NOAA FISHERIES

North Pacific Groundfish and Halibut Observer Program

2014 Annual Report

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EXECUTIVE SUMMARY

This annual report provides information, analysis, and recommendations based on deployment of observers in the North Pacific Groundfish and Halibut Observer Program (Observer Program). The Observer Program provides the regulatory framework for NMFS-certified observers to obtain information necessary to conserve and manage the groundfish and halibut fisheries in the Gulf of Alaska (GOA) and the Bering Sea and Aleutian Islands (BSAI) management areas. Data collected by well-trained, independent observers are a cornerstone of management of the Federal fisheries off Alaska. These data are needed by the North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) to comply with the Magnuson-Stevens Fishery Conservation and Management Act, the Marine Mammal Protection Act, the Endangered Species Act, and other applicable Federal laws and treaties.

Each year NMFS releases an Annual Deployment Plan (ADP) that describes how NMFS plans to deploy observers to vessels and processors in the partial observer coverage category in the upcoming year. The following year, the agency provides an Annual Report with descriptive information and scientifically evaluates the deployment of observers. The ADP and Annual Report process provide 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. This annual report provides information and recommendations based on deployment of observers in 2014.

Fees, budget, and costs

- The budget for observer deployment in 2014 in the partial coverage category was $4,937,414 and 4,368 days.
- The budget for 2014 was made up of $3,044,606 in fees (from 2013 landings) and $1,892,808 in federal money.
- Fee billing statements for all landings that occurred in 2014 were mailed to approximately 100 processors in January, 2015, for a total of $3,458,715.
- The breakdown in contribution to the 2014 observer fee liability by species was: 30% halibut, 22% sablefish, 26% Pacific cod, 19% pollock, and 2% all other groundfish species.
- To date, NMFS has spent $11,537,542 to procure 10,816 observer days for an average cost per observer day of $1,067 per day.
- The 2-year contract with A.I.S., Inc. for the provision of fishery observer services to the partial coverage component of the Alaskan fleet contract expired in September 2014, but was extended for an additional 6 months until March 30, 2015. In the fall of 2014, a solicitation for a new observer services contract was released and in April 2015, NOAA awarded a 5-year contract to A.I.S., Inc.
- The detailed breakdown of costs under the contract is confidential and NMFS can only release information on the amount of services (observer days) after services have been procured. Future annual reports will continue to provide information and funds spent, days procured, and the average cost per day under the new contract. However, NMFS anticipates that the average cost per observer day is likely to be reasonably stable over the next 5 years and not vary dramatically from average costs we have seen thus far in the

program. During the first two years of the program, the partial coverage costs have been on par with partial coverage, government-contracted observer costs in other regions.

Deployment Performance Review

The report presents a review of the deployment of observers in 2014 relative to the intended sampling plan and goals of the restructured Observer Program. A set of performance metrics were used to assess the efficiency and effectiveness of observer deployment into the partial coverage category. These metrics provide a method to evaluate the quality of data being collected under the restructured Observer Program. These metrics fall into three broad categories:

- **Deployment rate metrics** that evaluated whether achieved sample rates were consistent with intended sample rates. In addition, the achieved sampling rate were evaluated against the anticipated sampling rates (i.e., did we get the coverage rates we planned to get) in terms of the tracking of costs to ensure coverage across the entire year;
- **Sample frame metrics** that quantify differences between the population for which estimates are being made and the sample from which those estimates are derived (i.e., were the trips and vessels that we sampled similar to the rest of the fleet). If the trips and vessels that are sampled (the sample population) are not "representative" of the entire fleet (the whole population), it can result in incorrect conclusions being drawn about the population based on the sample.
- **Sample size metrics** analysis to determine whether enough samples were collected to ensure adequate spatial and temporal coverage.

Did we meet anticipated deployment goals?

Costs

- Based on simulations of 2012 fishing data made a year in advance of deployment, NMFS expected observed fishing effort to be 4,718 days at the end of 2014. In 2014, NMFS deployed observers for 4,368 days, or 92.6% of our anticipated budget.

Observer Declare and Deploy System (ODDS) overview and performance

- Random selection of trips in the trip selection stratum is facilitated by the ODDS. 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 cancelled to accommodate changing plans. Once a trip has been completed, logged trips must be closed by a vessel operator.
- If a trip is selected for observer coverage and cancelled by the user, then the vessel's next logged trip is automatically selected for coverage. The "inherited" trips preserve the *number* of selected trips in the year, but cannot prevent the *delay* of selected trips during the year, which resulted in temporal bias.
- In 2014, ODDS users cancelled trips that had been selected for coverage at nearly four (3.7) times the rate of unselected trips. Since only cancelled trips that had been originally selected are preserved, the final selection rate in ODDS was higher than if selected trips had not been disproportionately cancelled.

Evaluation of at-sea strata

- Among all fishing activity (full and partial coverage categories) in Federal fisheries off Alaska, 5,883 trips (43%) and 417 vessels (32.8%) were observed.
- Evaluation of the deployment performance was conducted the level 11 different deployment strata[1], these include:
    - Full coverage: 1) full coverage in regulation and 2) voluntary full coverage
    - Trip selection: 1 stratum
    - Vessel selection: 6 time periods
    - No selection : 1) vessels less than 40ft and those fishing with jig gear, and 2) vessel participating in Electronic Monitoring (EM) research
- The anticipated deployment rates in the 2014 ADP were: 12% of vessels for the vessel selection pool, and 16% for the trip selection pool.
- The program met expected rates of coverage for the full-coverage regulatory and full-coverage voluntary strata, the trip selection stratum, four of six time-periods within vessel selection, and the partial coverage no selection.
- Observer coverage was higher than the expected 12% selection rate in two of the six time periods within vessel selection. Vessels were selected for sampling based on whether they fished in 2013. This resulted in a discrepancy between the sampling list and the list of vessels that actually fished. In addition, the unpredictability in the number of vessels that would be granted conditional releases meant that NMFS "oversampled" in some of the vessel selection time periods. These problems were also highlighted in the 2013 Annual Report and were part of the rationale for moving all vessels to the trip selection method in 2015.

Dockside Monitoring

- In the GOA, offloads of pollock trawl catcher vessels delivering to shoreside processors were observed to obtain counts of salmon and to obtain genetic samples to determine stock of origin.
- The monitoring protocol for salmon bycatch in the trawl pollock fishery involves observer monitoring of the delivery at shoreside processing plants. In the full-coverage category of the fleet, this task is performed by plant observers, whereas in partial-coverage only trips that are observed at sea are also monitored at the plant. In 2014, the observer program did not achieve a random sample of trawl pollock deliveries in partial coverage at the desired rate. Coverage rates were especially low in ports with high tendering activity. When tendering activity was removed, the likelihood the observer program achieved a random sample at the desired rate of coverage increased two orders of magnitude from 0.001 to 0.1.

Was the Coverage Representative?

Temporal Patterns

- We evaluated the possibility for temporal bias in the trip selection stratum.[2] Although coverage rates were lower than expected at the beginning of the year, the final coverage rate was within expected ranges.

[1] Note that these strata definitions have changed in 2015. See section 1.4 for a list of deployment changes since 2014.

Spatial Representativeness

- In 2014, the spatial distribution of observer coverage in trip selection was as would be expected under a random sample of trips. In vessel selection, however there were more observed vessels in certain NMFS reporting areas than would be expected under random deployment. This result highlights the difficulty in obtaining an adequate sampling frame in vessel selection.

Trip characteristics

NMFS expanded the comparison of trip metrics between various categories of vessels relative to the analysis conducted in the 2013 Annual Report. In both the 2013 version and this Annual Report, NMFS compared trip duration (number of days), number of NMFS areas visited during a trip, landed catch weight, species diversity (the number of different species in the landed catch), and the proportion of landed catch that was due to the predominant species in the catch (the "purity" of the catch). For 2014, NMFS added comparisons of vessel length to the trip metrics and performed analyses using permutation tests instead of visual inspection of histograms.

- Comparison of *tender trips and non-tender trips*:
  Vessels that delivered to a tender were 11.5% shorter in length, fished 29.1% longer in duration, and had catch that was 1.3% less "pure" than vessels that did not deliver to a tender.

- Comparison of *observed and unobserved trips delivered to tenders:*
  - The analysis found no differences in NMFS areas visited during a trip, trip duration, the total weight of landed catch, or the number of species in the landed catch. The permutation tests did, however, indicate a difference in vessel length and the proportion of the predominant species in the landed catch for observed and unobserved vessels delivering to tenders. Observed vessels delivering to tenders were 8.8% shorter than unobserved vessels delivering to tenders. The landed catch by observed vessels delivering to tenders was 6% less "purely the predominant species" than landed catch by unobserved vessels delivering to tenders.

- Comparison of *observed unobserved trips delivered shoreside (i.e., non-tender)*:
  - *Trip selection*: Hook-and-line vessels that were observed landed 14.4% less catch and 9.1% more species than unobserved vessels. Trawl vessels that were observed fished in 4.2% fewer areas and were 8.4% shorter in duration than unobserved vessels. There were no differences between observed and unobserved trips for vessels that fished pot gear. Taken together, there is evidence of an observer effect in trip selection hook-and-line and trawl gear.
  - *Vessel selection*: Six trip metrics were evaluated for each of the 6 time periods (36 comparisons). Of the 36 tests, 18 showed significant differences between observed and unobserved trips providing evidence of an observer effect in vessel selection.

[2] Temporal patterns were not evaluated in the vessel selection stratum because vessels were selected for 2-month time periods, so temporal patterns would only show deployment and not indicate representativeness.

Sample Size Metrics

- In 2014, some NMFS Areas have low fishing effort and as a result have a relatively high probability of being missed by the simple random sampling represented by observer deployments. From this analysis, the likelihood of achieving at least one sample in a NMFS Area: 1) increased as the number of sampling units (trips or vessels) increased, and 2) increased with higher selection rates. Sample size requirements to ensure data are present in all cells of interest will be evaluated during the planning process for 2016 and are also presented in the Supplemental EA (NMFS 2015).

Compliance and Enforcement

- AKD Fisheries Enforcement Agents and Officers dedicated 3,831 hours to observer related investigations, outreach and education, and compliance assistance with a focus on observer safety, work environment and data collection duties. AKD reported an increase of reports and investigations of systematic sample biasing as well as harassment, intimidation and sexual harassment.

Outreach

- NMFS continued public outreach events in 2014. The agency found the meetings with industry associations to be a valuable way to share information with fishery participants, to answer their questions, and to get their input on areas of concern and potential solutions.

NMFS Recommendations

Update to previous recommendations

In the 2013 Annual Report (NMFS 2014a) NMFS made a series of recommendations. Here we provide an update (*in italics*) to the previous recommendations.

<u>Vessel Selection:</u>

- Based on the 2013 Annual Report, NMFS recommended that participants in the vessel selection category be placed in the trip selection category in 2015.

This recommendation was implemented in the 2015 ADP. Vessels that were in vessel selection are now in the small-vessel trip selection strata. NMFS continues to recommend trip-selection method for all vessels in 2016.

- If the vessel selection pool continues in 2015 and the releases are continued in the vessel selection pool, then they should apply to all fishing activities during a release period.

Under the 2015 ADP, NMFS discontinued conditional releases for bunk space and is only granting conditional release to vessels in the small vessel category with insufficient life-raft capacity to accommodate an observer, or if their two previous trips were observed trips (i.e., two trips in a row were observed, the third trip will be released from coverage).

For 2016, NMFS recommends providing vessels in the small vessel category where taking an observer is problematic (e.g., with insufficient life-raft capacity) an opportunity to 'opt-in' to the EM selection pool to participate in the EM cooperative research. To implement the Observer Science Committee's (OSC's) recommendation that vessels not be moved in and out of the coverage strata, NMFS recommends that any vessels put in the no selection pool and the EM selection pool be in that pool for the entire year.

No selection pool:

- Recognizing the challenging logistics of putting observers on small vessels, NMFS recommends that vessels less than 40ft continue to be in the no selection pool for observer coverage. However, NMFS also recommends that vessels less than 40ft be considered for testing of electronic monitoring since NMFS has no data from this segment of the fleet.

NMFS reiterates this recommendation for 2016.

Coverage Rates:

- NMFS does not anticipate recommending coverage rate changes at this time, except that NMFS will scale coverage rates up if there is sufficient funding to do so. Trip selection rates should remain constant throughout the entire year and NMFS should use buffers in the budget to mitigate the risk of the rare event of a cost-overage.

NMFS was able to increase coverage rates in 2015 based on carryover of funds, less anticipated effort, and Federal funds. NMFS will continue to explore efficient sampling designs with the constraints of available budgets and anticipated fishing effort in 2016.

Tenders:

- Based on the analysis in the 2013 Annual Report NMFS recommended that continued development of alternatives to deploy observers from or on tenders be considered in the context of other actions and priorities for Council and NMFS analysis.

There are two aspects of tendering activity: 1) impact on biological sampling for salmon, and 2) the potential for bias.

Biological sampling for salmon:

- *Analysis in Chapter 3 (section 3.6.2) confirmed the challenge of collecting data from vessels delivering to tenders. While plant observers are available to conduct genetic sampling in the BSAI full coverage category, in the GOA partial coverage category the sampling protocol relies on the observer from an observed trawl catcher vessel collecting genetic samples from each Chinook salmon in a delivery. Observers on trawl catcher vessels delivering to tenders cannot collect genetic samples from all Chinook salmon in the delivery because the delivery is made to a tender and they are not authorized to work on the tenders, nor are the tenders set up to accommodate observer sampling.*
- *Given the priority the Council has placed on salmon prohibited species catch management, additional discussions are needed about a number of aspects of this issue,*

including the specific needs for genetic sampling for salmon; options for modifying the collection of salmon prohibited species catch data from all vessels using trawl gear, including those delivering to tenders; and the priority of these issues relative to other issues requiring further analysis. Increasing genetic sampling for salmon or modifying protocols would require a shifting of staff and resources away from other sampling and data collection duties.

Potential for bias:

- *An issue of concern is whether observed vessels delivering to tenders are fishing differently than unobserved vessels delivering to tenders. The most noteworthy findings from 2014 is that we do not see indication that observed vessels delivering to tenders were making shorter trips or fishing in different areas than unobserved vessels delivering to tenders. This finding agrees with findings in the 2013 Annual Report.*
- *Differences between observed and unobserved vessels in vessel length and proportion of the predominant species may be explained by characteristics of the vessels delivering to tenders such as deployment strata or gear type. Further analysis, similar to that conducted for the non-tendered trips (in Tables 3.12 and 3.13) that evaluated trip metrics by strata and gear, could provide further information about the differences in the observed and unobserved tendered trips. However, it also is possible that the number of observed trips by vessels delivering to tenders may not be sufficient to do this analysis for all strata and gear types. NMFS recommends that further investigation of this issue be considered in the context of other actions and priorities for Council and NMFS analysis.*

Performance Metrics:

- NMFS envisions that future reporting will expand key performance metrics to improve our understanding of the Observer Program performance. NMFS has already noted progress on incorporating variances associated with catch estimates, and will continue to report as work progresses.

NMFS continues this recommendation for 2016 and will continue to expand ways to evaluate deployment and catch estimation. For example, Chapter 3 of this report expands the comparison of trip metrics; the supplemental environmental assessment (SEA) for the restructured observer program contains a "gap analysis" and summary of the quality of observer information compared to the old program; and NMFS is continuing to evaluate and make improvements to catch estimation methods (e.g., Cahalan et al. 2014, Cahalan et al. 2015; Cahalan et al. In press).

Trip Identifiers:

- NMFS staff will consider and identify the best approach to develop a trip identifier tied to landing data to provide linkage between ODDS and eLandings and improve data analysis. Identification of tender trips through electronic reporting on tenders (via tLandings) would also facilitate analysis.

A solution for trip identifiers was not yet been implemented. However, NMFS reiterates this recommendation and plans to dedicate staff time to develop a solution for 2016.

Additional recommendations to improve the 2016 ADP

ODDS

- *NMFS recommends modifications to ODDS to address in observer coverage and temporal bias exhibited in trip-selection during 2013 and in 2014. The current methods in ODDS of 1) allowing selected trips to be cancelled, and 2) allowing multiple trips to be logged prior to sailing should be re-evaluated.*

Observer Effects

- *Although the finding of observer effects in 2014 does not guarantee that they will be found in future years, the evidence of observer effects in both trip and vessel selection strata are concerning to NMFS. Besides moving vessels to full coverage, there is not an easy mechanism to solve observer effects and they may be related to trip-logging issues in ODDS or vessels fishing differently when an observer is onboard. Regardless of the drivers, future ADPs should take the evidence of observer effects into consideration and evaluate whether changes in coverage rates be broadly applied to existing strata or if they could be applied to newly defined strata (e.g., gear).*

Defining strata and coverage rates

- *The 2016 ADP should explore defining strata to deploy observers by gear (e.g. fixed gear, and trawl gear) and FMP area (BSAI, GOA). Sector (catcher vessel and catcher/processor) should also be considered, especially if the Council takes action to move more catcher/processors into the partial coverage category.*

- *NMFS agrees with the OSC that the assumption used in the 2013-2015 ADPs, that effort in the following year will be equal to that two years prior, should be improved upon. NMFS should develop better tools such as models to predict fishing effort.*

1 INTRODUCTION

This annual report provides information, analysis, and recommendations based on deployment of observers in the North Pacific Groundfish and Halibut Observer Program (Observer Program). The Observer Program provides the regulatory framework for NMFS-certified observers to obtain information necessary to conserve and manage the groundfish and halibut fisheries in the Gulf of Alaska (GOA) and the Bering Sea and Aleutian Islands (BSAI) management areas. Data collected by well-trained, independent observers are a cornerstone of management of the Federal fisheries off Alaska. These data are needed by the North Pacific Fishery Management Council (Council) and NMFS to comply with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Marine Mammal Protection Act, the Endangered Species Act, and other applicable Federal laws and treaties.

Observers collect biological samples and fishery-dependent information used to estimate total catch and interactions with protected species.[3] Managers use data collected by observers to manage groundfish and prohibited species catch within established limits and to document and reduce fishery interactions with protected resources. Scientists use observer 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. Although NMFS is working with the Council and industry to develop methods to collect some of these data electronically, currently much of this information can only be collected independently by human observers.

In 2013, the Council and NMFS restructured the Observer Program to place all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two categories: (1) the full coverage category, where vessels and processors obtain observers by contracting directly with observer providers, and (2) the partial coverage category, where NMFS has the flexibility to deploy observers when and where they are needed based on an annual deployment plan (ADP) developed in consultation with the Council. Some vessels and processors may be in full coverage for some of the fisheries in which they participate and in partial coverage in other fisheries. Funds for deploying observers in the partial coverage category are provided through a system of fees based on the ex-vessel value of retained groundfish and halibut in fisheries and landings that are not in the full coverage category.

The purpose of restructuring the Observer Program was to:

- reduce the potential for bias in observer data,
- authorize the collection of observer data in fishing sectors that were previously not required to carry observers,
- allow fishery managers to provide observer coverage to respond to the scientific and management needs, and
- assess a broad-based fee to more equitably distribute the costs of observer coverage.

[3] Additional information about the data collected by observers is described in the observer sampling manual (AFSC 2015) and summarized in Appendix D of the electronic monitoring strategic plan (Loefflad et al. 2014).

The objective of addressing known sources of bias is critical to the quality of the data collected by observers and assessing the degree to which we are making progress on that goal is an important outcome of this annual report. The Magnuson-Stevens Act requires the Observer Program to "gather reliable data, by stationing observers on all or a statistically reliable sample of fishing vessels and processors" (section 313(b)(1)(A)). Placing an observer on every vessel and in every processing plant in sufficient quantities to census and assess all aspects of commercial fishing is logistically and financially impractical and not necessary if an adequate sampling program exists. Sampling is collecting information from a subset of the total units in a population following prescribed methods. Sampling information is then extrapolated to describe the population of interest. Bias is introduced when the sample (i.e., observed trips) does not represent fishing activity to which it is expanded (i.e., population of all fishing trips). There were several issues associated with bias in the design of the Observer Program prior to restructuring:

- Non-representative samples: Prior to restructuring the Observer Program, vessel operators chose when to take observers to fulfill their observer coverage requirement. The ability for vessels to choose when data were collected was a fundamental flaw with the previous observer deployment and violated the assumption of representative sampling.

- Spatial and temporal bias: Since vessel operators were allowed choice in when they took an observer within the requirements of the "30 percent" observer coverage category, some vessel operators waited to deploy observers until the end of the quarter or when observers were available. This created patchy observer coverage that was not representative of fishing effort throughout the entire quarter or across all fisheries;

- Population not represented in sample: Vessels fishing for halibut and those less than 60 ft length overall were not required to carry observers so they were not included in the sampled population. These vessels comprise an important portion of the fishing fleet. Like all fishermen off Alaska, they fish in ecologically sensitive areas and harvest long-lived and vulnerable species that require accurate accounting to ensure long-term sustainability. In addition, these previously unobserved vessels harvest species that NMFS is responsible to assess and protect under annual catch limits and accountability measures required by the Magnuson-Stevens Act. It is important for NMFS to obtain some independent information about catch and bycatch by these vessels to ensure that data used to estimate total catch is representative of the fishing activity by these vessels.

- Incentives to bias data ("observer effect"): Observer effects, for example if vessels fish differently when there is an observer onboard, can occur in any observed fishery and introduce bias into the observer data. Alaska groundfish fisheries have limits on the amount of bycatch that is allowed to be caught, particularly for halibut, salmon, and crab. Since bycatch accounting relies on at-sea data collection from observers, incentives exist to fish differently when an observer is on board a vessel than when a vessel is unobserved (i.e., to fish in areas where bycatch is expected to be lower). In the old program, it was difficult to detect observer effects because of the lack of random deployment.

1.1 Observer Coverage Categories and Coverage Levels

Under the restructured Observer Program, all vessels and processors in the groundfish and halibut fisheries off Alaska are assigned to one of two observer coverage categories (1) a full coverage category; or (2) a partial coverage category.

1.1.1 Full Coverage

The full coverage category includes:

- catcher/processors (with limited exceptions),
- motherships,
- catcher vessels while participating in programs that have transferable prohibited species catch (PSC) allocations as part of a catch share program,
- inshore processors when receiving or processing Bering Sea pollock.

NMFS recommended that all catcher/processors and motherships be placed in full coverage to obtain independent estimates of catch, at-sea discards, and PSC for these vessels. At least one observer on each catcher/processor eliminates the need to estimate at-sea discards and PSC based on industry provided data or 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 while they are participating in these programs. These programs include Bering Sea pollock (both American Fisheries Act and Community Development Quota [CDQ] programs), the groundfish CDQ fisheries (CDQ fisheries other than halibut and fixed gear sablefish), and the Central GOA Rockfish Program.

Under the catch share programs, quota share recipients are prohibited from exceeding any allocation, including, in many cases, transferable PSC allocations. All allocations of exclusive harvest privileges create some increased incentive to misreport as compared to open access or limited access fisheries. Transferable PSC allocations 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 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 taking deliveries of Bering Sea pollock are in the full coverage category because of the need to monitor and count salmon under transferable PSC allocations.

1.1.2 Partial Coverage

The partial observer coverage category includes:

- 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 (because any halibut discarded in these CDQ fisheries does not accrue against the CDQ group's transferable halibut PSC allocation);
- 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.

Under the 2014 ADP (NMFS 2014b), the partial coverage category consisted of vessels in three "strata" (statistical subgroups) or "pools" with differing requirements:

> No Selection Pool. This category applied to all vessels less than 40 ft length overall (LOA) and catcher vessels fishing with jig gear (which includes handline, jig, troll, and dinglebar troll gear). Inclusion in this pool is re-evaluated each year in the ADP and may change in the future. Eligible landings from vessels in the no selection pool are included in the observer fee assessment.
>
> Vessel Selection Pool. This category applied to catcher vessels fishing with hook-and-line and pot gear that are greater than or equal to 40 ft and less than 57.5 ft LOA. Vessel owners or operators in this pool were not required to log trips into the Observer Declare and Deploy Systems (ODDS). However, a sub-set of vessels, randomly selected by NMFS, were required to take observers for every groundfish or halibut fishing trip that occurred during a specified 2-month period. Owners of selected vessels were contacted by NMFS at least 30 days in advance of the 2-month period.[4]
>
> Trip Selection Pool. This category applies to all catcher vessels of any length fishing with trawl gear, to hook-and-line and pot gear vessels that are greater than or equal to 57.5 ft. LOA, and to the small catcher/processors eligible to be placed in partial coverage. Owners or operators of vessels in this pool are required to log each fishing trip into ODDS. Upon logging a trip, the vessel owner or operator is immediately informed if the trip has been randomly selected for observer coverage. If the logged fishing trip is selected, then the vessel must take an observer on that trip. The observer will be provided by a NMFS contractor. Vessel owners or operators in this pool must log fishing trips at least 72 hours before anticipated departure.

[4] The vessel selection pool was discontinued at the end of 2014 due concerns about the quality of observer data from vessels in this pool. It was difficult for NMFS to accurately project the list of vessels that would fish in the vessel selection pool in each selection period, which made it difficult to randomly select vessels for observer coverage. In addition, the large number of conditional releases created concerns about bias in the data collected from vessels in this pool. These concerns are described in more detail in the 2013 Annual Report.

1.2 Annual Planning and Reporting Process

Amendments 86/76 established an annual process of 1) developing an ADP that describes plans and goals for observer 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 Annual Deployment Plan (ADP) describes how NMFS plans to deploy observers to vessels and processors in the partial observer coverage category in the upcoming year. The ADP provides flexibility to optimize deployment to meet scientifically based estimation needs while accommodating the realities of a dynamic fiscal environment. NMFS's goal is to achieve a representative sample of fishing events, and to do this without exceeding funds available through the observer fee. This is accomplished by the random deployment of observers in the partial coverage category. Specific elements of the 2014 ADP are described in more detail in Section 1.3.
>
> 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 chapter 3, the "deployment performance review" chapter, which scientifically evaluates the deployment of observers in 2014. The purpose of the deployment performance review is to evaluate whether actual deployment achieved the goals of the ADP and to identify areas where improvements are needed to collect the 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.

The annual planning and reporting process is described below:

- January – June: NMFS staff compile the annual report for the previous year. Chapter 3 (the observer deployment performance review) is prepared by the Observer Science Committee, which is described in more detail in Chapter 3.

- June: NMFS presents the annual report to the Council (including the Council's Observer Advisory Committee, Advisory Panel and Scientific and Statistical Committee) and to the public. The Council and public provide input to NMFS on the annual report. This input may be factored into the draft ADP, the next annual report, or other reports or analyses for the Council.

- June – August: Using information from the prior year's annual report and Council recommendations, NMFS prepares a draft ADP for the upcoming year.

- September: NMFS releases the draft ADP by September 1 of each year to allow review by the Groundfish and Crab Plan Teams. The Plan Teams discuss the draft ADP during September and may provide written recommendations to the Council through the Plan Team reports. The Council's Observer Advisory Committee also reviews the draft ADP and Plan Team recommendations prior to the Council's October meeting and provides written recommendations to the Council.

- October: The Council and its Advisory Panel and Scientific and Statistical Committee review the revised draft ADP and Plan Team and Observer Advisory Committee recommendations. The Council also seeks input from the public on the draft ADP. The Council may recommend adjustments to observer deployment to prioritize data collection based on conservation and management needs. NMFS will review and consider these recommendations; however, extensive analysis and large-scale revisions to the draft ADP are not feasible between October and December. This constraint is due to the short period before the December Council meeting and practical limitations on planning for deployment (including contracting with an observer provider) and associated processes that need to be in place by January 1.

- December: After final analysis of the Council recommendations, NMFS makes any necessary adjustments to finalize the ADP and release it to the public. Ideally the final ADP will be released to the public prior to the December Council meeting. NMFS also evaluates whether the Environmental Assessment (EA) prepared for Observer Program Restructuring (NPFMC 2011)[5] needs to be supplemented for the ADP. In 2014, NMFS has prepared a Supplementary Information Report explaining why the EA did not need to be supplemented.[6]

1.3 Summary of the 2014 Annual Deployment Plan

The 2014 ADP outlined the sampling plan for 2014 (NMFS 2013b[7]). The most important goal of the ADP is to achieve randomization of observer deployment in the partial coverage category. Sampling that incorporates randomization is desirable at all levels of the sampling design because 1) sampling theory dictates that randomization at all levels allows for unbiased estimation and 2) sampling is generally preferential over a census because it is more cost efficient, is less prone to bias than an imperfectly implemented census (one subject to logistical constraints), and can result in greater data quality (Cochran 1977). Once fully implemented, random deployment will greatly improve NMFS's ability to evaluate the statistical properties of estimators and improve catch estimation procedures in the future. The sampling methods described in the 2014 ADP were designed to reduce bias in observer data, improve catch estimates, and lay the groundwork for cost-effective improvements to sampling methods implemented in future ADPs.

Since 2008 the Observer Program has employed a hierarchical (nested) sampling design (Cahalan et al. 2014). Starting in 2013, randomization of samples now occurs at all levels of sampling. The ADP sets forth the sampling plan with the goal of randomization of observer deployment at the first level of the sampling design — the trip or vessel level. The other sampling levels, including sampling the haul (or set) for species composition, and sampling

[5] Restructuring of the Observer Program was implemented under Amendment 86 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 76 to the Fishery Management Plan for Groundfish of the Gulf of Alaska (Amendments 86/76). The final rule for Amendments 86/76 was published in the Federal Register on November 21, 2012 (77 FR 70062).
[6] The Supplementary Information Report for the 2014 ADP is on the NMFS Alaska Region website at: http://alaskafisheries.noaa.gov/sustainablefisheries/observers/adp_sir2014.pdf.
[7] Available on the Alaska Region website at: http://alaskafisheries.noaa.gov/sustainablefisheries/observers/adp2014.pdf .

individual fish to collect lengths, weights, and tissue samples, are achieved through the observer sampling methods that are described in the observer sampling manual (AFSC 2015).

Stratified random sampling, such as is described in the ADP, requires that sample units (trips or vessels) be assigned to a single stratum and that within a stratum a single sampling design and estimation process is used. Hence, the partial coverage trip selection stratum and the full coverage stratum are two separate strata and estimation calculations will reflect this. By definition, each trip (or vessel) must be assigned to a stratum before any fishing occurs, the probability of selection must be based on the stratum, and this probability must be known for all observed and unobserved trips (or vessels).

The 2014 ADP allocated observer effort to at-sea deployments on vessels. Observers were allocated among trips in the trip selection stratum and among vessels in the vessel selection stratum. The deployment period for vessels in the vessel selection pool was 2 months.

The two strata were sampled at a set rate with the goal to achieve a planned sampling rate while staying within the budget allocated for observer deployment.

Sample size and resulting coverage rate estimates were generated through simulation using the identical approach used for the 2013 ADP (NMFS 2013a). The deployment rate for vessel-selection was set lower (0.74) than the rate in trip-selection to preserve the weighting used in the 2013 ADP and reflect the Council's recommendation to provide inseason managers with information to monitor PSC on larger vessels while not severely compromising sampling rates in the vessel selection pool.

At the time of releasing the 2014 ADP, fisheries were ongoing; therefore, NMFS did not know the actual budget available for deploying observers in 2014. Instead of projecting fee revenue for mid-July through December 2013, NMFS identified a target budget of $4.8 million to use for the simulations. This target budget aimed to have a similar number of at-sea observer days 2014 as in 2013 (NMFS 2013b). The initial deployment rate described the 2014 ADP were 10.2% of vessels for the vessel selection pool, and 13.7% for the trip selection pool.

After the final ADP was released and before the start of 2014, increases in the available budget changed the tolerance for risk for NMFS. In addition, NMFS noted that the effort in 2012 was unrealistically high for 2014. Therefore, simulations were re-run and NMFS set the final deployment rates for 2014 as:

- 12% of vessels for the vessel selection pool, and
- 16% of trips for the trip selection pool.

The realized deployment rates in each of the selection pools are described in Chapter 3.

In its October 2013 review of the draft 2014 ADP, the Council recommended "continuing the policies that allow vessels to make an annual selection for 100% coverage in the BSAI Pacific cod fishery, not displacing IFQ crew members, and conditional release of vessels to address space and safety concerns." The Council accepted NMFS's recommendation to offer conditional releases only to vessels in the vessel selection pool (see Section 1.4.6 of the 2014 ADP).

In addition, the Council also accepted NMFS's recommendations to revise the approach for collecting data about salmon prohibited species catch in the GOA trawl fisheries. Under the 2014 ADP, NMFS planned to sample Chinook salmon from randomly selected trips for both pollock and non-pollock trawl vessels fishing in the GOA. Observers collected genetic samples from a census of Chinook salmon for observed trips on pollock trawl catcher vessels delivering to shoreside processors and from at-sea samples for observed trips on non-pollock trawl catcher vessels. As a result of the changes in salmon sampling, NMFS did not deploy observers to the shoreside processing plant and instead used all funds for at-sea observer coverage. For more information, see Section 1.4.5 of the 2014 ADP.

NMFS also continued to incorporate into the ADP the Council's recommendations that trawl catcher vessels participating in the BSAI Pacific cod fishery be allowed to voluntarily take full coverage and carry an observer at all times while fishing in the BSAI in 2014. This provision responded to industry requests to take full coverage to better manage their halibut PSC limits and to minimize bycatch to the extent practicable. In 2014, the Council also placed a high priority on the regulatory amendment needed to authorize this policy on a permanent basis. However, due to the priority of other projects, the project was not tasked for analysis until early 2015. Table 1-1 summarizes the number of vessels that have opted into full coverage under this provision in 2013 through 2015.

Table 1-1. Number of trawl catcher vessels that voluntarily participated in the full observer coverage category and total number of vessels that participated in the BSAI Pacific cod fishery, 2013-2015.

Number of vessels	2013	2014	2015
Volunteering for full coverage	40	37	31
Total in BSAI Pacific cod fishery	53	48	48

1.4 Changes that have been made since the 2014 ADP

This Annual Report is focused on evaluation of 2014, however, changes have been made to the sampling plan that are being implemented in 2015. Here we provide a summary of the changes that have been made since the 2014 ADP.

- Starting in 2015, NMFS used the trip-selection method (i.e., the trip-selection pool) to assign observers to vessels and the vessel-selection method was discontinued. NMFS anticipates that moving to trip-selection method will correct sampling frame problems that NMFS identified with the vessel-selection method in the 2013 Annual Report (2014a) and are reported again in this report (see Chapter 3) for 2014.

- NMFS deployed observers into two trip-selection pools for 2015:
    - *Small vessel trip-selection***:** This pool is comprised of catcher vessels that are fishing hook-and-line or pot gear and are greater than or equal to 40 ft, but less than 57.5 ft in LOA. The vessels in this pool were in the "vessel-selection" pool in the 2013 and 2014 ADPs.

- *Large vessel trip-selection***:** This pool comprises three classes of vessels: 1) all catcher vessels fishing trawl gear, 2) catcher vessels fishing hook-and-line or pot gear that are also greater than or equal to 57.5 ft LOA, and 3) catcher-processor vessels exempted from full coverage requirements. This pool was termed the "trip-selection" pool in the 2013 and 2014 ADPs.

- Anticipated selection rates in 2015 are 12% for the small vessel trip-selection pool and 24% for the large vessel trip-selection pool. NMFS will report on the realized coverage rates in the 2015 Annual Report, which will be presented to the Council in June, 2016.

- In 2015, NMFS is granting conditional releases in the small vessel category under two scenarios: 1) vessels with insufficient life-raft capacity to accommodate an observer, or 2) vessels that are not released due to insufficient life-raft capacity shall be released from observer coverage on their third trip if it is consecutive to two previously observed trips (i.e., two trips in a row were observed, resulting in the third trip being released from coverage).

2 FEES AND BUDGET

2.1 Budget for partial coverage category in 2014

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 second year that fees were collected from the partial coverage fleet. Fee collections from 2013, the first year of the restructured Observer Program, were billed in January 2014, and fee collections from 2014 were billed in January, 2015. Fee billing statements were mailed to approximately 100 processors on January 9, 2015. All but five bills were paid in full. In order to collect delinquent fees, five 30-day notices were mailed to processors on March 19, 2015, two 60-day notices were mailed on April 17, 2015, and one 90-day notice will be mailed on May 17, 2015. Processors submitting late fee payments were charged an administrative fee of $25 plus interest on the observer fees with each notice. A total of $3,458,715.87 in observer fees will be collected once all bills are paid. NMFS greatly appreciates the cooperation of processors in prompt payment of observer fees because one of the more expensive administrative costs of a fee collection program is collection of delinquent accounts.

The sequestration of funds initiated under the 2011 Budget Control Act affects the Observer Fund. NOAA was authorized to transfer $3,944,606 to the Alaska Fisheries Science Center (AFSC) to fund the observer deployment contract and this transfer was made on April 2, 2014. At the direction of the Office of Management and Budget under sequestration procedures, the remaining $306,846.17 (7.2%) is being held in the Observer Fund. The Alaska Region Office has been informed that these remaining funds will be transferred to the AFSC in fiscal year 2015. However, NMFS is uncertain how the actual application of the sequestration procedures to this fund will occur and so far none of the sequestered funds have been transferred to AFSC.

In addition to the $306,846.17 in sequestered funds, an additional $900,000 in unused observer funds were carried over from FY14 to FY15 (for a total of $1,206,846.17). The carryover funds will be used to fund the observer deployment contract in 2015. These two additional sources of funding bring the total observer funds available for the 2015 observer deployment contract to $4,665,938.42 (Table 2-1).

In calendar year 2013, the Council requested an additional $1.4M in funding from NMFS ($550K to account for the decline in groundfish prices and resulting shortage in fee collection revenues; $500K for cooperative research on electronic monitoring; and $339K in infrastructure costs). NMFS provided the full amount requested. A portion of these additional funds ($550,000) were used to fund the observer deployment contract. In calendar year 2014, the Council again requested an additional $1.5M in funding from NMFS to offset lower revenues from the fee collection proceeds. NMFS has contributed $1.4M in Federal funds (Table 2-1) in calendar year 2015.

2.2 Fees Collected from 2014, Summarized by Species, Gear, and Area

Observer coverage for the partial coverage category is funded through a system of fees based on the ex-vessel value of groundfish and halibut, with potential supplements from Federal appropriations. The objective of the observer fee assessment is to levy a fee on all 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.[8]

A fee equal to 1.25% of the ex-vessel value is assessed on the landings of groundfish and halibut subject to the fee. 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 2014 fee assessments were published in the *Federal Register* on December 9, 2013 (78 FR 73842).[9]

NMFS assesses each landing report submitted via eLandings and each manual landing entered into the IFQ landing database and determines if the landing is subject to the observer fee and, if it is, which groundfish in the landing are subject to the observer fee. All IFQ or CDQ halibut in a landing subject to the observer fee are assessed as part of the fee liability. For any groundfish or halibut subject to the observer fee, NMFS applies the appropriate standard ex-vessel prices for the species, gear type, and port, and calculates the observer fee liability associated with the landing.

The intent of the Council and NMFS is for vessel owners to split the fee liability 50/50 with the processor or registered buyer. While vessels and processors are responsible for their portion of the fee, the owner of a shoreside processor or a stationary floating processor and the registered buyer are responsible for collecting the fee, including the vessel's portion of the fee, and remitting the full fee liability to NMFS. Fee liability notices (fee billings) are sent in January of each year, and the fees are due to NMFS by February 15.

Table 2-2 through Table 2-4 summarize the observer fee liabilities that accrued for 2014.

[8] 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) and shown on page 2 of an informational bulletin titled "Observer Fee Collection" on the NMFS Alaska Region website at:
http://www.alaskafisheries.noaa.gov/sustainablefisheries/observers/observerfees.pdf.
[9] Available online at: http://alaskafisheries.noaa.gov/notice/78fr73842.pdf

Table 2-1. Summary of the fees and Federal funding for partial coverage observers across the respective years.

	2012		2013		2014		2015	
	Fees	Federal	Fees	Federal	Fees	Federal	Fees	Federal
Funds at the start of the calendar year	$0		$0		$0		$1,206,846	
Fees deposited during the calendar year	$0		$0		$4,251,452		$3,458,715	
Funds paid out during the calendar year	$0	$4,484,962	$0	$2,115,166	$3,044,606	$1,892,808	$4,665,938[1]	$1,400,000
Observer Days at the start of the calendar year	0	0	0	4,535	0	2,915	2,471	239
Observer Days purchased during the calendar year	0	4,535	0	1,913	2,596	1,772	4,369[2]	
Observer Days used during the calendar year	0	0	0	3,533	125	4,448		

[1]These funds will be paid out to the contract in 2015 when all the funds have been received.
[2]The approximate number of days that will be purchased when the funds above are paid out.

Table 2-2. 2014 observer fee liability[10] 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 Groundfish	Total All Species
Hook and Line	<40	$194,810	$18,188	$15,345	$93	$1,331	$229,767
	40 - 57.5	$356,384	$227,004	$44,505	$223	$8,713	$636,828
	>57.5	$498,802	$482,805	$22,720	$85	$10,163	$1,014,575
	H&L Total	$1,049,996	$727,997	$82,571	$400	$20,206	**$1,881,171**
Jig	<40	$427		$1,717	$4	$101	$2,248
	40 - 57.5	$622		$4,194	$20	$135	$4,970
	>57.5	$249		$56	$1	$20	$326
	Jig Total	$1,298		$5,967	$24	$256	**$7,545**
Pot	<40			$109		$25	$134
	40 - 57.5			$27,953	$5	$263	$28,221
	>57.5		$27,882	$350,622	$108	$5,582	$384,193
	Pot Total		$27,882	$378,683	$113	$5,870	**$412,548**
Trawl	40 - 57.5			$1,906	$13,509	$294	$15,708
	>57.5		$13,211	$432,912	$636,670	$58,951	$1,141,744
	Trawl Total		$13,211	$434,818	$650,179	$59,245	**$1,157,452**
Total All Gear		**$1,051,294 (30%)**	**$769,089 (22%)**	**$902,038 (26%)**	**$650,717 (19%)**	**$85,577 (2%)**	**$3,458,716 (100%)**

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

[10] Administrative fees and interest charged for late fee payments are not included.

Table 2-3. 2014 observer fee liability[11] by gear type, vessel size category, and species or species in the *Gulf of Alaska.*[12]

Gear	Vessel Length Category	Halibut	Sablefish	Pacific Cod	Pollock	All Other Groundfish	Total All Species
Hook and Line	<40	$147,093	$16,945	$15,344	$93	$1,297	$180,772
	40 - 57.5	$303,136	$207,691	$37,021	$223	$8,521	$556,591
	>57.5	$405,304	$459,476	$16,022	$85	$9,724	$890,611
	H&L Total	$855,533	$684,112	$68,387	$400	$19,542	**$1,627,975**
Jig	<40	$274		$1,708	$4	$101	$2,086
	40 - 57.5	$622		$4,188	$20	$135	$4,965
	>57.5	$249		$56	$1	$20	$326
	Jig Total	$1,145		$5,952	$24	$256	**$7,377**
Pot	<40			$109		$25	$134
	40 - 57.5			$12,175	$5	$145	$12,325
	>57.5			$151,292	$107	$5,411	$156,811
	Pot Total			$163,576	$113	$5,581	**$169,270**
Trawl	40 - 57.5			$1,906	$13,509	$294	$15,708
	>57.5		$13,211	$156,458	$630,621	$58,921	$859,211
	Trawl Total		$13,211	$158,363	$644,130	$59,215	**$874,919**
Total All Gear		**$856,678**	**$697,323**	**$396,279**	**$644,667**	**$84,594**	**$2,679,541**

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

[11] Administrative fees and interest charged for late fee payments are not included.
[12] 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. 2014 observer fee liability[13] by gear type, vessel size category, and species or species group in the *Bering Sea/Aleutian Island*.[14]

Gear	Vessel Length Category	Halibut	Sablefish	Pacific Cod	Pollock	All Other Groundfish	Total All Species
Hook and Line	<40	$47,717	$1,243	$1		$34	$48,995
	40 - 57.5	$53,248	$19,313	$7,484		$192	$80,237
	>57.5	$93,498	$23,329	$6,698		$438	$123,964
	H&L Total	$194,463	$43,885	$14,183		$664	**$253,196**
Jig	<40	$153		$9			$162
	40 - 57.5			$6			$6
	Jig Total	$153		$15			**$168**
Pot	40 - 57.5			$15,777	$0	$118	$15,896
	>57.5		$27,882	$199,329	$1	$171	$227,382
	Pot Total		$27,882	$215,107	$1	$289	**$243,278**
Trawl	>57.5			$276,454	$6,049	$30	$282,533
	Trawl Total			$276,454	$6,049	$30	**$282,533**
Total All Gear		**$194,616**	**$71,767**	**$505,760**	**$6,049**	**$983**	**$779,175**

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

[13] Administrative fees and interest charged for late fee payments are not included.
[14] Includes Pacific halibut regulatory areas 4A, 4B, 4C, and 4D; and sablefish regulatory areas Bering Sea and Aleutian Islands.

2.3 Costs

2.3.1 Programmatic Costs

The Fisheries Monitoring and Analysis Division (FMA) monitors groundfish and halibut fishing activities in the U.S. Exclusive Economic Zone off Alaska. Fishery observers collect data that are used for quota monitoring, stock assessments, ecosystem investigations, documenting incidental injury and mortality of marine mammals and other protected species, and various research investigations. FMA staff are responsible for a suite of activities that support the overall observer data collection enterprise on board commercial fishing vessels and at shoreside processing plants. FMA has a total of 50 staff located in: Seattle, WA (44), Anchorage, AK (4), Kodiak, AK (1), and Dutch Harbor, AK (1). The AFSC allocates a budget to FMA each fiscal year. Note that the Federal fiscal year runs from October 1 through September 30. In fiscal year 2014, FMA was allocated and spent $7,181,607 in Federal appropriations in support of the following activities:

FMA Division Leadership and Coordination emphasizes 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 have an understanding of their responsibilities and priorities. Staff also provides advice to support policy development, decision-making, and regulatory and program development by NMFS, the Council, and other regional and national bodies. They also provide guidance and advice on policy issues, monitoring programs, and related topics at the regional, national, and international level.

Fishery Dependent Data Analysis and Interpretation 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 at-sea sampling on commercial fishing vessels. Analysts also work closely with the Alaska Regional Office and Council staff ensuring that FMA provides relevant, high quality information for fisheries management and in support of requests from the Council and other constituents.

Application Development and Data Presentation develops custom software that supports the recording of fishing effort, location, species composition and biological data collected by fishery observers from the 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. In addition, together with FMA Analysts, staff working under this activity developed and continue to support the Observer Declare and Deploy System (ODDS) which allows vessel owners to register, edit, and close fishing trips. This application was developed with independent modules for FMA management, the observer coverage services provider which includes the ODDS call center, and each vessel owner.

In-season Operations activities include data entry, data validation, and observer support, as well as industry, interagency, and interdivisional support. Staff members install and maintain custom software which is used to transmit observer information and data, ensure observers are trained on

the use and configuration of the software, and provide near real time data quality control and guidance for observers using these systems. In addition, staff provide data entry support and verification for all non-electronic data submissions as well as providing technical support to the ODDS call center.

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 regularly updated and created in response to changes in regulations, data needs for stock assessment and ecosystem-based fishery modeling efforts. Training methods are updated to best convey the complex topics and concepts to the observer work force.

Debriefing and Quality Control ensures FMA's established data collection procedures were properly followed during observer deployments to commercial fishing vessels and processing facilities. Staff members assist at-sea observers through communications (referred to as in-season advising) available through custom software for answering questions, correcting data errors, and ensuring safety concerns are addressed. In addition, they document and evaluate each observer's data collection methodologies through interviews, electronic vessel surveys, and written descriptions submitted by an observer. Staff conduct data quality control checks on data collected by fishery observers; verifying the accuracy of recorded data, identifying errors, and ensuring observers make the necessary corrections.

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 provide 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 conduct 1- and 2-day briefings at this field office and maintain an inventory of complete sampling and safety gear sets for observers redeploying directly from the Anchorage office.

Kodiak Field Office provides support to observers primarily assigned to vessels in the Gulf of Alaska. Support includes conducting pre-cruise briefings with vessel representatives and observers prior to the observer's first trip aboard; conducting mid-cruise debriefings with observers to address any safety concerns on their vessels, and review their data collection methodology and recorded data, providing in-situ problem resolution, and issuing sampling and safety equipment. In addition, they receive, track, and ship biological samples that are collected by observers in support of resource management, scientific research, and observer training. They also serve as the primary FMA contact for observed vessels and processing facilities in the Gulf of Alaska.

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 aboard, conducting mid-cruise debriefings with observers to address any safety concerns on their vessels, and review data collection methodology and recorded data, providing in-situ problem resolutions, and issuing sampling and safety equipment. In addition, they conduct observer sample station and scale inspections on board commercial fishing vessels to ensure the sample stations meet the standards required in federal regulations. They also serve as the primary FMA contact for observed vessels and processing facilities in the Bering Sea and Aleutian Islands.

Observer Gear Inventory and Deployment ensures fishery observers have the sampling and safety equipment needed to conduct their work within any fishery operation they are assigned to observe. This requires that staff ensure there is sufficient gear inventory to supply the observers deployed throughout the year. They also ensure the field offices in Anchorage, Dutch Harbor, and Kodiak have sufficient gear to supplement observer needs and provide for losses or the exchange of observer gear during deployment. In addition, staff develop inventory control systems and policies to maintain safety equipment, ensure sampling equipment readiness, and monitor equipment losses.

Partial Coverage Deployment and Funding ensures the infrastructure and contracts are in place to meet the observer deployment requirements of BSAI Amendment 86 and GOA Amendment 76. Staff provide oversight of the fishery observer services provider contract; serving as the primary point of contact for the contracted provider and FMA. They coordinate with NOAA's Acquisition and Grants Office to develop future Requests for Proposals. Staff also 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.

Electronic Monitoring (EM) was formed as a unique activity within FMA starting in 2013 and has continued to dedicate staff time to the development and integration of electronic technologies in Alaskan fisheries. In April 2014, the Council convened an EM Workgroup to develop alternatives for EM in the small hook-and-line fleet. Several FMA staff participated in the workgroup and have a lead role in planning and executing coordinated research activities that will advance the science of EM and increase efficiencies in interpreting resulting data.

2.3.2 Contract Costs for Partial Coverage

Funding for observer deployment in the partial coverage component of the restructured Observer Program in 2014 was provided through a combination of Federal funds and observer fee collections. Additional Federal funds were allocated in 2013 to continue 2014 coverage until fee proceeds were available from the U.S. Treasury for NMFS spending. Future observer funding in the partial coverage component of the Observer Program will largely be dependent on fee proceeds. Additional funds were added in 2014 to make up for a shortfall of anticipated funds from the fee collection proceeds of 2013.

In 2014, a total of $4,937,414 ($3,044,606 in observer fees and $1,892,808 in Federal funds) was used to purchase 4,368 observer days (2,596 with observer fees and 1,772 with Federal funds) to be used towards the 2014 implementation year of the program. In 2014, NMFS managed the available observer days conservatively with coverage rates set to spend, on average, 90 percent of the days. This approach was necessary to ensure that NMFS did not overspend as money was

not available in 2014 to procure additional days. NMFS also needed to consider that observer days would be needed until fee proceeds became available. There is some uncertainty regarding when the fee proceeds will be available from the Treasury for spending. The fee proceeds were transferred to the AFSC on April 2, 2014, and Task Orders on the contract were used to allocate these fees to sea days. At the close of 2014, NMFS had used 4,573 observer days and carried 2,710 observer days already procured with observer fess and Federal funds into 2015.

Estimated cost per day for partial coverage

Through calendar year 2014, NMFS has spent $11,537,542 to procure 10,816 observer days for an average cost per observer day is $1,067 per day. The cost is a combination of a daily rate, which is paid for the number of days the observer is on a boat or at a shoreside processing plant, and reimbursable travel costs. The contractor also must recoup their total costs and profit through the daily rate, which includes the costs for days the observers are not on a boat. These days include training, travel, deployed in the field but not on a boat, and debriefing.

The observer coverage under the first two years of the program fell under a 2-year contract awarded to A.I.S., Inc. A second contract was awarded to A.I.S. in April, 2015, for the next 5 years of the program (see Section 2.5 and Section 2.6.1). The detailed breakdown between daily rate and travel is confidential and NMFS has been advised that it can only release information on the amount of services (observer days) after services have been procured. Table 2-1 provides a summary of funds spent and the number of days procured so far in the program, which result in the average cost of $1,067 per day. Future annual reports will continue to provide information and funds spent, days procured, and the average cost per day under the new contract. NMFS anticipates that the average cost per observer day is likely to be reasonably stable over the next 5 years and not vary dramatically from average costs we have seen thus far in the program.

It is worth noting that during the first two years of the program, the partial coverage costs in the North Pacific have been on par with partial coverage, government-contracted observer costs in other regions (e.g., $1,200/day in the North East region[15]). There are several factors that impact the costs in partial coverage, particularly when compared to costs in full coverage:

- The partial coverage contract is a Federal contract between NMFS and the observer services provider company whereas the full coverage observer providers do not operate under a federal contract. Instead, full coverage observer providers are certified by NMFS and contract observer services directly with vessels;
- 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;
- Partial coverage observers deploy out of many small, remote port locations which increases travel and lodging costs;
- The average trip duration for partial coverage observers is significantly shorter (3 to 5 days) than for full coverage observers (60 to 90 days), requiring more travel between vessels.

[15] http://www.nefsc.noaa.gov/fsb/SBRM/2014/Proposed_2014_Observer_Sea_Day_Allocation_05222014_rev.pdf

- All travel costs and expenses incurred are reimbursed in accordance with the Government's Travel Regulations which includes specified per diem rates which are paid regardless of actual expenses;
- Partial coverage is inherently inefficient compared to full coverage as days when observers are not deployed are expected, but difficult to predict; risk and uncertainty regarding the number of unobserved days are likely to influence costs.

2.4 Estimated Cost Per Day for Full Coverage

Since 2011, certified observer providers have been required to submit copies of all invoices for observer coverage under 50 CFR part 679 (75 FR 69016; November 10, 2010). The invoices are submitted to, and compiled by, FMA staff. Regulations governing the submission of observer invoices are at § 679.52(b)(11)(viii). These regulations require the submission of 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. These invoices provided the data used to calculate the average cost of observer coverage in the full coverage category for 2014.

Figure 2-1 summarizes the average costs to fishing vessels and processors in the full coverage category by sector and gear type in 2014. Figure 2-1, part (a) shows the average number of observer days for vessels in five vessel and processor categories, and the average daily rate observer providers charged for observer coverage in each of these categories. Days may include days by more than one observer in a year, and days for an operation may exceed 365 days in a year if multiple observers were present. The average daily rate costs range from $325/day for shoreside processors to $336/day for catcher/processors using trawl gear. This reflects the variable costs only. Figure 2-1, part (b) shows the estimated average variable and fixed costs for observer coverage for vessels and processors. Variable costs equal the product of the daily rate for coverage and the number of days of observer coverage. Fixed costs equal total invoiced expenses minus the variable costs, and are primarily costs of transporting observers to and from their stations.

The total cost billed to 177 vessels and processing facilities for observer coverage in the full coverage category in 2014 was $14,478,545. The total number of observer days represented by these invoices was 39,068. Based on this information, the average cost per day of observer coverage in the full coverage category in 2014 was $371. This average combines invoiced amounts for the daily rate per observer day (variable cost) plus all other costs for transportation and other expenses (fixed costs).

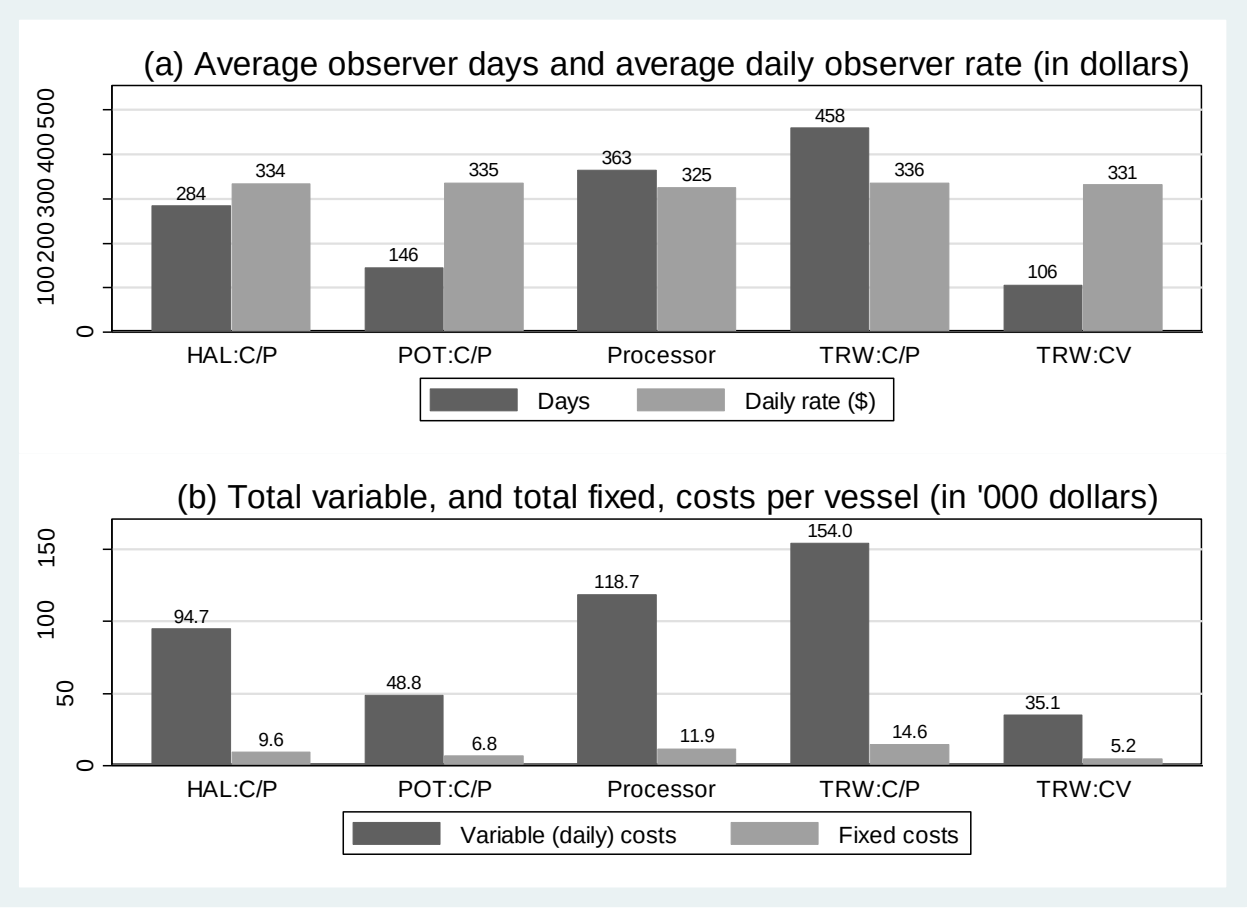

Figure 2-1. Variable costs (a, b) and fixed costs (b) to vessels and processors, by sector and gear type, for observer coverage in the full coverage category in 2014.

2.5 Contract Process

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). NMFS receive legal guidance on the FAR through NOAA contract attorneys and AGO staff. The detailed costs on the Federal contract are protected by confidentiality as they contain competitive information. NMFS has been advised that it can only release information on the amount of services (observer days) after the contract task order is awarded and services have been procured. Note that detailed information on costs for all NOAA observer contracts were requested in a 2013 Freedom of Information Act request and this request is currently in litigation.

After a contract is awarded by NOAA, 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.

In September 2012, NOAA awarded a 2-year contract to A.I.S., Inc. for the provision of fishery observer services to the partial coverage component of the Alaskan fleet. The contract expired in September 2014, but was extended for an additional 6 months until March 30, 2015. Observer provider services continued beyond the expiration date on existing task orders that had been purchased on the 2-year contract. On October 2, 2014 a solicitation for a new observer services contract for the North Pacific was released on FedBizOpps.gov. All proposals were due by November 3, 2014. In April 2015, NOAA awarded a 5-year contract to A.I.S., Inc.

Federal contracting procedures and milestones were discussed in the Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis for restructuring the Observer Program (NPFMC 2011). Additional information can also be found at http://www.easc.noaa.gov/APG/. Although the contract is confidential and not made public, the Request for Proposals for the currently awarded contract is available to the public.[16]

2.6 Cost Savings and Efficiencies

2.6.1 Partial Coverage

The new observer service provider contract was awarded on April 22, 2015. The rates that NMFS currently pays the observer services contractor were established through a competitive bidding process. The new contract has several components designed to improve efficiency and reduce costs. For example, the new contract requires that partial observed sea day completed by the contractor are paid one-half the fixed price daily rate. A partial observed sea day is one in which the vessel leaves port after 1200 (noon) or returns to port before 1201. The lower rate would thus apply to all days in which an observed vessel leaves or arrives in port before or after the designated times.

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 must factor in an estimate for the contractor's costs for unobserved days. Increasing the proportion of time spent at sea would increase the efficiency of the overall program.

Similar to the last contract, NMFS included the provision of observers to staff NMFS survey vessels, paid through Federal appropriations. While not related directly to observer services, this modification allows the contractor to provide additional work to their employees during the summer season when observer opportunities are more limited. This provides their employees continuity in employment, additional experience, and may help to reduce employee turnover, thereby increasing their overall efficiency. NMFS survey staff get trained observers with sea experience to help to conduct their fieldwork. The survey fieldwork is funded with NMFS appropriations outside the scope of the observer fee or FMA appropriations.

[16] Available online at: https://www.fbo.gov/index?s=opportunity&mode=form&id=a39e12eac42aaa4b0d10e98388792339&tab=core&_cview=1

2.6.2 Full Coverage

The costs associated with the full coverage component are the direct costs that industry pays to certified observer providers, sometimes referred to as "pay as you go." The fees observer providers charge recoups their costs associated with recruiting, paying observers to attend training and debriefing, and deploying observers on the full coverage sector of the fleet. There are currently four active certified providers in Alaska and they compete for the business of industry. The full coverage costs are described in Section 2.4.

NMFS has implemented regulations that limit deployment, set minimum qualifications, require specific experience for observers assigned to certain deployments, and require specific reporting. Efficiencies could potentially be gained by increasing competition, reducing constraints, or increasing efficiency of NMFS supporting activities.

The majority of business is conducted by three of the four NMFS certified observer providers. This pool is down from a high of 10 certified providers in 1991. It is NMFS's understanding that the pool was reduced due to competition, so it is uncertain if a new provider could be competitive, or if the impact would result in substantial increases in efficiency.

NMFS last received an application from a new observer provider in 2012, and NMFS declined to consider the application due to the workload associated with implementing the restructured Observer Program. An additional concern was the potential for confusion of a new certified observer provider beginning work at the same time. NMFS does not have any applications for certification pending at this time. Note that increasing the number of certified providers would increase the workload and reduce the efficiency of NMFS due to the time required to ensure a new observer provider was complying with applicable regulations.

Reducing regulatory requirements has often been proposed as a mechanism that could improve efficiencies and thereby reduce costs. For example, NMFS currently requires educational minimums for observers, physical exams, limits deployment durations, and requires minimum experience levels for more complex deployments. Each regulation governing the Observer Program was put in place for a specific reason, and NMFS has not identified any specific regulations that it believes are unnecessary at this time.

2.6.3 FMA Supporting Activities

FMA provides a range of activities described in Section 2.3 that directly support both the full coverage and the partial coverage components of the program. The ongoing provision of this work is essential to the overall function of the Observer Program and efficient completion of these tasks can directly impact costs. For example, if NMFS were to cut the frequency of training, observer providers would need to retain more experienced observers, which could increase their costs. If they were unable to retain experienced observers, industry would be unable to obtain required coverage and thus experience delays and disruptions in fishing operations.

3 DEPLOYMENT PERFORMANCE REVIEW

3.1 Introduction

This chapter contains the Observer Science Committee (OSC) review of the deployment of observers in 2014 relative to the intended sampling plan and goals of the restructured Observer Program. Each year the Alaska Fisheries Science Center's (AFSC) Fisheries Monitoring and Analysis (FMA) Division establishes an *ad hoc* OSC for the North Pacific Groundfish and Halibut Observer Program (Observer Program). The OSC is intended 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). OSC members must have practical, analytical and scientific expertise relating to the observer sampling of groundfish and halibut fisheries of the BSAI and GOA and/or the use of the resulting data. If possible, the OSC is represented by at least one member of the AFSC/FMA (Observer Program) Division, one member of the AFSC/Stock Assessment and Multispecies Assessments Program, one member of the Alaska Regional Office (AKRO)/ Sustainable Fisheries Division, and one member of the International Pacific Halibut Commission (IPHC).

This chapter 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 2016 Annual Deployment Plan (ADP). The goal of sampling under the restructured program is to randomize the deployment of observers into fisheries to collect representative data used to estimate catch and bycatch, assess stock status, and determine biological parameters used in ecosystem modeling efforts and salmon stock-of-origin analyses. Therefore, this evaluation focuses on the randomization of observer deployments (primary sampling units) under the restructured Observer Program, and how departures from a random sample affect data quality. It does not evaluate the catch estimation process that is evaluated and summarized in separate documents (Cahalan et al. 2014).

3.2 Observer Deployment Performance Metrics

Performance metrics have been developed to assess the efficiency and effectiveness of observer deployment into the partial coverage strata. These metrics reflect four mechanisms that can impact the quality of the data: sample frame discrepancies, non-response, trip differences, and sample size.

Sample frame discrepancies (under- and over-coverage of the sample frame) are used to quantify the differences between the sampled population and the population for which estimates (inferences) are made, as well as to identify possible mechanisms of bias. Non-response assessments are made to quantify the differences between the selected sample (selected trips or vessels expected to be observed) and the actual observed sample (observed trips or vessels after non-response drivers such as releases) that may lead to bias in the resulting data. Other measures that address potential observer deployment effects (sensu the "observer effects" of Benoit and Allard [2009]) are focused on the representativeness of the sample; for example whether observed trips have similar characteristics to unobserved trips such as areas fished, numbers of

species landed, and trip duration. Adequacy of sample size is evaluated by assessing whether sample sizes were large enough to ensure data were captured for all types of fisheries.

Specifically, the probability of selecting a sample and observing no trips in a specified area is used to evaluate the adequacy of the sample rates used in 2014.

This chapter is an evaluation of whether the deployment of observers is representative of fishing effort. This focus on observer deployment is important because it represents the first tier of the observer hierarchical sampling design from which all haul, species composition, length, age, sex, maturity, and genetic data collections depend on.

It has been argued that variance of the resulting catch estimate be used as a performance metric to determine adequate sample size for observer programs (NMFS, 2004). However, given the multiple sources of variance that results from the complex nature of the sampling and estimation routines used in the North Pacific, final variance and catch estimates are neither the only metric nor necessarily the best metric for evaluating stratification and randomization of sampling of primary sample units (trips, vessels). For example, an analytical focus on variance does not evaluate the overall *quality* of the underlying data collection process.

The performance measures listed below are meant to assess the representativeness of the data collected by the Observer Program through the implementation of the 2014 ADP.

3.2.1 Description of Performance Metrics Used in this Evaluation

1. Deployment rates for each stratum: This is the basic level of evaluation comparing sampling rates targeted and achieved. Implementation challenges can be identified in this step, such as: sample frame inadequacy, selection biases, and issues with sample unit definitions (e.g., tender trips). Specifically, this section assesses the following:
    a. Sample rates (partial selection strata) and number of samples (vessel selection strata) 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 (trips or vessels) that are not part of the target population. When these elements are included in the random sample, effort (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 data 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 estimators of parameters of interest. A randomized sample design is expected to achieve a rate of observed events (relative to the trip or vessel strata) that is similar across both space and time. The hypergeometric distribution is used to construct several of these metrics. This distribution

describes the probability of selecting sample units (e.g., trips) with specific characteristics (e.g., NMFS Reporting Area) based on a sample taken from a population with known characteristics (e.g., trips that occurred in a NMFS Reporting Area). Representativeness of the sample was divided into three separate components:

a. Temporal representativeness
    i. Effort plots: plots of expected and actual observed effort over time. Areas where these two lines deviate from each other are indicative of periods with differential realized sample rates (and potential temporal bias).
b. Spatial representativeness
    i. Maps: Maps provide a visual depiction of the spatial distribution of observer coverage relative to effort in each partial coverage stratum, as well as where low or high coverage rates occurred.
    ii. Probability of selecting a sample and observing a fewer or greater number of trips within an area than would be expected given the implemented sample rates. This probability of observing as many or a more extreme number of trips for each NMFS Reporting Area (e.g. are 610, 620, 630, etc. in the GOA) and deployment stratum is determined using the hypergeometric distribution.
c. Representativeness of trip characteristics: Consistency of trip characteristics for observed and unobserved portions of the stratum. Attributes include:
    – Trip duration
    – Vessel size
    – The number of NMFS Reporting Areas visited during the trip
    – The amount of landed catch
    – The number of species in the landed catch (also known as species richness)
    – The proportion of the total landed catch that was due to the most prevalent species (a measure of species diversity).

3. Adequacy of sample size: A well-designed sampling program will have a sample large enough to reasonably ensure that the entire target population is sampled (represented in the data). This determination was made through an examination of the probability of selecting a sample and having cells (e.g., defined by NMFS Reporting Area and strata) with no observer coverage as determined using the hypergeometric distribution.

3.3 Evaluation of 2014 Implementation of Observer Deployment

The deployment of observers into the 2014 Federal fisheries in Alaska needs to be evaluated at the level of the deployment stratum because each stratum is defined by a different sampling unit (trips, vessels) and sampling rate (i.e., time period). In the 2014 ADP, simulated sampling of 2012 fishing effort was conducted to achieve a set of selection rates that was anticipated to result in about a 1 in 10 chance of going over budget. Following a Council request that coverage rates in trip selection be higher than those in vessel selection, vessel selection rates were selected to be less than trip selection by the same relative amount as in the 2013 ADP (vessel selection rates = 0.74 * trip selection rates).

In the 2014 ADP, initial rates were selected assuming a NMFS budget of $4.8 million. However, actual budgets were not known at the time of the 2014 December Council Meeting (NMFS 2014b). Increases in the available budget changed the tolerance for risk for NMFS for 2014. In addition, NMFS noted that the effort in 2012 was unrealistically high for 2014. Therefore, simulations were re-run after the final ADP and before the start of 2014 with a rate set such that expected expenditures were equal to the budget. This is equivalent to the point estimate, and is a rate such that the likelihood of deploying over budget is equal to that of deploying under budget. NMFS programmed the ODDS to select 16% of trips and vessel selection draws were conducted to achieve the specified number of vessels in the 2014 ADP (NMFS 2013b).

3.4 Tracking Costs

The selection rates translate into costs through fishing effort. Therefore how close anticipated costs are to actual costs is a function of how well NMFS predicts effort and how well the NMFS achieves its sampling rate.

To inform the Observer Program of costs throughout the year, two sources of information were used. The first was the range of observer days expected to be observed from the ADP simulations. The second was the amount of observer days for which the program had data for (equivalent to payable days). Based on simulations of 2012 fishing data made a year in advance of deployment, the FMA expected observed fishing effort to be 4,718 days at the end of 2014. In 2014, the FMA deployed observers for 4,368 days, or 92.6% of anticipated budget.

On the whole, the results above imply that the FMA was very good at anticipating fishing effort and achieving its desired selection rate. However, upon closer inspection this appears to be the result of lower than expected observer days in trip selection and higher than anticipated observer days in vessel selection (Figure 3-1). The reasons for these discrepancies will be explored in greater detail within each stratum separately.

3.5 Performance of the Observer Declare and Deploy System in Trip Selection

Random selection of trips in the trip selection stratum is facilitated by the ODDS. The ODDS generates a random number according to pre-determined rates and assigns each logged trip to either "selected to be observed" (selected) or "not selected to be observed" (not selected) categories. The NMFS observer provider has access to all selected trip information necessary to schedule observer logistics. Users of the system are given flexibility to accommodate their fishing operations; up to three trips may be logged in advance of fishing.

Logged trips have different dispositions. They may be closed by a vessel operator after fishing (the desired outcome), or cancelled prior to fishing. Trips can be cancelled by the user or the observer provider. In the former case the trip is recorded as selected and cancelled while in the latter case the logged trip is recorded as a trip waiver. Any remaining trips that have not been closed at the end of the calendar year are automatically cancelled by the ODDS. The number of trips logged in the ODDS in 2014 and their dispositions is summarized in Table 3-1. Of 4,687 trips logged, a total of 570 trips were cancelled (12.2%), and 15 trips were waived (0.3%).

The ratio of the number of trips cancelled by users that had been selected and those that had not been selected for coverage is useful to determine the amount of potential manipulation of trips. If

users were trying to avoid observer coverage, then we would expect the cancellation rate (%) to be higher for selected trips compared to not-selected trips. We found that 5% of non-selected trips logged had been cancelled compared to 18.5% of selected trips logged that had been cancelled. In 2014, ODDS users disproportionately cancelled trips that had been selected for observer coverage compared to trips that had not been selected for coverage.

The flexibility offered by the ODDS means that the outcome of random selection is known to the vessel operator for up to three logged trips. In the case where ODDS users disproportionately cancel selected trips, observer coverage is expected to be less than programmed selection rates. To reduce this potential bias, ODDS is programmed to automatically select the vessel's next logged trip if a previously selected trip was cancelled by the user. Although these "inherited" trips preserve the *number* of selected trips in the year, they cannot prevent the *delay* of selected trips during the year. Therefore the potential for temporal bias is still present.

The extent to which trip selections are altered can be determined by comparing the rate of trip observation expected from 1) random selection of all logged trips (initial selection rate) and 2) random selection of remaining trips after they have had dates changed and are closed or cancelled (final selection rate). In either case, the proportion of trips selected to be observed should fall within what would be expected given the binomial distribution (since each trip is either selected or not selected). The rate obtained in the initial selection process was 15.5% and was within the range of values expected from a binomial distribution (exact binomial test p-value = 0.342). This means that the ODDS was selecting trips according to the programmed rate. The final selection rate after trips were closed and cancelled was 16.6%. The final selection rate is greater than the initial selection rate because cancelled trips that were originally selected for coverage are preserved through the inherit process, while cancelled trips that were not originally selected for coverage are not. These rates and the potential impact of trip selection waivers is presented in Table 3-2.

Differences in the initial and final selection rates are evident throughout the year. While the original selection rate rapidly rises from zero to approach the programmed rate within a month after the start of the year, that of the final selection rate lags that of the initial rate and does not approach the programmed selection rate until several months later (Figure 3-2). Near mid-year, the final selection rate eclipses that of the initial selection rate and remains higher through the remainder of the year. These patterns are consistent with the hypothesis that the disproportionate cancellation of selected trips results in a greater number of selected trips later in the year as the result of the inherit process. Had vessel operators not disproportionately cancelled their initially selected trips, the final selection rate would have been lower.

It is important to remember that ODDS only provides the expectation as to what levels of observer coverage should be from actual fishing events. While the 2014 ODDS provided users with a list of Report IDs from eLandings from which to close their logged trips, there is no way to know that such linkages between logged and realized trips are accurate. At a minimum, all trips logged should be closed or cancelled by the end of the year. In order to prevent 2014 ODDS trips from bleeding into 2015, trips that were not closed by the end of the year were automatically closed (cancelled) by ODDS. The number of these auto closed trips provides a

minimum estimate of the potential mismatch between ODDS and eLandings. A total of 259 trip selection trips were auto closed at the end of 2014 by NMFS (5.9%).

3.6 Evaluation of Deployment Rates

This section compares the coverage rate achieved against the expected coverage rates. Unlike the earlier evaluation of the ODDS, data for this evaluation derive from a special database generated for this purpose that utilizes data within the Catch Accounting System (managed by the AKRO), the Observer Program database NORPAC (managed by the AFSC), and eLandings (under joint management by Alaska Department of Fish and Game, NMFS, and IPHC). Separate rate evaluations are conducted depending on whether the unit of observer deployment was at-sea fishing trips or dockside deliveries of pollock.

3.6.1 At-Sea Deployments

Observers were deployed onto at-sea fishing trips by vessels designated as belonging to full or partial selection categories. There are two deployment strata to evaluate in full coverage; trips belonging to vessels defined in regulation (e.g. American Fisheries Act, termed regulatory full coverage), and those made by vessels that volunteered to carry full observer coverage when fishing in the BSAI (termed voluntary full coverage). Deployment strata in the partial coverage category include: trips by vessels in trip selection during the year, trips made by vessels in vessel selection during six two-month selection periods, and trips made by vessels in the no selection category. This last category includes two strata: those vessels designated as belonging to the no selection category in the 2014 ADP, and those that were removed from vessel selection because they had agreed to carry electronic monitoring technology.

Rate evaluations are based on trips for the year with the exception of the vessel selection stratum that is evaluated in terms of vessels in a two-month time period. Evaluations for the full coverage category and the no selection category are straightforward - either the coverage achieved was equal to 100% or 0%, respectively, or it was not. For trip and vessel selection strata, observed rates were expected to fall between upper and lower bounds on the expected value that were generated from the 0.025 and 0.975 quantiles of a binomial distribution (aka a 95% "confidence bound") for each time period. Coverage levels were considered to have met expectation goals if the actual value was equal to one of the upper or lower confidence bounds, or fell within them. For the trip selection stratum, the expected coverage rate was the rate programmed into ODDS. For the vessel selection strata, the expected number of vessels observed was taken from the 2014 ADP, and the expected bounds for the binomial distribution were determined from Vr where V is the total number of vessels that fished in the stratum each time period and r is the expected rate of coverage from the 2014 ADP (12%).

In 2014 there were 11 different deployment strata that were evaluated (Table 3-3). The program met expected rates of coverage for the full-coverage regulatory and full-coverage voluntary strata, the trip selection stratum, four of six time-periods within vessel selection, and the partial coverage no selection. Observer coverage was higher than expected from a 12% selection rate in two of the six time periods within vessel selection. Among all fishing in Federal fisheries of Alaska, 5,883 trips (43%) and 417 vessels (32.8%) were observed.

Coverage Rates in Vessel Selection

Two factors that impact the ability to achieve a target number of vessels to be observed in vessel selection are 1) the lack of a complete sampling frame, and 2) policies that grant releases from observer coverage based on certain conditions. A sampling frame should include all the elements of the population of interest. Hence, a sampling frame for vessel selection would consist of a list of vessels that actually fish in each 2-month deployment period. This list was not available for the vessel selection strata prior to each selection period of 2014. In trip selection, only vessels that intend to fish log trips into ODDS. Consequently, the trip-selection sampling frame for the Observer Program is equal to the target population. However in vessel selection, without a similar notification system informing NMFS of their intent to fish, the sample frame is based on past fishing behavior (specifically whether the vessel landed catch in the same 2-month period the year prior). NMFS used 2012 data to plan for coverage given anticipated budgets for the 2014 ADP, but used data from 2013 to generate lists of vessels to select from for 2014.

Obviously the list of vessels that fished 2 years ago or last year may not be the same as the list of vessels that fish in the current year. This introduces two potential sources of error. The first is the selection of vessels that fished prior to 2014 but did not fish during 2014. This is called "over-coverage" and results in sampling inefficiency (this term over-coverage derives from survey research methods and should not be confused with having too much observer coverage). To meet the target sample size (number of vessels), additional vessels are selected to carry observers. The amount of this "over-draw" was based on the expected proportion of vessels in the selection frame that will not fish in 2014 *plus* the proportion of vessels that are selected and will fish, but are expected to be granted a release from observer coverage. The greater this combined proportion, the greater the inefficiency of the sampling process and the greater the amount of over-draw in the selection. For vessel selection time periods 3 through 6, data from the current year, but from two time periods earlier to accommodate a 60-day advance notice of selection, were also used to construct the sampling frame (e.g., the first time period selection results could not inform future selections until the third time period selection, the fourth time period selection was informed by the first and second selection results).

The second source of error introduced by an incomplete sampling frame is that a portion of the population has no chance of being selected for observer coverage (no way to select "new" vessels). A new vessel in this case is one that did not fish during a time period in 2013 but will fish in the same time period in 2014; these are not included in the selection frame. These "new" vessels then have no chance to be selected for observer coverage. This is called "under-coverage" and is of particular concern because it represents a potential bias (the term under-coverage derives from survey research methods and should not be confused with having too little observer coverage). Bias would result if these new vessels in 2014 fish differently than vessels that fished in 2013 and were in the selection frame. These combined effects make vessel selection imprecise and inefficient for NMFS.

Vessels in the vessel selection strata can be classified in numerous ways depending on their fishing, selection, and observation status. Table 3-4 presents these values for each time period. The number of vessels that fished in 2014 was lower than the number of vessels anticipated to fish in the ADP in all but the second time period (row 6 vs. row 1 in Table 3-4). Values of the relative amount of overdraw, (expressed as the number of selected vessels divided by the target

number of vessels to be observed) ranged between 7.3 and 9.9 (average=8.6) among time periods. Between 10 and 71 vessels were selected and actually fished among time periods (Table 3-4, line 10). Between 5 and 35 vessels were selected, fished, and actually observed among time periods (Table 3-4, row 15).

The number of vessels that would be expected to carry observers after considering release policies is difficult to determine because a release may be granted that is only for a part of the coverage period, or for only some activities. For example, if a vessel is granted a conditional release based on a life raft with insufficient capacity, then we would expect all fishing to be released from coverage. However if a release was granted for only those trips during which an IFQ holder is on board, the vessel would carry an observer when fishing without an IFQ holder, that is, outside of IFQ fisheries. In this example the vessel has received a release based on certain criteria; in some situations there is an observer on board, whereas on other trips there is not. The data summaries pertaining to the expected number of observed vessels are presented in a generalized level in Table 3-4 on rows 12 through 20.

To measure the performance of the vessel selection process, data in Table 3-4 were expressed as relative percentages (Table 3-5). Over- and under-coverage rates in the vessel selection sampling frame are not additive, since the former is a percentage of the sampling frame, and the latter is a percent difference from the true frame (i.e. the list of vessels that actually fished). Values in these metrics were greatest in the last selection period (Table 3-5, rows 1 and 2). If being selected for coverage has no effect on the likelihood that a vessel fishes in Federal waters, we would expect that the percentage of vessels that were in the selection frames and did not fish to be approximately equal to the percentage of vessels that were in the selection frame and were selected for coverage and did not fish. Comparing the first and third lines of Table 3-5 shows that this was the case in the latter four time periods. Only in the second time period did a greater percentage of selected vessels not fish compared to the percentage of vessels that were not selected. With the exception of the second time period, it appears that the act of being selected for coverage did not greatly increase the percentage of vessels that chose not to fish in Federal waters.

The loss of information on trips that should be observed is also presented in Table 3-5. This type of non-response is represented by the number of vessels that were selected, fished, but were not observed, divided by the number of vessels that fished. It can be caused by conditional release, loss of observer data due to poor quality or failure to follow protocols, or non-compliance. The rate of non-response for "expected to be observed" vessels ranged between 36.8 and 66.2 percent and gradually increased from the start of the year to a peak in the fourth selection period before decreasing until the end of the year (Table 3-5, row 4). As expected, a similar pattern was evident in the percentage of vessels released from coverage (36.8 %, row 7).

By dividing the number of desired vessels to be observed from the 2014 ADP by the number of vessels that actually fished in 2014, the expected proportion of vessels to be observed is obtained (Table 3-5, row 8). Dividing the number of observed vessels by the number of vessels that actually fished in 2014 gives the actual proportion of vessels observed (Table 3-5, row 9). The achieved coverage rate in vessel selection was close to that expected given the number of vessels that fished, and was greater than expected in the first and third selection periods.

Types of Non-response in Vessel Selection
There were two types of releases granted in 2014: temporary exemptions and conditional releases. Temporary exemptions were granted when a vessel had more bunk space than life raft capacity. Conditional releases were granted when all available bunks were planned to be occupied by either crew or crew and IFQ holders. Table 3-6 summarizes the number of vessels that received each type of release in vessel selection.

Spatial Patterns of Non-response in Vessel Selection
The effect of non-response (expected to be observed but were not) on the spatial distribution of observer coverage was evaluated (Table 3-7). In total, 54% of the vessels and 55% of the trips resulting from these vessels, were in the non-response category (expected to be observed but were not). Non-response percentages by NMFS Area must be interpreted with caution when only a few vessels are present within each category (consider the extreme case where only one vessel fishes— the only possible percentages are either zero or 100%). With this caveat in mind, where there were more than ten trips in a NMFS Area, the non-response percentages were similar between areas. No observer data was obtained from four NMFS Reporting Areas as a result of conditional releases (Table 3-7).

Cost Trajectories Revisited
The results of the trip and vessel selection rate evaluations allow us to re-evaluate the results of the cost trajectories in Figure 3-1. It appears that for trip selection the difference between the expected days observed and actual days observed was due to changes in fishing effort between 2012 and 2014. This conclusion is supported by the fact that random selection in ODDS was according to programmed rates and the rate of observed trips conformed with expectations. For vessel selection the difference between the expected days observed and actual days observed was due to the inability to construct an adequate sampling frame. Supporting evidence comes from the fact that under and over coverage among time periods averaged 40.3%.

3.6.2 Coverage Rates for Dockside Monitoring
Observers were assigned to monitor deliveries of walleye pollock (*Gadus chalcogrammus*). The objective of this monitoring is to obtain a count of the number of salmon caught as bycatch and to obtain genetic samples from these fish in each observed pollock delivery. There have been many iterations of the sampling design used to obtain genetic samples from salmon bycatch for the purposes of stock of origin (Faunce 2015). For 2014, the level of dockside monitoring of walleye pollock should be 100% in the full coverage category, and within acceptable tolerance of expected values for a deployment rate of 16% in the partial coverage category. This is because the Observer Program gains substantial logistical efficiency by having observers that participate in at-sea coverage also monitor corresponding offloads, and all deliveries of this species are expected to occur with trawl gear that is restricted to trip selection.

One issue that arises with this Observer Program objective is how pollock deliveries are defined. The problem facing the observer is that his or her sampling protocols are dictated by the answer given by the captain as to whether or not this trip will be a pollock trip. Asking the captain for the expected fishery is necessary, since catch is not known before a trip begins. However, the fact that the captain told the observer this was a pollock trip is not recorded in landings records or the observer data. The assignment of a pollock delivery is necessarily made once the fish have been delivered and a landing report has been generated. One approach is to label any delivery

where the predominant species is pollock as a pollock delivery (i.e. trip target = pollock) while another is to use a minimum threshold of the landed catch that is comprised of pollock. The first method is referred to as the target definition, while the latter is the (minimum) ratio definition. A minimum percentage in the delivery of 20% was used here to define the ratio method since that is the definition of directed pollock fishing used by the Catch Accounting System (CAS) to assign a trip to a management program. Since there are different ways that a delivery can be assigned to the pollock fishery that are not known to the observer prior to monitoring the delivery, there is the potential for the observer to monitor a delivery that is not a pollock delivery, and to not monitor a delivery that is a pollock delivery.

The number of deliveries identified as belonging to the pollock fishery using both definitions is presented in Table 3-8. There was very good agreement (99%) between definitions across all ports. Among ports, two deliveries at Kodiak in full coverage were not identified by the target definition and King Cove had a relatively low rate of agreement in partial coverage (84.4%). From these results, we defined pollock deliveries using the minimum ratio definition and evaluated observer coverage accordingly.

In partial coverage, unbiased estimates of salmon stock of origin should arise from samples of individual fish obtained from samples of pollock deliveries given randomization protocols. However a random sample of pollock deliveries is not possible because of tendering activity. This activity occurs when a vessel delivers caught fish to a tender and that tender vessel then delivers the fish to a shoreside processing plant. Since tender vessels can provide fuel and food, it is possible that a catcher vessel can remain at sea on a single trip for the entire season. If that trip were logged into ODDS and not selected, the vessels' entire season activity would not be observed. Furthermore, the tender vessel does not log their own trips, since they are not fishing, and cannot be observed.

The relative impact of tendering activity can be illustrated by comparing the observer coverage rates by port for all pollock deliveries to those without tender deliveries. While very few pollock deliveries were unobserved in full coverage (0.31%), the chance that the coverage rate in partial coverage resulted from 16% random deployment was extremely small (exact binomial test p-value = 0.001; Table 3-9). However, when deliveries of pollock from tender trips were removed, this likelihood is dramatically increased by two orders of magnitude (p-value = 0.1). The majority of pollock deliveries in the ports of Akutan and King Cove from the partial coverage category were tender deliveries (Table 3-9).

3.7 Representativeness of the sample

3.7.1 Temporal Patterns in Trip Selection

An examination of temporal patterns in trip selection is warranted since ODDS data demonstrated that observed trips were disproportionately cancelled and coverage levels after trips were logged lagged that of originally logged trips. Under the hypothesis that there is no temporal bias in the observation of trips during the year, the number of observed trips should be close to the expected value of 16%. The cumulative number of trip selection trips was multiplied by 0.16 to obtain the expected number of observed trips, and acceptable bounds of the number of

observed trips were obtained from the 0.025 and 0.975 quantiles from the normal approximation of the binomial distribution (the 95% "confidence bounds").

The number of observed trips achieved was outside of their expected values during start of the year (Figure 3-3). We would expect that 5% of our observed values would fall outside of our upper and lower expected bounds, and the value was 15.3%. At the end of the year, the likelihood that the number of trips observed resulted from random selection at 16% (exact binomial test p-value) was 0.1. These results mean that while coverage rates were lower than expected at the beginning of the year, the final coverage rate was within expected ranges.

3.7.2 Spatial Representativeness

Under a strictly random selection of trips and with a large enough sample size, the spatial distribution of selected trips should reflect the spatial distribution of all trips. However, the interpretation of results when the number of observed trips deviates from expected values is not straightforward. The hypergeometric distribution was used to calculate the probability of having a given number of items with a certain characteristics (e.g., trip selection trips in NMFS Area 610) in a sample taken from a population (all trips in a stratum) where the number of items with that same characteristic is known (the number of trips in a NMFS Reporting Area based on landings data). The expected number of trips based on this distribution is the number of trips selected divided by the total number of trips (= sample rate) multiplied by the number of trips that fished in an area.

Using this method, we compared the expected number of sample units (trips in trip selection and vessels in vessel selection) with the observed number of sample units in each NMFS Reporting Area and stratum combination (Figure 3-4). The size of the data points in Figure 3-4 represent the probability of observing that number of sample units or a number of sample units farther from the expected number (more extreme). Small data points indicate an observed number of trips or vessels that is unlikely ($p < 0.05$) given randomized observer deployment. Given that there were 17 NMFS Areas fished in trip selection, we would expect there to be $0.05 \times 17 = 1$ small data points for this stratum. There was indeed 1.

Observations deviated more from expected in vessel selection than in trip selection. Given that there were 69 NMFS Area time period combinations fished in vessel selection, we would expect there to be $0.05 \times 69 = 4$ small data points. There were 14 small data points. All but one of these combinations had greater number of observed vessels than expected under random deployment. There was a near even distribution between trips taken in the BSAI (8) and the GOA (6). These results should be interpreted with caution however. It is not known which of these outcomes is real and which 4 are by chance. In addition, vessels may fish in more NMFS Areas when observed than when unobserved, and counts of vessels among NMFS Areas within a two month time period are not independent. Not accounting for the clustering of sampling units would result in an inflated number of cells with extreme outcomes than actually exist, although the use of vessel as the unit of measure in this analysis should help alleviate this effect.

The same data in the above analyses can also be presented in maps. Trip selection coverage rates among NMFS Areas ranged from 11.1% to 33.3% (median = 14.5; Figure 3-5). The likelihood of this amount of coverage in trip selection is depicted in Figure 3-6. Vessel selection coverage rates among NMFS Areas were more variable, and ranged from 0% to 100 (median = 16; Figure

3-7 and Figure 3-8). The likelihood of this amount of coverage in vessel selection is depicted in Figure 3-9 and Figure 3-10.

Taken together, the spatial distribution of observer coverage in trip selection is what would be expected under a random sample of trips. However there was a greater number of observed vessels in the vessel selection strata than would be expected under random deployment. These results highlight the difficulty in obtaining an adequate sampling frame in vessel selection.

3.7.3 Trip Metrics

This section is focused on answering three questions related to the deployment of observers: 1) are tendered trips identical to non-tendered trips? 2) are observed tendered trips identical to unobserved tendered trips? and 3) are observed non-tender trips identical to unobserved non-tender trips?

Six trip metrics were examined in each question. These metrics are: the number of NMFS Reporting Areas visited in a trip, trip duration (days), the weight of the landed catch (t), the vessel length (m), the number of species in the landed catch, and the proportion (0 to 1) of the landed catch that was due to the most predominant species (pMax). Total catch is comprised of retained and discarded portions. While it may be desirable to compare discarded catch or total catch between groups, there is a problem with this logic since discarded catch from catcher boats is not available from unobserved trips. Therefore retained catch represents the only "apples to apples" comparison available.

The metric vessel length was not included in the 2013 Annual Report. If observers are deployed randomly into the fleet, then the distribution of vessel lengths on observed trips should be equal to that of unobserved trips. Since fishing power is positively correlated to vessel length, this metric is used to help interpret the results from landed weight of catch. For example, differences between landed catch weight on observed and unobserved trips have different meaning if there is also a difference in vessel length between observed and unobserved trips. 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 is an observer 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 N1 that depicts the number of abundant species (Hill 1973) and is a measure of how "pure" catch is, since a value of 1 would indicate that only the predominant (and presumed desirable) species was landed.

In the 2013 version of this report comparisons of trips were conducted using simple histograms and visual inspection (Faunce et al. 2014). Here we employ permutation tests (a.k.a randomization tests) to answer the question "How likely is the difference we found given 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., observed and unobserved). By randomizing group assignment, the combined distribution of randomized differences represents the sampling distribution under the null hypothesis that the two groups are equal. In this report 10,000 randomized trials are run for each 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 rare events and provide evidence to reject the null hypothesis of equality. In an attempt to improve clarity, although five values are calculated in each test; 1) the difference between groups, 2) the mean difference between groups from randomized trials, 3) number 1 expressed as a percentage of the mean value of the metric being tested, 4) number 2 expressed as a percentage of the mean value of the metric being tested, and 5) the p-value of the test, only numbers 1, 3 and 5 are presented in relevant tables.

Are tender trips identical to non-tender trips?

This comparison is the basis for examining if there is a tendering effect (i.e., differential trip characteristics when vessels use tenders compared to when they do not). Under the null hypothesis tendered and non-tendered trips are the same. Permutation tests examine whether the difference in trip metrics found between these two groups could have arisen from random differences under the null hypothesis. Low p-values (<0.05) indicate that there is reason to reject the null hypothesis and conclude that there is a tendering effect. In these comparisons differences were calculated by subtracting non-tender trip values from tendered trip values. Of the six metrics compared, three had low p-values. Vessel that delivered to tenders were 11.5% shorter and fished 29.1% longer than non-tendered trips (Table 3-10). The catch of tender trips was 1.3% less “pure” (i.e., more diverse) than non-tendered trips. Although some of these results are small, the likelihood that tendered and non-tendered trips were the same in 2014 is very small.

Are observed tendered trips identical to unobserved tendered trips?

The finding that tendered trips are different from non-tendered trips necessitates separate examination of an observer effect within tendered and non-tendered trips. This comparison is the basis for examining if there is an observer effect (i.e., differential behavior when observed compared to when not observed) within tendered trips. Under the null hypothesis observed and unobserved tendered trips are the same. Permutation tests examine whether the difference in trip metrics found between these two groups could have arisen from random differences under the null hypothesis. Low p-values (<0.05) indicate that there is reason to reject the null hypothesis and conclude that there is an observer effect. In these comparisons differences were calculated by subtracting unobserved trip values from observed trip values. Of the six metrics compared, 2 had low p-values. Observed vessels that delivered to tenders were 8.8% shorter and catch was 6% less “pure” (i.e. more diverse) (less "purely the predominant species") than unobserved tendered trips (Table 3-11). There is evidence that observed tender trips in 2014 were different than unobserved tendered trips.

Are observed non-tendered trips identical to unobserved non-tendered trips?

This comparison is the basis for examining if there is an observer effect (i.e., differential behavior when observed compared to when not observed) within non-tendered trips. Under the null hypothesis observed and unobserved non-tendered trips are the same. Permutation tests examine whether the difference in trip metrics found between these two groups could have arisen from random differences under the null hypothesis. Low p-values (<0.05) indicate that there is reason to reject the null hypothesis and conclude that there is evidence for an observer effect. In these comparisons differences were calculated by subtracting unobserved trip values from observed trip values. Separate comparisons are made for each partial coverage observer deployment stratum.

3.7.3.1 Trip selection

The results of permutation tests for this question are presented in Table 12 (TS rows). Vessels that carried observers were -2.6% shorter and landed -9.1% less catch than unobserved vessels (Figure 3-11).

An additional analysis was carried out following these results to repeat the permutation tests which include the variable of gear (Table 3-13). The results for trip selection are presented in Figure 3-12. Since we have 6 metrics and 3 gear types, we have 18 tests of which we expect 1 to have low p-values. Instead there were 4. These results demonstrate that the effect of vessel length in trip selection was confounded by gear type. Hook-and-line vessels in trip selection that were observed landed 14.4% less catch and 9.1% more species than unobserved vessels (Table 3-13, row 13). Trawl vessels in trip selection that were observed fished in 4.2% fewer areas on trips that were 8.4% shorter in duration than unobserved vessels (Table 3-13, row 15). There were no low p-value tests for trip selection vessels that fished pot gear (Figure 3-12). Taken together, there is evidence of an observer effect in trip selection hook-and-line and trawl gear.

3.7.3.2 Vessel selection

Unlike trip selection that has only one time period and six trip metrics, vessel selection has six time periods and six metrics. This means that even without considering gear, there are 36 permutation tests. Under the assumption that observed and unobserved trips are the same, the distribution of resulting p-values from many tests should be uniform (i.e., we expect that only 5% of p-values to be below a value of 0.05, only 10% of the values to be below 0.1, etc.). Hence, rather than placing undue emphasis on a particular test result, here a strong deviation from the expected frequency of *all* of the resulting p-values was used as criteria to broadly reject the null hypothesis (Murdoch et al. 2008). If tests of interest are those that have p-values less than 0.05, we would expect there to be 2 tests of interest, and instead there were 18 (Table 3-12; Figure 3-13). Evidence of an observer effect was found in vessel selection.

3.8 Adequacy of the sample size

In a well-designed sampling program, the observer coverage rate should be large enough to reasonably ensure that the range of fishing activities and characteristics are represented in the sample data. The Catch Accounting System post-stratifies data into groups of fishing activities with similar characteristics (gear, NMFS Area, trip targets) within weekly periods. At low numbers of trips and low sampling rates, the probability of no observer data within a particular post-stratum is increased and may result in expansions of bycatch rates from one type of fishing activity against landings for a different type of fishing activity. For this reason it is important to have a large enough sample (observed trips and vessels) to have reasonable expectation of observing all types of fishing.

Over the course of an entire year, some NMFS Areas have low fishing effort and as a result have a relatively high probability of being missed by the simple random sampling represented by observer deployments. The fishing effort data for each stratum (trip and vessel selection for each time period) and the sample size (number of observed trips in trip selection and vessels in vessel selection) over the course of 2014 was used to illustrate their combined effect on the probability of a NMFS Area containing observer data using the hypergeometric distribution (Figure 3-14). From this figure it can be seen how 1) the likelihood of at least one observation is increased with

sampling units (trips or vessels fishing) and 2) is also increased with an increase in the selection rate. The results in Figure 3-14 should be interpreted as an optimistic simplification since including additional factors such as week, gear, and target will decrease cell size and increase the probabilities of obtaining no observer data in the random sample. Sample size requirements to ensure data are present in all cells of interest will be evaluated during the planning process for 2016 and are the focus of other analyses conducted by NMFS (NMFS 2015).

3.9 Recommendations to improve data quality

The Observer Science Committee made the following recommendations in its 2013 review of observer deployment to be considered in developing the 2014 ADP (Faunce et al. 2014, NMFS 2014a). Following each recommendation is the outcome of that recommendation for 2014 in italics.

Recommendations from 2013

- The sampling frame in vessel selection would be improved through a check-in system whereby vessels would notify the Observer Program of their intent to fish and would in return be notified of whether the vessel would require an observer and the duration of the observation period. This type of check-in system is identical to the procedure currently used in trip selection. Use of such a system would greatly reduce errors due to oversampling and improve the efficiency of the selection process.

  Such a check-in system was not implemented in 2014. However, noting the problems with vessel selection, this method of observer deployment was discontinued in 2015 (NMFS 2014b).

- The conditional release policy imparts bias into the observer data. If such releases are continued, then they should apply to all fishing activities within the sampling unit (all trips made by a vessel during the time period, and not only during certain fishing activities).

  This recommendation was not adopted in 2014. Consequently in this evaluation it was difficult to identify the trips within vessel selection time periods that were required to carry observers but did not. However, this recommendation was adopted in 2015.

- The selection rate in ODDS should remain constant throughout the year. Changing the selection rate creates temporal strata. Rather than reduce the selection rate in ODDS to reduce the risk of cost overages, we recommend that NMFS use budget buffers if possible to mitigate for the rare event of overage.

  This recommendation was adopted in the 2014 ADP.

- Data analyses continue to be hampered by the lack of a trip identifier. We recommend that the linkage between ODDS and eLandings be strengthened.

  A trip identifier has not been implemented to date.

Recommendations from 2014

Below are the Observer Science Committees recommendations to improve the 2016 ADP:

- Providing vessel operators the flexibility in ODDS to log 3 trips also provides vessels with the ability to delay observer coverage and potentially bias observer data. The current protocols of 1) allowing selected trips to be cancelled in ODDS and 2) allowing multiple trips to be logged prior to sailing should be re-evaluated. Changing these protocols should reduce the time lag in observer coverage and temporal bias exhibited in trip-selection during 2013 and in 2014.

- The ability of a catcher/processor to retain product for more than several days without spoilage means that trip durations and landed catch per trip are likely to be larger than from catcher vessels that cannot freeze their catch. An expansion of the number of catcher/processors in the partial coverage class would necessitate their treatment as a separate stratum with a potentially different selection rate in ODDS.

- The use of metrics known before a trip begins is necessary for the designation of deployment strata. Each trip must be assigned to one and only one deployment strata at the time it is logged. The merits of deploying observers by gear and FMP area (e.g., BSAI or GOA) should be explored in future ADPs. There are FMP areas and gear types for example that have low effort and are highly likely to be missed in random selection procedures without high selection rates.

- The assumption used in the ADP that effort in the following year will be equal to that two years prior should be improved upon. NMFS should develop better tools such as models to predict fishing effort.

- The practice of granting releases whereby vessels are sometimes subject to human observer coverage and sometimes not subject to human observer coverage should be discontinued. We recommend that a list of vessels that cannot carry an observer be generated. The list should be updated each calendar year. This list defines a new stratum to be observed with alternatives to human monitoring, and the new stratum should be included in the annual deployment plan and annual review.

- We repeat our 2013 recommendation that the linkage between ODDS and *e*Landings be strengthened through the use of a trip identifier.

- Tender vessel activities are problematic for the Observer Program for several reasons. First, the regulatory definition of a trip means that an operator of a vessel in partial coverage can use an unselected logged trip to deliver to a tender for an extended duration of time unobserved. In the extreme, the vessel could take a single trip that encompasses the entire fishing effort by the vessel. Second, vessels that act as tenders are not covered under the safety requirements of NMFS regulations, meaning that they cannot be used to deploy or house observers. Third, the catch that is delivered to a tender is not accessible to an observer. Finally, the tender vessel, by its very nature, mixes catch from multiple deliveries, meaning that salmon bycatch if identified by an observer dockside could not be attributed to a catcher vessel trip.

- The ability of the Observer Program to obtain a representative sample of salmon bycatch from the GOA pollock fishery for genetic stock composition analysis is compromised by three factors. In increasing magnitude these factors are: 1) observers are dependent on the response of the captain on whether or not the trip is a pollock trip, 2) insufficient resources to ensure perfect detection of salmon in the delivery at the processing facility, and 3) the inability to be deployed to or monitor tender deliveries. We do not see an easy solution to #1; deployment into fishery is problematic since catch that determines fishery has not yet occurred at the time of deployment. The GOA Chinook stock compositions have been remarkably stable between the years 2010 through 2015 (Guyon et al. 2015, slide 12). Alternatives to the *status quo* monitoring of pollock deliveries include: 1) the collection of genetic tissues by citizen or third party other than the Observer Program or 2) providing additional funds to institute a more rigorous dockside monitoring by the Observer Program. Of these, the former is cost effective to the Observer Program while the latter is more expensive. Costs to the observer program to obtain genetic bycatch material reduces the available revenue for at-sea Observer Program; it is this at-sea observer coverage which should be the primary deployment objective of the Observer Program since observers are the only source of discard at-sea information for NMFS to use in fisheries management.

Table 3-1. Disposition of trips in the ODDS for 2014. "Paper" indicates trips that were logged when the ODDS was not available.

Strata	Random Selection	Logged	Cancelled by System	Cancelled by User	Waived	Paper
Trip-Selection	Not Selected	3692	258	183	0	0
Trip-Selection	Selected	675	0	125	0	0
Trip-Selection	Not Assigned	16	1	0	15	1
Voluntary 100%	Not Assigned	304	0	3	0	0
Total		4687	259	311	15	1

Table 3-2. Number of logged trip selection trips that were selected using the initial random number generator (Random Selection Only) and those that remained after user manipulation (Final Expected). The relative impact of waivers in trip selection is shown in the last column.

Variable	Random Selection Only	Final Expected	Final Expected if No Waivers
Selected	675	635	650
Total	4367	3816	3816
Selection %	15.5	16.6	17.0

Table 3-3. Number of total vessels (V), sampled vessels (v), total trips (N), sampled trips (n) for each observer deployment stratum in 2014. Totals are unique vessels. Expected coverages are in percent for trip selection and number of vessels for vessel selection. TS= Trip selection, VS= Vessel selection, ZS= Zero selection, EM= Electronic Monitoring.

Coverage	Strata	Time Period	V	v	N	n	% Trips Observed	% Observed (Deployment Type)	Expected Coverage	Expected Coverage (min)	Expected Coverage (max)	Meets Expectations?
Full	Regulatory	Year	166	166	4588	4587	100.0	100				
Full	Voluntary	Year	30	30	310	310	100.0	100				
Full	Total	Year	171	171	4898	4897	100.0	100				
Partial	TS Total	Year	293	199	4390	662	15.1	15.1	16	14	16.2	Yes
Partial	VS	Jan. - Feb.	50	12	293	69	23.5	24	9	2	11	No*
Partial	VS	Mar. - Apr.	160	17	471	46	9.8	10.6	16	12	28	Yes
Partial	VS	May - Jun.	173	35	434	79	18.2	20.2	24	13	29	No*
Partial	VS	Jul - Aug.	135	24	289	62	21.5	17.8	18	9	24	Yes
Partial	VS	Sep. - Oct.	168	19	476	49	10.3	11.3	20	12	29	Yes
Partial	VS	Nov. - Dec.	32	5	116	19	16.4	15.6	5	1	8	Yes
Partial	VS Total	Year	375	86	2079	324	15.6	22.9				
Partial	ZS	Year	484	0	2305	0	0.0	0				
Partial	ZS (EM)	Sep. - Oct.	5	0	15	0	0.0	0				
Partial	ZS Total	Year	489	0	2320	0	0.0	0				
Total Fleet	Total	Year	1270	417	13687	5883	43.0					

**Observed > Expected*

Table 3-4. The number of vessels that fall under specific criteria within the vessel-selection strata.

Row	Metric	Jan. - Feb.	Mar. - Apr.	May - Jun.	Jul - Aug.	Sep. - Oct.	Nov.- Dec.
1	Anticipated to fish (2014 ADP)	85	154	233	177	200	48
2	In selection frame (2013 data); F	66	158	215	150	159	46
3	In frame and fished; fY	36	116	129	76	96	16
4	In frame and did not fish; fN	30	42	86	74	63	30
5	Not in frame and fished (potential bias); f0	14	44	44	59	72	16
6	Active (fished = true frame); f*=f0 + fY	50	160	173	135	168	32
7	Desired to be observed; vT	9	16	24	18	20	5
8	Selected for coverage; vS	27	43	117	141	90	27
9	Selected by did not fish; vN	8	16	51	70	43	17
10	Selected and fished; vF	19	27	66	71	47	10
11	Selected, fished, and never released	12	15	33	23	18	6
12	Selected, fished, and had released trips; vR	7	12	33	48	29	4
13	Selected, fished, released for the entire period	6	12	32	43	26	4
14	Selected, fished, released part of the period	1	0	1	5	3	0
15	Selected and obseved total, v	12	17	35	24	19	5
16	Selected with at least one non-released trip (Expected Observed)	13	15	34	28	21	6
17	Selected, not released, all data present	11	15	29	19	19	5
18	Selected, not released, some data missing	1	0	1	1	0	0
19	Selected, not released, all data missing (potential violation)	1	0	4	8	2	1
20	Selected, released, but observer data; v?	0	2	5	4	0	0

Table 3-5. Vessel-selection rates expressed as percentages (all rate formulations multiplied by 100). Abbreviations follow Table 3-4.

Row	Metric	Jan. - Feb.	Mar. - Apr.	May - Jun.	Jul - Aug.	Sep. - Oct.	Nov. - Dec.
1	Error in sampling frame due to over-coverage (% of sample frame); fN/F	45.5	26.6	40.0	49.3	39.6	65.2
2	Error in sampling Frame due to under-coverage (% of True Frame); f0/f*	28.0	27.5	25.4	43.7	42.9	50.0
3	Error due to non-response: selected and did not fish; vN/vS	29.6	37.2	43.6	49.6	47.8	63.0
4	Error due to non-response: Selected, fished, and not observed (vF-v)/vF	36.8	37.0	47.0	66.2	59.6	50.0
5	Chance of selection if in frame and fished; vF/fY	28.8	17.1	30.7	47.3	29.6	21.7
6	Chance of selection if not in frame	0.0	0.0	0.0	0.0	0.0	0.0
7	Percent selected boats that fished and given some sort of release; vR/vF	36.8	44.4	50.0	67.6	61.7	40.0
8	Percent coverage desired; vT/f*	18.0	10.0	13.9	13.3	11.9	15.6
9	Percent coverage acheived; v/f*	24.0	10.6	20.2	17.8	11.3	15.6

Table 3-6. Number of vessels that received two types of releases from observer coverage in each time period of 2014 vessel selection. Temporary exemptions were granted when a vessel had more bunk space than life raft capacity. Conditional releases were granted when all available bunks were planned to be occupied by either crew or crew and IFQ holders.

Time Period	Temporary Exemption	Conditional Release	Total Vessels
Jan. - Feb.	1	6	7
Mar. - Apr.	1	11	12
May - Jun.	2	31	33
Jul - Aug.	7	41	48
Sep. - Oct.	3	26	29
Nov. - Dec.	0	4	4
Year	10	91	101

Table 3-7. The total number of trips and vessels in the vessel-selection strata that were either observed or conditionally released. The number of vessels and trips are not unique among individual cells of this table (trips and vessels can cross NMFS Reporting areas), so totals should be interpreted with caution. NMFS Reporting Areas > =600 are located in the Gulf of Alaska, Areas 541-543 are located in the Aleutian Islands, and other areas are located in the Bering Sea.

NMFS Reporting Area	Observed trips	Released trips	Released trips (%)	Observed vessels	Released vessels	Released vessels (%)
513	0	1	100	0	1	100
514	0	5	100	0	1	100
517	0	1	100	0	1	100
518	6	4	40	4	2	33
519	13	18	58	4	2	33
521	0	1	100	0	1	100
523	1	0	0	1	0	0
541	17	10	37	4	4	50
542	5	4	44	2	3	60
543	1	1	50	1	1	50
610	47	46	49	12	14	54
620	42	24	36	18	17	49
630	107	156	59	33	40	55
640	16	21	57	9	12	57
649	7	12	63	4	6	60
650	59	82	58	26	31	54
659	32	29	48	23	26	53
Total	324	390	55	86	101	54

Table 3-8. Comparison of the number of pollock deliveries during 2014 as defined by predominant species (Target definition) and at least 20% pollock (Ratio definition) by port, coverage category, and Fishery Management Plan.

FMP	Coverage	Port	Ratio Definition	Target Definition	Agreement %
Bering Sea	Full	Akutan	737	736	99.9
Bering Sea	Full	Dutch Harbor	783	782	99.9
Bering Sea	Full	Inshore Floating Processor	310	310	100.0
Bering Sea	Full	King Cove	83	83	100.0
Gulf of Alaska	Full	Kodiak	2	0	0.0
Gulf of Alaska	Partial	Akutan	20	20	100.0
Gulf of Alaska	Partial	Inshore Floating Processor	13	13	100.0
Gulf of Alaska	Partial	King Cove	135	114	84.4
Gulf of Alaska	Partial	Kodiak	1196	1197	100.1
Gulf of Alaska	Partial	Sand Point	238	228	95.8
Gulf of Alaska	Partial	Seward	3	3	100.0
Total			3520	3486	99.0

Table 3-9. The number of pollock deliveries by observation status and tendering status. BSAI= Bering Sea and Aleutian Islands, GOA= Gulf of Alaska, IFP= Inshore Floating Processor, H= Harbor.

FMP	Coverage	Port	Trips Total	Trips Observed	% Observed	p value Trips Observed	% Tender Trips	% Observed without Tenders	p value Trips Observed without Tenders
BSAI	Full	Akutan	737	735	100		0	100	
BSAI	Full	Dutch H.	783	782	100		0	100	
BSAI	Full	IFP	310	309	100		0	100	
BSAI	Full	King Cove	83	83	100		0	100	
GOA	Full	Kodiak	2	0	0		0	0	
GOA	Partial	Akutan	20	0	0		80	0	
GOA	Partial	IFP	13	1	8		15	9	
GOA	Partial	King Cove	135	3	2		92	27	
GOA	Partial	Kodiak	1196	167	14		0	14	
GOA	Partial	Sand Point	238	38	16		3	16	
GOA	Partial	Seward	3	1	33		0	33	
Total	Full		1915	1909	100		0	100	
Total	Partial		1605	210	13	0.001	9	14	0.1

Table 3-10. Results of permutation tests between tendered and non-tendered trips in 2014. OD: Observed Difference. Differences are calculated from tendered minus non-tendered trips.

NMFS Areas	Days Fished	Landed Catch	pMax Species	Species Landed	Vessel Length	Metric
0.008	0.884	4.826	-0.012	0.169	-7.883	Observed Difference
0.748	29.104	9.525	-1.277	4.869	-11.538	OD (%)
0.364	**0.000**	0.092	**0.006**	0.196	**0.000**	p-value

Table 3-11. Results of permutation tests between observed and unobserved tendered trips in 2014. OD: Observed difference. Differences are calculated from observed minus unobserved.

NMFS Areas	Days Fished	Landed Catch	pMax Species	Species Landed	Vessel Length	Metric
0.007	-0.536	-23.384	-0.057	0.433	-5.444	Observed Difference
0.642	-14.177	-42.727	-6.032	11.989	-8.824	OD (%)
1.000	0.355	0.068	**0.001**	0.317	**0.025**	p-value

Table 3-12. Results of permutation tests between observed and unobserved non-tendered trips in 2014. OD: Observed difference. Differences are calculated from observed minus unobserved. TS= Trip selection, VS= Vessel selection.

Row	Strata	Time Period	NMFS Areas	Days Fished	Landed Catch	pMax Species	Species Landed	Vessel Length	Metric
1	TS	Jan. - Dec.	-0.015	0.160	-4.970	0.002	-0.119	-1.967	OD
2	VS	Jan. - Feb.	0.038	0.232	1.750	-0.013	0.756	2.531	OD
3	VS	Mar. - Apr.	0.078	0.893	1.096	-0.070	1.088	3.558	OD
4	VS	May - Jun.	0.020	0.329	-0.858	0.013	-0.077	3.008	OD
5	VS	Jul - Aug.	0.090	1.806	2.203	0.035	-0.336	3.332	OD
6	VS	Sep. - Oct.	0.034	1.941	0.669	0.012	-0.135	4.399	OD
7	VS	Nov. - Dec.	-0.021	0.939	18.862	0.018	-0.672	8.787	OD
8	TS	Jan. - Dec.	-1.319	4.299	-9.142	0.166	-2.762	-2.555	OD (%)
9	VS	Jan. - Feb.	3.730	7.420	15.164	-1.409	25.650	5.568	OD (%)
10	VS	Mar. - Apr.	7.516	23.093	14.787	-7.749	29.112	7.342	OD (%)
11	VS	May - Jun.	1.850	7.576	-18.618	1.489	-2.056	6.123	OD (%)
12	VS	Jul - Aug.	8.237	39.948	47.956	3.926	-10.958	6.877	OD (%)
13	VS	Sep. - Oct.	3.213	50.276	12.119	1.343	-4.387	9.082	OD (%)
14	VS	Nov. - Dec.	-2.048	28.256	139.685	1.977	-21.756	19.443	OD (%)
15	TS	Jan. - Dec.	0.320	0.128	**0.015**	0.817	0.370	**0.028**	p-value
16	VS	Jan. - Feb.	0.127	0.130	0.095	0.165	**0.002**	**0.000**	p-value
17	VS	Mar. - Apr.	**0.022**	**0.001**	0.208	**0.000**	**0.000**	**0.000**	p-value
18	VS	May - Jun.	0.617	0.178	0.066	0.460	0.775	**0.000**	p-value
19	VS	Jul - Aug.	**0.046**	**0.000**	**0.000**	0.083	0.267	**0.000**	p-value
20	VS	Sep. - Oct.	0.504	**0.000**	0.382	0.532	0.647	**0.000**	p-value
21	VS	Nov. - Dec.	1.000	**0.002**	**0.000**	0.305	**0.029**	**0.000**	p-value

Table 3-13. Results of permutation tests between observed and unobserved non-tendered trips by strata and gear type in 2014. OD= Observed differences. % OD = percent observed differences. HAL= Hook-and-Line gear. TS= Trip selection. VS= Vessel selection. NaN= Not a number, NA= Not Available. These codes arise because all selected vessels that made Pot trips in the September – October selection period (2) were released and there were no observed trips.

Row	Strata	Time Period	Gear	NMFS Areas	Days Fished	Landed Catch	pMax Species	Species Landed	Vessel Length	Metric
1	TS	Jan. - Dec.	HAL	0.019	0.434	-1.673	-0.018	0.332	-1.392	OD
2	TS	Jan. - Dec.	Pots	0.001	0.093	-0.230	-0.006	0.003	-2.101	OD
3	TS	Jan. - Dec.	Trawl	-0.047	-0.213	-3.793	0.016	-0.211	-0.862	OD
4	VS	Jan. - Feb.	HAL	0.058	0.619	-0.026	-0.030	0.918	-0.110	OD
5	VS	Jan. - Feb.	Pots	0.000	-0.586	7.574	-0.002	1.043	6.599	OD
6	VS	Mar. - Apr.	HAL	0.078	0.893	1.102	-0.163	1.090	3.558	OD
7	VS	May - Jun.	HAL	0.020	0.329	-0.858	0.013	-0.077	3.008	OD
8	VS	Jul - Aug.	HAL	0.090	1.806	2.203	0.035	-0.336	3.332	OD
9	VS	Sep. - Oct.	HAL	0.024	1.674	1.275	0.024	-0.345	5.289	OD
10	VS	Sep. - Oct.	Pots	NaN	NaN	NaN	NaN	NaN	NaN	OD
11	VS	Nov. - Dec.	HAL	-0.022	1.378	1.826	-0.042	-0.189	6.222	OD
12	VS	Nov. - Dec.	Pots	0.000	1.222	42.281	0.055	0.056	3.833	OD
13	TS	Jan. - Dec.	HAL	1.555	7.371	-14.380	-2.112	9.070	-2.171	OD (%)
14	TS	Jan. - Dec.	Pots	0.116	2.535	-0.644	-0.563	0.151	-2.776	OD (%)
15	TS	Jan. - Dec.	Trawl	-4.243	-8.359	-4.348	1.833	-3.597	-1.016	OD (%)
16	VS	Jan. - Feb.	HAL	5.671	19.236	-0.222	-3.216	28.603	-0.250	OD (%)
17	VS	Jan. - Feb.	Pots	0.000	-21.403	72.540	-0.236	54.883	12.970	OD (%)
18	VS	Mar. - Apr.	HAL	7.516	23.093	14.879	-16.585	29.192	7.342	OD (%)
19	VS	May - Jun.	HAL	1.850	7.576	-18.618	1.489	-2.056	6.123	OD (%)
20	VS	Jul - Aug.	HAL	8.237	39.948	47.956	3.926	-10.958	6.877	OD (%)
21	VS	Sep. - Oct.	HAL	2.296	40.552	25.554	2.699	-10.567	11.085	OD (%)
22	VS	Sep. - Oct.	Pots	NaN	NaN	NaN	NaN	NaN	NaN	OD (%)
23	VS	Nov. - Dec.	HAL	-2.179	41.005	16.762	-4.674	-5.776	14.206	OD (%)
24	VS	Nov. - Dec.	Pots	0.000	39.855	136.808	5.584	2.976	7.038	OD (%)
25	TS	Jan. - Dec.	HAL	0.653	0.104	**0.015**	0.104	**0.032**	0.099	p-value
26	TS	Jan. - Dec.	Pots	1.000	0.529	0.924	0.124	1.000	0.346	p-value
27	TS	Jan. - Dec.	Trawl	**0.025**	**0.000**	0.160	0.120	0.340	0.451	p-value
28	VS	Jan. - Feb.	HAL	0.089	**0.001**	0.980	**0.006**	**0.003**	0.871	p-value
29	VS	Jan. - Feb.	Pots	1.000	**0.029**	**0.002**	0.727	**0.000**	**0.000**	p-value
30	VS	Mar. - Apr.	HAL	0.025	**0.001**	0.203	0.103	**0.000**	**0.000**	p-value
31	VS	May - Jun.	HAL	0.613	0.170	0.071	0.456	0.781	**0.000**	p-value
32	VS	Jul - Aug.	HAL	**0.042**	**0.000**	**0.000**	0.090	0.275	**0.000**	p-value
33	VS	Sep. - Oct.	HAL	0.754	**0.000**	0.077	0.239	0.248	**0.000**	p-value
34	VS	Sep. - Oct.	Pots	NA	NA	NA	NA	NA	NA	p-value
35	VS	Nov. - Dec.	HAL	1.000	**0.001**	0.340	0.061	0.673	**0.000**	p-value
36	VS	Nov. - Dec.	Pots	1.000	**0.014**	**0.000**	**0.035**	1.000	0.140	p-value

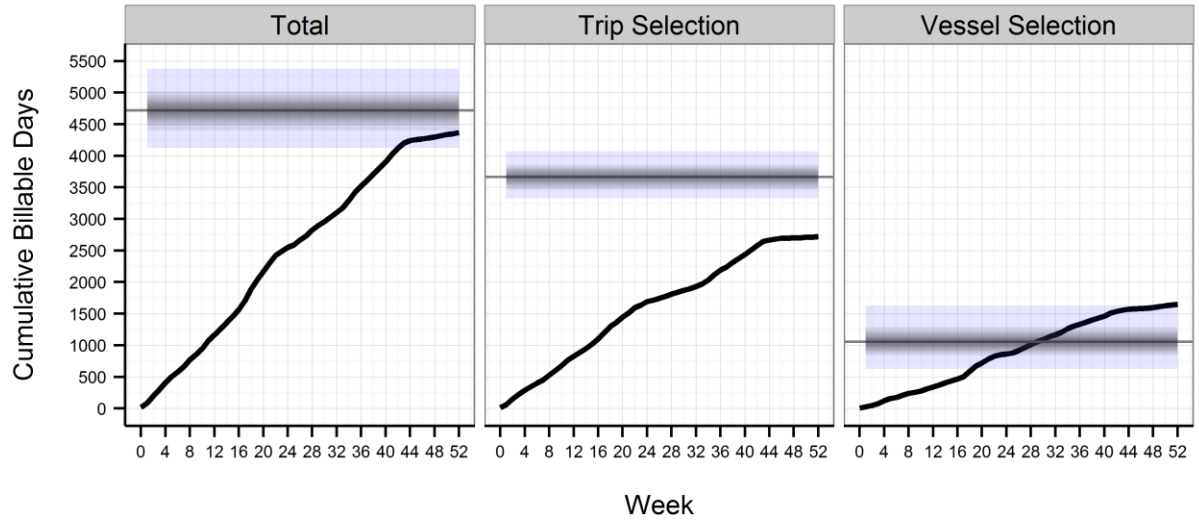

Figure 3-1. Cumulative plots of the number of billable days expected from observer data in 2014. Horizontal bands denote the range of potential billable days that were estimated in December 2013. Shading is proportional to the expected likelihood from 2014 ADP simulations.

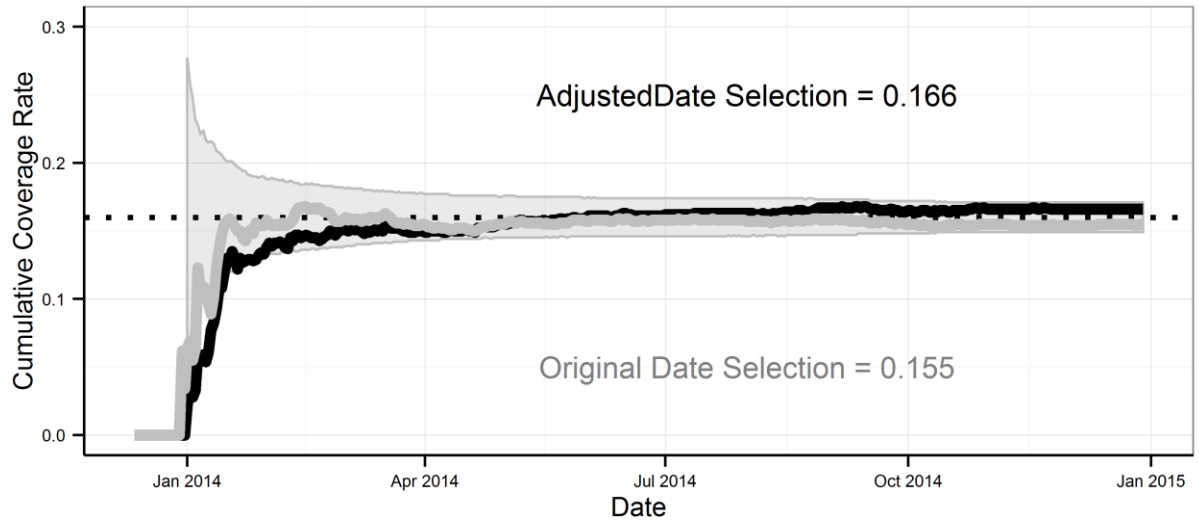

Figure 3-2. Rate of selected trips logged into ODDS organized by original date entered for all trips (grey line and grey text), and final date considering only non-cancelled trips (black line and black text). The programmed selection rate is depicted as the dotted line. Grey shaded areas denote the range of coverage rates that correspond to the 95% 'confidence intervals' expected from the binomial distribution. The final coverage rate was higher than if trip dates had not been altered and trips not cancelled.

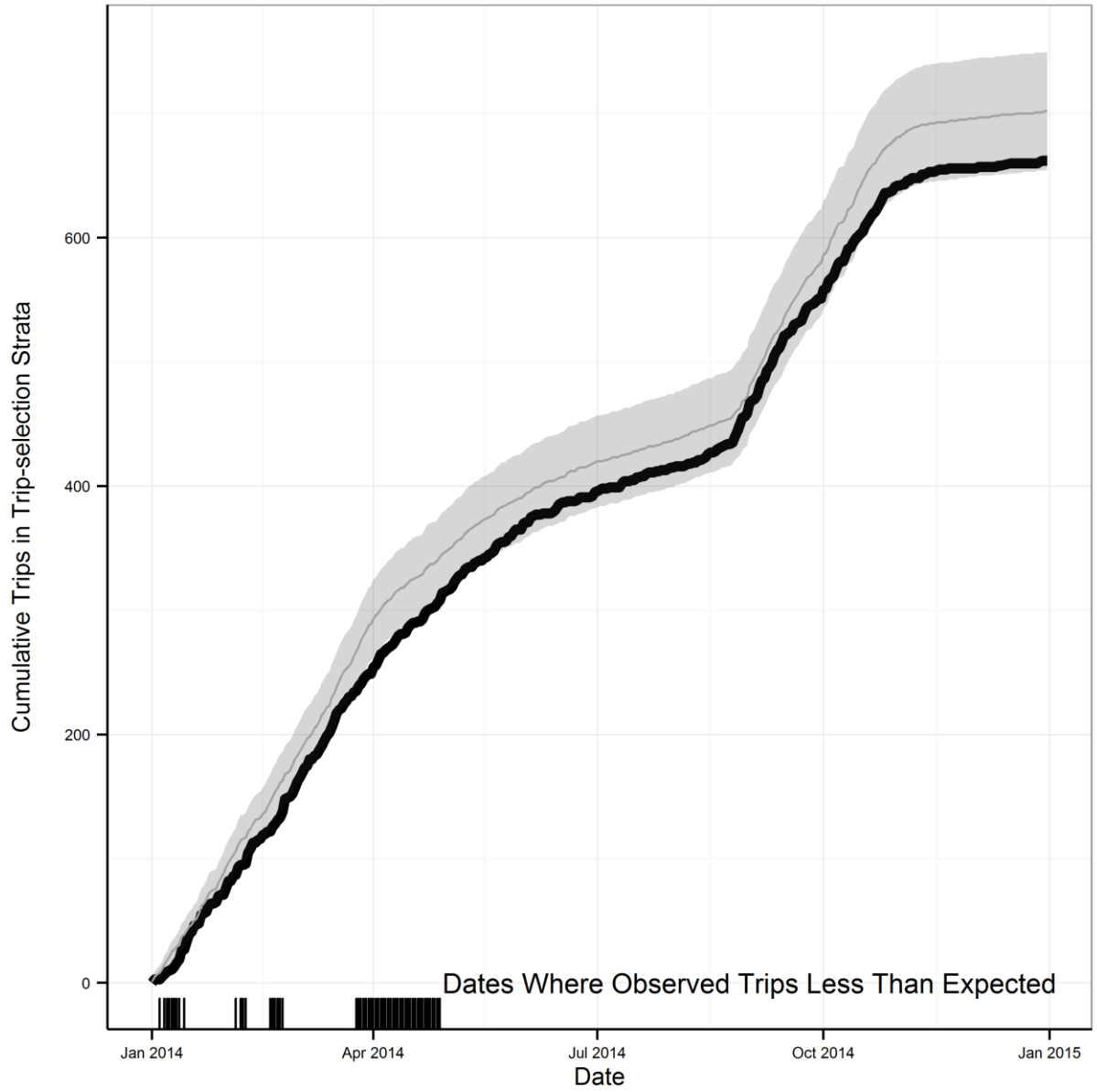

Figure 3-3. Cumulative number of trips observed during 2014 (black line) compared to the expected cumulative number of trips from an observation rate of 16%. Grey shaded areas denote the range of coverage rates that correspond to the 95% 'confidence intervals' expected from the binomial distribution. range of observed trips. Dates where the observed number of trips is less or more than the range of expected values are depicted as tick marks on the x-axis.

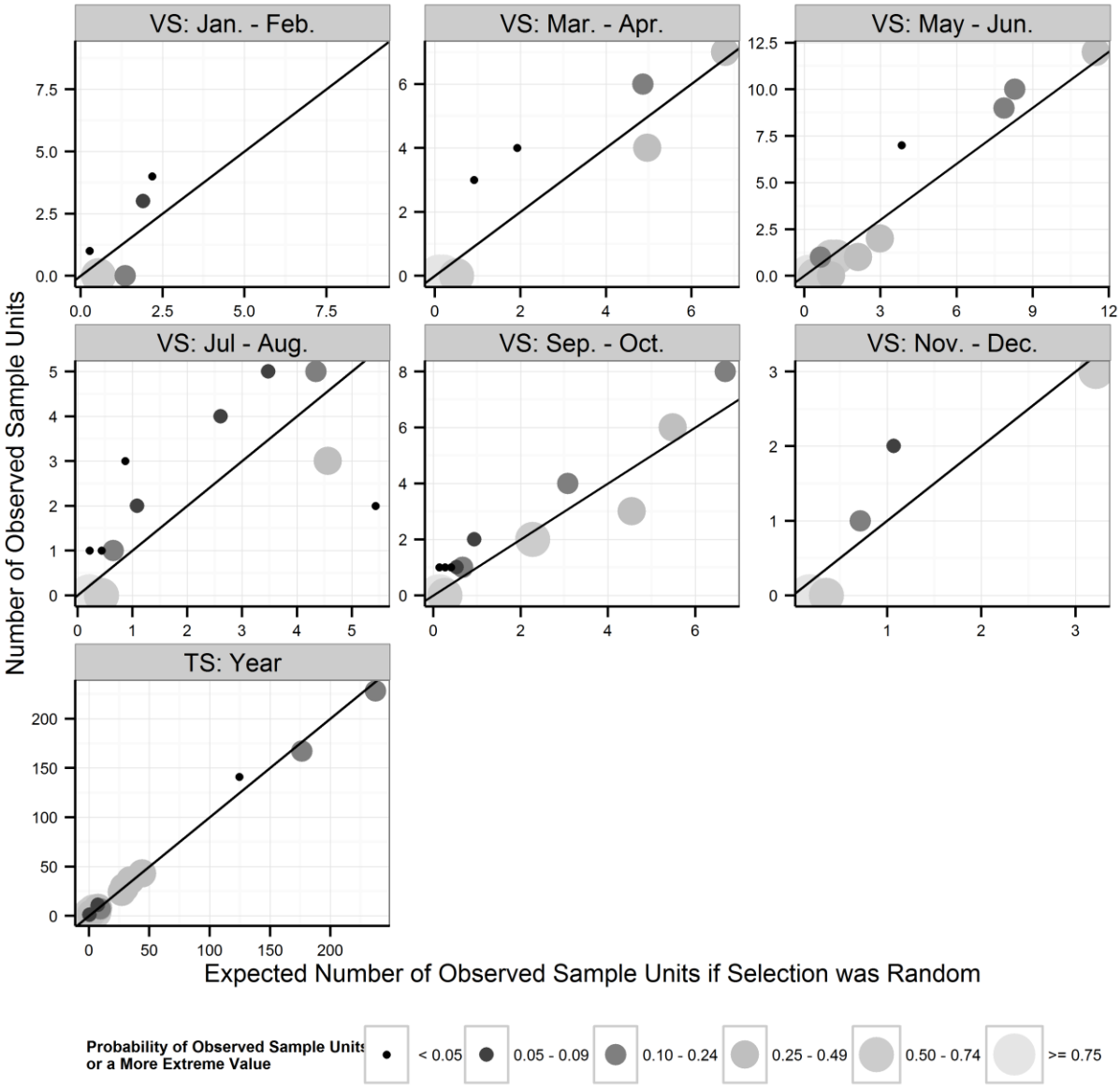

Figure 3-4. Comparison plots depicting the number of observed sample units (trips for trip-selection = TS; vessel for vessel-selection = VS) compared to the number of expected observed sample units from the hypergeometric distribution. Each point on a plot represents a NMFS Reporting Area. The size of the plot is proportional to the probability of the observed number of sample units or a more extreme outcome (more if above the solid 1:1 line, less if below it).

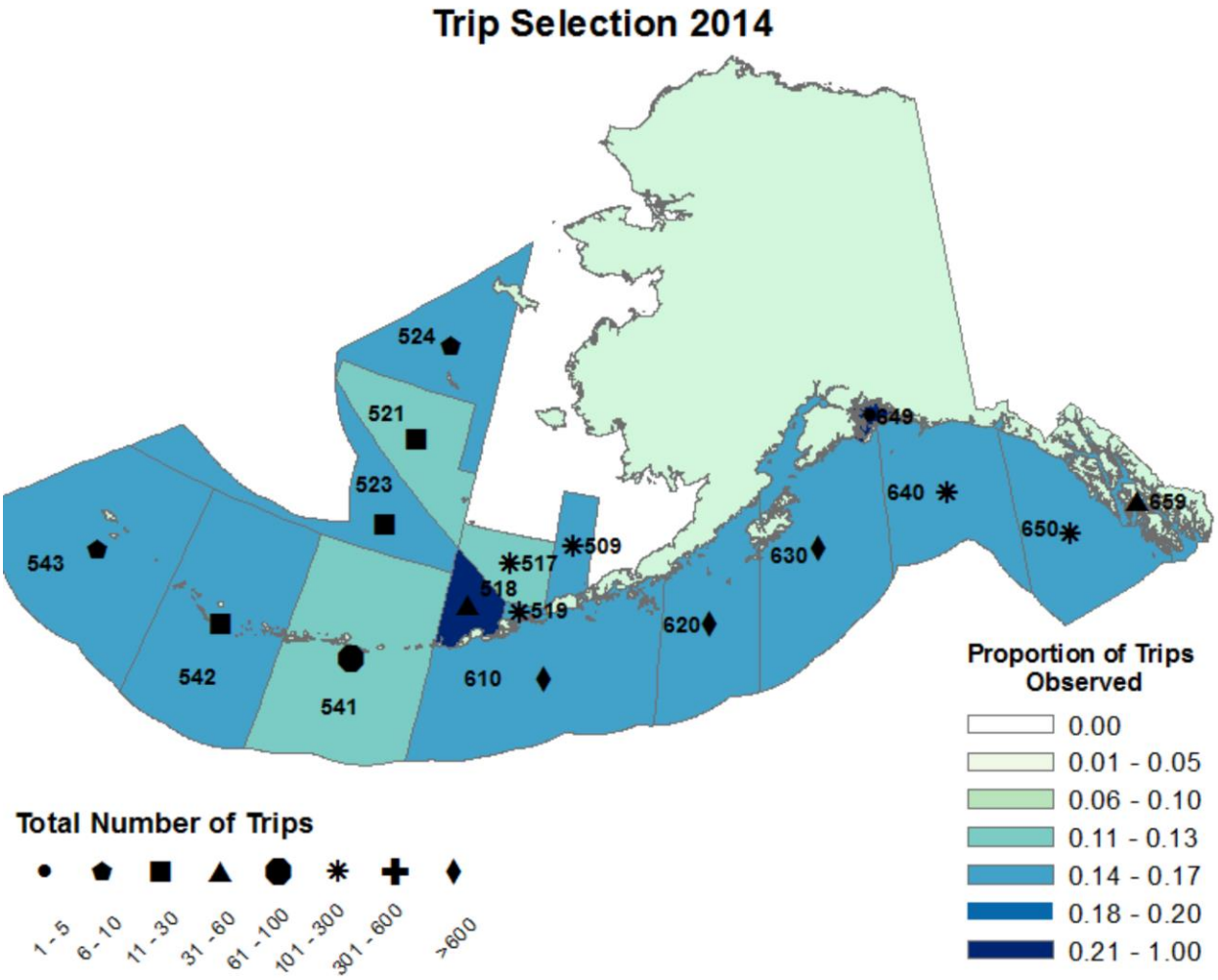

Figure 3-5. Proportion of trips observed in each NMFS Reporting Area in the trip-selection stratum. The color of the Reporting Area reflects the proportion of trips that were observed while the symbol indicates the total number of fishing trips that occurred in that area.

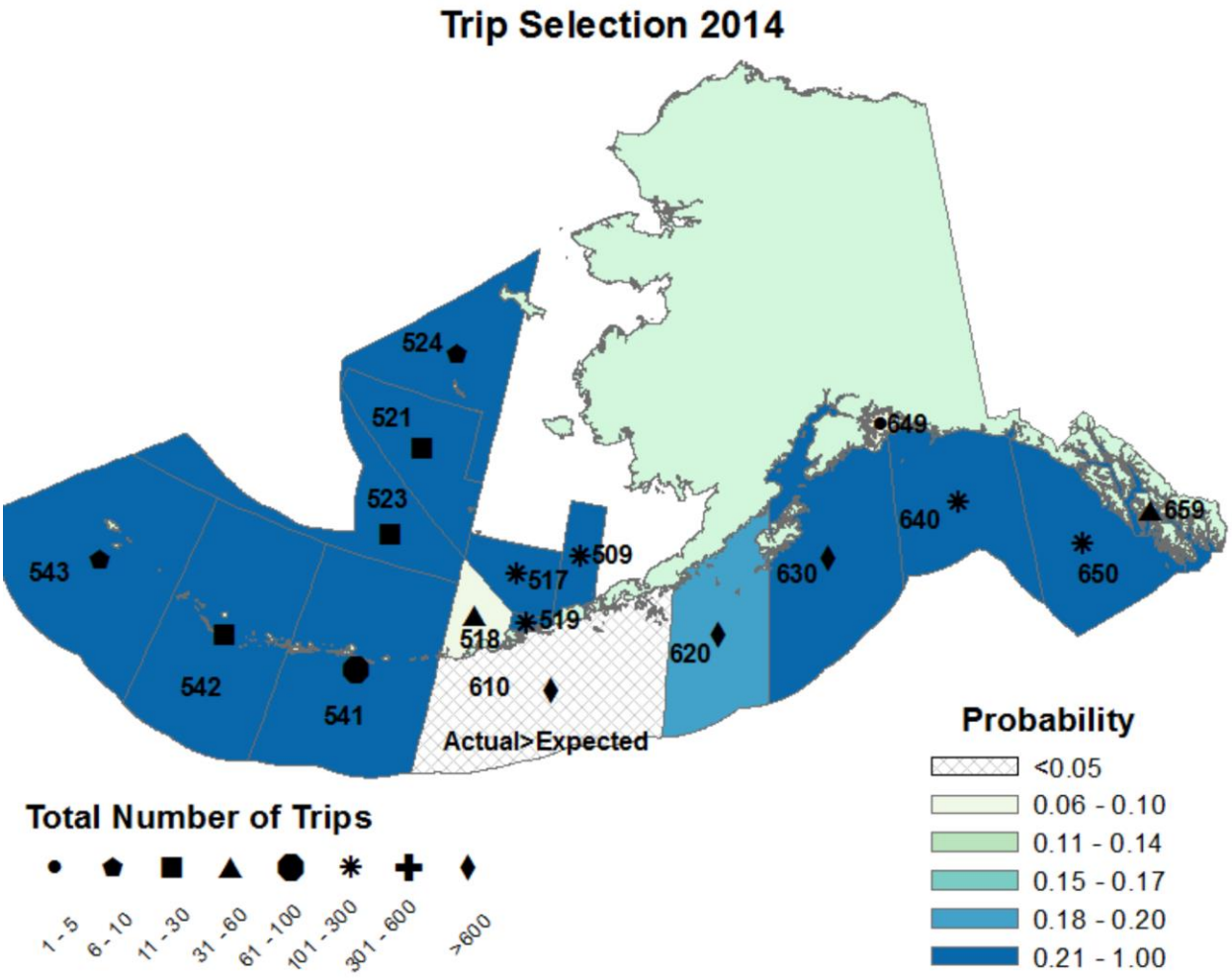

Figure 3-6. The probability of observing a number of trips in trip-selection stratum as far or farther from expected values (probability of observing a more extreme value). The symbol indicates the total number of fishing trips that occurred in that area.

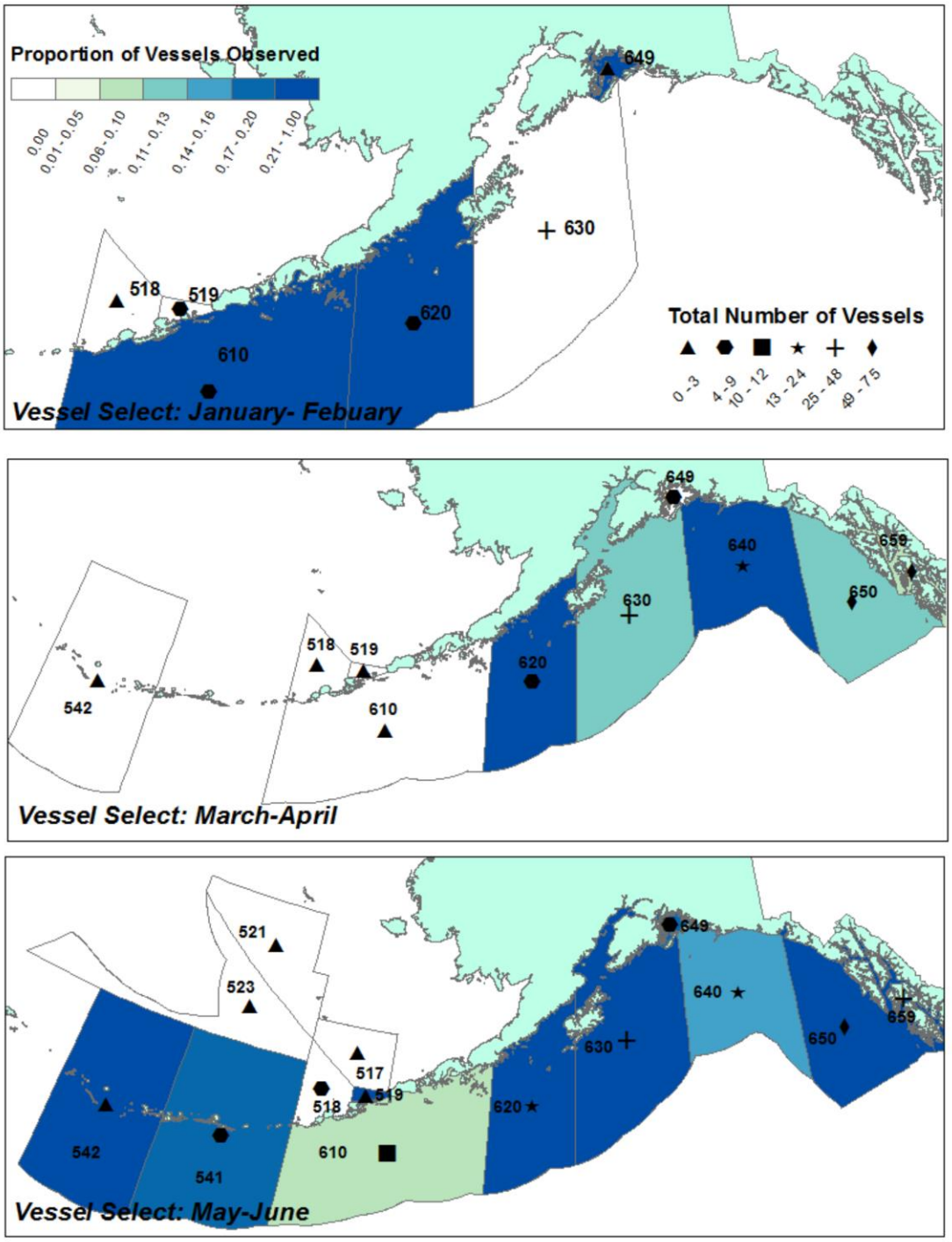

Figure 3-7. Proportion of vessels observed in each NMFS Reporting Area in the vessel-selection strata during the first half of 2014. The color of the Reporting Area reflects the proportion of vessels that were observed while the symbol indicates the total number of fishing vessels that occurred in that area.

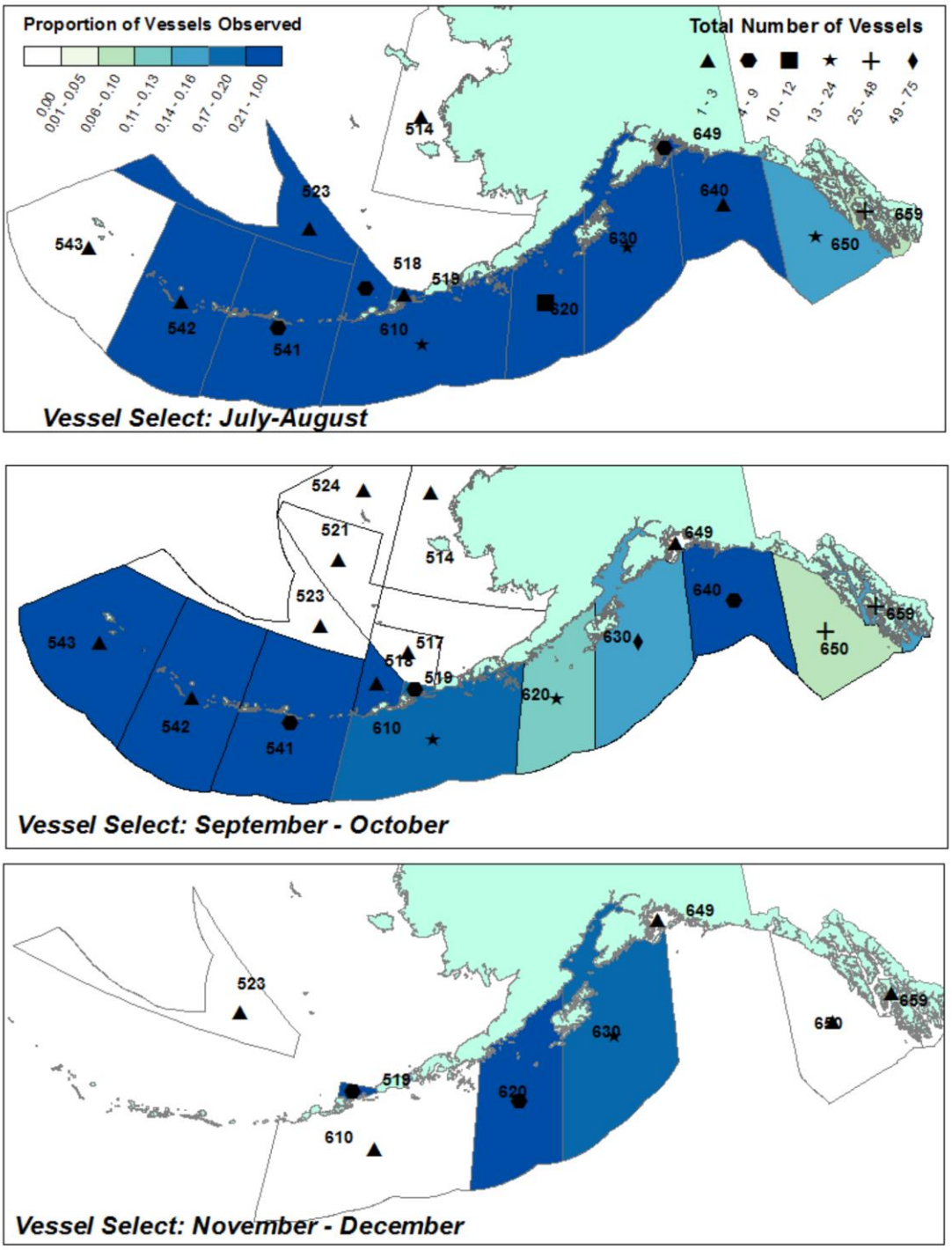

Figure 3-8. Proportion of vessels observed in each NMFS Reporting Area in the vessel-selection stratum during the second half of 2014. The color of the Reporting Area reflects the proportion of vessels that were observed while the symbol indicates the total number of fishing vessels that occurred in that area.

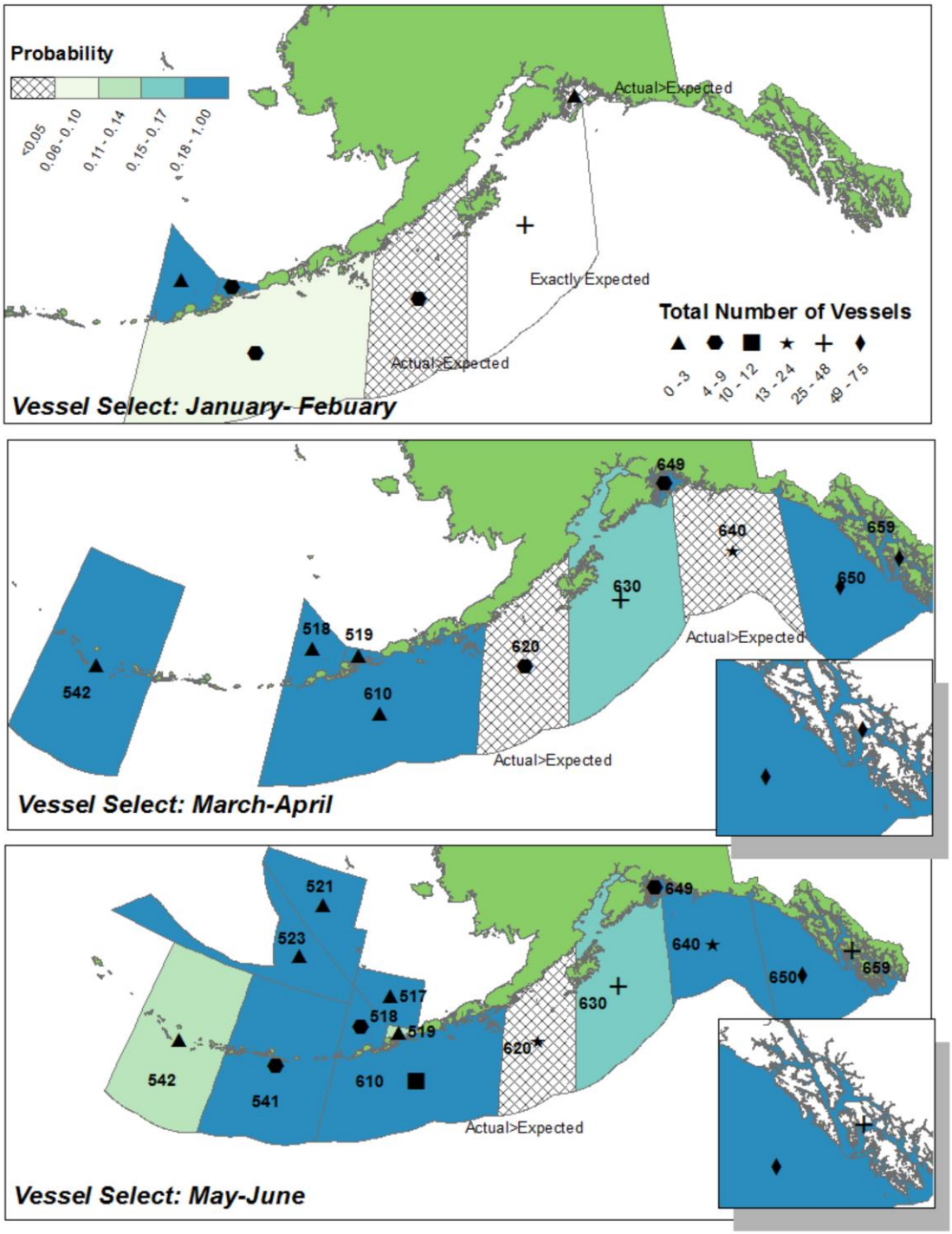

Figure 3-9. The probability of observing a number of trips in vessel-selection strata as far or farther from expected values (probability of observing a more extreme value) during the first half of 2014. The symbol indicates the total number of fishing trips that occurred in that area.

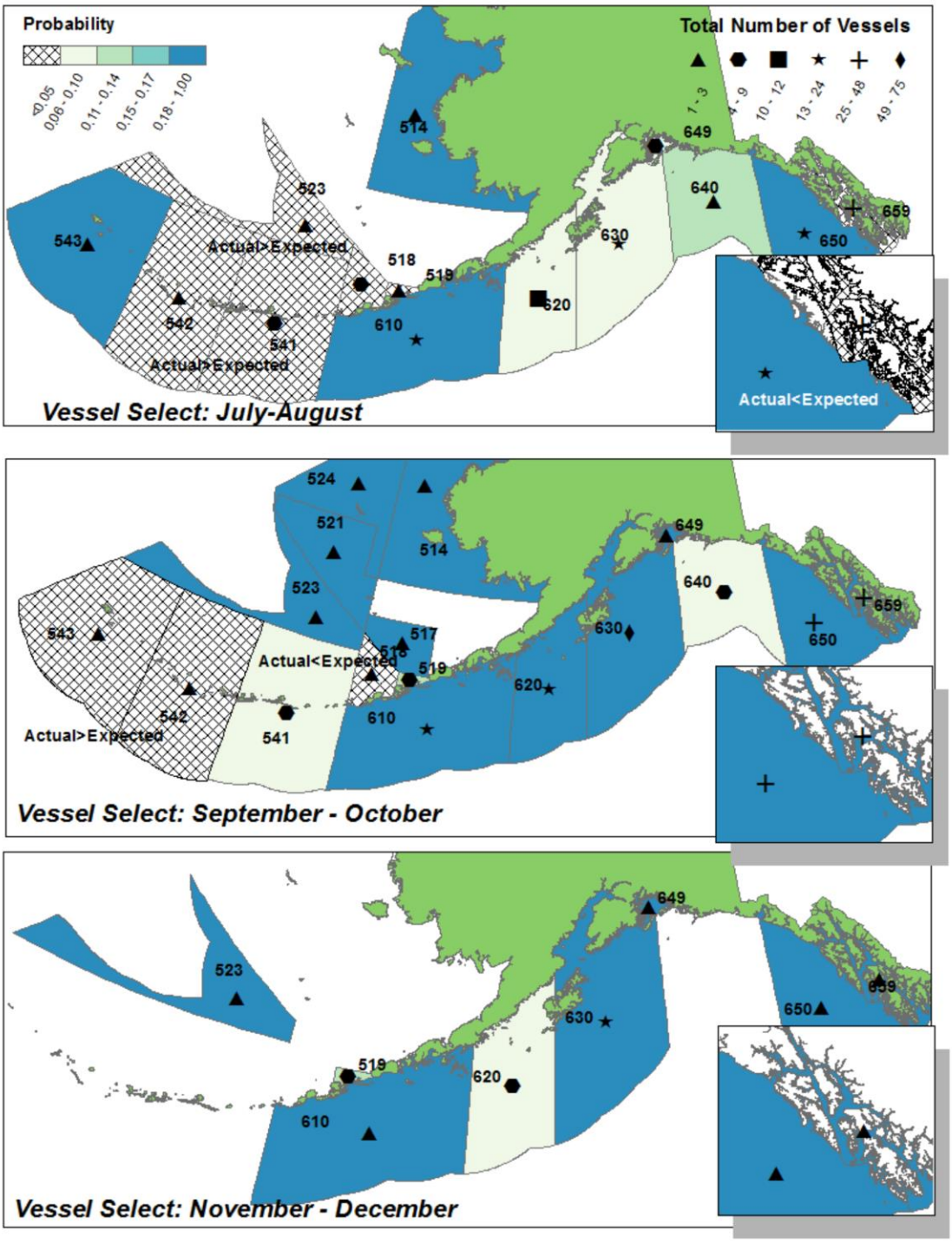

Figure 3-10. The probability of observing a number of trips in vessel-selection strata as far or farther from expected values (probability of observing a more extreme value) during the second half of 2014. The symbol indicates the total number of fishing trips that occurred in that area.

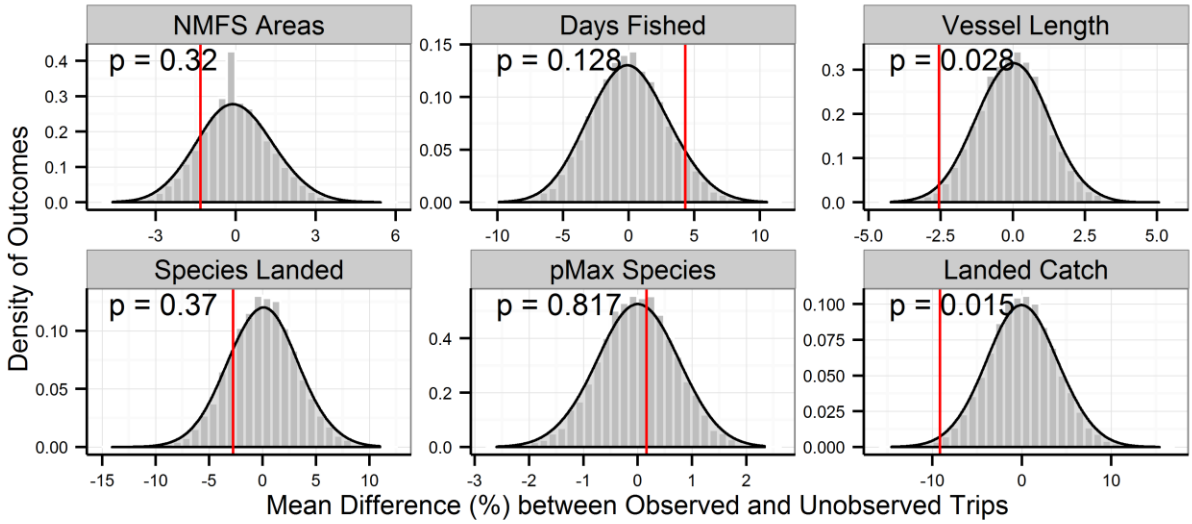

Figure 3-11. Results of permutaion tests for each trip metric that was evaluated for the trip-selection stratum. In each panel, the grey bars depict the distribution of differences between observed and unobserved trips where the assignment of observation status had been randomized (this represents the sampling distribution under the null hypothesis that observed and unobserved trips are the same). The vertical line denotes the actual difference between observed and unobserved trips. Values on the x-axis have been scaled to reflect the relative (%) differences in each metric. The corresponding p-value for each test is denoted in the upper left corner. Low p-values are reason to reject the null hypothesis and conclude that there is an observer effect. The finding that vessel length and landed catch are lower for observed trips is cause for further investigation into the potential drivers of this observer effect.

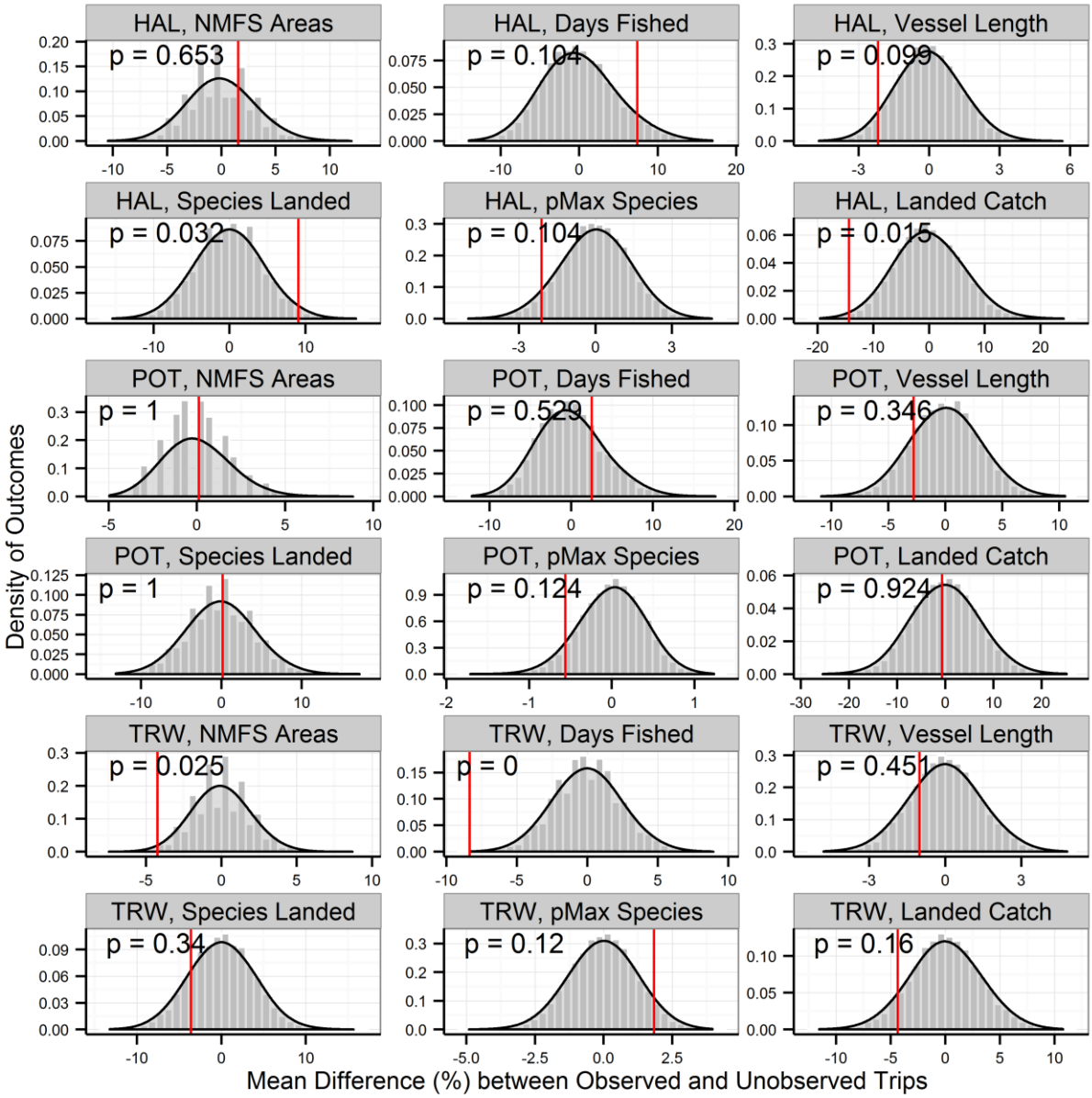

Figure 3-12. Results of permutaion tests for each trip metric in trip selection separated by gear type. In each panel, the grey bars depict the distribution of differences between observed and unobserved trips where the assignment of observation status had been randomized (this represents the sampling distribution under the null hypothesis that observed and unobserved trips are the same). The vertical line denotes the actual difference between observed and unobserved trips. Values on the x-axis have been scaled to reflect the relative (%) differences in each metric. The corresponding p-value for each test is denoted in the upper left corner. Low p-values are reason to reject the null hypothesis and conclude that there is an observer effect. Evidence of an observer effect is present in hook-and-line and trawl gear.

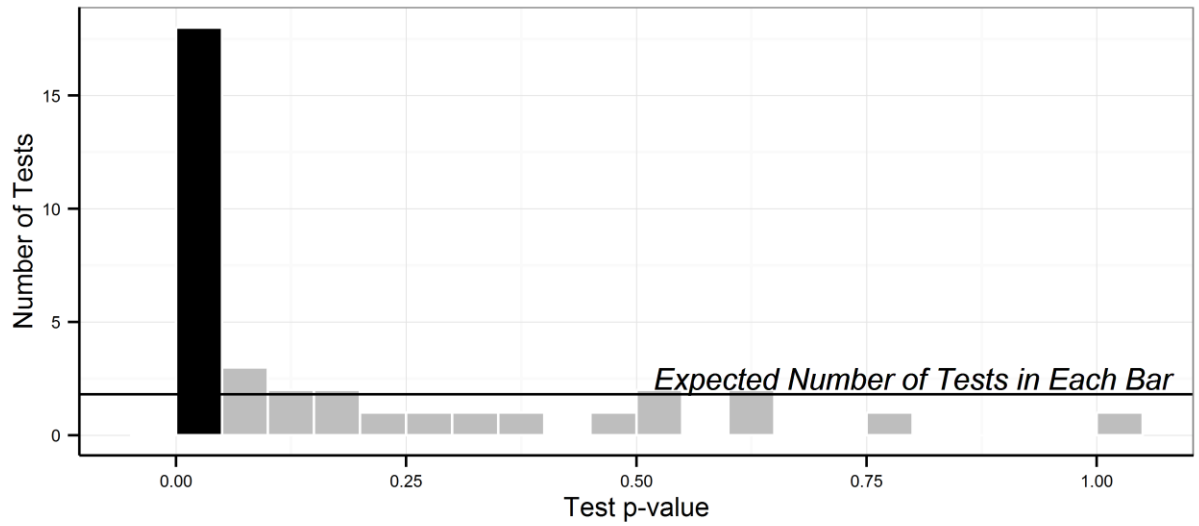

Figure 3-13. Histogram of the p-values from permutation tests on six trip metrics from within six time periods of vessel selection. Under the null hypothesis that observed and unobserved trips are the same, we would expect a distribution of p-values to roughly follow the horizontal solid line. The preponderance of low p-value test results denoted in black is reason to conclude that an observer effect was present in vessel selection.

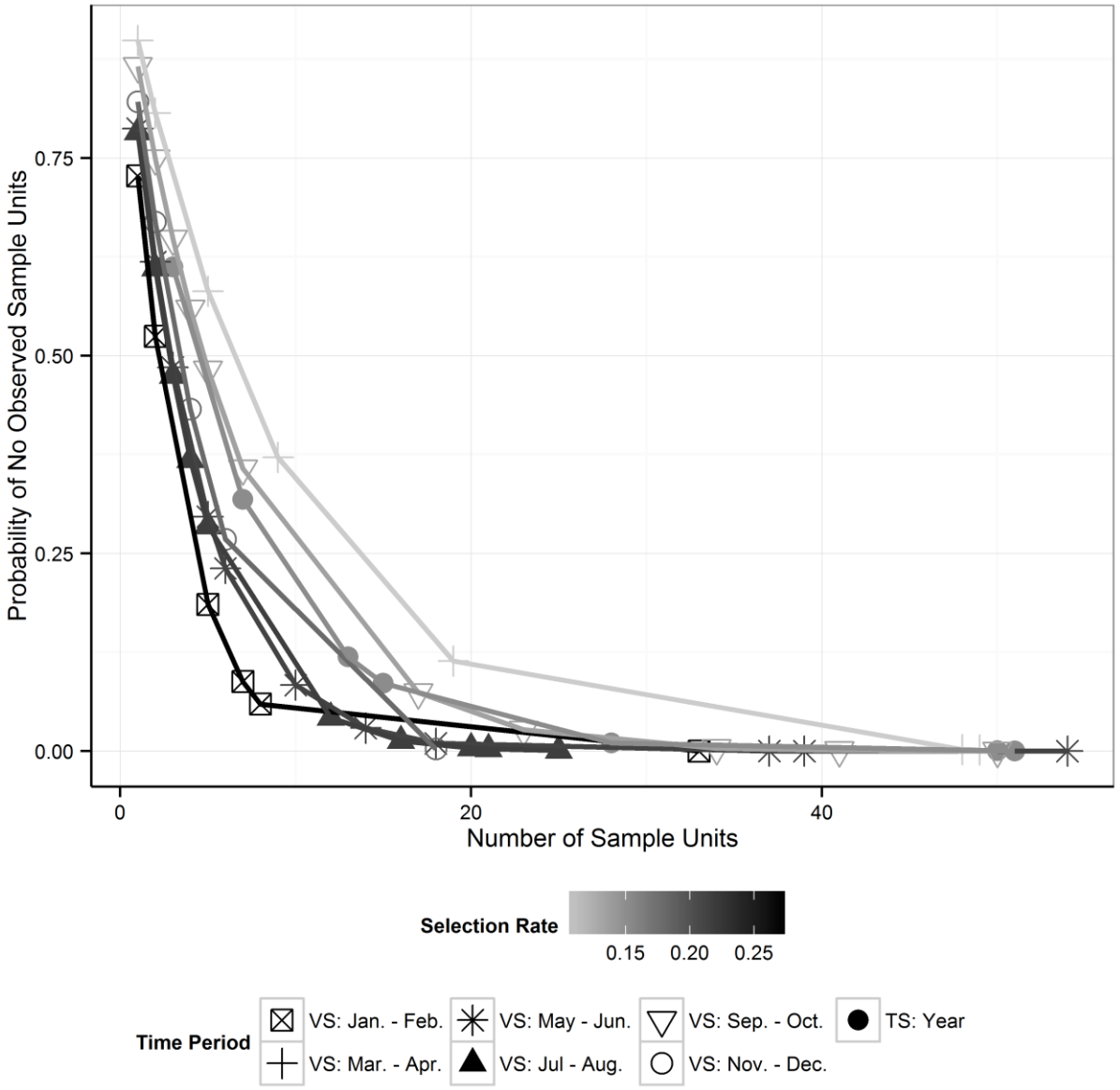

Figure 3-14. Probability of selecting a sample and observing no sample units (trips in trip-selection and vessels in vessel-selection) as a function of the number of sample units and the realized selection rate that occurred in a NMFS Area, time period, and stratum. The x-axis has been truncated to increase resolution at smaller numbers of sampling units. The likelihood of having no observer data decreases with increasing total fishing effort and selection rate.

4 DESCRIPTIVE INFORMATION

This chapter describes information that has been requested on to the restructured Observer Program that is not specifically related to the annual performance review of the sampling design for observer deployment.

4.1 Number of trips and vessels by gear and FMP area

Table 4-1 provides a summary of the number of trips and vessels that fished in each FMP area and by gear type in the 3 partial coverage categories.

Table 4-1. Number of trips and vessels in 2014 in each FMP area (BSAI and GOA) and gear type for each of the partial coverage categories.

	Trip Selection		Vessel Selection		No Selection	
	Total Trips	**Total Vessels**	**Total Trips**	**Total Vessels**	**Total Trips**	**Total Vessels**
BSAI						
Hook-and-Line	146	37	193	22	708	95
Pot	501	47	31	3		
Trawl	119	14				
Jig					10	6
GOA						
Hook-and-Line	1017	172	1734	356	1399	367
Pot	591	51	131	16	6	1
Trawl	2040	69				
Jig					209	40
Total	**4414**	**390**	**2090**	**398**	**2332**	**509**

4.2 Total Catch and Discards and Amount of Catch Observed

Total catch of groundfish and halibut (retained and discarded) was summarized by gear and area for 2014 (Table 4-2 through Table 4-7) from the NMFS catch accounting system. The ADP does not deploy observers into fisheries (because the fishery is not defined before fishing occurs) and instead deploys to trips and vessels across all fisheries, however there is interest in comparing observer coverage across resulting fisheries, defined by area and gear type. This section includes these comparisons for the metric of catch weight.

Harvest information, or retained catch, was collected from eLandings landing reports (fish tickets) and production reports. Discard information was estimated using bycatch rates derived from haul-specific at-sea observer information. The rates were then applied to landings on a landings specific basis. Catch estimation methods are described in detail in Cahalan et al. 2014.

The table rows titled "Observed" indicates catch that occurred on trips[17] where an observer was present. The rows titled "Total" represents estimates of all catch from all trips regardless of whether it was observed. The columns title "Retained" indicate catch that was offloaded (minus dockside discard). The columns titled "Discard" are estimated at-sea discard.

All catch and discard information, including halibut,[18] is presented in round weight metric tons. If species were landed in a condition other than round weight then standard product recovery rates (PRRs[19]) were used to obtain round weight. Halibut that were landed in ice and slime were additionally corrected for ice and slime. A standard 2% correction was made for ice and slime.

The retained and discard information in the Gulf of Alaska (GOA) presented Table 4-4 and Table 4-5 was derived from Table 4-2 in that the same information is broken by species. Species groupings can be found in Appendix A. The same is true for tables Table 4-6 and Table 4-7 in that they provide more detail of the Bering Sea/Aleutian Islands (BSAI) information that is summarized in Table 4-3. The catch of each species is simply the summation of the amount of catch for that species by each gear type. This is not the same as "fishery" and instead shows the total catch of that species across all fisheries using a particular gear type.

Halibut that are incidentally caught in federally managed groundfish trawl, hook-and-line, and pot fisheries are required by regulations to be discarded, regardless of whether the fish is living or dead. Halibut bycatch is tracked in the groundfish fisheries using prohibited species catch (PSC) limits. PSC limits are applied to specific target fisheries, gear types, and seasons. In the halibut IFQ fishery there is as a length retention requirement of 32 inches below which fish must be discarded.

To increase the survival of incidentally caught halibut that are released, regulations require that halibut be returned to the sea following careful release methods. However, despite careful handling, some fish die from being caught and handled and the probability of morality depends on the target fishery and gear. For example, there is higher survival of discarded halibut caught with longline gear then that caught with trawl gear. The International Pacific Halibut Commission (IPHC) uses viability (injury and condition) data collected by observers to generate halibut discard mortality rates (DMRs) in Alaskan groundfish fisheries (Williams 2013a). DMRs are applied to halibut discard information when NMFS tracks PSC limits for the groundfish. However, DMRs are not applied to raw observer data prior to expansion to the entire fishery. Therefore, in order to present observed and unobserved catch, the data are presented without DMRs. As such, these data represent total catch – not total mortality; it is important to recognize that not all of the halibut that were discarded would have died. The IPHC uses a combination of estimated discard and DMR to assess total halibut mortality across the

[17] Trips for catcher/processors are defined as a week (Sunday through Saturday). Trips for catcher vessels are defined as the time period between when a vessel started fishing and all fish were offloaded (including split deliveries).
[18] Note that IPHC use net weight when reporting on catch limits and biomass for halibut. The conversion of halibut from round weight to net weight is: Net Weight = Round Weight x 0.75.
[19] Standard PRRs are published in Federal regulations and available at http://alaskafisheries.noaa.gov/rr/tables/tabl3.pdf

groundfish fisheries (Williams 2013b) and in its assessment and management of the halibut stock, IPHC uses a DMR of 0.16 for halibut fishery discards.

The at-sea discard of Pacific halibut in fisheries where halibut are retained (i.e. halibut IFQ fisheries) may be overestimated in Table 4-2 through Table 4-7. As with all longline data observer collections, observers collect fish weights used to estimate the mean weight per fish from the unsorted (retained and discarded) catch. Because there is a minimum size limit in the halibut IFQ fishery, smaller fish (less than 32 inches) are required to be discarded while larger fish are required to be retained. Hence, basing the mean weight per fish on observer data may overestimate the mean weight of discarded fish and underestimate the weight of retained fish. Thus the haul-specific estimates of at-sea discards of halibut in the IFQ fishery may be biased; however, how this bias impacts the final discard estimates is not yet known. Initial analyses suggest that some bias may persist in the fishery-level estimates of weight of at-sea discard of halibut in the IFQ fishery.

A document is being prepared that describes Observer Program Pacific halibut data collections along with the catch/bycatch estimation routines used to estimate the at-sea discard of halibut in the IFQ halibut fishery. An evaluation of the potential bias in these estimates is currently underway and will be included in this document. We anticipate that this evaluation will use regressions of mean weight per fish on the percent of halibut retained, and direct comparisons of observer-based weight/fish by disposition (retained v. discarded) for halibut where injury assessment data are available. In the case that a bias is identified in the estimates, both changes to estimation processes and modifications to sampling methodologies will be evaluated as potential solutions.

Table 4-2. Total catch of groundfish and halibut (in metric tons) caught in the groundfish and halibut fisheries in 2014 in the *Gulf of Alaska*. Empty cells indicate that no catch occurred.

	Trip	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
Sector	**Disposition**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**
	Observed	6,388	1,677			40,326	5,219			1,817	58
Catcher/Processor	Total	6,605	1,706			41,793	5,892			1,817	58
	Observed	3,406	2,139			3,404	693	3,021	141	19,340	171
Catcher Vessel	Total	25,594	14,819	1,099	<1	45,998	7,298	20,290	1,160	130,608	1,176
Catcher Vessel:	Observed					10,222	371			1,930	25
Rockfish Program	Total					10,527	399			2,068	29

Table 4-3. Total catch of groundfish and halibut (in metric tons) caught in the groundfish and halibut fisheries in 2014 in the *Bering Sea / Aleutian Islands (BSAI)*.

	Trip	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
Sector	**Disposition**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**
Catcher/Processor	Observed	133,899	27,651			374,177	32,420	7,627	449	580,677	3,492
	Total	135,459	28,270			374,229	32,619	7,627	454	580,818	3,515
Mothership	Observed					19,630	1,681			111,734	296
	Total					19,630	1,703			111,734	296
Catcher Vessel	Observed	365	249			26,145	2,222	3,829	103	551,484	607
	Total	4,489	2,498	3	<1	35,486	2,945	27,681	709	560,423	615

Table 4-4. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught in 2014 by *catcher/processors in the Gulf of Alaska*. See Appendix A for species grouping definitions.

Sector	Species Caught	Trip Disposition	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
			Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher/ Processor	Deepwater Flatfish	Observed	11	51			23,021	839			5	<1
		Total	11	54			24,181	1,254			5	<1
	Halibut	Observed		790				648				<1
		Total		806				703				<1
	Other groundfish	Observed	1	169			1,034	300				2
		Total	1	169			1,114	300				2
	Pacific cod	Observed	5,788	160			1,051	1,321				
		Total	5,900	160			1,211	1,356				
	Pollock	Observed	22	5			1,626	509			15	2
		Total	22	5			1,648	509			15	2
	Rockfish	Observed	69	119			12,184	986			1,798	54
		Total	81	124			12,211	1,091			1,798	54
	Sablefish	Observed	417	9			433	44			<1	<1
		Total	511	9			433	45			<1	<1
	Shallow-water flats	Observed	<1	7			978	84				<1
		Total	<1	7			994	84				<1
	Skates	Observed	79	353				352				
		Total	79	359				381				
	Sharks	Observed		14				136				
		Total		14				168				

Table 4-5. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught in 2014 by *catcher vessels in the Gulf of Alaska.* See Appendix A for species grouping definitions.

	Species	Trip	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
Sector	**Caught**	**Disposition**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**	**Retained**	**Discard**
Catcher Vessel	Deepwater Flatfish	Observed		32			1,353	331	1	<1	92	1
		Total	<1	214	<1		14,025	2,248	2	1	771	14
	Halibut	Observed	1,095	1,153				188		1		2
		Total	8,245	8,038	11			1,316		62		2
	Other groundfish	Observed	1	50			12	41	77	113	8	2
		Total	7	309	<1		59	382	511	859	56	11
	Pacific cod	Observed	724	191			2,315	253	2,941	25	218	<1
		Total	7,467	1,220	1,047		20,346	2,186	19,745	211	1,697	1
	Pollock	Observed	14	7			869	46	3	1	19,052	79
		Total	118	65	16	<1	9,096	329	33	8	127,847	548
	Rockfish	Observed	126	88			8,126	112		1	1,889	92
		Total	777	534	24		8,695	632	<1	11	2,143	476
	Sablefish	Observed	1,381	69			325	3		<1	1	<1
		Total	8,511	427			439	31		2	16	<1
	Shallow-water flats	Observed		1			542	39	<1	<1	6	
		Total	<1	13	<1		3,196	333	<1	2	118	<1
	Skates	Observed	65	414			84	46	<1	<1	2	<1
		Total	468	2,812	<1		666	223	<1	<1	16	1
	Sharks	Observed	<1	134			1	4		<1	1	19
		Total	<1	1,187			3	18		3	11	152

Table 4-6. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught in 2014 by *catcher/processors in the Bering Sea / Aleutian Islands*. See Appendix A for species grouping definitions.

Sector	Species Caught	Trip Disposition	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
			Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher/ Processor	Atka Mackerel	Observed	<1	4			27,763	359		<1	2	5
		Total	<1	4			27,763	359		<1	2	5
	Flatfish	Observed	64	2,436			219,555	9,626	1	349	4,406	1,393
		Total	65	2,455			219,567	9,627	1	349	4,406	1,393
	Halibut	Observed		4,489				2,919		9		94
		Total		4,537				3,114		14		117
	Other groundfish	Observed	4	1,402			50	2,797	4	86	117	519
		Total	4	1,416			50	2,799	4	86	117	519
	Pacific cod	Observed	121,013	2,847			33,575	416	7,619		2,200	4
		Total	122,429	2,870			33,615	416	7,619		2,200	4
	Pollock	Observed	5,308	603			37,507	11,385	3	4	573,202	384
		Total	5,364	607			37,507	11,385	3	4	573,342	384
	Rockfish	Observed	87	110			31,578	489		<1	270	632
		Total	88	110			31,578	489		<1	270	632
	Sablefish	Observed	194	6			59	1				
		Total	196	6			59	1				
	Turbot	Observed	748	603			22,826	1,976		1	278	129
		Total	748	605			22,826	1,976		1	278	129
	Skates	Observed	6,482	15,073			1,264	2,448		<1	202	307
		Total	6,565	15,185			1,264	2,449		<1	202	307
	Sharks	Observed		53				4			<1	25
		Total		54				4			<1	25

Table 4-7. Total catch (retained and discard) of groundfish species and halibut (in metric tons) caught in 2014 by *catcher vessels in the Bering Sea / Aleutian Islands*. See Appendix A for species grouping definitions.

Sector	Species Caught	Trip Disposition	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
			Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher Vessel	Atka Mackerel	Observed		<1				1	<1	1	95	1
		Total		<1			<1	2	<1	7	101	1
	Flatfish	Observed		1			10	365	<1	1	1,634	34
		Total	<1	17			14	512	<1	5	1,657	34
	Halibut	Observed	229	107				247		<1		59
		Total	1,749	956	2			332		30		62
	Other groundfish	Observed	<1	8			3	169	6	86	610	313
		Total	5	61			3	224	79	503	621	313
	Pacific cod	Observed	70	45			25,109	154	3,793	13	1,798	<1
		Total	2,166	246	2		34,074	190	27,274	145	1,856	<1
	Pollock	Observed		2			1,021	1,066	<1	1	546,628	74
		Total		9			1,392	1,391	2	7	555,444	74
	Rockfish	Observed	5	13				8	<1	<1	392	47
		Total	48	170	<1	<1	<1	18	1	5	409	50
	Sablefish	Observed	60	3					29		<1	
		Total	514	27					324		<1	
	Turbot	Observed	1	13			2	122		1	176	2
		Total	4	105			2	157	<1	8	182	2
	Skates	Observed		57			1	90		<1	147	41
		Total	3	903			1	118		<1	150	42
	Sharks	Observed		1				<1			4	36
		Total		3			<1	<1			4	37

4.3 Observer Training and Debriefing

For the 2014 fishing year, approximately 436 individual observers were trained, briefed, and equipped for deployment to vessels and processing facilities operating in the Bering Sea and Gulf of Alaska groundfish fisheries. These observers collected data on board 367 fixed gear and trawl vessels and at 14 processing facilities for a total of 44,178 observer days.

New observer candidates are 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 164 new observers to deploy in 2014 (Table 4-8).

Returning observers are required to attend an annual 4-day briefing class prior to their first deployment each calendar year. These briefings provide observers with annual updates regarding their responsibilities for the current fishing season and the observers are required to demonstrate their understanding and proficiency by passing exams on fish, crab and bird identification, and by successfully completing various in-class activities. Prior to subsequent deployments, all observers must attend a 1-day, 2-day, or 4-day briefing; the length of the briefing each observer attends is dependent on the individual's needs. In rare cases when an observer has demonstrated major deficiencies in meeting program expectations, they may be required to attend another 3-week training.

After each deployment, observers meet with an FMA staff member for debriefing where their sampling and data recording methods are reviewed and the data are finalized. There were 97 debriefings in Anchorage completed by three FMA staff and 572 debriefings in Seattle completed by 21 FMA staff. Many observers deploy multiple times throughout the year and debrief after each contract, followed by a briefing for redeployment. Since observers are required to attend more than one briefing annually, the total number of trainings/briefings exceeds the total number of observers. Thus, the total number of briefings and debriefings for 2014 do not represent a count of individual observers.

Table 4-8. Number of observer training classes and number of observers trained/briefed from December 2, 2013 through November 13, 2014.[20]

Training Classes	Number of Classes	Number of Observers Trained/Briefed
3 week training	10	164
4-day briefing	19	272
4-day partial coverage briefing	9	38
2-day briefing	5	5
1-day briefing	61	291
TOTAL		**770**

[20] The dates were selected based on observers being trained in December to deploy at the beginning of the fishing year in January; i.e., counting observers trained from December through December would not have represented the actual number trained for deployment in the 2014 fishing year.

5 COMPLIANCE AND ENFORCEMENT

This chapter describes the cooperative relationship between the Alaska Division (AKD) of NOAA's Office for Law Enforcement's (OLE) and the Observer Program, as well as the observer's compliance reporting role and complaints received.

5.1 Observer Program and Fisheries Enforcement

5.1.1 NOAA Office for Law Enforcement

AKD maintains a cooperative partnership with the North Pacific Groundfish and Halibut Observer Program (Observer Program). AKD's mission is to support resource management by enforcing the laws and regulations that protect living marine resources. One of AKD's highest enforcement priorities is to protect observers and their ability to collect scientific data used to manage Alaskan fisheries. Reports of assault, harassment, tampering, sample bias, interference, or coercion are among the highest investigative priorities for OLE.

AKD Agents and Officers frequently engage with industry and the Observer Program to support outreach, education, and compliance assistance. Agents and officers in all AKD field offices respond to industry questions about compliance with Observer Program regulatory requirements as well as participate in agency meetings to discuss the implementation and review of new and ongoing management programs. In 2014, AKD Agents and Officers dedicated 3831.75 hours to supporting the Observer Program, including civil and criminal investigations, outreach, education, and compliance assistance activities.

AKD dedicates a full time contractor to support observer program compliance reporting in Seattle. Duties of the liaison contractor include: to receive, organize, and distribute compliance statements; provide resources and support to observer victims of crime; develop and edit manuals, reports, and compliance training materials; provide training and liaison with observer program staff and observers; and distribute AKD outreach materials to industry; as well as provide observer related administrative and investigative support to agents and officers.

AKD also maintains a full-time liaison Special Agent; duties include: to conduct and assist with complex observer related investigations, liaison with Observer Program staff, provide agency analysis on observer related topics, provide compliance monitoring portions of observer training and program staff updates, attend meetings and outreach events, and assist industry to comply with fishery management regulations.

AKD is dedicated to supporting resource management and agency personnel in the field. Observers were asked to provide feedback during 4-day annual briefings in 2014 by completing a survey about their interactions with AKD Agents and Officers. A summary of these surveys was reported to the North Pacific Fishery Management Council in the AKD biannual report in December 2014. The surveys revealed that observers have a high level of confidence in support provided by AKD and some observers also provided suggestions about how to improve visibility and communication with observers.

5.1.2 U.S. Coast Guard

It is a high U.S. Coast Guard (USCG) priority to promote compliance with observer regulations and ensure that observers can effectively and accurately collect and report unbiased data. During at-sea boardings, the USCG seeks to detect and deter violations involving observers including failure to carry a required observer, observer harassment, gear tampering, presorting of catch, or otherwise biasing of samples collected by the observer.

5.2 Compliance Reporting Process

The observer's compliance monitoring role is identified in the Magnuson-Stevens Act as part of their duties when assigned to collect scientific data from commercial fisheries to support conservation and management purposes as defined in regulation or in permits issued under the Magnuson-Stevens Act. An observer's compliance monitoring role is to monitor and document vessel activities and report compliance information to the Agency. Observers also play an important role in assisting the industry to comply with requirements regarding observer safety and access to catch to allow them to complete their duties. The Observer Program documents and report compliance information relevant to observer deployment, observer safety, observer's work environment and/or the performance of required duties. Observers may also report common compliance issues that impact resource management such as violations of retention and discard requirements, takes or harassment of seabirds and marine mammals and violations of prohibited species regulations. Observers are trained on their compliance monitoring role during 3-week observer training and 4-day annual briefings by the AKD Liaison office and the USCG Commercial Fishing Vessel Safety office.

5.2.1 Compliance reports to the USCG

During all boardings where observers are present, USCG boarding officers will discreetly interview them to ensure they are being allowed to perform their duties. Reports from observers describing harassment, intimidation, and safety issues are of particular concern. All reports of suspected offenses will be passed to AKD.

NMFS regulations establish national safety standards for commercial fishing vessels carrying observers. These regulations require that any commercial fishing vessel, not otherwise inspected, must pass a USCG dockside safety examination before carrying an observer. Further, an observer may conduct an independent review of the fishing vessels' major safety items and may determine that deficiencies exist. When the USCG receives an observer report or statement, it will be considered and further action will be taken on a case by case basis in accordance with current USCG policy.

The USCG may be contacted to assist AKD in determining the presence of a safety concern when a report is received by an observer while deployed with a vessel. Whenever possible, the USCG will attempt to locate a vessel when such a report is received and will conduct a commercial fishing vessel safety boarding at-sea or if dockside, a commercial fishing vessel safety examiner will conduct an inspection, to ensure no hazardous conditions exist and if they do, take the necessary actions to get these corrected in accordance with current USCG policy. These situations will be coordinated with AKD and all information will be forwarded.

On occasion, observers may have difficulty with the master or crew on a vessel and will request immediate USCG assistance and possibly, removal from the vessel. In these cases, the USCG

will coordinate with AKD to board the vessel and gather facts related to the claimed allegation. Any decision to remove the observer from the vessel will be made by the USCG District Seventeen Commander in consultation with AKD prior to the debarkation of the boarding team. In July 2014, an observer was removed at their own request during a USCG federal fisheries boarding after claiming to be harassed by the vessel crew. This case was forwarded to AKD and NOAA General Counsel for further investigation and possible prosecution.

5.3 Non-compliance trends

Each complaint received by AKD is evaluated and prioritized according to divisional priorities available on the web: www.nmfs.noaa.gov/ole/priorities/priorities.html. AKD Officers and Agents investigate complaints to identify if a violation has occurred; many low level infractions may be handled by a compliance assistance interaction or by issuing a verbal or written warning. Compliance trend analysis allows AKD to maximize potential positive impacts on resource management by targeting available resources to problem areas where there is an identified need. Table 5-1 summarizes Observer Program complaints received by coverage sector and Table 5-2 summarizes the status of complaints received and associated AKD incidents and cases.

AKD continues to work closely with the Observer Program and partial coverage observer provider to address high priority compliance issues that affect observer safety, sampling, and the observer's work environment. When high priority complaints are received in a timely manner, this improves AKD's ability to address significant compliance issues in real time and aids the industry in complying with rules and regulations that may still be relatively new.

Table 5-1. Observer Program complaints received by AKD by coverage sector and subject matter in 2014.

Compliant Topic	Partial Coverage	Full Coverage	Total
Assault or Sexual Harassment	4	8	12
Harass Intimidate Interfere	25	69	94
Safety-NMFS	43	55	98
Sampling Accommodations	37	85	122
Observer Accommodations	2	9	11
Record Keeping and Reporting	84	104	188
Limited Access Programs*	0	274	274
Gulf of Alaska Salmon	27	0	27
Retention / Discard	54	28	82
Prohibited Species	36	74	110

Compliant Topic	Partial Coverage	Full Coverage	Total
Seabirds	38	10	48
Marine Mammal	1	2	3
Miscellaneous Violations	8	16	24
Contractor Problems	0	16	16
Observer Coverage	85	0	85
Total	**440**	**750**	**1194**

*Excludes IFQ fisheries.

Table 5-2. Status of complaints received by AKD in 2014 from the North Pacific Groundfish and Halibut Observer Program*

<table>
<tr><th colspan="2">Complaints</th><th colspan="2">Incidents</th><th colspan="2">Cases</th></tr>
<tr><td rowspan="8">1194 Complaints Received in 2014</td><td rowspan="5">800 Complaints Referred for Investigation</td><td rowspan="5">257 Incidents Forwarded to Agents and Officers</td><td rowspan="4">98 Incidents associated with a case number</td><td rowspan="4">97 Cases</td><td>51 Ongoing</td></tr>
<tr><td>3 Penalty Issued</td></tr>
<tr><td>30 Warning</td></tr>
<tr><td>2 Transferred</td></tr>
<tr><td>11 Closed</td></tr>
<tr><td rowspan="3">100 Ongoing
2 Transferred
57 Closed</td><td colspan="2" rowspan="3"></td></tr>
<tr><td rowspan="3">287 Received
30 Transferred
77 Closed</td><td colspan="2" rowspan="3"></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">Complaints include individual observer statements and reports from Agency staff.</td><td colspan="2">Multiple complaints regarding a vessel or company may be combined into a single incident for investigation.</td><td colspan="2">A case may include more than one incident for a vessel or company.</td></tr>
</table>

*Current as of April 2015.

5.3.1 Observer Coverage Complaints

Observer coverage issues are identified and reported by NMFS staff; 85 complaints were received in 2014 involving 71 distinct vessels in the partial coverage category. More than half the complaints involved issues with the trip logging process and 23 reports of a vessel embarking on a fishing trip without a required observer. Given the number of fishing trips and the number of vessels required to carry an observer, this demonstrates very high compliance with observer coverage requirements.

5.3.2 Observer Safety Complaints

A variety of safety issues were reported, including failure to maintain a lookout while at-sea, unsafe at-sea operation of the vessel, blocked passageways, and unsafe living and working conditions. Of the 98 received, 55 were referred for investigation; 21 involved the partial coverage sector and 34 involved the full coverage. 20 complaints were transferred to another agency for investigation. Alcohol or drug use by vessel personnel was a factor in 9 safety reports.

5.3.3 Observer Victim Complaints

AKD has noted a significant trend involving catcher/processor vessels participating in Limited Access Programs where the fishery is limited by prohibited species catch. Observers reported a number of incidents of harassment, intimidation, hostile work environment, or attempted sample bias related to the collection of prohibited species catch data. AKD has also detected an increase of institutionalized intentional biasing of observer data, attempts to influence how observers collect samples and hostile work environment; multiple investigations are currently ongoing.

AKD continues to monitor this trend and multiple investigations have been initiated involving vessels in the full coverage category. These investigations include allegations of physical sample bias including removing halibut from observer samples, or physically preventing a halibut from entering an observer's sample during collection. Additional allegations include hostile work environment due to industry behavior and remarks to the observer in an attempt to influence how they sample the catch to reduce the number of halibut in their sampling.

AKD does not tolerate harassment/assault of observers. Reporting victimizations are challenging for an observer, especially because of the unique and isolating environments they may find themselves in. Observers have the right to feel safe and secure in their work environment. AKD is actively investigating multiple complaints of harassment and will continue to make these investigations a high priority.

5.3.4 Resource Complaints

AKD Agents and Officers investigated two incidents of a short-tailed Albatross take in September and the take of an unidentified Albatross in December 2014. AKD continued to receive a high number of complaints regarding the use of seabird avoidance gear from the partial coverage sector. More information regarding the number of complaints in the full and partial coverage sectors can be found in Table 5-1.

AKD has seen an increase in the number of reports about record keeping and reporting requirements in the full coverage sector and partial coverage sectors. Observers assigned to vessels delivering to shoreside processors and observers assigned to shoreside processors consistently report numerous incidents of failure to accurately report prohibited species catch and bycatch species, failure to follow catch monitoring control plan (CMCP), and failure to record at sea discards.

Enforcement of salmon retention and reporting regulations in the Gulf of Alaska still prove difficult with the limited monitoring and enforcement tools. Observers again reported difficulties with obtaining accurate counts of salmon from pollock deliveries due to fast belts, deep fish, and limited access to salmon sorted from the catch after the completion of the offload.

5.4 Enforcement Actions

Investigations can be complex and may take time from complaint received to prosecution by NOAA General Counsel Enforcement Section (GCES) or the United States Attorney's Office (USAO). AKD utilizes the cooperative relationship with Alaska's fishing industry to preemptively educate the fleet on new programs, as well as to advise cooperative managers of non-compliance trends through outreach letters detailing concerns and explaining the applicable regulations.

AKD Agents and Officers may directly issue a summary settlement for common violations or forward significant or more egregious violations to GCES for civil prosecution or the USAO for criminal prosecution. AKD Agents and Officers closed over 100 cases reported by observers or the Observer Program in 2014, several which were initiated prior to 2012. Summary settlements are routinely issued for coverage and safety issues and more than 60 written and verbal warnings were issued. Enforcement Actions issued by GCES are available on the web at http://www.gc.noaa.gov/enforce-office7.html.

AKD issued two outreach letters to large cooperatives, one to the Amendment 80 vessel co-op, Alaska Seafood Cooperative, and an email sent to the freezer longline fleet. These letters identified trends involving intimidation, harassment, hostile work environment, sample bias and attempted coercion regarding halibut bycatch sampling methods as well as catch weighing and record keeping and reporting requirements. This type of outreach is important because it allows wide distribution of compliance information and can compel compliance without delay with immediate benefits to the resource and fishery managers. AKD will continue to utilize a step-wise enforcement approach that involves a graduated enforcement action from warnings and outreach to prosecution by NOAA GC for repeat offenses.

Settlement agreements and charges filed listed in the following paragraphs include cases initiated from observer or the observer program complaints received by AKD. The Observer Program reports compliance information related to the deployment observers and observers routinely report events and situations that impact their safety, work environment, data collection as well as catch data.

5.4.1 NOAA General Counsel - Settlement Agreements

AK0803641; American No. 1 - Magnuson-Stevens Act $8,000 NOVA settled for $5,000 and dismissed one count. [Initial charging information, item 1, February 2014 posting: Owner was charged in two counts under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) for interfering with or biasing the sampling procedure employed by an observer by sorting skates before sampling and allowing fish to remain on deck without an observer present, and for failing to record haul numbers into the flow scale; failing to reset the flow scale daily; failing to print the flow scale report at least once every 24 hours; and failing to retain the daily flow scale reports. An $8,000 NOVA was issued.]

AK0900589, AK1000315, and AK1003465; F/V *Alpine Cove* - Magnuson-Stevens Act $15,911, $18,494, and $20,223 NOVAs settled for a 30 day suspension of two permits relating to the F/V Alpine Cove. [Initial charging information, items 4, 7, and 8, from August 7, 2012 posting: AK0900589; Owner and operator were charged in three counts under the Magnuson-Stevens Act for failing to carry an observer; for failing to ensure communication equipment on board was functional; and for engaging in directed fishing for Pacific cod. A $15,911 NOVA was issued. AK1000315; Owner and operator were charged under the Magnuson-Stevens Act for engaging in directed fishing for Pacific cod. An $18,494 NOVA was issued. AK1003465; Owner and operator were charged under the Magnuson-Stevens Act for engaging in directed fishing for Pacific cod. A $20,223 NOVA was issued.]

AK0700698, AK1101557, AK1200532; American Seafoods Company, LLC - Magnuson-Stevens Act $2,676,600 combined NOVAs settled for $1,750,000. [Initial charging information, item 1, from August 7, 2012 posting, and item 15 and item 23, from August 2, 2013 posting: AK0700698; F/V American Dynasty – Owner, manager, and operator were charged in thirty-two counts under the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act) for failing to maintain or operate a flow scale to obtain accurate weights; for submitting inaccurate or false data, statements or reports; for failing to comply with flow scale testing requirements; for failing to provide notification to an observer and failing to have an observer present; for failing to comply with reporting requirements; and for failing to weigh catch, interfering with or biasing the observer's sampling procedure, and failing to provide reasonable assistance. A $543,500 NOVA was issued. AK1101557; F/V Ocean Rover - Owner, and operators were charged in 64 counts under the Magnuson-Stevens Act for making adjustments to the flow scale that failed to bring performance errors closer to zero value; for processing groundfish that was not weighed on a NMFS-approved scale that meets the maximum permissible error of plus or minus 3 Page 2 of 17 August 2, 2013 percent, and which was not maintained in proper operating condition throughout its use; and for failing to accurately record the scale weight for hauls to the nearest pound or .001 metric ton. An $848,000 NOVA was issued. AK1200532; F/V Northern Eagle - Owner and operators were charged in 81 counts under the Magnuson-Stevens Act for processing groundfish that was not weighed on a NMFS approved scale that meets the maximum permissible error of plus or minus 3 percent, and which was not maintained in proper operating condition throughout its use and for failing to record the accurate scale weight for hauls to the nearest pound or .001 metric ton. A $1,337,000 NOVA was issued.]

5.4.2 NOAA General Counsel - Civil Charges Filed

AK1000171; F/V *Viking Explorer* - Operator was charged under the Magnuson-Stevens Act for failing to retain all Improved Retention and Improved Utilization (IR/IU) species on board until lawful transfer. A written warning was issued.

AK1004042; F/V *Majesty* - Individual was charged under the Magnuson-Stevens Act for discarding or releasing IR/IU species prior to being brought on board the vessel; for failing to comply with the record and recording requirements by failing to record haul weights and discard information and signing an Alaska Department of Fish and Game fish ticket which contained false information; for altering or changing an entry in a logbook; and for failing to submit the blue colored page of the logbook to the receiving shore side processor. A written warning was issued.

AK1202525; F/V *Arcturus* - Individual was charged under the Magnuson-Stevens Act for harassing an observer by conduct that had sexual connotations, had the purpose or effect of interfering with the observer's work performance, or otherwise created an intimidating, hostile, or offensive environment. A $17,500 NOVA was issued.

6 OUTREACH

Outreach meetings continued throughout 2014 focusing on general Observer Program questions and addressing the objectives of quality data collection and management. This report focuses specifically on the outreach activities that were conducted in the fall of 2013 (in preparation for the 2014 fishing year) and throughout the 2014 calendar year. The outreach meetings were held in various locations in Washington and Alaska, and via telephone (Table 6-1) with a variety of information disseminated at the meetings (Table 6-2).

Many agency staff contributed to outreach efforts including: NMFS (Observer Program and Sustainable Fisheries), Office of Law Enforcement, United States Coast Guard, Alaska Department of Fish and Game, and AIS Inc. Meeting attendance included vessel owners, operators, fish processors, industry representatives, observers, and local newspapers and public radio stations. NMFS would like to thank everyone who participated and attended the meetings and provided valuable information and feedback.

The goals of the late fall 2013 and early 2014 public outreach meetings were to maintain a dialogue with industry members and inform them about the program, vessel responsibilities, and the objectives of quality collection of data and management. Several meetings were held at the request of industry members to address various concerns such as the supply of lead level 2 observers to the freezer longline catcher/processor fleet and the treatment of observers on Amendment 80 vessels. In the late fall 2014 public outreach meetings, the focus of information disseminated transitioned to the 2015 ADP and the changes to the selection process for the 2015 fishing year.

Some successes that were highlighted at the meetings included: meeting the expectations in the trip selection pool in terms of deployment and representative data for management; the management of the call center was transferred in 2014 to AIS, Inc. streamlining the call-in process and increased efficiency of the call-in utility for industry members.

Challenges discussed included: the number of conditional releases administered in the vessel selection pool; and accommodation and space requirements on board small vessels.

Meeting participants again included many representatives from vessels in the vessel selection pool, as well as representatives from vessels in the trip selection pool and shoreside processors and vessels in the full coverage sector. Questions answered dealt with a variety of topics including quality of data collected; purpose of the observer data; observer coverage rates; halibut careful release regulations; electronic monitoring; the observer fee and standard price calculation; Observer Program budget, funding, and cost efficiencies; and various topics related to the logistics of having an observer on board, such as, space considerations, IFQ holders and bunk space. Some people were interested in the uses of the data collected and its role in fisheries management. Specific meetings were held the treatment of observers on Amendment 80 vessel, and the availability of lead level 2 observers to the freezer longline catcher/processor fleet.

NMFS plans to continue outreach meetings in a range of communities while recognizing that the times and locations need to be spread throughout the year, and logistics may require that some meetings will be conducted via telephone, or other technologies as is appropriate. Due to the logistics of travel, competing meetings and the locations of communities, we are trying to conduct outreach meetings earlier in the year.

While NMFS conducts formal outreach sessions, it is important to note that the observer providers and the individual observers have the most direct daily contact with the fishing industry. Those day-to-day interactions are very important to the overall success of the program and it is important to acknowledge their important contribution to the overall effort of providing factual information on the Observer Program to the industry.

Table 6-1. Outreach activities related to the Observer Program in fall of 2013 and throughout 2014.

Date	Location	Description
Nov 20-22, 2013	Seattle, WA	Pacific Marine Expo
Dec 3, 2013	Petersburg, AK	Public outreach meeting
Dec 5, 2013	Homer, AK	Public outreach meeting
Dec 11, 2013	NPFMC, Anchorage, AK	Public outreach meeting
Dec 19, 2013	Phone	Aleutians East Borough meeting
Jan 16, 2014	Kodiak, AK	Public outreach meeting
Jan 13, 2014	Phone & web ex	Demo for processors on observer fee payment
Feb 19, 2014	Sitka, AK	Public outreach meeting
Feb 20, 2014	Juneau, AK	Public outreach meeting
Feb 20, 2014	Juneau, AK	United Fishermen of Alaska Board meeting
Apr 17, 2014	Kodiak, AK	ComFish 2014 Public outreach meeting
May 14, 2014	Seattle, WA	Freezer Longline Coalition Symposium
Aug 20, 2014	Seattle, WA	Alaska Seafood Cooperative & Groundfish Forum meeting
Nov 13, 2014	Seattle, WA	Alaska Freezer Longline Coalition on lead level 2 observers
Nov 19-21, 2014	Seattle, WA	Pacific Marine Expo
Dec 2, 2014	Kodiak	Public outreach meeting
Dec 4, 2014	Homer	Public outreach meeting

Table 6-2. Summary of the outreach information distributed on the Observer Program in 2014.

Handout type	How Distributed	Link
What is a North Pacific Groundfish Observer?	handout at meetings; available online	http://www.afsc.noaa.gov/FMA/PDF_DOCS/NPG%20observer%20program%20brochure%206-6-14.pdf
North Pacific Groundfish Observer Program	handout at meetings; available online	http://www.afsc.noaa.gov/FMA/PDF_DOCS/What%20is%20a%20NPG%20Observer%206-6-14.pdf
Summary of the restructured North Pacific Groundfish and Halibut Observer Program	handout at meetings; available online	http://www.alaskafisheries.noaa.gov/sustainablefisheries/observers/overview.pdf
Observer Program Frequently Asked Questions	handout at meetings; available online	http://www.alaskafisheries.noaa.gov/sustainablefisheries/observers/faq.htm
Partial coverage contacts	laminated card handed out at meetings	
Observer harassment warning poster	mailed to vessel permit holders; available online	http://www.alaskafisheries.noaa.gov/sustainablefisheries/observers/harassment_warning.pdf
Vessel responsibilities regulation excerpt	mailed to vessel permit holders	
Halibut careful release poster	handout at meetings	
USCG MARPOL sticker	distributed by USCG Dockside Safety Examiners	http://www.uscg.mil/TVNCOE/Documents/policyletters/CVCPolicyLtr2013.pdf

7 NMFS RECOMMENDATIONS

7.1 Update to previous recommendations

In the 2013 Annual Report (NMFS 2014a) NMFS made a series of recommendations. Here we provide an update of those recommendations (*in italics*).

Vessel Selection:

- Based on the 2013 Annual Report, NMFS recommended that participants in the vessel selection category be placed in the trip selection category in 2015.

This recommendation was implemented in the 2015 ADP. Vessels that were in vessel selection are now in the small-vessel trip selection strata. NMFS continues to recommend trip-selection method for all vessels in 2016.

- If the vessel selection pool continues in 2015 and the releases are continued in the vessel selection pool, then they should apply to all fishing activities during a release period.

Under the 2015 ADP, NMFS discontinued conditional releases for bunk space and is only granting conditional release to vessels in the small vessel category with insufficient life-raft capacity to accommodate an observer, or if their two previous trips were observed trips (i.e., two trips in a row were observed, the third trip will be released from coverage).

For 2016, NMFS recommends providing vessels in the small vessel category where taking an observer is problematic (e.g., with insufficient life-raft capacity) an opportunity to 'opt-in' to the EM selection pool to participate in the EM cooperative research. To implement the Observer Science Committee's (OSC's) recommendation that vessels not be moved in and out of the coverage strata, NMFS recommends that any vessels put in the no selection pool and the EM selection pool be in that pool for the entire year.

No selection pool:

- Recognizing the challenging logistics of putting observers on small vessels, NMFS recommends that vessels less than 40ft continue to be in the no selection pool for observer coverage. However, NMFS also recommends that vessels less than 40ft be considered for testing of electronic monitoring since NMFS has no data from this segment of the fleet.

NMFS reiterates this recommendation for 2016.

Coverage Rates:

- NMFS does not anticipate recommending coverage rate changes at this time, except that NMFS will scale coverage rates up if there is sufficient funding to do so. Trip selection rates should remain constant throughout the entire year and NMFS should use buffers in the budget to mitigate the risk of the rare event of a cost-overage.

NMFS was able to increase coverage rates in 2015 based on carryover of funds, less anticipated effort, and Federal funds. NMFS will continue to explore efficient sampling designs with the constraints of available budgets and anticipated fishing effort in 2016.

Tenders:

- Based on the analysis in the 2013 Annual Report NMFS recommended that continued development of alternatives to deploy observers from or on tenders be considered in the context of other actions and priorities for Council and NMFS analysis.

There are two aspects of tendering activity: 1) impact on biological sampling for salmon, and 2) the potential for bias.

Biological sampling for salmon:

- *Analysis in Chapter 3 (section 3.6.2) confirmed the challenge of collecting data from vessels delivering to tenders. While plant observers are available to conduct genetic sampling in the BSAI full coverage category, in the GOA partial coverage category the sampling protocol relies on the observer from an observed trawl catcher vessel collecting genetic samples from each Chinook salmon in a delivery. Observers on trawl catcher vessels delivering to tenders cannot collect genetic samples from all Chinook salmon in the delivery because the delivery is made to a tender and they are not authorized to work on the tenders, nor are the tenders set up to accommodate observer sampling.*
- *Given the priority the Council has placed on salmon prohibited species catch management, additional discussions are needed about a number of aspects of this issue, including the specific needs for genetic sampling for salmon; options for modifying the collection of salmon prohibited species catch data from all vessels using trawl gear, including those delivering to tenders; and the priority of these issues relative to other issues requiring further analysis. Increasing genetic sampling for salmon or modifying protocols would require a shifting of staff and resources away from other sampling and data collection duties.*

Potential for bias:

- *An issue of concern is whether observed vessels delivering to tenders are fishing differently than unobserved vessels delivering to tenders. The most noteworthy findings from 2014 is that we do not see indication that observed vessels delivering to tenders were making shorter trips or fishing in different areas than unobserved vessels delivering to tenders. This finding agrees with findings in the 2013 Annual Report.*
- *Differences between observed and unobserved vessels in vessel length and proportion of the predominant species may be explained by characteristics of the vessels delivering to tenders such as deployment strata or gear type. Further analysis, similar to that conducted for the non-tendered trips (in Tables 3.12 and 3.13) that evaluated trip metrics by strata and gear, could provide further information about the differences in the observed and unobserved tendered trips. However, it also is possible that the number of observed trips by vessels delivering to tenders may not be sufficient to do this analysis for all strata and gear types. NMFS recommends that further*

investigation of this issue be considered in the context of other actions and priorities for Council and NMFS analysis.

Performance Metrics:

- NMFS envisions that future reporting will expand key performance metrics to improve our understanding of the Observer Program performance. NMFS has already noted progress on incorporating variances associated with catch estimates, and will continue to report as work progresses.

NMFS continues this recommendation for 2016 and will continue to expand ways to evaluate deployment and catch estimation. For example, Chapter 3 of this report expands the comparison of trip metrics; the supplemental environmental assessment (SEA) for the restructured observer program contains a "gap analysis" and summary of the quality of observer information compared to the old program; and NMFS is continuing to evaluate and make improvements to catch estimation methods (e.g., Cahalan et al. 2014, Cahalan et al. 2015; Cahalan et al. In press).

Trip Identifiers:

- NMFS staff will consider and identify the best approach to develop a trip identifier tied to landing data to provide linkage between ODDS and eLandings and improve data analysis. Identification of tender trips through electronic reporting on tenders (via tLandings) would also facilitate analysis.

A solution for trip identifiers was not yet been implemented. However, NMFS reiterates this recommendation and plans to dedicate staff time to develop a solution for 2016.

7.2 Additional recommendations to improve the 2016 ADP

ODDS

- *NMFS recommends modifications to ODDS to address in observer coverage and temporal bias exhibited in trip-selection during 2013 and in 2014. The current methods in ODDS of 1) allowing selected trips to be cancelled, and 2) allowing multiple trips to be logged prior to sailing should be re-evaluated.*

Observer Effects

- *Although the finding of observer effects in 2014 does not guarantee that they will be found in future years, the evidence of observer effects in both trip and vessel selection strata are concerning to NMFS. Besides moving vessels to full coverage, there is not an easy mechanism to solve observer effects and they may be related to trip-logging issues in ODDS or vessels fishing differently when an observer is onboard. Regardless of the drivers, future ADPs should take the evidence of observer effects into consideration and evaluate whether changes in coverage rates be broadly applied to existing strata or if they could be applied to newly defined strata (e.g., gear).*

Defining strata and coverage rates

- *The 2016 ADP should explore defining strata to deploy observers by gear (e.g. fixed gear, and trawl gear) and FMP area (BSAI, GOA). Sector (catcher vessel and*

catcher/processor) should also be considered, especially if the Council takes action to move more catcher/processors into the partial coverage category.

- *NMFS agrees with the OSC that the assumption used in the 2013-2015 ADPs, that effort in the following year will be equal to that two years prior, should be improved upon. NMFS should develop better tools such as models to predict fishing effort.*

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APPENDIX A

Appendix A presents the definitions of the species groupings that were used in total catch and discard tables in Chapter 4. The groupings were done to simplify the tables and are based on categories that make sense from a management standpoint.

Table A-1. Description of the individual species that were combined into species groups in the Gulf of Alaska for Table 4-4 and Table 4-5.

Deep water Flatfish	**Other Groundfish**	**Rockfish**	**Shallow Water Flats**	**Skates**	**Sharks**
Rex sole	Squid	Dusky	Starry flounder	Longnose	Spiny dogfish
Flathead sole	Octopus	Rougheye	Yellowfin sole	Alaska	Salmon shark
Arrowtooth flounder	Atka Mackerel	Thornyheads	Rock sole	Aleutian	Sleeper
Greenland Turbot	Sculpin	Pacific Ocean Perch	Butter sole	Whiteblotched	Other sharks
Dover sole		Other rockfish	Other flounder	Big	
Kamchatka flounder		Northern	English sole	Other skates	
Deepsea sole		Shortraker	Alaska plaice		
			Sand sole		

Table A-2. Description of the individual species that were combined into species groups in the Bering Sea/Aleutian Island for Table 4-6and Table 4-7.

Flatfish	**Other Groundfish**	**Rockfish**	**Skates**	**Sharks**	**Turbot**
Alaska plaice	Squid	Shortraker	Longnose	Spiny dogfish	Greenland turbot
Starry flounder	Octopus	Rougheye	Alaska	Salmon shark	Kamchatka flounder
Dover sole	Sculpin	Thornyheads	Aleutian	Sleeper	Arrowtooth flounder
Petrale sole					
Butter sole		Pacific Ocean Perch	Whitebloched	Other sharks	
English sole					
Other flounder		Other rockfish	Big		
Rock sole		Northern	Other skates		
Flathead sole					
Yellowfin sole					