Discussion Paper:

Adjusting the Partial Coverage Observer Fee – Monitoring Objectives

Review Draft: May 4, 2018[1]

1 Introduction

In October 2017, the Council initiated an analysis of a potential adjustment to the observer fee. The observer fee supports deployment of observers and electronic monitoring (EM) in the commercial groundfish and Pacific halibut fisheries that are subject to partial coverage monitoring, throughout the Gulf of Alaska (GOA) and the Bering Sea and Aleutian Islands (BSAI). The proposed analysis will examine potential costs and benefits of raising the observer fee or leaving it at 1.25 percent of ex-vessel values. The alternatives under consideration vary as to whether the observer fee would be levied equally on fishing vessels in the partial coverage category of the North Pacific Observer Program, or whether a fee adjustment would be differentially applied by gear sector. Under any alternative, the scope of this analysis will be limited to changes in the observer fee percentage. The deployment of observers and electronic monitoring will continue to be implemented using the current, statistically-reliable, random sampling model.

As part of developing this analysis, the Council requested that staff specifically evaluate how best to determine the scale of measures needed for improving selection rates. The Council's Observer Advisory Committee referred to this evaluation as 'reference points;' this discussion paper instead characterizes this evaluation as the Council's 'monitoring objectives.' In both cases, **the purpose is to identify what the Council is aiming to achieve with the Observer Program, to highlight tradeoffs between different aims, and to present a set of metrics for assessing whether objectives related to the Observer Program might be achieved at a variety of fee levels.**

This discussion paper is intended for review by the Council's OAC, to get feedback on the monitoring objectives approach and the staff's workplan for analyzing fee adjustment alternatives. This paper presents recent Council actions related to this analysis; proposes a methodology for assessing observer fee adjustments; summarizes recent coverage levels; presents monitoring objectives related to the Observer Program; and, proposes a set of strawman breakpoints for analysis of alternatives. The OAC will review this discussion paper in May 2018.

This paper summarizes monitoring objectives related to the Observer Program as relates to the fee system in the partial coverage category, to provide a lens for the Council to consider how to evaluate the alternatives. The paper identifies sampling needs (section 5.2) and policy objectives that emerge during the Council process (section 5.3). The paper then proposes an analysis using strawman breakpoints

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(section 6) to evaluate the potential for each alternative to meet (or fail to meet) sampling needs and policy objectives.

2 Recent Council action

The Council initiated this analysis to adjust the fee in October 2017. The Council heard from NMFS headquarters that Federal funding would not be forthcoming for funding at-sea observer coverage, as had occurred during the initial years of implementing the restructured Observer Program, and staff noted that as a best case, initiating an analysis to adjust the fee in October 2017 would not result in changes to fee collection rates (and potentially increased selection rates) until 2021 at the earliest.

In February 2018, staff presented the Council with a timeline for adjusting the observer fee:

The earliest time that an increase in revenue could affect monitoring is in 2021. Under this timeframe, the regulatory amendment to adjust the fee would need to be implemented by January 2020, which means that the Council would need to take final action at the latest in early 2019. The following timeline was developed based on these milestones.

October 2017	Council motion initiating action – evaluate raising the fee, but consider OAC recommendations as part of analysis
February 2018	Council adopts draft problem statement/alternatives
May/June 2018	OAC/Council review of progress on reference point analyses, including gear- specific base level thresholds for the hurdle approach
Sep/October 2018	OAC/Council review of EM cost optimization and impacts through ADP
Dec 2018	Initial review of EA/RIR
Feb 2019	Final Action/Selection of Preferred Alternative
rest of 2019	Rulemaking
Jan 2020	Implementation – fees assessed at new rate
October 2021	Plan for mid-year influx of higher fees in 2021 ADP
Spring 2021	Fees at new rate received by NMFS

Also in February 2018, staff presented the Council with a set of analytical considerations relating to this action:

> In order to keep to the above timeline, it is not possible to address all of the OAC's requests within the fee analysis. To do so would necessarily extend the timeframe, which would mean that monitoring with an increased revenue base would not occur until 2022 or beyond.
>
> This action requires a regulatory amendment only. The FMP is written to accommodate an observer fee up to 2%, with the exact amount specified identified in regulations. The regulatory amendment will require an environmental assessment and a regulatory impact review.
>
> In initiating this analysis to consider raising the observer fee in October 2017, the Council requested staff to include in the analytical process the following specific work products as requested by the OAC in September 2017. The requests are identified in the list below. **In order to stay on track with a schedule that would allow for a higher observer fee revenue base by 2021, staff proposes to incorporate only the highlighted elements listed below as part of the fee analysis.**

1. Continue to develop reference points to inform the scale of measures needed for improving selection rates. There are five example reference points included in the current discussion paper, but the OAC suggests work to develop three other approaches:
    a. First, developing gear-specific base level thresholds (gear-specific hurdle approach)

to ensure that we are getting representative data, as was already requested under the ADP.

b. Second, it would be helpful to understand what level of coverage is needed to provide sufficient biological samples for stock assessments.

c. Third, what coverage is needed to evaluate the observer effect at the post-stratified gear/target fishery level (recognizing that some trawl target fisheries will need to be grouped for this analysis).

2. Continue to evaluate zero selection criteria and collaborate on the EM optimization analysis. The discussion paper identifies next steps for both of these options.

   a. For zero selection, these include consideration of further platooning of the hook and line fleet by effort, periodic expanded sampling plans (e.g., planning for more intensive selection rates every 4-5 years for a particular sector), and inclusion of vessels under 40 ft in a redefined zero selection pool.

   b. For EM optimization, these include developing cost forecasts for the EM selection pool, a study of how much biological data from observers is needed to support a given EM pool size, gap analyses for EM and observer strata, accounting for how the combined sampling achieves overall sampling rates for a gear sector, and consideration of how to design incentives to induce the most cost-effective vessels to participate in the EM pool.

Under this proposal, the analyses required to evaluate items 1c, 2a, and the last part of 2b on the list above would be bifurcated from the fee analysis and would be evaluated as independent projects as staff become available.

2.1 Purpose and need

The Council adopted the following purpose and need statement in February 2018:

> The North Pacific Observer Program (Observer Program) is widely recognized as successful and essential for the management of the North Pacific groundfish and halibut fisheries. The funding and annual planning and review process for monitoring vessels and processors in the partial coverage category are designed to implement a scientifically reliable sampling plan to collect data necessary to manage the commercial groundfish and halibut fisheries. This system distributes the cost of observer coverage across participants in the partial coverage category and provides annual flexibility to evaluate the performance of and improve the sampling plan, in consultation with the Council. Through this process, monitoring selection rates are adjusted annually according to the available budget. In addition, the monitoring selection rates may be adjusted in response to fishery management objectives, as funding allows.
>
> The annual process of establishing observer coverage and EM selection rates in the partial coverage category using the Observer Program Annual Report and Draft Annual Deployment Plan is a well-designed, flexible, and legally defensible process. This annual process produces a statistically reliable sampling plan for the collection of scientifically robust data at any level of observer coverage and can allow for annual consideration of policy-driven monitoring objectives identified through the Council process.
>
> To continue to improve the Observer Program, maintain and enhance the Council's ability to meet policy objectives through monitoring, and fund deployment of electronic monitoring systems, additional funding for monitoring in the partial coverage category may be necessary.

2.2 Alternatives

NEPA requires that an EA analyze a reasonable range of alternatives, consistent with the purpose and need for the proposed action. The alternatives in this chapter were designed to accomplish the stated purpose and need for the action, to maintain current levels of observer coverage, fund deployment of electronic monitoring systems, and continue to improve the partial coverage Observer Program.

The Council adopted the following alternatives for analysis in February 2018.

Alternative 1: Status quo. Observer fee of 1.25 percent applies equally to all landings in the partial coverage category.

Alternative 2: Increase the observer fee up to 2 percent (analyze a range), to apply equally to all landings in the partial coverage category.

Alternative 3: Maintain the 1.25 percent observer fee applying equally to all landings in the partial coverage category, and additionally, raise the fee up to 2 percent (analyze a range) by gear [FISHERY] sector (longline, pot, jig, trawl).

3 Proposed methodology for assessing observer fee adjustments

The proposed analysis will explore expected ramifications of not changing the observer fee, as well as potential impacts of a fee adjustment. The alternatives under consideration vary as to whether the fee would be levied equally on fishing vessels in the partial coverage category of the North Pacific Observer Program, or whether a fee adjustment would be differentially applied by gear sector.

Under any alternative, the scope of this analysis is limited to a change in the fee percentage. The deployment of observers and electronic monitoring would continue to be implemented using the current, statistically-reliable, random sampling model. The analysis will look into how different fee percentages relate to yielded coverage amounts by sector, but decisions about deployment will remain part of the ADP process.

During 2017, an OAC subgroup analyzed a suite of deployment reference points, including how much of an increase in the observer fee would be required to achieve different reference point targets for deployment. We propose to use a similar methodology to assess different fee break points for the purpose of analysis (section 6), but with updated fee projections. This means that the proposed analysis will assess how much each fee level might be expected to generate (in dollars) and purchase (in observer days and percent of coverage) in the future. EM values would be included in this and all numerical values would be updated for current levels throughout the analysis.

To the extent possible this analysis will examine changes to the observer fee, holding all else equal. The proposed analysis will, however, examine items that impact the fee directly, including how sensitive a suite of fee levels might be to:

- total Allowable Catch (TAC) levels for groundfish and halibut species in the partial coverage category of the Observer Program;
- fluctuations (especially decreases) for the ex-vessel value of groundfish and halibut, including how those prices might affect a) standard prices for the observer fee; and, b) the proportion of all fee revenue that each fishery sector contributes to the overall Observer Program;
- fluctuations in the total cost of an observer-day supplied by the contracted provider for the partial coverage category, including both variable costs (e.g. travel) and fixed costs that are amortized across the total number of observer-days deployed;

The outcomes associated with different fee levels would be assessed based on their:

- performance in relation to sampling needs and policy objectives; and,
- relative impacts on stakeholders and communities in the BSAI and GOA partial coverage fisheries (potentially through a qualitative network analysis).

The proposed analysis will accept deployment methods in the current ADP as a given constraint. The proposed analysis will not produce a recommendation for NMFS concerning deployment. The proposed analysis will also accept current methods for calculating standard prices as a given. Section 4 describes recent and expected future deployment levels in the Observer Program. Section 6 presents a set of potential strawman break points of fee levels for analysis.

4 Coverage levels achieved through the Annual Deployment Plans, since 2013

The implementation of the restructured Observer Program in 2013 was supported through funding from the federal government, which supported the program while the 1.25 percent observer fee was implemented and assessed in the initial year. NMFS continued to provide some supplementary funding to support at-sea deployment each of the first four years of the restructured program. The justification for this was both to ensure stability of coverage during the initial years of the program, as ex-vessel values fluctuated and costs exceeded expectations, and also to accommodate the timing of the fee collection and distribution process, whereby the previous year's fees may not be available in some years until May, and even then may not be available in full.[2] In 2016, NMFS informed the Council that future Federal funding would not be guaranteed for supporting at-sea observer coverage in the future, as the agency's goal is for the cost of at-sea observer coverage to be borne by industry. As a result, 2017 coverage levels were based almost exclusively on the observer fee, and the resulting low levels of coverage led the Council to initiate this analysis. In June 2017, the Council requested and subsequently received a further $1+ million allocation from NMFS, to stabilize coverage rates for 2018 and 2019 while the Council develops this analysis.

Table 4-1 uses fee and Federal funding data from the 2016 Annual Report and the 2018 Annual Deployment Plan to identify how many days could have been afforded in each of the previous years, if relying exclusively on the observer fee. The table also identifies approximately how many observer days have been purchased with supplementary Federal funding and reports the actual coverage days that were used (or predicted) in each year, along with the actual coverage levels that were achieved (or predicted) using those observer days. The observer fee's purchasing power has varied between 3,200 and 3,800 observer days since 2013. If the partial coverage category were entirely industry-funded, the Council would likely only be able to afford coverage at selection rates slightly greater than 2017, which realized approximately 3,050 observer days at coverage rates of 4 percent for pot gear vessels, 11 percent for longline vessels, and 18 percent for trawl vessels. The additional NMFS funding, which allowed the Council to purchase between 800 and 2,100 days per year, has substantially increased the selection rate. The 2015 Supplemental EA found that spatial and temporal bias in the observer data was much reduced when selection rates were increased to 15 percent and above.

[2] The implementation of the Federal sequestration requirement has meant that a portion of the industry fee collection is sequestered each year, although the monies are eventually refunded. Additionally, there have been instances where a processor has gone bankrupt before paying the owed observer fees.

Table 4-1 Coverage levels resulting from the observer fee plus Federal funding, 2013-2018

Year	Total deployment of at-sea observer days in partial coverage	Observer fees received during calendar year (assessed from previous year's landings) in $ millions	Industry/Federal breakout		What coverage levels have we achieved in the partial coverage fleet with these observer days?		
			How many days could we have afforded with the previous year's industry fee	Days purchased with supplementary Federal funding during calendar year	Pot/longline vessels 40-57.5' LOA		All trawl vessels, and pot/longline >57.5' LOA
2013	3,533	n/a	0	6,450*	11%		15%
2014	4,573	$4.25	3,800	1,675	16%±		15%
2015	5,318	$3.46	3,200	2,500	12%		24%
					Pot	Longline	Trawl
2016	4,677	$3.90	3,700	375	15%	15%	28%
2017 *(predicted)*	3,059	$3.77	3,600		Pot: 4% Tender pot: 4%	Longline: 11% Tender longline: 25%	Trawl: 18% Tender trawl: 14%
2018 *(predicted)*	4,394		3,375	1,900	Pot: 16% Tender pot: 17%	17%	Trawl: 20% Tender trawl: 17%

* Also includes Federal funding provided in 2012.
± Represents the coverage rate achieved; selection rate was actually 12%.
Source: Calculated based on the summary of fees and funding in the 2016 Annual Report and 2018 Annual Deployment Plan.

[THIS SECTION WILL BE UPDATED TO INCLUDE CURRENT OBSERVER AND EM COVERAGE INFORMATION]

5 Monitoring objectives

In the most general of terms, the Council's action alternatives for this proposed analysis are intended to provide greater stability in the ability of NMFS to collect sound management data from the fisheries that are under the partial coverage category, through the use of observer fee revenues, while considering the extent to which an amended observer fee level would impact stakeholders, especially the harvesters and processors that pay the fee.

Alternatives under consideration vary as to whether a fee adjustment would be levied equally on fishing vessels in the partial coverage category of the North Pacific Observer Program, as a proportion of the ex-vessel value of landed fish, or whether a fee adjustment would be differentially applied by gear sector. Under any alternative, the scope of this analysis is limited to a change in the fee percentage; the deployment of observers and electronic monitoring will continue to be implemented using the current, statistically-reliable, random sampling model.

The rate of deployment for observers is not coupled directly with fee collection, and alternatives considered in this analysis do not include alterations to observer or EM deployment levels. At the same time, fee revenue and deployment of observers and EM are closely linked, through factors that influence the available fee revenue for observer and EM deployment. For example, stock declines have the potential to negatively impact observer fee revenues, which could in turn result in decreased capacity to purchase days of observer or EM coverage in the future. This chapter provides some background on the Council's monitoring objectives for the fishery which are met through the deployment of observers and EM systems, and will be used as a basis for the Council to assess how to determine what, if any, fee adjustment may be appropriate to address the Council's objectives and risk tolerance.

5.1 Objectives from Observer Program Amendments

5.1.1 Observer Program Restructuring

In 2013, the restructured Observer Program was implemented for vessels subject to partial coverage. The restructured Observer Program replaced the previous industry-financed pay-as-you go service delivery model for the Observer Program in place from the 1990s through the end of 2012. Restructuring addressed problems with the earlier service delivery model, including the following key concerns:

- **The inability for NMFS to determine when and where observers should be deployed.** Vessels and processors in the 30 percent observer coverage category could decide, within certain target fishery and time categories, when to carry observers. In addition, for vessels and processors with less than full coverage, and the program did not allow fishery managers to effectively control when or where observers were deployed. This resulted in sources of bias that jeopardized the statistical reliability of catch and bycatch data.
- **Inadequate coverage levels established in regulation.** The program design was driven by coverage levels based on vessel size, which did not include observer requirements for either the commercial halibut sector or the under 60 foot groundfish sector.
- **Disproportionate cost issues among the various fishing fleets.** Many smaller vessels had faced observer costs that were disproportionately high relative to their gross earnings, compared to larger offshore vessels operating in the BSAI, their under 60-foot counterparts, and their counterparts outside of Alaska.
- **The difficulty to respond to evolving data and management needs in individual fisheries.** Coverage levels and deployment patterns could not be effectively tailored to management needs or circumstances of individual fisheries or evolving fisheries management objectives.

Changing the service delivery model and including previously unobserved halibut and under 60 foot groundfish vessels in the partial coverage component of the Observer Program meant that the restructure reduced bias in observer data, facilitated collection of observer data in sectors that did not previously have coverage requirements, and allowed flexibility through the Annual Deployment Plan model, whereby fishery managers can tailor observer coverage in response to management needs and circumstances of individual fisheries. The creation of a fee-based funding mechanism reflecting the value a vessel or processor extracts from the fishery has improved the equitability of cost distribution among fishery participants. NMFS contracts directly with observer providers for the partial coverage category and determines when and where observers are deployed based on a scientifically sound sampling design.

Landings by vessels in the partial coverage category are assessed a 1.25 percent fee which is paid to NMFS by processors and registered buyers and is used to fund the deployment of observers. A 1.25 percent fee was chosen during the restructure analysis based on the Council's interest in balancing need for revenue to support the Observer Program with need to minimize impacts on the industry sectors included in the restructured Program. As all sectors benefit from monitoring data that allows sustainable management of the fishery resource, the Council chose to apply the same fee percentage to all participants, to develop a fee program that is fair and equitable across all sectors in the BSAI and GOA groundfish and halibut fisheries.

The restructure of the Observer Program has provided a framework for NMFS and the Council to allocate observer effort towards its multiple objectives within an established budget. Under the restructured program, NMFS reports regularly to the Council through the Annual Report and Annual Deployment Plan processes, which have improved transparency with respect to the sample design and financial aspects of the program. NMFS and the Council have used the flexibility of the restructured process to make continuous improvements towards optimizing coverage across fisheries.

5.1.2 Objectives Addressed in the Electronic Monitoring Integration Analysis

Since 2013, the Council has been working to integrate an electronic monitoring option into the partial coverage component of the Observer Program. An EM system uses cameras, video storage devices, and associated sensors to record and monitor fishing activities, in lieu of having an observer onboard. EM systems can collect at-sea data for NMFS to estimate discards of fish, including halibut, and mortality of seabirds. The Council-established EM Workgroup, which includes representatives from commercial fishing operations, agencies, and EM service providers, oversaw a program of EM cooperative research from 2014 through 2017. Beginning with the 2018 fishing year, the EM option was fully implemented in regulation, and vessels that are approved to participate in the EM selection pool, and which comply with EM deployment requirements, are not required to carry an observer.[3]

The Council's primary objective in pursuing an EM option was to develop an alternate method of collecting catch and discard information to accommodate small fixed gear vessels that have trouble accommodating an observer onboard. This option was subsequently extended to other fixed gear vessels that prefer to utilize EM instead of observers. The Council also recognized that there may be other opportunities in the future to utilize EM as part of an optimized monitoring program, under the Annual Deployment Plan.

Developing the EM program required considerable investment and was funded through a combination of federal funding and funding from external sources such as the U.S. National Fish and Wildlife Foundation. Beginning in 2019, the costs of the fixed gear EM program must be covered through the observer fee system that also supports observer deployment in the partial coverage component of the Observer Program.

5.2 Sampling Needs

One factor for the Council to consider in the decision about whether to recommend raising the observer fee is to identify the sampling needs for observer and EM data, and whether those needs are currently being met. The following sections provide some discussion of what sampling needs are for managing fisheries and stock assessment and describe some of the previous and ongoing work to assess baseline coverage needs.

5.2.1 Managing fisheries – target species, incidental catch, and bycatch

The Observer Program complies with the Magnuson-Stevens Act requirement that the program must be reasonably calculated to gather reliable data by stationing observers on all, or a statistically reliable sample, of fishing vessels and processors necessary for conservation, management, and scientific understanding of the fisheries covered by the fisheries research plan (16 U.S.C. 1862(b)(1)(A)). Prior to 2013, the Observer Program did not deploy observers in fisheries subject to partial coverage using well-established random sampling methods. Instead, fishermen could choose when to take observers to fulfill their observer coverage requirement. The ad-hoc deployment method prevented representative sampling across fishing trips, resulting in a) sampling effort that did not correspond with fishing effort, and b) consistent problems with too little or too much coverage in fisheries in the 30 percent observer coverage category. Implementing a scientific sampling plan for deploying observers has been a major accomplishment of the restructured Observer Program.

Since observer data collected in the partial coverage category is extrapolated in the Catch Accounting System to create estimates of catch for groundfish fishing operations, it is important that NMFS collect observer data from a representative sample of fishing operations. Collecting a representative sample means that information from a subset of fishing operations is collected to estimate characteristics of all federal groundfish and halibut fishing operations off Alaska. The purpose of random sampling is to obtain

[3] NMFS approved 141 eligible vessels to participate in the EM selection pool for 2018.

data that represents characteristics of a population for which inferences are needed. The group of units for which inferences are needed is called the target population. In the Observer Program, the target population is all federal groundfish and halibut fishing operations off Alaska. At-sea data collected by observers from a randomly-selected subset of all fishing operations (called a sampling frame) are used to make inferences about the target population of all trips that comprise all federal groundfish and halibut fisheries.

Inferences about unsampled events (i.e., discard on unobserved trips) in the target population are made using available sampling information, the quality of which depends on how 'representative' the sampling frame is of the target population and the estimation processes used in the inference. Sample units collected using stratified random sampling can also be grouped after the sample has been collected. This procedure is called post-stratification, which results in 'post-strata.' Post-strata boundaries are defined using information that is known after a sample unit has been selected. The quality of estimates depends on the observed fishing activity (selected from the sample frame) having the same distributional characteristics as the target population. Hence, differences in the characteristics of the units within the sampling frame versus units outside the sampling frame and within the target population can be a source of bias in the inferences.

Under the previous program, the lack of a random sampling of trips prevented rigorous statistical inferences about unsampled trips. This problem was compounded by concerns about the representativeness of the sampled events relative to the sample frame and target population (MRAG 2000). An important improvement under the restructured Observer Program is better alignment of the sampling frame with the target frame. The restructured rule authorized observers to be placed on all halibut vessels and vessels under 60 feet LOA. The improved sample frame reduced the number of trips that had no probability of coverage by 41 percent and 35 percent for 2013 and 2014, respectively. Following the trend in trips, the number of vessels included in the sampling frame has also increased when compared to the previous program.

The restructured Observer Program has improved catch estimates through improved sampling methods. The Observer Program now collects data on previously unobserved portions of the fishing fleet (halibut individual fishing quota (IFQ) vessels and vessels between 60 feet and 40 feet LOA). The restructure also decreased bias caused by self-selection of observed trips allowed under the program between 1990 and 2013.

The expanded sampling frame created by the restructured Observer Program has further resulted in better spatial distribution of sampling relative to the overall fishery footprint. The spatial distribution of observer coverage under the new program includes areas not previously covered. The largest improvement during the first years of the restructured program (2013, 2014, and 2015) occurred in southeastern Alaska (reporting Area 659), which had no coverage from 2009 through 2012.

The Supplement to the Environmental Assessment for restructuring the Observer Program (NMFS 2015) described in detail the increased reliability in observer information resulting from implementing the restructured program. Even at higher than anticipated costs in the first few years of the restructured program, the improvements have resulted in improved information for the management and conservation of the North Pacific fisheries. The inclusion of previously unobserved small vessels and halibut vessels under the restructured Observer Program improved the representativeness of data compared to the previous program, even at very low deployment rates in the small vessel sampling frame (given the rate prior to restructuring was 0 percent). The spatial distribution of observer coverage since 2013 includes areas not previously covered, particularly nearshore areas.[4]

[4] Prior to the restructure, analysis suggested there was poor observer coverage in nearshore areas, particularly southeastern Alaska and other nearshore areas in the Central and Western Gulf of Alaska (Gasper and Kruse, 2013).

NMFS has found from studies in Alaska and elsewhere that even at low deployment rates, statistically reliable estimates can be made for nearly all fishing operations.[5] NMFS does not provide a 'hard line' or baseline that indicates a single rate that results in the whole observer data collection program not being able to collect reliable information. There is not a specific amount of coverage at which NMFS is unable to manage the groundfish fisheries in the BSAI or GOA, rather there are levels of observer coverage at which NMFS may not have data in specific strata or fisheries. Data quality is a continuum, and a single threshold is not appropriate, nor desired, for such a complicated and diverse program. Instead, the ADP process provides a risk assessment and information to guide policy decisions about where to reduce risk of no coverage, rather than a single defining rate where data becomes unreliable (which would only be relative to a specific sampling objective and measure). The flexibility afforded NMFS and the Council through the ADP process allows the Observer Program to adapt, as new scientific information is available, and to inform future changes in estimation methods that will result in better use of observer data under existing funding levels.

5.2.2 Stock assessment data needs

Observers collect size, sex, length, and weight of all organisms in samples, and collect biological samples such as scales, tissues, age structures (otoliths), and stomachs. This information is used in stock assessments to model the age structure of the species, predator-prey interactions, and temporal, geographic, or depth-related differences in the distribution, for example by age or sex. Biological samples also provide important data for developing ecosystem models that show food web interactions.

There are many factors that go into biological sampling needs, including: increased understanding of target and non-target species; how many stock assessment models currently use biological samples; and, how many may need biological samples in the future. There is no direct translation between a percentage rate of observer coverage and a threshold number of biological samples. While some sample collection could be conducted dockside with landed species, other information must be collected at sea. This is obvious for discarded species, but also, for example, maturity and trophic interaction information (including stomach contents) cannot be successfully collected dockside, after biological tissue has deteriorated.

Table 5-1 was part of the EM analysis. Table 5-1 presents information about otolith samples collected by observers over time. In the GOA, about 60 percent of Pacific cod otolith samples are currently collected from the fixed gear catcher vessel sectors, and about half of sablefish otolith samples. Since 2013, no Pacific cod otoliths collected from the fisheries have been aged in either the BSAI or the GOA, and about 20 percent of sablefish otoliths from each management area have been aged. Longline catcher vessels account for approximately 46 percent of shortraker rockfish samples, and about a third of shortspine thornyhead otolith samples (as well as the only longspine thornyhead rockfish sample taken in 2013 through 2015), which have not yet been aged. In the GOA, about 35 percent of rougheye rockfish otolith samples derive from hook-and-line catcher vessels, and approximately 14 percent of samples from all gears have been aged. In the BSAI, fixed gear catcher vessels accounted for approximately 20 percent of Pacific cod and shortraker rockfish otolith samples, as well as one of the three dark rockfish samples collected during the time period (Table 5-1).

[5] If observer data are not available at the NMFS reporting area level, then estimation of discarded catch still occurs at the FMP area level. If observer data are not available at the FMP area level, however, then statistically reliable estimates of discarded catch are not generated in the Catch Accounting System.

Table 5-1 Number of otolith samples collected from fixed gear catcher vessels, compared to total otoliths collected from the groundfish and halibut fisheries, for 2013 through 2015 inclusive, and proportion of otoliths collected from all gear types that have been aged.

Area	Species	Number of otolith samples					Proportion of total (all gears) that are aged
		Total (all gears)	Hook and line	Proportion of total from hook and line	Pot	Proportion of total from pot	
GOA	Pacific cod	1,280	442	35%	352	28%	0%
	Sablefish	3,524	1,905	54%			18%
	Pollock	2,682	3	0.1%			NA
	Pacific Ocean perch	4,615	17	0.3%			9%
	Northern rockfish	3,149	6	0.2%			15%
	Shortraker rockfish	999	455	46%			0%
	Rougheye rockfish	869	302	35%			14%
	Dusky rockfish	2,326	53	2%			0%
	Dark rockfish	48	6	13%			0%
	Shortspine thornyhead rockfish	1,447	446	31%			0%
	Longspine thornyhead rockfish	1	1	100%			0%
BSAI	Pacific cod	9,482	46	0.5%	181	2%	0%
	Sablefish	1,719	245	14%	95	6%	21%
	Northern rockfish	1,474	1	0.1%			30%
	Shortraker rockfish	725	148	20%			0%
	Rougheye rockfish	697	47	7%			0%
	Dusky rockfish	136	11	8%			0%
	Dark rockfish	3	1	33%			0%
	Shortspine thornyhead rockfish	1,193	170	14%	2	0.2%	0%

Source: NMFS AFSC Observer Program, data compiled by AKFIN, except proportion of total otolith samples that have been aged, which is from http://access.afsc.noaa.gov/al/otolith_inventory/searchform.php.

[THIS SECTION WILL BE REVISED TO INCLUDE MORE INFORMATION ABOUT CURRENT AND EXPECTED FUTURE BIOLOGICAL SAMPLING NEEDS. This section will be expanded to include qualitative information about distribution at spatial and temporal scales, as well as information about how many samples stock assessment authors need from each management area. That information is not expected to be a comprehensive analysis of coverage levels across all biological needs for every species, and is not directly translatable to coverage levels, but it is expected to be helpful nonetheless. This section may also include discussion of seabird and marine mammal observations, and relationship to baseline needs. NMFS staff have discussed the potential for including (in this analysis) examples of how lowest thresholds may be determined on a species-specific in this analysis, below which collected data are useless. In the longer term, sampling needs and minimum sampling needs may be addressed, but a detailed analysis of sampling needs across all sectors and species lies outside the scope of this analysis and may be better suited for a future analysis focusing on the zero selection pool and coverage needs, or a future analysis on its own.]

5.2.3 Risk Analysis in the Supplemental EA (2015)

The Supplemental EA for the restructured program (NMFS 2015) included a gap analysis, which illustrated the risk of not having enough observer data to generate estimates of discarded catch under varying observer coverage rates. Several overall trends were associated with the deployment across strata: (1) as deployment rates increased, the probability of not having Fishery Management Plan (FMP)-level (GOA vs BSAI) and reporting-area data on discarded catch in a fishery declined; (2) most data gaps at the FMP-level disappeared or were severely minimized at deployment rates greater than or equal to 15 percent; and (3) even at observer deployment rates less than 15 percent, there was generally sufficient observer coverage to provide estimates of discards at an FMP-level.

The Supplemental EA found that there are a multitude of potential risks related to missing data along a continuum of coverage rates and fishing effort. For example, at coverage rates of 10 percent, potential

estimation gaps at the FMP-level were likely to develop for only 5 percent to 6 percent of all trips in the small vessel stratum. Many of these estimation gaps were related to vessels not being in the sample frame (i.e., there is no coverage for vessels under 40 ft LOA), resulting in gaps that persisted even at high coverage levels (i.e., potential estimation gaps were estimated for 6 percent of the trips were estimated regardless of coverage level). The sampling frame issue is a problem that can only be addressed through improvements in deployment (i.e., change in the ADP to start data collection on vessels less than 40 ft LOA) and adjustments to Catch Accounting System methods to ensure estimation occurs.

In the 2015 Supplemental EA gap analysis, observer deployment rates at about 25 percent were found to greatly reduce estimation gaps in a fishery at the reporting-area in both the large vessel and small vessel stratum. The analysis notes that to have the very low risk of estimation gaps for nearly all gear and reporting area combinations it would likely require deployment rates of at least 20 percent in the large vessel stratum and even higher coverage rates (greater than 30 percent) for the small vessel stratum. However, not filling these gaps does not mean NMFS cannot estimate; estimates will be made by aggregating information across reporting areas. The consequence of aggregating information across reporting area is a potential loss of precision and an increased risk for bias in some situations. Based on past evaluations, the impact on estimation from crossing reporting areas will vary for each species estimated and hence will not be uniformly 'bad' or 'good.'

The 2015 gap analysis found that the yearly fluctuation in observer coverage rates has consequences in NMFS's ability to estimate catch in the groundfish and halibut fisheries. The 2015 analysis found that compared with the groundfish discard system, the PSC and non-target systems are less likely to result in situations where no estimates can be made since the lowest priority level over which data are aggregated to form a discard rate is much larger than those used in the groundfish system. An important consequence of changing deployment rates is whether the post-strata within the Catch Accounting System can still be reliability filled with observer information and the degree to which estimates of discarded catch are available to inform fishery management decisions. Mitigating the risks of not having observer data in a specific fishery will require consistent and reliable random sampling across fleets.

Overall, the restructured program has lowered variance in what *time* of year vessels carry observers. Maintaining consistency or increases in the number of observer days deployed each year is crucial to ensure *spatial* representativeness. The general pattern for large vessels, regardless of FMP, was that post-strata with many trips observed overall were less impacted due to non-coverage. Post-strata with more than 5 trips in quadrant I or II at a 5 percent deployment rate were generally reduced to <5 trips with no coverage at a 25 percent deployment rate in the BSAI and a 20 percent rate in the GOA. Overall, the impacts of estimation gaps were highest at coverage rates <15 percent as demonstrated by a large number of trips (>20) belonging to post-strata with at least a 50 percent probability of no coverage. All post-strata were observed at a deployment rate greater than 60 percent. In general, the number of trips in the small-vessel strata exposed to the estimation gap was low when coverage rates were at least 25 percent in the BSAI and 15 percent in the GOA.

Results of the 2015 analysis demonstrate that there is not a specific amount of coverage at which NMFS is unable to manage the groundfish fisheries in the BSAI or GOA, rather there are levels of observer coverage at which NMFS may not have data in specific strata or fisheries. Therefore, the response to the risk of not having observer data in a specific fishery to estimate discards at either the FMP-level or the reporting-area-level could be addressed by: (1) ensuring that observer coverage is maintained above a level that corresponds to chosen risk or probability of no estimation at the FMP-level or reporting-area (for example, at coverage rates of 10 percent, potential estimation gaps at the FMP-level were likely to develop for 5 percent to 6 percent of all trips in the small vessel stratum); (2) exploring changes to the sampling strata (e.g., gear-specific strata); and (3) exploring methods to modify the Catch Accounting System to improve catch estimates.

5.2.4 Deployment approaches analyzed in the ADPs

Over the course of the last six draft ADPs, NMFS has evaluated several different observer coverage stratification schemes, and allocation strategies among them, for vessels subject to partial coverage. Observer coverage rates are affected by the number of observer days purchased with existing fee revenues, anticipated effort in the deployment strata (how many trips are predicted for the upcoming year, and of what duration), and the allocation of deployment between the strata. The range of realistic possible observer coverage rates in the partial coverage category is calculated based on: 1) expected catch and ex-vessel prices, used to estimate the available budget from the observer fee revenues; 2) expected observer costs per day[6]; and 3) expected fishing effort. Each year, NMFS Observer Program staff use a simulation model to evaluate several different stratification and/or allocation strategies, and estimate what selection rate can be afforded in each stratum within a reasonable certainty of not going over budget. While in most cases, anticipated fishing effort is generally assessed using the actual activity of vessels in the recent past, in some cases, the analysts will also factor in assumptions for effort change in the upcoming year.[7]

Since 2016, NMFS has deployed observers into different gear strata (pot, longline, and trawl), and for the 2018 draft ADP, NMFS provided a comparison of three observer coverage allocation strategies: 1) equal allocation – allocate observer days equally by strata; 2) optimized, where an algorithm is used to allocate observer deployment to optimize monitoring of discards at sea, and 3) 15 percent plus optimization, which is a 'hurdle' approach where observer sea days are first allocated equally up to a 15 percent coverage rate and any remaining sea-days are allocated using an optimal algorithm based on discards. For both the 15 percent plus optimized and the optimized strategies, two metrics for optimization were evaluated: 1) discards of groundfish and halibut PSC; 2) discards of groundfish, halibut PSC, and Chinook PSC. The algorithm maximizes precision for these metrics for the least cost.

The strategies in the draft ADP are then evaluated for their impact, specifically using a gap analysis that explores the likelihood of the strategy in question resulting in NMFS reporting areas where no observer data would be available.

Based on the ADP evaluations, and also analysis in the Supplemental EA for the restructured program (NMFS 2015), a fully optimized observer and EM allocation strategy based on maximizing precision on discarded species actually results in the *most* gaps in observer coverage. For this reason, NMFS has consistently recommended that some minimum level of observer and EM coverage be used in all strata. In the 2017 and 2018 draft ADPs, NMFS has recommended requiring a minimum 15 percent selection rate in each strata, based on analysis in the Supplemental EA, and also Annual Report evaluations of the performance of deployment strategies in strata and during years where a minimum of 15 percent coverage was achieved. The Council's Scientific and Statistical Committee (SSC) has supported strategies that require a minimum level of sampling in all strata and has noted that the method is precautionary with respect to avoiding bias and providing data across all gear types. The SSC noted the need to balance minimizing the variability of discard estimates, prioritization of PSC-limited fisheries, and the need to reduce gaps in observer coverage in all strata in the partial coverage category.

The Council's Observer Advisory Committee, the SSC, and the Council have all commented that while a 'hurdle' approach may be appropriate, the identification of what the minimum allocation by stratum should be may differ between strata (i.e., may not be a fixed 15 percent across the board), and should be investigated further. NMFS has agreed to evaluate how to identify gear-specific thresholds for the hurdle approach and will provide further analysis for the draft 2019 ADP in September 2018. The OAC and the

[6] Noting that circumstances that affect travel costs or non-fishing days may affect the average cost of deploying observers in the partial coverage category.

[7] For example, in the 2018 ADP, the data set was modified to adjust for the reduction of fishing effort due to the recent stock assessments of Pacific cod, and the expectation that catch quotas would be reduced by up to 85 percent from 2017 levels.

Council have also previously expressed an interest in further NMFS work to refine the gap analysis, as there may be some NMFS reporting areas for which the Council is willing, from a policy perspective, to allow a greater risk tolerance for potentially not having statistically reliable observer data. This investigation has not yet been initiated.

5.3 Policy objectives for observers and EM

Section 3.2 discussed the factors that contribute to identifying sampling needs for the users of Observer Program data. There is no specific threshold of coverage below which NMFS cannot sustainably manage federal fisheries. However, there are levels of coverage below which there is an increased risk of non-representative data, or below which there may be gaps in the ability to obtain biological samples for stock assessments. At lower levels of coverage there is risk that observer data become less useful for achieving random, gear-specific, area-specific, or species-specific sampling. At lower levels of observer coverage, fishery managers may take more conservative or precautionary approaches towards management decisions.

In addition to meeting sampling goals, the Council will also consider its *policy* objectives for deployment and data collection when assessing whether to recommend raising the observer fee. Decisions about how to distribute observer coverage are not based solely on statistically reliable sampling requirements of the MSA. NMFS and the Council balance a diverse set of sampling and *policy*-based objectives for deployment and data collection, while drawing from a single funding source. NMFS allocates deployment among sampling strata through the ADP process, while policy choices of the Council may influence the stratification scheme (e.g., small/large vessel strata, gear-specific strata). The Council's policy objectives for data collection, such as PSC accounting, are complementary to but different from goals of attempting to achieve random samples and representative data of fishing trip behavior. Meeting both sampling objectives and policy objectives sometimes requires tradeoffs, but NMFS generally strives to achieve sampling goals of representative data of trip behavior *while* meeting policy goals.

For example, for 2018, NMFS implemented an observer deployment allocation strategy of 15 percent plus increases, called 'optimization,' based on discarded groundfish and halibut and Chinook (two PSC species). A minimum level of sampling is precautionary with respect to avoiding bias and providing data across all gear types. The 15 percent plus optimization allocation strategy provided a balance between minimizing variability of discard estimates, prioritization of PSC-limited fisheries, and the need to reduce gaps in observer coverage in the partial coverage category. This is an example of balancing a diverse set of sampling and policy goals in one deployment strategy.

The sections that follow describe some of the key policy objectives that the Council has previously identified, and discuss risk tolerance and the potential effect of EM optimization on determining the need for an adjustment to the observer fee.

5.3.1 Policy objectives for the Observer Program

The Council and NMFS have identified that it is critical to conservation and management objectives that the management of the Alaska fisheries be supported by reliable and scientifically valid observer and EM information. NMFS strives to collect high quality and unbiased observer and EM data for the benefit of stewardship objectives. The following subsections provide some discussion of several additional policy objectives that the Council has identified, at some point in time, relevant to observer data. To the extent possible, this analysis will discuss the impacts of the alternatives, in later chapters, with respect to the policy objectives identified here.

Although there is evidence that certain levels of observer coverage reduce the likelihood of undesirable data gaps from forming, there is no simple definition of what a minimum level of observer or EM

coverage should be. The Council has supported gathering enough data to ensure that certain policy goals are accomplished. Specific policy objectives for the Observer Program include:

Conservation interests

- Minimizing a 'monitoring effect' so that observed vessels are representative of unobserved vessels
- Improving discard estimates for fishery species, including minimizing variability and reducing gaps in coverage in all strata/reporting areas
- Priority for monitoring PSC
- Detecting species decline or rare events
- Design the program with flexibility to respond to evolving data and management needs in individual fisheries

Stakeholder interests

- Provide for equitable distribution of the burdens of monitoring among fishery participants
- Design the program, to the extent practical, so that the requirement for monitoring still allows the vessel operator to make the same operational choices
- Foster and maintain positive public perception/stakeholder support for the Observer Program

5.3.1.1 Minimizing a 'monitoring effect'' that data from observed vessels are representative of unobserved vessels

The random sampling established under the restructured Observer Program eliminated much of the bias that existed under the previous program. The goal of sampling under the restructured program was 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 (NMFS 2013a). Random sampling results in better spatial and temporal distribution of observer coverage across all fisheries.

At the same time, a well-known issue with at-sea data collection is the potential for an observer-effect. This occurs when the vessel fishes differently when an observer or EM system is on board. Each Annual Report investigates differences between the sampled population, the sample frame, and the target population to investigate potential observer effects. Alaska groundfish fisheries have limits on the amount of bycatch allowed to be caught, particularly for halibut, salmon, crab, and herring (PSC species). 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).

For example, for several years, the Council has discussed the potential for an observer effect among vessels delivering to a tender. While this has not always been the case, in 2016, currently the most recent year for which data is available, an observer effect was found within trips that delivered to tenders in the trawl stratum. Whether this observer effect is due to intentional manipulation of trips (facilitated by the flexibility in ODDS and the current trip definitions), or by vessel operator behavior in the trawl pollock partial coverage fleet), the structure of the data (observed trips and trips with VMS are shortened since all unobserved non-VMS deliveries to a tender are lumped into the same trip), or simply low sample size is unknown.

The observer-effect phenomenon is closely related to the policy goal for accurate PSC accounting, and for equitability among participants in bearing the burdens of monitoring. The observer-effect also impacts representative sampling goals of NMFS. Therefore, minimizing or eliminating the potential for an observer-effect is both a sampling goal and a policy goal. Maintaining or expanding coverage might have

a positive impact on minimizing or eliminating the potential for an observer-effect, while decreasing coverage could be expected to have no effect or a negative impact on the potential for an observer-effect. Expanding coverage would likely require increased capacity, in the form of more observer days or broader EM implementation, both of which cost money.

5.3.1.2 Improving discard estimates for fishery species, including minimizing variability and reducing gaps in coverage in all strata/reporting areas

Without estimates of discarded catch in a given fishery, managers are compelled to manage using more precautionary approaches for data-limited fisheries. If observer data are not available at the reporting area level, then estimation of discarded catch still occurs at the FMP area level. If observer data were not available at the FMP area level, however, then estimates of discarded catch are not generated in the Catch Accounting System. The Council has consistently placed a priority on the NMFS analysis of catch and bycatch and estimates of variance (which requires at least 3 observed trips in each NMFS reporting area). Mitigating risks of gaps in the observer data in a specific fishery or reporting area will require consistent and reliable random sampling across fleets.

5.3.1.3 Priority for monitoring PSC

While there is no level below which observer data are useless, the Council has communicated for several years through feedback to NMFS on the draft ADPs that it has a low risk tolerance for PSC limited fisheries. In fact, documenting bycatch and PSC limited catches in domestic fisheries has been a key policy goal of the Observer Program since the 1980s:

> The SSC prefers the alternatives that use observers because of the desire to monitor bycatch and prohibited species catches… (SSC minutes May 1985).

Under the restructured Observer Program, all catcher/processors and motherships were placed in the full coverage category, in part due to the need for independent estimates of PSC and other discards from these vessels. In addition, all catcher vessels were placed in full coverage when they participate in catch share programs with transferable PSC limits. Several characteristics of transferable PSC limits work together to create a level of incentive to misreport that NMFS and the Council felt justified full coverage. First and foremost, PSC limits can prevent the full harvest of a target fishery allocation if the PSC limit is reached before the target fishery catch is fully harvested. This creates an incentive to misreport the PSC and the discard of any other species that might limit the catch of the target species. These incentives to misreport exist with both transferable PSC limits under catch share programs and with non-transferable PSC limits in limited access fisheries. However, under catch share programs, the responsibility for not exceeding target species and PSC limit allocations rests with the individual vessel or entity receiving the allocation.

In general, although NMFS retains the ability to close fisheries to prevent overfishing, NMFS does not actively manage catch share programs by issuing fishery closures once NMFS data indicates that a catch or PSC limit allocated to an entity will be reached. Vessels fishing for entities with transferable PSC limits under a catch share program can continue to fish until the entity's allocation of target species or PSC is reached. The ability to work together to manage entity-level allocations is what creates many of the important benefits of a catch share program. However, this ability also creates an increased incentive to misreport PSC or the catch of other limiting species. This incentive does not exist at such a high level in limited access fisheries more actively managed by NMFS. Transferable PSC limits also provide the potential for individual vessels and entities to benefit by transferring PSC not needed to support their target species allocations for additional compensation. These incentives together created the justification for full coverage for catcher vessels with transferable PSC limit allocations under a catch share program, while catcher vessels operating in limited access fisheries with non-transferable PSC limits were placed in partial coverage.

Beginning in 2013, the Council has requested that NMFS maintain higher observer coverage rates for all trawl vessels and fixed gear vessels over 57.5' to expand coverage on PSC limited fisheries, and in 2017 the Council endorsed using the full optimization allocation strategy that maximizes precision for halibut PSC.

5.3.1.4 Detecting species decline or rare events

The Supplemental EA analysis (NMFS 2015) found that the yearly fluctuation in observer coverage rates has consequences for NMFS's ability to estimate catch in the groundfish and halibut fisheries. An important consequence of changing deployment rates is whether the post-strata within the CAS can still be reliably filled with observer information and the degree to which estimates of discarded catch are available to inform fishery management decisions. The 2015 analysis found that compared with the groundfish discard catch accounting system, the PSC and non-target systems are less likely to result in situations where no estimates can be made since the lowest priority level over which data are aggregated to form a discard rate is much larger than those used in the groundfish system. Discard rates for a NMFS reporting area may differ from the FMP-wide discard rate if the fishery species composition/discard composition varies geographically.

In 2017, the Council discovered that Gulf of Alaska Pacific cod had undergone a considerable decline in abundance. The Council hosted an Ecosystem Workshop in February 2018, which brought together the Council, SSC, and AP for a day to focus on ecosystem issues in the BSAI and GOA Regions. A prominent theme of the Workshop was the need to lower the risk that rare events or species declines like the cod scenario in 2017 might be missed. Maintaining the Observer Program with consistent, reliable observer and EM coverage across all Federal fisheries is consistent with the policy goal to lower the risk of missing a species decline or rare event. One potential strategy to increase confidence that species declines will be detected might be to steadily increase overall observer coverage rates while minimizing yearly fluctuations or instability in coverage across all sectors.

5.3.1.5 Design the program with flexibility to respond to evolving data and management needs in individual fisheries

One of the advantages of restructuring the Observer Program was the implementation of the Annual Deployment Plan process, which allows the Council and NMFS to consider on an annual basis the appropriate stratification scheme and allocation strategy for observers in partial coverage, within the available budget. The Council highlighted the importance of this feature when recommending that EM be integrated as an option in the Observer Program.

The ability to change the deployment strategy from year to year, however, also means that sometimes there lacks the stability to evaluate which adjustment to the program created which result. NMFS has previously recommended to the Council the deployment strategy remain stable for at least a two-year period, to allow for evaluation and optimization.

5.3.1.6 Provide for equitable distribution of the burdens of monitoring among fishery participants

One of the keystones of restructuring the Observer Program was to address the issue of equitability with respect to paying the cost of observer coverage, through implementation of the fee system based on ex-vessel value. One of the drivers for the Council's prioritization of an EM option for fixed gear vessels was to address the disproportionate burden experienced by small vessels when required to accommodate an observer onboard, which often came at the expense of leaving a crewmember behind.

5.3.1.7 Design the program, to the extent practical, so that the requirement for monitoring still allows the vessel operator to make the same operational choices

The design of the Observer Program is intended to provide that, to the extent practical, the presence of the observer onboard does not affect a vessel operator's choices about carrying out their fishing operation (their operational choices). This principle was prioritized by the Council in developing a fixed gear EM approach using EM for catch estimation, in that while there are some additional responsibilities for vessel operators to install and maintain the EM system, once it is installed the vessel is largely able to continue its normal fishing practice, and does not have additional duties for data collection (e.g., such as maintaining a logbook that would be audited through EM).

5.3.1.8 Foster and maintain positive perception/stakeholder support for the Observer Program

Fostering and maintaining positive perceptions and general stakeholder support for the Observer Program is an important policy goal for the Council. Positive stakeholder perceptions are closely related to the several previous objectives, such as the equitable distribution of costs and logistical burdens. This objective also requires stakeholder buy-in about the value of Observer Program, and its appropriate management and use by the agency.

Between 2014 and 2015, selection rates were increased from 15 percent to 24 percent in the large vessel sector. This increase in at-sea days supported higher deployment rates on the trawl fleet, which helped ensure continued stakeholder support for and confidence in the new program, especially in the first few years after the restructure. The Council is interested in maintaining observer coverage in the future at these higher selection rates, to continue to get high quality data and maintain stakeholder confidence in estimates of bycatch.

EM development fulfills a mixture of sampling goals and policy goals by expanding coverage, while alleviating some logistical issues for vessels that may have a hard time accommodating observers. But increasing coverage rates on vessels carrying EM systems was a secondary goal of EM development. The primary driver of implementing a broad EM program has been the policy objective to maintain stakeholder support by offering alternative monitoring options for fixed gear vessels.

5.3.2 Risk tolerance as a decision factor in assessing fees

The Supplemental EA gap analysis described in Section 5.2.3 provided a discussion of the risk of not having observer data in a specific fishery to estimate discards. Without estimates of discarded catch in a given fishery, managers are compelled to manage using more precautionary approaches for data-limited fisheries. If observer data are not available at the reporting area level, then estimation of discarded catch still occurs at the FMP area level. If observer data were not available at the FMP area level, however, then estimates of discarded catch are not generated in the Catch Accounting System. The Council has consistently placed a priority on the NMFS analysis of catch and bycatch estimation methods for variance.

The Council has requested development of estimation methods for variance as a mechanism to consider whether existing variance for catch and bycatch estimates is within the Council's risk tolerance. NMFS's work to address variance as a factor in Annual Deployment Plan optimization is one example of a response to the need to mitigate risk. Mitigating risks of gaps in the observer data in a specific fishery or reporting area is, to some extent, dependent on stable and reliable random sampling across fleets.

[THIS SECTION MAY BE EXPANDED]

5.3.3 Effect of EM optimization

The first step to understanding the effect of supporting the fixed gear EM program through the observer fee is to better understand EM costs. NMFS intends to present an EM cost evaluation as part of the draft

2019 ADP in September, as this will be the first year that the ADP contemplates allocating funding among EM and observer strata.

While the initial cost of installing equipment on EM vessels is relatively high, vessels that remain in the program (stratum) produce data for multiple years at lower ongoing monitoring costs (primarily maintenance, licensing, and data review). The intention is for EM to be able to achieve a higher selection rate for less cost than the current cost per observer day, even when considering the cost of video data review. This is a major difference between EM and observer monitoring, where the daily cost of observing vessels is fairly stable but relies on a great deal of human capital and frequent travel. Under an optimized EM/observer program it may be possible to achieve the monitoring goals by reducing the average daily cost of monitoring for the program as a whole.

At the same time, existing research suggests a large proportion of small boats (such as those in the fixed gear sector) are not necessarily ideally suited for making EM economically efficient, because they may not carry out enough fishing trips each year to make up for the initial investment 'sunk' costs of EM system installation. There is some evidence to suggest that data is often of lower quality on a vessel's first trip of the year. Furthermore, the voluntary aspect of the current EM program has the potential to introduce a relatively high level of risk in terms of cost and cost savings to the overall Observer Program. If vessels carry EM in one year, but not the next, sunk costs of system installation could be lost. In addition, the future service model for EM is moving from a grant process to a Federal contract beginning in mid-2019, the implications of which remain uncertain.

[THIS SECTION WILL BE UPDATED AS NEW INFORMATION ABOUT EM COSTS BECOMES AVAILABLE]

6 Strawman break points for analysis

In developing the restructured Observer Program, NMFS and the Council recognized that selection rates for any given year are dependent on available revenue generated from fees. The Annual Deployment Plan process allows deployment rates to be adjusted in each year so that sampling can be achieved within financial constraints. The Council has initiated this analysis to include two alternatives that consider raising the fee from 1.25 percent up to 2 percent. For analytical purposes, staff will analyze several breakpoints along the continuum under each alternative and provide a qualitative discussion of the impacts of each in terms of the Council objectives identified in Section 5.3.1. The purpose of identifying breakpoints is to show how much additional funding may be needed overall, or in each gear stratum, to reach different coverage levels, which may help the Council recommend an appropriate action.

Several example reference points for coverage rates were developed by an OAC subgroup in 2017 and discussed by the full committee. The OAC analysis of reference points for coverage provides a reasonable starting point for identifying potential fee breakpoints for analysis in this document. Therefore, it is proposed that a fee adjustment analysis begin with the OAC work and expands upon it. Four of the scenarios that were evaluated include:

a) 15 percent minimum coverage level across all strata: The 2018 ADP uses a flat 15 percent selection rate across all strata to address coverage needs for catch accounting purposes (based on gap analysis).

b) Gear-specific minimum coverage levels: In 2017, the Council requested NMFS staff to investigate whether a different minimum coverage level should apply to different gear strata. The analysis for this option will await the draft 2019 ADP.

c) 2016 rates: The 2016 actual coverage rates of 15/15/28 percent (Hook and Line/Port/Trawl) have been identified as a useful example of a year where the Annual Report showed that the spatial and temporal needs of the catch accounting program were satisfied.

d) 30 percent coverage level across all strata: The Observer Restructuring analysis evaluated a 30 percent coverage level across all strata. Based on the calculations that follow, the 30 percent base rate likely requires an increase to the fee above 2 percent, which exceeds the statutory maximum of 2 percent. This option is included in the calculations, however, solely for informative purposes, as representing a high-end range for considering coverage levels.

A fifth potential scenario (e) was included in the Council's 2017 letter to NMFS Administrative Assistant Chris Oliver, requesting supplementary Federal funding while the Council analyzes options for increasing coverage rates. The Council requested Federal funding to allow the Observer Program to plan for a budget of approximately 5,000 observer at-sea days per year.

e) Budget that allows deployment of 5,000 observer days per year.

   [WE COULD ANALYZE A RANGE OF DAYS; 5,000 WAS USED IN RECENT COUNCIL DOCUMENTS]

Using these five scenarios (a-e, above), the following paragraphs and tables calculate either what the increase in revenue would need to be to accommodate these scenarios, or alternatively, by how much would the cost per day need to be reduced to accommodate the scenario within the budget. The latter target is provided to give some indication of what a target might be for optimizing cost savings attributable to the integration of EM into the observer fee budget.

Table 6-1 illustrates the procedure outlined above for the listed reference points, using the process developed by the OAC subgroup. Note that the coverage rates listed in the reference points were based on trips, translated into sea days, as calculated from data in the 2016 Annual Report (provided in Table 6-2). To calculate the current budget based exclusively on fees, staff began with the 2016 Annual Report, Table 2-1 (p. 24), which shows that approximately $3.77 million in fees were collected from industry in 2017. This estimate was adjusted downward, to account for recent information about the loss of $200,000 in fees due to one non-payment and the uncertainty associated with the amount of sequestered funds and carry over funds actually available in 2018. The adjusted budget of $3.5 million was used in this exercise to reflect the total revenue from the observer fee. Staff then apportioned the annual fee revenue among strata by simply identifying the percentage of total sea days assigned to each stratum under the various reference scenarios and assign the same portion of the annual budget based on fees to those strata. [TABLES 6-1, 6-2, AND 6-3 WILL BE UPDATED WITH CURRENT OBSERVER AND EM COST INFORMATION OVER THE COURSE OF THIS ANALYSIS. THE CURRENT BUDGET WILL BE UPDATED AND A NEW SCENARIO COULD BE ADDED THAT ADJUST TO THE DESIRE FOR 5,000 SEA DAYS.]

Table 6-1 Total cost of monitoring, by gear sector, under five reference point scenarios, and targets to achieve that monitoring

		Calculation of Total Cost of Monitoring for each Reference Point							Targets to achieve monitoring cost	
Stratum	Selection rate	Table 3-3 # trips	Ave Trip length	Calculated total days	Calculated Observed Seadays	% Total Sea Days	Total Cost	**Current budget (adjusted) from fees**	Reduce $/sea day to:	Find additional funding if using 2016 daily rate $1,049
Equal Base Rate										
Pot	15%	1,158	3.99	4,622	693	18%	$727,272	$639,230	$922	$88,041
HAL	15%	2,274	5.93	13,493	2,024	53%	$2,123,124	$1,866,104	$922	$257,019
Trawl	15%	2,518	2.86	7,192	1,079	28%	$1,131,661	$994,666	$922	$136,996
Total		5,950	4.25	25,307	3,796	100%	$3,982,056	$3,500,000	$922	$482,056
Gear Specific Base Rate										
Pot	10%	1,158	3.99	4,622	462	11%	$484,848	$377,601	$817	$107,247
HAL	15%	2,274	5.93	13,493	2,024	47%	$2,123,124	$1,653,496	$817	$469,628
Trawl	25%	2,518	2.86	7,192	1,798	42%	$1,886,102	$1,468,903	$817	$417,199
Total		5,950	4.25	25,307	4,284	100%	$4,494,073	$3,500,000	$817	$994,073
2016 rates										
Pot	15%	1,158	3.99	4,622	693	15%	$727,272	$512,903	$740	$214,369
HAL	15%	2,274	5.93	13,493	2,024	43%	$2,123,124	$1,497,318	$740	$625,806
Trawl	28%	2,518	2.86	7,192	2,014	43%	$2,112,434	$1,489,779	$740	$622,655
Total		5,950	4.25	25,307	4,731	100%	$4,962,829	$3,500,000	$740	$1,462,829
30% equal base rate										
Pot	30%	1,158	3.99	4,622	1,387	18%	$1,454,543	$639,230	$461	$815,313
HAL	30%	2,274	5.93	13,493	4,048	53%	$4,246,247	$1,866,104	$461	$2,380,143
Trawl	30%	2,518	2.86	7,192	2,158	28%	$2,263,322	$994,666	$461	$1,268,657
Total		5,950	4.25	25,307	7,592	100%	$7,964,113	$3,500,000	$461	$4,464,113

Table 6-2 Number of trips and number of trip days in 2016, by gear strata.

2016	Number of trips	Number of trip days	Days/trip
Trawl	2,518	7,192	2.86
Hook and Line	2,274	13,493	5.93
Pot	1,158	4,622	3.99
Total	5,950	25,307	4.25

Source: 2016 Observer Program Annual Report.

Table 6-3 presents a preliminary analysis of the percentage fee adjustments that would be required to meet additional funding needed under the scenarios, based on the 2016 daily rate of $1,049/observer day.

Table 6-3 Fee needed to meet additional funding as required under four scenarios, based on $1049 daily observer rate and the projected 2019 budget, if the fee is equal across partial coverage fishery sectors (Alternative 2), or differs (Alternative 3).

Stratum	Selection rate	Total cost for reference point	Current budget (adjusted) from fees	Additional funding needed if using 2016 daily rate $1,049	**Alternative 2 Increase fee equally**	**Alternative 3 Increase fee by sector to meet need**	% difference between options
Equal Base Rate							
Pot	15%	$727,272	$639,230	$88,041	1.42%	1.58%	11.07%
HAL	15%	$2,123,124	$1,866,104	$257,019	1.42%	1.40%	-1.29%
Trawl	15%	$1,131,661	$994,666	$136,996	1.42%	1.41%	-0.94%
Total		$3,982,056	$3,500,000	$482,056	1.42%	1.42%	
Gear Specific Base Rate							
Pot	10%	$484,848	$377,601	$107,247	1.61%	1.65%	2.89%
HAL	15%	$2,123,124	$1,653,496	$469,628	1.61%	1.53%	-4.60%
Trawl	25%	$1,886,102	$1,468,903	$417,199	1.61%	1.73%	8.02%
Total		$4,494,073	$3,500,000	$994,073	1.61%	1.61%	
2016 rates							
Pot	15%	$727,272	$512,903	$214,369	1.77%	2.05%	15.79%
HAL	15%	$2,123,124	$1,497,318	$625,806	1.77%	1.63%	-8.34%
Trawl	28%	$2,112,434	$1,489,779	$622,655	1.77%	1.97%	11.25%
Total		$4,962,829	$3,500,000	$1,462,829	1.77%	1.77%	
30% equal base rate							
Pot	30%	$1,454,543	$639,230	$815,313	2.85%	4.30%	51.23%
HAL	30%	$4,246,247	$1,866,104	$2,380,143	2.85%	2.68%	-5.95%
Trawl	30%	$2,263,322	$994,666	$1,268,657	2.85%	2.72%	-4.35%
Total		$7,964,113	$3,500,000	$4,464,113	2.85%	2.85%	

In this example the 30 percent equal base rate requires a fee value above 2 percent (ranging between 2.85 and 4.3 percent; Table 6-3). Since the fee can only be increased to a maximum of 2 percent, as stipulated in the MSA, this makes it unlikely that a 30 percent equal base rate is possible.

Table 6-3 serves as a starting point for how Alternatives 2 and 3 might impact how fees would need to be adjusted to account for additional coverage at the four example levels. As described in the 2010 restructuring analysis, everyone in the fishery benefits from getting good data, therefore there is justification for everyone contributing to the cost of monitoring. At the same time, some sectors have more complex or time-sensitive data needs than others, so an argument can be made that these sectors should pay a higher cost for monitoring. Alternatives 2 and 3 reflect these different perspectives. Alternative 2 shows the fee percentage change if the fee is increased equally for all sectors, as the 1.25 percent fee is applied in the status quo. Alternative 3 adjusts the fee that is over and above the current 1.25 percent differentially by sector. A final column is included to show the difference between the two options.

The analysis displayed in Table 6-3 is meant to be a justification for selecting break points in the range of fee adjustment, for analysis of the alternatives included in this document. These scenarios help provide scale for assessing the appropriate level for adjusting the observer fee. The analysis further provides a starting point for evaluating the how the integration of EM vessels may affect cost targets for fixed gear vessels.

While the OAC subgroup focused on deployment reference points, we propose to use a similar methodology to assess different fee break points. Based on the analysis above we propose to analyze break points for the fee in this analysis using the same methodology, but with updated fee projections. Table 6-4 details some breakpoints that could be used in the analysis. Alternative 1 would be analyzed using a 1.25 percent fee across all strata, including whether and by how much this rate fails to meet the example selection rates in Table 6-3. Alternative 2 would be analyzed across (three) different break points—1.42, 1.61, and 1.77 percent—corresponding to the three sets of selection rates in Table 3-5. The three break points for Alternative 2 would be analyzed across the Pot, Hook and Line, and Trawl strata equally. Alternative 3 would be analyzed across the (nine) different break points—1.40, 1.41, 1.53, 1.58, 1.63, 1.65, 1.73, 1.97, and 2.00[8] percent. The nine break points proposed in Table 3-6 for Alternative 3 correspond to separate calculations of a fee percent for each strata and each of the nine example selection rates from Table 6-3. All alternatives will be analyzed using fee revenue estimates for 2018 and 2019.

Table 6-4 Strawman break points for this analysis

	Alternative 1	Alternative 2	Alternative 3
Fee revenue % to analyze	1.25%	1.42% 1.61% 1.77% 2%	Pot – 1.58%, 1.65%, 2% Hook and line – 1.4%, 1.53%, 1.63%, 2% Trawl – 1.41%, 1.73%, 2% Jig – 1.25%

Table 6-4 presents one set of potential break points, but alternative break points could be chosen from simply analyzing a range of fee projections at regular intervals. For example, projections could be calculated at intervals of .05 or .1 percent, between 1.25 and 2 percent.

[8] 2.05 as listed in Table 6-3 is not possible in reality, so 2.00 would be used instead.