarding event (see AFSC 2022 for details). Based on injury type and overall vitality, halibut are assigned to gear-specific condition categories (e.g., minor injuries, moderate, serious, among others) that correspond to fixed mortality probabilities derived from the literature (e.g., Clark et al. 1992, Williams 1997, and Kaimmer and Trumble 1998).

Expansion of condition data from samples to hauls, trips, and ultimately to the defined operational group is structurally consistent with the statistical sampling hierarchy. Expansion of discard estimates is done

¹ Jen Cahalan (PSMFC), Jennifer Ferdinand (NMFS AFSC), Michael Fey (AKFIN), Mary Furuness (NMFS AKRO), Jason Gasper (NMFS AKRO), Ian Stewart (IPHC)

² <https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/alaska-groundfish-harvest-specifications>

³ <https://www.fisheries.noaa.gov/alaska/population-assessments/north-pacific-groundfish-stock-assessments-and-fishery-evaluation>

⁴ [2017-2018 Halibut DMR Recommendations](#)

within each sampling strata (e.g., full coverage or gear-specific partial coverage) before estimates are combined across strata to produce fishery-level DMRs.

Specified DMRs are averages of the estimated DMRs for the two most recent complete fishing years. The appropriateness of different reference timeframes was evaluated by the workgroup and reviewed by the Plan Teams and SSC in 2016. A two-year period was chosen to keep PSC accounting consistent with recent DMR levels and fishery operational practices. Upon completing a 5-year review of rates and intra-annual variance associated with the specified rates the Workgroup recommends use of a four-year average when necessary. The goal is still to apply two-year averages when possible. From a management/policy perspective, frequently updating applied DMRs may, in the presence of other contributing factors, provide incentives for operations to adjust handling practices to improve halibut survival.

Workgroup recommendations:

The workgroup recommends the DMRs provided in Table 1 be used for in-season management of halibut PSC in 2024, noting that groundfish harvest specifications are for two-year periods, and these DMRs would also be specified for 2025 until recalculated for the 2025/2026 harvest specifications. Annual DMR estimates and additional supporting information (numbers of vessels, trips, hauls, and condition assessments) for the selected operational groups are provided in Tables 2-7. Note that pelagic trawl DMRs are not estimated, but are instead specified at 100%. In cases where data from very few vessels contributed to DMR estimates, proxy operational groupings with similar halibut handling characteristics were identified (see footnotes in Table 1). The workgroup recommends proxy DMR values based on analogous fisheries for the following operational group:

- The BSAI hook-and-line CV operational group uses the rate estimated for BSAI hook-and-line CPs.
- GOA Rockfish Program non-pelagic trawl CV, GOA hook-and-line CV and pot operational groups move to a four-year average.

Additional workgroup comments

Deck sorting

As in previous years, the DMR estimates provided here do not pertain to deck-sorted halibut. PSC mortalities for deck-sorted halibut are accounted for through independent processes that are not part of the Council specification cycle. Because deck-sorted halibut do not enter the factory and are discarded relatively quickly, discarded halibut are presumed to have lower post-capture mortality. However, the presence of killer whales feeding on discarded halibut is a concern. Observers recorded 104 instances of marine mammals feeding on discards by Amendment 80 vessels in 2022, a 50% decrease from the previous year (see Table 9). The 104 instances are the lowest amount observed since 2016. While some of this activity may be associated with non-deck-sorted hauls, the persistence of killer whale feeding on halibut discard continues to warrant further investigation. The Workgroup suggests that the methods used to estimate halibut mortality be reviewed with a particular focus on marine mammal feeding on discards.

Directed halibut fishery

Halibut DMRs needed for calculating discards in the directed halibut fishery are also not provided here. Capture rates and DMRs for those halibut are addressed independently as part of the IPHC 's stock assessment process. In characterizing non-halibut commercial bycatch mortalities of halibut in regulatory areas off Alaska, the IPHC does use mortality estimates provided by the NMFS AKRO which are based on the specified DMRs.

The Workgroup will be reviewing the current DMR estimation methods for potential use in assessing mortality in the directed halibut fisheries.

Intra-annual variability of DMR estimates

The Workgroup evaluated the inter-annual variability of the DMR estimates and concluded that four groupings would be more appropriately estimated with 4-year averages at this stage. High between-year variability in the estimated DMRs and associated instability in specified DMRs prompted this change. The pot groupings for the BSAI and GOA were identified as operational groups that would benefit from use of a 4 year average, as well as the GOA Rockfish Program non-pelagic trawl CV and the GOA hook-and-line CV groupings. This inter-annual variance will continue to be monitored on an annual basis with the option of moving operational groupings back to a two-year average if appropriate to maintain a responsive rate.

Pelagic trawl samples

For the pelagic trawl gear operational group, the DMR is fixed at 100% and samples from hauls on these vessels are not used in the DMR estimation process. The workgroup concluded that these data collections were no longer necessary and therefore in 2022 observers discontinued the collection of halibut condition data on pelagic trawl vessels; however, all other data related to halibut continue to be collected (e.g., halibut length data).

Model based DMRs

The Workgroup supports continued research into the feasibility of modeling DMRs based on variables expected to impact post-capture survival (hook-release method, time-out-of-water). Using modeled DMRs would reduce the data collection burden on observers and would dovetail with the expansion of Electronic Monitoring.

Research related to halibut discard mortality

The workgroup looks forward to reporting on any research findings that could be incorporated into alternative calculations of DMR. The IPHC is currently conducting research in support of improved estimation of DMRs and halibut post-capture mortality. Current projects are summarized below.

1. Examination of effects of hook release techniques and environmental conditions on injuries and associated physiology of captured Pacific halibut and their interplay with discard survival. (IPHC)

After having reported on our estimates of discard mortality rate in the directed longline fishery (Loher et al., 2022; <https://doi.org/10.1002/nafm.10711>), the second component of this study investigated the relationships among hook release techniques (e.g., gentle shake, gangion cutting, and hook stripping), injury levels, stress levels and physiological condition of released fish, as well as the environmental conditions that the fish experienced during capture. Gentle shake and gangion cutting resulted in the same injury and viability outcomes with 75% of sublegal fish in ‘Excellent’ condition, while the hook stripper produced the poorest outcomes (only 9% in ‘Excellent’ condition). Hook stripping also resulted in more severe injuries, particularly with respect to tearing injuries, whereas gentle shake and gangion cutting predominantly resulted in a torn cheek, effectively the injury incurred by the hooking event. Physiological stress indicators (plasma levels of glucose, lactate, and cortisol) did not significantly change with viability outcomes or injuries, except for higher lactate plasma levels in fish categorized as ‘Dead’. Hematocrit levels were significantly lower in fish that were categorized as ‘Dead’. Furthermore, 89% of fish classified as “Dead” were infiltrated by sand fleas, present in several sets in deeper and colder waters. Our results indicated that avoiding the use of hook strippers and minimizing soak times in areas known to have high sand flea activity result in better survival outcomes. A manuscript describing this work has been submitted to a peer reviewed journal.

2. Improving the characterization of discard mortality of Pacific halibut in the guided (“charter”) recreational fishery (IPHC).

Experimental fishing was conducted in the summer of 2021 using charter recreational gear (12/0 and 16/0 circle hooks) and handling practices aboard charter vessels operating out of Sitka and Seward, AK. A combined total of 361 Pacific halibut were captured, sampled, tagged, and released. For all Pacific halibut captured, we recorded the time from hooking to release, length, weight, the injury code and release viability category using the standard IPHC criteria, and air and fish temperature. In addition, from each fish we collected a blood sample by caudal puncture, measured somatic fat content with the use of a Distell Fat Meter, took a picture of the hooking injury, collected a fin clip for genetic sexing and tagged the fish with an opercular wire tag prior to release. Eighty (80) Pacific halibut captured in IPHC Regulatory Area 3A were tagged with acceleration-logging survivorship pop-up archival transmitting (sPAT) tags instead of wire tags. These fish were selected from fish that were classified in the ‘Excellent’ viability category and did not have a blood sample taken to minimize handling-related stress. The deployed sPAT tags were programmed to be released after 96 days.

Seventy-six (76) of the 80 electronic accelerometer-based survivorship pop-up archival transmitting (sPAT) tags provided useable data reports. Survival analysis (R package = “survival”) produces a mortality rate estimate of 1.35% with a 95% CI of 0.0-3.95% for Pacific halibut captured on circle hooks and released in the ‘Excellent’ viability category. This estimate is consistent with the supposition that fish discarded in the recreational fishery from circle hooks in ‘Excellent’ condition have a mortality rate that is arguably lower than 3.5%, as is currently used for ‘Excellent’ viability fish released in the commercial fishery (Meyer, 2007). As this estimate does not factor in mortality rates on fish in less than ‘Excellent’ condition, does not inform mortality rates on non-circle hooks (J-hooks, jigs, other), nor directly applies to fish captured and released from non-charter practices, changes to the overall recreational discard mortality estimation are not currently contemplated. These are the first field corroborated estimates of recreational discard mortality and are consistent with currently applied recreational mortality estimates. Analysis of physical properties, blood stress parameters, and environmental influences are ongoing.

References

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Tables

Table 1. Halibut DMRs specified for fishery operational types defined for halibut PSC management in GOA and BSAI groundfish fisheries in 2022 and workgroup recommendations for application in 2024 and 2025.

Area	Gear	Operation	2023 DMRs (specified)	2024/25 DMRs (recommended)
BSAI	Pot	All	26%	26% ^b
	Hook-and-line	CP	9%	7%
	Hook-and-line	CV	9% ^a	7% ^a
	Non-pelagic trawl	Mothership / CP	85%	85%
	Non-pelagic trawl	CV	62%	63%
GOA	Pot	All	27%	26% ^b
	Hook-and-line	CP	13%	11%
	Hook-and-line	CV	9%	10% ^b
	Non-pelagic trawl	Mothership / CP	83%	83%
	Non-pelagic trawl	CV	74%	69%
	Non-pelagic trawl	CV-Rockfish Prog	55%	56% ^b
All	Pelagic trawl	All	100%*	100%*

^a Based on BSAI HAL CP

^b 4-year average

*Fixed, not estimated

Table 2. **BSAI hook and line** vessels, trips, hauls, injury assessments and corresponding DMRs from 2013 – 2022 observer data. The bottom rows for each panel provides the recommended specified DMRs based on either two-year averages or interpolated values (*) from similar operations. Source: AKFIN Data.

BSAI Hook and Line CPs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	30	257	3,427	17,164		8.6%
2014	29	223	2,966	11,055		8.1%
2015	28	259	2,884	10,224		7.8%
2016	28	242	2,242	7,130		7.8%
2017	27	221	1,931	6,345		9.1%
2018	23	141	1,065	3,617	8%	9.1%
2019	20	125	694	1,925	8%	8.1%
2020	18	95	441	1,190	9%	10.5%
2021	16	92	550	1,422	9%	6.7%
2022	18	133	1014	3,813	10%	7.9%
2023 Specs					9%	
WG recom. for 2024 Specs					7%	

BSAI Hook and Line CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013						
2014	1	2	5	21		21%
2015	1	1	1	6		4%
2016						
2017	1	1	1	2		4%
2018	2	4	17	83	17%	4%
2019	1	1	5	15	4%	11%
2020					9%*	
2021					9%*	
2022					10%*	
2023 Specs					9%*	
WG recom. for 2024 Specs					7%*	

Table 3. **BSAI non-pelagic trawl** vessels, trips, hauls, viability assessments and corresponding DMRs from 2013 – 2022 observer data. The bottom rows for each panel provides the recommended specified DMRs based on either two-year averages or interpolated values (*) from similar operations. Source: AKFIN Data.

BSAI Nonpelagic Trawl CPs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	19	93	892	2,868		85.8%
2014	20	66	535	1,928		85.6%
2015	10	22	186	463		81.2%
2016	14	96	881	3,685		83.7%
2017	11	61	517	2,003		73.8%
2018	20	165	1,049	2,426	84%	84.7%
2019	20	164	1,101	2,879	78%	83.6%
2020	15	114	945	2,578	75%	85.2%
2021	16	106	744	2,167	84%	85.1%
2022	18	84	585	1,768	84%	85.5%
2023 Specs					85%	
WG recom. for 2024 Specs					85%	

BSAI Nonpelagic Trawl CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	24	129	459	2,090		45.5%
2014	22	169	581	2,780		52.9%
2015	34	146	446	1,977		57.9%
2016	43	163	660	2,677		64.9%
2017	49	205	1,555	10,199		53.7%
2018	40	165	1,389	11,085	60%	61.6%
2019	47	177	2,093	16,781	59%	56.6%
2020	35	139	1,100	9,063	58%	67.7%
2021	29	62	524	3,668	59%	56.9%
2022	38	101	573	4,740	62%	69.9%
2023 Specs					62%	
WG recom. for 2024 Specs					63%	

Table 4. **GOA hook and line** vessels, trips, hauls, injury assessments and corresponding DMRs from 2013– 2022 observer data. The bottom row for each panel provides the recommended specified DMRs based on either two year averages, four-year averages or interpolated values (*) from similar operations. Source: AKFIN Data.

GOA Hook and Line CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	11	33	165	801		16.4%
2014	10	36	123	398		7.8%
2015	19	26	97	449		13.8%
2016	19	24	69	324		22.7%
2017	14	20	80	367		19.1%
2018	18	21	74	284	17%	7.4%
2019	18	20	52	243	21%	18.8%
2020	3	3	6	20	13%	4.6%
2021	9	12	51	195	13%	13.2%
2022	1	1	2	4	12%	3.5%
2023 Specs					9%	
WG recom. for 2024 Specs					10%	

GOA Hook and Line CPs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	5	10	102	643		18.2%
2014	8	17	285	1345		10.4%
2015	6	25	382	1570		9.1%
2016	9	18	185	1399		8.5%
2017	8	21	217	1539		10.1%
2018	2	3	29	232	10%	14.9%
2019	3	5	15	106	11%	18.7%
2020	3	4	7	39	11%	18.6%
2021	2	4	16	147	15%	15.7%
2022	5	8	38	309	15%	5.8%
2023 Specs					13%	
WG recom. for 2024 Specs					11%	

Table 5. **GOA non-pelagic trawl** vessels, trips, hauls, viability assessments and corresponding DMRs from 2013–2022 observer data. The bottom row for each panel provides the recommended specified DMRs based on either two-year averages or interpolated values (*) from similar operations. Source: AKFIN Data

GOA Nonpelagic Trawl CPs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2012	5	8	78	591		81.7%
2013	6	18	167	424		81.1%
2014	2	12	73	164		73.7%
2015	1	1	1	1		90.0%
2016	7	13	76	232		84.0%
2017	5	38	424	2,367		75.0%
2018	4	25	114	709	84%	82.9%
2019	5	40	359	1,669	79%	85.9%
2020	5	30	170	988	75%*	85.5%
2021	5	26	260	576	84%*	77.9%
2022	4	11	95	230	83%*	88.2%
2023 Specs					83%	
WG recom. for 2024 Specs					83%	

GOA Nonpelagic Trawl CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	27	48	111	533		66.0%
2014	21	35	99	487		66.3%
2015	19	33	66	346		64.2%
2016	36	94	239	1,433		65.9%
2017	28	59	144	778		67.6%
2018	25	46	105	641	67%	69.4%
2019	24	65	153	1,034	67%	68.8%
2020	13	35	93	515	68%	68.9%
2021	13	31	52	279	69%	70.3%
2022	16	30	42	237	69%	69.0%
2023 Specs					74%	
WG recom. for 2024 Specs					69%	

Table 6. **BSAI and GOA pot** vessels, trips, hauls, viability assessments and corresponding DMRs from 2013 – 2022 observer data. The bottom rows for each panel provides the recommended specified DMRs based on either two-year averages, four-year averages or interpolated values (*) from similar operations. Source: AKFIN Data

BSAI Pot CPs and CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	DMR
2013	21	45	259	491		9.5%
2014	20	52	264	498		6.5%
2015	24	78	310	723		5.8%
2016	24	66	245	424		10.8%
2017	14	33	191	335		25.5%
2018	22	34	101	197	9%	7.9%
2019	19	28	73	140	19%	39.0%
2020	9	13	51	60	27%	27.9%
2021	7	21	83	181	32%	20.0%
2022	17	51	176	441	33%	15.6%
2023 Specs					26%	
WG recom. for 2024 Specs					26%	

GOA Pot CPs and CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	DMR
2013	26	56	163	363		8.3%
2014	17	31	68	179		15.0%
2015	32	82	210	895		5.4%
2016	37	62	158	732		8.4%
2017	20	25	50	168		0.0%
2018	9	11	20	69	7%	0.0%
2019	11	16	40	82	4%	21.4%
2020	6	10	33	128	0%	42.9%
2021	38	62	220	730	10%	12.0%
2022	42	55	168	405	29%	40.1%
2023 Specs					27%	
WG recom. for 2024 Specs					29%	

Table 7. **Rockfish Program GOA non-pelagic trawl** vessels, trips, hauls, viability assessments and corresponding DMRs from 2013 – 2022 observer data. The bottom rows for each panel provides the recommended specified DMRs based on either two year averages, four-year averages or interpolated values (*) from similar operations. Source: AKFIN Data

GOA Nonpelagic Trawl Rockfish Pgm CVs						
Year	Vessels	Trips	Hauls	Assessments	Spec DMR	Est DMR
2013	16	28	50	124		53.6%
2014	12	16	23	58		44.4%
2015	10	17	30	94		69.7%
2016	16	46	108	375		40.8%
2017	17	47	99	400		57.7%
2018	14	23	57	246	62%	46.7%
2019	13	18	28	61	49%	73.2%
2020	12	13	29	105	52%	59.5%
2021	6	15	33	115	60%	72.6%
2022	3	9	13	35	66%	20.0%
2023 Specs					55%	
WG recom. for 2024 Specs					56%	

Table 8. **Halibut IFQ hook and line** vessels, trips, hauls, viability assessments and corresponding DMRs from 2013 – 2022 observer data. The annual DMR is specified by IPHC. Source: AKFIN Data

Halibut IFQ Hook and Line CVs					
Year	Vessels	Trips	Hauls	Assessments	Est DMR
2013	11	33	165	801	16.3%
2014	11	39	140	467	8.5%
2015	21	31	117	537	12.7%
2016	22	27	85	391	24.2%
2017	17	24	99	433	18.9%
2018	20	25	91	367	6.9%
2019	19	21	57	258	18.7%
2020	3	3	6	20	4.6%
2021	9	12	51	195	13.3%
2022	1	1	2	4	3.5%

*rate specified by IPHC

Table 9. Total vessels with halibut PSC associated with operational groupings and vessels in the electronic monitoring (EM) pool of the vessels with halibut PSC.

AREA-GEAR	SECTOR	2015	2016	2017	2018	2019	2020	2021	2022
BSAI-HAL	CP	31	32	29	26	24	21	17	19
	CV	15	10	7	8	8	7	1	3
<i>Total BSAI HAL</i>		46	42	36	34	32	28	18	22
GOA-HAL	CP	12	12	11	7	7	4	5	9
	CV	270	264	215	222	207	146	131	100
<i>Total GOA HAL</i>		282	276	226	229	214	150	136	109
Total All Areas HAL		311	301	247	253	236	172	149	123
EM All Areas HAL		1	12	30	52	60	44	49	42
% EM All Areas HAL		0%	4%	12%	21%	25%	26%	33%	34%

AREA-GEAR	SECTOR	2015	2016	2017	2018	2019	2020	2021	2022
BSAI-POT	CP,CV	51	59	68	82	86	93	70	78
GOA-POT	CP,CV	115	119	117	73	85	139	196	218
Total All Areas POT		154	166	168	140	153	93	237	260
EM All Areas POT		0	0	5	1	15	13	32	29
% EM All Areas POT		0%	0%	3%	1%	10%	14%	14%	11%

Table 10. Observed instances of marine mammals feeding on Amendment 80 discards in the BSAI.

Year	Hauls	MM Feeding on Discards	Percent
2022	16,625	104	0.64%
2021	16,637	209	1.26%
2020	18,205	310	1.70%
2019	21,569	184	0.85%
2018	20,032	113	0.56%
2017	18,465	142	0.77%
2016	18,006	15	0.08%
2015	16,266	7	0.04%