



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
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Dear Mr. Nies,

Thank you for your July 3, 2019 letter requesting “...the NEFSC provide observer deployment data at the vessel level for groundfish trips to better understand concerns about differences in coverage rates between vessels.” The Northeast Fisheries Science Center (NEFSC) welcomes the opportunity to present the technical and operational details of observer deployment in the Northeast Multispecies Fishery (groundfish). The observer deployment topic is complex, involving multiple monitoring programs with differing sampling designs, a multitude of regulatory exemptions from these monitoring programs, and the operational realities of managing observer programs of which ensuring observer safety is paramount. A comparison of coverage rates between vessels is informed by an understanding of these complexities.

Background

The groundfish fishery uses a combination of observer programs to achieve ASM target coverage levels mandated by the groundfish FMP, which presents unique observer deployment challenges. There are currently four separate at-sea observer sampling programs (or tiers) covering the groundfish fishery in support of Fishery Management Plan (FMP) sector coverage objectives: 1) Standardized Bycatch Reporting Methodology (SBRM) which is fulfilled using Northeast Fisheries Observer Program (NEFOP) coverage; 2) Marine Mammal Protection Act (MMPA) which is fulfilled using Limited NEFOP (NEFOP Limited) coverage; and Sector At-Sea Monitoring (ASM) which can be fulfilled using either 3) industry-funded ASMs or 4) Electronic Monitoring (EM) in lieu of human ASMs. The three types of coverage that count towards the groundfish ASM coverage levels are NEFOP, ASM, and EM. NEFOP Limited coverage is only deployed on groundfish vessels fishing with gillnet gear during certain periods of the year (there were 87 NEFOP Limited trips in FY 2018 and there have been 72 trips to date in 2019). EM can be used as both a surrogate of ASM coverage (Partial EM Program), and as a means of exempting a vessel from ASM coverage (Audit Model EM Program). Trips that are exempt from

ASM coverage are not included when evaluating ASM coverage levels - these include trips eligible for the Framework 55 (FW55) extra-large mesh gillnet exemption, as well as fishing trips conducted under certain Exempted Fishing Permits, or EFPs (e.g., Audit Model EM Program, Maximized Retention). Some EFPs may also exempt trips from SBRM coverage (e.g., Maximized Retention).

All observer selections in the groundfish fishery are accomplished using the NEFSC's Pre-Trip Notification System (PTNS). The PTNS employs a stratified random sampling approach for the deployment of observers in each of the three sampling programs, or tiers, currently deployed on the groundfish fishery (NEFOP, ASM, EM). Each of the selection tiers is broken up into sampling strata, with strata defined by certain trip characteristics (gear, port region, fishing region, sector, etc.). The sampling design varies across sampling programs (i.e., the stratification design used in SBRM is different than the one used for ASM).

Fishery observers are deployed based on the characteristics of the fishing trip, not on the identity of the vessel (i.e., do the trip characteristics meet the criteria of an observer program and a defined sampling stratum within that program?). A vessel's trips may be subjected to different observer sampling programs and sampling strata depending on the variability in a vessel's fishing practices (gear types fished, fishing area, etc.). The realized coverage a vessel experiences is a product of the aggregate coverage across all trips taken by a vessel over the course of a fishing year. The observer selection/deployment experience of each vessel is specific to that vessel's operations and thus, comparing vessel-level coverage rates should be done considering the variety of observer sampling programs and sampling strata.

We have identified several explanations for varying coverage rates between vessels, including:

- Trips were subjected to a different combinations of sampling programs (e.g., some trips were eligible for only SBRM selection, while other trips were eligible for both SBRM and ASM selection).
- Trips were subjected to the same sampling program(s), but occurred in different sampling strata and coverage levels (e.g., two trips were both eligible for SBRM selection but were fishing different gear types, and therefore associated with different SBRM fleets with different sea day allocations and coverage levels). Using the example of the 2019 SBRM sampling program, Figure 1 demonstrates how the distribution of vessel-level coverage rates within a sampling program can vary widely due to differences in the strata-specific coverage targets.

- Differences in coverage rates arising from several factors including random variation, observer unavailability, vessel non-compliance and/or observer avoidance behavior, and observer provider preference for certain vessels or avoidance of others (i.e., deployment effects).

The interaction of the ASM and SBRM sampling programs leads to increased complexity in calculating ASM coverage. To date, in the 2019 fishing year there have been 51 unique combinations of SBRM and ASM selection outcomes, with combinations having differing coverage levels, including exemptions from one or both programs (Fig. 2). Only those combinations subjected to the ASM sampling program would count towards the monitoring of the ASM coverage targets (i.e., 31% in FY 2019). Figure 2 highlights that some collection of trips within a sector will receive more than the mandated 31% combined SBRM and ASM coverage, while others will receive less. This variability in coverage stems from the interaction of the SBRM and ASM sampling programs. The groundfish FMP specifies that the ASM coverage targets are evaluated at a sector-level, and not at the strata and vessel-levels that better reflects the individual vessel experience. The sector coverage rate average reflects an average across all SBRM/ASM trip combinations occurring within a sector (Fig. 2).

Analysis

To provide observer deployment data at the vessel level for groundfish trips we have analyzed the observer deployment data available within our Pre-Trip Notification System (PTNS). A major upgrade was made to our PTNS system at the start of FY 2018, which allows for improved tracking of the trip selection process and coverage metrics. For this reason, our analysis is restricted to FYs 2018 and 2019. Our analysis includes non-canceled trips eligible for either the SBRM or ASM sampling programs. Trips that are exempt from an observer sampling program have been excluded from the appropriate coverage rate calculations (i.e., trips that are exempt from ASM, but not SBRM would be included in our calculation of SBRM coverage rates, but excluded from the calculation of ASM coverage rates). In FY 2018 the PTNS notification compliance rate was 95.1% (4.9% of the trips or 379/7809 failed to notify) compared to 98.2% in FY 2019 (1.8% of the trips or 86/4782 failed to notify).

To facilitate comparisons across the observer sampling programs and sampling strata, we have normalized vessel-level coverage using a z-score approach. The z-score approach is helpful for placing coverage estimates from different observer sampling programs and sampling strata on a similar scale. A z-score is a measure of the number of standard deviations an individual observation is from the group mean. For example, a z-score of 0 would indicate that a vessel's realized coverage was identical to the stratum mean, and a z-score of 1 would indicate that a

vessel's realized coverage was +1 standard deviation from the mean. A z-score can only be calculated when 3 or more vessels were active within a stratum. The z-score approach can obscure large differences, or accentuate small differences (e.g., a vessel whose coverage rate is at 1% relative to a stratum mean coverage rate of 2% may appear similar to a vessel whose coverage rate is at 10% relative to a stratum mean of 20%).

The results of our analysis are shown in Figure 3. An important feature of the coverage distribution is that vessel-level coverage converges on the stratum mean as a vessel takes more fishing trips. This is a design feature of the PTNS that has been previously documented (Palmer et al. 2013). The revised PTNS also includes a 2nd stage selection process to further reduce inter-vessel variability which further reduces inter-vessel variability beyond what is documented in Palmer et al. (2013). Of those vessels with 20 or more trips, 91.3% of the vessel-level coverage rates were within ± 1 standard deviation of the stratum mean, with the percentage increasing to 94.3% for vessels with 50 or more trips. The ± 1 standard deviation measure is arbitrary – there is currently no defined metric to objectively categorize coverage as 'equitable' or 'inequitable'.

This analysis does provide a description of the relative variation of vessel-level coverage within individual sampling strata, and how the variability changes as a function of vessel activity. We have integrated these types of analyses into a dashboard utility contained in the revised PTNS – these tools allow us to monitor observer deployment patterns in real-time, and then work with vessels, sector managers, and service providers to better understand and address any identified issues.

Efforts to promote equitability

The NEFSC takes the issue of potentially inequitable coverage seriously and monitors coverage rates closely. Factors that can contribute to varying coverage rates include vessel safety deficiencies, vessel non-compliance (i.e., failure to notify), and observer provider preference or avoidance. Of the non-cancelled PTNS trips, 1.5% of trips (115/7809) and 0.6% (29/4782) of the trips were waived of coverage for safety deficiencies in FY 2018 and 2019, respectively.

We actively work with all our program participants (vessel owners, captains, sector managers, observer service providers, and observers) to limit the influence of deployment effects on vessel-level coverage. To proactively prevent this, the provider cannot see the vessel name at trip offering, only after accepting the trip. To address any possible issues that arise in a timely fashion, sector managers, providers and Agency staff communicate no less than monthly about realized coverage, trip offerings and acceptance, cancellation rates and individual vessel level

coverage. Individual vessel challenges are discussed and if an issue is identified, we work together to resolve it.

The NEFSC would welcome the opportunity to discuss this topic in more depth with your Groundfish Plan Development Team, or other relevant Council committee. If you would like to further discuss observer deployment issues, please contact Amanda McCarty, Fishery Monitoring and Research Division Chief, at 508-495-2341, or Amanda.McCarty@noaa.gov.

References

Palmer MC, Hersey P, Marotta H, Shield GR, Cierpich SB. 2013. The design, implementation and performance of an observer pre-trip notification system (PTNS) for the northeast United States groundfish fishery. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-21; 82 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <http://nefsc.noaa.gov/publications/>

Figures

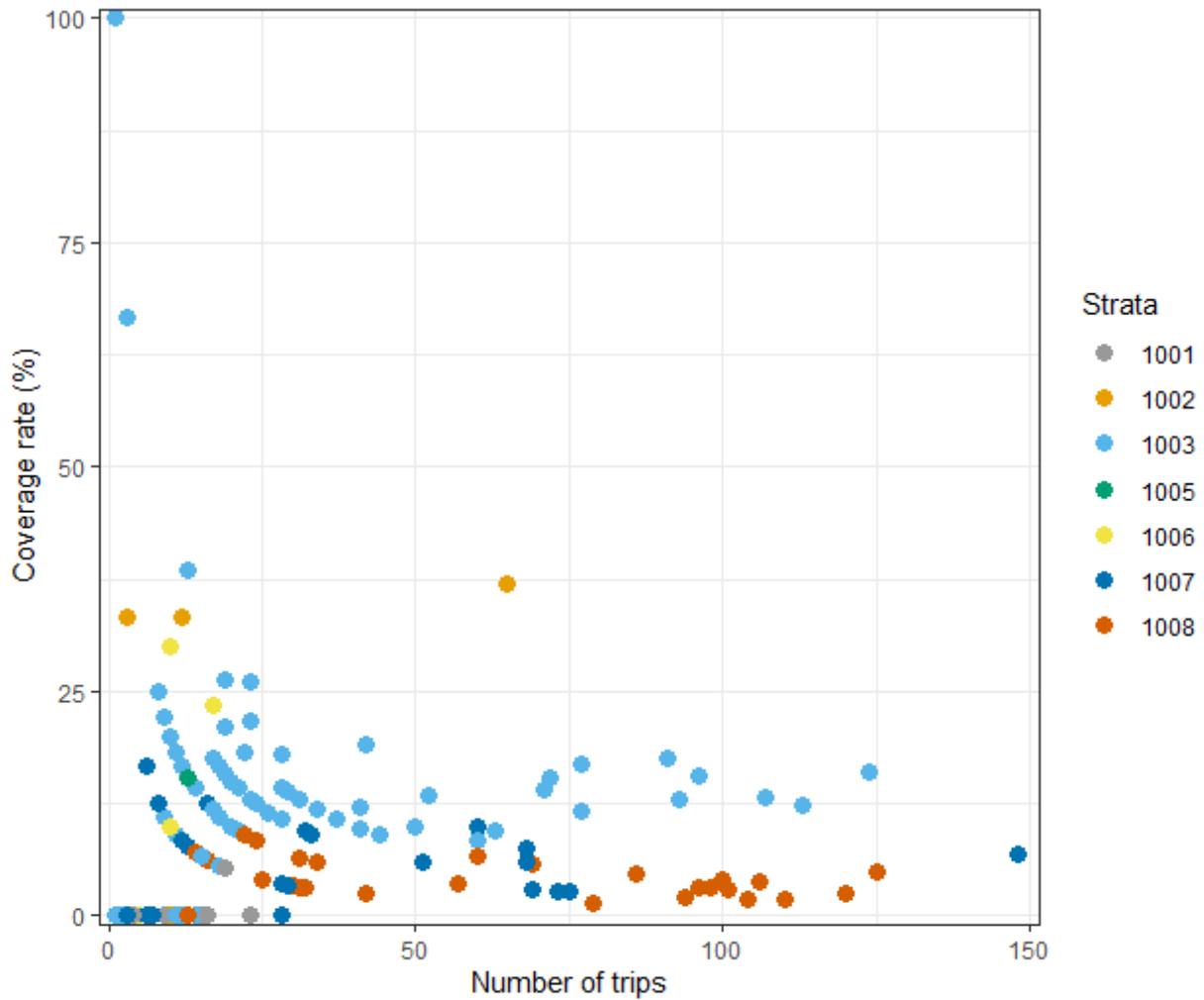


Figure 1. Vessel-level realized coverage rates as a function of fishing activity (number of trips) for the 2019 Standardized Bycatch Reporting Methodology (SBRM) sampling program. There are currently 7 active strata (i.e., SBRM ‘fleets’) in the 2019 SBRM sampling program operating in the groundfish fishery. Each dot represents a single vessel’s activity within a sampling stratum (i.e., if a vessel fished in multiple sampling strata it would be represented by multiple dots on the plot). Target coverage rates can vary widely across sampling strata - the PTNS target coverage rate settings for the SBRM sampling program currently range from 2% (1001) to 50% (1002). Data are current as of November 14, 2019.

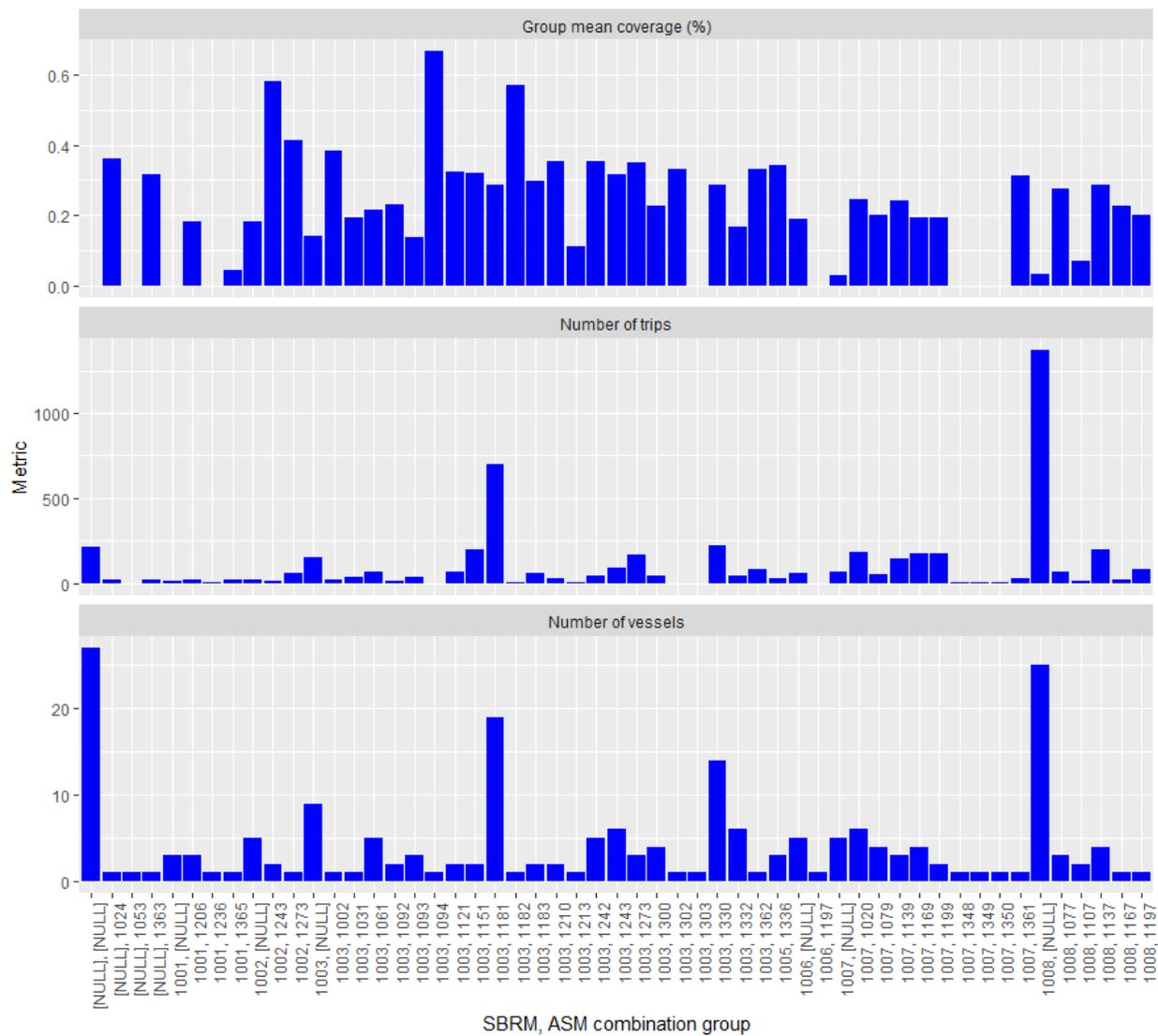


Figure 2. Summary of the SBRM and ASM selection outcome combinations experienced by groundfish trips in the 2019 fishing year, through November 14, 2019. The x-axis displays the unique combinations of SBRM and ASM selection strata groundfish trips were subjected to. The values represent the SBRM stratum identifier followed by the ASM stratum identifier. Values of '[NULL]' indicate an exemption from that sampling program. Data are summarized by combination group to provide the mean realized coverage of each combination, and the number of trips and vessels within each. Only combinations where the ASM identifiers are not null count toward the monitoring of ASM coverage targets.

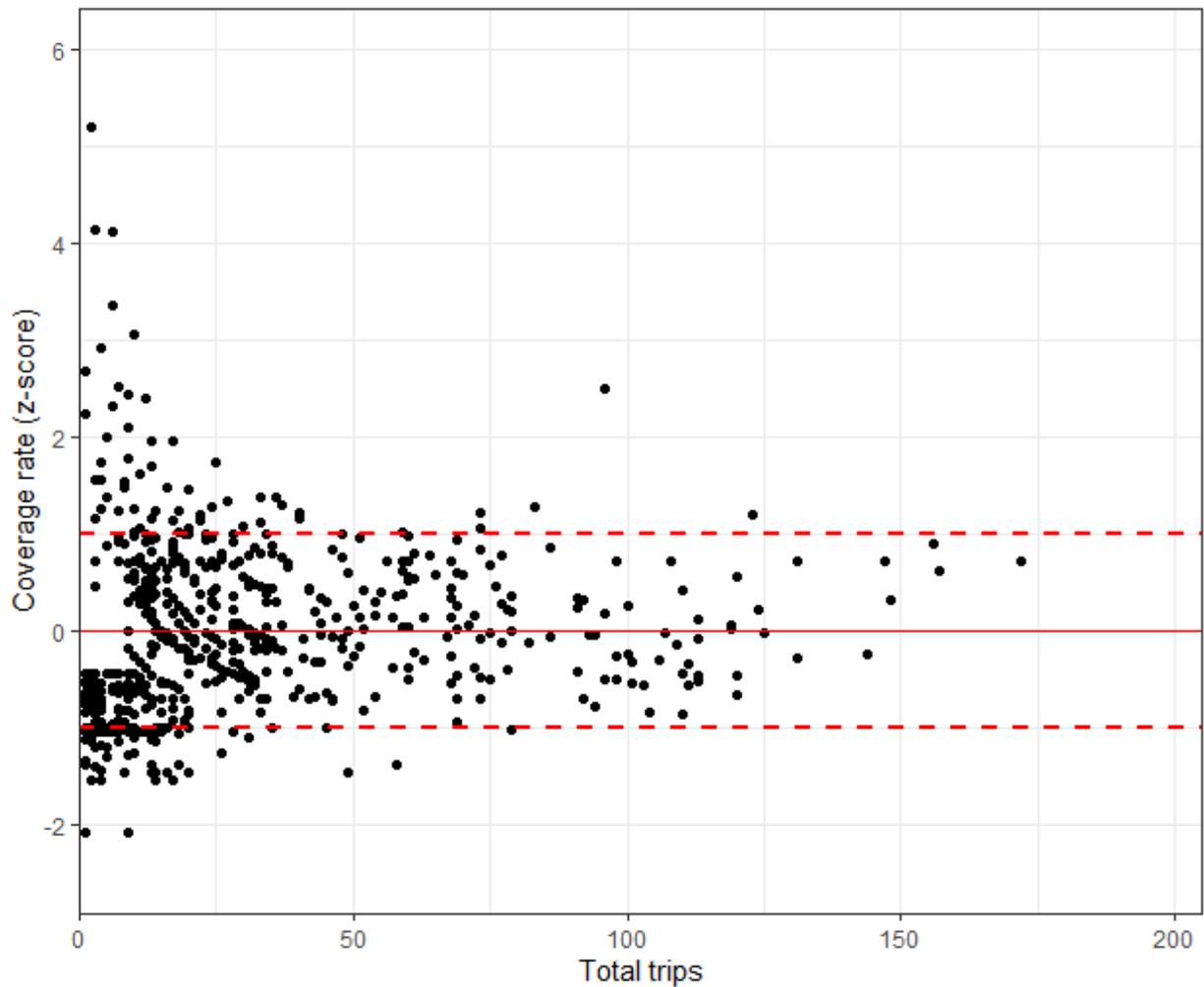


Figure 3. Normalized (z-score) vessel-level realized coverage rates as a function of fishing activity (number of trips) across all 2018 and 2019 Standardized Bycatch Reporting Methodology (SBRM) and At-Sea Monitoring (ASM) sampling strata. The data reflect the distribution of vessel-level coverage across 115 distinct sampling strata. Dots near the solid red line at 0 represent vessels with coverage near the stratum mean. The dashed red line represents ± 1 standard deviation from the stratum mean. Data are current as of November 14, 2019.