North Pacific Observer Program
2023 Annual Report

Draft Presented to North Pacific Fishery Management Council
May, 2024

Fisheries Monitoring and Analysis Division
Alaska Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
7600 Sand Point Way NE
Seattle, WA 98115-6349

Sustainable Fisheries Division
Alaska Regional Office
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
709 W. 9th Street
Juneau, AK 99802

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Executive Summary

This Annual Report provides information, analysis, and recommendations based on the deployment of observers and Electronic Monitoring (EM) systems by the North Pacific Observer Program (Observer Program) in the halibut and groundfish fisheries off Alaska during 2023.

Section 313 of the Magnuson-Stevens Act (16 U.S.C. 1862) authorizes the North Pacific Fishery Management Council (Council), in consultation with National Marine Fisheries Service (NMFS), to prepare a fishery research plan for the purpose of stationing observers and EM systems to collect data necessary for the conservation, management, and scientific understanding of the commercial groundfish and Pacific halibut fisheries of the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) management areas. Observers and EM systems collect fishery-dependent information used to estimate total catch and interactions with protected species. Managers use these data to manage groundfish and prohibited species catch within established limits and to document and reduce fishery interactions with protected resources. Scientists use fishery-dependent data to assess fish stocks, to provide scientific information for fisheries and ecosystem research and fishing fleet behavior, to assess marine mammal interactions with fishing gear, and to assess fishing interactions with habitat.

The Observer Program is the nation's largest observer program and covers vessels in both partial coverage and full coverage. In the full coverage component of the program, every trip is monitored by 1 or 2 observers and the vast majority of groundfish harvest is covered by this portion of the program. Each year, the Annual Deployment Plan (ADP) describes the science-driven method for deployment of observers and EM systems on vessels in the partial coverage component of the program (50 CFR 679.51(a)). The ADP specifies the scientific deployment design for the partial coverage fisheries and the selection rate—the portion of trips that are sampled by observers and EM. The following year, the agency provides an Annual Report with descriptive information and scientific evaluation of the deployment of observers and EM. The ADP and Annual Report process provides information to assess whether the objectives of the Observer Program have been met and a process to make recommendations to improve implementation of the program to further these objectives.

Program summary

- Overall, for all federal fisheries off Alaska, 3,780 trips (43.7%) and 463 vessels (50.2%) were monitored by either an observer or EM system in 2023.
- During the 2023 fishing year, approximately 350 individual observers were trained, briefed, and equipped for deployment to vessels and processing facilities operating in the BSAI and GOA groundfish and halibut fisheries. Of these, 159 trainings were for new observers and 191 were prior observers who attended a briefing of some type in 2023.
- In 2023, observers collected data on board 343 fixed gear and trawl vessels and at 11 processing facilities for a total of 32,789 observer days (29,232 full coverage days on

vessels and in plants; and 3,557 partial coverage days on vessels and in plants).

- NMFS approved 179 vessels in the 2023 fixed-gear EM selection pool. Of these, 124 vessels fished at least 1 trip, but not all vessels were randomly selected to turn on their EM system. In 2023 there were a total of 305 selected trips (209 longline trips and 96 pot trips). Once video review data is available from fixed-gear EM vessels it can be incorporated into the Catch Accounting System. However, video review timeliness was impacted in 2023 due to staffing issues and the increasing need for review due to expansion of EM programs in Alaska and along the west coast. As of April 1, 2023, video review had been completed for 211 fixed-gear trips (149 longline trips and 62 pot trips) from 103 vessels. In 2024, EM review protocols were changed to first prioritize 2024 imagery review for the first trip of the year on each vessel in order to provide immediate feedback to the vessel operator, then review other 2024 trip data, and lastly work to complete the remaining 2023 EM data review.

- In 2023, fishing continued under an Exempted Fishing Permit (EFP) to evaluate the efficacy of EM and shoreside observers for pollock catcher vessels using pelagic trawl gear in both the Bering Sea and Gulf of Alaska. The goal for EM is compliance monitoring of maximized retention. Catch accounting for the vessel's catch and bycatch is done via eLandings reports and shoreside plant observers. There were 85 participating vessels in 2023 from both the partial and full coverage categories.

- In the fourth year of the trawl EM EFP, there continued to be a considerable amount of effort allocated to coordination and collaboration between FMA, AKRO, Office Of Law Enforcement, Alaska Groundfish Data Bank, United Catcher Boats, Aleutian East Borough (AEB), the Pacific States Marine Fisheries Commission, Archipelago Marine Research, and observer providers. The agency continues to find outreach to be a valuable way to share information with industry, to answer their questions, and to get their input on areas of concern and potential solutions.

- FMA staff also participated in various meetings focused on industry engagement, including: the AEB annual meeting, the Freezer Longline Coalition annual meeting, the Kodiak trawl fleet meetings, and meetings with the Amendment 80 sector.

Fees and Budget

- The expenditures for observer deployment in 2023 in the partial coverage category was $4,801,704 for 3,126 invoiced days, resulting in an average cost per observer sea day in the partial coverage category of $1,536. The average cost per observer sea day is a combination of a daily rate, which is paid for the number of days the observer is on a vessel or at a shoreside processing plant, and reimbursable travel costs, including quarantine days which were still required in some cases for the safety of crews and observers in light of the COVID-19 pandemic.

- Fee billing statements for 2023 were mailed to 85 processors and registered buyers for a total of $4,379,166 in observer fees. The breakdown in contribution to the 2023 observer fees by species was: 43% Pacific halibut, 30% sablefish, 13% Pacific cod, 13% pollock, and 1% all other groundfish species.
- For 2023, the preliminary costs for the fixed-gear EM program was $1,092,410. At the time of compiling cost information for this report, EM review was still ongoing and the cost reflected here includes only imagery review through March 31, 2023. The EM sea day cost will be calculated once the full suite of EM imagery from 2023 are reviewed.

Deployment Performance Review

A review of the deployment of observers and EM in 2023 relative to the intended sampling plan and goals of the Observer Program is provided in Chapter 3. A set of performance metrics was used to assess the efficiency and effectiveness of observer deployment, with emphasis on the partial coverage category. These metrics provide a method to evaluate the quality of data being collected under the restructured Observer Program.

Did We Meet Anticipated Deployment Goals?

Effort Predictions

Based on simulations of annual fishing effort from the final 2023 ADP, NMFS expected to deploy at-sea observers for 3,093 days in the partial coverage category in 2023. The actual number of observer deployment days purchased in 2023 was 3,088.5, which was 0.1% less than predicted, but well within the range of possibilities predicted in the ADP (Figure 3-1). Note that deployment days exclude the small number of quarantine days that were still required in 2023.

Observer Declare and Deploy System (ODDS) Performance

The ODDS facilitates the random selection of fishing trips for monitoring within the partial coverage strata. Users of the system are given flexibility to accommodate their fishing operations; up to three trips may be logged in advance of fishing and trips can be canceled to accommodate changing plans.

- Logged trips can be either closed (marked as complete) or canceled. Of the 4,482 total trips logged, 987 were selected for coverage, and 155 were canceled: five by ODDS (0.5%) and 150 by users (15.2%). The user cancellation rate for selected trips among strata ranged from 6.9% for *EM POT* to 21.2% for *OB HAL* in 2023 (Table 3-2). These two strata also had the least and greatest cancellation rates in 2022 (2.6% and 41.7% respectively).
- If a trip is selected for observer coverage and canceled, then the vessel's next logged trip is automatically selected for coverage. The "inherited" trips preserve the *number* of selected trips in the year, however they can cause a *delay* of selected trips during the year and result in temporal bias. The relative percentage of selected trips that inherited their final selected-status due to a previous cancellation ranged from 5.2% in the *EM POT* stratum to 29.0% in the *OB HAL* stratum. Within the same gear-type, cancellation rates

and the proportion of inherited trips were much larger for strata that used observers for at-sea monitoring than those that used EM (Table 3-3).

Evaluation of At-sea Deployment

There were 9 deployment strata evaluated in 2023 (Section 3.6.3). A summary of the number of vessels and trips in each strata and realized coverage rates in 2023 are as follows:

Coverage category	Strata	Total vessels	Total trips	Sampled trips	Expected coverage rate	Realized coverage rate	Met expectations?[1]
Full coverage	Full	101	1,592	1,588	100.0	99.7[2]	Lower than expected
	EM Trawl EFP in BSAI	46	1,162	1,162	100.0	100.0[3]	Yes
Partial coverage	Observer Hook-and-line	286	1,291	251	17.9	19.4	Yes
	Observer Pot	176	1,074	191	17.1	17.8	Yes
	Observer Trawl	67	657	212	22.7	32.3	Higher than expected
	EM Hook-and-line	112	619	139	30.0	22.5[4]	Lower than expected
	EM Pot	53	262	49	30.0	18.7[4]	Lower than expected
	EM TRW EFP in GOA	34	580	188	33.3	32.4[3]	Yes
No selection	Zero Coverage	291	1420	0	0.0	0.0	Yes

[1]The expectation for partial coverage strata is that selection rates are within the 95% confidence intervals of realized deployment rates. The expectation for full and zero coverage strata are that coverage rates are exactly 100% and 0%, respectively

[2] Four full coverage trips were unmonitored (three BSAI open access non-pelagic trawl trips targeting Pacific cod on one vessel and one trip on another vessel with identical attributes).

[3]The trawl EM EFP requires cameras at-sea on 100% of trips for compliance monitoring of maximized retention requirements in addition to shoreside sampling by observers on all trips in the BSAI and a random selection of trips in the GOA. This table evaluates the goal of 100% and 33.3% coverage of shoreside monitoring to collect biological samples and census counts of salmon and halibut PSC in the BSAI and GOA, respectively.

[4]Sampled trips and realized coverage rates reflect video review through April 1, 2024.

Dockside Monitoring

The sampling design used for dockside monitoring in 2023 remained unchanged from 2022. All vessels participating in the BSAI pollock trawl fisheries are in the full coverage category and dedicated plant observers monitor all deliveries to account for salmon bycatch. In the GOA, all pollock trawl catcher vessels are in the *OB TRW* stratum unless they are participating in the EM Exempted Fishing Permit (EFP), in which case they have full coverage EM at-sea. For randomly selected *OB TRW* and EM EFP pollock trips in the GOA, observers monitor the delivery at the shoreside processors to obtain counts of salmon caught as bycatch and to obtain tissue samples for stock of origin determination using genetic techniques. When an observed trawl vessel in the GOA delivers its pollock catch to a tender vessel instead of a shoreside processor, the observer is unable to monitor the delivery and collect additional tissue samples. In this situation, the trip would be monitored, but there is no offload monitoring. Conversely, when an EM vessel in the GOA delivers its pollock to an EM tender vessel, the entire tender offload can be sampled at the final processing facility, and tissue samples for genetic information can be collected.

A total of 2,139 pollock deliveries to shoreside processors were monitored by observers for salmon in 2023. Of those, 1,805 occurred in ports in the Bering Sea and 334 occurred in ports in the Gulf of Alaska (Tables 3-6 & 3-7).

Was the Coverage Representative?

Temporal Patterns

At the end of 2023 the number of monitored trips was outside of this expected range in three of the six partial coverage strata: *OB TRW* (expected rate = 22.7%, realized rate = 32.3%, p-value < 0.001), *EM HAL* (expected rate: 30.0%, realized rate: 22.5%, p-value < 0.001) and *EM POT* (expected rate = 30.0%, realized rate = 18.7%, p-value < 0.001; Table 3-4 and Figure 3-4). The *OB HAL* stratum was outside of the expected range earlier in the year but fell within the expected range by the end of April. Coverage rates were within their expected ranges for 100% of the year for the *OB POT* stratum (expected rate = 17.1%, realized rate = 17.8%, p-value = 0.543).

Spatial Representativeness

The only obvious spatial bias in the distribution of monitored trips was in the *OB HAL* stratum, where an unexpectedly high number of trips were monitored in the central GOA near Kodiak and fewer trips were monitored in the western and eastern GOA. Other strata exhibited spatial patterns that were not as pronounced or unexpected. In the *OB POT* stratum, the western GOA was overrepresented in the sample. In the *OB TRW* stratum, there were some slight localized biases in the central GOA, but no spatial cells had an unlikely number of monitored trips. In the *EM HAL* stratum, the central GOA was underrepresented and the eastern GOA was overrepresented. The spatial distribution of monitoring was as expected in the *EM POT* and *EM TRW EFP* strata, with no spatial cells with an unlikely number of monitored trips / deliveries (Figure 3-5).

Spatial-Temporal Patterns

Proximity indices, as described in the 2024 Draft ADP (NMFS 2023a), were calculated for each

stratum to evaluate whether coverage met expectations. The proximity index quantifies the spatiotemporal extent of monitoring coverage and identifies any gaps in monitoring. The proximity index was defined as the proportion of sample units in a stratum that were either monitored or near a monitored sample unit in space or time. Because the proximity index incorporates both space and time, results will differ from indications of spatial or temporal bias individually. The proximity index is meant to be an overall indication of whether monitoring data were collected where and when fishing occurred.

The spatiotemporal distributions of monitoring coverage in strata were within the expected ranges with the only exception being the *EM HAL* stratum, which had a lower than expected proximity value (Figure 3-6), particularly in the GOA (Figure 3-7). All other strata were within expected ranges. These results suggest that *EM HAL* was the only stratum for which monitoring data did not accurately represent where and when fishing occurred within the stratum.

Trip Metrics

Six trip metrics were used to evaluate observer effects to determine if observed trips are similar to unobserved trips . Permutation tests were used to compare trip metrics between monitored and unmonitored trips. The metrics included: the number of NMFS Areas visited in a trip, trip duration (days), the weight of the landed catch (t), the vessel length (ft), the number of species in the landed catch and the proportion (0 to 1) of the total catch that is made up of the most predominant species (pMax).

Results of trip metric tests are presented in Table 3-8 and Figure 3-8. Observed trips in the *OB HAL* stratum were 16.1% (0.94 days) shorter in duration and landed catch that weighed 22.4% (1.56 metric tons) less than unobserved trips. This pattern was also evident in 2022 (Appendix A, Table A-8 and Figure A-8). Observed trips in the *EM HAL* stratum landed 12.9% (0.53) more species than unobserved trips. Observed trips in the *OB TRW* stratum landed catch that was 2.3% more diverse than unobserved trips.

Compliance and Enforcement

The Office of Law Enforcement, Alaska Division (AKD), works closely with the U.S. Coast Guard (USCG), Alaska Wildlife Troopers (AWT), industry, Observer Program, and observer providers to address incidents that affect observers and observer work environments, safety, and sampling.

Historically, there were numerous inefficiencies and shortcomings to the way observer potential violations (a.k.a., statements) were electronically collected and stored. To address these shortcomings, FMA and OLE collaborated to improve the electronic database used for observer statements. The new database was deployed on July 19, 2023. The mid-year rollout of the new database created challenges for reporting but was deemed worthwhile due to the improvements in reporting and ease of use for observers. Due to these challenges, this report demonstrates how the improved database has interrupted the historical time series of potential violation reporting, and where the new system can be used to compare with historical data appropriately.

The new observer statements data differs from the old data in two important ways. First, the number of categories of potential violations is greater in the new database compared to the old. This results in the second important difference: there are more occurrences of potential violations in the new database compared to the old database. Translations (in the form of alluvial plots) from the old categories to the new categories were made to illustrate the way that the old database and new database categorized statements (Figures 5.1-5.3).

Changes to the way that the number of occurrences are recorded between the former old system and the new system have broad implications for between-year comparisons. Comparing data from statements entered into the old and new databases should be carried out with extreme caution because of the differences in the way that the number of occurrences is recorded between the two databases. Comparisons between years and database systems cannot be made because the manner in which the number of occurrences per statement is recorded differs between the two systems. In the past, standardized rates of occurrences per 1000 observed days was presented as the metric. Unfortunately, the numerator in this calculation is the number of occurrences, which is greater per statement in the new database compared to the old database.

NMFS Recommendations

NMFS recommends the following for the 2025 Annual Deployment Plan:

Deployment Design:

- NMFS recommends the continued use of the Proximity allocation method for the partial coverage strata (with the exception of trawl EM) in 2025. Doing so will provide consistency in deployment and allow NMFS to collect data for a full review of the method in the 2025 Annual Report.
- For the Trawl EM stratum in the BSAI, all offloads from Trawl EM trips are to be sampled for salmon, halibut, and biological data, In the GOA, NMFS recommends maintaining the status quo sampling rate where 33% of EM deliveries are sampled by shoreside fishery observers. In the future NMFS may recommend using the same allocation method (e.g. Proximity) for the GOA Trawl EM stratum as other partial coverage strata; however, maining status quo for 2025 will enable NMFS to gather more information on trawl EM costs.
- NMFS recommends maintaining the stratification used in the 2024 ADP for use in the 2025 Annual Deployment Plan. As in 2024, stratification definition would be based on monitoring method (Observer, EM Fixed Gear, EM Trawl), Fishery Management Plan (BSAI, GOA), and gear type that combines hook-and-line and pot gear (Fixed, Trawl). The 7 recommended partial coverage strata for 2025 are:
    - Observed fixed gear trips in the GOA (OB_FIXED - GOA)
    - Observed fixed gear trips in the BSAI (OB_FIXED - BSAI)
    - Observed trawl gear trips in the GOA (OB_TRW - GOA)
    - Observed trawl gear trips in the BSAI (OB_TRW - BSAI)

- EM fixed gear trips in the GOA (EM_FIXED GOA)
- EM fixed gear trips in the BSAI EM_FIXED (EM_FIXED - BSAI)
- EM trawl gear deliveries in the GOA (EM_TRW - GOA)

ODDS:

- NMFS recommends that the agency collaborate with the Partial Coverage Fishery Monitoring Advisory Committee (PCFMAC) to develop an ODDS trip cancellation policy that will not significantly impede industry, affords the observer provider adequate time to deploy an observer, and reduces impacts to coverage rates and non-random monitoring. This new policy should be decided on in time for implementation as part of the 2025 Annual Deployment Plan.
- NMFS intends to make modifications to ODDS to implement the regulated EM Trawl program.

EM Video Review:

- NMFS should collaborate with the PSMFC to find a video review selection rate and review strategy that will result in EM video review times that result in the most useful information for the most number of trips for a given cost.
- To maximize data utility, NMFS, in collaboration with PSMFC, should develop specific prioritization rules that can be used to allocate review effort to the fisheries, gear types, times and areas that are the most dependent on EM data.
- To provide the public and data users confidence that catch estimates from fixed-gear EM fleet are robust to delayed or missing information, NMFS recommends conducting an assessment of impacts of delayed or missing fixed-gear EM data and risks to management and the stocks of not having these data available (e.g. risk of exceeding TAC and PSC, risk of premature or late fishery closures).

Fixed-gear EM:

- Maintain an EM selection pool composed of up to 177 fixed gear vessels, which would maintain the size of the EM pool from 2024. As additional funds are available, increase the number of vessels in the EM selection pool up to the Council's recommendation of 200 fixed-gear EM vessels.
- NMFS recommends prioritizing placement in the EM selection pool based on vessel size, fishing effort, minimizing data gaps, and cost efficiency.
- If a vessel operator had repeated problems with EM system reliability or video quality or has failed to comply with the requirements in their Vessel Monitoring Plan, NMFS may disapprove a Vessel Monitoring Plan and the vessel may be removed from the EM pool.

EM Trawl Implementation:

- NMFS anticipates publishing a final rule for the trawl EM category and intends to implement the regulated program in 2025. NMFS proposed the following elements to be required under the regulated program:
  - Vessels would be required to opt into the regulated program prior to November 1,

2024 and would be required to have a NMFS-approved Vessel Monitoring Plan in place prior to participating in trawl EM in 2025.
    - Vessels would need to transmit a Landing Notice to the shoreside processor through the NMFS approved system prior to each trawl EM offload.
    - EM hardware service providers would be required to have a NMFS-approved permit prior to the start of the fishing season.
- NMFS will continue to evaluate shoreside sampling priorities in order to balance observer workloads for both partial and full coverage sectors.
- NMFS requests collaboration from the EM service providers and the trawl EM EFP permit holders to gain a better understanding of EM trawl costs (both for EM and shoreside observers) so the agency can appropriately budget for trawl EM in the 2025 ADP.

EM Development:

- In addition to implementation of trawl EM, NMFS will continue to collaborate with industry partners on EM development and cost efficiency projects. NMFS will work with Council's monitoring committees (FMAC and PCMAC) to coordinate with National Fish and Wildlife Foundation grantees to plan for potential upcoming grant proposals.

1. Introduction

This annual report provides information, analysis, and recommendations based on deployment of observers and Electronic Monitoring (EM) systems in the federal North Pacific commercial groundfish and Pacific halibut fisheries off Alaska during 2023. Section 313 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1862) authorizes the North Pacific Fishery Management Council (Council), in consultation with National Marine Fisheries Service (NMFS), to prepare a fishery research plan. NMFS implemented the Council's fisheries research plan through the North Pacific Observer Program (Observer Program). The Observer Program provides the regulatory framework for stationing observers and EM systems to collect data necessary for the conservation, management, and scientific understanding of the commercial groundfish and Pacific halibut fisheries of the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) management areas.

The Observer Program is the nation's largest observer program and is responsible for monitoring a fleet of nearly a thousand vessels that fish a combination of hook-and-line, pot, and trawl gear across the Alaska Exclusive Economic Zone (EEZ) area of roughly 3.77 M km^2. Data collection through the Observer Program provides a reliable and verifiable method for NMFS to gain fishery discard and biological information on fish, and data concerning seabird and marine mammal interactions with fisheries. These data contribute to the best available scientific information used to manage the fisheries in the North Pacific and meet data collection mandates of the Magnuson-Stevens Act, Marine Mammal Protection Act, and Endangered Species Act. Observers and EM systems provide fishery-dependent information that is used to estimate total catch and interactions with protected species. Managers use these data to manage groundfish and prohibited species catch within established limits and to document and reduce fishery interactions with protected species. Much of this information is expeditiously available (e.g., daily or at the end of a trip, depending on the type of vessel) to ensure effective management. Scientists also use fishery-dependent data to assess fish stocks, evaluate marine mammal interactions with fishing gear, characterize fishing impacts on habitat, and provide data for fisheries and ecosystem research and fishing fleet behavior.

All vessels and processors that participate in federally managed or parallel groundfish and halibut fisheries off Alaska (except catcher vessels delivering unsorted codends to a mothership) are assigned to one of two categories: 1) the full observer coverage category (full coverage), or 2) the partial observer coverage category (partial coverage). Vessels and processors in the full coverage category have at least one observer present during all fishing or processing activity. Vessels and processors in the partial coverage category are assigned observer or EM coverage according to the scientific sampling plan described in the Annual Deployment Plan (ADP) developed by NMFS in consultation with the Council. Since 2013, observers have been deployed in the partial coverage category using established sampling methods to collect data on a statistically reliable sample of fishing vessels in the partial coverage category. Some vessels and processors may be in full coverage for some trips and partial coverage for other trips, depending on the observer coverage requirements for specific fisheries.

Observer coverage in the full coverage category is industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers. Observer coverage in the partial coverage category is funded through a system of fees collected under authority of Section 313 of the Magnuson-Stevens Act. The fee is based on the ex-vessel value of groundfish and Pacific halibut and is assessed on landings by vessels not included in the full coverage category. The system of fees fairly and equitably distributes the cost of observer coverage among all vessels and processors in the partial coverage category and is independent of the level of coverage each vessel incurs under the Annual Deployment Plan.

The current structure of the Observer Program, including the definition of full and partial coverage, random deployment methods, and the fee system has been in place since 2013 when the Observer Program was restructured and changes were implemented under Amendment 86 to the Fishery Management Plan (FMP) for Groundfish of the BSAI Management Area and Amendment 76 to the FMP for Groundfish of the GOA (Amendments 86/76). Since 2013, a series of regulatory and Fishery Management Plan (FMP) amendments have been implemented to amend the Council's fisheries research plan and make specific modifications to observer coverage requirements under the Observer Program[1]. Here we identify those which affected 2023 or regulations that changed 2023 that will be implemented in 2024:

- In October 2022, the Council took final action on Amendment 126 to the BSAI FMP and Amendment 114 to the GOA FMP, which would implement regulations for Trawl Electronic Monitoring. Fishing under the Exempted Fishing Permit (EFP) to test the efficacy of EM as a compliance monitoring tool in the pelagic pollock fishery is continuing in 2023.
- On November 9, 2023, NMFS published a final rule to modify monitoring requirements for catcher/processors using pot gear in the BSAI (88 FR 77228). This rule was effective December 11, 2023. This action improves observer data collection by requiring participants to carry a Level 2 observer and comply with pre-cruise meeting notifications, and by requiring certification and testing standards for participants choosing any of a suite of voluntary monitoring options.A regulatory amendment (84 FR 55044, 15 October 2019) implemented regulations for catch handling and monitoring requirements to allow halibut bycatch to be sorted on the deck of trawl catcher/processors and motherships when operating in the non-pollock groundfish fisheries off Alaska. This rule allows halibut to be returned to the water faster while also ensuring that observer data continue to result in reliable estimates of halibut incidental catch rate and viability. This rule also changed observer sampling station inspection requirements in Federal groundfish fisheries and made minor changes to bin monitoring requirements for the Amendment 80 fleet. Effective 14 November 2019. Implemented 1 January, 2020.

[1] A list of regulatory and Fishery Management Plan amendments is available online: https://www.fisheries.noaa.gov/tags/north-pacific-observer-program?title=FMP&field_species_vocab_target_id=&sort_by=created

- NMFS published a proposed rule to implement the Pacific Cod Trawl Cooperative (PCTC) program on February 9, 2023 (88 FR 8592). The PCTC program would be a limited access privilege program (LAPP) for the harvest of Pacific cod in the BSAI trawl catcher vessel sector, and would allocate harvest quota to qualifying groundfish LLP license holders and qualifying processors. Catcher vessels participating in the program will be in the full coverage component of the observer program. The final rule for the PCTC program is expected to be published in 2023 and implementation is expected in 2024.

1.1. Observer Coverage Categories and Coverage Levels

Full Coverage

Vessels and processors in the full observer coverage category must comply with observer coverage requirements at all times when fish are harvested or processed. Specific requirements are defined in regulation at 50 CFR § 679.51(a)(2). The full coverage category includes the following:

- Catcher/processors (with limited exceptions)
- Motherships
- Catcher vessels that are participating in programs that have transferable prohibited species catch (PSC) allocations as part of a catch share program.
- Catcher vessels that are using trawl gear and have requested placement in the full coverage category for all fishing activity in the BSAI for one year.
- Inshore processors receiving or processing Bering Sea Pollock

Independent estimates of catch, at-sea discards, and PSC -- among other data -- are collected aboard all catcher/processors and motherships in the full observer coverage category. Requiring at least one observer on every catcher/processor means that at-sea discards and PSC estimates are not based on self-reported data or extrapolated observer data from other vessels. Catcher vessels participating in programs with transferable PSC allocations as part of a catch share program also are included in the full coverage category. These programs include Bering Sea Pollock (both American Fisheries Act and CDQ programs), the groundfish CDQ fisheries (CDQ fisheries other than Pacific halibut and fixed gear sablefish; only vessels greater than 46 ft. LOA), and the Central GOA Rockfish Program.

Independent observer data are important under these catch share programs because quota share recipients are prohibited from exceeding any allocation, including, in many cases, transferable PSC allocations. Allocations of exclusive harvest privileges can create increased incentive to misreport as compared to open-access or limited-access fisheries. Transferable PSC allocations also present challenges for accurate accounting because these species are not retained for sale and they represent a potentially costly limitation on the full harvest of the target species. To enforce a prohibition against exceeding a transferable target species or PSC allocation, NMFS must demonstrate that the quota holder had catch amounts that exceeded the allocation.

Supporting a quota overage case for target species or PSC that could be discarded at sea from an unobserved vessel requires NMFS to rely on either industry reports or estimated catch based on discard rates from other similar observed vessels. These indirect data sources create additional challenges to NMFS in an enforcement action. In addition, the smaller the pool from which to draw similar observed vessels and trips, the more difficult it is to construct representative at-sea discard and PSC rates for individual unobserved vessels.

Inshore processors receiving deliveries of Bering Sea Pollock are in the full coverage category because of the need to monitor and count salmon under transferable PSC allocations.

Partial Coverage

The partial coverage category (50 CFR 679.51(a)) in the Pacific halibut and groundfish fisheries off Alaska includes the following:

- Catcher vessels designated on a Federal Fisheries Permit when directed fishing for groundfish in federally managed or parallel fisheries, except those in the full coverage category.
- Catcher vessels when fishing for halibut individual fishing quota (IFQ) or sablefish IFQ (there are no PSC limits for these fisheries).
- Catcher vessels when fishing for halibut CDQ, fixed-gear sablefish CDQ, or groundfish CDQ using pot or jig gear; or catcher vessels less than or equal to 46 ft. LOA using hook-and-line gear fishing for groundfish.
- Catcher/processors that meet criteria that allows assignment to the partial coverage category.
- Shoreside or stationary floating processors, except those in the full coverage category.

Each year, NMFS prepares an Annual Deployment Plan (ADP) that describes the science-driven method for deployment of observers and EM systems to support statistically reliable data collection in the partial coverage category. Table 1-1 summarizes the partial observer coverage sampling strata that have been implemented through the ADP process since 2013.

1.2. Annual Planning and Reporting Process

Amendments 86/76 established an annual process of 1) developing an Annual Deployment Plan (ADP) that describes plans and goals for observer and EM systems deployment in the partial coverage category in the upcoming year, and 2) preparing an annual report providing information and evaluating performance in the prior year.

The ADP describes how observer coverage and EM systems will be assigned to vessels and processors in the partial observer coverage category in the upcoming year. NMFS develops each ADP in consultation with the Council after reviewing an evaluation of deployment performance for the previous year. NMFS and the Council created the ADP process to provide flexibility in the deployment of observers and EM to gather reliable data for estimation of catch in the groundfish and halibut fisheries off Alaska. The ADP process ensures that the best available

information is used to evaluate deployment, including scientific review and Council input, to annually determine deployment methods.

In general, the timing of the ADP process enables the Council and its Advisory Panel and Scientific and Statistical Committee to review the analysis used to prepare the draft ADP as well as Plan Teams and Fishery Monitoring Committees recommendations and any input from the public in September and October of each year. In December, NMFS finalizes the ADP for the upcoming year by determining the final deployment design and computing the selection rates for using a refined estimate of the total budget and expected fishing effort. NMFS also evaluates whether the Environmental Assessment (EA) prepared for Observer Program Restructuring (NPFMC and NMFS 2011) needs to be supplemented for the ADP. In 2014, NMFS prepared a Supplementary Information Report explaining why the EA did not need to be supplemented. In 2015, NMFS prepared a Supplemental Environmental Assessment (NMFS 2015) in response to a Court Order to consider whether the restructured Observer Program would yield reliable, high-quality data given likely variations in costs and revenues.

The annual report provides descriptive information, analysis, and recommendations based on observer deployment in the previous year. An important component of the annual report is to evaluate deployment performance including statistical evaluation of the deployment of observers and EM in the previous year. The purpose of the deployment performance review is to evaluate whether observer and EM deployment and monitoring goals detailed in regulation and the ADP were achieved and to identify recommendations for future observer and EM deployment in order to promote the collection of data necessary to conserve and manage the groundfish and halibut fisheries. The annual report is an important source of information in developing the proposed ADP for the next year and informing potential regulatory changes to the Observer Program. NMFS presents the annual report to the Council (including the Council's Monitoring Committees, Advisory Panel, and Scientific and Statistical Committee) and to the public in June of each year. The Council may recommend adjustments to observer deployment to prioritize data collection based on conservation and management needs. The Council and public provide input to NMFS on the annual report and ADP. This input may be factored into the evaluation of the partial coverage sampling design, the next annual report, or other reports or analyses for the Council.

1.3. Summary of the 2023 Annual Deployment Plan

In December, 2022, NMFS released the final 2023 ADP (NMFS 2022) with the following strata and deployment rates (rounded to the nearest whole number):

- No Selection – 0%
- Hook-and-line – 18%
- Pot – 17%
- Trawl vessels not participating in Trawl EM – 23%
- Fixed-Gear EM – 30%
- Trawl EM – all vessels

- 100% at-sea coverage with EM; plus 33% shoreside monitoring in the GOA and 100% shoreside monitoring in the BSAI.

In 2023, Fixed-gear EM was deployed according to trip-selection. The Trawl Electronic Monitoring Trip-Selection Pool was composed of all trips fished under an Exempted Fishing Permit (EFP) to evaluate the efficacy of EM on pollock catcher vessels using pelagic trawl gear in the Bering Sea and Gulf of Alaska. The goal for the trawl EM program is compliance monitoring of maximized retention to ensure that shoreside observers have access to complete, unsorted trip-level catch to account for PSC catch and to sample for biological data collection. Catch accounting for the vessel's catch and bycatch was done via eLandings reports and shoreside plant observers. Industry received National Fish and Wildlife Foundation (NFWF) funding to support the project which includes participating catcher vessels, tender vessels, and shoreside processors.

1.4. Changes since the 2023 ADP

1.4.1 Partial Coverage Cost Efficiencies Analysis

At the October 2019 Council meeting, the Council recommended an increase in the observer fee percentage from 1.25 percent to 1.65 percent for the Partial Coverage Observer Program and dovetailed that recommendation with continued development of mechanisms to improve cost efficiency in the program as its highest priority moving forward. Specifically, the Council requested work to focus on:

- Pelagic trawl EM combined with shoreside sampling;
- Integrated monitoring plan for fixed gear that combines EM, shoreside sampling, and at-sea observer coverage as needed (e.g., consider whether the 15% hurdle is still the appropriate baseline level for observer coverage in combination with EM coverage; develop average weight protocols to support the use of EM);
- Optimizing the size and composition of the fixed gear observed and EM fleets, taking into account both cost priorities and data needs for average weights and biological samples (including consideration of expansion of the zero-coverage pool to include vessels fishing from remote ports harvesting small amounts of fish).

In response to a Council priority to improve cost efficiencies in the partial coverage category and to integrate upcoming changes into the observer program, including incorporating regulatory changes required by the Pacific Cod Trawl Cooperative (PCTC) and Trawl EM, NMFS initiated a evaluation of partial coverage to compare alternative scientifically robust, cost-effective sampling plans. The integrated evaluation of data collection methods (observers and EM) was presented in the draft 2024 ADP (NMFS 2023a) and incorporated the goal of spending the limited, available funding more efficiently such that the most coverage (both EM and observers) is achieved for a range of budgets. The analysis evaluated the trade-offs between different monitoring designs, including:

- Relative per unit cost efficiency of each design
- Statistical efficiency of each design
- Relative impact on data quality (e.g. timeliness, ability detect rare events)
- Relative scalability of each design

The evaluation in the draft 2024 ADP (NMFS 2023a), included several stratification methods (ways to divide the sample population of trips into groups, or strata) and allocation approaches (how much to sample in each stratum) and provided the basis appropriate sampling plan for deployment in 2024 and beyond.

1.4.2 2024 ADP

The 2024 ADP created a stratification definition based on monitoring method (Observer, EM Fixed Gear, EM Trawl) and Fishery Management Plan (FMP) area (BSAI, GOA), and gear that combines Hook-and-line and pot gear (Fixed, Trawl).

NMFS implemented the Proximity allocation method to deploy observers and EM (NMFS 2023a, NMFS 2023b). The Proximity allocation method is designed to spread sampled trips throughout the fisheries to increase the proportion of trips that are sampled or near a sampled neighbor and to be consistent between strata within a specified budget, while also protecting against small sample sizes within a stratum. As such, the Proximity allocation method is precautionary with respect to obtaining data from all types of fishing activity (decreasing data gaps) while protecting against high variance associated with low sample sizes. This allocation method was applied to all sampled strata (i.e., does not apply to zero selection stratum) except the trawl EM stratum. For the Trawl EM strata in the GOA, NMFS implemented a sampling rate of EM deliveries by shoreside fishery observers of 33%. In the BSAI, implemented full coverage sampling so that all offloads from Trawl EM trips could be sampled for salmon, halibut, and biological data.

The 10 sampling strata and selection rates (rounded to the nearest whole number) implemented in 2024 were:

- **Observer Trip Selection**
  - Fixed-gear BSAI - 44%
  - Fixed-gear GOA - 13%
  - Trawl BSAI - 72%
  - Trawl GOA - 21%
- **Fixed-Gear EM trip selection**
  - Fixed-gear EM GOA - 24%
  - Fixed-gear EM BSAI - 74%
- **Trawl EM**
  - Trawl EM GOA - 33% shoreside monitoring, plus 100% EM coverage at-sea
  - Trawl EM BSAI - 100% shoreside monitoring, plus 100% EM coverage at-sea
- **Zero Coverage** - 0%
- **Observer full coverage** - 100%

Table 1-1-- Sampling strata and selection pools in the partial coverage category from 2013 to the present. The partial coverage selection rates set through the Annual Deployment Plan are noted and the realized coverage rates evaluated in each Annual Report are noted in parentheses. PreIm = Pre-implementation, prior to a fully regulated program; CP = catcher/processor vessel; CV = catcher vessel; GOA= Gulf of Alaska; BS = Bering Sea; H&L = hook-and-line gear; LOA = vessel length overall.

<table>
<tr><th rowspan="2">Year</th><th colspan="6">Observer Trip Selection</th><th colspan="2" rowspan="2">Fixed-Gear EM trip selection pool
EM required on randomly selected</th><th colspan="2" rowspan="2">Trawl EM</th><th rowspan="2">Observer vessel selection pool</th><th colspan="2" rowspan="2">No selection pool
Observer coverage not required</th></tr>
<tr><th colspan="5">Trip-selection across all ports
Observer coverage required on all randomly selected trips</th><th>Port-based Trip Selection*</th></tr>
<tr><td>2024</td><td>Fixed-gear BSAI: 44%</td><td colspan="2">Fixed-gear GOA: 13%</td><td>Trawl BSAI: 72%</td><td>Trawl GOA: 21%</td><td>n/a</td><td>Fixed-gear EM GOA: 24%</td><td>Fixed-gear EM BSAI: 74%</td><td rowspan="5">GOA: 33% shoreside monitoring + 100% at-sea EM</td><td rowspan="5">BSAI: 100% shoreside monitoring + 100% at-sea EM</td><td rowspan="6">n/a</td><td colspan="2" rowspan="3">Vessels <40’ LOA and Jig gear</td></tr>
<tr><td>2023</td><td>Trawl: 22.7% (32.3)</td><td colspan="3">H&L 17.9% (19.4)</td><td>Pot: 17.1% (17.8)</td><td n/a</td><td colspan="2" rowspan="6">Fixed gear (H&L and Pot) EM: 30%</td></tr>
<tr><td>2022</td><td>Trawl 29.7% (29)</td><td colspan="3">H&L 19% (14.6)</td><td>Pot 17.5% (18.1)</td></tr>
<tr><td rowspan="2">2021</td><td colspan="5">Sep. 1 - Dec. 31:
Trawl: 21% (28.2) H&L 18% (17.2) Pot 18% (20.5)</td><td>Deployment in all ports</td><td rowspan="3">Vessels <40’ LOA and Jig gear</td><td rowspan="3">EM Innovation Research 2-4 vessels</td></tr>
<tr><td colspan="5">Jan. 1 - Aug. 31: Limited waivers due to COVID-19</td><td>Deployment in 13 ports</td></tr>
<tr><td rowspan="3">2020</td><td colspan="5">Mar. 26 - Jun. 30: Waivers issued due to COVID-19</td><td>Deployment in 13 ports</td></tr>
<tr><td colspan="5">Mar. 26 - Jun. 30: Waivers issued due to COVID-19</td><td>Deployment in Kodiak only</td></tr>
<tr><td colspan="5">Jan. 1 – Mar. 25:
Trawl: 20% (22.4) H&L: 15% (13.4) Pot: 15% (15.5)</td><td>Deployment in all ports</td></tr>
<tr><td>2019</td><td>Trawl: 24% (25.2)</td><td>Trawl Tender: 27% (35.7)</td><td>H&L: 18% (17.6)</td><td>Pot: 15% (14.0)</td><td>Tender Pot: 16% (29.5)</td><td>n/a</td><td colspan="2">n/a</td></tr>
</table>

<table>
<tr><th rowspan="2">Year</th><th colspan="7">Observer Trip Selection</th><th colspan="2">Fixed-Gear EM trip selection pool
EM required on randomly selected</th><th rowspan="2">Trawl EM</th><th rowspan="2">Observer vessel selection pool</th><th colspan="2">No selection pool
Observer coverage not required</th></tr>
<tr><th colspan="6">Trip-selection across all ports
Observer coverage required on all randomly selected trips</th><th>Port-based Trip Selection*</th></tr>
<tr><td>2018</td><td colspan="5">Trawl 20% (20.3) | Trawl Tender: 17% (35.0) | H&L: 17% (15.5) | Pot: 16% (15.5) | Tender Pot: 17% (29.0)</td><td rowspan="6">n/a</td><td>H&L EM: 30%</td><td>Pot EM PreIm: 30% (not used in catch accounting)</td><td rowspan="6">n/a</td><td rowspan="5">n/a</td><td rowspan="5">Vessels <40’ LOA and Jig gear</td><td>EM Innovation Research 2-4 vessels</td></tr>
<tr><td>2017</td><td colspan="6">Trawl 18% (20.7) | Trawl Tender 14% (18.8) | H& 11% (12.0) | H&L Tender 25% (0) | Pot: 4% (7.7) | Pot Tender 4% (5.3)</td><td colspan="2" rowspan="4">n/a</td></tr>
<tr><td>2016</td><td colspan="3">Trawl: 28% (28.0)</td><td colspan="2">H&L: 15% (15.0)</td><td>Pot: 15% (14.7)</td><td>EM PreIm 60 vessels</td></tr>
<tr><td>2015</td><td colspan="4">Large Vessel: 24% (23.4) Trawl CVs, Small CPs, H&L/Pot CVs ≥ 57.5’</td><td colspan="3">Small Vessel: 12% (11.2) H&L/Pot CVs >40’ and <57.5’</td><td>EM PreIm 12 vessels</td></tr>
<tr><td>2014</td><td colspan="7">All Trawl CVs and H&L/Pot vessels ≥ 57.5’ LOA: 16% (15.1)</td><td>H&L/Pot CVs >40’ and <57.5’: 12% (15.6)</td><td>Voluntary EM</td></tr>
<tr><td>2013</td><td colspan="7">All Trawl CVs and H&L/Pot vessels ≥ 57.5’ LOA: 14.5% (14.8)</td><td>H&L/Pot CVs >40’ and <57.5’: 11% (10.6)</td><td colspan="2">Vessels <40’ LOA and Jig gear</td></tr>
</table>

*Observer coverage on randomly selected trips in specific ports. This protocol was implemented in response to the COVID-19 pandemic when travel and lodging conditions in specific ports allowed observers to meet and maintain applicable health mandates for deployment into the commercial fisheries.

2. Fees and Budget

2.1. Budget for Partial Coverage Category in 2023

Section 313(d) of the Magnuson-Stevens Act authorizes the creation of the North Pacific Fishery Observer Fund ("Observer Fund") within the U.S. Treasury. This was the eleventh year that fees were collected from the partial coverage fleet. The following section provides information on the amount of fees that accrued on landings made in 2023 that are anticipated to be collected in 2024, as well as the amount of fees collected in 2022 that were obligated to the partial coverage contract to pay for sea days in 2023.

Fee billing statements for 2023 were mailed to 85 processors and registered buyers in January 2024. A total of $4,379,166 in observer fees were billed. At the time of this publication, six processors had not yet paid observer fees totaling $390,677. In order to collect delinquent fees, seven 30-day notices were mailed in March. Additional notices will be mailed as needed. Processors submitting late fee payments were charged a one-time administrative fee of $25 plus interest on the observer fees with each notice.

The sequestration of funds initiated under the 2011 Budget Control Act continues to affect the Observer Fund. Each year, the Observer Fund is subject to sequestration, meaning a percentage of the fee revenue is held in the Fund. NMFS tracks sequestered funds and has typically received the previous years sequestered funds, although this did not occur in 2023. NMFS continues to track these expected funds allocations and will continue to work with the Department of Treasury to receive these.

The amounts from the Observer Fund used to support the observer deployment contract in each fishing year are shown in Table 2-1. Revenue from the Observer Fund is also used to support the partial coverage fixed-gear EM program consistent with the NMFS Policy Directive on Cost Allocation in Electronic Monitoring Programs. In 2025, the Observer Fund will also be used to support the regulated partial coverage trawl EM program.

2.2. Summary of Fees Collected in 2023

Observer coverage for the partial coverage category is funded through a system of fees based on the ex-vessel value of groundfish and Pacific halibut, with potential supplements from federal appropriations. The observer fee is assessed on landings accruing against a federal total allowable catch (TAC) for groundfish or a commercial halibut quota made by vessels that are subject to federal regulations and not included in the full coverage category. Therefore, a fee is only assessed on landings of groundfish from vessels designated on a Federal Fisheries Permit or from vessels landing IFQ or CDQ halibut or IFQ sablefish. Within the subset of vessels subject to the observer fee, only landings accruing against the federal TAC are included in the fee

assessment.[2]

The observer fee equal to 1.65% of the ex-vessel value is assessed on the landings of groundfish and halibut subject to the fee.[3] Ex-vessel value is determined by multiplying the standard price for groundfish by the round weight equivalent for each species, gear, and port combination, and the standard price for halibut by the headed and gutted weight equivalent. The standard ex-vessel prices used for 2023 fee assessments were published in the *Federal Register* on December 29, 2022 (88 FR 80164).[4] Table 2-2, Table 2-3, and Table 2-4 summarize the observer fees that accrued for 2023. Table 2-5 is new with the 2023 Annual Report and also summarizes fees by area, but differentiates the type of monitoring the vessel was subject to and which selection pool or strata the vessel was in when the fees accrued.

2.3. Cost

2.3.1 Program Structure

The Fisheries Monitoring and Analysis Division (FMA) at the Alaska Fisheries Science Center (AFSC) oversees the Observer Program and is responsible for a suite of activities that support the overall observer data collection in the groundfish and halibut fisheries in Alaska, inclusive of EM programs which supplement or are used in lieu of observer coverage. FMA has staff located in Seattle, Washington, and in Anchorage, Kodiak and Dutch Harbor, Alaska. The AFSC allocates a budget to FMA each fiscal year to support these activities. FMA staff are responsible for training, briefing, debriefing, and oversight of observers who collect catch data on board fishing vessels and at shoreside processing plants. FMA is also responsible for quality control/quality assurance of observer data and EM, conducting research and development of fishery monitoring technologies, and providing a host of fishery-dependent data products and services.

The FMA Division is organized into a Directorate and five programs: Observer Training and Curriculum Development; Debriefing and Data Quality Control; Information and Monitoring Technologies; and Analytical Services; and Field and Operations Management.

Observer Training and Curriculum Development ensures that observers are properly trained and equipped for their deployments. Observers are trained to follow FMA's established data collection procedures while deployed on commercial fishing vessels or stationed at processing facilities. Training materials are updated annually in response to changes in regulations and data needs for fishery management, stock assessment, and ecosystem-based fishery modeling efforts. Training methods are routinely updated to best convey the complex topics and concepts to the

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[2] A table with additional information about which landings are and are not subject to the observer fee is in NMFS regulations at 679.55(c) (CFR 679.55 Observer Fees) and shown on page 2 of an informational bulletin available online at: Observer Fee Collection

[3] Final Rule: Fee Adjustment to 1.65% (85 FR 41424, July 10, 2020). Available online at: 85 FR 41424

[4] Available online at: 88 FR 80164

observer workforce. Program staff also manage FMA's extensive sampling gear inventory to ensure a sufficient supply for observers throughout the year at all FMA office locations and develop inventory control systems and policies to maintain safety equipment, provide sampling equipment readiness, and monitor equipment losses.

Debriefing and Quality Control assures observers are provided support throughout their deployment and that FMA's established data collection procedures were properly followed during observer deployments. Staff members assist at-sea observers through communications (referred to as in-season advising) through secure software for answering questions, correcting data errors, and ensuring safety concerns are addressed. Data quality control activities, both in-season and post-deployment include data entry, data validation, and observer support, as well as industry, interagency, and interdivisional support. Staff members install and maintain the custom software (ATLAS) which is used to transmit observer information and data, ensure observers are trained on the use and configuration of software, and provide near real-time data quality control and guidance for observers using these systems. In addition, they document and evaluate each observer's data collection methodologies through interviews, electronic vessel surveys, and written descriptions submitted by the observer. Staff conduct data quality control checks on data collected by fishery observers by verifying the accuracy of recorded data, identifying errors, and ensuring observers make the necessary corrections.

Information and Monitoring Technologies develops custom software that supports the recording of fishing effort, location, species composition and biological data collected by fishery observers from North Pacific commercial fisheries. This software enables the transmission, validation, and loading of those data, the editing and reporting of current and vetted data sets; observer logistics and contract management; and the recording of bird and marine mammal data collections for both internal and external use. Staff also support the ingestion of EM data into FMA's data structure and develop data quality control measures within these databases. In collaboration with FMA analysts, staff working under this activity developed and continue to support ODDS which allows vessel owners to register, edit, and close fishing trips. This application was developed with independent modules for FMA management, the partial coverage observer services provider - including the ODDS call center, EM service providers, and each vessel owner.

Analytical Services collaborates with scientists throughout the AFSC to ensure that observer data meet the needs of stock assessment and ecosystem-based fishery modeling efforts. In addition, analysts perform independent research aimed at identifying bias and variances associated with fishery-dependent sampling. Analysts work closely with the Alaska Regional Office and Council staff to ensure that FMA provides relevant, high-quality information for fisheries management and in support of requests from the Council and other stakeholders.

Field and Operations Management runs field stations in Anchorage, Dutch Harbor, and Kodiak to provide support to observers and industry members in-season. Staff strategically stationed in these locations provide a wide variety of assistance in the field including pre-cruise meetings for industry and observers, complete mid-cruise reviews for observers; and refresh observer safety and sampling supplies. The Operations Management Program also oversees the partial coverage

deployment and funding to ensure the infrastructure and contracts are in place to meet the observer deployment requirements of BSAI Amendment 86 and GOA Amendment 76. FMA staff provide oversight of the fishery observer services provider contract, serving as the primary point of contact for the contract provider and FMA. The contract provider and FMA staff coordinate with industry, schedule vessel inspections as needed, and participate in decision-making for partial coverage vessels that are selected for coverage but request a release from the requirement.

EM was formed as a unique activity within FMA under Field and Operations Management starting in 2013 and has continued to dedicate staff time to the development and integration of electronic technologies in Alaska fisheries. More information about the EM innovation results is provided in section 3.4.

Division Directorate staff emphasize coordinating and prioritizing resources across programs and activities, as well as managing links between the programs and overall costs. In addition, overall management and supervision of staff, budget, and contracting is required to ensure resources are appropriately allocated and staff understand their responsibilities and priorities. Staff provide advice to support policy development, decision-making, and regulatory and program development by NMFS and the Council. They also provide guidance and advice on policy issues, monitoring programs, and related topics at the regional, national, and international level.

Program Field Offices

The Anchorage Field Office ensures FMA's established data collection procedures were properly followed during observer deployments to commercial fishing vessels and processing facilities as well as provides observers with support in the field during their deployment. Staff assist at-sea observers through in-season advising and mid-cruise debriefings. In addition, they document and evaluate each observer's data collection methodologies through interviews, electronic vessel surveys, and written descriptions submitted by observers, as well as conduct data quality control checks to verify data accuracy by identifying errors and ensuring the observer makes the necessary corrections. Staff maintain an inventory of complete sampling and safety gear sets for observers redeploying directly from the Anchorage office.

The Kodiak Field Office provides support to observers primarily assigned to vessels in the GOA. Support includes conducting pre-cruise briefings with vessel representatives and observers prior to the observer's first trip onboard, conducting mid-cruise debriefings with observers to address any safety concerns on their vessels, reviewing their data collection methodology and recorded data, providing in situ problem resolution, and issuing sampling and safety equipment. In addition, staff receive, track, and ship biological samples that are collected by observers in support of resource management, scientific research, and observer training. Staff also serve as the primary FMA contact for observed vessels and processing facilities in the GOA and therefore played a key role in coordinating on the GOA portion of the pelagic trawl EM exempted fishing permit beginning in 2020 and continuing through 2024.

The Dutch Harbor Field Office provides support primarily to observers assigned to vessels in the

Bering Sea and Aleutian Islands. Support includes conducting pre-cruise briefings with vessel representatives and observers prior to the observer's first trip onboard, conducting mid-cruise debriefings with observers to address any safety concerns on their vessels, reviewing data collection methodology and recorded data, providing in situ problem resolutions, and issuing sampling and safety equipment. In addition, staff conduct observer sample station and scale inspections on board commercial fishing vessels to ensure the sample stations meet the standards required in federal regulations. Staff also serve as the primary FMA contact for observed vessels and processing facilities in the Bering Sea and Aleutian Islands and have supported the BSAI portion of the pelagic trawl EM EFP beginning in 2020 and continuing through 2024.

2.3.2 Contract Costs for Partial Coverage

NOAA's Acquisition and Grants Office (AGO) secures and administers contracts for NMFS. FMA staff participate in contracting by initiating requirements documents, providing funding, and participating in the contract review and award process through formal source evaluation boards. The processes for federal contracts follow the Federal Acquisition Regulations (FAR) and Commerce Acquisition Regulations (CAR). NMFS receives legal guidance on the FAR and CAR through NOAA contract attorneys and AGO staff.

After NOAA awards a contract, FMA staff participate by assigning a Contracting Officer Representative (COR) to the contract. The COR provides direct technical oversight of the contract by monitoring contract performance, identifying and resolving operational issues, and reviewing and approving invoices. While FMA is directly involved in day-to-day contract management through its assigned COR, NOAA retains full authority over the contract through their appointed Contract Officer (CO). The NOAA CO can modify, extend, cancel, and award contracts.

Contracts for observer services are awarded through a competitive process, allowing any company that provides these services to bid. The observer coverage for the first 2 years (2013 and 2014) of the program was procured through a two-year contract awarded to AIS Inc. A second contract was awarded for the subsequent five years of the program to AIS, Inc. in April 2015. A third contract was competed and subsequently awarded for up to five years of the program to AIS, Inc. in July of 2019. In 2024, the contract will be recompeted again, with an expected award for up to five years.

Table 2-1 provides a summary of funds expended and observer days used since 2017. Note that past Annual Reports used funds obligated instead of funds expended to calculate an average sea day cost. An obligation of funds is a legal liability to disburse funds upon receiving the service – in this case the provision of observer coverage. Obligations of funds therefore reflect the potential quantities of service, not the cost of the realized service. Expenditures are the disbursement of funds and are directly related to the service.

In 2023, the average cost per observer sea day in the partial coverage category was $1,536 (based on the cost of $4,801,704 for 3126 observer days). The average cost per observer sea day is a

combination of a daily rate, which is paid for the number of days the observer is on a vessel or at a shoreside processing plant, and reimbursable travel costs, including quarantine days which were still required in some cases for the safety of crews and observers in light of the COVID-19 pandemic. Note that travel costs have increased over the years, and the contractor does not have control over these costs. Travel costs are reimbursed as actuals (e.g., transportation) and government established per diem rates (e.g., lodging, meals, and incidental expenses). Travel costs have increased 3.8% since 2019, despite a drop in coverage days. The contractor also needs to recoup their total costs and profit through the daily sea day rate, which includes costs for days the observers are not on a boat. These days include training, travel, deployment in the field but not on a boat, and debriefing.

The average annual cost per sea day in partial coverage has ranged between $895 and $1,536 since 2014 (Table 2-6). Much of this variation is associated with the total number of sea days used, as the cost of "optional" sea days are less expensive than "guaranteed" sea days under the federal contract. Additionally, there is variation from year-to-year in travel costs which, for Alaska, tend to be higher per trip than other regions of the country.

2.3.3 Costs for Full Coverage

The costs associated with the full coverage category are paid by the commercial fishing industry directly to certified observer providers. This cost structure is sometimes referred to as "pay as you go." The services carried out by observer providers include paying observers, deploying observers to vessels and shoreside processors, recruiting, training and debriefing. There are currently three active certified full-coverage providers in Alaska: Alaskan Observers Inc (AOI); Saltwater, Inc. (SWI); and AIS, Inc.

Since 2011, certified observer providers have been required to submit to NMFS copies of all of their invoices for observer coverage. The regulations require the submission of the following:

- vessel or processor name;
- dates of observer coverage;
- information about any dates billed that are not observer coverage days;
- rate charged for observer coverage in dollars per day (the daily rate);
- total amount charged (number of days multiplied by daily rate);
- the amount charged for air transportation; and
- the amount charged for any other observer expenses with each cost category separated and identified.

The invoice data were used to calculate the average cost of observer coverage in the full coverage category for 2023. The observer invoice data are confidential under section 402(b)(1) of the Magnuson-Stevens Act. Therefore, summarized information may be provided in this report only when the cost data used in the summary statistic derives from invoices submitted by at least three observer providers. This confidentiality requirement limits the detail of the average cost data that may be reported to the public, as noted below.

Table 2-7 shows total billed vessels/plants, total billed observer coverage days, total costs, and average costs in the full coverage sector for each year 2014-2023. In 2023:

- 111 vessels and processing facilities were billed for observer coverage in the full coverage category representing a 8.3% decrease from the 121 that were billed in 2022. This continues the trend wherein there has been a decrease in the number of vessels carrying full coverage observers every year since 2019. (Note that full coverage EM costs are not reported to NMFS and therefore are not included in invoiced amounts.)
- The total invoiced amount was $11,741,838.15, down 4.4% from the 2022 total of $11,469,305.03, continuing the decreasing trend that began in 2020.
- The total number of observer days represented by these invoices was 29,095[5], a very slight 0.1% increase (essentially flat) from the 29,069 that were billed in 2022. However, 2021 and 2022 saw strong decreases each year in the total number of observed days, so the 2023 value continues the trend of reduced full observer deployment coverage days since 2020.

The continued decrease in billed vessels and the decreases in billed observer coverage days and total costs are in part due to continued expanded participation in the Electronic Monitoring (EM) Exempted Fishing Permit (EFP) by American Fisheries Act pollock catcher vessels in the BSAI. These full-coverage vessels were exempted from carrying an observer during the EFP. While additional observers were deployed to processors that participated in the EM EFP to collect prohibited species and biological data from observer-exempted vessels participating in the EM EFP, the number of vessels that were exempted from carrying an observer greatly outnumbered these additional observers deployed to processing plants.

The average "fully-loaded" cost per day of observer coverage in the full coverage category in 2023 was $404, up 2.3% from 2022 when it was $395, and 6.0% higher than the time-series mean of $381. This 'fully-loaded' average combines invoiced amounts for the daily rate per observer day ("daily cost") plus all other costs for transportation and other expenses ("incidental costs"). The overall average percentage of incidental costs per day to the total cost per day across all gear types and sectors was 11%[6] , down slightly from 12% in 2022 and slightly above the time-series mean of 9.7%.

Previous annual reports have shown figures and data summarizing the average costs to fishing vessels and processing facilities for full coverage observers by vessel type and gear type. However, in 2023 only two observer provider companies provided full coverage observer services to all but one of the sectors. As a result, the cost-by-sector analysis does not pass the

[5] This value is lower than the total full coverage deployment days calculated by FMA of 29,142 days (see Chapter 4) because FMA's method of counting total deployment days includes some non-fishing and non-delivery days when the observer was assigned to a vessel or plant that were not billed as days by the full coverage provider.

[6] Calculated as total incidental costs divided by the total cost of coverage.

confidentiality requirements and has been removed from the report for 2023.

More information about the comparison of costs per observer day for full and partial coverage is described in Section 2.4.3.

2.3.4 Costs for Electronic Monitoring

NMFS implemented EM for the purposes of catch estimation on fixed gear vessels 40-57 ft in length. EM costs are dependent on the number of vessels participating in the EM program, the number of systems that need to be purchased and/or replaced on an annual or recurrent basis, deployment rates, field support services, video review, and other factors.

The preliminary cost of the fixed-gear EM program in 2023 was: $1,092,410. The cost includes ongoing costs (EM Service Provider Fees and Overhead; Equipment Maintenance and Upkeep; Data Transmission; Data Review and Storage) and one-time costs (Equipment Purchases and Installation). However, the EM video review was not done near-real time and imagery review from the 2023 fishing year was ongoing at the time the cost data for this report was compiled (April, 2024). Since these costs are incomplete, a total cost and a cost-per-day for EM was not calculated for 2023.

2.4. Cost Savings and Efficiencies

2.4.1 Partial Coverage

The current observer service provider contract was awarded on 30 July 2019. The rates that NMFS currently pays the observer services contractor were established through a competitive bidding process. This contract has several components designed to improve efficiency and reduce costs. For example, the contract requires that a partially observed sea day (i.e., a day that begins after 1200 or returns to port before 1201) is paid at an amount equal to one-half the daily rate. The lower rate applies to all days completed by the contractor in which an observed vessel leaves or arrives in port before or after the designated times.

Similar to the last contract, NMFS included the provision for observers to participate in NMFS fishery-independent surveys using funds made available through AFSC. This allows AIS, Inc. to provide additional work to their employees during the summer season when observer opportunities as part of the ADP are more limited. This provides their employees continuity in employment, additional experience, and may help to reduce employee turnover, thereby increasing overall efficiency. NMFS benefits from trained observers with sea experience to help to conduct their survey fieldwork.

The current observer services contract expires 16 August 2024.

2.4.2 Full Coverage

The majority of full coverage business is conducted by two of the three NMFS-permitted

observer providers. NMFS has implemented regulations that govern the terms of observer deployment (e.g., limiting deployment duration, setting minimum qualifications, requiring specific experience for observers assigned to certain deployments, etc.). Efficiencies could potentially be gained by increasing competition, reducing constraints, or increasing efficiency of activities supported by NMFS.

2.4.3 Full Versus Partial Coverage Costs

There are several factors that impact how comparable the average observer coverage costs per day are between in the partial coverage category and the full coverage category.

- The partial coverage contract is a federal contract between NMFS and the observer provider company, whereas the full coverage observer providers do not operate under a federal contract. Instead, full coverage observer providers are permitted by NMFS and contract observer services directly with vessels and processing plants.
- Federal contracts are subject to Federal Acquisition Regulations, Fair Labor Standards Act, and Service Contract Act requirements, and applicable Department of Labor Wage Rate Determination which establish, among other things, minimum wage and benefits for observers, including overtime. Some of these same regulations and requirements may also apply to full coverage observer providers depending on the size of the companies.
    - The Service Contract Act (SCA) is applicable to all federally contracted positions, and the Department of Labor sets minimum wages, overtime pay requirements, and fringe benefits including health insurance, paid sick leave, paid vacation, and holiday pay. Some of these same benefits may not be provided under the pay-as-you-go model, where a day-rate pay scale is more frequently used than hourly rates plus benefits. The SCA wage determinations are periodically updated, with the last increase on June 30, 2023. The partial coverage contract holder does not have control over these wage and benefit requirements.
- All travel costs and expenses incurred in partial coverage are reimbursed in accordance with the Government's Travel Regulations. These include specified per diem rates which are paid regardless of actual expenses. Full coverage providers have more flexibility as to how they invoice travel expenses, and can use non-invoiced travel options such as having observers ride a vessel to Alaska and/or be carried aboard a chartered flight paid for by a fishing vessel company.
- The costs associated with the partial coverage component are a daily fee NMFS pays for each sea day, and a reimbursable cost for travel as defined in the NOAA contract. Because NMFS only pays for sea days, the daily rate charged to NMFS must factor in an estimate for the contractor's fixed costs for unobserved days. Note that in 2020-2023, "sea days" include observer days at shoreside processing plants in support of the EM-EFP, and quarantine days. Increasing the proportion of time spent at sea or at plants would increase the efficiency of the overall program since it would lower fixed costs to the contractor and allow for a newly negotiated lower daily rate charged to NMFS. Higher coverage rates equate to greater efficiency and lower costs per day, while lower

coverage costs equate to lower efficiency and greater costs per day.

- Observers in the partial coverage category are typically deployed out of many small, remote port locations which increases travel and lodging costs. Travel costs are also increased due to the short time frame in which partial coverage observers are required, due to the 72 hour timeframe in which partial coverage vessels log trips. This is markedly different from full coverage vessels which may have longer lead time for sailing schedules and operate from fewer ports.
- Observers in the partial coverage category are often only deployed on a vessel for one trip which is significantly shorter (one to five days) than the typical vessel deployment for full coverage observers (60 to 90 days), requiring more travel between vessels.
- Partial coverage by its very nature is less efficient on a cost per unit basis compared to full coverage. This is because partial coverage samples the fleet, such that partial coverage informs NMFS on the entirety of the fleet, whereas full coverage informs NMFS on the harvest aboard that vessel. Partial coverage requires a random selection model to ensure statistically reliable data and predicting where observers will be deployed and in what amount is difficult with random selection procedures. The risk and uncertainty regarding the number of observed days is borne solely by the partial coverage observer provider and increases costs on a per unit (daily rate) basis.

Despite the inherent differences between the full and partial coverage categories, NMFS is frequently requested to compare these costs. When doing this, the most salient comparison of costs is a "fully loaded" daily rate, which is calculated as the total funds expended divided by the number of observed days.

The fully loaded rate for each year of the partial coverage contract is shown in Table 2-6. For example, in 2023, the fully loaded rate was $4,801,704 ÷ 3126 days = $1536 per day. This calculation is appropriate for partial coverage since most trips in this category have a similar duration ranging between one and five days.

The average daily observer rate (variable costs only) for full coverage was similar across all gear and sector categories at approximately $404 per day (Table 2-8). Compared to a partial coverage observer that may be deployed onto multiple vessels for one to five days at a time, an observer deployed onto a full coverage vessel boards once and may stay on that vessel for a month or more (up to 90 days). Assuming the costs of paying an observer for a day and maintaining an observer provider infrastructure are constant, the incidental costs are likely to be dominated by travel and temporary housing. These incidental costs as a proportion of the total cost for an observer deployment will decline with increased deployment duration. Therefore, the fully loaded rate of an observer day will also decline with an increase in the number of invoiced days for a given vessel in a given month. We can illustrate this phenomenon using the full coverage invoice database maintained by FMA (Figure 2-1). The per-day base rate for observer coverage per permitted provider is known. Therefore, this value multiplied by the total number of invoiced days yields the total base invoice cost. Since the total invoice amounts are known, a subtraction

of the total base invoice from the total invoice amount will either yield a zero, or a positive value. Only those invoices that included travel costs and therefore "fully loaded" and were considered further. The fully loaded invoice value was divided by the number of days on the invoice, yielding a fully loaded daily rate for each invoice. The fully loaded rate as a function of the total number of observed days in the invoice does in fact decline as expected.

Additionally, full coverage observer costs have not kept up with recent inflation rates. We can illustrate this by comparing the "expected" costs per day - calculated by applying the average inflation rate for each year[7] to the 2014 daily costs as the baseline - to the "actual" costs per day (Figure 2-2). While the actual "incidental" costs in full coverage have generally followed the expected inflation-adjusted value (with the exception of 2020 when travel and between-vessel lodging costs were intentionally minimized due to vessel fidelity strategies during the COVID-19 pandemic), the actual "base" (daily) costs have increased much more slowly through the time-series, with relatively small increases even during the recent strong inflation years of 2021-2023. Fluctuations in incidental costs such as flights and hotels tend to be outside of an observer provider's control and will naturally increase with inflation, whereas the base costs are more within the providers' control since they reflect the rate they charge each vessel/plant for an observer day. In contrast, partial coverage daily costs - which as previously noted are subject to periodic Service Contract Act wage determination updates - have increased along with inflation. This factor must be taken into account when comparing full coverage and partial coverage costs over time.

[7] Inflation rate source: US Bureau of Labor Statistics (https://www.bls.gov/cpi/data.htm)

Table 2-1 -- Summary of the fees and federal funding for partial coverage observer sea days from 2013 to 2023

Calendar year	Funding category	Observer fees received	Funds sequestered	Prior year sequester funds received	Funds obligated to contract	Observer sea days at start of the year	Observer sea days purchased during year	Total observer sea days used during year
2013	Fees Federal Funds				$1,885,166	4,535	1,913	3,533
2014	Fees Federal Funds	$4,251,452	($306,105)		$3,044,606 $1,892,808	2,915	4,368	4,573
2015	Fees Federal Funds	$3,451,478	($251,958)	$306,105	$3,058,036 $2,700,000	2,710	5,330	5,318
2016	Fees Federal Funds	$3,775,522	($256,735)	$251,958	$5,144,983 $390,800	2,722	5,277	4,749
2017	Fees Federal Funds	$3,592,750	($247,900)	$256,735	$3,542,196 $1,398,531	3,322	5,285	2,591
2018	Fees Federal Funds	$3,799,560	($250,771)	$247,900	$2,396,040 $0	5,858	2,350	3,207
2019	Fees Federal Funds	$3,244,801	($201,178)	$250,771	$997,845 $412,307	5,001	4,600	3,316
2020	Fees Federal Funds	$2,894,448	($170,772)	$201,178	$4,990,546 $1,905,169	2,266	5,784	1,977[8]
2021	Fees Federal Funds	$3,043,516	($140,267)	$170,798	$1,841,346 $814,654	3,680[9]	Confidential	3,193
2022	Fees Federal Funds	$3,073,779	(178,802)	$ 0[10]	$1,484,481 $905,000	1,014	Confidential	2,968
2023	Fees	$3,728,622	($225,378)	$0	$3,024,427	2,528	Confidential	3,126

[8] Includes sea days, shoreside processing plant days, and quarantine days.
[9] For 2021, NMFS modified the contract to move funds from sea days to travel. This modification reduced available sea days for the start of the fishing year.
[10] Prior year sequestered funds were not yet made available at the time of this report. NMFS continues to track the status of these funds

Federal Funds	$810,973	

Table 2-2 -- Observer fees[11] in 2023 by gear, vessel size category, and species or species group for all areas combined.

Gear	Vessel Length Category	Halibut	Sablefish	Pacific Cod	Pollock	All Other Species	Total All Species
Hook and Line	<40	$283,399	$2,902	$8,490	$1	$435	$295,226
	40 - 57.5	$758,583	$125,664	$20,233	$10	$5,133	$909,624
	>57.5	$848,600	$103,376	$1,381	$0	$3,682	$957,039
	Gear Subtotal	$1,890,582	$231,942	$30,105	$11	$9,250	$2,161,889
Jig	<40	$2,588	$0	$232	$0	$11	$2,832
	40 - 57.5	$994	$0	$709	$0	$221	$1,924
	>57.5	$5	$0	$0	$0	$0	$5
	Gear Subtotal	$3,588	$0	$941	$0	$232	$4,761
Pot	<40	$0	$10,436	$1,187	$0	$9	$11,632
	40 - 57.5	$2,331	$343,581	$6,417	$0	$915	$353,244
	>57.5	$4,341	$716,297	$283,937	$1	$1,349	$1,005,925
	Gear Subtotal	$6,672	$1,070,315	$291,541	$1	$2,273	$1,370,801
Trawl	>57.5	$0	$1,093	$235,433	$588,150	$17,038	$841,715
	Gear Subtotal	$0	$1,093	$235,433	$588,150	$17,038	$841,715
Total All Gear		**$1,900,842**	**$1,303,350**	**$558,020**	**$588,162**	**$28,792**	**$4,379,166**
Percent by Species		**43%**	**30%**	**13%**	**13%**	**1%**	**100%**

Rounding error sometimes results in slight differences in row and column totals.

[11] The unpaid portion of the observer fees are included. Administrative fees and interest charged for late fee payments are not included

Table 2-3-- Observer fee[12] in 2023 by gear, vessel size category, and species or species group in the Gulf of Alaska.[13]

Gear	Vessel Length Category	Halibut	Sablefish	Pacific Cod	Pollock	All Other Species	Total All Species
Hook and Line	<40	$272,052	$2,902	$8,490	$1	$435	$283,880
	40 - 57.5	$676,838	$118,714	$20,207	$10	$5,097	$820,866
	>57.5	$645,247	$96,074	$1,353	$0	$3,613	$746,286
	Gear Subtotal	$1,594,137	$217,689	$30,051	$11	$9,145	$1,851,032
Jig	<40	$2,588	$0	$232	$0	$11	$2,832
	40 - 57.5	$994	$0	$709	$0	$221	$1,924
	>57.5	$5	$0	$0	$0	$0	$5
	Gear Subtotal	$3,588	$0	$941	$0	$232	$4,761
Pot	<40	$0	$6,024	$1,187	$0	$9	$7,220
	40 - 57.5	$1,022	$289,740	$606	$0	$428	$291,796
	>57.5	$4,304	$625,196	$60,148	$0	$750	$690,398
	Gear Subtotal	$5,326	$920,961	$61,940	$0	$1,187	$989,414
Trawl	>57.5	$0	$1,093	$72,935	$588,119	$17,033	$679,181
	Gear Subtotal	$0	$1,093	$72,935	$588,119	$17,033	$679,181
Total All Gear		**$1,603,050**	**$1,139,743**	**$165,868**	**$588,130**	**$27,597**	**$3,524,387**
Percent by Species		**45%**	**32%**	**5%**	**17%**	**1%**	**100%**

Rounding error sometimes results in slight differences in row and column totals.

[12] The unpaid portion of the observer fees are included. Administrative fees and interest charged for late fee payment are not included.

[13] The Gulf of Alaska includes Pacific halibut regulatory areas 2C, 3A, and 3B; and sablefish regulatory areas Western GOA, Central GOA, West Yakutat, and Southeast Outside

Table 2-4-- Observer fees[14] in 2023 by gear, vessel size category, and species or species group in the Bering Sea/Aleutian Islands.[15]

Gear	Vessel Length Category	Halibut	Sablefish	Pacific Cod	Pollock	All Other Species	Total All Species
Hook and Line	<40	$11,347	$0	$0	$0	$0	$11,347
	40 - 57.5	$81,745	$6,951	$26	$0	$36	$88,758
	>57.5	$203,354	$7,302	$28	$0	$69	$210,752
	Gear Subtotal	$296,445	$14,253	$54	$0	$105	$310,857
Pot	<40	$0	$4,412	$0	$0	$0	$4,412
	40 - 57.5	$1,309	$53,842	$5,811	$0	$487	$61,449
	>57.5	$37	$91,101	$223,789	$1	$599	$315,527
	Gear Subtotal	$1,346	$149,354	$229,601	$1	$1,086	$381,387
Trawl	>57.5	$0	$0	$162,498	$32	$5	$162,534
	Gear Subtotal	$0	$0	$162,498	$32	$5	$162,534
Total All Gear		**$297,792**	**$163,607**	**$392,152**	**$32**	**$1,195**	**$854,779**
Percent by Species		**35%**	**19%**	**46%**	**<1%**	**<1%**	**100%**

Rounding error sometimes results in slight differences in row and column totals.

[14] The unpaid portion of the observer fees are included. Administrative fees and interest charged for late fee payment are not included.

[15] The Bering Sea/Aleutian Islands includes Pacific halibut regulatory areas 4A, 4B, 4C, and 4D; and sablefish regulatory areas Bering Sea and Aleutian Islands

Table 2-5-- Observer Fees[16] in 2023 by monitoring type, strata or selection pool, and area.[17]

Monitoring	Strata/Selection Pool	GOA	BSAI	All Areas
At-Sea Observers	Hook and Line	$1,057,923	$247,894	$1,305,817
	Pot	$763,985	$340,689	$1,104,675
	Trawl	$365,557	$162,534	$528,091
	Observer Trip Selection	$2,187,465	$751,118	$2,938,583
Electronic Monitoring	Fixed-Gear EM	$725,074	$87,902	$812,976
	Trawl EM	$313,624	$0	$313,624
	EM Subtotal	$1,038,698	$87,902	$1,126,600
No Monitoring	No Selection	$298,225	$15,759	$313,983
All Monitoring	**All Partial Coverage**	**$3,524,387**	**$854,779**	**$4,379,166**

[16] The unpaid portion of observer fees are included. Administrative fees and interest charged for late fee payments are not included.

[17] The Gulf of Alaska includes Pacific halibut regulatory areas 2C, 3A, and 3B; and sablefish regulatory areas Western GOA, Central GOA, West Yakutat, and Southeast Outside. The Bering Sea/Aleutian Islands includes Pacific halibut regulatory areas 4A, 4B, 4C, and 4D; and sablefish regulatory areas Bering Sea and Aleutian Islands.

Table 2-6-- Average annual observer partial coverage sea day costs from 2014 to 2023

Year	Funds expended	Number of observer sea days invoiced	Average sea day cost
2014	$4,937,414	4,573	$1,080
2015	$5,758,268	5,318	$1,083
2016	$4,186,303	4,677	$895
2017	$3,146,111	2,749	$1,144
2018	$4,425,144	3,207	$1,380
2019	$4,342,098	3,316	$1,309
2020	$2,729,486	1,977	$1,381
2021	$4,448,612	3,193	$1,393
2022	$4,428,624	2,968	$1,492
2023	$4,801,704	3,126	$1,536

Table 2-7-- Annual observer full coverage costs, 2014 to 2023.

	Fleet-wide Sum Totals					Averages Per Coverage Day		
Year	Billed vessels and plants	Billed Full Coverage Days	Base daily costs	Incidental costs	Fully loaded costs	Base daily costs	Incidental costs	Fully loaded costs
2014	177	39,066	$13,028,325	$1,450,220	$14,478,545	$333	$37	$371
2015	177	39,963	$13,623,614	$1,335,407	$14,980,340	$341	$33	$375
2016	179	38,536	$13,242,003	$1,518,717	$14,760,720	$344	$39	$383
2017	171	37,620	$12,972,358	$1,435,974	$14,408,332	$345	$38	$383
2018	167	36,695	$12,674,251	$1,356,088	$14,030,339	$345	$37	$382
2019	170	36,376	$12,666,376	$1,337,931	$14,004,293	$348	$37	$385
2020	154	39,039	$13,639,974	$984,471	$14,624,445	$349	$25	$375
2021	130	32,565	$11,202,430	$1,102,590	$12,305,020	$344	$34	$378
2022	121	29,069	$10,121,828	$1,347,477	$11,469,305	$348	$46	$395
2023	111	29,095	$10,458,708	$1,283,130	$11,741,838	$359	$44	$404

Figure 2-1– Relationship between the fully loaded cost per invoiced day for full observer coverage as a function of the number of days invoiced, which is a proxy for the duration of the deployment. The fully-loaded cost per day is calculated as the invoice total divided by the number of days on the invoice. Includes all vessel/gear types.

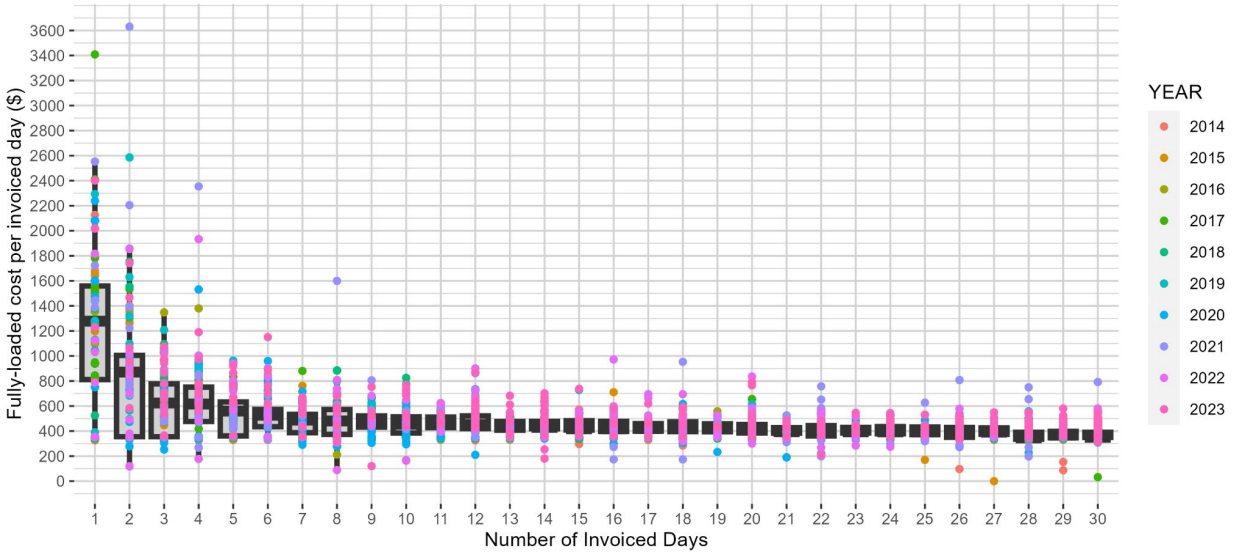
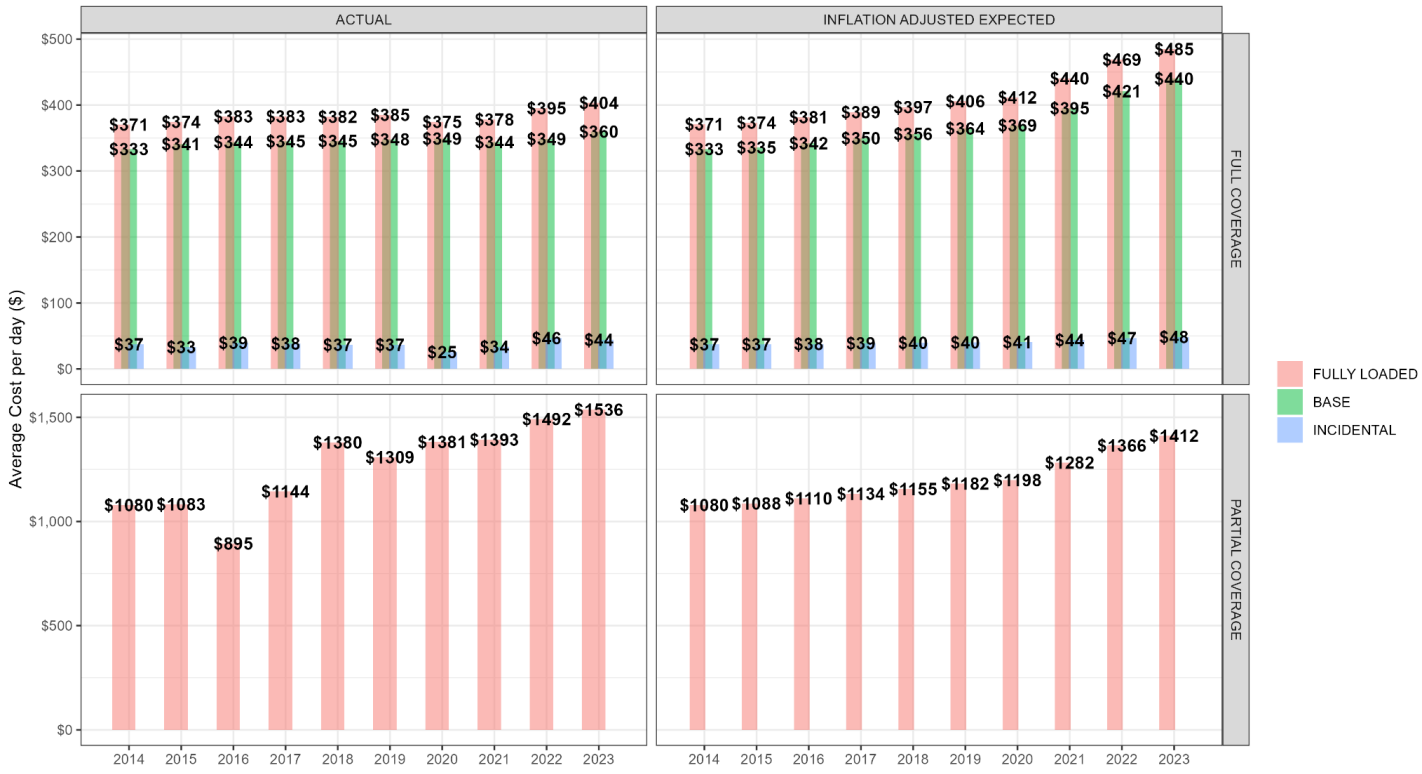


Figure 2-2 -- Actual and inflation-adjusted-expected costs per observer day in full and partial coverage, 2014-2023. Actual values are from tables 2.6 (partial coverage) and 2.7 (full coverage). Expected values are calculated by applying the annual inflation rate each year using 2014 as the baseline. Inflation rate source: US Bureau of Labor Statistics (https://www.bls.gov/cpi/data.htm)



3. Deployment Performance Review

3.1. Introduction

The goal of the Observer Program is to achieve a random deployment of observers and electronic monitoring (EM) into fisheries to collect representative data used to estimate catch and bycatch, assess stock status, collect fishery-dependent biological information used in population and ecosystem modeling efforts and make salmon bycatch stock-of-origin determinations, among other objectives. This chapter contains a review of the deployment of observers and EM in 2023 relative to the intended sampling plan and goals of the 2023 Annual Deployment Plan (ADP; NMFS 2022). Consistent with its purpose, this chapter focuses on the randomization of observer and EM deployments into primary sampling units and how departures from a random sample affect data quality. This review identifies where possible biases exist and provides recommendations for further evaluation, including potential improvements to the observer deployment process that should be considered during the development of the 2025 ADP.

This review is performed by staff from the Fisheries Monitoring and Analysis / Analytical Services Program (FMA) of the Alaska Fisheries Science Center (AFSC) and the Sustainable Fisheries Division / Catch Analysis and Data Quality Branch of the Alaska Regional Office (AKRO). Catch and monitoring data from the 2023 calendar year as of 15 April 2024 were used in analyses.

The analyses in this chapter benefited from review and recommendations from the Fisheries Monitoring Science Committee (FMSC). The FMSC is established annually to provide scientific advice in the areas of regulatory management, natural science, mathematics and statistics as they relate to observer deployment and sampling in the groundfish and halibut fisheries of the Bering Sea and Aleutian Islands (BSAI) and the Gulf of Alaska (GOA). The FMSC members have analytical and scientific expertise relating to observer sampling of groundfish and halibut fisheries of the BSAI and GOA and use of the collected data. If possible, the FMSC is represented by at least one member of the FMA, one member of the AFSC / Stock Assessment and Multispecies Assessments Program, one member of the AKRO and one member of the International Pacific Halibut Commission (IPHC).

3.1.1 The Sampling Design of the Observer Program

Since 2013, the Observer Program has used a stratified hierarchical sampling design with randomization at all levels (Cahalan and Faunce, 2020). Stratification increases the efficiency of sampling by observers and helps address some logistical issues associated with deployment. By grouping similar fishing activities into strata and sampling those strata appropriately, sampling efficiency increases and the estimated variance decreases relative to unstratified sampling. Sampling strata are defined in the ADP and are designed such that each unit of deployment (e.g., trip) is assigned to only one stratum.

Randomization helps ensure that the data collected from a sample will be representative of the

entire fishing fleet (observed and monitored trips are equivalent to unobserved and unmonitored trips within a stratum). Within a stratum, observers are deployed randomly to either: (1) vessels for a predetermined period of time (termed vessel-selection) or (2) to individual fishing trips (termed trip-selection). In both cases, this initial deployment to the fishery is the first level of the sampling hierarchy and defines the primary sampling unit (PSU; either vessel-periods or individual trips). The list of all PSUs in a stratum defines the sampling frame and should equate to the population of interest for that sampling stratum (e.g., all trips taken by trawl vessels fishing in the Alaska Exclusive Economic Zone). If the sampling frame does not contain all elements of the stratum, the resulting information may be biased. The magnitude and direction of the bias will depend on how different the fishing activities in the sample frame are from actual fishing activity.

Although this chapter evaluates whether monitoring goals were met, we include a brief summary of the full sampling hierarchy here for context. For each observed trip, if all hauls cannot be sampled for logistical reasons, hauls are randomly selected to be sampled. This is the next level in the hierarchy; the secondary sampling units are defined as hauls within a trip. Randomization of haul selection is designed to allow observers to record and transmit data, attend to other non-sampling responsibilities and to allow observers time to sleep and eat. Randomization of haul selection also gives EM video reviewers the ability to optimize the amount of video that can be reviewed from each trip. Haul selection is determined using the random sampling tables and random break tables provided by NMFS. For each haul, fishing location and effort (e.g., number of hooks) are recorded, while marine mammal and seabird interactions are primarily recorded on randomly selected hauls. The ability of EM to capture marine mammal and seabird interactions is less than that of observers due to the fixed location in which EM equipment is placed.

For the randomly selected hauls, a random sample of the catch is collected (observers) or selected for video review (EM) and data from those samples are used to determine the species composition and amount of discarded catch. These samples of catch within each haul are the third level of the sampling hierarchy. While observers are trained to collect multiple large samples of catch, the number and size of samples taken from each haul will depend on the vessel configuration, fishing operations and diversity of catch. The size of EM samples is largely determined by the number of video reviewers available relative to the amount of video to be reviewed.

At the fourth level of the sampling hierarchy, a predetermined number of individual fish of predetermined species are randomly selected from the species composition sample and measured. Lastly, at the fifth sampling level, a random selection of fish is used to collect otoliths, reproductive maturity assessments, stomach contents, genetic tissues and other biological specimens. The number and species of fish selected for measurement and biological specimen collection is specified each year by the AFSC's stock assessment scientists. Sampling rates for genetic tissue collection by observers (e.g., 1 of 10 Chinook salmon [*Oncorhynchus tshawytscha*] caught as bycatch) are set each year by the AFSC's Auke Bay Laboratory. Sampling at the fourth and fifth levels of the sampling hierarchy does not occur with EM.

3.1.2 The 2023 Annual Deployment Plan

The deployment design for the partial coverage component of the program involves three elements: (1) the selection method to accomplish random sampling; (2) division of the population of partial coverage trips into selection pools or strata; and (3) the allocation of deployment among strata.

In 2023, observers and EM were to be deployed using the trip selection model in all ports throughout Alaska. Trip-selection refers to the method of selecting fishing trips as the sampling unit. Trip selection was to be facilitated through vessel operators and owners logging their trips into the Observer Deploy and Declare System (ODDS) and being notified if the trip is selected for coverage.

In 2023, NMFS implemented an observer deployment allocation strategy of an adjusted 15% baseline, plus optimization based on discarded groundfish, Pacific halibut (*Hippoglossus stenolepis*) prohibited species catch (PSC) and Chinook salmon PSC to determine how many trips were to be monitored in each deployment stratum.

The deployment strata for 2023 (with abbreviation and coverage rate rounded to whole number) were defined as:

- Hook-and-line vessels greater than or equal to 40 ft length overall (LOA) monitored with observers (*OB HAL* - 18%).
- Pot vessels greater than or equal to 40 ft LOA monitored with observers (*OB POT* - 17%).
- Trawl vessels making a trip not covered by another stratum (*OB TRW* - 23%).
- Fixed-gear EM vessels (evaluated separately as *EM HAL* and *EM POT* - 30%). Initiated by the Council in 2018, trips in this stratum are randomly selected for monitoring through ODDS. Species identifications and counts derive from human review of location and video information captured from EM equipment. Weights for catch estimation are supplied from other sources.
- Vessels when fishing under the Trawl EM Exempted Fishing Permit (EFP). An Exempted Fishing Permit was applied for in 2019 and awarded starting in 2020. In June 2021 the Council took action to implement this as a non-EFP program. This EFP applies to trawl vessels fishing with pelagic gear targeting walleye pollock (*Gadus chalcogrammus*, hereafter referred to as “pollock”) in the BSAI and GOA. Vessels participating in the EFP do not log trips into ODDS. The EFP aims to gain monitoring efficiency by removing at-sea observers and transferring the responsibilities associated with the at-sea collection of PSC data and biological samples to observers stationed at the shoreside plant. Cameras and location EM systems installed on the vessel monitor for

compliance with EFP rules. Participating vessels must retain all catch while fishing under the EFP except for: marine mammals, jellyfish, small amounts of discard that occur while cleaning the deck, large individual marine organisms, including large individual rays or skates, sharks except for Pacific spiny dogfish (*Squalus suckleyi*) and discard of catch resulting from an unforeseen and reasonably unforeseeable event that is beyond the control of the vessel operator or crew. Shore-based observers monitor for halibut, salmon and to collect biological tissues to generate estimates of stock of origin. The 2023 ADP had a dockside selection rate for monitoring in the GOA set at 30%. However, since there was no pre-generated selection frame to identify random samples from ODDS, the FMA directed observers to sample one in three deliveries for logistical efficiency. Therefore, this stratum has a 33% monitoring expectancy for dockside in the GOA (*EM TRW EFP* - 100% dockside observation BSAI, 33% dockside observation GOA).

- Fixed-gear vessels less than 40 ft LOA and vessels fishing with handline, jig, troll and dinglebar troll gear (*Zero coverage* - 0%).

More information on the sampling design used by observers and the relationship between the sample design and catch estimation can be found in Cahalan and Faunce (2020) and the 2023 Observer Sampling Manual (AFSC 2022). Bycatch estimates of Chinook salmon in the GOA are estimated using methods described in Cahalan et al. (2014). In the event that a delivery cannot be monitored (e.g., the case in a tendered delivery or non-pollock delivery), then estimation of bycatch comes by applying salmon bycatch rates to landed catch. Estimates of stock of origin from salmon bycatch are produced by the AFSC's Auke Bay Laboratory.

Although this chapter is focused on the partial coverage component of the fleet, the majority of the catch taken from the Federal waters off Alaska are completely monitored at the level of the trip (*Full coverage* - 100%). Vessels and processors in the full observer coverage category must comply with observer coverage requirements at all times when fish are harvested or processed. Specific requirements are defined in regulation at *50 CFR § 679.51(a) (2)*. The full coverage category includes the following:

- Catcher / processors (with limited exceptions).
- Motherships.
- Catcher vessels participating in programs that have transferable PSC allocations as part of a catch share program.
- Catcher vessels using trawl gear that have requested placement in the full coverage category for all fishing activity in the BSAI for one year.
- Inshore processors receiving or processing Bering Sea pollock.
- Catch share programs with transferable PSC allocations include Bering Sea pollock (both American Fisheries Act [AFA] and Community Development Quota [CDQ] programs), the groundfish CDQ fisheries (CDQ fisheries other than Pacific halibut and fixed-gear

sablefish [*Anoplopoma fimbria*]; only vessels greater than 46 ft LOA) and the Central GOA Rockfish Program.

3.1.3 Performance Review Objectives

The following items from the 2023 ADP have been identified as objectives for evaluation in this report:

- **Deploy for the planned number of sea days in the 2023 ADP**. This objective will be considered to be met if the actual number of sea days expended falls within the range of values from simulated sampling provided in the 2023 ADP.
- **Deploy at the coverage rates specified in the 2023 ADP**. For full and zero coverage, either the rate was equal to 100 or 0%. For stratum under partial selection, coverage selection rates are expected to be within a 95% confidence interval computed from the realized coverage rates (under the assumption of a binomial distribution for observed trips)
- **Collect tissue samples from Chinook and chum (*Oncorhynchus keta*) salmon as specified in the 2023 Observer Sampling Manual to support the goal of collecting genetic samples from salmon caught as bycatch in groundfish fisheries to identify stock of origin**. The sampling protocol established in the 2014 ADP (NMFS 2013, Faunce 2015) was used in 2023. Under this protocol, observers on vessels delivering to shoreside processors in the GOA pollock trawl fishery monitor the delivery to enumerate salmon bycatch and obtain tissues for genetic analysis from the salmon bycatch. For trips that are delivered to tender vessels and trips outside of the pollock fishery, observers obtain salmon counts and tissue samples from all salmon found within at-sea samples of the total catch.
- **Randomize deployment of observers into the partial coverage category of fishing activities**. Evaluation of this objective is focused on the randomization of observer and EM deployments into primary sampling units, and how departures from a random sample affect data quality.

3.1.4 Observer Deployment Performance Metrics

Performance metrics have been developed to assess whether the trip-selection process (through the implementation of the 2023 ADP) provides a representative sample of fishing trips in the North Pacific in 2023. These metrics reflect four mechanisms that can impact the quality of the data: (1) sample frame discrepancies, (2) non-response, (3) differences in trip characteristics, and (4) sample size.

The performance metrics used in this evaluation are as follows:

1. Deployment rates for each stratum: This is the basic level of evaluation for comparing targeted and achieved sampling rates, where sampling strata are partitions of the entire

population about which we want to make inferences (e.g., generate estimates of catch). Specifically, this section assesses the following:

a. Sample rates and number of samples relative to intended values.

b. Quantification of under- and over-coverage rates (sample frame discrepancies). Over-coverage of a population occurs when the sample frame includes elements that are not part of the target population. When these elements are included in the random sample, effort (i.e., time, cost) is expended needlessly. Under-coverage results from having a sample frame that does not include a portion of the target population which can lead to biased sampling if that portion of the population differs from the population included in the sample frame.

c. Non-response rates. Non-response occurs when randomly selected elements (trips or vessels) are not actually sampled. If these trips or vessels have different fishing behavior (e.g., catch, areas fished) than the rest of the population, the data collected will not represent the entire fleet (non-response bias).

2. Representativeness of the sample: Randomized sampling is a method used to ensure that the results of sampling reflect the underlying population. Departures from randomization can lead to non-representative data and hence potential bias in estimates of the parameters of interest. A randomized sample design is expected to achieve a rate of monitored events that is similar across both space and time. Representativeness of the sample was divided into four separate components:

a. Temporal representativeness. Plots of expected and actual monitoring rates over time, highlighting periods when these two rates deviate from each other which are indicative of periods with differential realized sample rates (and potential temporal bias).

b. Spatial representativeness. Maps provide a visual depiction of the spatial distribution of monitoring coverage relative to effort in each partial coverage stratum, highlighting areas where more or fewer trips were monitored than expected.

c. Spatiotemporal distribution of coverage. The proportions of sample units monitored or nearby in time and space to monitored trips (the proximity indices) are compared to distributions of simulated outcomes to determine whether the realized coverage was distributed evenly in both time and space and whether the achieved coverage met the expectations of the selection rates prescribed by the ADP.

d. Representativeness of trip characteristics. Consistency of trip characteristics for monitored and unmonitored portions of the stratum. These metrics are based, in part, on the availability of data for both monitored and unmonitored fishing activities; for example, data that are reported for all trips on landing reports.

Although these metrics can identify places where observed results differ from expectations, it is ultimately a subjective decision as to whether or not these differences are substantial enough to have management implications. This holds true even for tests that have associated *p*-values.

3.2. Changes to This Report from Last Year

Abbreviated versions of this chapter have been produced for calendar years 2021 and 2022. This chapter represents a return to the original "full" review format. Analysts have performed the full review of 2022 and 2023 data but focus here on 2023. However, where trends were notable, results from 2022 have been included in Appendix A.

Changes to our analyses for spatial and spatio-temporal representativeness were adopted following the evolution of these analyses in recent years and are described in later sections.

3.3. Evaluation of Deployment in 2023

The deployment of observers into the 2023 Federal fisheries of Alaska is primarily evaluated at the level of the deployment stratum because each stratum is defined by a different sampling rate or by a different monitoring method (e.g., observers and EM). In this document, trips in the *EM HAL* and *EM POT* strata are considered successfully monitored if at least some video was reviewed. The rationale for defining monitored trips this way is that it is most similar to the way in which trips in other strata are considered observed (i.e., irrespective of whether or not haul information or usable species composition data were collected).

3.3.1 Evaluating Effort Predictions

Each year, the NMFS sets an annual budget for the deployment of partial coverage at-sea observers in terms of cost and observer days. The partial coverage observer budget for 2023 was set at $4,896,623 and 3,093 days in the 2023 ADP.

In 2023, the FMA paid for 3,088.5 observer days, which was 0.1% lower than predicted by the average simulation and within the range of possibilities predicted in the 2023 ADP (Figure 3-1, top panel). Although there was 16.6% less effort in *OB POT* than predicted, *OB HAL* and *OB TRW* both had higher than predicted effort (Table 3-1). Despite observing the number of days predicted, expenditures for partial observer coverage were under budget (Figure 3-1, bottom panel). Cost savings resulted because the cost of a partial coverage observer day in 2023 was less than the expected cost that was estimated in the 2023 ADP.

3.3.2 Performance of the Observer Declare and Deploy System in Trip-Selection

The ODDS facilitates the random selection for monitoring in strata and fishers are required to log anticipated fishing trips. The ODDS generates a random number according to the programmed rates from the ADP and assigns each logged trip to either "selected to be monitored" (selected) or "not selected to be monitored" (not selected) categories. The ODDS is not used to select which deliveries are to be monitored by shoreside observers for the *EM TRW*

EFP stratum.

Logged trips have different dispositions. When initially logged, trips are considered pending, and subsequently have two dispositions: closed or canceled. A trip can be closed by (1) selecting landing reports from a menu or (2) manually entering the end of trip information for observed trips. The vessel operator may change the dates of a logged trip regardless of selection status prior to, or in lieu of, cancellation. However, trips that have not been closed at the end of the calendar year are automatically canceled by the ODDS to prevent 2023 ODDS trips from affecting the deployment rates set for the 2024 ADP. Trips that were selected to be monitored by ODDS and are subsequently canceled trigger the next newly-logged trip (for at-sea observers) or next logged trip (for fixed-gear EM) to automatically inherit the selected status. These trips are termed inherited trips.

The number of trips logged in the ODDS in 2023 and their dispositions is summarized in Table 3-2. Of the 4,482 total trips logged, 987 were selected, and 155 were canceled: five by ODDS (0.5%) and 150 by users (15.2%). The user cancellation rate for selected trips among strata ranged from 6.9% for *EM POT* to 21.2% for *OB HAL* in 2023. These two strata also had the least and greatest cancellation rates in 2022 (2.6% and 41.7% respectively, (Appendix Table A- 2).

The number of completed trips that were randomly selected for monitoring or from inherited monitoring as well as the number of trips that were waived are summarized in Table 3-3. It is notable that 29% of monitored trips in the *OB HAL* stratum and 22.2% of monitored trips in the *OB POT* stratum were inherited. This was a continuation of what was seen in 2022 in which 35.9% of *OB HAL* stratum and 28.2% of *OB POT* stratum and 17.8% of *OB TRW* trips were monitored via the inherit system (Appendix Table A- 3). This is in contrast to the fixed-gear EM strata where fewer than 10% of monitored trips were inherited in either year.

The extent to which trip-selections are changed from the time they are entered can be determined by comparing the rate of trip observation expected from (1) random selection of all logged trips (initial random selection) and (2) random selection of remaining trips after cancellations, inherits and waivers. In any case, the proportion of trips selected to be monitored should fall within what would be expected given the binomial distribution (since each trip is either selected or not selected). The rates obtained (%, with associated *p*-value based on the binomial distribution) in the initial selection process were within expected ranges with the following exception — the initial selection rate was 26.50% (p-value = 0.012) for the *OB TRW* stratum (Table 3-4). This means that the *OB TRW* stratum was being over-selected in ODDS. A time series of ODDS initial selection rates and final realized rates is presented in Figure 3-3.

The final selection rate after trips were closed, canceled or waived were within expected bounds with the exception of the *OB HAL* and the *OB TRW* strata (Table 3-4). The *OB HAL* stratum had a programmed rate of 17.87% but through the result of cancellations, inherits and waivers ended up being selected at 21.38% (p-value = 0.002). The *OB TRW* stratum had an original selection rate of 22.68% but was selected at 26.5%, and through the process of cancellations, inherits and waivers was selected at 29.26% (p-value < 0.001; Table 3-4). While both strata exhibited an

increase in monitoring because of inherits, the impact that inherits had to elevate monitoring rates was greater for *OB HAL* than it was for *OB TRW*. The impact of waivers was small, averaging a 1.4% reduction in monitoring rate among strata with the most waived trips within the *OB POT* stratum (Table 3-3).

3.3.3 Evaluation of Coverage Rates

This section compares the coverage rates achieved against the expected coverage rates. Data used in this evaluation are stored within the Catch Accounting System (CAS; managed by the AKRO), the Observer Program database (NORPAC; managed by the AFSC), and eLandings (under joint management by the Alaska Department of Fish and Game, the IPHC and the NMFS). Separate rate evaluations are conducted depending on whether the unit of observer deployment was at-sea fishing trips or dockside deliveries of pollock.

In combination across all strata, coverage levels and fishery monitoring tools, 3,780 trips (43.7%) and 463 vessels (50.2%) were successfully monitored among all fishing in the Federal fisheries of Alaska in 2023 (Table 3-5). This compares to a total of 3,534 trips (39.7%) and 441 vessels (45.3%) monitored in 2022 (AFSC and AKRO 2023).

The 2023 Observer Program had nine deployment strata to be evaluated (Table 3-5). There were two *Full coverage* strata; vessels that were required to have full coverage (e.g., AFA vessels) and BSAI trawl catcher vessels that opted into full coverage (i.e., *EM TRW EFP* under regulations *50 CFR 679.51(a)(4)*). There were six partial coverage strata: three observed strata and three EM strata, defined by gear designation. There was also one *Zero coverage* stratum that included jig vessels and vessels under 40 ft LOA that are not monitored.

Evaluations for the full coverage category and zero-selection pool are straightforward — either the coverage achieved was equal to 100% or 0%, respectively, or it was not. The program achieved 99.7% coverage in its full coverage category (Table 3-5). Four trips were not monitored in the full coverage category (three BSAI open access non-pelagic trawl trips targeting Pacific cod (*Gadus macrocephalus*) on one vessel and one trip on another vessel with identical attributes). The program achieved compliance with the *Zero coverage* stratum (Table 3-5).

Under the assumption that the deployment was randomized, a 95% confidence interval computed from the realized coverage rates (under the assumption of a binomial distribution for monitored trips) will contain the actual deployment rate 95% percent of the time. If expected coverage levels were within the 95% confidence intervals, then we conclude that realized and expected coverage rates were equal.

Coverage rates were consistent with expected values in only half of the six partial coverage strata. Coverage rates were higher than expected within the *OB TRW* stratum but lower than expected for *EM HAL* and *EM POT* strata. (Table 3-5). The high rate in *OB TRW* is again explained by the unexpectedly high selection of trips by the ODDS. However, the low coverage rates in the *EM HAL* and *EM POT* strata can be explained by a lack of reviewed EM data. Unlike observed trips, the coverage rate for EM is based on information provided from the Pacific States

Marine Fisheries Commission (PSMFC) that is available to analysts in the NORPAC database at the time of writing this report. In 2023, the average time between receipt and completion of review was 167 days for *EM HAL* and 184 days for *EM POT* (Figure 3-2). This was a slight improvement over the average review times of 227 days for the *EM HAL* stratum and 213 days for the *EM POT* stratum in 2022 (Appendix Figure A- 2)

Note that there are several reasons why the total number of trips and the final monitoring rates presented in this section differ with what was presented earlier within the ODDS. The *OB HAL* stratum had a higher than expected monitoring rate in ODDS (Table 3-4), but was within the expected range (although elevated) according to the dataset using eLandings and CAS (Table 3-5). There is no robust link between the ODDS database and eLandings, and therefore, trips in ODDS cannot be linked directly to realized landings in eLandings, which inform the trip identification numbers created by CAS. The FMSC has recommended in past reports that this linkage be established. Moreover, ODDS trips are sometimes not logged as required (see Chapter 5, section 1.5.2, Figure 5.5) and records are not created in ODDS after-the-fact.

Coverage Rates for Dockside Monitoring

For this analysis, pollock deliveries were defined as any delivery where the predominant species is pollock in eLandings. In 2023, 100% of full coverage pollock deliveries were monitored in both strata, meeting expectations Table 3-6, Table 3-7).

Evaluations of the partial coverage category for dockside monitoring are not as straightforward as for full or zero coverage. As a matter of policy, no tender deliveries are monitored and these deliveries are not included in this chapter. While it may seem intuitive that the expected coverage rate for non-tendered deliveries within the *OB TRW* stratum should be equal to the programmed trip selection rate of 22.68%, this assumption is likely untrue because observers are not deployed specifically into the pollock fishery, but into the entire trawl fishery, and the relationship between the number of deliveries and trips is not expected to be constant, especially when measured across ports. Therefore, we present the dockside observation rates for non-tendered *OB TRW* pollock deliveries and non-tendered *EM TRW EFP* deliveries but make no comparison to the expected deployment rates (Table 3-6, Table 3-7).

3.4. Sample Quality

3.4.1 Temporal Patterns in Trip-Selection

The cumulative number of fishing trips in each stratum was multiplied by the stratum-specific selection rate to obtain the expected number of observed trips. Under the assumption that there is no temporal bias in observer coverage, 2.5% of values should be larger than the upper 95% confidence limit and 2.5% should be smaller than the lower limit. At the end of 2023 the number of observed trips was outside of this expected range in three of the six partial coverage strata: *OB TRW* (expected rate = 22.7%, realized rate = 32.3%, p-value < 0.001), *EM HAL* (expected rate: 30.0%, realized rate: 22.5%, p-value < 0.001) and *EM POT* (expected rate = 30.0%, realized rate = 18.7%, p-value < 0.001; Table 3-4 and Figure 3-4). The *OB HAL* stratum was outside of the

expected range earlier in the year but fell within the expected range by the end of April. Coverage rates were within their expected ranges for 100% of the year for the *OB POT* stratum (expected rate = 17.1%, realized rate = 17.8%, *p*-value = 0.543).

3.4.2 Spatial Patterns in Trip-Selection

Under a random selection of trips / deliveries the spatial distribution of monitored trips should reflect the spatial distribution of all trips / deliveries. To evaluate whether the actual spatial distribution of monitoring matched what would be expected from random selection or exhibited unlikely spatial patterns, the sample units of each stratum were divided into 200 km wide hexagonal spatial cells ("cells"). The total count of trips actually monitored in each cell was compared to results of 10,000 simulations of randomized trip selection using the actual monitored rate. The difference in the count of actually monitored trips versus the median count was calculated for each simulation. Cells where the count of actually monitored trips in a spatial cell were more extreme than 95% of simulations were identified to represent unlikely outcomes under the assumption of random sampling. By graphically viewing where the spatial distribution of actual monitoring deviated from the distribution provided by the simulations, regional patterns in the over- or under-representation by monitoring could be identified. Maps summarizing these patterns are provided in Figure 3-5.

The only obvious spatial bias in the distribution of monitored trips was in the *OB HAL* stratum, where an unexpectedly high number of trips were monitored in the central GOA near Kodiak and fewer trips were monitored in the western and eastern GOA. Other strata exhibited spatial patterns that were not as pronounced or unexpected. In the *OB POT* stratum, the western GOA was overrepresented in the sample. In the *OB TRW* stratum, there were some slight localized biases in the central GOA, but no spatial cells had an unlikely number of monitored trips. In the *EM HAL* stratum, the central GOA was underrepresented and the eastern GOA was overrepresented. The spatial distribution of monitoring was as expected in the *EM POT* and *EM TRW EFP* strata, with no spatial cells with an unlikely number of monitored trips / deliveries (Figure 3-5).

3.4.3 Spatiotemporal Distribution of Monitoring Coverage

Under a random selection of trips / deliveries the spatiotemporal distribution of monitoring in a stratum should reflect the spatiotemporal distribution of all trips / deliveries in the stratum. The evaluation methods here are adapted from the proximity index described in the 2024 Draft ADP (NMFSa 2023). The proximity index was defined as the proportion of sample units in a stratum that were either monitored or near a monitored sample unit in space or time. By considering sample units that were neither monitored nor neighboring a monitored trip as a gap in monitoring, the proximity index quantifies the spatiotemporal extent of monitoring coverage.

To calculate the proximity index, sample units were placed into spatiotemporal boxes defined by 200-km hexagonal cells and 1-week time periods. Sample units were allowed to span multiple spatiotemporal boxes and contribute equally to each box (e.g., a trip that crosses three boxes is

counted as 0.33 trips in each box). Sample units were identified as monitored or unmonitored using actual or simulated outcomes, and then unsampled trips / deliveries were identified as either neighboring monitored units or not (i.e., in an adjacent spatial cell or week). Lastly, the proximity index was calculated as the sum of the weight of monitored or neighboring sample units divided by the total number of sample units in the stratum. Simulations of random sampling were repeated 10,000 times each using the programmed selection rates and realized monitoring rates. The proportion of sampling iterations that were more extreme than the actual value was calculated to indicate the likelihood of the achieved outcome.

Comparing the proximity indices obtained from real data within each stratum to those obtained by simulated random sampling at rates achieved and rates programmed into ODDS, we can determine how well the distribution of monitoring matched what was expected under random sampling at the actual rates that were achieved and how well the distribution of actual monitoring matched what was expected from selection rates specified in the 2023 ADP.

Proximity indices were calculated for each stratum to evaluate whether coverage met expectations overall Figure 3-6), and for the BSAI and GOA separately following the use of Fishery Management Plan (FMP) in the stratum definition for the 2024 ADP (NMFS 2023b, Figure 3-7).

The spatiotemporal distributions of monitoring coverage in strata were within the expected ranges (the upper, green distributions of Figure 3-6 and Figure 3-7) with only one exception. The proximity value of the *EM HAL* stratum was lower than expected (Figure 3-6), particularly in the GOA (Figure 3-7). Therefore, a spatiotemporal bias was apparent in the *EM HAL* stratum based on the available data. The proximity value for the *EM TRW EFP* stratum was low but not unexpected, and resulting proximity values were very close to 1 (indicating good spatiotemporal overlap).

The achieved proximity values were within the expected ranges from the sampling rates defined by the ADP (the lower, blue distributions of Figure 3-6 and Figure 3-7) for the *OB HAL*, *OB POT* and *EM TRW EFP* strata. The *OB TRW* stratum had a higher proximity index than expected because it had an unexpectedly high realized monitoring rate. Both fixed-gear EM strata, *EM HAL* and *EM POT*, had lower proximity indices than expected due to the lower than expected realized monitoring rates. At the FMP-level, proximity values for these strata were lower than expected except for in the BSAI of the *EM HAL* stratum, which had a very wide expected range due to low fishing effort and low expected sample size (Figure 3-7).

3.4.4 Trip Metrics

This section analyzes whether monitored trips are similar to unmonitored trips using a permutation test (a.k.a., randomization test). This test evaluates the question “How likely is the difference we found if these two groups have the same distribution (in the metric we are comparing)?” Permutation tests compare the actual difference found between two groups to the distribution of many differences derived by randomizing the labels defining the two groups (e.g.,

monitored and unmonitored). Difference values in the permutation test were calculated by subtracting the mean metric value for the "No" condition from the mean metric value for the "Yes" condition. For example, the difference between vessel lengths in a permutation test for a monitoring effect would be the mean value for unmonitored trips subtracted from the mean value for all monitored trips. By randomizing group assignments, the combined distribution of randomized differences represents the sampling distribution under the null hypothesis that the two groups are equal. In this report, 1,000 randomized trials were run for the permutation test. The *p*-value from the test is calculated as the number of randomized trials with greater absolute differences than the actual difference divided by the number of randomized trials. Similar to the other statistical tests used in this report, low *p*-values indicate unlikely events under the hypothesis of equality and are therefore considered evidence against that hypothesis. Unlike other statistical tests used in this report, a Bonferroni adjustment has been applied to the significance threshold of 0.05 by dividing it by the number of metrics being tested. This results in an adjusted significance threshold of 0.05 / 6=0.00833. The *p*-values are then compared to the adjusted significance threshold. In an attempt to improve clarity, five values are calculated in the test; (1) the difference between groups, (2) the mean difference between groups from randomized trials, (3) #1 expressed as a percentage of the mean value of the metric being tested, (4) #2 expressed as a percentage of the mean value of the metric being tested and (5) the *p*-value of the test; however only values (1), (3) and (5) are presented.

Six trip metrics were examined in the permutation test. These metrics were as follows: the number of NMFS Areas visited in a trip, trip duration (days), the weight of the landed catch (t), the vessel length (ft), the number of species in the landed catch and the proportion (0 to 1) of the total catch that is made up of the most predominant species (pMax). The metric 'vessel length' is used to help interpret the results from 'weight of landed catch' since fishing power is positively correlated to vessel length. Specifically, differences in weight and length are interpreted as a failure to achieve a random sample of vessels of different sizes, whereas differences in weight only lend more evidence that there was a monitoring effect. The number of species within the landed portion of the catch is a measure of species richness. Our pMax metric follows the concepts behind Hill's diversity number N_1 that depicts the number of abundant species (Hill 1973) and is a measure of how "pure" catch is since a value of one would indicate that only the predominant (and presumed desirable) species was landed.

Were Monitored Trips Similar to Unmonitored Trips?

The sample sizes available (trips) and the results of permutation tests are presented in Table 3-8. A visual depiction of individual results of this permutation test is given in Figure 3-8 for illustration purposes. Observed trips in the *OB HAL* stratum were 16.1% (0.94 days) shorter in duration and landed catch that weighed 22.4% (1.56 metric tons) less than unobserved trips. This pattern was also evident in 2022 (Appendix Table A- 8). Observed trips in the *EM HAL* stratum landed 12.9% (0.53) more species than unobserved trips. Observed trips in the *OB TRW* stratum landed catch that was 2.3% more diverse than unobserved trips.

3.5. Response to Council and SSC Comments

The Council reviewed the 2023 ADP as part of their 11 June 2022 meeting and made the following recommendation:

The Council supports maintaining the stratification and allocation strategy from the 2022 ADP in 2023. The Council also supports (1) additional fixed gear EM vessels (30% coverage) in the EM pool in 2023 (up to 200 total vessels) provided they opt-in prior to 1 November 2022, additional funding for EM equipment is secured, and they meet the criteria in the ADP and (2) continuation of the pelagic trawl EM project with 100% at-sea monitoring in addition to shoreside observer coverage.

The SSC has requested that a specific section with responses to SSC comments be provided in the written report, as is done for SAFE documents. The SSC last reviewed the results of this chapter during the presentation of the 2017 Annual Report made at the June 2018 Council meeting.

In January 2022, the SSC reviewed a presentation made by industry and the AKRO on the proposed elements of what is now the *EM TRW EFP* stratum. Items raised related to the replacement of at-sea observers with EM included:

1. The pollock stock assessment team should be closely consulted concerning whether loss of haul level spatial information will impact any ongoing or future analyses and how the data changes will be treated in the assessment (e.g., effective sample sizes for biological collections, weighting of samples from tenders vs individual vessels). It will be essential that authors are prepared to incorporate these new data streams before they become permanent rather than being done in a post hoc manner.
2. Provide details on how catches and biological data could be assigned to trip- or haul-level information when catches from multiple catcher vessels are mixed on tenders, or how pooled data can be tracked and analyzed appropriately.
3. Confirmation that this program will not result in a loss of overall specimen and biological samples, particularly in the GOA where this can be most challenging.
4. Evaluate the potential for large shifts in discard estimates during the year within CAS as compliance monitoring is completed on video review.
5. Provide more detailed numbers in the next iteration, including examples of biological samples before and after the EFP.
6. An illustrative example of how salmon PSC calculations would be different under this program would be helpful, including a GOA and BSAI example.

The data used in this and prior Annual Reports are available to answer items 2, 3, 5 and 6 should staff resources at the AKRO and FMA be allocated to this task.

3.6. FMSC Recommendations to Improve Data Quality

3.6.1 Recommendations from the 2023 Annual Deployment Review

The Fisheries Monitoring Science Committee (formerly the Observer Science Committee) reviewed the results of ODDS and EM data timeliness from this report on 30 April 2024, and made the following recommendations to be considered in developing the 2025 ADP.

- ODDS:
    - **Work with the Partial Coverage Fishery Monitoring Advisory Committee to find an ODDS trip cancellation policy that will not significantly impede industry, affords the observer provider adequate time, and reduces impacts to coverage rates and non-random monitoring. This new policy should be decided on in time for implementation as part of the 2025 Annual Deployment Plan.**
- Fixed-gear EM review times:
    - **NMFS should work with the EM review agency PSMFC to find a selection rate that provides timely data that achieves the goals of the monitoring program in a cost-effective manner**. The FMA needs all data reviewed by April of the following year for annual reports (a three month delay maximum) while stock assessors need data from the prior year by September (a eight month delay maximum).
    - The FMSC recognizes that EM review times are not fast enough for the purposes of in-season management and suggests that **the NMFS perform an analysis of impacts of missing EM data and risks to management and the stocks of not having these data available (e.g., risk of exceeding Total Allowable Catch and PSC, risk of premature or late fishery closures, etc.)**

Table 3-1-- Comparison between predicted and actual monitored trip days for partial coverage strata in 2023. Predicted values come from the 2023 Annual Deployment Plan.

	Trip days		Difference	
Strata	**Predicted**	**Actual**	**Actual**	**Percent**
OB HAL	1,213	1,359	146	12.1
OB POT	1,260	1,050	-210	-16.6
OB TRW	621	716	95	15.3
EM HAL	1,040	733	-307	-29.5
EM POT	735	268	-467	-63.6
EM TRW EFP	486	545	59	12.1
Total	5,355	4,671	-684	-12.8

Table 3-2 – Trip cancellation rates in the ODDS for 2023. A trip is canceled by the system if the user did not identify whether fishing had occurred by the end of the year. "Paper" indicates that a trip was logged when the ODDS was not available.

Strata	Random number outcomes	Logged (*a*)	Canceled by system (*b*)	Trips remaining (*c* = *a* - *b*)	Canceled by user (*d*)	Waived	Paper	% user cancellation (*d*/*c* × 100)	Waiver (%)
OB HAL	Not selected	1,118					0		
	Selected	243	2	241	51	3	0	21.2	1.2
OB POT	Not selected	1,044					0		
	Selected	200	0	200	37	8	0	18.5	4.0
OB TRW	Not selected	608					0		
	Selected	219	0	219	31	0	0	14.2	0.0
EM HAL	Not selected	496					0		
	Selected	222	1	221	24	1	0	10.9	0.5
EM POT	Not selected	229					0		
	Selected	103	2	101	7	0	0	6.9	0.0
Total	Not selected	3,495					0		
	Selected	987	5	982	150	12	0	15.3	1.2

Table 3-3 – Number of remaining trips after cancellation in each trip-selection stratum that were selected using the initial random number generator ("Random number selection") and those that remained after user manipulation ("Total final selected") in 2023. The relative impact of waivers in trip-selection is also shown ("% reduction of selected trips due to waivers"). **Selections not from random numbers.

Strata	Total Trips	Random number selection (*r*)	Inherited selection **(*i*)	Waived (*w*)	Total final selected (*T* = *r* + *i* - *w*)	% selected from inherits ((*i*/*T*) × 100)	% reduction of selected trips due to waivers (*w*/(*T* + *w*) × 100)
OB HAL	1,146	177	71	3	245	29.0	1.2
OB POT	1,062	161	43	10	194	22.2	4.9
OB TRW	721	180	31	0	211	14.7	0.0
EM HAL	668	192	21	1	212	9.9	0.5
EM POT	311	92	5	0	97	5.2	0.0
Total	3,908	802	171	14	959	17.8	1.4

Table 3-4 – Number of logged trips in each partial coverage stratum in 2023 that were selected using the initial random number generator ("Initial random selection") and those that remained after user manipulation ("After cancellations"). The relative impact of inherits and waivers in trip-selection is also shown ("With inherits", "After waivers").

Strata	Trip disposition	Selected trips	Total trips	Actual (%)	Programmed (%)	*p*-value
OB HAL	Initial random selection, *a*	229	1,278	17.92	17.87	0.971
	After cancellations, *b* (*a* - *b*)	177	1,146	15.45	17.87	0.034*
	With inherits, *c* (*a* - *b* + *c*)	248	1,146	21.64	17.87	0.001*
	After waivers, *d* (*a* - *b* + *c* - *d*)	245	1,146	21.38	17.87	0.002*
OB POT	Initial random selection, *a*	196	1,188	16.50	17.09	0.616
	After cancellations, *b* (*a* - *b*)	161	1,062	15.16	17.09	0.103
	With inherits, *c* (*a* - *b* + *c*)	204	1,062	19.21	17.09	0.073
	After waivers, *d* (*a* - *b* + *c* - *d*)	194	1,062	18.27	17.09	0.308
OB TRW	Initial random selection, *a*	208	785	26.50	22.68	0.012*
	After cancellations, *b* (*a* - *b*)	180	721	24.97	22.68	0.142
	With inherits, *c* (*a* - *b* + *c*)	211	721	29.26	22.68	0.000*
	After waivers, *d* (*a* - *b* + *c* - *d*)	211	721	29.26	22.68	0.000*
EM HAL	Initial random selection, *a*	217	695	31.22	30.00	0.482
	After cancellations, *b* (*a* - *b*)	192	668	28.74	30.00	0.499
	With inherits, *c* (*a* - *b* + *c*)	213	668	31.89	30.00	0.291
	After waivers, *d* (*a* - *b* + *c* - *d*)	212	668	31.74	30.00	0.332
EM POT	Initial random selection, *a*	101	327	30.89	30.00	0.718
	After cancellations, *b* (*a* - *b*)	92	311	29.58	30.00	0.902
	With inherits, *c* (*a* - *b* + *c*)	97	311	31.19	30.00	0.665
	After waivers, *d* (*a* - *b* + *c* - *d*)	97	311	31.19	30.00	0.665

Table 3-5 – Number of total vessels (*V*), sampled vessels (*v*), total trips (*N*), and sampled trips (*n*) for each stratum in 2023. The coverage and 95% confidence interval columns are expressed as percentages of the total number of trips taken within each stratum.

					Coverage		95% confidence interval		
Strata	***V***	***v***	***N***	***n***	**Expected**	**Realized**	**Lower limit**	**Upper limit**	**Realized meets expected?**
Full coverage									
Full	101	100	1,592	1,588	100.0	99.7			No - lower than expected
EM TRW EFP	46	46	1,162	1,162	100.0	100.0			Yes
Full coverage total	138	138	2,754	2,750		99.9			
Partial coverage									
OB HAL	286	147	1,291	251	17.9	19.4	17.3	21.7	Yes
OB POT	176	94	1,074	191	17.1	17.8	15.5	20.2	Yes
OB TRW	67	52	657	212	22.7	32.3	28.7	36.0	No - higher than expected
EM HAL	112	79	619	139	30.0	22.5	19.2	26.0	No - lower than expected
EM POT	53	28	262	49	30.0	18.7	14.2	24.0	No - lower than expected
EM TRW EFP	34	34	580	188	33.3	32.4	28.6	36.4	Yes
Partial coverage total	543	362	4,483	1,030		23.0			
Zero coverage									
Zero coverage	291	0	1,420	0	0.0	0.0			Yes
Total	922	463	8,657	3,780		43.7% trips; 50.2% vessels			

Table 3-6 – The number of pollock deliveries made by vessels in the OB TRW stratum during 2023, separated by port and coverage category. Trips that made a delivery to a tender have been excluded. Observed deliveries denote deliveries that were observed shoreside for salmon.

FMP	Coverage category	Port	Total deliveries (*N*)	Observed deliveries (*n*)	% observed
BSAI	Full	Akutan	259	259	100.0
		Dutch Harbor	349	349	100.0
		King Cove	21	21	100.0
BSAI total			629	629	100.0
GOA	Partial	Akutan	49	11	22.4
		Dutch Harbor	1	0	0.0
		Kodiak	632	136	21.5
		Sand Point	12	2	16.7
GOA total			694	149	21.5

Table 3-7– The number of pollock deliveries made by vessels in the *EM TRW EFP* stratum during 2023, separated by port and coverage category. Trips that made a delivery to a tender have been excluded. Observed deliveries denote deliveries that were observed shoreside for salmon.

FMP	Coverage category	Port	Total deliveries (*N*)	Observed deliveries (*n*)	% observed
BSAI	Full	Akutan	449	449	100.0
		Dutch Harbor	709	709	100.0
		King Cove	18	18	100.0
BSAI total			1,176	1,176	100.0
GOA	Partial	Akutan	50	18	36.0
		Dutch Harbor	23	7	30.4
		Kodiak	335	101	30.1
		Sand Point	172	59	34.3
GOA total			580	185	31.9

Table 3-8– Results of permutation tests between monitored and unmonitored trips in the 2023 trip-selection strata. OD: Observed difference (monitored - unmonitored). Observed and unobserved columns are in units of trips. Statistically significant results are in bold italics.

Strata	Observed	Unobserved	Metric	NMFS areas	Days fished	Vessel length (ft)	Species landed	pMax species	Landed catch (t)
OB HAL	251	1,040	OD	-0.023	***-0.943***	1.050	0.077	-0.018	***-1.563***
			OD (%)	-1.995	***-16.085***	1.957	2.114	-1.981	***-22.439***
			p-value	0.431	***< 0.001****	0.244	0.592	0.061	***0.002****
EM HAL	139	480	OD	0.005	-0.412	-1.830	***0.532***	-0.013	0.015
			OD (%)	0.422	-7.247	-3.510	***12.948***	-1.475	0.201
			p-value	0.912	0.220	0.044	***0.008****	0.328	0.984
OB POT	191	883	OD	0.008	-0.723	4.051	0.087	0.011	-5.566
			OD (%)	0.758	-12.063	6.361	3.568	1.123	-20.974
			p-value	0.744	0.029	0.017	0.500	0.070	0.278
EM POT	49	213	OD	-0.045	0.014	-1.979	0.366	0.002	4.310
			OD (%)	-4.252	0.256	-3.176	13.596	0.204	21.481
			p-value	0.500	0.973	0.455	0.159	0.862	0.354
OB TRW	212	445	OD	-0.030	-0.253	0.176	0.293	***-0.021***	3.830
			OD (%)	-2.488	-6.938	0.207	4.583	***-2.260***	3.011
			p-value	0.415	0.367	0.906	0.287	***0.007****	0.644

Figure 3-1– Total number of observer sea days purchased (top panel) and total cost of observing those sea days (bottom panel). Vertical bars signify the range of potential outcomes predicted by the 2023 Annual Deployment Plan. Dashed lines signify expected outcomes. Solid lines signify what actually occurred in 2023.

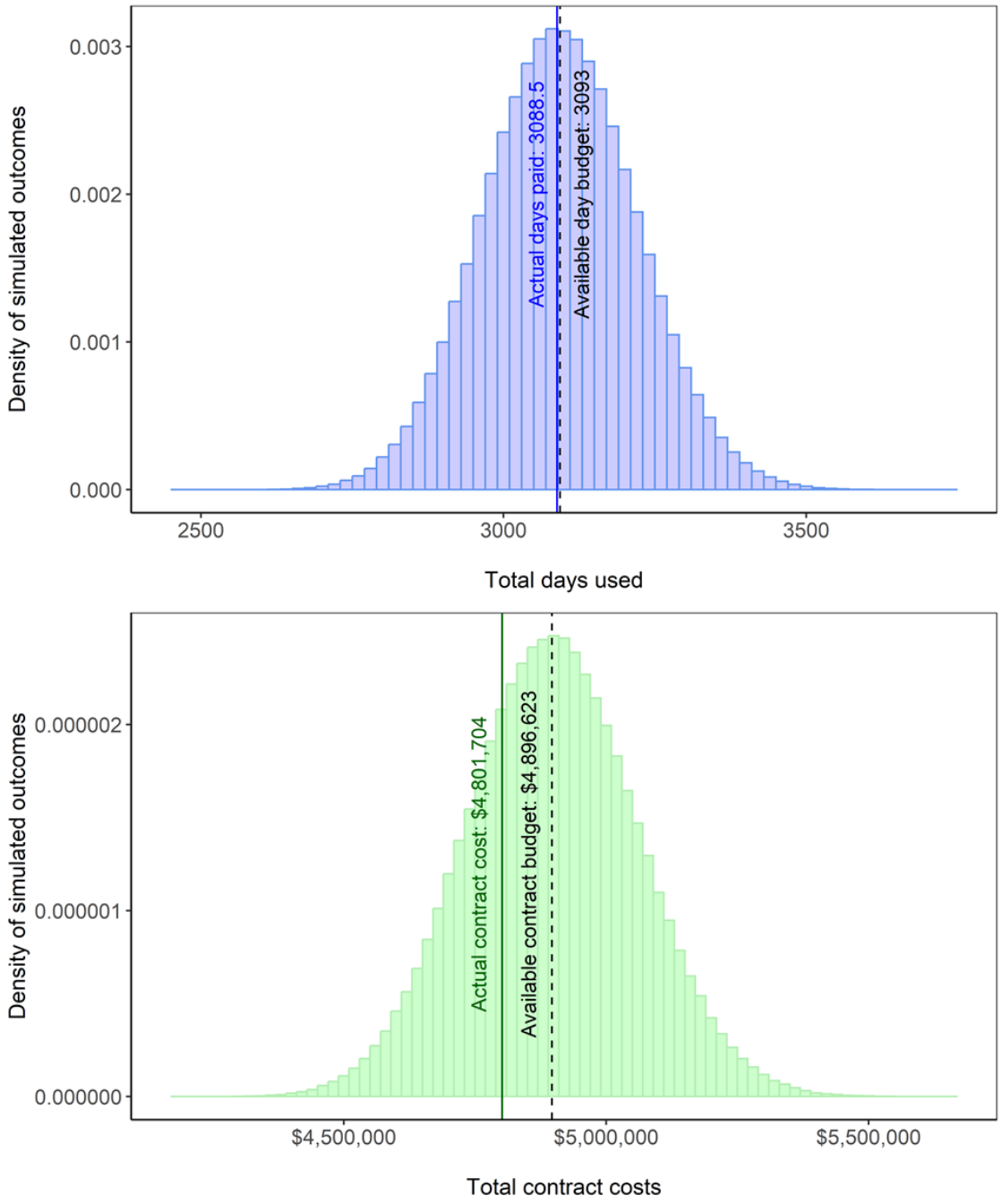


Figure 3-2– Distributions of data timeliness (the time between a trip or delivery ending and those monitoring data being available for catch accounting) by stratum. Dashed red lines and annotations show mean data timeliness.

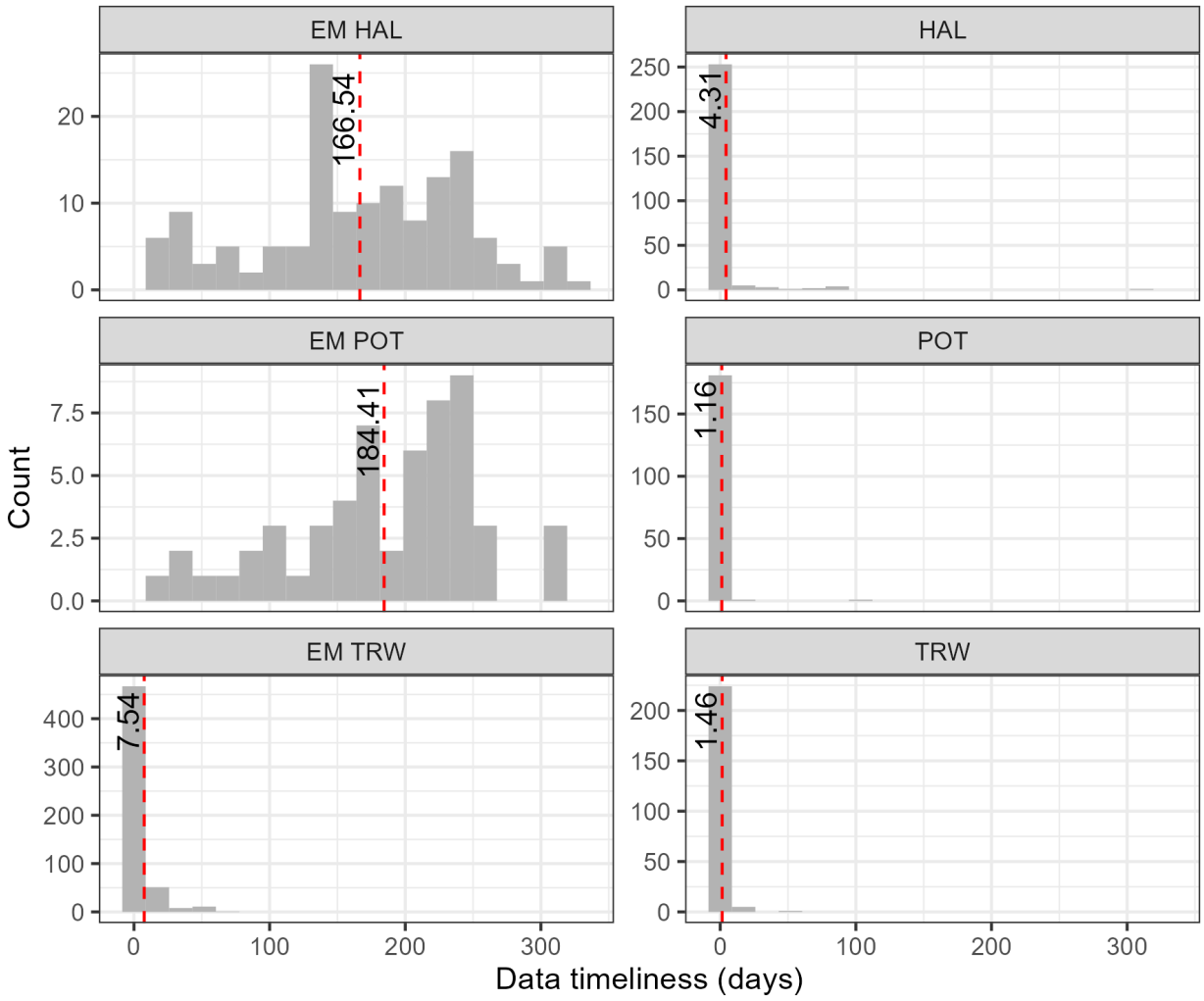


Figure 3-3– Rate of selected trips logged into ODDS in 2023 organized by original date entered for all trips (gray line and gray text), and final date considering only non-cancelled trips (black line and black text). The programmed selection rate is depicted as the dotted line. Gray shaded areas denote the range of coverage rate corresponding to the 95% confidence intervals expected from the binomial distribution. Vertical tick marks on the x-axis depict dates when selected trips were canceled (gray, on the bottom) and when inherited trips were monitored (black, on the top).

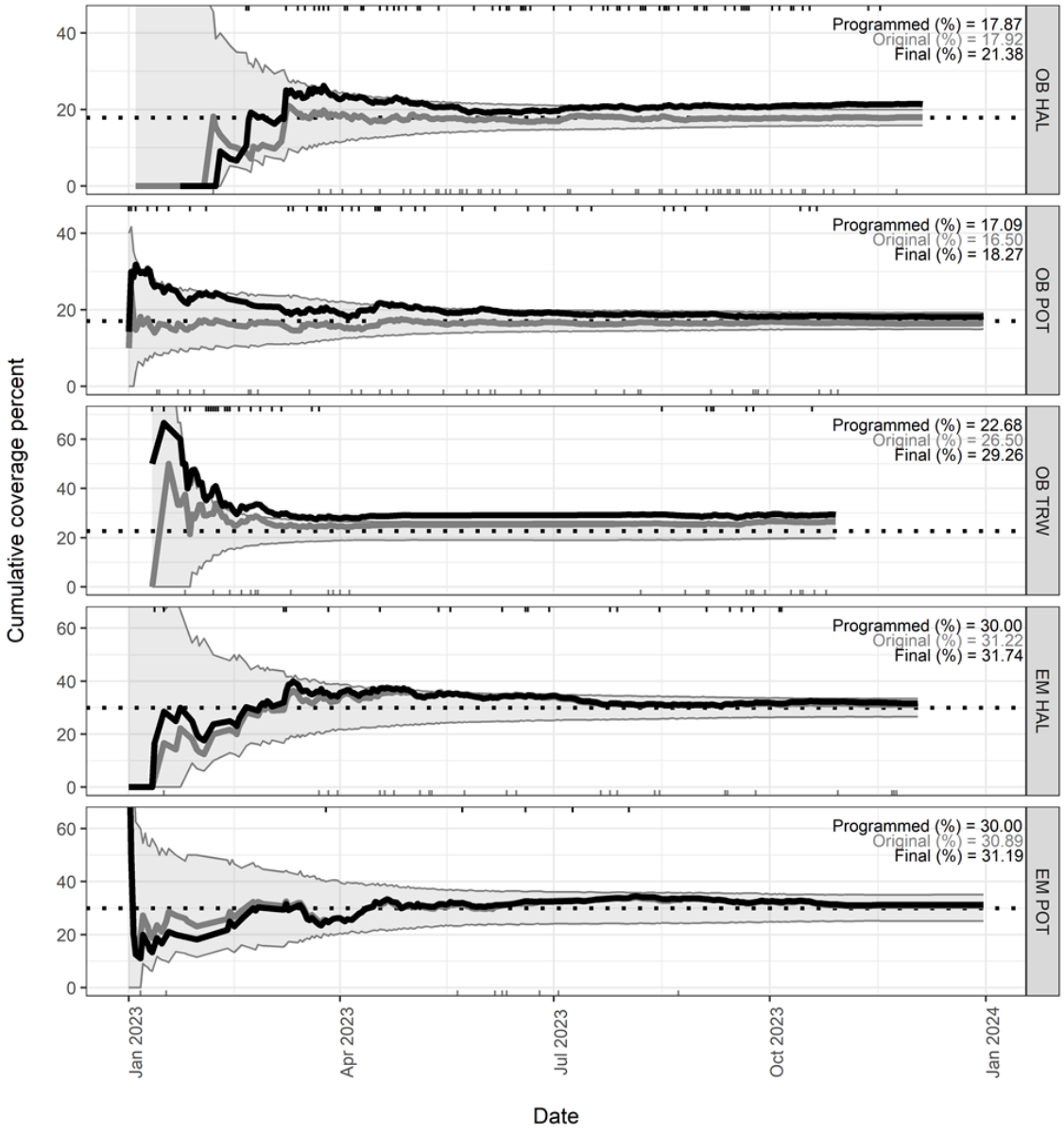


Figure 3-4 – Cumulative number of trips monitored during 2023 (black line) compared to the expected range of observed trips (shaded ribbon) given fishing effort and sampling rates. Dates where the monitored number of trips is outside of expected (less or more than the range) are depicted as tick marks on the x-axis. Test results (using a binomial distribution) determining if the observed rate was sampled at the selection rate are denoted as p-values.

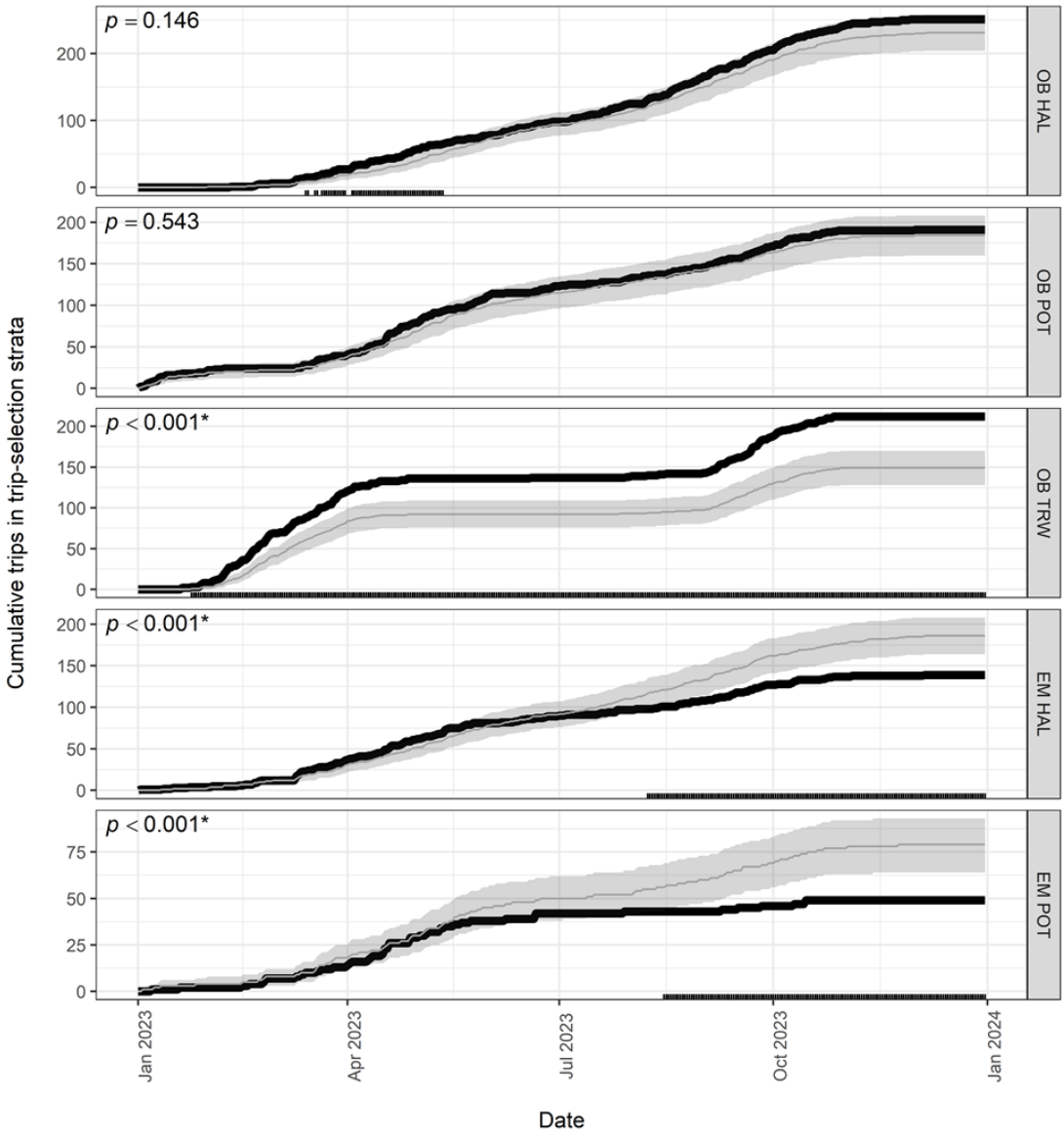


Figure 3-5– Spatial patterns of the distribution of monitoring in partial coverage in 2023. Each hexagonal spatial cell is 200 km wide. The numbers in the cells represent the difference in the number of trips / deliveries actually monitored relative to the median of 10,000 simulations of random sampling using the stratum's realized monitoring rate. Cells without a number had the same number of monitored trips / deliveries as the median of the simulations (difference of zero). Cells where the actual number of monitored trips / deliveries was more extreme than 80% of simulated outcomes are colored pink (fewer trips / deliveries than expected) or green (more), and those cells with a more extreme outcome than 95% of simulated outcomes are outlined in blue with bold text.

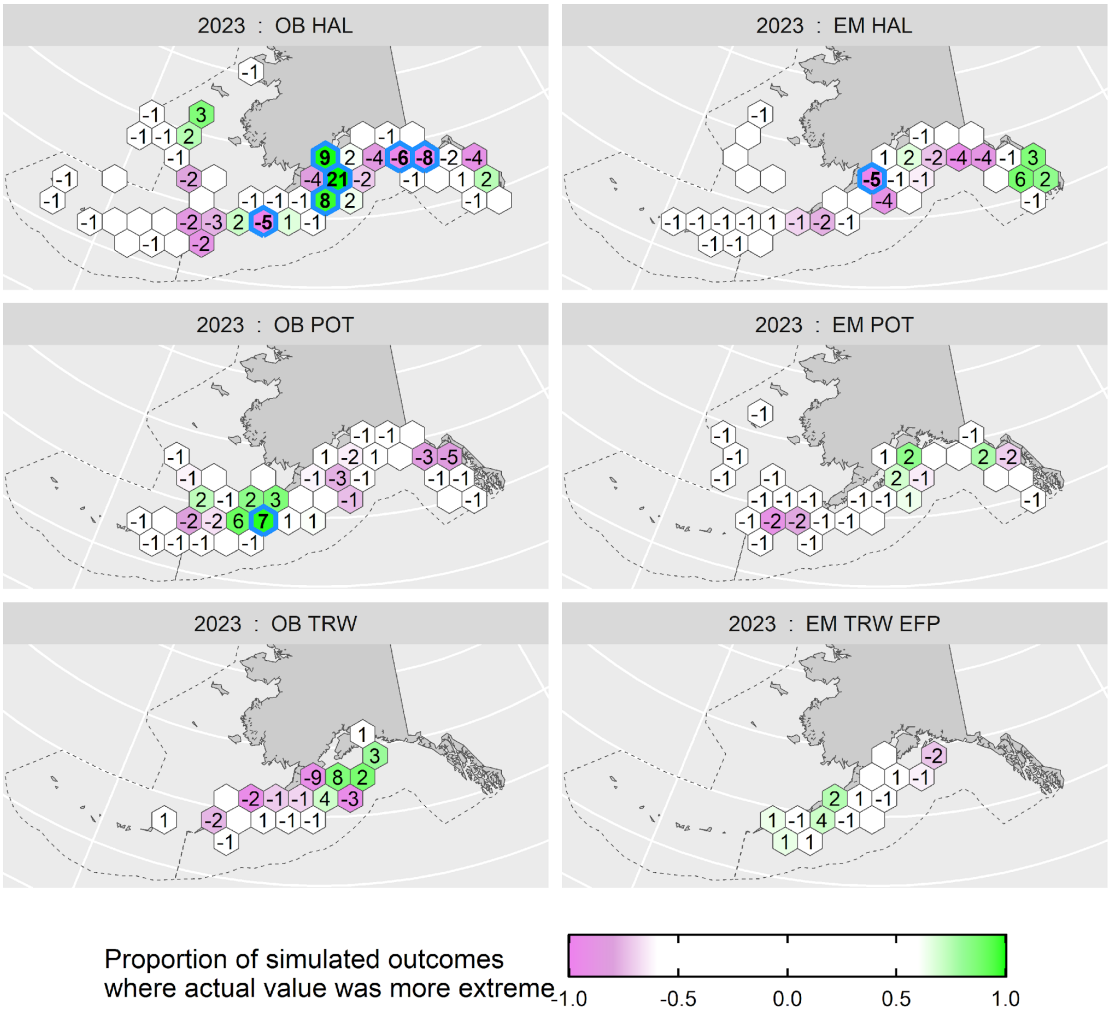


Figure 3-6 – Stratum-level proximity indices in partial coverage in 2023. The purple vertical dashed line represents actual proximity indices. The distributions show the proximity values obtained from 10,000 simulations of random sampling, where the upper (green) distribution sampled using the realized monitoring rate and the lower (blue) distribution used the programmed monitoring rate. The 2.5% tails of the distributions are shaded darker to represent unlikely outcomes. The number of sample units in each stratum is displayed in the upper-left of each facet. Note the varying scales of the x-axes between facets

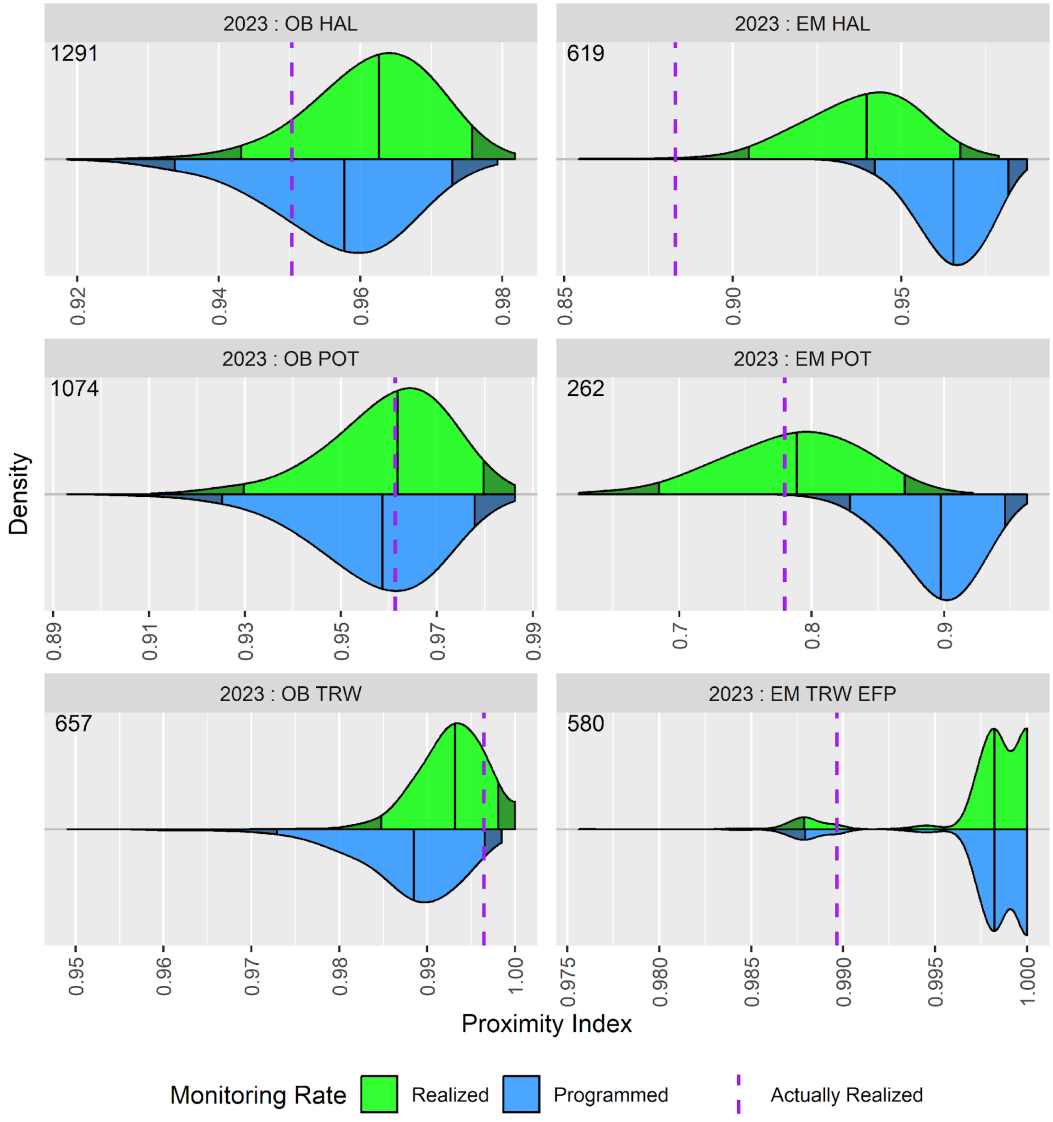


Figure 3-7– Stratum and FMP-level proximity indices in partial coverage in 2023. The purple vertical dashed line represents actual proximity indices. The distributions show the proximity values obtained from 10,000 simulations of random sampling, where the upper (green) distribution sampled using the realized monitoring rate and the lower (blue) distribution used the programmed monitoring rate. The 2.5% tails of the distributions are shaded darker to represent unlikely outcomes. The number of sample units in each stratum and FMP is displayed in the upper-left of each facet. Note the varying scales of the x-axes between facets.

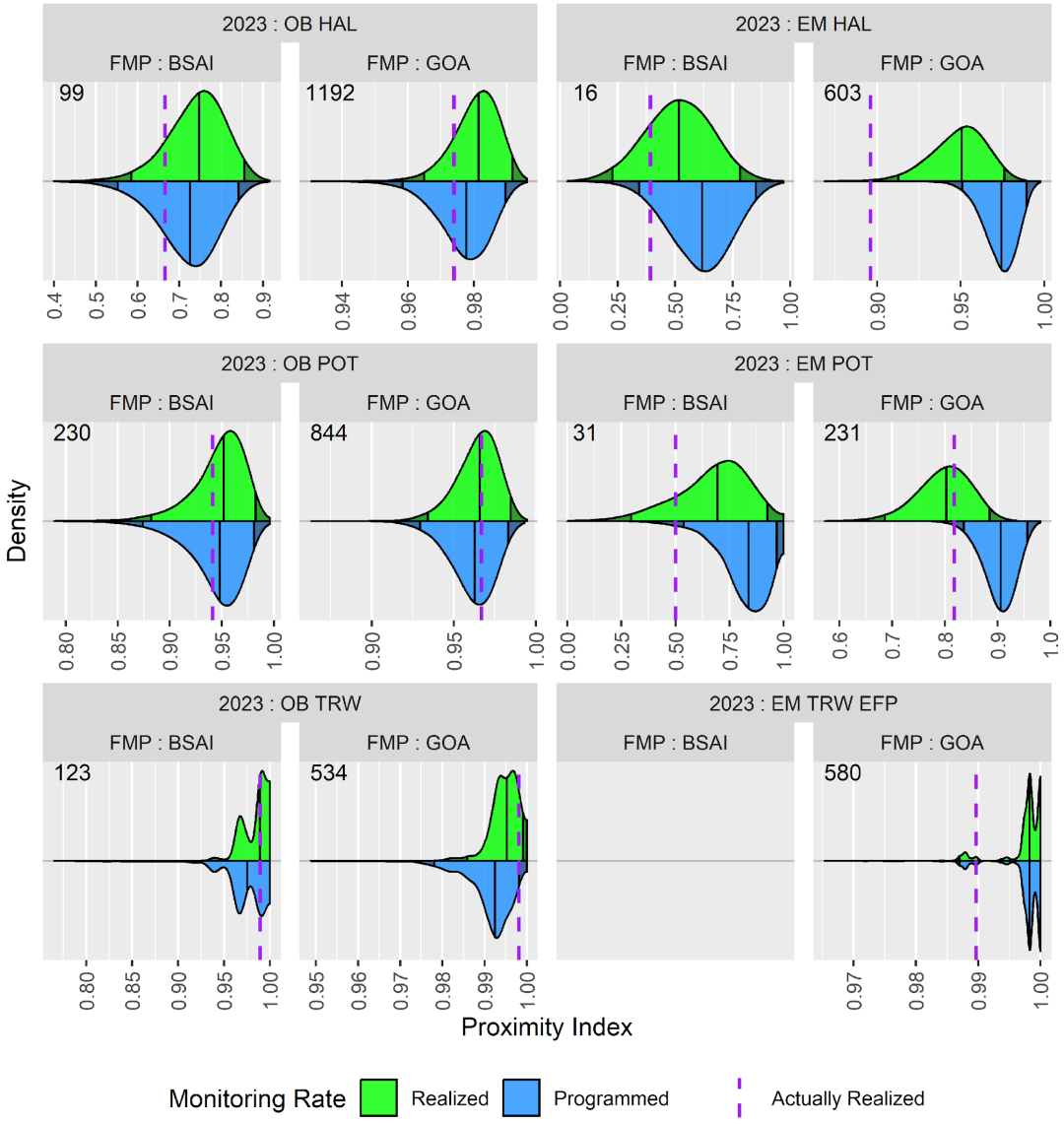
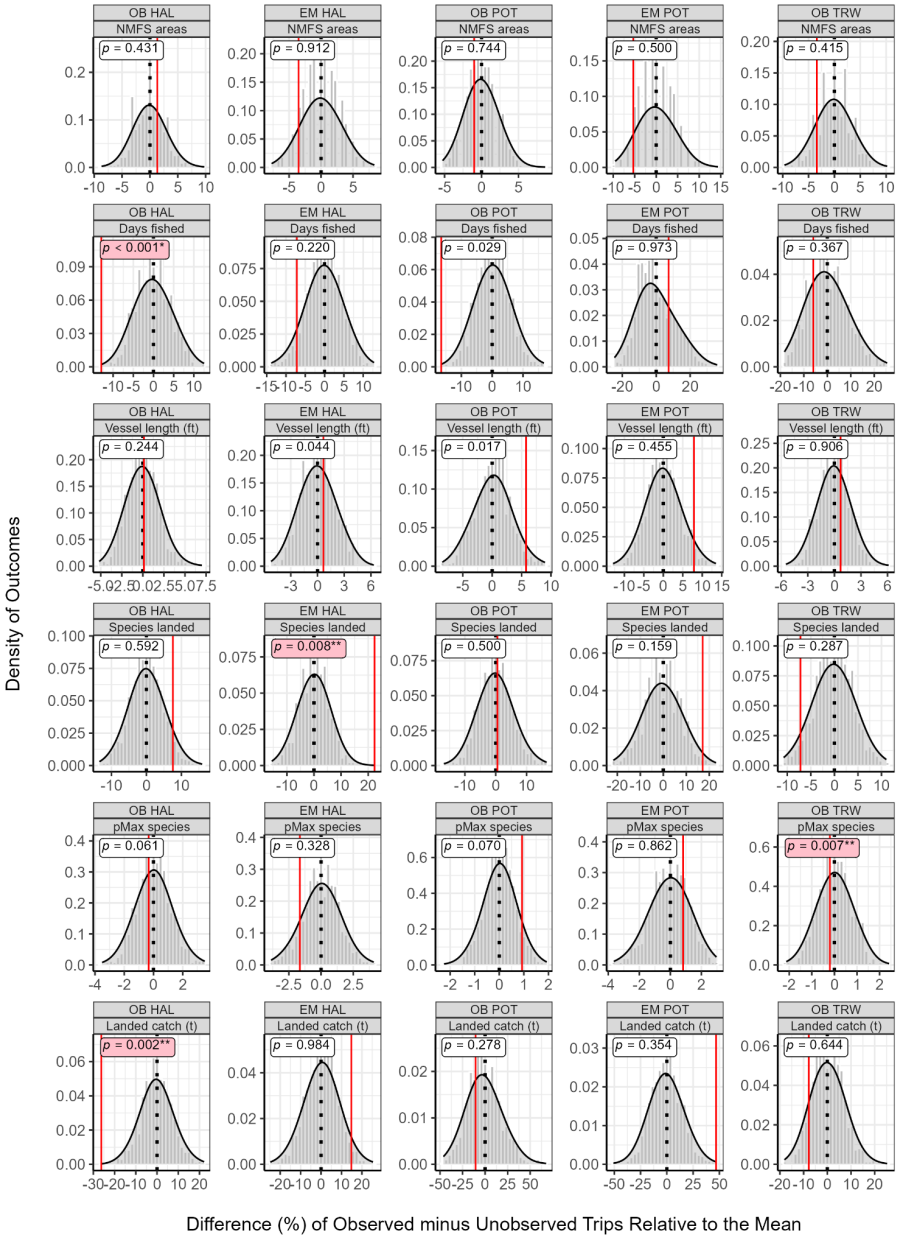


Figure 3-8– Results from permutation tests depicting percent differences between monitored and unmonitored trips by strata in the partial coverage category. Gray bars depict the distribution of differences between monitored and unmonitored trips when the assignment of monitoring status has been randomized (this represents the sampling distribution under the null hypothesis that monitored and unmonitored trips are the same). The vertical red solid line denotes the actual difference between monitored and unmonitored trips. Values on the x-axis have been scaled to reflect the relative (%) differences in each metric. The *p*-value for each test is denoted in the upper left corner. Low *p*-values (shaded pink) are reason to reject the null hypothesis and conclude that there is a monitoring effect.



4. Descriptive Information

4.1. Observer Training and Debriefing

In 2023, the Observer Program was largely back to normal operations post-pandemic. In 2023, observers collected data on board 343 fixed gear and trawl vessels and at 11 processing facilities for a total of 32,789 observer days (29,232 full coverage days on vessels and in plants; and 3,557 partial coverage days on vessels and in plants).

During the 2023 fishing year, approximately 350 individual observers were trained, briefed, and equipped for deployment to vessels and processing facilities operating in the BSAI and GOA groundfish and halibut fisheries. Thanks to the hybrid framework during the pandemic, the Program now uses both virtual and in-person training environments for training and briefing operations. Trainings which require hands-on interactive activities that benefit from in-person interactions - such as the 3-week, non-trawl lead level two, and annual briefings - are conducted in-person, while the Fish and Crab ID and 1-day briefings are conducted within a hybrid asynchronous environment.

New observer candidates are typically required to complete a 3-week training class with 120 hours of scheduled class time and additional training by FMA staff as necessary. The FMA Division conducted training for 159 new observers for 2023 deployments in addition to the 191 prior observers who attended a briefing of some type (Table 4-1). Portions of FMA's 3-week observer training class were attended by observer providers, FMA staff, NOAA Fisheries Office of Law Enforcement and General Counsel, and NOAA Workplace Violence Prevention and Response staff.

During their first two deployments, observers are required to complete a mid-cruise debriefing while still in the field. This mid-cruise debriefing provides the opportunity for both the observer and FMA staff to assess the data collected up to that point, methods used, challenges encountered, and discuss future vessel assignments. After successfully completing two contracts, mid-cruise debriefings are only required on an individual basis if recommended by FMA staff.

Traditionally, mid-cruise debriefings can be completed in person, over the phone, electronically, or via fax, or a combination of methods. In 2023, the majority of all mid-cruises were performed in person. This year there were eight mid-cruise debriefings in Anchorage, 164 in Dutch Harbor, eight in Kodiak, and 34 in Seattle. Completing these mid-cruises required extensive coordination and communication between field staff, observers, observer providers, and industry members to ensure the observers received the valuable feedback the mid-cruise debriefings provided.

After each deployment, observers must meet with an FMA staff member for a debriefing interview. During the debriefing process, sampling and data recording methods are reviewed and, after a thorough data quality check, the data are finalized. In 2023, the 550 debriefings were completed either in-person or remotely by 19 FMA staff located in the Seattle and Anchorage offices.

Depending on their performance and assessment during debriefing, observers must attend a 1-day, a focused training (FCT), an annual briefing, or a fish and crab identification briefing. In rare cases when an observer has demonstrated major deficiencies in meeting program expectations, they may be required to retake the 3-week training. Regardless of their required training as the result of debriefing, all returning observers must attend an annual briefing class prior to their first deployment each calendar year. These briefings provide observers with annual reminders on safe practices on fishing vessels and at processing plants, updates regarding their responsibilities for the current fishing season inclusive of programmatic and sampling updates, office of law enforcement training, seabird data collection, and USCG Guard safety lectures and discussions. Additionally, observers are required to demonstrate their understanding and proficiency by passing the annual briefing exam, a seabird identification test, and successfully completing various in-class activities. In addition to all these updates, in 2023 specifically, the curriculum focused on the pollock trawl EM EFP, updates on new special research project data collections, industry updates, and general reminders.

To support the success of observers and the trawl EM/EFP, specialized briefings, upon request by the observer providers, were held for observers deploying to plants participating in the trawl EM/EFP.

In addition to the training provided to observers, FMA Training team members also provided marine safety, back care, and marine mammal identification trainings to AFSC sea-going staff. As part of the Marine Instructor Safety Training (MSIT) cross-training requirement, several FMA training team members assisted the At-Sea Hake Observer Program (Northwest Fisheries Science Center, NWFSC) with their annual safety trainings for their program and FMA hosted a trainer from the Southeast Fisheries Science Center as well as from the NWFSC.

4.2. Number of Trips and Vessels by FMP Area, Strata, Gear, and Vessel Length

In Chapter 3, Table 3-1 provides trip and vessel counts based on coverage type and strata. The Council has previously requested a summary of trip and vessel counts based on criteria that are not, or are no longer, considered when deploying observers on trips (e.g., FMP area and vessel length). In this chapter, Table 4-2 and Table 4-3 summarize the number of vessels, total trips, and monitored trips by FMP area, strata, gear type, and vessel length category within the full and partial coverage categories. Monitored trips reflect either trips with an observer, EM fixed gear trips if at least some video was reviewed, or EM trawl trips where biological samples and census counts of salmon and Pacific halibut PSC were collected at shoreside plants. All EM trawl trips are also required to have cameras on for 100% of their trips for compliance monitoring (not shown in Table 4-2 and Table 4-3).

Vessels and trips may be counted more than once in a vessel length category in Table 4-2 and Table 4-3 if a vessel is in more than one stratum, fishes in more than one FMP area, or utilizes

more than one gear type on a trip or within the year. The table rows titled “BSAI Subtotal”, “GOA Subtotal”, and “Total Unique” include the number of unique vessels and unique trips in each vessel length category where each vessel or trip is counted only once, in each of the FMP areas or overall, respectively.

4.3. Total Catch and Discards and Amount of Catch Monitored

The ADP does not assign observers or EM coverage by fisheries because the fishery cannot be defined before fishing occurs. Instead observers or EM are deployed on trips and vessels across all fisheries. However, there has been interest in comparing observer and EM coverage across resulting fisheries, so this section includes summaries of monitored and total catch by area, gear type, and sector. The total catch of groundfish and halibut (retained and discarded) for 2023 was summarized from the NMFS Catch Accounting System (CAS) in Table 4-4 and Table 4-5. These tables allow for comparisons of the metric of catch weight derived from CAS. Catch estimation methods are described in detail in Cahalan et al. (2014).

The proportion of catch weight monitored for a subset of fishing activity (i.e., a fishery) should not *a priori* be expected to equal the deployment rates specified in the ADP (i.e, proportion of trips selected for observer or EM coverage). If there are differences in fishing characteristics between subsets of fishing activity, specifically differences in catch weights or discard rates per trip, those differences will be reflected in the relative proportions of catch monitored. For example, within the partial coverage trawl stratum, trips in the Pollock fishery will have very different total catch weights and discard characteristics than trips in flatfish fisheries. In addition, there are several other factors that will contribute to the apparent inconsistencies between proportion of catch monitored, the proportion of trips monitored, and the deployment rate specified in the ADP. These include the actual number of trips selected (sample size), variability in deployment due to random chance, the number of trips in each of the fisheries, and lack of independence between the coverage rates within a sampling stratum.[18]

In Table 4-4 and Table 4-5,“Monitored” indicates catch that occurred on trips where an observer was present, on EM fixed gear trips for which some video was reviewed, or on EM trawl trips where biological samples and census counts of salmon or Pacific halibut PSC were observed at the shoreside plants. The EM trawl trips are also required to have cameras turned on for 100% of their trips for compliance monitoring of maximized retention requirements, but this monitoring strategy is not used to define “Monitored” in Table 4-4 and Table 4-5. In Table 4-4 and Table 4-5, “Total” represents estimates of all catch from all trips regardless of whether it was monitored. The rows titled “Retained” indicate catch that was offloaded (minus dockside discard). The rows titled “Discard” are estimated at-sea discard.

All catch and discard information, including halibut, summarized in these tables are in round

[18] More trips monitored in one subpopulation (fishery) equates to fewer monitored trips in the other subpopulations since all the trips across the different subpopulations must add to the total number of trips selected.

weight metric tons. If species were landed in a condition other than round weight, then standard product recovery rates (PRRs) were used to obtain round weight. Halibut that were landed in ice and slime were additionally corrected for ice and slime using a standard 2% correction.

These tables can also be used to compare the proportion of catch that occurred in full coverage or the partial coverage categories or the proportion of catch that was monitored for trips in partial coverage. For example, in the:

- BSAI and GOA combined, 90.6% of pelagic trawl catch was on trips in the full coverage category and 9.4% was on trips in partial coverage. All partial coverage trips were in the GOA and 33.5% of their catch was monitored. This percentage is higher if at-sea compliance monitoring for maximized retention requirements on trawl EM trips is considered;
- BSAI and GOA combined, 94% of non-pelagic trawl catch was on trips in full coverage category and 6% was on trips in partial coverage. Partial coverage trips occurred in both the BSAI and GOA with 45% and 42% of their catch monitored, respectively.

Additional retained and discard catch information, broken down by species for the Gulf of Alaska (GOA) and Bering Sea/Aleutian Islands (BSAI), are available online for 2023 as well as prior years.[19]

4.4. Electronic Monitoring Video Review

This section provides metrics of the EM video review, including information on reliability and image quality. Video that was collected in 2023 from vessels participating in the fixed-gear EM program was sent to the Pacific States Marine Fisheries Commission (PSMFC) for review and was incorporated into the CAS for catch estimation to support inseason management of the fisheries and for use in fishing mortality estimates in stock assessments. Video collected from Pollock trawl vessels participating in the EM Exempted Fishing Permit was sent to either PSMFC or Saltwater, Inc. for review for compliance purposes with discard limitations and logbook report verification. Video reviewers are trained by PSMFC and Saltwater staff working with the North Pacific Observer Program on Alaska species reporting conventions. The reviewers are instructed to record species to the lowest identifiable taxonomic level or grouping, as required by the Alaska Region.

4.4.1 EM Data from fixed-gear vessels

The fixed gear EM program includes vessels that fish with longline or pot gear and each year there are varying numbers of active vessels in the fixed-gear EM program, as such the numbers of trips by gear types varies. The data are split by gear because different gear requires different Vessel Monitoring Plans (VMPs). NMFS approved 179 vessels in the 2023 fixed-gear EM

[19] Available online at: Monitored Catch Tables.

selection pool. Of these, 124 vessels fished at least 1 trip, but not all vessels were randomly selected to turn on their EM system. In 2023 there were a total of 305 selected trips (209 longline trips and 96 pot trips). Video review timeliness was impacted in 2023 due to staffing issues and the increasing need for review due to expansion of EM programs in Alaska and along the west coast. As of April 1, 2023, video review had been completed for 211 fixed-gear trips (149 longline trips and 62 pot trips) from 103 vessels. By target species, there were 107 halibut trips, 32 Pacific cod trips, and 72 sablefish trips (Oberg et. al 2024). The data spanned 541 halibut sea days, 147 Pacific cod sea days, and 410 sablefish sea days for a total of 1,098 sea days with trips averaging 5.3 days across all fisheries. There were 7,190 hauls within trips selected for review, of which 2,429 hauls were reviewed for catch-level data collection. Catch was defined as anything seen by an EM reviewer, excluding free-moving marine birds and mammals alongside the vessel.

Video Review Rates

Video review rate varies among Pacific halibut, sablefish, and Pacific cod fisheries and fishing gear.

- Review rate for halibut and sablefish target fisheries ranged from 0.62 to 0.79 minutes of review per minute of video (Oberg et. al 2024) The review rate in the Pacific cod target fishery was slower and close to real time (e.g., one hour of catch handling could be reviewed in just under an hour).
- Pacific cod longline hauls tended to have a larger variety of species caught, as well as being the only fishery where stern hauling was conducted. Stern haulers were more difficult to review due to a side view of the line (as opposed to a top down view), as well as poor lighting on the line at night.

EM Problems and Issues

EM Logging Problems: Problems encountered during EM review are logged in the EM Service Provider Application / Observer Declare and Deploy System (EMSP ODDS application) and PSMFC database. Every logged issue in the EMSP ODDS application results in an automated email being sent to the associated vessel with instructions on how to fix the problem. The EM Service Provider also contacts the vessel to resolve the issue, including phone calls or site visits if needed. Logged issues may result in trip logging limitations, a waiting period of 72 hours if appropriate, notifications by email of all issues, contact by the EM Service Provider, OLE contact or actions, and/or removal from the EM program.

Issues logged for non-trawl EM trips by video reviewers continue to trend downward overall. We can see this trend by examining the proportion of reviewed trips each year that had at least one issue logged by video reviewers. In 2023 the downward trend in this metric continued for longline trips, but went back up slightly for pot trips, although still quite a bit lower than the 2020-2022 values (Figure 4-2). 37.4% (n=114) of non-trawl EM trips had at least one issue that was logged by video reviewers in 2023. By gear type, 34.0% of longline trips (n=71) and 44.8%

of pot trips (n=43) had at least one issue. This decrease over time as seen in Figure 4-2 is a notable trend, and is a hopeful sign that continued improvements are effective. Given that the full year has not yet been reviewed and different years had varying percentages of all data reviewed for that year, the rates may change as more data is reviewed, but it is still a hopeful development.

Video and Sensor Completeness: During an EM trip, sensors or video data might not be captured creating gaps in the EM data. As the fixed-gear EM program has grown, the video review success has decreased slightly from one year to the next. This is likely due to aging equipment, more effort by the participating vessels, and new entrants requiring training and support, as well as many other issues. Video reviewers at PSMFC assessed the completeness of the video and sensor data during each trip and haul.

Image Quality: Qualitative image quality assessments ("High", "Medium", or "Low or unusable", Figure 4-1) have been provided by PSMFC review staff for each haul since 2021. Of the 2,429 hauls reviewed so far from 2023, 75% had high image quality, 10% had medium image quality, and 15% had low or unusable image quality. Figure 4-1 illustrates the increasing trend in "High" quality images since 2020. Common reasons for medium- and low-quality video were water spots, poor camera angles, night lighting, dirty cameras, glare, and intermittent gaps in the video. Condensation, dirty cameras, glare, and water spots were the most common issues. These issues pose problems during review and create gaps in EM data. These issues could be mitigated in real time by the participating vessel. Real-time monitoring of the EM systems during vessel operation is required by each Vessel Monitoring Plan.

EM Video Review - Logged Problems: In 2023, 19 issue types were logged for EM trips by video reviewers out of all 41 issue types that were available to reviewers. A total of 96 issues were logged for pot gear and 58 issues were logged for longline gear (total=154) during video review in 2023. A description of the issue types, the raw numbers recorded, and the 2023 occurrence rate per 100 reviewed trips for each type can be found in Table 4-6. The number of records for each type were divided by the total number of reviewed trips for the year to yield a relative proportion for each type that should be comparable between years.

Issue types are logged at the trip level (not the haul level), and certain types are categorized as high priority, low priority, or no priority assigned. If the EM system function test detects a malfunction identified as a high priority in the vessel's VMP or does not allow the data collection objectives to be achieved, the vessel must remain in port for up to 72 hours to allow an EM service provider time to conduct repairs. If the repairs cannot be completed within the 72-hour time frame, the vessel is released from EM coverage for that fishing trip and may depart on the scheduled fishing trip. A malfunction must be repaired prior to departing on a subsequent fishing trip. The vessel will automatically be selected for EM coverage for the subsequent fishing trip after the malfunction has been repaired. There can be multiple issues reported for a single logged trip. Logged issues often cause data loss or data degradation due to lower quality data. One trip issue may impact all or some hauls in a trip. If the EM system function test detects a malfunction identified as a low priority in the vessel's VMP, the vessel operator may depart on the scheduled fishing trip following the procedures for low priority malfunctions described in the vessel's

VMP. At the end of the trip the vessel operator must work with the EM service provider to repair the malfunction. The vessel operator may not depart on another fishing trip selected for EM coverage with this system malfunction unless the vessel operator has contacted the EM service provider. All other issues are neither high nor low priority, and do not impact trip logging.

- High priority issues are as follows.
    - Monitor
    - GPS
    - Insufficient storage
    - Control Center
    - Insufficient lighting
    - Hauling camera
    - Deck/Discard Camera
    - Continuous Power (only required for IFQ multi area)

Low priority- May depart but must notify EM service provider

- Streamer line camera
- Hydraulic sensor
- Rotation sensor
- Keyboard – mouse

VMP Related issues may require an amendment to current VMP, no reapproval for failure to improve, or enforcement Actions.

The most commonly logged issue was 'Catch handling inconsistent with VMP' and occurred on 31 trips (15 Longline and 16 Pot). The amount by gear type was roughly the same rate of this occurrence. The other most logged issues are Camera lens dirty, Camera repositions required, Hard drive incomplete, and Prohib mishandling/careful release. All of these should be caught while fishing is occurring by utilizing the onboard monitor as required by the VMP. These issues combined for possibly 80 total trips impacted (A vessel may have multiple problems per trip). Other issues that had ≥ 10 issues logged included: Camera obstructed, Continuous power, Hydraulic sensor, and streamer line camera issues.

In addition to examining the proportion of the EM fleet that had at least one issue logged during video review as previously shown, we also calculated the rate of all logged EM system issues per selected trip. Data for this metric were available for 2018-2023. This metric differs from the previously-described metric in that it includes issues that were logged by the EM video reviewers, as well as any issues that were logged by the EM service provider and/or self-reported by the vessel. Overall this metric shows a similar trend: improvement over time. We can illustrate this by binning the rate of issues logged per selected trip for each year 2018-2023 (Figure 4-3). The proportion of vessels with 0 issues per selected trip has generally increased over time, while the proportions of vessels with 1, 2, 3, or 4-or-more issues per selected trip has generally decreased over time. In 2023, 23% of pot vessels had 0 issues per selected trip and 29.2% of longline vessels had 0 issues per selected trip.

This improvement in the EM fixed gear program over the years is a deliberate process of continued outreach, agency cooperation internally and externally, and hard work by all participants. Yearly outreach is done by completing the VMP by vessel and the EM Service Provider. The VMP must be reviewed each year. Direct outreach is done by automated emails sent to the vessel provided email addresses on all logged issues and resolutions of such issues. Vessels can also directly contact NMFS staff when needed regarding such emails. Also, the EM Service Provider is required to contact the vessel for all logged issues in case an email is not sufficient. The EMSP is also required to log all such contacts into a FMA application. So in total a vessel will be contacted by EMSP upon logging of all issues, by automated emails when issues are logged, upon the resolution of all issues, and emails for all such actions. OLE also is an important partner in outreach as they contact and assist vessels that have serious data issues and/or compliance issues.

EM Service Providers Logged Issues: These issues are not associated with specific trips as they occur prior to a trip or on non-selected EM trips. Logged issues by the EM Service Provider are equipment issues identified by the EM Service Provider or vessel operator and are expected to be resolved prior to the start of an EM selected trip. Such issues must be self-reported to the EMSP, and may allow for repairs prior to data loss. Additionally, the EM Service Provider is required to serve as the primary point of contact to a vessel when a video review problem is logged.

In 2023 there were 52 times a vessel self-reported issues that were then logged by the EM service provider, in 2022, there were 51 total trips with issues that were logged by the EM Service Providers. Logged issues included deck/discard camera, hauling camera, bird streamer line camera, camera out of focus, GPS unit malfunction, hard drive data is incomplete, hydraulic sensor, and other system problems. Self-reported issues logged by the EM service provider increased each year from 2020 to 2023; 21, 42, 51, 52. This increasing trend is a positive step to improve overall program success.

Logged issues by the EM Service Provider and/or vessels are an important step to make sure issues are addressed before or during the fishing trip and are a critical step to ensuring data quality. Self-reporting also allows subsequent trips to be successful EM trips as any outstanding issues are addressed. As the EM program continues to mature, it is expected that rates of logged issues by the EM Service Provider and/or vessels will increase as vessels gain familiarity with EM systems.

4.4.2 EM Issues Specific to Pot Vessels

Species and counts of catch were recorded for a subset of hauls for single pot gear and longline gear. For single pot gear, catch was reviewed for every third haul (each pot is a haul for single pots). The pot gear type involving longline/slinky/string pots was reviewed in its entirety for an individual string. The review rate in the pot fishery was close to real time (e.g., 1 hour of catch handling could be reviewed in just under an hour) or longer and the following observations were made:

- Review is time consuming when large amounts of bycatch exist.
- Crab identification to species was noted as an issue. Crab on EM vessels are unable to be speciated by a remote reviewer, and must be assigned a group code such as King Crab unidentified, or Tanner Crab unidentified. This is particularly an issue in Pot Gear trips. CAS estimates crab using rates derived from at-sea observer data in these situations.
- Longline/slinky/string pot gear is being used more frequently, which has impacted review. This type of pot gear is not considered a separate gear type in Alaska. In the fixed-gear EM program, longline/slinky/string pots are considered pot gear.
- New entrants to pot fishery due to longline/slinky/string pots caused data loss and degradation as they were not fully aware of how catch handling differed from previous longline experience and that another VMP is required for pot fishing. The addition of pot gear often requires another camera and following different catch handling rules. This resulted in a time lag of pot data review, and at times lower quality data and/or data loss.
- Additional negative impacts to data quality are possible in higher bycatch pot fisheries (e.g., Pacific cod) as it is harder to count high numbers of items quickly. This can result in lower ratings for data quality, image quality, and video completeness.
- Catch handling that is inconsistent with VMP is a common problem with pot gear. Catch handling by the crew impacts data quality, as crew must clear each pot and process catch prior to the next pot coming onboard. Organisms also must be handled in such a way that allows a view and/or count by the video reviewer. This may slow fishing efforts but must be done to comply with VMP.
- Bias may exist towards pots with lower catch if reviewers move past pots where organisms cannot be counted and only review pots that can be counted. Once a pot is successfully counted, the intended sample frame is resumed. NMFS is working to support additional reviewers to decrease the review time lag and to allow for longer review time needed by pot gear as well as working on review options that might reduce review times for pot gear.

4.2.3 Trawl EM EFP

An Exempted Fishing Permit (EFP) was issued in January 2020 to evaluate the efficacy of electronic monitoring systems and shoreside observers for pollock catcher vessels (CVs) using pelagic trawl gear in the Bering Sea (BS) and Gulf of Alaska (GOA). The objectives of the trawl EM are: (1) improve salmon accounting; (2) reduce monitoring costs; and (3) improve the quality of monitoring data. The EM systems onboard trawl vessels ensure compliance monitoring objectives are met while providing a chain of custody for prohibited species catch (PSC). Catch accounting for the vessel's catch and bycatch is achieved via eLandings reports and observers at the shoreside processors. There were 41 participating catcher vessels in 2020, 71 vessels in 2021, 80 vessels in 2022, and 85 vessels in 2023. The EFP includes catcher vessels in the partial and full coverage categories and tender vessels in the partial coverage category. See Section 3.1 for specifics on monitoring and shoreside observer coverage for participating vessels in the EFP. At the October 2022 meeting, the NPFMC took final action to implement the trawl

EM program. In January 2023, the EFP was extended through 2024, with expected regulatory implementation of the Trawl EM program by 2025. The proposed rule for the trawl EM category (89 FR 7660) published on February 5, 2024.

Pacific States Marine Fisheries Commission (PSMFC) and Saltwater Inc. have conducted the video review during the EFP. Table 4-7 provides a summary of video review data for the trawl EM EFP program for 2023. Due to unforeseen staffing challenges at PSMFC, there are trawl EM EFP trips from 2023 still awaiting video review. Alterations in program protocols changed review priorities for 2024 to emphasize data sets from 2024 for priority review over data sets from 2023. This reprioritization is necessary to provide timely feedback to allow vessels the opportunity to improve their performance in the program for 2024, PSMFC has prioritized review of all trips for vessels new to the trawl EM program for 2024 and the first 2024 trips for returning trawl EM vessels. PSMFC has hired and trained new staff and expects these issues to be resolved for video review of 2024 data.

4.2.4 Improving EM data review timeliness and data quality

In 2022, the AK fixed-gear EM review team was expanded from two full-time staff to three full-time staff in an effort to improve review turnaround time. However, video review continued to be impacted in 2023 due to severe staffing issues and challenges in backfilling multiple video reviewer positions. The expansion of the trawl EM EFP and west coast EM programs also competed for limited reviewer resources. An additional full-time reviewer will be added to the review team in 2024, bringing the total to four full-time review staff for the AK fixed gear EM program, to further improve review times. In addition, alterations in program protocols changed review priorities for 2024 to emphasize 2024 data review for the first trip of the year (to give immediate feedback), then review 2024 non-first trip data, and then to complete what was left from 2023. This was done to allow current/recent data to be prioritized.

NMFS and OLE are using the information from the logged issues and data quality impacts to find ways to work with the industry to improve EM data. Some of these activities were started in 2020 and will continue in the future:

1. Continue to develop and utilize outreach letters called notice of improvement needed letters, for vessels with the most issues and/or highest rates of issues. This process was added to the VMP approval process starting in 2021, and has continued in 2022 and 2023. Briefly, vessels are sent a notice when the EM data they have provided is of consistent poor quality and that it must improve. The EM issue data are analyzed at the end of the calendar year to determine which vessels are to be sent a notice of improvement (NOI) for the following calendar year. Those vessels with the highest number of logged issues per vessel, the highest number of logged issues per selected trip, or any unsubmitted hard drives in 2022 were sent an NOI letter for 2023. The NOI pool of vessels is relatively small, but they have a disproportionate impact on data quality. Trips with lots of issues tend to be very time consuming for reviewers, which is expensive and takes their time away from reviewing other hard drives. The 2023 NOI

pool improved as a whole in terms of EM system issues per selected trip, indicating an overall positive effect of using the NOI letter process (Figure 4-4).

2. Continue and expand the removal of vessels that will not comply with program responsibilities that were in the NOI group if they did not improve performance in the preceding year. While overall the NOI pool did show improvement relative to their performance in 2022, not all vessels improved and one was removed for 2024 due to continued poor performance. The agency will reserve the right to continue to remove vessels from the EM pool if there are continued issues after a notice of improvement letter (NOI) has been sent.
3. Resolving issues with set-up of the EM system (e.g., bad camera angles) and improved crew behaviors, such as wiping water spots and cleaning dirty cameras could lower the percentage of hauls with reduced image quality.
4. Potentially focus EM eligibility on vessels with more fishing effort. Vessels that do very few trips tend to have outstanding issues that are not addressed, and the same issues can persist to the next year. EM systems on boats that did not fish were not available to other vessels that might want to join the EM pool.
5. Continue to increase outreach for vessels with new gear types (longline/slinky/string pots).
6. Continue keypunching logbooks and incorporate the information into NMFS data systems to make the data available for data stock assessments and other needs.

OLE has assigned a person to work on EM issues/potential violations to prioritize logged issues and add cases to the OLE database, AKR has assigned staff to EM tasking, and FMA will add additional staff time to the EM program. All these actions are hoped to improve the turnaround time, and for overall improvements in the fixed gear EM program.

4.5. Outreach

While regular communication is a standard component of our operations between the AFSC, AKR, OLE, the NPFMC, and industry constituents, this section highlights noteworthy situations with elevated communications.

In the fourth year of the Exempted Fishing Permit for electronic monitoring in the Bering Sea and Gulf of Alaska pollock fisheries for catcher vessels using pelagic trawl gear, there continued to be a considerable amount of effort allocated to coordination and collaboration between the FMA, AKRO, Office Of Law Enforcement, Alaska Groundfish Data Bank, United Catcher Boats, Aleutian East Borough (AEB), the Pacific States Marine Fisheries Commission, Archipelago Marine Research, and observer providers. Bi-monthly meetings were held with all entities to discuss issues or complications that occurred providing input to inform the regulatory development process. In addition to the bi-monthly meetings, there were observer pre-cruises and processing plant tours with industry members, AKR staff, and FMA staff. These tours focused on observer needs for sampling, what access they will need,

elements that will make their jobs easier/more possible, and what features would be required for the CMCPs. Additionally, all observer deployed to a processing plant participating in the Trawl EM EFP were interviewed at the time of their debriefing to gather additional, direct accounts of the observer's experience. This project has continued to require extensive staff time and effort to oversee the communication with observers, observer data collections, data management, and flow of data processing. It is anticipated that this will become a regulated program in 2025 and more extensive details for this project are outlined in the Trawl EM section of this document (section 4.3.4).

In March 2023, the International Fisheries Observer and Monitoring Conference was held in Hobart, Tasmania. Representatives from AKRO, OLE, and FMA as well as observers and provider representatives were able to attend this conference presenting on a variety of topics: fostering resilience in the observer workforce, training methods during COVID, outreach and collaboration with industry, quantifying bias, fisheries observers as enforcement assets, CMCPs as a collaborative tool, impacts of COVID on observer mental health, and observer harassment rate estimates. This was a unique conference, affording an incredible opportunity for agency staff, providers and observers to network, foster collaborations, and connect with industry constituents.

Observer providers are integral in the contribution to the management of successful observer deployments in the Alaska fisheries. On an annual basis, FMA meets with the observer providers one to two times per year. Historically these meetings have focused on program policies, OLE matters, recruitment and retention of observers, etc. In 2023, FMA held two sets of meetings with providers in August and October. August's meeting focused on FMA staff staffing challenges, Fish and Crab ID training processes, the new vessel and OLE survey structure, OLE's investigative processes, observer on observer harassment, and observer recruitment and retention. The Fall meeting's focus was directed on the 2023 training operations (registration updates, observer attendance expectations), the hybridized debriefing model (in-person versus remote), gear policies and practices for A-season, and potential government shut-down planning. These meetings are beneficial to keep lines of communication open, discuss solutions to the challenges, and supporting providers to provide continuous and safe observer coverage to Alaskan fishing fleets.

Staff have participated in assorted meetings focused on industry engagement: the AEB annual meeting, the Freezer Longline Coalition annual meeting, and the Kodiak Trawl fleet meetings. Engagement with our industry constituents proves to be valuable and necessary for NMFS staff and the fishing communities.

Table 4-1. -- Number of observer training classes and number of observers trained/briefed from 28 November 2022 to 16 November 2023.

Training classes	Number of classes	Number of observers trained/briefed
3 week training	8	168
Annual briefing	19	191
Focused briefing	3	3
1-day briefing	38	208
Lead Level 2	7	29
Cold Water Training	3	4
Fish and Crab ID Training	24	140
Total	**102**	**743**

Table 4-2. -- Number of vessels (V), total trips (N), monitored trips (n)[1], and percent of trips monitored (%) in 2023 in the BSAI by strata, gear type (hook and line (HAL), non-pelagic trawl (NPT), pelagic trawl (PTR), pot, and jig), and vessel length category (based on length overall, in feet) for the full and partial coverage categories.

			Vessel length category											
			<40'				40-57.4'				>=57.5'			
Area	Strata	Gear	V	N	n	%	V	N	n	%	V	N	n	%
BSAI	Full[2]	HAL									18	172	172	100.0
	Full	NPT									31	414	410	99.0
	Full	POT									7	34	34	100.0
	Full	PTR									40	797	797	100.0
	EM TRW EFP (Full)	PTR									46	1,162	1,162	100.0
	EM HAL	HAL					3	9	2	22.2	7	13	2	15.4
	EM POT	HAL					1	3	0	0.0	1	2	0	0.0
	EM POT	POT					1	8	0	0.0	7	23	2	8.7
	OB HAL	HAL					16	55	3	5.5	19	54	11	20.4
	OB HAL	POT									3	5	2	40.0
	OB POT	HAL					4	7	1	14.3	1	1	0	0.0
	OB POT	POT					10	82	12	14.6	35	149	37	24.8
	OB TRW	NPT									32	124	40	32.3
	Zero	HAL	20	109	0	0.0								

Zero	POT	1	3	0	0.0								
BSAI Subtotal		21	112	0	0.0	23	154	17	11.0	193	2,941	2,665	90.6

[1] Monitored reflect either trips with an observer, EM fixed gear trips for which some video was reviewed, or EM trawl trips where observ sampled shoreside to collect biological samples and census counts of salmon and halibut PSC. EM trawl trips also require 100% at-sea vid monitoring for compliance with maximized retention requirements, but that monitoring is not reflected in this table.

[2] Full coverage in this table includes vessels in both the Regulatory and Voluntary Full Coverage strata.

Table 4-3.-- Number of vessels (V), total trips (N), monitored trips (n)[1], and percent of trips monitored (%) in 2023 in the GOA and overall, by strata, gear type (hook and line (HAL), non-pelagic trawl (NPT), pelagic trawl (PTR), pot, and jig), and vessel length category (based on length overall, in feet) for the full and partial coverage categories.

			Vessel length category											
			<40'				40-57.4'				>=57.5'			
Area	Strata	Gear	V	N	n	%	V	N	n	%	V	N	n	%
GOA	Full	HAL									6	9	9	100.0
	Full	NPT									25	96	96	100.0
	Full	POT									3	5	5	100.0
	Full	PTR									23	117	117	100.0
	EM HAL	HAL					77	444	104	23.4	35	164	35	21.3
	EM HAL	POT					10	17	2	11.8	5	8	2	25.0
	EM POT	HAL					14	21	4	19.0	5	10	2	20.0
	EM POT	POT					26	99	19	19.2	23	134	28	20.9
	EM TRW EFP (Partial)	PTR									34	580	188	32.4
	OB HAL	HAL					182	826	162	19.6	95	379	78	20.6
	OB HAL	POT					13	16	2	12.5	21	41	5	12.2
	OB POT	HAL					23	53	6	11.3	29	75	10	13.3
	OB POT	POT					61	337	47	13.9	88	511	95	18.6
	OB TRW	NPT									31	204	81	39.7

OB TRW	PTR									36	486	145	29.8
Zero	HAL	259	1,243	0	0.0								
Zero	JIG	10	20	0	0.0	8	12	0	0.0				
Zero	POT	6	39	0	0.0								
GOA Subtotal		268	1,299	0	0.0	282	1,718	332	19.3	231	2,490	784	31.5
Total Unique		283	1,408	0	0.0	286	1,852	346	18.7	353	5,397	3,434	63.6

[1] Monitored reflect either trips with an observer, EM fixed gear trips for which some video was reviewed, or EM trawl trips where observers sampled shoreside to collect biological samples and census counts of salmon and halibut PSC. EM trawl trips also require 100% at-sea video monitoring for compliance with maximized retention requirements, but that monitoring is not reflected in this table.

Table 4-4. – Monitored catch[1] (metric tons), total catch, and percent monitored (%) of groundfish and halibut retained and discarded in the groundfish and halibut fisheries in 2023 in the Gulf of Alaska. Empty cells indicate that no catch occurred.

		Catcher/Processor			Catcher vessel			Catcher vessel: Rockfish program			Gear total		
Gear	**Catch**	**Monitored**	**Total**	**%**	**Monitored**	**Total**	**%**	**Monitored**	**Total**	**%**	**Monitored**	**Total**	**%**
Hook and Line	**Retained**	2,191	2,402	**91%**	2,136	13,724	**16%**				4,328	16,126	**27%**
	Discard	638	723	**88%**	1,955	12,009	**16%**				2,593	12,732	**20%**
Jig	**Retained**				0	69	**0%**				0	69	**0%**
	Discard												
Non-Pelagic Trawl	**Retained**	25,145	25,145	**100%**	3,409	8,198	**42%**	3,627	3,627	**100%**	32,181	36,970	**87%**
	Discard	2,383	2,383	**100%**	495	1,095	**45%**	186	186	**100%**	3,063	3,664	**84%**
Pot	**Retained**	609	630	**97%**	2,750	15,350	**18%**				3,359	15,980	**21%**
	Discard	14	14	**99%**	59	395	**15%**				73	409	**18%**
Pelagic Trawl	**Retained**	2,924	2,924	**100%**	44,091	131,539	**34%**	11,478	11,478	**100%**	58,493	145,941	**40%**
	Discard	292	292	**100%**	492	1,488	**33%**	86	86	**100%**	870	1,866	**47%**

[1] Monitored reflects either trips with an observer, EM fixed gear trips for which some video was reviewed, or EM trawl trips where observers sampled shoreside. EM trawl trips also require 100% at-sea video monitoring for compliance with maximized retention requirements, but that monitoring is not reflected in this table.

Table 4-5. – Monitored catch[1] (metric tons), total catch, and percent monitored (%) of groundfish and halibut retained and discarded in the groundfish and halibut fisheries in 202 in the Bering Sea/Aleutian Islands. Empty cells indicate that no catch occurred.

		Catcher/Processor			Mothership			Catcher vessel			Gear total		
Gear	**Catch**	**Monitored**	**Total**	**%**	**Monitored**	**Total**	**%**	**Monitored**	**Total**	**%**	**Monitored**	**Total**	**%**
Hook and Line	**Retained**	81,882	81,882	**100%**				263	1,474	**18%**	82,145	83,356	**99%**
	Discard	14,255	14,255	**100%**				243	1,227	**20%**	14,498	15,482	**94%**
Jig	**Retained**												
	Discard												
Non-Pelagic Trawl	**Retained**	325,201	325,201	**100%**	23,891	23,891	**100%**	7,328	16,261	**45%**	356,421	365,354	**98%**
	Discard	26,169	26,169	**100%**	2,098	2,098	**100%**	273	626	**44%**	28,540	28,893	**99%**
Pot	**Retained**	3,905	3,905	**100%**				2,430	17,585	**14%**	6,335	21,491	**29%**
	Discard	87	87	**100%**				24	180	**13%**	111	268	**41%**
Pelagic Trawl	**Retained**	585,623	585,623	**100%**	113,206	113,206	**100%**	566,949	566,949	**100%**	1,265,777	1,265,777	**100%**
	Discard	757	757	**100%**	321	321	**100%**	646	646	**100%**	1,724	1,724	**100%**

[1] Monitored reflects either trips with an observer, EM fixed gear trips for which some video was reviewed, or EM trawl trips where observers sampled shoreside. EM trawl trips also require 100% at-sea video monitoring for compliance with maximized retention requirements, but that monitoring is not reflected in this table.

Table 4-6. -- Issues types, the number reported to NMFS, and the number reported per 100 reviewed trips in each gear type in 2023. *Denotes a 'High' priority issue type

Problem Type	Longline		Pot	
	N issues reported	Issues per 100 reviewed trips	N issues reported	Issues per 100 reviewed trips
Camera Inactive	1	0.48	1	1.04
Camera Lens Dirty	15	7.18	1	1.04
Camera Reposition Required	8	3.83	6	6.25
Camera out of focus	1	0.48	0	0
Camera view Obstructed	0	0	4	4.17
Catch handling inconsistent with VMP	15	7.18	16	16.67
Complete Logbook not submitted	11	5.26	3	3.13
Continuous Power*	6	2.87	1	1.04
Crew catch handling goes beyond camera time duration	1	0.48	1	1.04
Drive does not contain the ODDS selected trip	0	0	2	2.08
Hard Drive Data is Incomplete	11	5.26	8	8.33
Hydraulic Sensor	7	3.35	4	4.17
Intermittent camera gaps	1	0.48	3	3.13
Other System Problem	4	1.91	0	0
Prohib mishandling/Careful release issues	11	5.26	6	6.25
Seabirds not presented to camera	0	0	1	1.04
Streamer Line Camera	1	0.48	0	0
Streamers lines not used- note in comment if bad weather	2	0.96	0	0
System not activated prior to beginning trip	1	0.48	1	1.04
All Issues	***96***	***45.9***	***58***	***60.4***

Table 4-7. -- Video review information for the trawl EM program for 2023 as reported by the video review entities. Note that in 2023, Pacific States Marine Fishery Commission did not conduct video review for GOA tenders and Saltwater Inc. did not conduct video review for BS CVs. CV trips for the purposes of trawl EM video review end at the delivery of catch to a tender vessel or shoreside processor. There are no partial deliveries in the trawl EM program.

Pacific States Marine Fishery Commission	**BS CV**	**GOA CV**	**GOA tender**
Trips not yet reviewed (as of May 3, 2024)	409	188	NA
Trips Reviewed	784	267	NA
Hauls Reviewed	2211	525	NA
Unique Vessels Reviewed	47	23	NA
Of reviewed trips, video was incomplete	38	13	NA
Of reviewed trips, EM review was affected by incomplete video	17	5	NA

Saltwater Inc.	**BS CV**	**GOA CV**	**GOA tender**
Trips not yet reviewed (as of April 3, 2023)	NA	NA	NA
Trips Reviewed	NA	201	37
Hauls Reviewed	NA	344	37
Unique Vessels Reviewed	NA	10	7
Of reviewed trips, video was incomplete	NA	21	1
Of reviewed trips, EM review was affected by incomplete video	NA	18	1

Figure 4-1. -- Image quality of EM video for reviewed hauls 2021-2023, as reported to NMFS by PSMFC reviewers. The video quality of each haul is assessed as either high, medium, or low-or-unusable. Overall image quality continued the improving trend in 2023.

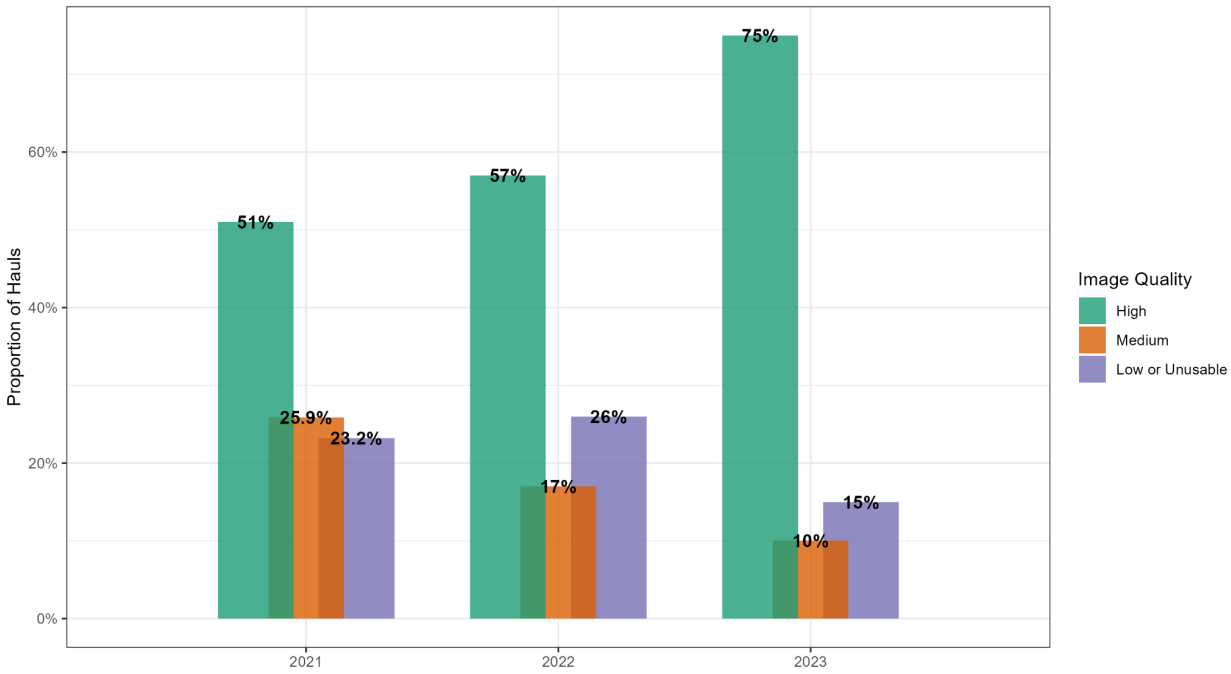


Figure 4-2. -- Proportion of trips with at least one issue reported by PSMFC video reviewers, 2020-2023, as reported to NMFS by PSMFC reviewers.

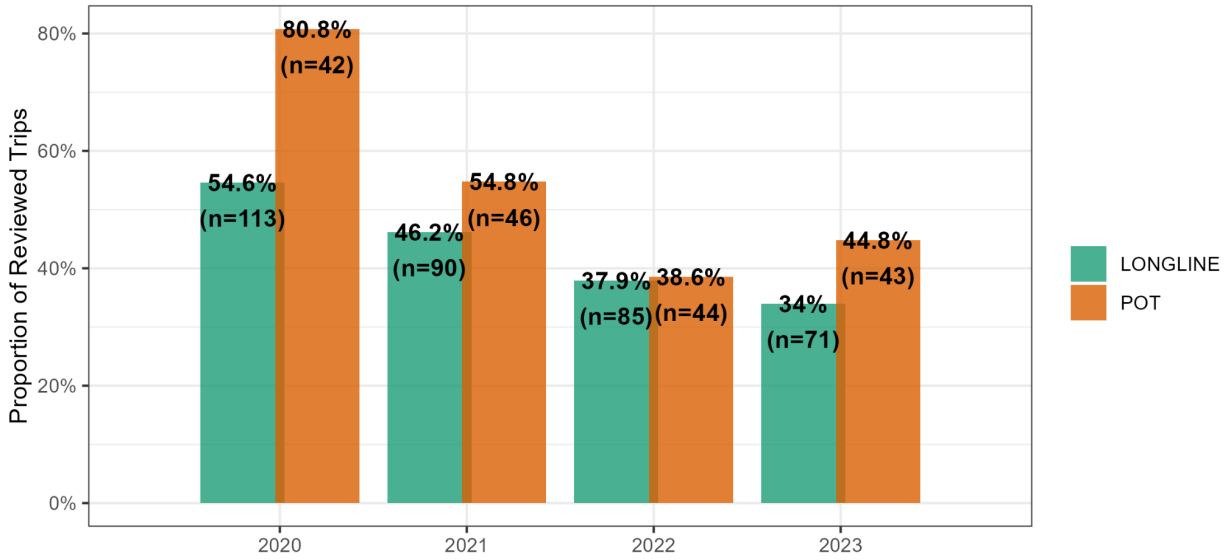


Figure 4-3. -- Proportion of fixed gear (pot and longline) vessels in each bin of EM system logged issues per selected trip. The general trend has been a decrease in the proportion of vessels with multiple issues per selected trip, and an increase in the proportion of vessels with 0-1 issues per selected trip

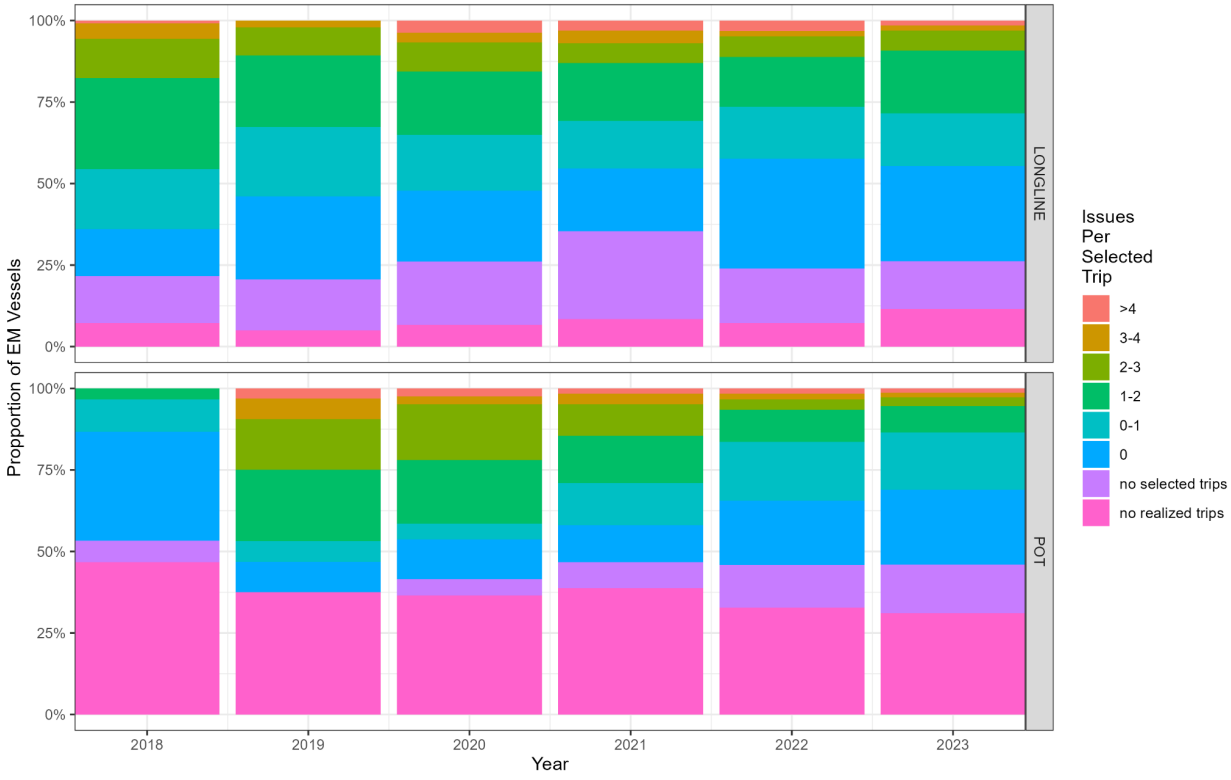
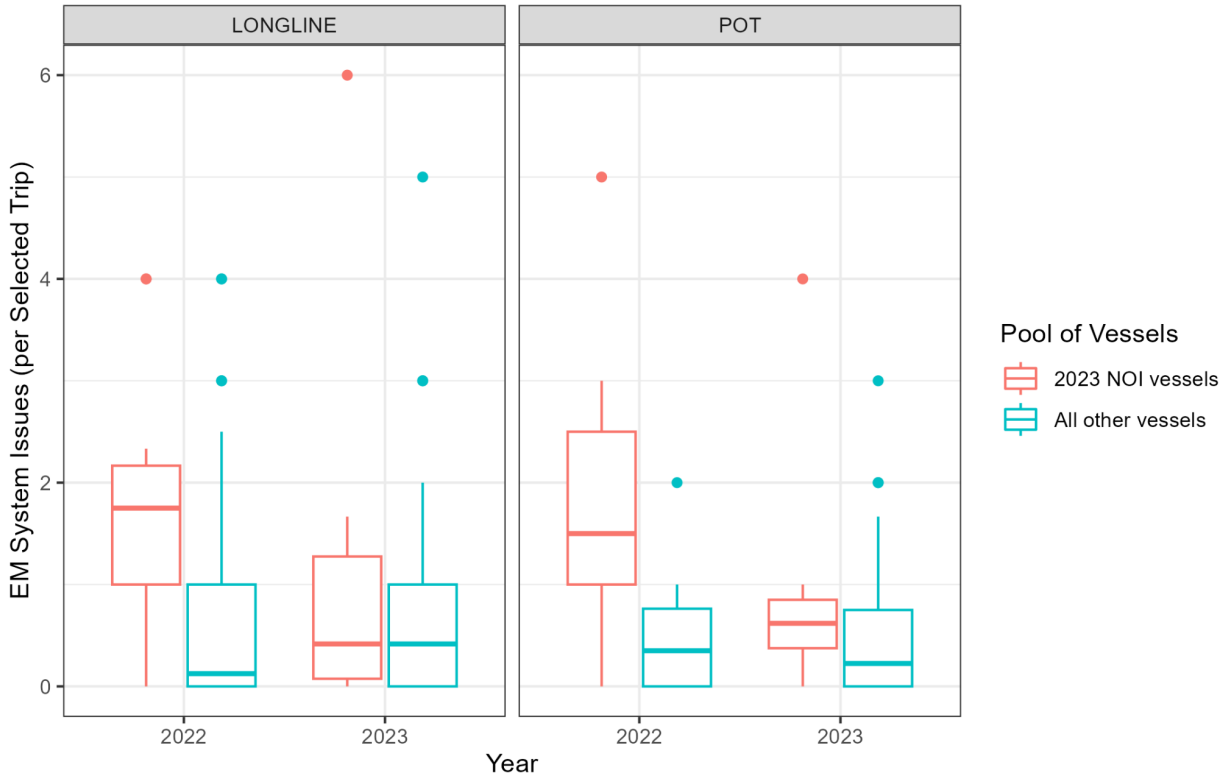


Figure 4-4.-- EM system issues per selected trip for 2023 Notice of Improvement Pool (NOI) vessels and all other vessels. NOI letters were sent out based in part on issue rates from 2022. Overall the NOI pool performed better in 2023 indicating some success of the NOI letter process.



5. Compliance and Enforcement

This chapter provides a review of the collaborative efforts between NOAA's Office of Law Enforcement Alaska Division (OLE), the Fisheries Monitoring and Analysis Division of the Alaska Fisheries Science Center (FMA), the fishing industry, and other partners in 2023. It is concerned with reports of potential and prosecuted law violations associated with fishing under federal jurisdiction in the Alaska Exclusive Economic Zone.

5.1. What are potential maritime law violations?

5.1.1 Terminology

A Violation of maritime law occurs when an individual or entity (such as a vessel or processor) commits an act that is prohibited by NMFS or USCG regulations.

A Complaint is a report of a *potential* violation. Complaints can be reported to enforcement at any time. Observers, the FMA, industry, or members of the community can report complaints. When a complaint is reported by an observer, it is typically documented in a "statement".

A Statement is the documentation of potential violations by an observer to the FMA, typically during debriefing. Multiple statement headings can categorize potential violations. A single statement may report one or multiple occurrences of the same potential violation, or it may report occurrences of different violation types falling under the same category.

An Occurrence is a specific instance of a potential violation within a statement. A statement may consist of one or many occurrences.

An Assignment, or observer assignment, is a unit of measure for analysis of some statement types represented by a combination of an observer and a unique vessel or plant.

A Cruise is used to define the deployment period for an observer. A cruise deployment period can last up to 90 days (not including debriefing) and may contain many individual vessel/plant assignments, but is generally limited to four assignments unless an additional-boat waiver has been requested by the provider and approved by NMFS.

A Unit is the time and/or spatial level at which an occurrence of the potential violation was observed (Table 5.2). A unit can be a "deployment day", "trip", "haul", or "offload", depending on the potential violation type. Units are a component of data collection added in the OLE database in 2023.

An Incident consists of one or more statements that, after review by the OLE, are deemed to contain a potential violation. Not all statements result in incidents: for example, some incidents contain no violation and many are recorded for information purposes only. The OLE logs enforcement responses as incidents into an electronic case management database. An incident that is forwarded for further examination is referred to as an "investigation". Multiple statements

may be investigated under a single incident number, however not all incidents are forwarded for investigation.

An Investigation is an inquiry conducted by the OLE to determine if a violation has occurred.

A Case is the conclusion of an investigation that may result in enforcement action.

An Enforcement Action is the outcome of a case that holds the violator accountable. Levels of enforcement action include Compliance Assistance, Written Warning, Summary Settlement (monetary penalty), Notice of Violation and Assessment by the NOAA General Counsel Enforcement Section, or criminal prosecution.

ODDS is the Observer Declare and Deploy System, an online database application into which vessels or owners are required to log partial coverage trips and are selected at random for monitoring coverage.

eLandings is an online database application that processors use to report catch landings. It is jointly managed by NMFS, the Alaska Department of Fish and Game (ADF&G), and the International Pacific Halibut Commission (IPHC).

5.2. Reporting Process

The two primary report types that this chapter will describe are ODDS-related issue reports and observer reports of potential violations. ODDS-related issues are identified and tracked by FMA staff using information available in both ODDS and eLandings. They are reported to the OLE as they occur. A brief description of the observer reporting process follows.

Since 1990, observers have been required to accurately report any suspected violations that they witness. The basic unit for observers to report potential violations is in the form of statements. Statements are completed during an observer's debriefing, which is a data review and methods validation process that completes the observer's cruise. Statements are one component of that data collection. Prior to deployment, observers are trained in compliance monitoring. The FMA has stored statements in an electronic database since 1999 (hereafter "statements database"). Statements contain a record of the number of occurrences for each potential violation that happened during an observer's assignment on a vessel or at a processor. Each potential violation that an observer witnessed and documented may have multiple occurrences. For example, a statement written for the action of "a failure to conduct safety drills" may be recorded once during a 90-day period in which the observer was on a large catcher processor vessel, resulting in one statement with one occurrence of a potential violation. Conversely, a potential violation of "failure to notify" the observer prior to bringing fish on board may be recorded for each haul during a three-day period the observer was on a partial coverage vessel, resulting in several occurrences for the one statement.

The OLE works closely with the FMA and observer providers to address incidents that affect

observer safety, sampling, and work environments. The electronic format of observer statements allows for efficient transfer of information to the appropriate authorities (OLE and USCG). Every statement received by the OLE is first evaluated and prioritized. Then, OLE Officers and Agents investigate the most egregious complaints to identify if violations have occurred and to determine the appropriate level of response. Some investigations become "cases" that are pursued further by the OLE. The OLE also utilizes observer statement data to track compliance trends and makes subsequent adjustments to training, outreach, and operations.

A detailed description of the enforcement partners in Alaska and their respective roles - including the NOAA Office of Law Enforcement (OLE), the US Coast Guard, and the Alaska Wildlife Troopers - can be found in the 2021 version of this report (AFSC and AKRO 2022, section 4.2).

A review of the type, frequency, magnitude, and drivers of observer-derived statements of potential violations with maritime law during 1999-2020 has been completed and provides a historical account of these data in the North Pacific (Faunce et al. 2023).

5.3. Changes from prior reports

5.3.1 New observer statement database

Historically, there were numerous inefficiencies and shortcomings to the way observer statements were electronically collected and stored. The workflow was time consuming for an observer to manually type all the pertinent information into a text box. Text boxes are not standardized, making statements difficult to query and summarize. While the statement was assigned a category during documentation, not all statement categories assigned to observer statements were informative, because they did not describe the potential violation. This was especially true for regulatory packages pertaining to Limited Access Programs. For example, the statement category "Limited Access Programs" contains subcategories of "Amendment 91" and "Amendment 80", which did not provide insight into the potential violation. Within each "Limited Access Program" category, there are often many pertinent regulations. Quantifying the number of statements that relate to "A80" is not as informative as quantifying the number of statements of an illegal action defined in regulations (e.g., "Operational Requirements - Catch Weighing"). An observer's ability to precisely define a potential violation, record the details, recall the details during debriefing, and correctly submit a statement is subject to considerable variation because there are so many regulations with reporting requirements for observers (Faunce et al. 2023). Furthermore, trends useful to policy makers and law enforcement were hard to discern because of the lack of rigor in the way that the number of occurrences in each statement was recorded. Finally, in the former system, statements could not be prepared by a witness of a potential violation or for non-standard locations (i.e., not the assigned plant or vessel).

To address these shortcomings, an updated interface and new database were co-developed by

staff from FMA and the OLE starting in October 2019. Programming began in 2020 with financial support from the National Catch Share Program, and the new database system (hereafter "new database") was deployed on July 19, 2023. The new database is maintained by the Fisheries Monitoring and Analysis Division of the Alaska Fisheries Science Center (FMA).

The new database has the potential to improve the accuracy and timeliness of observer reporting of potential violations due in part to the following implemented improvements:

1. The OLE worked closely with the FMA to develop new statement categories and statement types (or subcategories) that align better with regulatory language and are descriptive of specific behaviors and actions, thereby increasing transparency and comprehension of future summaries (Figure 5-1). As previously noted a good example of this is the new category → subcategory "Operational Requirements → Catch Weighing".

2. OLE and FMA staff identified 460 regulations that pertain to maritime law and observers. These included regulations that were not previously used in the "old" system. After additional filtering to remove those that did not apply to observers in 2023 or did not require an observer for reporting (i.e., the information is available from other sources), the resulting number of possible regulations that were active in 2023 was 451. For each regulation, staff identified an applicability code. The code allows for an efficiency gain for observer time and effort, and it ensures that statements are only reported under applicable categories and regulations. This was achieved by leveraging the observer's data in the process of writing a statement. Under the new database design, the type of vessel and fishing operations observed are stored and used to filter and present to the observer only those questions that pertain to regulations that apply to the observer's cruise being debriefed.

3. Each potential violation now carries a unit. These include easily recognizable items such as "days", "hauls", and "samples" (Table 5-2). When an observer writes a statement, the observer selects from a short list of possible units that could exist during their cruise and apply to the potential violation. For example, a statement where the observer selects three specific hauls for a potential violation (e.g., hauls #120, 121 & 122) would now appear as three occurrences, one for each of the three selected hauls. This enables the quantification of units per statement and eliminates ambiguity in the severity of the potential violation.

4. The new database allows observers to report potential violations that they witnessed being perpetrated against victims who might not self-report.

5. The new database allows for statements to be written for plants or vessels other than those an observer was assigned to, or without a plant or vessel entirely (e.g., for issues related to their employer).

6. Most of the statement elements are auto-populated or use select-lists (e.g. the observer name, vessel, dates, violation type, units affected). This saves time and prevents

keypunch mistakes because observers no longer need to write much of the statement text.

5.4. Data Analysis

5.4.1 Data Treatment

The mid-year rollout date (July 19, 2023) of the new database created challenges for reporting. Due to the changes in data collection methods, the focus of this report is to demonstrate how the improved database has interrupted the historical time series of potential violation reporting, and where the new system can be used to compare with historical data appropriately. In cases where there were fewer than three observer vessel/plant assignments available for summary, those summaries were excluded to protect the identity of individual observers or vessels. In 2023, observers who debriefed prior to July 19th reported statements in the former database under the former categories and are labeled in this chapter as "OLD". Observers who debriefed on or after July 19th reported statements in the new system under the new categories and are labeled as "NEW" in this chapter. Statements and rates (in terms of occurrences per statement, occurrences per assignment, and occurrences per 1000 deployed days) from 2022 are compared to 2023 statements and rates as entered into the former database ("2023 old") and 2023 statements and rates as entered into the new database ("2023 new"), to determine short-term trends.

5.4.2 Changes in observer statement categories and statement types

Observer statements were queried separately from both the former statements database and the new database to include only those statements that occurred during 2023. Translations from the new categories to the old categories were made to allow for comparison of data contained within the two systems. Quantitative alluvial plots were constructed to illustrate the way that the old database and new database categorized statements (Figure 5-1, Figure 5-2, Figure 5-3). Any statement type or category that had fewer than three records were not included in the figures to preserve confidentiality. Alluvial plots are read left to right, and depict different colors "flowing" from the left columns to the right. The height of each horizontal color is proportional to the number of statements.

The number of statements identified by statement type and category in 2023 prior to the new system are depicted in Figure 5-1. The categories "All Other Statement Types" and "Coast Guard" contained relatively high numbers of statements, specifically of the statement types "Record Keeping and Reporting" and "Marine Casualty", respectively.

Many more statement types exist in the new database, necessitating different plots for groups of categories. Figure 5-2 depicts the relationship between the old category, the new category and the new statement type for statements that were not related to observer safety or interpersonal conflict. Reading from top to bottom and left to right, we see that the old category "Coast Guard" is now listed as the new sub-category "MARPOL/Oil Spill" and that this divides into subcategories of "discharge of garbage or plastic, or loss of fishing gear" and "discharge of oil". Many more statements were written about trash than about oil, and this distinction was never

elucidated before. The “Limited Access Programs” category of the former database is now divided into “Gear/Equipment Requirements” and “Operational Requirements" with a few “Permits, Documents and Recordkeeping” (Figure 5-2). New statement types clearly describe the nature of the potential violation (e.g “Video Monitoring System”, “Monitoring the Flow of Fish”). The former category of “Protected Resource and Prohibited Species" was renamed “Prohibited Species, Marine Mammals and Seabirds”. However, under the old database system, statement types under this category included “Amendment 91 Salmon”; the new database system now includes the more descriptive statement “BSAI Salmon Bycatch” with clear reference to Amendment 91 regulations. The former category of “All Other Statement Types” has undergone substantial revision, completely eliminating the uninformative “Other” category. The old “Other” category is now divided into three new categories of five new statement types. Doing so revealed that, while most statements were about “General Reporting Requirements”, there were a substantial number of statements about “False Reporting”, “Unlawful Discard” and "Deployment Logistics” (Figure 5-2, bottom).

The OLE prioritizes issues involving observer assault, sexual assault, sexual harassment, harassment, and safety violations (NOAA 2023). Observers' role in reporting potential safety violations can exert a positive effect on the dangerous fishing industry which benefits all individuals who work on vessels or in processing plants. For these reasons, these categories are depicted separately. Here the former categories of “OLE Priority: Interpersonal” and “OLE Priority: Safety and Duties” have been combined into “Observer Safety and Work Environment”. A new statement type of “Intimidation, Bribery, and Coercion” was reported (Figure 5.3 upper right). “Observer Safety and Work Environment “and “Safety - USCG: Marine Casualty” were the most numerous categories in terms of observer statements related to OLE priorities (Figure 5-3). The former category of “Coast Guard” has been divided into four new categories and six statement types. Of particular note, new statement types for “Food and Accommodations”, “Notification” and “Reasonable Assistance” would have been categorized in the old database as “All Other Statement Types”.

5.4.3 Changes to the reporting of the number of occurrences.

Changes to the way that the number of occurrences are recorded between the former old system and the new system have broad implications for between-year comparisons. In the former database, the observer (with FMA staff member review) entered the number of occurrences for a statement as a single numeric entry, while under the new database, the actual sum of the units selected by the observer yields the number of occurrences for the statement. The formalization of the unit combined with the ability to select from actual observer data has resulted in changes to the mean number of occurrences for a statement. This trend exists when all statement categories are examined together (Figure 5-4, top) and when OLE priority statement types are examined (Figure 5-4, bottom). While Figure 5-4 illustrates that the number of occurrences per statement has increased overall when comparing 2023 data collected under the new database compared to that collected under the old database (as evidenced by the taller “box”), the greatest difference is

from the relative number of statements that had only one occurrence. Figure 5-4 illustrates on the right side of each boxplot the relative density of each value for the number of occurrences per statement, which is much smaller at the value of 1 for statements under the new database than under the former database. This direct comparison is provided in Table 5-3.

5.5. Sexual Assault, Sexual Harassment, and Hostile Work Environment

Comparisons between years and database systems cannot be made because the manner in which the number of occurrences per statement is recorded differs between the two systems. In the past, standardized rates of occurrences per 1000 observed days was presented as the metric. Unfortunately, the numerator in this calculation is the number of occurrences, which is greater per statement in the new database compared to the old.

To illustrate this point, the number of occurrences for 100 Vessel/Plant Assignments for four OLE priority statement categories collected under the former (2022 and 2023 OLD) and current (2023 NEW) databases are presented in Table 5-4. The rate for sexual harassment and Safety-NMFS in the new database for 2023 are 3-5 times the rates for 2023 from the old database. The incorrect conclusion could be drawn from Table 5-4 that sexual harassment and safety have greatly increased from the first half of 2023 to the second half of 2023. The reason this conclusion would be incorrect is that the mean occurrences for a statement between the old and new databases in 2023 show a 3-5x increase (Table 5-5) but the number of statements written between the old and new databases in 2023 do not show this magnitude of increase (Table 5-6). Taken together, these tables show that the increase in the occurrences per 100 vessel/plant assignments in Table 5-4 is due to the change in reporting accuracy in the number of occurrences from the old to the new system. What this implies is that past values for the number of occurrences and rates of sexual harassment, assault, and safety-NMFS were biased low (but note that trends in reporting are accurate, because this bias is consistent in the time series for the old database). Further evidence for this conclusion is that the average number of occurrences per statement for Marine Casualty do not show differences between the two databases in 2023. This is because Marine Casualties tend to be isolated, singular incidents (as opposed to the other types, which tend to be recurring), so changes to the number of occurrences seen in other categories as a result of the new database do not affect this statement type.

5.6. Trends over time

5.6.1 Trends in occurrence rates for fleet sectors

The number of statements (written documentation), occurrences (number of times something happened), and the resulting rates per vessel/plant assignment or per 1000 deployed days (derived from observer logistics data) were calculated for combinations of coverage type, vessel type, gear type, Management Program, and NMFS Region. Differences in reporting between the old system and the new system prevented combining those data at the subcategory level, so rates were calculated separately from each system. Although data collected in the new database have

new categories and statement types, these were converted to the former categories for consistency (Table 5-7 contains summary information from the statements entered into the old system during 2023, while Table 5-8 contains summary information from statements entered into the new system during 2023).

Comparing data from statements entered into the old and new databases should be carried out with extreme caution because of the differences in the way that the number of occurrences is recorded between the two databases. For this reason, the authors do not condone comparison of individual values between Table 5-7 and Table 5-8. However, similarities in the factors that had the greatest rates between the two databases does warrant specific mention, because its consistency despite differences in the number of occurrences per statement makes the trend robust. From Table 5-7 and Table 5-8, two consistent patterns were evident. In the first, the Full Coverage, Catcher Processor, Non-Pelagic Trawl, Amendment 80 sector operating in the Bering Sea and Aleutian Islands had the greatest number of observer deployed days, statements, and occurrences among all categories. This finding may not be too surprising if the number of statements are a consistent function of the number of observer deployed days. In the second trend, the Full Coverage, Catcher Processor, Pelagic Trawl sector operating in the Bering Sea and Aleutian Islands had the greatest rate of occurrences per plant or vessel assignment for OLE priority statements. Recall that in section 1.4 the values for the rate of occurrence were greatly changed by the database system but that for this statement category the number of statements written per assignment were not. This sector of the fleet did exhibit a greater than expected rate of statements of a highly sensitive nature for this reason and the fact that this sector did not have the greatest number of deployment days.

5.6.2 Trends in ODDS compliance issues

The Observer Declare and Deploy System (ODDS) facilitates the logging of trips in the partial coverage fleet, constructs a random sampling frame for observer and electronic deployment, and enables communication between the NMFS, fisheries monitoring providers, and the industry[20]. Each year, FMA staff track potential issues related to the ODDS that have the potential to bias resulting fishery monitoring data that the OLE takes very seriously. This information has not been included in this chapter since the 2018 Annual Report (AFSC and AKRO 2021). In 2018, standardized rates for reporting were introduced, and the section entitled "Observer Coverage Complaints" was dropped to focus on shortened reports in subsequent years. Here we include the complete time series of issues reported from the FMA to the OLE regarding the ODDS. Each record represents a vessel-trip combination. The number of records reported will fluctuate depending on the number of trips in partial coverage, the selection rate of different strata, the compliance rate of participating vessels, and the diligence paid to discovering potential issues. The number of records for each type of potential violation were divided by the total number of records for the year to yield a relative proportion for each type that should be comparable

[20] https://www.fisheries.noaa.gov/resource/tool-app/observer-deploy-and-declare-system-odds

between years.

Figure 5-5 illustrates the relative contribution of each type of potential ODDS violation (rows) each year (columns). Colors denote the relative contribution of each row within a year, while values in each cell denote the number of records. From this figure three trends are evident. First, vessels had problems identifying whether or not the trip would be delivering their catch to a tender vessel during 2017-2019. This issue stopped being recorded in 2019 because the definition of deployment stratum no longer separated tendering trips from non-tendering trips in Annual Deployment Plans after 2019. Second, failure to identify the correct gear type of an ODDS trip has increased in prevalence since 2020. This trend corroborates the rationale that was used to combine longline and pot gear into one fixed gear stratum for the 2024 Annual Deployment Plan (NMFS 2023). As a result of this new deployment stratification, "Incorrect Gear Type"is expected to stop being recorded, similar to the trend seen in "Incorrect Tender". Finally, the issue of "trip not logged" has been a consistently prevalent issue during the entire time series. Trips of this type occur when a landing occurs for which there has been no logged ODDS trip. The FMA will continue to share this information with the OLE for their use in outreach and compliance efforts.

5.7. Outreach and Compliance Assistance

5.7.1 Outreach

The OLE worked with industry groups providing outreach and education focusing on observer harassment, management program operational requirements, and general violations that impact observer data. Meetings were held with different fisheries groups, cooperatives, and individual companies. "Ensuring a Safe Work Environment for Observers" focused specifically on observer harassment and was often conducted in conjunction with routine meetings that covered potential violations reported on a specific company's fleet.

5.7.2 Compliance Assistance

When the OLE determines that there were mitigating circumstances present when a violation occurred, compliance assistance may be provided rather than issuance of a formal citation such as a Written Warning or a Summary Settlement. Mitigating circumstances may include the violation being a single isolated incident, a generally low violation history for the vessel/processor or vessel operator/plant manager, the immediate identification of the violation and immediate attempts to rectify the issue, re-training of the involved crew, and/or working with the observer to correct any impacted data or duties. The OLE may not consider providing compliance assistance when aggravating circumstances are present such as multiple violations, repeat offenses, low effort to prevent or resolve violations, no attempts to train crew, and egregious impacts on observer duties and data. The OLE will not provide compliance assistance for instances of sexual assault or sexual harassment of observers; the OLE will take enforcement action in all substantiated cases of SASH.

5.8. Enforcement Operations and Actions

5.8.1 Enforcement Operations

The OLE conducted its annual Observer Operation in the port of Dutch Harbor from January 30 to February 24, 2023. Four Special Agents participated in this operation. The Workplace Violence Prevention and Response (WVPR) West Coast Regional Coordinator also participated in this operation for two weeks. The operation began with 25 open investigations involving 97 statements initiated through observer complaints. Throughout the operation, additional investigations were initiated as the Special Agents interacted with observers in the field; this enabled observers to disclose potential violations to the OLE immediately. New potential violations were also detected during the investigations. After the operation, there were a total of 47 investigations with 190 statements. Out of the 190 individual statements, 35 were resolved immediately, and investigators made contacts and furthered the investigations of 135 complaints. Of the 35 resolved statements, 32 were addressed with the offending party through compliance assistance provided due to mitigating circumstances that did not warrant enforcement action, 2 were unfounded, and 1 was closed due to a lack of evidence. While the OLE conducted investigations, the WVPR coordinator met with multiple observers and vessel management to discuss victim advocacy services and training. Overall, observers and vessel personnel alike recognized the WVPR coordinator and the OLE investigators, which assisted in communications.

5.9. Written Warnings, Summary Settlements, Cases Forwarded for Prosecution

5.9.1 Written Warnings

When compliance assistance is not appropriate for a substantiated violation, a Written Warning is the lowest level of formal enforcement action taken. In 2023, the most common reason a Written Warning was issued was for record-keeping and reporting violations. The second most common reason a Written Warning was issued involved failure to retain IFQ species. Written Warnings were also issued for safety issues, failure to provide reasonable assistance, failure to notify 15 minutes prior to fish being brought on board, prohibited species mishandling, marine mammal feeding, creating a hostile work environment, and sexual harassment.

5.9.2 Summary Settlements

A Summary Settlement, which consists of a monetary penalty, may be offered for substantiated violations where a Written Warning may be inadequate due to aggravating factors such as multiple instances of the same violation, additional violations of a different nature, no attempts to rectify the behavior, an increased impact on an observer and their duties, or an impact of the resource. The most common violation where Summary Settlements were offered involved halibut deck sorting operations. Multiple Summary Settlements were also offered for violations

specific to management programs such as Amendment 80, AFA, and halibut and sablefish IFQ. Fleetwide, Summary Settlements were offered for record-keeping and reporting violations and prohibited species mishandling. There were multiple Summary Settlements offered for violations that directly impacted observers and their ability to complete their duties; these violations involved interference with sampling, failure to provide reasonable assistance, restricting access, tampering with observer's personal effects, inadequate accommodations, and failure to notify the observer 15 minutes prior to fish being brought onboard. Additional Summary Settlements were offered for safety issues, IR/IU violations, and marine mammal feeding.

5.9.3 Cases Forwarded for Prosecution

In 2023, several cases were forwarded to the Office of General Counsel's Enforcement Section for prosecution. These cases involved intentional misreporting of haul and set data, interference with the observer's ability to sample specifically relating to salmon bycatch in the Gulf of Alaska, failure to adhere to Amendment 91 salmon bycatch requirements, failure to adhere to operational requirements under the Amendment 80 program, and sexual harassment of fishery observers.

5.9.4 Cases Charged by the Office of General Counsel Enforcement Section

AK2106551; C/P Cape Horn– Operator Ata Ioapo was charged under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) with sexually harassing a female observer by grabbing her buttocks without consent. A $24,000 NOVA was issued.

AK2300579; F/V Alaskan Star– Owners Alaskan Star Fisheries, LLC, Sunrunner Alaska Corp., and Moriah Fishing, Inc., Operator Abraham Brendan Sullivan, and Vessel Manager James Aaron Stevens were charged under the Magnuson-Stevens Act with failing to log four fishing trips in the Observer Deploy and Declare System (ODDS). A $12,000 NOVA was issued.

AK2003678; F/V American Dynasty– Medic Daniel Craig Azcarate was charged under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) with sexually harassing a female fisheries observer. A $36,000 NOVA was issued.

Table 5-1. -- New statement category groups, and the number of subcategories and applicable regulations in each group..

Statement Category Group	# Sub-categories	# Applicable Regulations
OBSERVER SAFETY AND WORK ENVIRONMENT	9	17
SAFETY-USCG-MARINE CASUALTY	1	1
SAFETY-USCG-EQUIPMENT	3	16
SAFETY-USCG-FAIL TO CONDUCT DRILLS OR SAFETY ORIENTATION	1	2
INTERFERENCE WITH DUTIES	5	22
GEAR/EQUIPMENT REQUIREMENTS	10	85
PROHIBITED SPECIES/MARINE MAMMALS/SEABIRDS	8	106
SUSTAINABLE FISHERIES	5	36
OPERATIONAL REQUIREMENTS	21	105
PERMITS/DOCUMENTS/RECORD KEEPING AND REPORTING	6	33
MARPOL/OIL SPILL	2	2
CONTRACTOR REQUIREMENTS	5	26
Total	***76***	***451***

Table 5-2. -- Unit types for occurrences in observer statements in the new database.

Unit Type	Definition	Applicability
Day(s)	The calendar day the potential violation occurred.	· Harassment violations · Any requirement, such as flow scale tests, that has to be completed in a 24-hour period · Many sample station, video monitoring, and scale violations
Haul(s)/Set(s)	The haul in which the violation occurred.	For violations that occur at the haul level, such as failure to notify.
Sample(s)	The haul and sample in which the violation occurred.	For violations that occur at the sample level, such as sample bias.
Offload(s)	The offload in which the potential violation occurred.	For plant observers monitoring or sampling offloads; or for CV observers monitoring offloads.
Trip(s)	The trip on which the potential violation occurred.	Violations that do not require a more specific unit, or where having a more specific unit would not be practical, such as: · Not notifying NMFS of pre-cruise · Failing to have seabird avoidance gear · (mostly violations that could be taken care of before the vessel leaves port).
Bird(s) or Marine Mammal(s)	The number of individual animals that were adversely affected by the potential violation.	Protected Resource violations, specifically seabird violations or marine mammal violations directed at one or more animals.
Deployments	The deployment in which the potential violation occurred.	This is the broadest unit and it is mostly applicable to observer provider violations.

Table 5-3. -- Proportion of statements with only one occurrence collected under the former (2022 and 2023 OLD) and current (2023 NEW) databases..

	2022	2023 OLD	2023 NEW
All Categories	0.6	0.606	0.418
OLE Priority: Interpersonal	0.663	0.649	0.417

Table 5-4. -- Occurrences Per 100 Vessel/Plant Assignments for four OLE and FMA priority statement categories collected under the former (2022 and 2023 OLD) and current (2023 NEW) databases..

	2022	2023 OLD	2023 NEW
Sexual Harassment	3.24	1.82	10.89
Assault	1.45	0.18	1.49
Marine Casualty	17.99	20.55	15.84
Safety-NMFS	12.36	16.91	63.04

Table 5-5. -- Mean occurrences for a statement for four OLE and FMA priority statement categories collected under the former (2022 and 2023 OLD) and current (2023 NEW) databases.

	2022	2023 OLD	2023 NEW
Sexual Harassment	2.24	1.43	6
Assault	2.43	1	4.5
Marine Casualty	1.57	1.55	1.57
Safety-NMFS	1.91	4.65	14.69

Table 5-6. -- Number of statements written per 100 plant or vessel assignments for four OLE and FMA priority statement categories collected under the former (2022 and 2023 OLD) and current (2023 NEW) databases.

	2022	2023 OLD	2023 NEW
Sexual Harassment	1.45	1.27	1.82
Assault	0.6	0.18	0.33
Marine Casualty	11.42	13.27	10.07
Safety-NMFS	6.48	3.64	4.29

Table 5-7. -- Deployment days and statement occurrence rates for the unique fishery factor combinations recorded in the former database during 2023. The highest value in each column within each statement category group is highlighted in yellow/red, for easy reference.

Factor Combinations					Sum Totals				Statement Category Group and Incident Occurrence Rate						
									OLE Proirity: Inter-Personal		OLE Priority: Safety and Duties	Coast Guard	Limited Access Programs	Protected Resource & Prohibited Species	All Other Statement Types
Coverage Type	Vessel Type	Gear Type	Manage-ment Program	NMFS Region	Vessel/Plant Assignments	Deployed Days	Statements (all categories)	Occurrences (all categories)	Occurrences per Vessel/Plant Assignment	Occurrences per 1000 Deployed Days					
FULL	CP/MS	HAL	CDQ	BSAI	7	129	1.1	11.7	0.054	2.9	43.9	1.1	35.1	1.2	6.8
			OA	BSAI	33	1598	27.7	210.8	0.231	4.8	43.4	9.3	54.1	6.5	13.8
				GOA	3	44	0.3	1.5	0	0	0	0	0	33.5	0
		NPT	A80	BSAI	76	4837	128.8	655.3	0.863	13.6	4.5	20.1	41.9	9.6	45.9
			CDQ	BSAI	36	648	15.8	52.8	0.02	1.1	1.6	15.2	16.5	39.1	7.9
			OA	BSAI	35	831	30.3	154.3	0.087	3.7	7.4	19	22	125.4	8.2
				GOA	7	144	1.4	1.8	0.09	4.4	3.7	3.7	0.8	0	0
			RPP	GOA	6	53	1.2	1.2	0	0	8.8	10.3	1.5	0	1.5
		POT	CDQ	BSAI	4	113	2.6	5.5	0	0	8.5	35.3	3.7	1.3	0
			OA	BSAI	3	52	1.8	1.9	0	0	0.8	19.5	0	16.4	0
		PTR	AFA	BSAI	37	1998	47.5	474	0.678	12.5	0.7	14	14.1	181.4	14.4
			CDQ	BSAI	25	587	13.5	276	1.877	80	1.2	13.5	42.1	271.8	61.6
	CV	NPT	OA	BSAI	15	184	2.7	3.6	0.112	9.2	0	6.5	0	0	4
			RPP	GOA	22	189	2	2	0	0	0	10.7	0	0	0
		PTR	AFA	BSAI	35	1245	24.3	35.4	0.295	8.3	0.8	6.3	0.8	2.4	9.9
			RPP	GOA	24	281	2	2	0	0	0	3.5	0	0	3.6
	PLANT		AFA	BSAI	45	1733	37.8	131.7	0.108	2.8	4.6	3.8	12.9	5.6	46.3
			OA	BSAI	18	146	2.6	5.6	0.003	0.4	5.7	5.6	17.5	2.5	6.6
				GOA	23	648	6.5	10.8	0.004	0.2	0.4	0.8	0	4.6	10.6
PARTIAL	CV	HAL	IFQ	GOA	77	448	23.4	88.8	0.026	4.5	0	15.4	33.5	26.8	118
			OA	GOA	6	21	1	2	0	0	0	95.2	0	0	0
		NPT	OA	BSAI	26	129	8.7	22.7	0	0	0	50.6	0	43.4	81.7
				GOA	43	150	16.5	44.8	0.116	33.3	73.3	20.7	0	22.8	148.3
		POT	IFQ	BSAI	8	55	0	0	0	0	0	0	0	0	0
				GOA	69	513	12.6	57.2	0	0	1.9	29.4	7.8	0	72.4
			OA	BSAI	10	86	5	20	0	0	0	11.6	0	0	220.9
				GOA	9	41	5	45	0	0	0	0	0	0	1097.6
		PTR	OA	GOA	46	283	19.8	21.6	0.022	3.5	3.5	8.3	0	24.7	36.1

Table 5-8. -- Deployment days and statement occurrence rates for the unique fishery factor combinations recorded in the new database during 2023. The highest value in each column within each statement category group is highlighted in yellow/red, for easy reference.

Factor Combinations					Sum Totals				Statement Category Group and Incident Occurrence Rate						
									OLE Proirity: Inter-Personal		OLE Priority: Safety and Duties	Coast Guard	Limited Access Programs	Protected Resource & Prohibited Species	All Other Statement Types
Coverage Type	Vessel Type	Gear Type	Manage-ment Program	NMFS Region	Vessel/Plant Assignments	Deployed Days	Statements (all categories)	Occurrences (all categories)	Occurrences per Vessel/Plant Assignment	Occurrences per 1000 Deployed Days					
FULL	CP/MS	HAL	CDQ	BSAI	22	494	6.9	21.3	0	0	4.3	29.3	7.4	0	2
			OA	BSAI	40	2029	35.1	320.8	0	0	0.5	63	60.5	6.9	27.3
				GOA	4	73	1.5	2.1	0	0	11.9	3.3	0	13.7	0
		NPT	A80	BSAI	93	3821	96.9	1448.3	0.313	7.6	30.3	103.2	128.4	40.7	68.9
			CDQ	BSAI	49	609	11.5	101.6	0.047	3.7	22.4	40.2	84.9	8.4	7.2
			OA	BSAI	39	685	10.1	68.3	0.008	0.5	13.3	28.6	39.8	8.3	9.3
				GOA	16	239	3.9	32.7	0.093	6.3	52.3	5.5	69.8	2.9	0
			RPP	GOA	10	357	5.6	48	0.077	2.2	0	6.8	125.6	0	0
		POT	CDQ	BSAI	6	133	3.5	129.4	0	0	0	15.7	917.3	0	39.7
			IFQ	BSAI	6	153	1.9	5.6	0	0	0	3.8	4	0	28.7
			OA	BSAI	4	104	4.6	6.6	0	0	19.2	44.5	0	0	0
		PTR	AFA	BSAI	40	2123	41.3	974.9	0.518	9.8	0	35.5	254.8	108.3	50.8
			CDQ	BSAI	23	504	8.7	161.1	0.142	6.5	0	58.7	8	163	83.6
	CV	NPT	RPP	GOA	12	85	1	1	0	0	0	0	0	11.8	0
		PTR	AFA	BSAI	39	1566	12	130	0	0	0	1.3	12.8	1.3	67.7
			RPP	GOA	15	108	1	4	0	0	37	0	0	0	0
	PLANT		AFA	BSAI	64	1776	27.5	1309.4	0.16	5.8	84.5	0	294.9	143.8	208.4
			OA	BSAI	5	28	1	90.5	0.2	35.8	500	0	1513.8	20.1	1161.9
PARTIAL	CV	HAL	IFQ	BSAI	16	208	10.2	379.5	0	0	0	4.8	0	0	1819.9
				GOA	148	865	42.6	289.3	0.182	31.2	71	52	0	6.9	173.4
		NPT	OA	BSAI	4	17	0	0	0	0	0	0	0	0	0
				GOA	14	63	1.8	20.8	0	0	0	0	0	317.5	12.7
		POT	IFQ	BSAI	11	54	12.1	30.3	0.455	92.6	18.5	129.6	0	0	319.6
				GOA	51	340	29	184.8	0.118	17.6	51.8	53	0	0	421.2
			OA	BSAI	6	71	5	35	0	0	0	239.4	0	0	253.5
		PTR	OA	GOA	40	200	4.2	14.2	0	0	20	50	0	0	1

Table 5-9. -- Status of Statements and Incidents. The status 'Ongoing' typically involves complex investigations while 'No OLE Action' includes incidents forwarded to another agency, incidents determined not to be a violation after an investigation, incidents that were closed due to a lack of personnel to conduct an investigation, and incidents closed as 'info only'. A statement may be closed as 'info only' if the observer and vessel operator's communication about a potential violation results in voluntary compliance at sea or if the potential was self-reported.

Statements	Incidents	Incident Statuses
630 Statements received and reviewed in 2023 64 statements did not document an actual violation 566 statements were forwarded to agents and officers	207 new incidents created (546 statements) 20 statements were added to 9 open incidents	69 Ongoing (249 statements) 7 Forwarded for prosecution (15 statements) 14 Written Warnings issued (20 statements) 23 Summary Settlements issued (67 statements) 31 Compliance assistance provided (90 statements) 72 Closed - No OLE Action (125 statements)

* As of 4/26/2024

Figure 5-1. -- Alluvial plot of 437 non-confidential statements reported by observers during 2023 prior to the new database. The color and vertical height of each box in a column depict the number of statements.

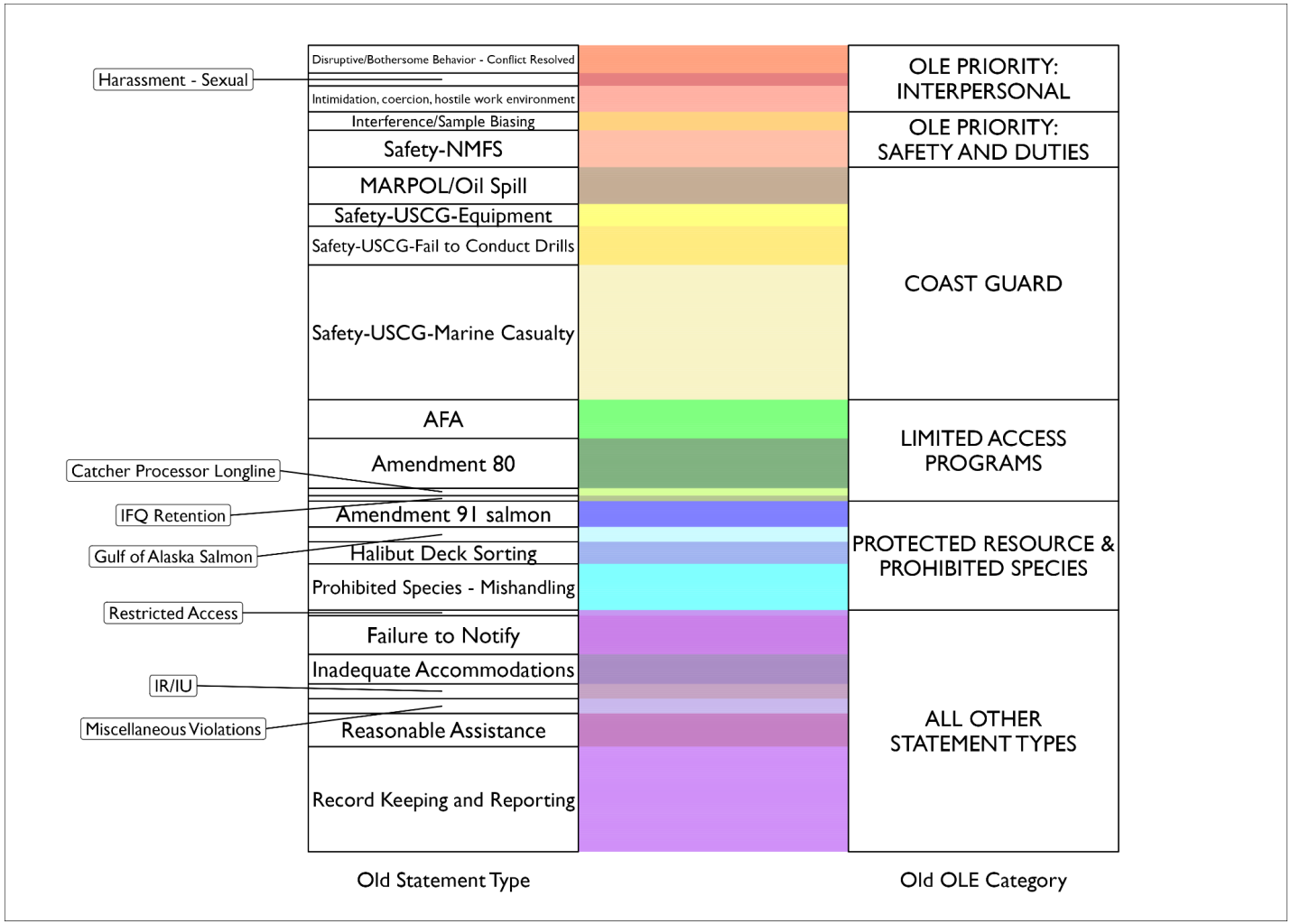


Figure 5-2. -- Alluvial plot of 220 non-confidential statements related to non-safety and OLE priority categories as reported by observers in the new database from July 19 to December 31, 2023. The relationship between the old category and new category are depicted as well as how they map to the new statement type. The color and vertical height of each box in a column depicts the number of statements

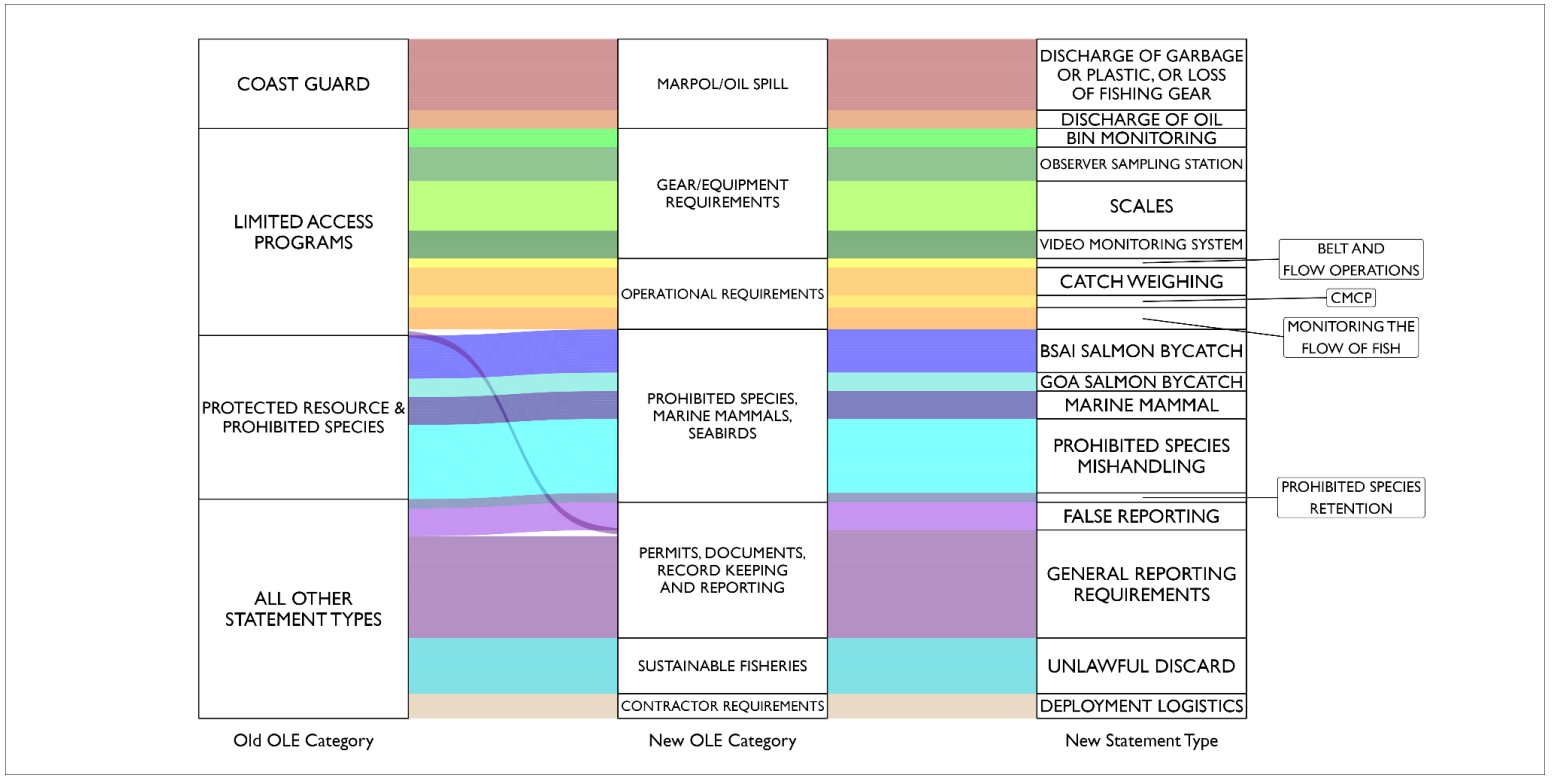


Figure 5-3. -- Alluvial plot of 172 non-confidential statements related to safety and OLE priority categories as reported by observers in the new database from July 19 to December 31, 2023. The relationship between the old category and new category are depicted as well as how they map to the new statement type. The color and vertical height of each box in a column depicts the number of statements.

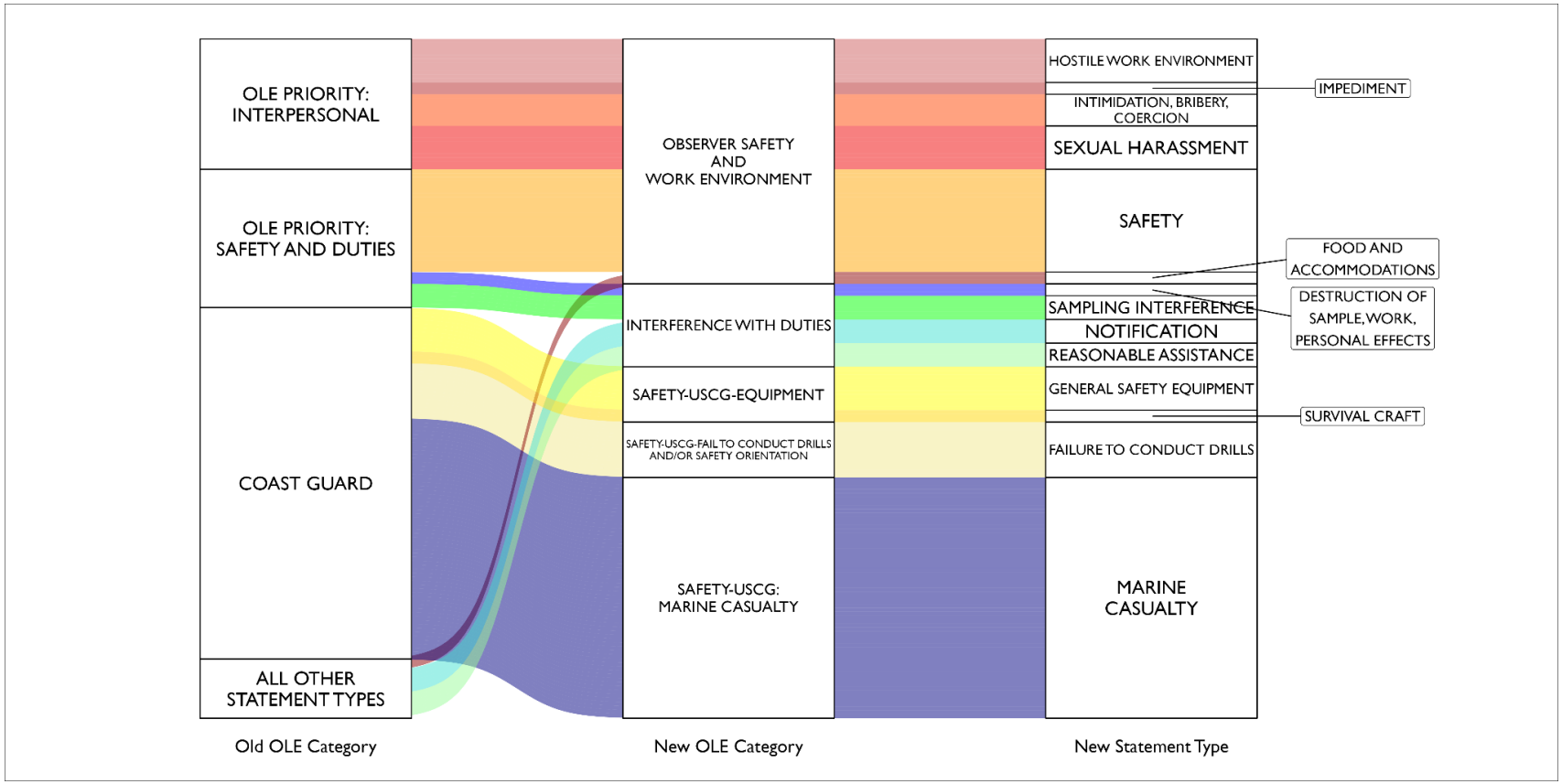


Figure 5-4. -- The distribution of the occurrences per statement under the former (OLD) and current (NEW) databases for 2022 and 2023. The vertical "y" axis is presented in log scale. Each column has data depicted in three ways. On the left side are the actual values depicted as open circles. In the center are box plots showing the "middle 50%" of the distribution with a black horizontal line at the median (50% percentile). Lines extending from the filled boxes denote 1.5 times the size of the box, or interquartile range. On the right are the relative densities of the distribution - the wider the density, the more data is contained within it.

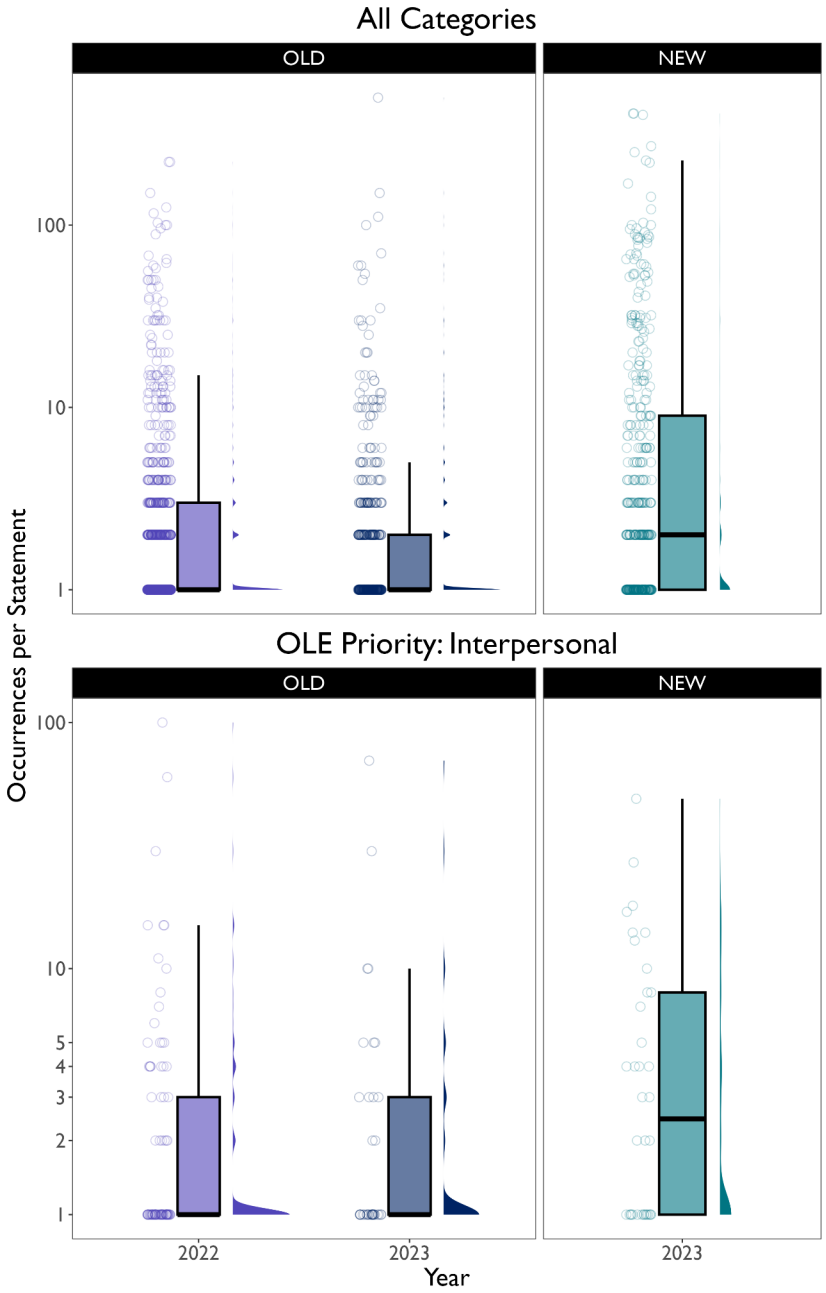
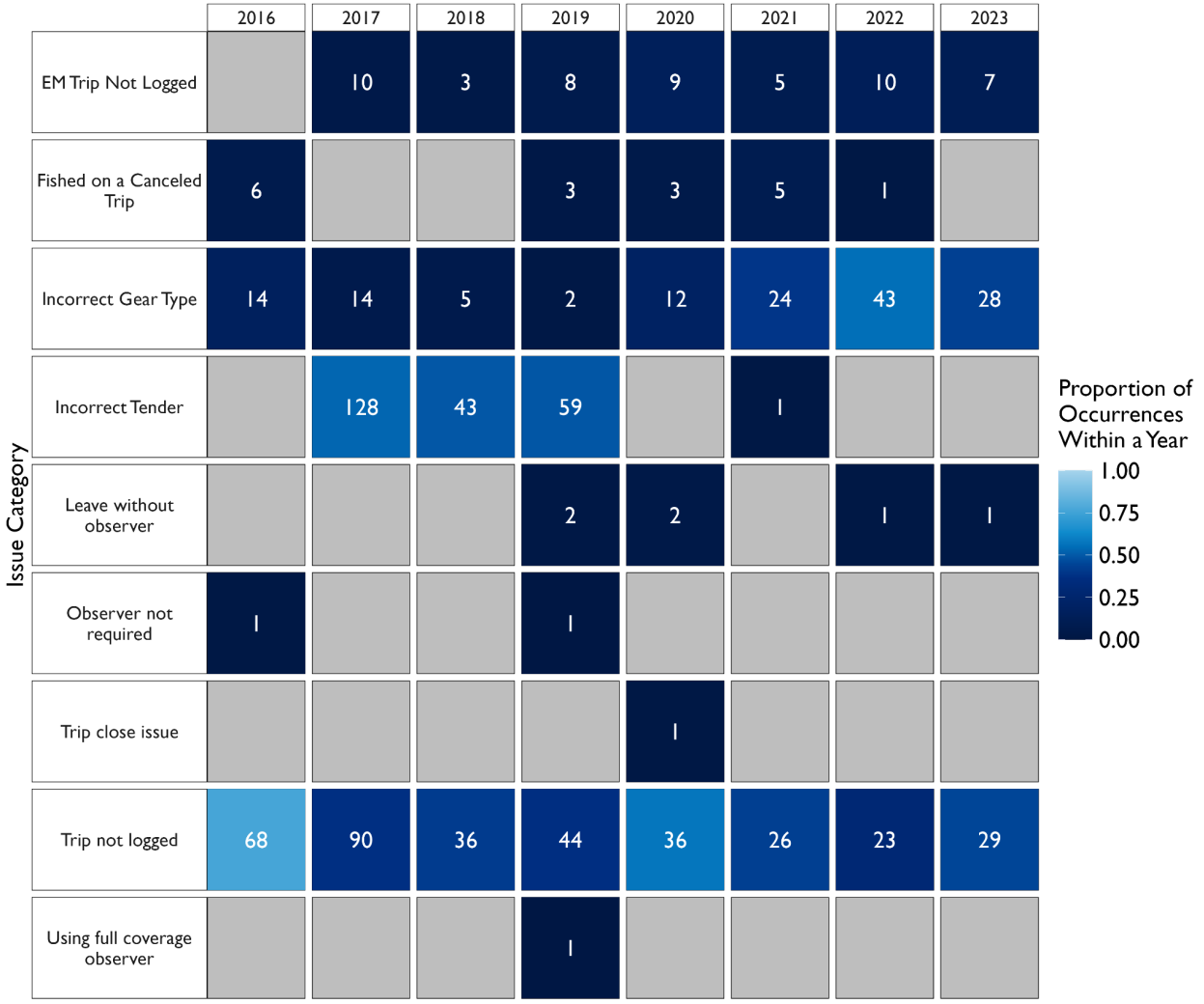


Figure 5-5. -- The types of potential violations reported by FMA staff to the OLE regarding partial coverage trip logging and the ODDS. The number in each cell represents the number of reported potential violations (each record is a vessel and trip combination). These values are not directly comparable between years because a variety of factors affect them. The color in each cell represents the relative proportion of trips in a year, and are comparable between years.



6. NMFS Recommendations

NMFS recommends the following for the 2025 Annual Deployment Plan:

Deployment Design:

- NMFS recommends the continued use of the Proximity allocation method for the partial coverage strata (with the exception of trawl EM) in 2025. Doing so will provide consistency in deployment and allow NMFS to collect data for a full review of the method in the 2025 Annual Report.
- For the Trawl EM stratum in the BSAI, all offloads from Trawl EM trips are to be sampled for salmon, halibut, and biological data, In the GOA, NMFS recommends maintaining the status quo sampling rate where 33% of EM deliveries are sampled by shoreside fishery observers. In the future NMFS may recommend using the same allocation method (e.g. Proximity) for the GOA Trawl EM stratum as other partial coverage strata; however, maining status quo for 2025 will enable NMFS to gather more information on trawl EM costs.
- NMFS recommends maintaining the stratification used in the 2024 ADP for use in the 2025 Annual Deployment Plan. As in 2024, stratification definition would be based on monitoring method (Observer, EM Fixed Gear, EM Trawl), Fishery Management Plan (BSAI, GOA), and gear type that combines hook-and-line and pot gear (Fixed, Trawl). The 7 recommended partial coverage strata for 2025 are:
    - Observed fixed gear trips in the GOA (OB_FIXED - GOA)
    - Observed fixed gear trips in the BSAI (OB_FIXED - BSAI)
    - Observed trawl gear trips in the GOA (OB_TRW - GOA)
    - Observed trawl gear trips in the BSAI (OB_TRW - BSAI)
    - EM fixed gear trips in the GOA (EM_FIXED GOA)
    - EM fixed gear trips in the BSAI EM_FIXED (EM_FIXED - BSAI)
    - EM trawl gear deliveries in the GOA (EM_TRW - GOA)

ODDS:

- NMFS recommends that the agency collaborate with the Partial Coverage Fishery Monitoring Advisory Committee (PCFMAC) to develop an ODDS trip cancellation policy that will not significantly impede industry, affords the observer provider adequate time to deploy an observer, and reduces impacts to coverage rates and non-random monitoring. This new policy should be decided on in time for implementation as part of the 2025 Annual Deployment Plan.
- NMFS intends to make modifications to ODDS to implement the regulated EM Trawl program.

EM Video Review:

- NMFS should collaborate with the PSMFC to find a video review selection rate and review strategy that will result in EM video review times that result in the most useful

information for the most number of trips for a given cost.

- To maximize data utility, NMFS, in collaboration with PSMFC, should develop specific prioritization rules that can be used to allocate review effort to the fisheries, gear types, times and areas that are the most dependent on EM data.
- To provide the public and data users confidence that catch estimates from fixed-gear EM fleet are robust to delayed or missing information, NMFS recommends conducting an assessment of impacts of delayed or missing fixed-gear EM data and risks to management and the stocks of not having these data available (e.g. risk of exceeding TAC and PSC, risk of premature or late fishery closures).

Fixed-gear EM:

- Maintain an EM selection pool composed of up to 177 fixed gear vessels, which would maintain the size of the EM pool from 2024. As additional funds are available, increase the number of vessels in the EM selection pool up to the Council's recommendation of 200 fixed-gear EM vessels.
- NMFS recommends prioritizing placement in the EM selection pool based on vessel size, fishing effort, minimizing data gaps, and cost efficiency.
- If a vessel operator had repeated problems with EM system reliability or video quality or has failed to comply with the requirements in their Vessel Monitoring Plan, NMFS may disapprove a Vessel Monitoring Plan and the vessel may be removed from the EM pool.

EM Trawl Implementation:

- NMFS anticipates publishing a final rule for the trawl EM category and intends to implement the regulated program in 2025. NMFS proposed the following elements to be required under the regulated program:
    - Vessels would be required to opt into the regulated program prior to November 1, 2024 and would be required to have a NMFS-approved Vessel Monitoring Plan in place prior to participating in trawl EM in 2025.
    - Vessels would need to transmit a Landing Notice to the shoreside processor through the NMFS approved system prior to each trawl EM offload.
    - EM hardware service providers would be required to have a NMFS-approved permit prior to the start of the fishing season.
- NMFS will continue to evaluate shoreside sampling priorities in order to balance observer workloads for both partial and full coverage sectors.
- NMFS requests collaboration from the EM service providers and the trawl EM EFP permit holders to gain a better understanding of EM trawl costs (both for EM and shoreside observers) so the agency can appropriately budget for trawl EM in the 2025 ADP.

EM Development:

In addition to implementation of trawl EM, NMFS will continue to collaborate with industry partners on EM development and cost efficiency projects. NMFS will work with Council's

monitoring committees (FMAC and PCMAC) to coordinate with National Fish and Wildlife Foundation grantees to plan for potential upcoming grant proposals

7. References

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8. List of Authors

Craig Faunce, Alaska Fisheries Science Center (AFSC)
Jennifer Ferdinand, AFSC
Phil Ganz, Alaska Regional Office (AKRO)
Christian Gredzens, AFSC
Jason Jannot, AFSC
Dennis Jaszka, NOAA Office of Law Enforcement (OLE)
Andy Kingham, AFSC
Joel Kraski, AKRO
Geoffrey Mayhew,
Jennifer Mondragon, AKRO
Gwynne Schnaittacher, AFSC
Jaclyn Smith, OLE
Lisa Thompson, AFSC
Cathy Tide, AKRO
Cameron VanHorn, Pacific State Marine Fisheries Commission (PSMFC)
Mike Vechter, AFSC

9. Appendix A– Deployment Performance Results in 2022

This appendix presents tables and figures using the methods performed in Chapter 3 on 2022 data. Since the 2022 Annual Report was an abbreviated report it did not include these deployment performance review results.

Table A- 1. – Comparison between predicted and actual monitored trip days for partial coverage strata in 2022. Predicted values come from the 2022 Annual Deployment Plan

	Trip days		Difference	
Strata	**Predicted**	**Actual**	**Actual**	**Percent**
OB HAL	1,236	1,042.5	-194	-15.7
OB POT	935	1,130	195	20.9
OB TRW	654	726.5	72	11.1
EM HAL	977	651	-326	-33.4
EM POT	414	506	92	22.2
EM TRW EFP	363	564	201	55.2
Total	4,579	4,620	41	0.9

Table A- 2. – Trip cancellation rates in the ODDS for 2022. A trip is canceled by the system if the user did not identify whether fishing had occurred by the end of the year. "Paper" indicates that a trip was logged when the ODDS was not available.

Strata	Random number outcomes	Logged (*a*)	Canceled by system (*b*)	Trips remaining (*c* = *a* - *b*)	Canceled by user (*d*)	Waived	Paper	% user cancellation (*d*/*c* × 100)	Waiver (%)
OB HAL	Not selected	1,266					0		
	Selected	277	1	276	115	12	0	41.7	4.3
OB POT	Not selected	1,104					0		
	Selected	228	0	228	66	8	0	28.9	3.5
OB TRW	Not selected	676					0		
	Selected	247	0	247	55	1	0	22.3	0.4
EM HAL	Not selected	527					0		
	Selected	230	0	230	13	0	0	5.7	0.0
EM POT	Not selected	213					0		
	Selected	115	0	115	3	1	0	2.6	0.9
Total	Not selected	3,786					0		
	Selected	1,097	1	1,096	252	22	0	23.0	2.0

Table A- 3. – Number of remaining trips after cancellation in each trip-selection stratum that were selected using the initial random number generator ("Random number selection") and those that remained after user manipulation ("Total final selected") in 2022. The relative impact of waivers in trip-selection is also shown ("% reduction of selected trips due to waivers"). **Selections not from random numbers.

Strata	Total Trips	Random number selection (*r*)	Inherited selection **(*i*)	Waived (*w*)	Total final selected (*T* = *r* + *i* - *w*)	% selected from inherits ((*i*/*T*) × 100)	% reduction of selected trips due to waivers (*w*/(*T* + *w*) × 100)
OB HAL	1,246	146	74	14	206	35.9	6.4
OB POT	1,122	154	57	9	202	28.2	4.3
OB TRW	773	182	39	2	219	17.8	0.9
EM HAL	717	213	16	1	228	7.0	0.4
EM POT	311	111	8	1	118	6.8	0.8
Total	4,169	806	194	27	973	19.9	2.7

Table A- 4. – Number of logged trips in each partial coverage stratum in 2022 that were selected using the initial random number generator ("Initial random selection") and those that remained after user manipulation ("After cancellations"). The relative impact of inherits and waivers in trip-selection is also shown ("With inherits", "After waivers").

Strata	Trip disposition	Selected trips	Total trips	Actual (%)	Programmed (%)	*p*-value
OB HAL	Initial random selection, *a*	253	1,425	17.75	19.02	0.237
	After cancellations, *b* (*a* - *b*)	146	1,246	11.72	19.02	0.000*
	With inherits, *c* (*a* - *b* + *c*)	220	1,246	17.66	19.02	0.234
	After waivers, *d* (*a* - *b* + *c* - *d*)	206	1,246	16.53	19.02	0.025*
OB POT	Initial random selection, *a*	218	1,252	17.41	17.48	0.970
	After cancellations, *b* (*a* - *b*)	154	1,122	13.73	17.48	0.001*
	With inherits, *c* (*a* - *b* + *c*)	211	1,122	18.81	17.48	0.239
	After waivers, *d* (*a* - *b* + *c* - *d*)	202	1,122	18.00	17.48	0.637
OB TRW	Initial random selection, *a*	233	870	26.78	29.65	0.069
	After cancellations, *b* (*a* - *b*)	182	773	23.54	29.65	0.000*
	With inherits, *c* (*a* - *b* + *c*)	221	773	28.59	29.65	0.529
	After waivers, *d* (*a* - *b* + *c* - *d*)	219	773	28.33	29.65	0.431
EM HAL	Initial random selection, *a*	226	739	30.58	30.00	0.748
	After cancellations, *b* (*a* - *b*)	213	717	29.71	30.00	0.903
	With inherits, *c* (*a* - *b* + *c*)	229	717	31.94	30.00	0.254
	After waivers, *d* (*a* - *b* + *c* - *d*)	228	717	31.80	30.00	0.290
EM POT	Initial random selection, *a*	114	320	35.62	30.00	0.033*
	After cancellations, *b* (*a* - *b*)	111	311	35.69	30.00	0.030*
	With inherits, *c* (*a* - *b* + *c*)	119	311	38.26	30.00	0.002*
	After waivers, *d* (*a* - *b* + *c* - *d*)	118	311	37.94	30.00	0.003*

Table A- 5. – Number of total vessels (*V*), sampled vessels (*v*), total trips (*N*), and sampled trips (*n*) for each stratum in 2022. The coverage and 95% confidence interval columns are expressed as percentages of the total number of trips taken within each stratum. Reproduced from the 2022 Annual Report (in review).

					Coverage		95% confidence interval		
Strata	***V***	***v***	***N***	***n***	**Expected**	**Realized**	**Lower limit**	**Upper limit**	**Realized meets expected?**
Full coverage									
Full	113	112	1,645	1,642	100.0	99.8			No - lower than expected
EM TRW EFP	50	50	897	897	100.0	100.0			Yes
Full coverage total	145	144	2,542	2,539		99.9			
Partial coverage									
OB HAL	299	122	1,346	196	19.0	14.6	12.7	16.6	No - lower than expected
OB POT	172	100	1,163	211	17.5	18.1	16.0	20.5	Yes
OB TRW	72	53	725	210	29.6	29.0	25.7	32.4	Yes
EM HAL	118	63	658	133	30.0	20.2	17.2	23.5	No - lower than expected
EM POT	50	34	349	85	30.0	24.4	19.9	29.2	No - lower than expected
EM TRW EFP	40	33	526	160	33.3	30.4	26.5	34.5	Yes
Partial coverage total	562	336	4,767	995		20.9			
Zero coverage									
Zero coverage	310	0	1,599	0	0.0	0.0			Yes
Total	974	441	8,908	3,534		39.7% trips; 45.3% vessels			

Table A- 6. – The number of pollock deliveries made by vessels in the *OB TRW* stratum during 2022, separated by port and coverage category. Trips that made a delivery to a tender have been excluded. Observed deliveries denote deliveries that were observed shoreside for salmon.

FMP	Coverage category	Port	Total deliveries (*N*)	Observed deliveries (*n*)	% observed
BSAI	Full	Akutan	268	268	100.0
		Dutch Harbor	319	319	100.0
		King Cove	10	10	100.0
BSAI total			597	597	100.0
GOA	Partial	Akutan	26	4	15.4
		Kodiak	669	147	22.0
		Sand Point	55	15	27.3
GOA total			750	166	22.1

Table A- 7. – The number of pollock deliveries made by vessels in the *EM TRW EFP* stratum during 2022, separated by port and coverage category. Trips that made a delivery to a tender have been excluded. Observed deliveries denote deliveries that were observed shoreside for salmon.

FMP	Coverage category	Port	Total deliveries (*N*)	Observed deliveries (*n*)	% observed
BSAI	Full	Akutan	344	344	100.0
		Dutch Harbor	538	538	100.0
		Inshore floating processor	3	3	100.0
		King Cove	43	43	100.0
BSAI total			928	928	100.0
GOA	Partial	Akutan	50	14	28.0
		King Cove	1	0	0.0
		Kodiak	306	89	29.1
		Sand Point	181	63	34.8
GOA total			538	166	30.9

Table A- 8. – Results of permutation tests between monitored and unmonitored trips in the 2022 trip-selection strata. OD: Observed difference (monitored - unmonitored). Observed and unobserved columns are in units of trips. Statistically significant results are in bold italics.

Strata	Observed	Unobserved	Metric	NMFS areas	Days fished	Vessel length (ft)	Species landed	pMax species	Landed catch (t)
OB HAL	196	1,150	OD	0.015	***-0.730***	0.073	0.276	-0.003	***-2.095***
			OD (%)	1.316	***-12.919***	0.136	7.584	-0.332	***-26.236***
			p-value	0.667	***< 0.001****	0.938	0.100	0.776	***< 0.001****
EM HAL	133	525	OD	-0.039	-0.380	0.340	***0.877***	-0.015	1.083
			OD (%)	-3.509	-7.196	0.660	***22.326***	-1.646	14.801
			p-value	0.222	0.096	0.711	***< 0.001****	0.203	0.052
OB POT	211	952	OD	-0.011	***-1.002***	3.832	0.014	0.009	-2.873
			OD (%)	-1.002	***-16.531***	5.772	0.566	0.927	-10.485
			p-value	0.694	***0.001****	0.043	0.920	0.133	0.536
EM POT	85	264	OD	-0.059	0.407	5.007	0.459	0.008	***8.840***
			OD (%)	-5.334	7.348	7.868	17.129	0.816	***46.865***
			p-value	0.200	0.517	0.060	0.022	0.498	***0.002****
OB TRW	210	515	OD	-0.043	-0.199	0.594	-0.448	-0.002	-9.384
			OD (%)	-3.391	-5.975	0.694	-7.211	-0.199	-7.814
			p-value	0.315	0.467	0.679	0.069	0.781	0.208

Figure A- 1. – Total number of observer sea days purchased (top panel) and total cost of observing those sea days (bottom panel). Vertical bars signify the range of potential outcomes predicted by the 2022 Annual Deployment Plan. Dashed lines signify expected outcomes. Solid lines signify what actually occurred in 2022

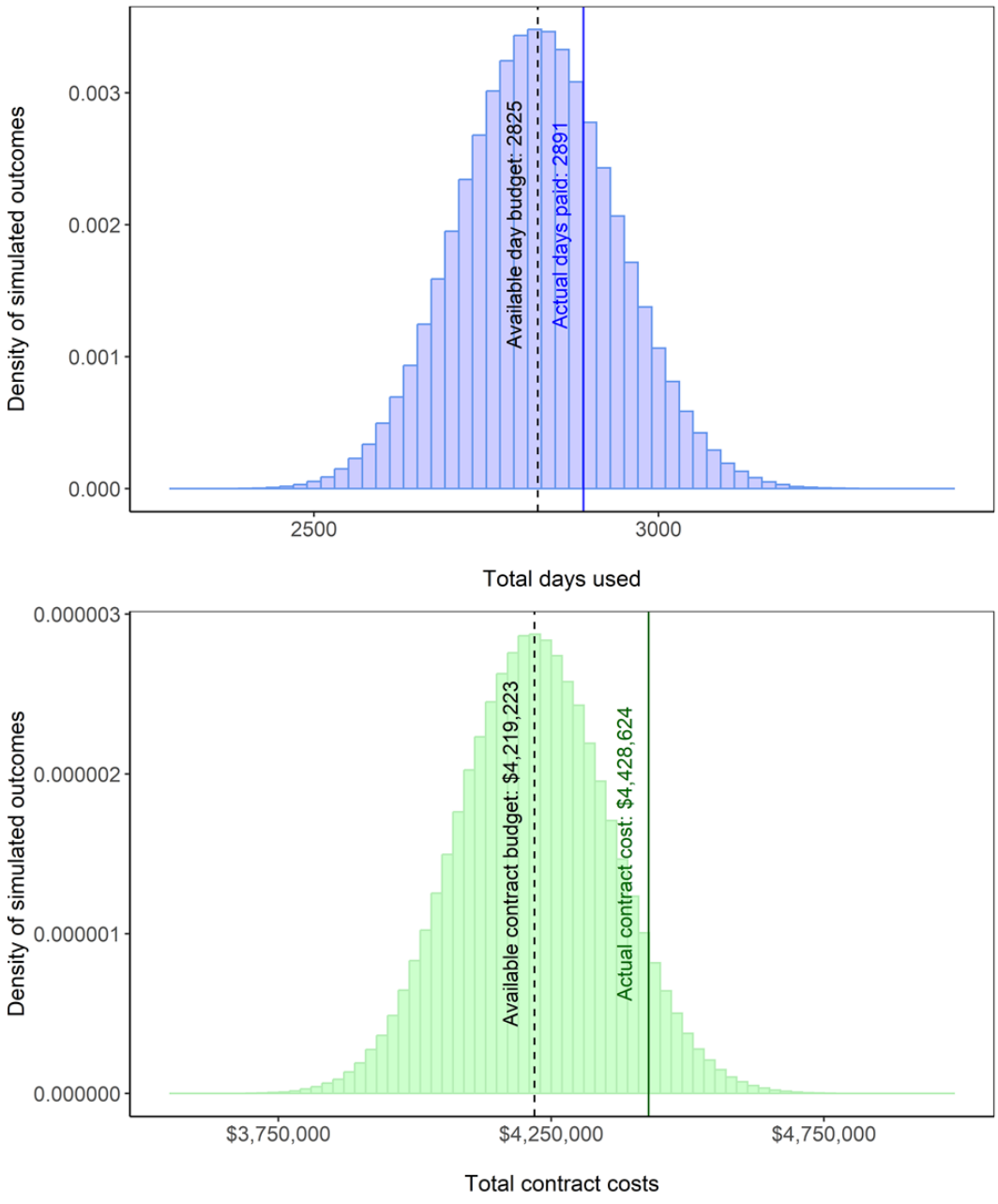

Figure A- 2. – Distributions of data timeliness (the time between a trip or delivery ending and those monitoring data being available for catch accounting) by stratum. Dashed red lines and annotations show mean data timeliness.

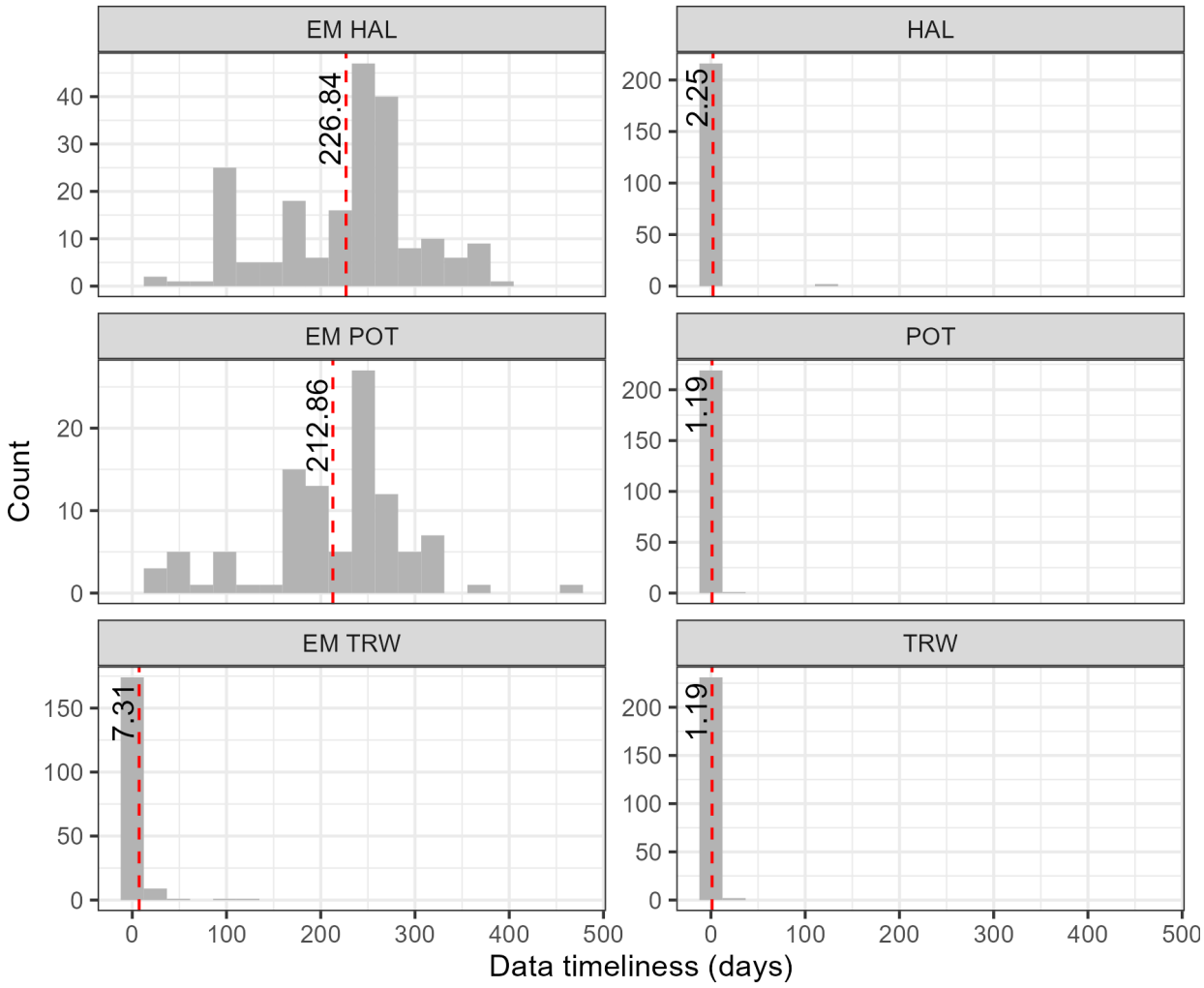

Figure A- 3. – Rate of selected trips logged into ODDS in 2022 organized by original date entered for all trips (gray line and gray text), and final date considering only non-canceled trips (black line and black text). The programmed selection rate is depicted as the dotted line. Gray shaded areas denote the range of coverage rate corresponding to the 95% confidence intervals expected from the binomial distribution. Vertical tick marks on the x-axis depict dates when selected trips were canceled (gray, on the bottom) and when inherited trips were monitored (black, on the top).

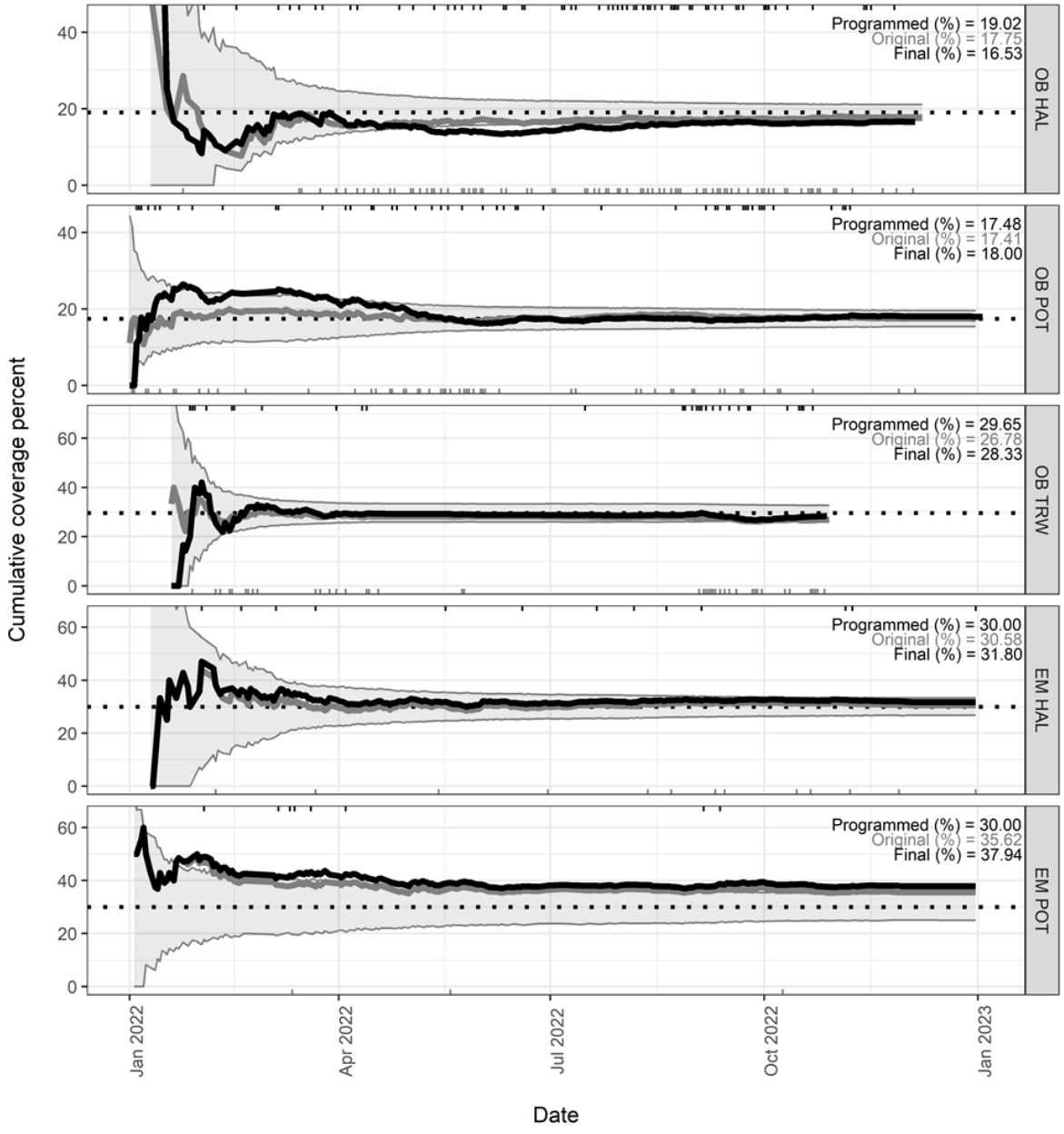

Figure A- 4. – Cumulative number of trips monitored during 2022 (black line) compared to the expected range of observed trips (shaded ribbon) given fishing effort and sampling rates. Dates where the monitored number of trips is outside of expected (less or more than the range) are depicted as tick marks on the x-axis. Test results (using a binomial distribution) determining if the observed rate was sampled at the selection rate are denoted as *p*-values.

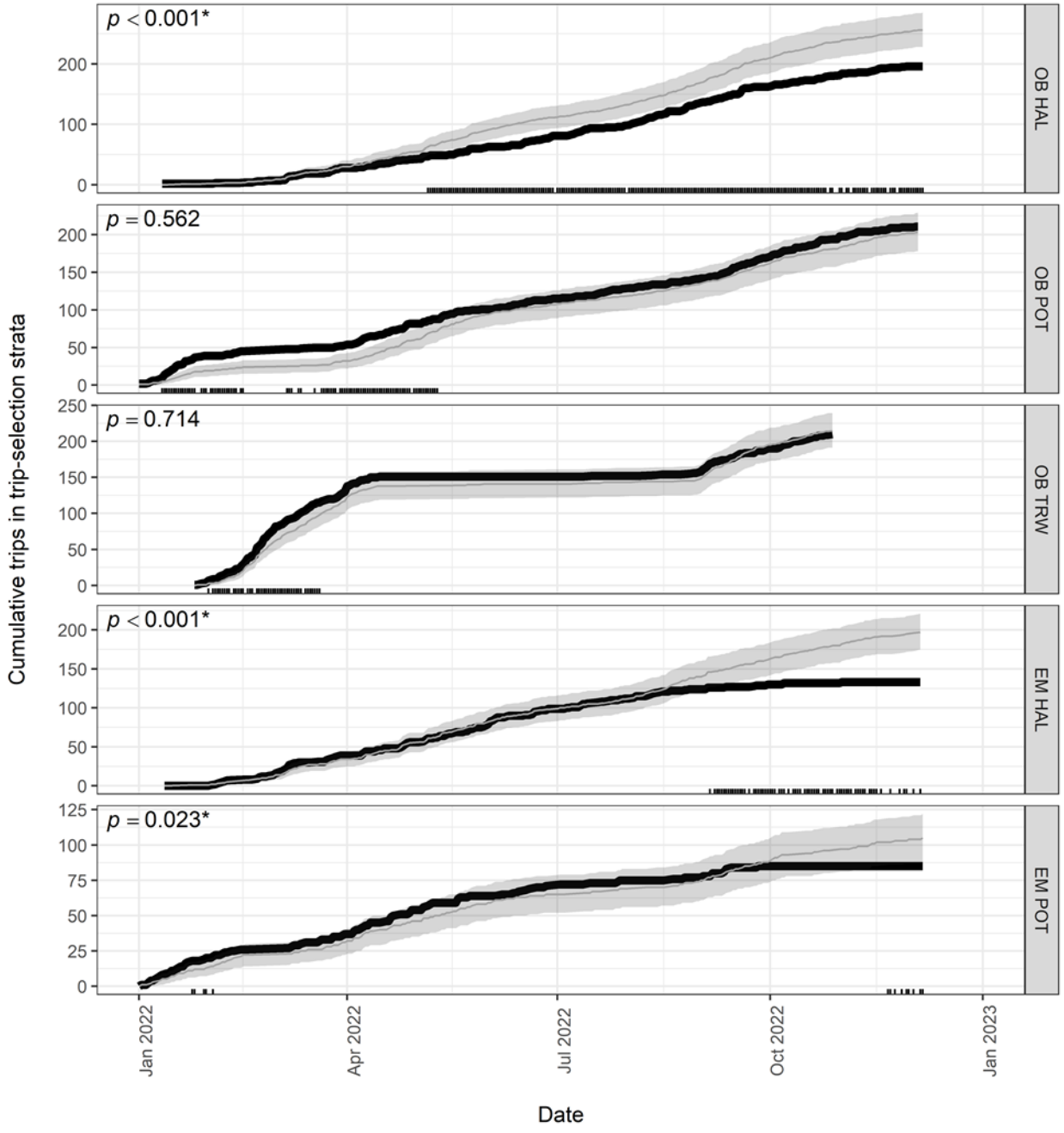

Figure A- 5. – Spatial patterns of the distribution of monitoring in partial coverage in 2022. Each hexagonal spatial cell is 200 km wide. The numbers in the cells represent the difference in the number of trips / deliveries actually monitored relative to the median of 10,000 simulations of random sampling using the stratum's realized monitoring rate. Cells without a number had the same number of monitored trips / deliveries as the median of the simulations (difference of zero). Cells where the actual number of monitored trips / deliveries was more extreme than 80% of simulated outcomes are colored pink (fewer trips / deliveries than expected) or green (more), and those cells with a more extreme outcome than 95% of simulated outcomes are outlined in blue with bold text.

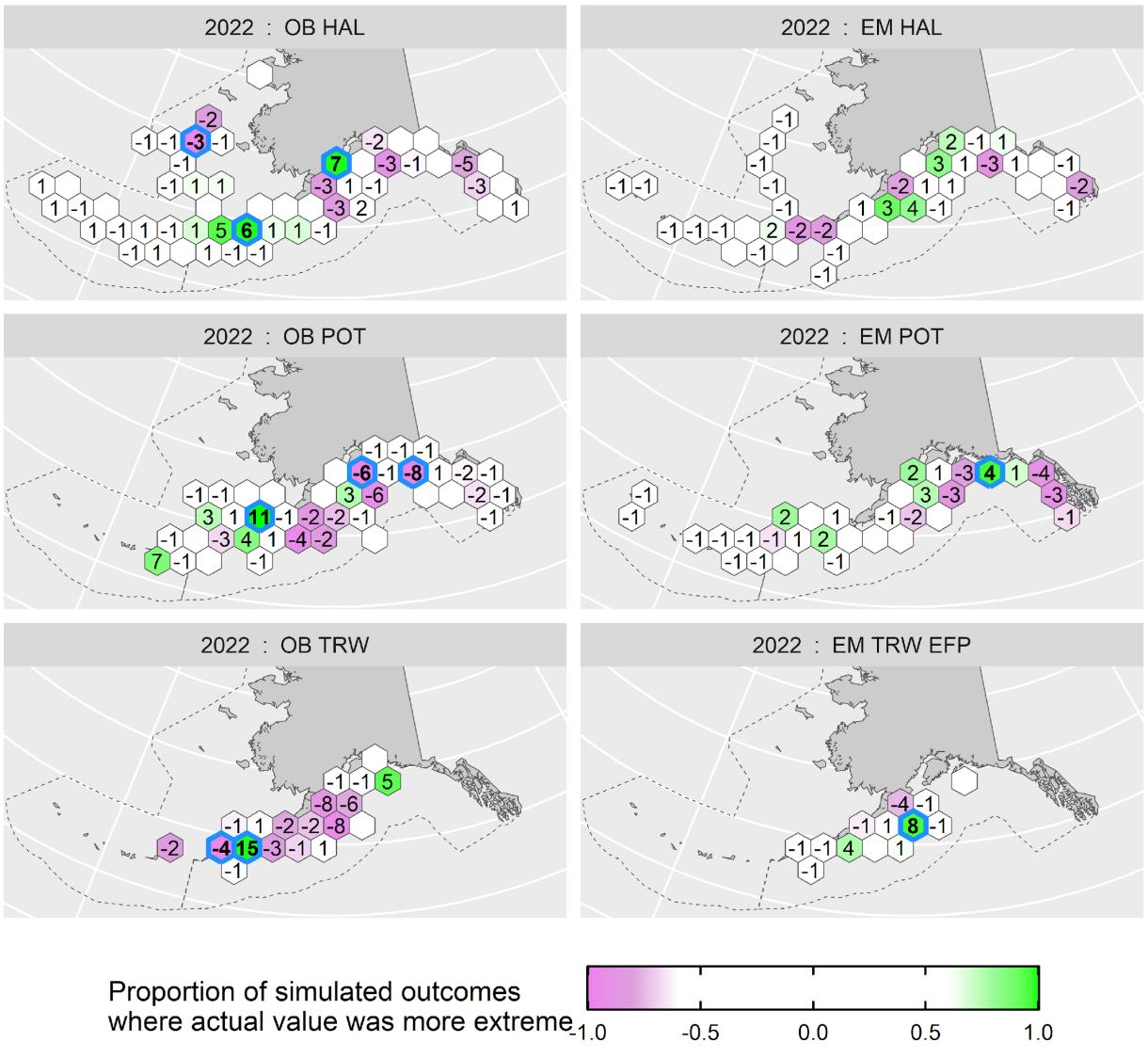

Figure A- 6. – Stratum-level proximity indices in partial coverage in 2022. The purple vertical dashed line represents actual proximity indices. The distributions show the proximity values obtained from 10,000 simulations of random sampling, where the upper (green) distribution sampled using the realized monitoring rate and the lower (blue) distribution used the programmed monitoring rate. The 2.5% tails of the distributions are shaded darker to represent unlikely outcomes. The number of sample units in each stratum is displayed in the upper-left of each facet. Note the varying scales of the x-axes between facets.

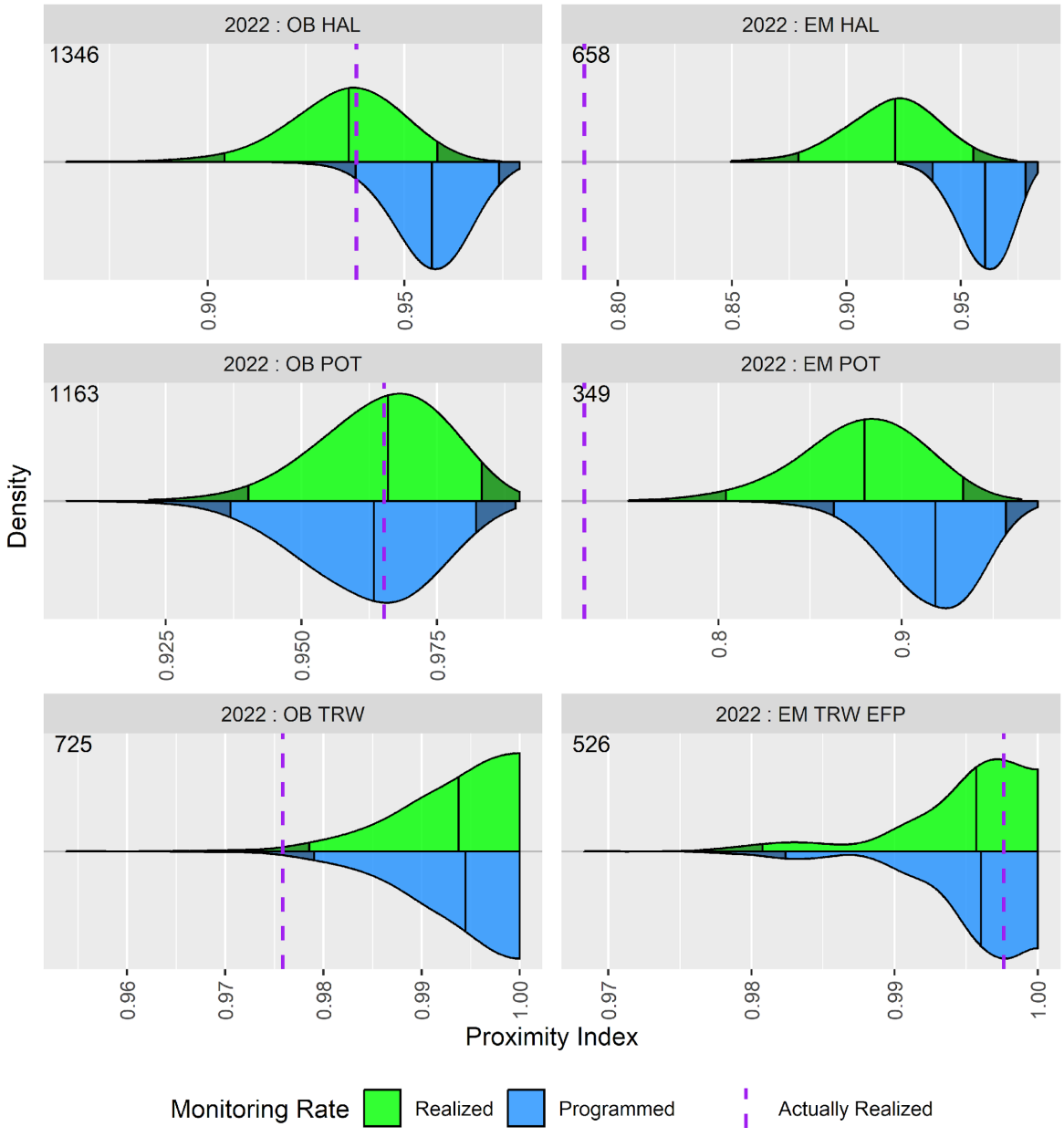

Figure A- 7. – Stratum and FMP-level proximity indices in partial coverage in 2022. The purple vertical dashed line represents actual proximity indices. The distributions show the proximity values obtained from 10,000 simulations of random sampling, where the upper (green) distribution sampled using the realized monitoring rate and the lower (blue) distribution used the programmed monitoring rate. The 2.5% tails of the distributions are shaded darker to represent unlikely outcomes. The number of sample units in each stratum and FMP is displayed in the upper-left of each facet. Note the varying scales of the x-axes between facets.

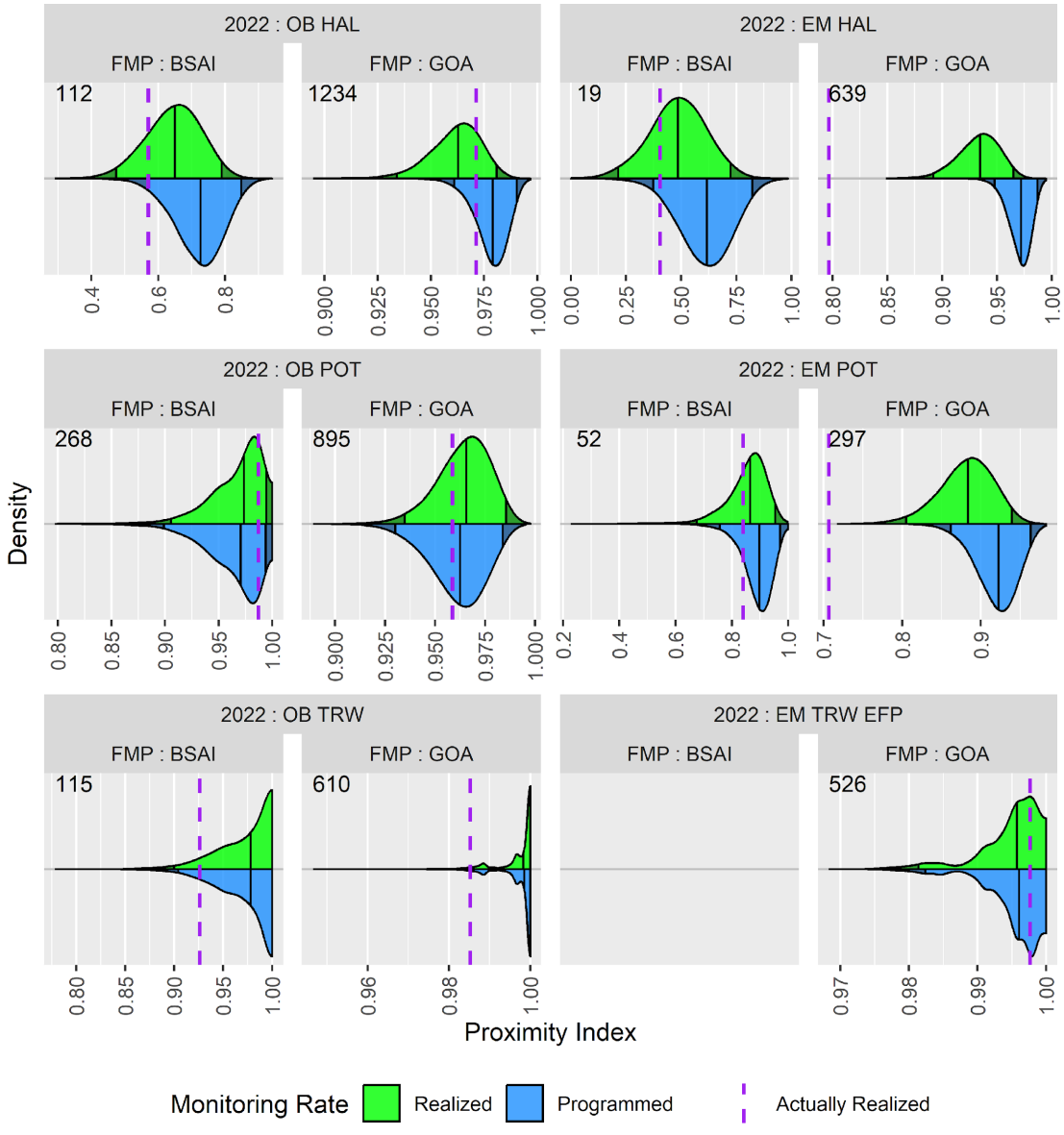

Figure A- 8. – Results from permutation tests depicting percent differences between monitored and unmonitored trips by strata in the partial coverage category. Gray bars depict the distribution of differences between monitored and unmonitored trips when the assignment of monitoring status has been randomized (this represents the sampling distribution under the null hypothesis that monitored and unmonitored trips are the same). The vertical red solid line denotes the actual difference between monitored and unmonitored trips. Values on the x-axis have been scaled to reflect the relative (%) differences in each metric. The *p*-value for each test is denoted in the upper left corner. Low *p*-values (shaded pink) are reason to reject the null hypothesis and conclude that there is a monitoring effect.