

DRAFT Amendment 23 Review Metrics Discussion Paper

Groundfish Plan Development Team

March 23, 2023



Intentionally Blank

Overview

In Amendment 23 (A23), the Council included a measure to establish a review process to evaluate the effectiveness of the increased at-sea monitoring (ASM) coverage targets, to occur once two full fishing years of data is available (in Year 3 following implementation of A23) and periodically thereafter. A23 was implemented January 9, 2023, mid-way through the 2022 fishing year. Therefore, the first full fishing year under A23 will be FY2023. Data collected for FY2022 will likely be used to test the metrics under development. The ASM coverage target in FY2022 was 99 percent from May 1, 2022, through November 28, 2022, before being revised to 80 percent based on available funding.

The review process is intended to be flexible and somewhat general but includes establishing metrics and indicators of how well the monitoring program improved the accuracy of catch data while maximizing value of the information collected and minimizing the costs to industry and the National Marine Fisheries Service. The Council recommended as a priority for 2021 and 2022 that the Groundfish Plan Development (PDT) develop the review process metrics. This discussion paper provides details on the proposed review metrics and indicators developed by the PDT.

Additionally, the Council established a review process for exclusions from the monitoring program to verify whether the intent of the measures (e.g., that the catch composition has little to no groundfish) is still being met. This discussion paper provides information on how the review process for the monitoring exclusions fits into the review of coverage rates and how these monitoring exclusions are taken into consideration in a review of comprehensive monitoring coverage.

1. Background

1. Important Reference Documents

Amendment 23 Final Rule – December 9, 2022; 87 FR 75852

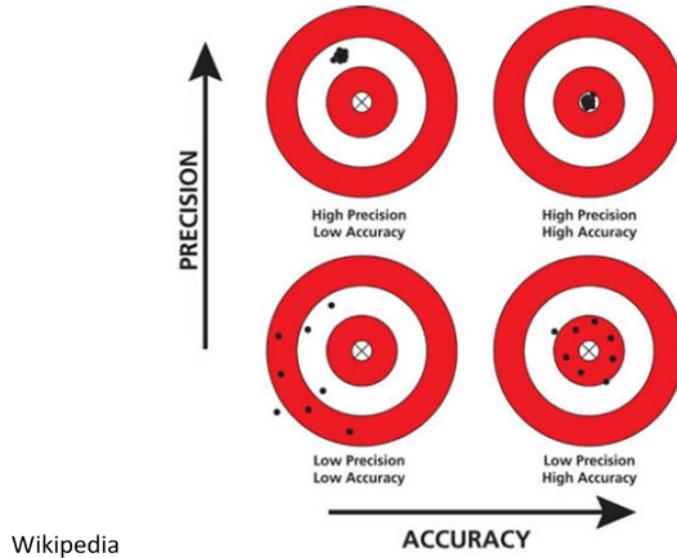
Amendment 23 Proposed Rule – February 28, 2022; 87 FR 11014

Amendment 23 Final Environmental Impact Statement (FEIS) Volume I – Final Submission, August 9, 2021 - Corrected January 7, 2022

Amendment 23 Appendix V - Groundfish Plan Development Team Monitoring Analyses and SSC Sub-Panel Peer Review Report

2. Glossary of Terms

Accuracy: The closeness of the estimated value of some quantity to the true value.



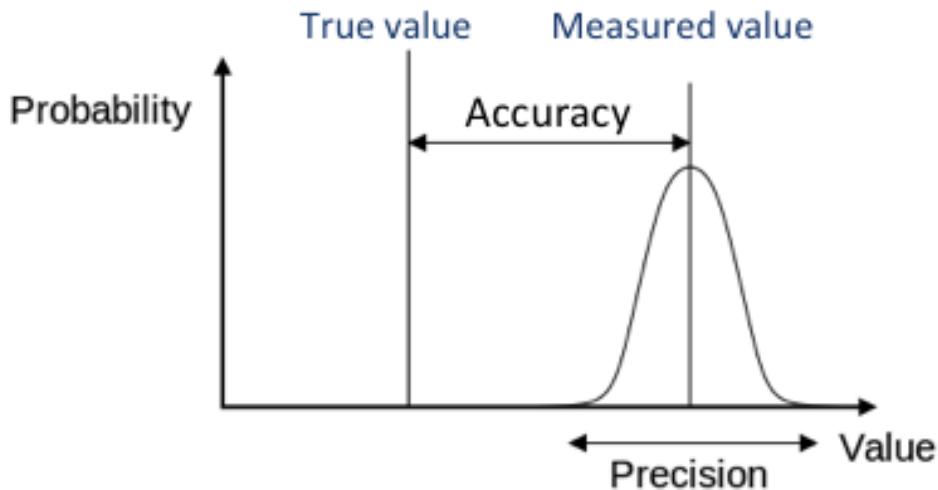
Bias: Systematic difference between the estimated value of some quantity and the true value being estimated. Bias can be due to:

- 1) a statistical estimator that is not properly tuned, such that the expected value does not align with the true value
- 2) a sample that is not representative of the true population

As described in the Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment: the accuracy of the data from a sampling program rarely can be measured because the true value of the population feature being estimated is not known (which is why it is being estimated). While accuracy cannot be determined directly, an estimator can be tested for potential biases and precision with a simulated population where the truth is known. Sources of bias can be identified and reduced in the data collection program. Absent bias, precision supports accuracy; thus, bias and accuracy are used interchangeably, but bias is generally associated with the design of sampling program. Eliminating potential sources of bias improves the accuracy of the results.

The ratio estimator used to estimate discards in the SBRM is an unbiased estimator of the true discard rate. Therefore, any bias in discard estimation is solely due to bias in the sampling program, such that observed trips are not representative of all trips due to various known and unknown factors.

If the degree of bias can be determined, then the estimate can be adjusted for the bias to produce an estimate closer to the truth.



(Adapted from Wikipedia)

Bias in the Fishery Monitoring System:

Observer Bias: Also referred to as the ‘observer effect’. Fishing activities on observed trips systemically vary from fishing activities on unobserved trips. This may be intentional or unintentional. Differences in fishing activities on observed trips versus on unobserved trips may arise due to the following: the act of knowing one is being watched results in changes in behavior (Hawthorne effect¹); fishermen strategically altering behavior to avoid affecting the rest of the sector; costs associated with slower fish processing and handling; or increased catch accountability (quota limits more constraining).

Selection Bias: Also referred to as a ‘deployment effect’. Occurs when the assignment of observers to vessels is non-random within sampling strata, resulting in a biased selection of trips across sampling strata. A *random* sampling design is one in which each sample has an equal probability of being chosen, so that a sample chosen randomly is meant to be an unbiased representation of the total population.

Discard estimation bias: When discards on observed trips are not representative of unobserved trips. Function of both observer and selection bias.

Self-reported data biases: Information from these sources may also contain errors or

¹ Hawthorne effect describes a phenomenon in psychology when subjects behave differently when observed, which may be a result of conscious and subconscious behavior changes.

otherwise misrepresent information which contributes to bias. These errors may be intentional or unintentional. Examples of self-reported bias and the data streams they occur in include:

- VTRs: statistical areas fished
- Dealer reports: landings information
- VTRs: Kept catch for home consumption (not weighed out by a dealer)
- Learning curve bias: It takes time for captains to become familiar with electronic monitoring and electronic reporting, and for observers to become familiar with collecting and recording data.

Precision: (see above figure) How much estimates of the same quantity differ from each other across multiple samples, due both to sample variation and sample size.

As defined in the SBRM Omnibus Amendment: Precision is a measure of how closely repeated samples will agree to one another (i.e., the variability of the samples). The precision of a sampling program can be measured because the data collected can be compared with one another using several basic statistical methods (to calculate the variance, standard error, standard deviation, etc.). Because we can compare the samples to one another, we can calculate the variability and, hence, get a measure of the precision of the observations. In a sampling program such as the at-sea observer program, the precision of the observations can be measured and controlled by calculating measures of variability and, if necessary, increasing the number of observations. Precision can also be increased through stratification (or changes to stratification), however, such changes may not be allowed through the mechanics of SBRM.

Coefficient of Variation: The ratio of the standard deviation to the mean. In other words, it is a measure of the extent of sample variation in relation to the mean of the population. It is useful for comparing the degree of variation from one data series to another, even if the means are drastically different from one another. In terms of an observer program, it is a standard measure of precision, calculated as the ratio of the square root of the variance of the bycatch estimate (i.e., the standard error) to the bycatch estimate itself. The higher the CV, the larger the standard error is relative to the estimate. A lower CV reflects a smaller standard error relative to the estimate.²

Reliability: The ability of the overall groundfish monitoring program to consistently provide an accurate estimate of total annual catch for each stock with a known level of precision. If estimates with similar accuracy and precision are achieved each year, year after year, they can be said to be reliable. In the context of a monitoring program, this refers to the consistency in quality of catch data, so that there is confidence that the monitoring program estimates each year can be used for catch accounting and stock assessment purposes. Reducing bias and improving accuracy in catch data increases reliability of the data.

² MAFMC/NEFMC. 2007. Northeast Region Standardized Bycatch Reporting Methodology: An omnibus amendment to the fishery management plans of the Mid-Atlantic and New England Regional Fishery Management Councils.

Validity: The extent to which one is adequately measuring what one claims to be measuring. In the case of monitoring, validity could be in reference to the stock assessments and reliability could be in reference to the methods used to collect the data that goes into them. In other words, the sampling program could be said to produce reliable estimates, and if they are accurately representing the population, they are providing for valid stock assessments.

Accountability: An obligation to be held responsible for one's actions.

In the case of a sector monitoring program, it is the concept of holding all sectors and their members to the same standards, such as matching catches with equivalent units of quota. An effective monitoring program is one designed so that each sector is confident that participants both within sectors and across all sectors are treated in a fair and equitable manner in terms of catch reporting requirements and ensuring catches do not exceed allocations. In the context of the groundfish fishery as a whole, it is being held accountable to the catch levels set by the measures of the management plan.

This includes responsibilities for vessels, sectors, and the agency. Vessels are responsible for complying with trip notification, assigned monitoring, and vessel reporting requirements. Sectors are responsible for contracting monitoring services as required and ensuring sector members comply with the vessel requirements, as well as sector-level monitoring and reporting requirements to manage allocations. NMFS is responsible for equally and effectively administering a reporting and monitoring program that considers the impacts of the costs of the groundfish monitoring program with the tradeoffs of the sector monitoring program benefits to fishery management.

Monitoring System Tools/Components:

At-sea monitor: With respect to the NE multispecies fishery, means any person responsible for observing, verifying, and reporting area fished, catch, and discards of all species by gear type for sector trips as part of an approved sector at-sea monitoring program.

Dockside/roving monitor: With respect to the NE multispecies fishery, means any person responsible for observing/verifying the offloads of all species by common pool or sector vessels either directly to a federally permitted dealer or to a truck for later delivery to a federally permitted dealer, and for certifying the accuracy of landed weights, as reported by federally permitted dealers, pursuant to this part.

Electronic monitoring: A network of equipment that uses a software operating system connected to one or more technology components, including, but not limited to, cameras and recording devices to collect data on catch and vessel operations. With respect to the groundfish sector monitoring program, electronic monitoring means any equipment that is used to meet sector monitoring requirements in § 648.11 in lieu of at-sea monitors as part of an approved sector at-sea monitoring program, including the audit model and maximized retention model.

Electronic monitoring data: Data that are created in the collection of fishery-dependent data by electronic monitoring systems during fishing operations, including the video, images, and other sensor data, as well as the metadata that provides information (e.g., trip sail date, vessel

information) about the raw data.

Electronic monitoring audit model: With respect to the groundfish sector monitoring program means a program in which all eligible trips must be electronically monitored; fish must be handled in view of cameras; allowed discarding must occur at controlled points in view of cameras; species identification and length must be collected for regulated species and ocean pout discards for catch estimation; discards are reported at the sub-trip level; and electronic monitoring data are compared to the area fished, regulated species and ocean pout discards, and other information reported on the vessel trip report on a subset of trips for validation.

Electronic monitoring maximized retention model (MREM): With respect to the groundfish sector monitoring program, means a program in which all eligible trips are electronically monitored; fish must be handled in view of cameras; allowed discarding must occur at controlled points in view of cameras; all allocated regulated species stocks must be retained; electronic monitoring is used to verify compliance; and offloads are subject to observation by dockside monitors.

Electronic monitoring provider staff: Any video reviewer, or any person employed or contracted by an electronic monitoring service provider to provide electronic monitoring services to vessels.

Observer or monitor: Any person authorized by NMFS to collect observer information, operational fishing data, biological data, or economic data for conservation and management purposes on or from fishing vessels or federally permitted dealers as required by the regulations, including, but not limited to, observers, at-sea monitors, observer/sea samplers, portside samplers, or dockside monitors.

Video reviewer: Any electronic monitoring service provider staff approved/certified or training to be approved/certified by NMFS for providing electronic monitoring video review services consistent with electronic monitoring program requirements.

Groundfish Dockside Monitoring (DSM): Dockside monitoring is the independent verification or collection of fishery landings data. DSM was implemented as a component of the MREM EM sector monitoring option. DSM is unique in that it doesn't provide estimates of discards as vessels are required to land sublegal sized fish. The EM review process identifies cases of non-compliance with program requirements.

Monitoring at sea: Independent third-party records fishery data while at sea.

Northeast Fisheries Observer Program (NEFOP): The Northeast Fisheries Observer Program is administered over a range of commercial fisheries, including the groundfish, herring, squid, surf clam and ocean quahog, and lobster fisheries. NEFOP observers meet requirements of the Magnuson-Stevens Act and the SBRM Omnibus Amendment, the Marine Mammal Protection Act and the Endangered Species Act. The primary duty of observers is to record all kept and discarded catch, with discard information as the priority. Actual weights of catch should be collected whenever possible, with estimates or

extrapolates of weights by sub-sampling as necessary. Other duties include collection of lengths of discards and kept catch of managed species, information on fishing gear, tow-by-tow information (location and time when fishing begins and ends), and detailed information on protected species interactions. Additionally, NEFOP observers collect biological samples from managed species and protected species.

At-Sea Monitoring (ASM): The At-Sea Monitoring program is a vessel monitoring program that is specific to groundfish sector monitoring. The primary duty of at-sea monitors is to record all kept and discarded catch, with discard information as the priority. Actual weights of catch should be collected whenever possible, with estimates or extrapolates of weights by sub-sampling as necessary. At-sea monitor duties are similar to those of NEFOP observers, with the exception that at-sea monitors do not collect biological samples and do not record the same level of detail on protected species interactions. As of January 9, 2023 Amendment 23 made changes to the ASM program.

Vessel Trip Report (VTR): Fishermen are required to fill out and submit self-reported trip reports for every trip, which provide information on when and where catch occurred. Information reported includes fishing location, time of fishing activity, gear characteristics, and estimates of catch and discards by species.

Vessel Monitoring System (VMS): Systems used to track and monitor the activities of fishing vessels. VMS records are called trip declarations and the activity code of the declaration provides information about fishing and trip type.

Trip Hails: Hails sent prior to starting a trip (trip start hail) or at the end of a trip (trip end hail) which may include specific fishing information such as areas fished, gear type used, when and where the vessel will be landing, if the product is being trucked or where the fish is going.

Pre-Trip Notification System (PTNS): The system used to assign monitoring coverage to vessels using multispecies A-DAS. Advanced notification of all sector groundfish trips (and most common pool groundfish trips) must be provided through the PTNS requires fishing vessels to notify all trips at least 48 hours in advance, but no more than 10 days in advance.

Enforcement: Enforcement agents from a variety of agencies including state fish and wildlife departments, NOAA Office of Law Enforcement, and U.S. Coast Guard may board and inspect vessels at sea or inspect landings for compliance with federal and state regulations. The purpose of enforcement activities is to inspect fishing operations for compliance with regulations and administer penalties if found in violation. This is distinct from the goals of monitoring systems, in which the purpose is to collect catch data for use in management and scientific processes. For example, the goal of the ASM program is to collect catch data for quota management, and while it may provide information useful to enforcement or encourage compliance, it is not designed as an enforcement tool. However, the previous dockside monitoring program was more enforcement focused as it did not collect or generate any additional data, and only acted to notify as to whether or not the reported data was falsified.

Discards: Catch that is not landed.

Economic discards: Discards of undesirable or unprofitable species. Reasons for economic discarding include quota limitations, highgrading³, unmarketable (spoiled, dead, or low quality). Depending on the quota system, economic discards may be limited to certain situations, or must still be covered with sufficient quota. The current sector regulations prohibit discarding of legal-size allocated fish, except for legal-size unmarketable fish (e.g., fish damaged by slime eels, seals, or gear).

Regulatory discards: Also known as mandatory or required discards. Discards that are required under the fishery management regulations, for example for prohibited species catches or for species that do not meet size requirements.

Days Absent: Any part of a calendar day spent on the water. It is calculated by subtracting the date landed minus the date sailed and then adding 1. Times are not considered in this calculation. Alternative definition: calculated as the amount of time between when the vessel leaves the dock and when it lands, as filled out in the vessel trip report by the captain.

Sea day: Any part of a calendar day where an observer is deployed on a vessel at sea (leaves port, is out at sea, and/or returns to port). An observer's sea day time begins when the Observer arrives at the dock one (1) hour prior to schedule departure time to allow for sufficient time to locate the vessel, unload sampling gear and park personal vehicle. An observer's sea day time ends when the observer disembarks, though there are different definitions depending on whether seadays are being calculated for billing purposes or accomplishments.

3. Goals and Objectives of Amendment 23

Amendment 23 maintains the current goals and objectives of the groundfish monitoring program described below, but considers measures to better address Goal #1: improve documentation of catch, described as “improved catch accounting” during the scoping process for this action. The objectives associated with that goal are: 1) determine total catch and effort, for each sector and common pool, of target or regulated species; and 2) achieve coverage level sufficient to minimize effects of potential monitoring bias to the extent possible while maintaining as much flexibility as possible to enhance fleet viability.

4. Goals and Objectives of Groundfish Monitoring Program

Goal 1: Improve documentation of catch

Objectives:

- Determine total catch and effort, for each sector and common pool, of target or regulated species.
- Achieve coverage level sufficient to minimize effects of potential monitoring bias to the

³ Highgrading = the process of selecting only the most valuable individuals while discarding others

extent possible while maintaining as much flexibility as possible to enhance fleet viability.

Goal 2: Reduce cost of monitoring

Objectives:

- Streamline data management and eliminate redundancy.
- Explore options for cost-sharing and deferment of cost to industry.
- Recognize opportunity costs of insufficient monitoring.

Goal 3: Incentivize reducing discards

Objectives:

- Determine discard rate by smallest possible strata while maintaining cost-effectiveness.
- Collect information by gear type to accurately calculate discard rates.

Goal 4: Provide additional data streams for stock assessments

Objectives:

- Reduce management and/or biological uncertainty.
- Perform biological sampling if it may be used to enhance accuracy of mortality or recruitment calculations.

Goal 5: Enhance safety of monitoring program

Goal 6: Perform periodic review of monitoring program for effectiveness

2. Objectives of the Review

The objective of the review process is to evaluate the effectiveness of higher sector monitoring coverage rates, including establishing metrics and indicators to determine whether the monitoring program is meeting the goal of improved accuracy of catch data, while maximizing value of the information collected and minimizing costs of the monitoring program. The review is intended to evaluate whether higher monitoring coverage rates are working as intended and the increased costs to industry are providing expected benefits from improved catch data accuracy and reduced potential for bias in catch data.

3. Summary of Groundfish Fishery Conditions

From FW65 Affected Environment/Human Communities:

Table 1 and Figure 1 - Figure 2 summarize major landings and revenues trends for the groundfish fishery over the last five fishing years. Landed pounds of groundfish increased over 2017-2020, before sharply decreasing in 2021. Groundfish revenue also decreased in 2021 from

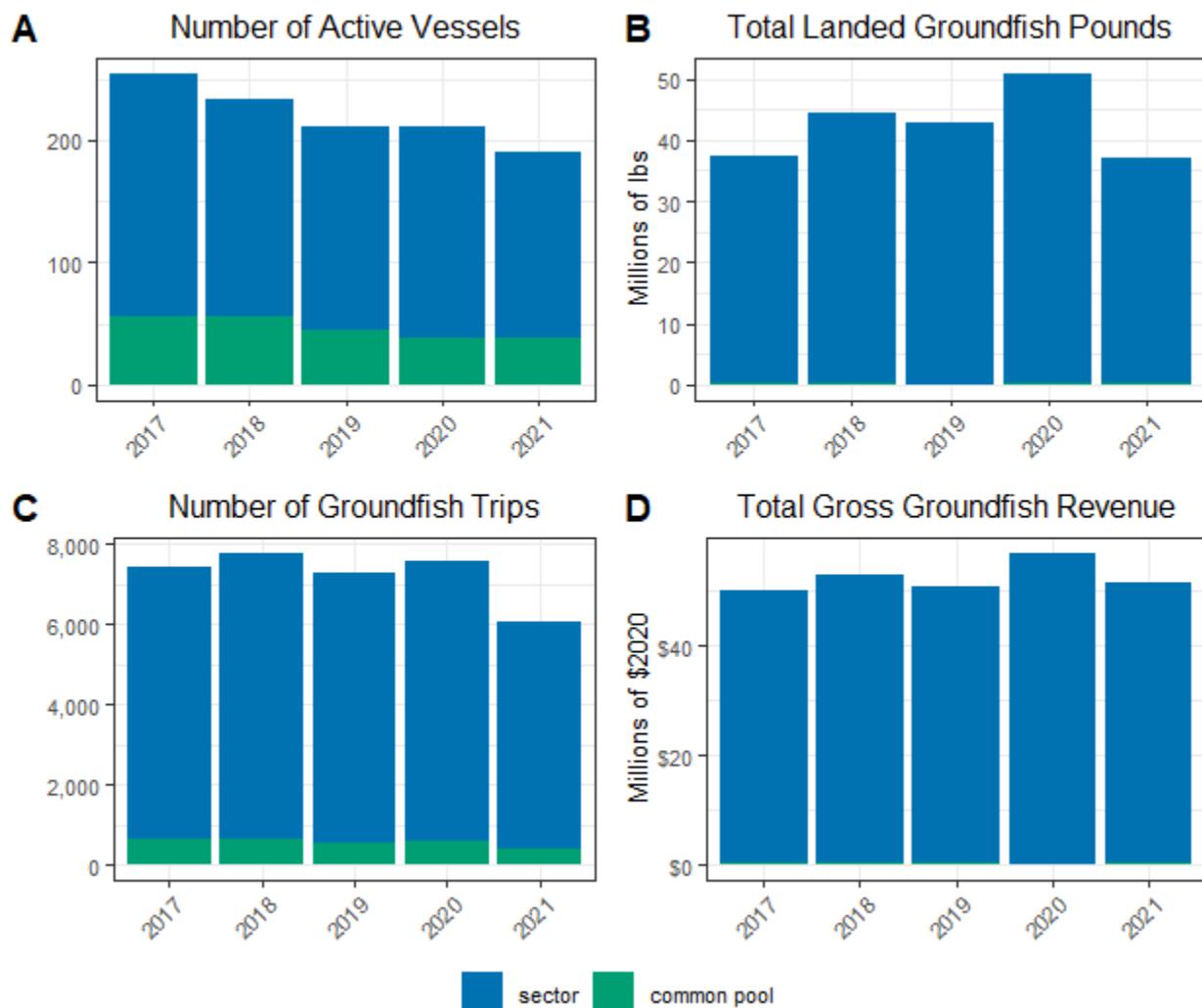
the 5-year high in 2020, but remained slightly higher than the 2019 mark. The average price of regulated groundfish landed on groundfish trips from sector vessels reached a five-year high of \$1.38/lb. in 2021. The groundfish price increase in 2021 relative due 2020 may have been driven in part by the COVID pandemic, as well as a substantial falloff in landings volume. Non-groundfish prices also increased in 2021 to a five-year high of \$1.38/lb. among sector vessels.

Table 1- Summary of major trends in the Northeast multispecies fishery by fishing year and group (\$2021). Pounds and revenue reflect total landings (landed lbs.) on groundfish trips in millions of pounds/dollars.

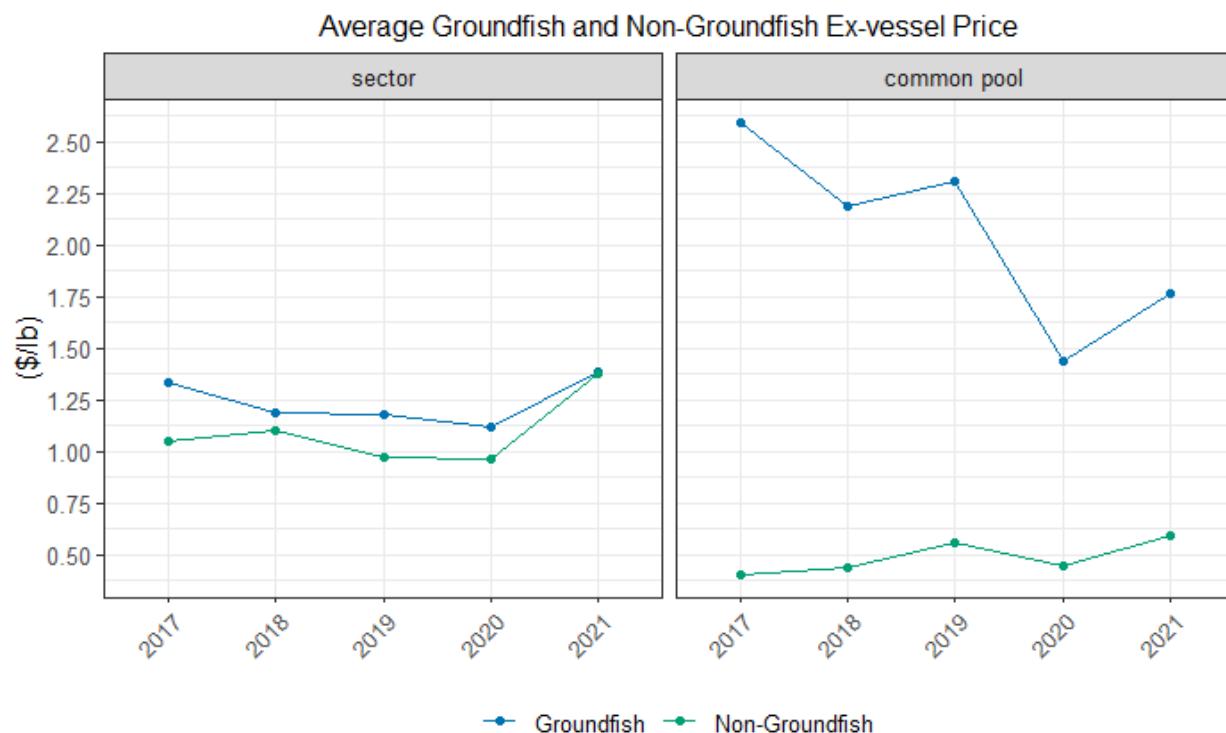
FY	group	GF pounds	GF revenue	GF price	NGF pounds	NGF revenue	NGF price	vessels	trips	days absent
2017	common pool	0.18	0.48	2.60	2.07	0.84	0.40	55	615	388
2017	sector	37.10	49.67	1.34	22.38	23.56	1.05	200	6,813	11,298
2018	common pool	0.14	0.32	2.19	2.12	0.94	0.44	55	612	388
2018	sector	44.22	52.62	1.19	20.82	22.97	1.10	179	7,165	10,570
2019	common pool	0.11	0.24	2.31	1.86	1.05	0.56	44	536	321
2019	sector	42.71	50.39	1.18	19.58	18.97	0.97	167	6,748	10,369
2020	common pool	0.12	0.17	1.44	2.31	1.03	0.44	38	568	355
2020	sector	50.84	56.71	1.12	20.80	20.05	0.96	173	6,988	11,515
2021	common pool	0.12	0.22	1.77	1.43	0.85	0.59	38	383	258
2021	sector	36.92	51.06	1.38	16.25	22.38	1.38	152	5,693	9,635

Source: GARFO DMIS data. Accessed November 2022.

Figure 1- (A) Number of active (at least one groundfish trip) vessels by fishing year and group; (B) Total landed pounds of allocated groundfish stocks; (C)Number of groundfish trips with >1 lb landed of ny species; (D) Total ex-vessel revenue from allocated groundfish stocks (\$2021).



Source: GARFO DMIS data. Accessed November 2022.

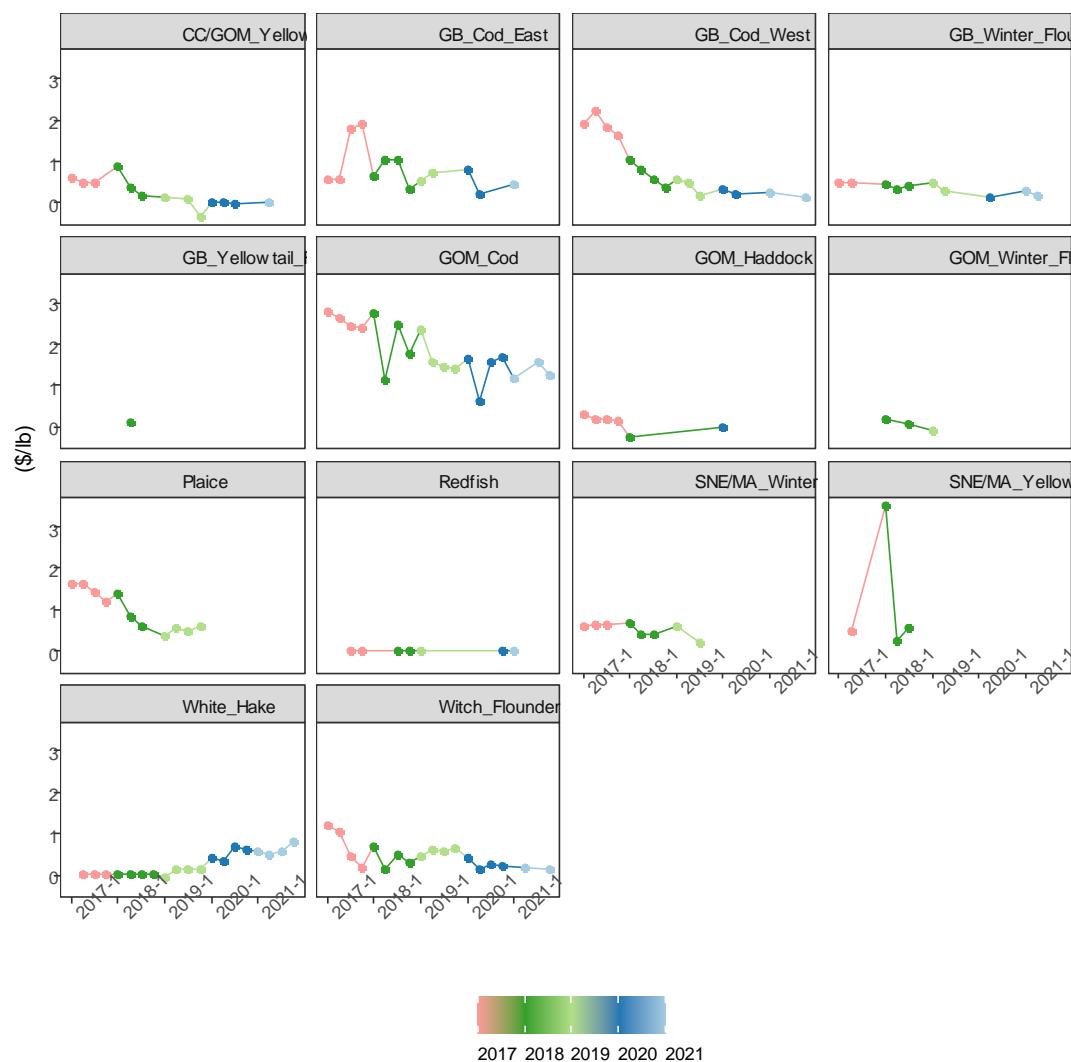
Figure 2- Average groundfish and non-groundfish price (\$2021) by fishing year.

Source: GARFO DMIS data. Accessed November 2022.

A hedonic price model⁴ of reported inter- and intra-sector ACE leases between FY 2017 and FY 2021 shows quarterly price trends in ACE leasing over time (Figure 3). Missing points indicate quarters where there were no reported trades for that stock. Several stocks do not have many reported trades, or are not associated with prices greater than \$0.00, such as GB haddock and pollock, and thus are not included in the figure. Other stocks show substantial changes in price over time. ACE lease prices for white hake exhibited an increasing trend over the 5-year period, while GB cod west prices exhibited a decreasing trend. GOM cod lease prices have generally been among the highest of any stock. For information on ACE leasing in earlier years of the sector program, see the 2015 groundfish fishery performance report (Murphy, et al. 2018).

⁴ A model that identifies the internal and external factors and characteristics that affect an item's price in the market. The model estimates the implicit price, or hedonic price, of these observable factors. The theoretical framework for hedonic pricing can be found in Rosen's 1974 article, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition".

Figure 3- Hedonic model of quarterly ACE lease prices FY 2017 to FY 2021 for allocated groundfish stocks.



Source: SSB model, data from GARFO inter-sector trade tables and sector year-end reports.

Groundfish Advisory Panel observations on market conditions:

[hold discussions with the GAP and maybe sector managers too to gather observations on market conditions – TBD]

Results of Amendment 23 bias analyses:

[consider including the results of the A23 bias analyses as a baseline for comparison in this section]

4. Possible Review Metrics and Indicators

[List of possible review metrics and indicators – to be refined during course of this work. Include description of what each metric/indicator would measure, what information would be needed to evaluate, caveats or considerations to note, identify which parties will be responsible for and involved with reporting on the various metrics (PDT and broader support)]

Realized coverage compared to target coverage (explore factors/reasons, comparison between monitoring tools (ASM, EM)):

- Distribution of vessels in ASM vs audit model EM vs MREM
 - What types of vessels select into ASM vs audit model EM vs MREM (by vessel size class, gear type, port, etc.)
 - Which sectors adopted EM - vessels can only opt into EM if their sector adopts EM
 - What reasons do vessels cite when leaving each EM program?
 - What types of vessels use the exclusions – 71 degrees 30 west and ELM gillnet
 - Exclusions do not apply to EM
 - Purpose: may impact pool of trips available for analysis of certain factors and require disaggregation when conducting analysis
- Achieved coverage
 - By coverage type and sector
 - Selections
 - Acceptance rates
 - Percent observed sailed trips compared with selected sailed trips
 - Waiver counts by reason (grouped PTNS coverage outcome reason and standard categories)
 - Canceled notifications
 - Caveat: There are many legitimate reasons to cancel (e.g., weather, repairs, or finding a relief captain). Also a large amount of cancellations are done by the PTNS staff during routine data cleaning.

- Coverage equitability
 - between sector
 - within sector
 - consider by individual vessel, trip type (day vs multiday), gear type, vessel size class
- Purpose: compare coverage targets with achieved coverage rates, explore what factors (observer availability, port, changes in monitoring choice mid-year, etc.) influenced achieved coverage
- Could look at percent trips, seadays, catch observed.
- Was coverage proportional to effort throughout the year?

Monitoring bias/catch accuracy (re-run PDT monitoring analyses, species composition correlations):

- Re-run PDT bias analyses
 - Evidence of bias in catch reporting between monitored and un-monitored trips, including: a. trip duration, b. species composition and size composition of landed groundfish, c. species composition and weight of discarded groundfish, and d. ratio of landed to discarded fish by species
 - Examine if those vessels that showed observer bias in the PDT work remaining in the fishery post A23
 - Purpose: determine if Council's intent with 100% coverage in reducing bias in catch estimates is realized
 - Caveats: dependent on how many vessels opt into EM vs ASM, if realized coverage is close to 100% may not be possible or may need to modify analyses as the pool of unobserved trips becomes smaller and reduces statistical power for comparisons, is it possible for years with low coverage and high coverage to pool observed trips between years
- Quantifying magnitude of bias
 - Pursue the suggestions offered by the A23 SSC Sub-Panel Peer Review on ways the following two analysis could be further pursued to understand the magnitude of the observer bias question: (1) Methods to Predict Groundfish Catch in the presence of an observer (2) Methods to evaluate groundfish catch ratios A23 analysis
- Compare discard estimates by monitoring program (ASM, audit model EM, MREM/DSM, NEFOP)
 - Both comparing two different boats fishing similarly with two different monitoring tools, and also same boat using two different monitoring tools
 - Purpose: Evaluate if these tools are equivalent in achieving goals of monitoring program
- Correlations between stocks and species caught on trips
 - Compare to previous correlations conducted within trips between different stocks and species,

- Purpose: related to bias and illegal discarding, examine whether there are changes from pre-A23 as expected, determine the value of higher monitoring for costs
 - Examine potential for changes in size distribution
 - Caveat: can look at this but suspect there will be lots of noise in the data
- Ways to look at how EM may improve accuracy in terms of removing human error
 - Look at secondary review of video reviewer
 - Use EM to evaluate vessel-reported catch
 - Observers do have review of species ID, change to observer trip review this year - tier 1 and tier 2 review, designed to be flexible going forward
 - EM removes the complications associated with selecting and covering trips with a human ASM and the challenge of cancellations
- How often observers observe on the same vessel and any impacts of that in terms of sampling strategy and recorded catch. How does observer experience impact sampling strategy and recorded catch?
- Statistical area/broad stock area reporting
 - Determine if improvements with higher levels of coverage

Monitoring costs (industry sampling costs and NMFS shoreside administrative costs):

- Total monitoring costs
 - Summarize overall industry sampling costs and agency shoreside administrative costs for meeting monitoring requirements
 - Include a cost comparison between EM-monitored trips (audit model and MREM) and human at-sea monitored trips
 - Update cost efficiency analysis and summarize agency costs relative to funding
 - Incorporate changes to monitoring tools in future that could result in changing costs, etc.
- Compare cost of monitoring before and after A23
 - Broken down by sea day rate, travel costs, training costs, meal reimbursement, equipment, operations costs, etc., where possible

Fishery performance (catch, effort, quota leasing prices, fishing costs):

- Catch/effort
 - Catch
 - Number of trips
 - Trip length
 - Trips in other fisheries
 - Seasonality of trip types (potentially distinguishing NMS v monk/mults combo trips)

- Gears used (by VTR gear code)
 - Use of exclusions
 - Purpose: characterize what's going on in the fishery (in terms of catch and effort), understand the extent to which monitoring is impacting fishery performance
- Discards and kept catch
 - Purpose: examine the influence of coverage to see if there's a change in discards and kept catch amounts with 100% coverage
- Quota trading prices
 - Are there price changes with higher monitoring coverage
 - How to control for quota changes (ANOVA?)
 - Look at whether quotas become more binding under higher coverage
 - QA/QC lease price data
 - Caveat: still have impacts of bias
- Fishing costs
 - Are there changes in operational costs with higher coverage (including the actual cost of monitoring)
 - Caveats: dependent on the number of vessels that opt into EM, this is information collected from observed trips, and so it's expected to lose this data with EM, only from NEFOP trips for those vessels
- Spatial distribution of the fleet
 - Are there changes with higher coverage and new exemption?
 - Are there differences between sail port and land port, areas fished?

Observer program administration/social indicators (PTNS compliance, refusals, safety issues):

- Refusals, PTNS compliance, and other observer incidents
 - Track to look at trends in compliance, refusals, incidents
 - Number of incidents by broad category
 - Is there a way to try to quantify boats that observers stop wanting to cover?
 - PTNS notification compliance tracked as a separate incident
 - Compare PTNS notification compliance over time compared to notification compliance under the 100% coverage target - has compliance increased?
 - Purpose: understand whether there are specific segments of the fleet responsible for refusals or other incidents, as this affects whether coverage is uniform across the fishery
- PTNS cancellations
 - With or without waivers – compare how often trips cancel with and without a waiver issued
 - Purpose: see if there are changes in cancellation rates with higher coverage

- Caveat: there are many reasons for cancellations and many are fully legit. If vessels are unsure whether they will fish or not, they are encouraged to notify for all days and cancel the unused notifications.
- Observer program administration/social indicators
 - Observer comment cards
 - Typically specific concerns about species ID, etc. or positive feedback on observer performance
 - Observer recruitment success
 - Observer retention
 - Observer average seaday accomplishments
- Social Indicators
 - Large-mesh specific groundfish Social Indicators
 - Probably from the 2020-2022 timeframe depending upon data availability.
 - Purpose: provide an “indication” of which ports might bear the most significant social burdens from increased costs to industry.
 - Caveat: As long as it’s federally-funded, these indicators would serve only as an expectation of social outcomes in the future when it moves to industry-funded.
 - Crew Survey
 - Goes back into the field next summer, so hopefully will have some preliminary data on demographic trends among crews that might be worth highlighting.
 - Anecdotal/fishermen feedback
 - Consider tracking public comments related to the impacts of higher observer coverage and if fishermen are saying if it seems to be making a difference one way or another, the impacts to on-the-boat activities, etc.
 - What other sources of data/information could be used to inform this section?
- Safety issues
 - Observer safety incidents tracked and categorized, summarize and show trends
 - Are there ways to track safety concerns from vessel crew in terms of sampling set up on deck, EM installation?
 - While there is not an approved set of questions on the Crew Survey for next summer on this issue, could spark informal, unstructured conversations about this topic at the end of interviews with crews, and could use these interactions to inform this metric.
 - FMO is working closely with OLE to update and evaluate OLE’s observer support action plan on a quarterly basis.
 - Sampling setup alone won’t be tracked as an incident, but could pull similar info out of catch estimation methods used. For example, is there a change in how observers sampled the hauls? Was it more difficult to get actual weights? Do we see increased usage of other catch estimation methods?

ASM coverage targets:

- ASM coverage targets
 - What was the target each year?
 - Were targets constant all year?
 - What was the basis for setting the target if <100%?
 - Purpose: A23 revised the process for setting coverage targets. Evaluate whether the new process is successful. What were the effects? Are changes to the process necessary or recommended?
 - Many assumed the coverage target would be 100% for at least 2 years because of pre-existing funding to pay for industry's costs. This overlooked the increased agency costs and the role the Federal budget for agency costs would play in setting coverage targets.

EM Video Review Rates:

- Audit Model Video Review Rates
- MREM Model Video Review Rates
 - Evaluate EM video review rates including considering:
 - Should all vessels have the same review rate?
 - Should each vessel individually be placed in review rate group (e.g., low performance, moderate performance, high performance)?
 - Should each vessel have a unique review rate based on its performance?
 - How frequently should rates change (annually, seasonally, quarterly)?
 - What do different review rates mean for cost and data accuracy?
 - Purpose: Evaluate how EM video review rates are set, as these impact effectiveness of the EM programs including data accuracy and cost components
 - Audit: Rather than review all video from EM trips, some trips are reviewed and others are not. In the audit model, this is used to evaluate the accuracy of eVTR-reported discards and to create an adjustment factor used to convert eVTR discards for catch accounting.
 - MREM: Video review is conducted to confirm compliance with discarding provisions.

Monitoring Exclusions:

- 71 degrees 30 west exclusion
 - Compare observed discard estimates Pre/Post A23

Other:

- Efficacy of the Dockside Monitoring Program required in the MREM program

- Purpose of the program (size composition and weights of sub-legal fish, validating dealer weights, hold inspection)
 - Cost of the program (including staff time to develop and support)
 - Use of information collected
 - Purpose: Evaluate this monitoring tool and its effectiveness in achieving monitoring program goals
 - Caveats: Decline in MREM participation with operational program/A23 implementation could be a challenge in analysis
- Size distribution of kept catch on MREM trips
 - Are there changes in targeting or converting discards to landings
 - Are there ex-vessel price changes
 - So far not many small fish landed under EFP, might this change with operational program, dealers no longer allowed to report X3 (mixed sublegal and terminal market category)
 - Examine mortality rate assumptions
 - Caveats: compare high volume MREM to high volume ASM, day-vessel to day-vessel, etc.
- Management uncertainty buffers and coverage target evaluation – evaluate assumption of 100% coverage removing management uncertainty
- Look at other regions with 100% monitoring programs (ex. west coast groundfish) to see if any have review processes to get ideas for metrics
 - North Pacific Observer Program Annual Reports - Deployment Performance Report

5. Pre-A23 Monitoring Program Comparison

Which years to use for a pre-A23 comparison?

- Don't eliminate any years for analysis at this stage - even FY2020 with low observer coverage due to COVID waivers will be useful for understanding the relationship between catch and observer coverage. FY2020 could serve as a low coverage year as a comparison to FY2022 which will be a high coverage target year.
- Consider starting with FY2016 - first year with ELM exemption which changed monitoring coverage in the fishery, FY2016 and forward reflective of current fishery conditions. Note that PTNS 2.0 was implemented in FY2018 (May 1, 2018) so any PTNS waiver reason-based metrics would need to start from FY2018.
- Could consider several sets of years to compare – FY2022/2023 with 99% or 80% coverage target, FY2020/2021 with 40% target (CV analysis done but coverage set higher to account for bias) plus COVID impacts, and FY2016-2019 (coverage based on CV)

6. Review of Monitoring Exclusions

The PDT discussed the additional review process the Council established for monitoring exclusions and how this review fits into the review process for coverage rates.

The purpose of the monitoring exclusions review is to verify whether the intent of the measures (e.g., that the catch composition has little to no groundfish) is still being met. With A23 implementation, there are two monitoring exclusions in effect which remove ASM requirements: 1) vessels fishing exclusively with extra-large mesh (ELM) gillnets of 10 inches (25.4 cm) or greater on a sector trip fishing exclusively in the SNE/MA and/or Inshore GB Broad Stock Areas (previously established under FW55⁵), and 2) vessels fishing exclusively on trips west of 71 degrees 30 west longitude.

The review of monitoring exclusions would occur after two years of fishing data is available and every three years after that. Given that A23 was implemented mid-way through FY2022 and the measure to remove monitoring coverage for vessels fishing on trips west of 71 degrees 30 west longitude was also delayed, this review will likely begin with FY2023 as the first year of data – lagging one year behind the review process for coverage rates.

Potential implications of monitoring exclusions on the review of coverage rates:

The new 71 degrees 30 west exclusion was implemented December 15, 2022, midway through fishing year 2022 – this will impact the total number of trips under ASM coverage.

The 71 degrees 30 west exclusion includes a trip start hail requirement through VMS – can look at trips taken under the exclusion and compare to how the vessels notified as an indicator of compliance or use of ASM resources.

Should the review of monitoring exclusions find that trips operating under these exclusions are not meeting the expectations of little to no groundfish catch, what would this mean for the efficacy of the monitoring program? In particular, what if there is a large increase in vessels participating in the exclusions (not covered by ASM)? What impact does the 7130 exclusion have on EM participation?

SNE/MA winter flounder stock is of biggest concern for the 71 degrees 30 west exclusion – can be a constraining stock, though stock status change with the updated assessment to not overfished and rebuilt, the stock is still in poor condition.

⁵ The FW55 exclusion also includes sector vessels fishing on these non-ASM sector trips and fishing exclusively within the footprint and season of either the Nantucket Shoals Dogfish Exemption Area, the Eastern Area of the Cape Cod Spiny Dogfish Exemption Area, and SNE Dogfish Gillnet Fishery Exemption Area, which are currently excluded from the requirement to only use 10+ inch mesh on these excluded trips in order to target dogfish with 6.5 inch mesh on the same trip, and are thus also removed from the at-sea monitoring coverage requirement. Groundfish catch is very low within the area and season of dogfish exempted fisheries. However, these exemptions are handled through sector operations plans.

7. Timeline

2022	PDT develops possible review metrics and indicators for the Committee/Council to consider
2023	SSC input on possible metrics and indicators, complete preliminary analysis, Committee/Council determines metrics
2024	Review occurs (after two full years of data)