# Interagency Halibut DMR Workgroup[1] Recommendations for GOA and BSAI Groundfish Fisheries in 2021 and 2022

## Summary

This document provides halibut DMRs for in-season management of BSAI and GOA groundfish fisheries in 2021 and 2022 (Table 1), as recommended by the interagency halibut DMR workgroup.

Other updates include:

1. Observer data and corresponding annual DMRs updates through 2019
2. Improved DMR estimates for BSAI nonpelagic trawl CPs, which now include factory-based condition assessments on vessels where deck sorting was also occurring (note that this document does not provide DMRs for deck sorted halibut.)
3. Changes in the presentation of historic DMRs and related data (Tables 2-4) to improve comparison among fisheries.
4. Updates on current research activity related to halibut DMRs
5. Other workgroup comments

## 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 limits[2] established for GOA and BSAI groundfish fisheries. DMRs are currently specified for eleven operational groups with unique combinations of area, gear, and handling characteristics that affect halibut mortality (Figure 1). 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), and National Marine Fisheries, Service (NMFS). The workgroup's recommendations are reviewed by the Council's GOA and BSAI Groundfish Plan Teams, the Science and Statistical Committee (SSC), along with other annual BSAI and GOA SAFE documents[3].

## DMR Estimation Methods

A detailed description of halibut DMR estimation methods was provided at the November 2016 Groundfish Plan Team meeting and those methods continue to be applied in the current update. Briefly, fishery-specific 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 2019 for details). Based on injury type and overall vitality, halibut are assigned to gear-specific condition categories (e.g., minor, 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 from samples to hauls, trips, and ultimately the defined operational group is structurally consistent with the statistical sampling hierarchy. Expansion of discard estimates is done within each

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[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

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

Specified DMRs reflect average 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. Additionally, 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.

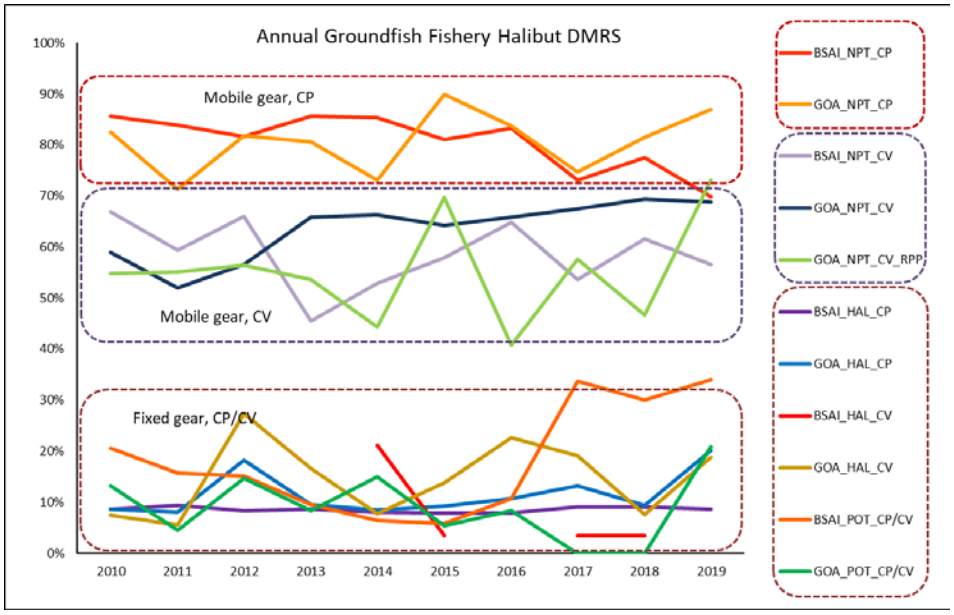


*Figure 1. Annual halibut DMR estimates for fishery operational types defined for halibut PSC management in GOA and BSAI groundfish fisheries.*

## Workgroup recommendations:

The workgroup recommends the DMRs provided in Table 1 be used for in-season management of halibut PSC in 2021. Note that, for rulemaking purposes, groundfish harvest specifications are for two-year periods, so these DMRs would also be specified for 2022.

The workgroup recommends proxy values based on analogous fisheries where very few vessels contributed to DMR estimates (see footnotes in Table 1).

Specifically, the BSAI hook-and-line CV fishery would use the rate estimated for BSAI hook-and-line CPs. Similarly, GOA nonpelagic trawl CPs would use the rate estimated for BSAI nonpelagic trawl CPs. As indicated in Table 1, pelagic trawl DMRs are not estimated, but are instead specified at 100%.

The GOA Pot fishery DMR is 0% currently, and 10% in the update, while the BSAI pot DMR has increased to 32%. For both BSAI and GOA, there are no halibut PSC limits established for pot fisheries, and hence, these changes would not potentially affect those fisheries, but the workgroup recommends investigating potential causes for these trends.

Annual DMR estimates and additional supporting information (numbers of vessels, trips, hauls, and condition assessments for the selected operational groups are provided in Tables 2-4.

## Other workgroup comments

### Deck sorting

Halibut discards that follow the regulatory allowance for deck sorting on BSAI non-pelagic trawl CP vessels are not provided in the workgroup recommendations. DMRs provided here reflect hauls by BSAI non-pelagic trawl CPs where halibut are discarded as the catch is being sorted and processed from within vessel onboard factories. Nevertheless, in generating DMR estimates for 2021/2022, improvements were made to better identify data from halibut condition assessments conducted in the factories of trawl CPs and motherships that are *also* deck-sorting halibut from the catch. These data were not collected until 2018 and were not included in the 2019 update (i.e., for the current 2020 DMR specifications) due to a data labeling issue that has now been corrected. As a result, DMRs estimated for BSAI nonpelagic trawl CPs for 2018 were revised from 77.53% to the current value of 84.24%. Notably, this improvement also increased the number of halibut assessments, so the updated DMR estimates are considered to be more robust.

PSC mortalities for deck-sorted halibut are accounted for through independent processes that are not part of the Council specification cycle. Deck-sorted halibut do not enter the factory, are discarded relatively quickly, and have much lower post-capture mortality probabilities. Note that, previously, deck-sorting operations were conducted under an exempted fishing permit (EFP), but in 2020, deck sorting became a regulated option for the Amendment 80, TLAS, and CDQ fishery sectors (84 FR 55044).

### 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 commercial bycatch mortalities of halibut in regulatory areas off Alaska, the IPHC does use mortality estimates provided by the NMFS AKRO and based on these DMRs .

### Electronic monitoring (EM)

With a growing number of vessels participating in the EM program, the number of vessels available for data collection by onboard observers has decreased. Halibut condition is determined for each assessed halibut using a dichotomous key developed by the IPHC that is based on having the halibut in-hand for inspection; an injury key for halibut caught on longline vessels and a viability key for halibut taken on trawl vessels. At this time, a visual key that could be used by EM reviewers has not been developed and hence condition data are not be available for vessels fishing in the EM program at this time. Note that research is currently being conducted by the IPHC and the Fishery Monitoring and Analysis (FMA) that may lead to development alternative data collections and/or DMR estimation methods (see below).

Many of the vessels participating in the EM program are also fishing halibut IFQs, and therefore since IPHC estimates post-capture halibut mortality in the directed fishery using alternative methods, DMRs are not needed for the halibut IFQ fishery. However, for catches that are not halibut IFQ fishing (halibut PSC catch), DMRs are needed in order to estimate halibut mortality and manage PSC. Halibut release method is still being recorded by EM reviewers and work will continue toward using release method to inform mortality. Table 5 provides the number of vessels participating in the EM program relative to the total number of active vessels. The provided DMR estimates did not include any EM-based data and are, instead, solely reliant on condition data collected by observers in the affected fisheries.

### Future methodological improvements:

- Continue to explore the potential use of model-based estimators of DMRs based on variables expected to impact post-capture survival (hook-release method, time-out-of-water).
- Review methods used to estimate halibut mortality with particular focus on marine mammal feeding on discards.

## Existing 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 and FMA are currently conducting research in support of improved estimation of DMRs and halibut post-capture mortality.

*1. Survivability assessment of discarded Pacific halibut in excellent condition in the directed fishery (IPHC).*

Survival of discarded of Pacific halibut in the directed fishery was inferred with the use of survivorship pop-up archival transmitting tags (sPAT) tags. In an experimental test fishing experiment conducted by IPHC on a longline chartered research vessel, 79 Pacific halibut that were captured in excellent condition were tagged with sPATs and released. Only 3 out of 79 sPATs did not generate data due to attachment or transmission failures. Of the 76 tags that successfully transmitted data, 71 tags were retained on tagged fish throughout their programmed 96-day deployment period. The remaining 6 tags that successfully transmitted data were released prematurely after 43-95 days. Data from sPAT tags was analyzed for movement patterns in order to determine survivability. 71 fish were classified as alive on the basis that their tags were retained until the programmed time of satellite transmission. On the 6 prematurely released tags, 3 tags showed continuous acceleration until the final recording and these tagged fish were therefore assumed to be alive. In contrast, the 3 other prematurely released tags showed discontinuous acceleration (absent from 4-50 hours prior to tag release) and these tagged fish were therefore assumed to be dead. In summary, our estimates of mortality of Pacific halibut released in excellent condition corresponded to a 4% mortality rate. Additional studies are being conducted to investigate potential relationships between individual physiological characteristics, capture conditions, and handling practices, and final viability release classifications in discarded Pacific halibut. These studies have received funding from the Saltonstall-Kennedy Grant Program NOAA.

*2. Capture of hook release method by electronic monitoring in the directed fishery (IPHC).*

A three-camera electronic monitoring (EM) system was installed on a longline chartered research vessel by Archipelago Marine Research. The EM system successfully captured imagery of the hauling station, fish stripper, and work area during gear retrieval from all sets. EM footage was reviewed by analysts at the Pacific States Marine Fish Commission for Pacific halibut release method, fish condition, and skate changes. Analysis of EM data revealed an almost perfect (95%-100%) agreement between the actual release method used and that captured by EM, with careful shake, gangion cut and hook stripper being captured with an accuracy of 100%, 97% and 95%, respectively. Therefore, we can conclude that different hook release methods are almost perfectly captured by EM systems. More recent work has focused on investigating the ability to estimate individual Pacific halibut lengths from EM systems in the longline fishery. The previously captured footage has been used to generate fish lengths that are being compared to the actual measurements of Pacific halibut from the same skates of gear. These studies have received funding from the Saltonstall-Kennedy Grant Program NOAA.

*3. Improving the characterization of discard mortality of Pacific halibut in the guided recreational fishery (IPHC).*

As an initial step in this project, information from the charter fleet on types of gear and fish handling practices used has been collected through stakeholder meetings and on dock interviews with charter captains and operators. Results show that the guided recreational fleet predominantly uses circle hooks (75-100%), followed by jigs. Predominant hook release methods included reversing the hook (54%), or twisting the hook out with a gaff (40%), and the fish were generally handled by supporting both the head and tail (65%), while other common techniques included handling by the operculum (10%) or by the tail alone (10%). This information will inform the design of the experimental test fishing that is expected to take place in 2021 and in which DMRs will be estimated with the use of sPAT tags. In addition, fish condition and stress will also be evaluated to identify best practices intended to minimize discard

mortality of Pacific halibut in this fishery. This project has received funding from the National Fish and Wildlife Foundation.

*4. Model-based discard mortality rates based on alternatives to halibut condition data (FMA).*

Previous research conducted by FMA assessing whether DMRs may be estimated from models that incorporate covariates such as time out of water, haul size, fish length, and temperature showed promising results. These are covariates have previously been demonstrated to predict halibut mortality and could be collected by observers while deployed in lieu of conducting the current condition assessments. Analysis of study data supported these results; however since the dataset in this study was limited, evaluation of study designs to continue field work are currently underway. With additional data, well-trained models may provide reliable DMR estimates that can replace the need for observers to assess the condition of discarded halibut and may be applied to larger commercial fisheries.

## References

AFSC (Alaska Fisheries Science Center). 2019. 2020 Observer Sampling Manual. Fisheries Monitoring and Analysis Division, North Pacific Groundfish Observer Program. AFSC, 7600 Sand Point Way NE, Seattle, WA 98115. Current manual available at https://www.fisheries.noaa.gov/resource/document/north-pacific-observer-sampling-manual

Clark, W. G., Hoag, S. H., Trumble, R. J., and Williams, G. H. 1992. Re-estimation of survival for trawl caught halibut released in different condition factors. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 1992: 197-206.

Kaimmer, S. M. and R. J. Trumble. 1998. Injury, condition, and mortality of Pacific halibut bycatch following careful release by Pacific cod and sablefish longline fisheries. Fish. Res. 38:131-144.

Williams, Gregg H. 1997. Pacific halibut discard mortality rates in the 1990-1995 Alaskan groundfish fisheries, with recommendations for monitoring in 1997. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 1996: 173-183.

## Tables

*Table 1. Halibut DMRs specified for fishery operational types defined for halibut PSC management in GOA and BSAI groundfish fisheries in 2020 and workgroup recommendations for application in 2021 and 2022.*

| | | | Recommended DMRS | |
|---|---|---|---|---|
| **Area** | **Gear** | **Operation** | **2020** | **2021/2022** |
| **BSAI** | Pot | All | 27% | 32% |
| | Hook-and-line | CP | 9% | 9% |
| | Hook-and-line | CV | 9%[a] | 9%[a] |
| | Non-pelagic trawl | Mothership / CP | 75% | 84% |
| | Non-pelagic trawl | CV | 58% | 59% |
| **GOA** | Pot | All | 0% | 10% |
| | Hook-and-line | CP | 11% | 15% |
| | Hook-and-line | CV | 13% | 13% |
| | Non-pelagic trawl | Mothership / CP | 75%[b] | 84%[b] |
| | Non-pelagic trawl | CV | 68% | 69% |
| | Non-pelagic trawl | CV-Rockfish Program | 52% | 60% |
| **All** | Pelagic trawl | All | 100%* | 100%* |

[a] Based on BSAI HAL CP

[b] Based on BSAI NPT CP

*Fixed, not estimated

*Table 2. **BSAI HAL and trawl** vessels, trips, hauls, viability assessments and corresponding DMRs from 2010 – 2019 observer data. The bottom three rows for each panel provide the 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 | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 33 | 142 | 1,912 | 8,947 | 9% |
| 2011 | 28 | 169 | 2,258 | 11,619 | 9% |
| 2012 | 30 | 185 | 2,599 | 13,887 | 8% |
| 2013 | 30 | 258 | 3,435 | 17,189 | 9% |
| 2014 | 28 | 220 | 2,962 | 11,049 | 8% |
| 2015 | 29 | 264 | 2,889 | 10,239 | 8% |
| 2016 | 29 | 244 | 2,245 | 7,138 | 8% |
| 2017 | 27 | 222 | 1,929 | 6,332 | 9% |
| 2018 | 23 | 141 | 1,063 | 3,615 | 9% |
| 2019 | 20 | 126 | 693 | 1,921 | 9% |
| | | | | 2019 Specs | 8% |
| | | | | 2020 Specs | 9% |
| | | | | WG recom. for 2021 Specs | 9% |

**BSAI Hook and Line CVs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | | | | | |
| 2011 | | | | | |
| 2012 | | | | | |
| 2013 | | | | | |
| 2014 | 1 | 2 | 5 | 21 | 21% |
| 2015 | 1 | 1 | 1 | 6 | 3% |
| 2016 | | | | | |
| 2017 | 1 | 1 | 1 | 2 | 4% |
| 2018 | 2 | 4 | 17 | 83 | 4% |
| 2019 | 1 | 1 | 5 | 15 | 11% |
| | | | | 2019 Specs | 4% |
| | | | | 2020 Specs | 9%* |
| | | | | WG recom. for 2021 Specs | 9%* |

**BSAI Nonpelagic Trawl CPs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 21 | 134 | 1,717 | 7,375 | 86% |
| 2011 | 22 | 108 | 801 | 2,363 | 84% |
| 2012 | 16 | 67 | 600 | 1,410 | 82% |
| 2013 | 19 | 93 | 892 | 2,868 | 86% |
| 2014 | 20 | 66 | 535 | 1,928 | 85% |
| 2015 | 10 | 22 | 186 | 463 | 81% |
| 2016 | 14 | 96 | 881 | 3,685 | 83% |
| 2017 | 11 | 61 | 517 | 2,003 | 73% |
| 2018 | 20 | 165 | 1,049 | 2,426 | 84% |
| 2019 | 20 | 164 | 1,097 | 2,875 | 83% |
| | | | | 2019 Specs | 78% |
| | | | | 2020 Specs | 75% |
| | | | | WG recom. for 2021 Specs | 84% |

**BSAI Nonpelagic Trawl CVs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 28 | 89 | 411 | 2,151 | 67% |
| 2011 | 25 | 117 | 514 | 2,972 | 59% |
| 2012 | 35 | 127 | 430 | 2,228 | 66% |
| 2013 | 24 | 129 | 459 | 2,090 | 45% |
| 2014 | 22 | 169 | 581 | 2,780 | 53% |
| 2015 | 34 | 146 | 446 | 1,977 | 58% |
| 2016 | 43 | 162 | 652 | 2,611 | 65% |
| 2017 | 46 | 152 | 567 | 2,860 | 54% |
| 2018 | 39 | 133 | 438 | 2,045 | 62% |
| 2019 | 44 | 118 | 563 | 2,151 | 57% |
| | | | | 2019 Specs | 59% |
| | | | | 2020 Specs | 58% |
| | | | | WG recom. for 2021 Specs | 59% |

*Table 3. **GOA HAL and trawl** vessels, trips, hauls, viability assessments and corresponding DMRs from 2010 – 2019 observer data. The bottom three rows for each panel provide the specified DMRs based on either two year averages or interpolated values (*) from similar operations. Source: AKFIN Data.*

**GOA Hook and Line CPs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 13 | 23 | 243 | 1,735 | 9% |
| 2011 | 9 | 24 | 345 | 2,281 | 8% |
| 2012 | 5 | 18 | 75 | 343 | 18% |
| 2013 | 8 | 14 | 121 | 740 | 10% |
| 2014 | 9 | 21 | 321 | 1,546 | 9% |
| 2015 | 8 | 29 | 430 | 1,784 | 9% |
| 2016 | 9 | 19 | 203 | 1,493 | 11% |
| 2017 | 10 | 25 | 258 | 1,781 | 13% |
| 2018 | 4 | 6 | 32 | 239 | 9% |
| 2019 | 7 | 13 | 54 | 253 | 20% |
| | | | | 2019 Specs | 12% |
| | | | | 2020 Specs | 11% |
| | | | | WG recom. for 2021 Specs | 15% |

**GOA Nonpelagic Trawl CVs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 2 | 7 | 27 | 180 | 7% |
| 2011 | 1 | 2 | 9 | 18 | 5% |
| 2012 | 2 | 6 | 42 | 127 | 27% |
| 2013 | 11 | 33 | 165 | 801 | 17% |
| 2014 | 10 | 36 | 123 | 398 | 8% |
| 2015 | 19 | 26 | 97 | 449 | 14% |
| 2016 | 19 | 24 | 69 | 324 | 23% |
| 2017 | 14 | 20 | 80 | 367 | 19% |
| 2018 | 18 | 21 | 74 | 284 | 8% |
| 2019 | 18 | 20 | 52 | 243 | 19% |
| | | | | 2019 Specs | 21% |
| | | | | 2020 Specs | 13% |
| | | | | WG recom. for 2021 Specs | 13% |

**GOA Nonpelagic Trawl CPs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 4 | 14 | 170 | 569 | 83% |
| 2011 | 8 | 18 | 201 | 903 | 71% |
| 2012 | 5 | 8 | 78 | 591 | 82% |
| 2013 | 6 | 18 | 167 | 424 | 81% |
| 2014 | 2 | 12 | 73 | 164 | 73% |
| 2015 | 1 | 1 | 1 | 1 | 90% |
| 2016 | 7 | 13 | 76 | 232 | 84% |
| 2017 | 5 | 38 | 424 | 2,367 | 75% |
| 2018 | 4 | 25 | 114 | 709 | 83% |
| 2019 | 5 | 40 | 359 | 1,669 | 86% |
| | | | | 2019 Specs | 79% |
| | | | | 2020 Specs | 75%* |
| | | | | WG recom. for 2021 Specs | 84%* |

**GOA Nonpelagic Trawl CVs**

| Year | Vessels | Trips | Hauls | Viabilities | DMR |
|---|---|---|---|---|---|
| 2010 | 31 | 106 | 410 | 2,256 | 59% |
| 2011 | 29 | 76 | 247 | 1,558 | 52% |
| 2012 | 36 | 138 | 443 | 2,726 | 57% |
| 2013 | 27 | 48 | 111 | 533 | 66% |
| 2014 | 21 | 35 | 99 | 487 | 66% |
| 2015 | 19 | 33 | 66 | 346 | 64% |
| 2016 | 36 | 94 | 239 | 1,433 | 66% |
| 2017 | 28 | 59 | 144 | 778 | 68% |
| 2018 | 25 | 46 | 105 | 641 | 69% |
| 2019 | 44 | 118 | 563 | 2,151 | 57% |
| | | | | 2019 Specs | 67% |
| | | | | 2020 Specs | 68% |
| | | | | WG recom. for 2021 Specs | 69% |

*Table 4.* ***BSAI and GOA POT and GOA Rockfish Program trawl*** *vessels, trips, hauls, viability assessments and corresponding DMRs from 2010 – 2019 observer data. The bottom three rows for each panel provide the specified DMRs based on either two year averages or interpolated values (*) from similar operations. Source: AKFIN Data.*

| BSAI Pot CPs and CVs | | | | | |
|---|---|---|---|---|---|
| Year | Vessels | Trips | Hauls | Viabilities | DMR |
| 2010 | 25 | 62 | 236 | 616 | 21% |
| 2011 | 32 | 87 | 348 | 1,259 | 16% |
| 2012 | 26 | 78 | 428 | 1,502 | 15% |
| 2013 | 21 | 45 | 259 | 491 | 10% |
| 2014 | 20 | 52 | 264 | 498 | 6% |
| 2015 | 24 | 78 | 310 | 723 | 6% |
| 2016 | 24 | 66 | 245 | 424 | 11% |
| 2017 | 14 | 33 | 191 | 335 | 34% |
| 2018 | 22 | 34 | 101 | 197 | 30% |
| 2019 | 19 | 28 | 73 | 140 | 34% |
| | | | | 2019 Specs | 22% |
| | | | | 2020 Specs | 32% |
| | | | | WG recom. for 2021 Specs | 32% |

| GOA Pot CPs and CVs | | | | | |
|---|---|---|---|---|---|
| Year | Vessels | Trips | Hauls | Viabilities | DMR |
| 2010 | 11 | 23 | 40 | 179 | 13% |
| 2011 | 16 | 51 | 200 | 1,067 | 4% |
| 2012 | 15 | 67 | 228 | 1,070 | 15% |
| 2013 | 26 | 56 | 163 | 363 | 8% |
| 2014 | 17 | 31 | 68 | 179 | 15% |
| 2015 | 32 | 82 | 210 | 895 | 5% |
| 2016 | 37 | 62 | 158 | 732 | 8% |
| 2017 | 20 | 25 | 50 | 168 | 0% |
| 2018 | 9 | 11 | 20 | 69 | 0% |
| 2019 | 11 | 16 | 40 | 82 | 21% |
| | | | | 2019 Specs | 4% |
| | | | | 2020 Specs | 0% |
| | | | | WG recom. for 2021 Specs | 10% |

| GOA Nonpelagic Trawl Rockfish Pgm CVs | | | | | |
|---|---|---|---|---|---|
| Year | Vessels | Trips | Hauls | Viabilities | DMR |
| 2010 | 14 | 33 | 54 | 113 | 55% |
| 2011 | 14 | 19 | 33 | 106 | 55% |
| 2012 | 15 | 33 | 63 | 156 | 56% |
| 2013 | 16 | 28 | 50 | 124 | 54% |
| 2014 | 12 | 16 | 23 | 58 | 44% |
| 2015 | 10 | 17 | 30 | 94 | 70% |
| 2016 | 16 | 46 | 108 | 375 | 41% |
| 2017 | 17 | 47 | 99 | 400 | 58% |
| 2018 | 14 | 23 | 57 | 246 | 47% |
| 2019 | 14 | 19 | 29 | 73 | 73% |
| | | | | 2019 Specs | 49% |
| | | | | 2020 Specs | 52% |
| | | | | WG recom. for 2021 Specs | 60% |

*Table 5. Total vessels associated with operational groupings and vessels in the electronic monitoring (EM) pool.*

| AREA-GEAR | SECTOR | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| **BSAI-HAL** | **CP** | 31 | 32 | 29 | 26 | 24 |
| | **CV** | 17 | 13 | 13 | 13 | 11 |
| *Total BSAI HAL* | | 48 | 45 | 42 | 39 | 35 |
| **GOA-HAL** | **CP** | 12 | 12 | 11 | 7 | 7 |
| | **CV** | 333 | 326 | 289 | 283 | 275 |
| *Total GOA HAL* | | 345 | 338 | 300 | 290 | 282 |
| | ***Total All Areas HAL*** | **393** | **383** | **342** | **329** | **317** |
| | ***EM All Areas HAL*** | **16** | **33** | **61** | **93** | **187** |
| | ***% EM All Areas HAL*** | **4.10%** | **8.60%** | **17.80%** | **28.30%** | **59.00%** |

| AREA-GEAR | SECTOR | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| BSAI-POT | CP,CV | 51 | 59 | 69 | 82 | 86 |
| GOA-POT | CP,CV | 116 | 119 | 129 | 79 | 90 |
| | ***Total All Areas POT*** | **461** | **457** | **429** | **369** | **372** |
| | ***EM All Areas POT*** | **0** | **0** | **25** | **1** | **51** |
| | ***% EM All Areas POT*** | **0.00%** | **0.00%** | **5.80%** | **0.30%** | **13.70%** |