DRAFT FOR INITIAL REVIEW

**Environmental Assessment/Regulatory Impact Review
for Proposed Amendments
to the Fishery Management Plans for Groundfish of the Bering Sea / Aleutian Islands Management Area and for Groundfish of the Gulf of Alaska**

Integrating Electronic Monitoring on Pollock Catcher Vessels using Pelagic Trawl Gear and Tender Vessels in the North Pacific Observer Program

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Abstract: This Environmental Assessment/Regulatory Impact Review analyzes proposed management measures that would apply exclusively to pollock catcher vessels (CVs) using pelagic trawl gear and tender vessels in the North Pacific Observer Program. The measures under consideration include alternatives that would allow an electronic monitoring (EM) system to supplement existing observer coverage. The purpose of this action is to advance cost efficiency and compliance monitoring through improved salmon accounting and reduced monitoring costs.

List of Acronyms and Abbreviations

Acronym or Abbreviation	Meaning
AAC	Alaska Administrative Code
ABC	acceptable biological catch
AGDB	Alaska Groundfish Data Bank
ADF&G	Alaska Department of Fish and Game
ADP	Annual Deployment Plan
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
AI	Aleutian Islands
AIS	A.I.S. Inc.
AKFIN	Alaska Fisheries Information Network
AOI	Alaska Observers, Inc.
BS	Bering Sea
BSAI	Bering Sea and Aleutian Islands
CAS	Catch Accounting System
CDC	Center for Disease Control
CDQ	Community Development Quota
CEQ	Council on Environmental Quality
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
CMCP	Catch Monitoring and Control Plan
CGOA	Central Gulf of Alaska
COAR	Commercial Operators Annual Report
Council	North Pacific Fishery Management Council
CP	catcher/processor
CV	catcher vessel
DFA	directed fishing allowance
DPS	distinct population segment
E.O.	Executive Order
EA	Environmental Assessment
EA/RIR	Environmental Assessment/Regulatory Impact Review
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
EM	electronic monitoring
ER	electronic reporting
ESA	Endangered Species Act
ESU	endangered species unit
FMA	Fisheries Monitoring and Analysis
FMAC	Fisheries Monitoring Advisory Committee
FMP	fishery management plan
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRFA	Final Regulatory Flexibility Analysis
ft	foot or feet
GOA	Gulf of Alaska
IRFA	Initial Regulatory Flexibility Analysis
IPA	Incentive Plan Agreement
JAM	jeopardy or adverse modification
lb(s)	pound(s)
LAPP	limited access privilege program
LEI	long-term effect index
LLP	license limitation program
LOA	length overall
m	meter or meters
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MRA	Maximum retainable amount
MSA	Metropolitan statistical area
MSST	minimum stock size threshold
t or mt	tonne, or metric ton
MTC	Midwater Trawlers Cooperative
NAICS	North American Industry Classification System
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fishery Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NPOP	North Pacific Observer Program
NPPSD	North Pacific Pelagic Seabird Database
NFWF	National Fish and Wildlife Foundation
Observer Program	North Pacific Groundfish and Halibut Observer Program
OMB	Office of Management and Budget
PBR	potential biological removal
PSC	prohibited species catch
PPA	Preliminary preferred alternative
PRA	Paperwork Reduction Act
PSEIS	Programmatic Supplemental Environmental Impact Statement
PSMFC	Pacific States Marine Fisheries Commission
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future action
RIR	Regulatory Impact Review
RPA	reasonable and prudent alternative
SAFE	Stock Assessment and Fishery Evaluation
SAR	stock assessment report
SBA	Small Business Act
Secretary	Secretary of Commerce
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
SRKW	Southern Resident killer whales
TAC	total allowable catch
UCB	United Catcher Boats
U.S.	United States
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMP	Vessel monitoring plan
VMS	vessel monitoring system
WGOA	Western Gulf of Alaska

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Executive Summary

This Environmental Assessment/Regulatory Impact Review (EA/RIR) analyzes management measures under consideration by the Council that would apply exclusively to pollock CVs using pelagic trawl gear and tender vessels in the North Pacific Observer Program. The measures under consideration include alternatives that would allow an electronic monitoring (EM) system to supplement existing observer coverage. The purpose of this action is to improve catch accounting for salmon, advance cost efficiency, and monitor for compliance with discard restrictions.

The development of the Trawl EM program has evolved as part of a cooperative research plan developed by the Trawl EM Committee through pilot projects in 2018 and 2019 and under an exempted fishing permit (EFP 2019-03)[1] which has expanded participation since 2020. Each phase of the program benefitted from a collaborative process and open communication between project partners, which includes agency staff, EFP permit holders (United Catcher Boats, Alaska Groundfish Data Bank, Inc., and Aleutians East Borough), EM service providers (Saltwater Inc., and Archipelago Marine Research Ltd.), video reviewers (Saltwater Inc., and Pacific States Marine Fisheries Commission), and observer providers (AIS Inc., Alaskan Observers Inc., and Saltwater Inc.). Lessons learned through this process are incorporated into this development of a regulated program.

Purpose and Need

The Council adopted the following purpose and need statement to originate this action in June 2021.

To carry out their responsibilities for conserving and managing groundfish resources, the Council and NMFS must have high quality, timely, and cost-effective data to support management and scientific information needs. In part, this information is collected through a fishery monitoring program for the groundfish fisheries off Alaska. While a large component of this monitoring program relies on the use of human observers, the Council supports integrating electronic monitoring and reporting technologies into NMFS North Pacific fisheries-dependent data collection program, where applicable, to ensure that scientists, managers, policy makers, and industry are informed with fishery-dependent information that is relevant to policy priorities, of high quality, and available when needed, and obtained in a cost-effective manner.

The Council and NMFS have been on the path of integrating technology into the fisheries monitoring systems for many years, with electronic reporting systems in place, and operational EM in some fisheries. An EM program for compliance purposes on pelagic pollock trawl catcher vessels and tenders both delivering to shoreside processors will obtain necessary information for quality accounting for catch including bycatch and salmon PSC in a cost-effective manner, and provide reliable data for compliance monitoring of a no discard requirement for salmon PSC. This trawl EM program has the potential to advance cost efficiency and compliance monitoring, through improved salmon accounting and reduced monitoring costs.

Regulatory change is needed to modify the current retention and discard requirements to allow participating CVs to maximize retention of all species caught (i.e., minimize discards to the greatest extent practicable) for the use of EM as a compliance tool on trawl catcher vessels in both the full and partial coverage categories of the Observer Program and meet monitoring objectives on trawl catcher vessels in the Bering Sea (BS) and Gulf of Alaska (GOA) pelagic pollock fisheries.

[1] The EFP application, permits, and reports can be found under the heading "Electronic Monitoring - Trawl Catcher Vessels" on the NMFS website: https://www.fisheries.noaa.gov/alaska/resources-fishing/exempted-fishing-permits-alaska

Alternatives

The Council adopted the following three alternatives and two options (which apply only to Alternative 3) for analysis in June 2021.

Alternative 1, No Action

EM would not be implemented and catch monitoring would be provided by at-sea observers.

Alternative 2

Electronic Monitoring is implemented on pelagic trawl pollock catcher vessels and tenders delivering to shoreside processors in the Bering Sea and Gulf of Alaska.

Alternative 3

Electronic Monitoring is implemented on pelagic trawl pollock catcher vessels delivering to shoreside processors and not on tenders.

Option 1: Bering Sea

Option 2: Bering Sea and Gulf of Alaska

Under Alternative 1, CVs in the BS are in the full coverage observer category and have observer monitoring associated with every trip. Observers assigned to vessels disembark the vessels at the offload and complete their data collection for salmon PSC at the processing plants, and are assisted by the observers stationed at the plant. Effectively, two observers (at least) are therefore working to account for salmon PSC – one on each vessel and at least one at the plant. CVs in the GOA are in the partial coverage observer category and are randomly selected to be monitored by an at-sea observer on a proportion of trips based on the sampling design in the Annual Deployment Plan (ADP). There are no observers stationed at processing plants in the GOA, however observers assigned to vessels disembark the vessels at the offload and complete their data collection for salmon PSC at the processing plants.

Under Alternatives 2 and 3, EM systems are implemented on CVs and tenders delivering to shoreside processors in the BS and GOA. Participation in the trawl EM program would be voluntary. EM systems include four primary components: cameras, sensors, the control center, and hard drives. The typical EM camera setup includes three cameras that are placed to show all areas of the deck and eliminate blind spots. Additional cameras are placed as necessary to meet data needs and accommodate unique setups. The EM system integrates data from a suite of sensors, including GPS, hydraulic pressure, and drum rotation monitors to determine set and haul positions and collect effort data. The control center records video and sensor data onto the hard drives, which are removed after offload and mailed to the NMFS-specified EM reviewer for imagery review.

The CV operators would ensure video recording is initiated two hours prior to deploying fishing gear on a Trawl EM trip and/or prior to transfer of catch onto a participating tender vessel. EM cameras would be required to be operational and recording as established in the vessel monitoring plan (VMP). During pre-implementation, the VMPs required cameras to record until completion of offload. CVs participating in the Trawl EM Program would be required to operate their EM systems on every trawl EM trip. During pre-implementation, every haul on every trip was reviewed. Additionally, all catcher vessel deliveries to tenders were reviewed. Video review in the trawl EM program is used for compliance monitoring and is integral to ensuring that vessels are complying with program requirements. The use of EM under the compliance monitoring approach means that EM video data does not directly feed into catch accounting

or stock assessments. Instead, catch accounting uses industry reported data (verified through EM) and data collected by shoreside observers. Maximized retention ensures that unsorted catch will be delivered and sampled by shoreside observers, allowing for non-biased data to be collected at the trip level by shoreside observers at the processing plant.

EM systems were redesigned for use on tender vessels to monitor CV offloads from CVs and ensure unsorted catch from EM CVs is delivered to the shoreside processing plant where it can be sampled by shoreside observers. EM review of tenders focuses on the transfer of catch at the delivery of fish to the tender and at tender offload at the shoreside processing plant.

Under Alternatives 2 and 3, the responsibilities associated with the at-sea collection of species composition samples, PSC data collection, biological samples, and other sampling assigned by the Alaska Fisheries Science Center (AFSC) normally conducted by at-sea observers (on non EM trips) will be completed by observers stationed at the shoreside plant. For CVs in the BS, sampling will continue to occur on every offload. Processing plants participating in the trawl EM program in the BS will require additional observers to account for the removal of vessel observers. In the GOA, the observer coverage rates to monitor deliveries from CVs and tender vessel offloads would be determined by NMFS through the ADP. Processing plants participating in the trawl EM program in the GOA will require shoreside observers, a new requirement under the trawl EM program. To support shoreside observer collection of data, processing plants will be required to have a catch monitoring and control plan. Alternative 3 excludes tender vessels from the EM program and gives the Council the flexibility to allow EM only in the BS (option 1) or in the BS and GOA (option 2). For the sectors included (depending on the option selected), the use of EM would be operationally equivalent to Alternative 2.

Environmental Impacts

No significant environmental impacts are expected on the majority of resources listed in Table 4-1[2] because the potential switch from human observers to a regulated Trawl EM Program would not result in changes in harvest, gear type, timing of fishing, or location of fishing. Some impacts of the potential switch from human observers to EM may affect some data collection on marine mammals, seabirds, and social and economic resources. Social and economic resources are discussed in the RIR, Section 5.

Target Species (Alaska pollock)

Under Alternatives 2 and 3, the primary target species is Alaska pollock. The potential impacts of Alternative 2 or 3 would be minimal. Fishing times and locations would not change and the pollock stocks would not otherwise be affected. The impact is limited to the difference in spatial and temporal data collection. The effects of the action alternatives on pollock would include a loss of some spatial and temporal resolution of the data used for stock assessment. This is because information on species composition, length, and age composition can only be collected at the resolution of the delivery, which will change from haul-level resolution under status quo to the trip-level resolution under Alternatives 2 and 3. Trip-level resolution contains catches from two or more hauls done in different places and times. Some of these data impacts can be mitigated by using delivery and logbook data to back-calculate to haul data.

Non-Target Species

Under Alternatives 2 and 3, lack of haul-level effort and fishing location information will likely have little impact on stock assessments for Pacific cod and Pacific ocean perch, as long as catch can be identified to the NMFS management area resolution. Some of these data impacts can be mitigated by using delivery and logbook data to estimate haul data.

[2] groundfish, prohibited species, ecosystem component species, marine mammals, seabirds, habitat, ecosystem, and social and economic resources

With regard to sharks, Alternative 2 has the potential for increased accuracy of large shark catch estimates from the pollock pelagic trawl (PTR) CV fleet. Differences in spatial and temporal data resolution are not a concern for shark stock complexes because they are managed at the FMP level. The data recorded in the trawl EM CV logbooks will provide new information for this stock assessment. The inclusion of tender vessels is not a concern for this stock assessment. Under Alternative 3, Option 1 (Bering Sea only), there is likely no effect on data collection of sharks because ~50% of large shark catch in the pollock PTR fleet results from CVs in the full coverage category (i.e., 100% at-sea observer coverage) and under Alternative 3, Option 1, these vessels will be 100% sampled by shoreside observers. The GOA is the area that this action will likely have the greatest effect on the shark stock complex assessment. All of the large shark catch in the pollock PTR fleet in the GOA is from CVs, which are in the partial coverage category (i.e., at-sea observers deployed on randomly selected trips). For GOA CVs, under Alternative 3, Option 2, the Alaska Fisheries Science Center (AFSC) Fisheries Monitoring and Analysis Division (FMA) (referred to as AFSC FMA) will set the rate of trips that will be randomly sampled by shoreside observers (currently 30% of EM trips in the EM EFP). Therefore, Alternative 3, Option 2 (BS and GOA) may result in more accurate estimates of catch, as well as advancements in the data available for stock assessment.

Marine Mammals

None of the alternatives would change the management of the fisheries, the location of the fisheries, fishing effort, or the marine mammal protection measures in place. However, a switch to EM may affect information flow into marine mammal stock assessments in several ways.

Under Alternative 1, NMFS places at-sea observers on trawl vessels. Observers record the species, number, and types of interaction (including location, date and time, interaction type, gear type, catch composition, and fishing depth) with marine mammals, and record the length, collect biological specimens, take photographs and videos, and record disposition (e.g., dead, released alive) of marine mammals caught in the gear. Tissue samples are particularly important for obtaining genetic confirmation of species identification, especially for similar, closely related species. Alternative 1 would leave at-sea observer coverage in place and data collected by at-sea observers would continue according to status quo. In addition, the terms and conditions of the 2014 biological opinion would continue to be met.

Under Alternatives 2 and 3, trawl vessels would be able to carry EM instead of an at-sea observer. Under Alternatives 2 and 3, a loss in data could occur, however some data could be gained as well. The types of data that could be lost include: body measurements, tissue samples, and other biological specimens. The loss of tissue samples is particularly critical because genetic information, in tandem with photo ID, can determine which stock an animal belongs to. EM cannot provide this information and under the Marine Mammal Protection Act (MMPA), fishermen are not allowed to collect biological samples from marine mammals. Alternatively, EM may provide more coverage in some instances. For example, under status quo, when gear is retrieved, an at-sea observer is not always looking or may not have the correct visual angle to be able to ID an animal to a species level. Under Alternatives 2 and 3, EM records video from multiple locations, which may provide more opportunity to capture marine mammal interactions. Additionally, EM video allows for pausing and rewinding, allowing an EM reviewer many chances to review a marine mammal interaction and consult with experts, an ability that at-sea observers do not have.

Seabirds

In contrast to the situation with marine mammals and MMPA requirements, under all of the alternatives if no observer is onboard, unidentified albatross and eider carcasses should be retained by vessel crew for future identification, or, at minimum, pictures documenting the species should be taken for verification, a report will be filled out, and the carcass processed.

Given that overall takes of seabirds in this fishery are relatively uncommon and because this action is not expected to result in changes to the timing and prosecution of the fishery, the effects on seabirds under

any of the Alternatives are not expected to be significant and are not expected to occur beyond the scope analyzed in previous NEPA and ESA documents.

Prohibited Species

Alternatives 2 and 3 would not change fishing behavior, rather the action alternatives would focus on improving accounting of groundfish catch and PSC estimation using EM systems. Therefore, there should be little to no impact on PSC rates as a result of any alternative. There would be limited change to how the agency estimates PSC compared to status quo. The principle change would be where data collection occurs, which would allow for more precision in estimates.

Alternatives 2 and 3 would likely increase accountability of PSC. EM systems would be used to verify compliance with retention requirements, allowing for PSC data to be collected during offload. Under Alternative 1 - status quo, data on salmon PSC are primarily collected by the at-sea observer during offload (i.e., for the partial coverage observer category in GOA, this means only on trips where an at-sea observer is onboard). Data for other PSC, including Pacific halibut, crab species, and Pacific herring, are collected from at-sea observers onboard the vessel. Under Alternatives 2 and 3, data from all PSC species will be collected during offload of trips by shoreside observers. This may result in less estimation variance since all PSC will be enumerated shoreside and PSC estimates will no longer depend on sample size limitations of observer PSC data collections on CV (at-sea samples).

Salmon Accounting

In the BS, Amendment 91 and Amendment 110 implemented PSC limits for salmon and included multiple monitoring requirements to increase accountability of PSC and precision of PSC estimation on salmon. Under Alternatives 2 and 3, the EM systems help support these PSC accounting requirements and the combination of current regulation and the EM system help improve accountability of PSC. There is no change to the process in which salmon PSC data are collected or how CAS estimates salmon PSC in the Bering Sea under any alternative. EM systems provide more verification that all salmon are retained and available to be counted regardless of whether the observer is on deck during dumping of catch.

In the GOA, Amendment 93 required retention of all salmon by vessels participating in pollock fisheries until the catch is delivered. If the vessel carried an at-sea observer, the at-sea observer would have the opportunity to count the number of salmon and to collect biological samples from the salmon during offload. Only vessels selected to have an at-sea observer, and delivering directly to a shoreside processing facility, had accountability that all salmon were retained and data from these vessels are used to estimate PSC. Shoreside accounting of salmon PSC from vessels delivering to a tender vessel was not possible because there was no way to confirm salmon were retained until offload to a shoreside processing facility. Vessels that delivered catch to tender vessels had PSC estimates derived from at-sea samples that can have large variance. EM provides an option to improve PSC estimation for vessels that deliver catch to tender vessels, allowing verification that all salmon were retained until available to be enumerated by a shoreside observer.

In the GOA, under Alternatives 2 and 3, EM systems and 100% review of video provides the accountability needed to allow for salmon PSC accounting during offload for pollock trips by vessels participating in Trawl EM. Alternative 2 allows for tender vessels to participate in Trawl EM and provide the accountability needed to verify no salmon were discarded. Alternative 2 would enable the collection of salmon PSC data from tender vessel offloads, improving PSC estimation for vessels that deliver catch to tender vessels.. Based on lessons learned during pre-implementation, in order to support observer collection of PSC data, GOA processors will be required to have a CMCP that is designed with PSC estimation and accounting in mind. Overall, salmon PSC estimation is improved with the implementation of an EM option under Alternatives 2 or 3.

Estimates of At-Sea Discards

On pelagic trawl vessels, particularly those targeting pollock, discards are uncommon, with most catch put directly into the vessel's hold. Under Alternative 1, status quo, at-sea discard estimates are derived from at-sea observer estimates of retention during their species composition sampling. At-sea observers collect species composition and record the percentage of catch of each species retained. On trawl CVs, these estimates sometimes lack precision because there can be many points of discard on a CV and it may be difficult for an at-sea observer to track all discarded catch, particularly while they are also collecting species composition samples.

Under Alternatives 2 and 3, at-sea discard is reduced due to maximized retention requirements. Any at-sea discard is obtained from information collected by vessel operators in their logbook. Vessel operators are required to report any at-sea discards in their logbook. These logbook pages are provided to the shoreside processor and entered into eLandings. Under Alternatives 2 and 3, vessels would get discard estimates specific to their vessel instead of a fleet wide rate applied to them. Vessel logbook estimates are verified by EM video review. Video review can also capture discard events not reported by the vessel operator.

Cost Allocation and EM Fee Implementation

The NMFS Procedural Directive 04-115-02, Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries (Cost Allocation PD) requires industry to be responsible for sampling costs of Council-initiated EM options. The Cost Allocation PD considers EM equipment purchase, EM field services, and EM review and data storage as sampling costs and requires industry to be responsible for these costs. Under both Alternatives 2 and 3, the responsibility to purchase EM equipment and maintain the EM systems with annual servicing would be a vessel operator cost. To cover the cost of EM video review and data storage, NMFS recommends a different approach in the GOA and BSAI.

Under all alternatives, vessels using pelagic trawl gear in the GOA will remain part of the partial coverage category as it relates to fees. The partial coverage category is funded through a system of fees collected from fishery participants (vessels and processing plants) under authority of Section 313 of the Magnuson-Stevens Act. Under Alternatives 2 and 3, NMFS would use partial coverage fees to procure EM review and data storage, in alignment with the Cost Allocation PD.

Under Alternative 1, status quo, BSAI vessels are part of the full coverage category and not subject to the partial coverage observer fee. Observer coverage in the full coverage category is industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers. The vessel owner and shoreside operators are responsible for sourcing and paying for an observer directly from certified observer provider companies.

Under Alternatives 2 and 3, NMFS will maintain alignment with the Cost Allocation PD, by requiring industry to be responsible for the costs of EM review and data storage. In the BSAI, NMFS recommends the use of fee authority under Section 313 of the MSA. NMFS would develop a new "BSAI EM Review Fee", an equitable and transparent fee system to cover the costs of data review, storage, and transmission of data for BSAI vessels opting into trawl EM under Alternatives 2 or 3. During review of EM video, EM reviewers will differentiate between GOA and BSAI reviews, allowing the agency to track actual costs for the BSAI review. The annual cost of EM review, data storage and transmission will then be divided among vessels that opt-in and are selected to participate in the BSAI trawl EM option. The agency would use the pollock history assigned to participating vessels to divide the cost equitably among participants. Billing would occur to vessel operators and failure to pay the fee could result in removal from the Trawl EM program in the following year. This approach removes many of the complexities related to implementing the fee as part of the eLandings systems, who collects fees, and calculation of ex-vessel

value, etc. It also allows for a different fee timeline to support operational efficiency and improve transparency in the collection and use of fee to support Trawl EM in the BSAI. Table E-1 provides a summary of the costs associated with the Trawl EM program and the cost allocation among different funding sources. The following sections provide more detail on these costs and the potential funding sources under the proposed alternatives.

Table E-1 Summary of the Trawl EM cost categories and allocation among proposed funding sources

Cost Category (per NMFS Procedure 04-115-02)	Trawl EM Cost	Responsible Parties	Funding Source
Sampling Cost	Partial Coverage Shoreside Observers (GOA)	Contracted Observer Provider (currently AIS)	Partial Coverage Observer Fee
Sampling Cost	Full Coverage Shoreside Observers (BSAI -AFA)	Shoreplant operator and Full Coverage Observer Providers	Participating Processor
Sampling Cost	Purchase EM Equipment	Vessel Owner/Operator and EM service provider	Participating catcher vessel
Sampling Cost	EM Field Services/Maintenance	Vessel Owner/Operator and EM service provider	Participating catcher vessel
Sampling Cost	Video Review	EM Review service provider	Partial Coverage Observer Fee - GOA
			New BSAI EM Review Fee
Sampling Cost	Data Storage	EM Review service provider	Partial Coverage Observer Fee - GOA
			New BSAI EM Review Fee
Administrative Cost	Annual Deployment Plan	NMFS	NMFS
Administrative Cost	CAS / Data management	NMFS	NMFS
Administrative Cost	ODDS, EM opt in / out process	NMFS	NMFS
Administrative Cost	Contract / grant development and management	NMFS	NMFS
Administrative Cost	Video review training	NMFS	NMFS

Opt-in to the Trawl EM Program

NMFS would establish an annual process in Federal regulations to opt-in to the Trawl EM selection pool by the annual deadline of November 15, using the Observer Deploy and Declare system (ODDS) system.

In the BS, CVs participating in the Trawl EM EFP were required to have EM on 100% of pelagic trawl pollock trips and all EM deliveries were sampled shoreside by observers. Under all alternatives, all Bering Sea participating CV vessels will continue to be under full coverage requirements: all trips will be monitored at-sea for compliance with maximum retention requirements using EM and all deliveries will be sampled by shoreside observers.

In the GOA, CVs participating in the Trawl EM EFP were provided the flexibility to opt-in on a trip-by-trip basis. For each trip, GOA CVs registered in ODDS and indicated whether they were going on a partial coverage EM trip or a trip with an at-sea observer. The primary reasons to consider trip-by-trip opt-ins during pre-implementation were to maintain flexibility to participate in other fisheries and flexibility to reduce shoreside observer costs when the pace of pollock fishing is reduced.

NMFS recognizes the benefits that maximum flexibility of the trip-by-trip opt-in approach provided to GOA participants. However, this flexibility also creates uncertainty in ADP process and therefore less cost efficiency, and is likely to decrease efficiency of observer resources in partial coverage. Trip-by-trip opt-in also increases confusion for shoreside observers, which is another sources of cost inefficiency and causes issues with data quality. Therefore, under Alternatives 2 and 3, NMFS recommends an annual opt-in with a requirement that vessels that choose to participate in Trawl EM would be required to operate their EM systems and follow all requirements on all trips where they use non-pelagic trawl year. NMFS expects to continue to work collaboratively with industry to develop solutions that may provide some flexibility to GOA vessels and limit negative impacts to efficient use of observer resources.

Shoreside Processing Plant Elements

Under Alternatives 2 and 3, shoreside processing plants that would be taking EM Trawl pollock deliveries would need to put in place a Catch Monitoring and Control Plan (CMCP) prior to accepting EM deliveries. A CMCP is a plan submitted by the owner and manager of a processing plant, and approved by NMFS, detailing how the processing plant will meet the catch monitoring and control standards to be determined by federal regulations. The BSAI processing plants already have a CMCP in place for the AFA pollock and salmon sorting processes, but the GOA shoreside processing plants do not at this time. Under a regulated program, the CMCP requirements will include elements to enable an observer's ability to collect and process random samples and collect the required prohibited species data.

The BSAI processing plants already have CMCPs in place for the AFA pollock and salmon sorting processes, but the GOA does not have any at this time. Based on feedback from observers there will be minimal updates to the BSAI observation areas, but GOA shoreside processing plants will have to work with NMFS to accommodate the observers sampling at the plants. Under Alternatives 2 and 3, CMCPs would designate an observation area within the processing plant where a shoreside observer may collect composition and biological samples, and monitor the flow of fish during a delivery. NMFS will establish a specific list of attributes that will be required for each observation area in Federal regulations for participating shoreside plants. The owner and manager of the shoreside plant must ensure that the observation area meets the outlined specifications.

In the GOA and the BSAI communication between observers, CVs, and shoreside processing plant personnel has proven to be imperative to ensure that reliable and adequate data are collected. Without frequent and clear communication, shoreside observers would be unable to collect data required for fisheries management. Under Alternatives 2 and 3, CMCPs would include information about the necessary communication equipment needed by shoreside observers to facilitate communications within the plant. The plant owner must ensure that the plant manager provides shoreside observers with the same communications equipment used by plant staff.

Regulatory Impact Review

The RIR provides information that is intended to allow the Council to recommend, the Secretary to approve, and NMFS to implement a voluntary EM program for the directed BS and GOA inshore pelagic pollock fisheries. The proposed EM program is intended to allow fisheries managers to ensure that CV operators are complying with at-sea retention requirements, improve monitoring and accounting of salmon incidentally harvested by trawl vessels using pelagic gear in the pollock fisheries, and reduce monitoring costs in the pollock fishery.

Regulatory changes are necessary to use EM as a compliance tool on trawl CVs in both the full and partial coverage categories of the Observer Program and meet monitoring objectives. To consider the impacts of the proposed regulatory changes, the Council has selected a No Action Alternative as well as action alternatives that would allow EM to be used on trawl CVs in the pelagic pollock fishery in the BS with options to allow EM to be used on trawl CVs in the GOA and on tender vessels that are used to deliver pollock harvested with pelagic gear to shoreside processors. There is no option to allow CVs that are directed fishing for pollock in the AI to use EM. The directed AI pollock fishery is currently allocated as CDQ and as an allocation to the Aleut Corporation. However, for a variety of reasons described in the RIR the AI pollock fishery has been historically reallocated for harvest in the BS. If the Council wished to allow the use of EM on AI CVs when harvesting pollock using pelagic gear, the alternatives would need to be amended. The Council's motion specifies that EM may be used in the BS shoreside pelagic pollock fisheries. Staff interprets the Council's motion to mean that if CDQ pollock were harvested by trawl CVs for delivery shoreside in the future, CVs would be allowed to use EM on those trips. CVs delivering unsorted codends to motherships are not required to have observers onboard when fishing pelagic pollock, since all fish are observed on the mothership. EM will not be necessary on CVs operating in this mode for the same reasons. Observer coverage requirements for motherships is not modified under this action.

Nothing in the proposed action is intended to modify certain regulations in the shoreside delivery pelagic pollock fishery. For example, GOA pollock trip limits, salmon PSC retention requirements and limits in the BS and GOA, fishing seasons, and gear limitations (pollock may only be harvested in the directed fishery in the BS with pelagic gear) will not change. Other regulations would be modified such as stationing shoreplant observers in GOA plants when they are taking deliveries of EM trip pollock, requirement for vessels less than 60ft. LOA to complete logbooks, complying with specific EM requirements, altering discard/retention requirements, etc.

If the voluntary EM program is implemented, observers at shoreside processors would still be necessary and certain duties that were performed by at-sea observers will be shifted to shoreplant observers. These duties are described in detail in the EA, and will result in shoreside processor observers being placed in plants that take GOA pollock deliveries to enumerate salmon bycatch and take biological samples on selected trips. GOA shoreplant observers would be funded through the 1.65 percent ex-vessel fee paid for deliveries from the partial observer coverage fisheries. It is assumed that a coverage rate of 30 percent of the GOA trips will be sampled, but the actual rate will be established annually in the ADP. The number of shoreplant observers that take BS pollock deliveries would also increase to ensure that all salmon on all trips are enumerated. These plants are currently in the full coverage category and are funded using the pay-as-you-go model. Overall, the analysis assumes that:

- Dutch Harbor and Akutan shoreside processors receiving pollock EM deliveries of AFA pollock will need a range of 3-5 observers per plant (a minimum of 2 per shift), depending on the number of vessels participating in EM.
- Shoreside processors (not in Dutch Harbor or Akutan) receiving AFA pollock deliveries will need a range of 2-3 observers per plant.
- GOA (or non-AFA) shoreside processors receiving pollock will need a range of 3-4 observers at Trident-Kodiak, and 2-3 observers to cover the other plants.

At-sea observer requirements are waived if the CV is in the EM program. EM will ensure that the CV operator is in compliance with the retention and discard requirements established for the fishery. If a CV is not in the EM program it will need to have the required at-sea observer coverage for the area they are fishing (partial coverage in the GOA and full coverage in the BS).

There are numerous challenges and uncertainties associated with estimating monitoring costs for observer programs and EM programs as described in the analysis. To compare potential costs of Alternatives 1 and 2, analysts estimated a range of potential costs for at-sea monitoring that would have occurred on vessels that participated in the trawl EM EFP in 2021 and compared that to reported costs of the 2021 EFP, including estimated costs of the shoreside observer component. This allows for comparison of costs at current levels of effort and participation in the EM program. Differing levels of participation, effort, scope and program design specifics will entail very different cost structures, impacting both the range of individual costs and average costs per unit. Analysts do not attempt to estimate costs of a future regulated EM program due to the uncertainties associated with the range of potential size, scale and design specifics, but instead provide a qualitative description of the factors that influence costs and may impact overall costs of a future regulated program.

To estimate at-sea observer costs, the average "fully-loaded" cost per day, as reported in the 2020 Annual Report (AFSC 2020) was used. The analysis notes that there are several factors that impact how comparable the average observer coverage costs per day are between the partial coverage category and the full coverage category including the type of contract. The partial coverage contract is a federal contract between NMFS and the observer provider company, whereas the full coverage observer providers do not operate under a federal contract. Full coverage observer providers are permitted by NMFS to negotiate contracts for observer services directly with vessel operators. Because of all the factors that impact observer costs, the analysis uses a "fully loaded" daily rate, which is calculated as the total funds expended divided by the number of observed days for both the partial coverage and full coverage sectors.

The daily at-sea observer rate for the full coverage fleet was estimated in the Annual Report (AFSC 2020) to range from $375/day to $415/day. Each day that is covered by EM would not need at-sea observer coverage. Based on 2021 EM days realized (3,041 days or if one additional day per trip is added to the trip's reported start and stop time – 4,217 days), the low cost and lower number of days estimate results in over $1.14 million less in at-sea observer costs and the higher days and cost per day yields about $1.75 million less in at-sea observer costs (see Table 5-26).

The average daily at-sea rate for the partial coverage fleet, reported in the 2020 North Pacific Observer Program Annual Report, was $1,381 (based on the cost of $2,729,486 for 1,977 observer days). The average cost per observer sea day is a combination of a daily rate, which is paid for the number of days the observer is on a vessel or at a shoreside processing plant, and reimbursable travel costs. In 2020, the reimbursable travel costs also included quarantine days. The contractor also needs to recoup their total costs and profit through the daily sea day rate, which includes costs for days the observers are not on a boat. These days include training, travel, deployment in the field but not on a boat, and debriefing. In 2020, the number of observer sea days included deployment days at shoreside processing plants for situations where vessel observers were not able to enter processing plants to complete their sampling, due to COVID restrictions. Federal funds were used to pay for shoreside observers to complete this sampling.

The average annual cost per sea day in partial coverage have ranged between $895 and $1,381 since 2014. Because there is only one observer provider with a federal contract for the partial coverage fleet it creates additional confidentiality concerns associated with estimating a more specific observer cost. Based on all the information available to analysts while adhering to confidentiality rules, a low ($1,309/day) and high ($1,381/day) cost of at-sea observer coverage was estimated. Based on an estimate of days fished, using reported 2021 EM at-sea fishing days (823) and adding one day per trip (1,264 days)

and sampling rates of 16 percent to 30 percent of trips, a low ($172k) and high ($523k) estimate of at-sea observer costs was generated.

Shoreplant observer costs were also estimated for the partial and full coverage plants. Discussions were held with the shoreside processing plant observer providers to determine a reasonable range of expected cost per day when the proposed Trawl EM program is projected to be implemented in 2024, using data presented in the 2020 Trawl EM status report to the Council[3] as the starting point. Actual costs were not collected from the observer providers to make the shoreplant estimates. Factors that were considered when generating the daily estimates used in this analysis from those discussions included the EM EFP budget resulted in lower plant observer costs than would be anticipated in the regulated program to allow the EFP to stay within its budget; the cost for plant observers in the partial coverage fisheries are dependent on future observer contracts that run to 2024 and it is not possible to speculate how various aspects of that contract will change when the new contract is implemented; trawl EM program regulations may impact shoreside observer wages, especially if specific observer experience levels are required to be a plant observer; Inflation rates are unknown, but observer providers have realized substantial increases in wage rates (tight labor market makes finding and retaining observers more difficult).

The estimated daily rates for full coverage plants were estimated to range from $380/day to $430/day. The 2020 EM report to the Council indicated that there were 770 full coverage observer days at BS plants. That number increased to 1,599 in 2021, using EM shoreplant observer provider data. Based on the number of observer days at these plants (1,599 days) in 2021, the estimated cost ranged from $608k to $688k. This may underestimate the actual number of shoreplant observer days needed as more vessels switch to EM.

In the GOA, it is difficult to determine with any precision the future daily shoreplant observer rate or how many EM shoreplant observer days will be needed, given the countervailing forces, confidentiality restrictions, and uncertainty. Information presented earlier in this section described changes in the number of shoreside plant observers that may be assigned to plants, but does not estimate the total observer days. Estimating the total number of days depends on many assumptions regarding the days plants will operate, the number of observers needed, the percent of trips that will be sampled, and the number of vessels delivering to the plant that are using EM. However, using the 548 GOA plant EM observer days reported in the 2021 trawl EM days and the broad range of daily costs considered ($500/day to $1,600/day), the estimated annual costs range from $274k to $877k.

There are numerous challenges associated with estimating the costs of an EM program that are further complicated by uncertain levels of scale and participation that could encompass the scope of a regulated program. Because of the uncertainty, the analysts' presented the costs of 2021 trawl EM EFP (the most recent year for which costs are available), as provided by the EM service providers and reviewers and qualitatively describe how the different cost factors may scale with the expansion of participation and how different variables of program design and demographics (i.e., number and location of vessels) may affect these costs. The most recent year of data is anticipated to best reflect the costs of the program in the future. While it is acknowledged that technological changes will impact future costs, the most recent data is thought to best reflect future costs assigned to the categories utilized in this analysis. The total costs for the ongoing EM components of the 2021 EFP were $392,002. Total costs by subcategory and average unit costs per CV, trip, haul and day are reported in Table- E-2. Note that there is large variability in per unit costs and these average per unit costs only apply to the design and scope of the 2021 EFP. Differing levels of participation, effort, scope and program design specifics will entail very different cost structures, impacting both the range of individual costs and average costs per unit. These costs were provided to the analysts by representatives from the two participating EM service providers and the two EM data reviewers. These costs represent all EFP participants, including CVs and tenders operating in the BS and

[3] https://meetings.npfmc.org/CommentReview/DownloadFile?p=84d1969a-7fce-4d29-bd7a-d3a0ae91f9da.pdf&fileName=C2%20EM%20EFP%20Interim%20Report.pdf

the GOA. This encompasses the suite of effort most analogous to Alternative 2. One- time costs totaled $276,653, which included new equipment purchases and installation costs for 15 CVs and two tenders. One-time costs are reported separately as they occur only once for vessels that are new participants.

Table- E-2 Total costs and average per unit costs for the 2021 EFP. Numbers in parenthesis correspond to the level of participation and effort in the 2021 EFP. *Day represents estimated fishing days, for example a trip that leaves on the 20th and returns on the 22nd is considered two days.

		Average per unit cost for 2021 EFP			
Ongoing costs	**Total costs**	**CV (68)**	**Trip (1503)**	**Haul (4272)**	**Day* (3864)**
1. Service Provider Fees and Overhead	$188,559	$2,773	$125	$44	$49
2. EM Equipment Maintenance and Upkeep	$86,832	$1,277	$58	$20	$22
3. Data Transmittal	$5,720	$84	$4	$1	$1
5. Data Review	$101,488	$1,492	$68	$24	$26
6. Data Processing and Storage	$9,403	$138	$6	$2	$2
Total ongoing costs	$392,002	$5,765	$261	$92	$101

One-time costs	**Total costs**	**CV (15)**	**Tender (2)**
4. Equipment Purchases and Installation	$276,653	$17,496	$7,106

Source: Discussions with EFP EM service providers and data reviewers.

Analysts do not attempt to estimate costs of a future regulated voluntary program due to the uncertainties associated with the range of potential size, scale and design specifics. However, the analysts do provide a summary table that compares the estimated changes in costs of monitoring using observers and EM in the pelagic pollock fisheries under the EFP in 2021.

Table E-3 summarize the costs under the EFP for 2021 that have been presented above rounded to the nearest $1k to provide a comparison of Alternative 1 and Alternative 2. The reported costs are intended to provide information on the general direction of cost changes and the reader is cautioned about using the values to compare actual future costs. Note that these costs of EM do not include the one-time costs of purchasing and installing EM equipment for the first time on vessels, but does include estimated repair and replacement costs. As stated throughout the document, there are many factors that make direct comparisons of costs between the No Action and action alternatives problematic, but there are anticipated cost savings. For example, as more vessel operators utilize EM, at-sea observer costs will decrease and EM costs will increase (in a non-linear fashion) and shoreplant observer costs will increase. EM costs increase in a non-linear fashion due to efficiencies associated with economies of scale, some of which increase in a stair-step manner.

Table E-3 Comparison of Alternative 1 and Alternative 2 Costs

Estimated costs of Alternative 1 (for effort associated with 2021 trawl EM EFP)

Description	Area	Low Estimate	High Estimate
Partial coverage at-sea Observer Cost	GOA	$172,000	$524,000
Full coverage at-sea observer cost	BS	$1,140,000	$1,750,000
Full coverage shoreside monitoring cost	BS	$304,000	$344,000
Total	BS and GOA	$1,617,000	$2,618,000

Estimated costs of 2021 trawl EM EFP (Alternative 2 at EFP level of effort, scope, scale)

Description	Area	Low Estimate	High Estimate
Ongoing EM costs (does not include one-time equipment costs)	BS and GOA	$392,000	$392,000
Partial coverage shoreside monitoring cost	GOA	$274,000	$877,000
Full coverage shoreside monitoring cost	BS	$608,000	$688,000
Total	BS and GOA	$1,274,000	$1,956,000

Source: Summary of costs presented in Section 5.9 of the RIR

It is anticipated that salmon bycatch accounting will improve under the action alternatives. The sampling and enumeration method to account for salmon PSC will not change for GOA CVs delivering shoreside or for BS pollock CVs. Under Alternative 1, in the GOA, observers in the partial coverage category are deployed using established random sampling methods to collect data on a statistically reliable sample of fishing vessels in the partial coverage category. On observed partial coverage trips, the vessel observer monitors the offload and conducts a full enumeration of salmon at the shoreside processing plant. EM (under Alternative 2 or Alternative 3 option 2) is expected to improve salmon accounting on shoreside delivery partial coverage trips by:

- ensuring at-sea discards do not occur by having greater coverage of the CVs deck than one observer can provide,
- increasing the percentage of trips that are monitored for discard/retention compliance at-sea (it is assumed that vessels with EM will account for a larger percentage of trips than currently covered by at-sea observers), and
- conducting full enumeration of a salmon bycatch at the plant on larger percentage of shoreside deliveries than are covered by at-sea observers at the plant (note that under the EFP plants had 30 percent coverage and trawl CV's target coverage was 16 percent in the 2021 ADP), which results in less extrapolation of salmon bycatch rates to unobserved trips.

In the full coverage category salmon bycatch may be improved under EM (in Alternative 2 or Alternative 3 option 1 or option 2) by verifying at-sea discards do not occur by having greater coverage of the CVs deck than one observer can provide. Full enumeration of salmon will continue by plant observers for all trips.

The fact that all trips in the EM strata in both the partial and full coverage strata will have 100 percent EM review for discards at-sea, verifying that at-sea discards do not occur, and full enumeration of all deliveries in the BS and randomly sampled EM deliveries in the GOA would benefit the resource, management, and the public perception of the accuracy of salmon bycatch accounting in the pollock fisheries.

Some smaller CVs deliver to tenders in the WGOA regulatory area with Chinook salmon PSC accounting based on at-sea species composition samples, not counts at the plant. At-sea sampling for rare species such as salmon can result in highly variable estimates. Allowing both the CV and the tender vessel to have EM (Under Alternative 2) to ensure discard/retention compliance would allow complete salmon enumeration to take place at the plant. Including tender offloads in salmon accounting, is expected to improve sampling selection by being both more random and representative. Full enumeration of all deliveries in the BS and randomly sampled EM deliveries in the GOA, and verification that at-sea discards do not occur on all trips would benefit the resource, management, and the public perception of the accuracy of salmon bycatch accounting in the pollock fisheries.

The pollock fishery has historically been relatively safe. Implementing EM will reduce the number of observers that are deployed in the pollock fishery and reduce their exposure to risk. This would be a benefit of the program, as safety is a high priority.

Observer providers that only provide human observers are expected to lose revenue and EM-only providers' revenue is anticipated to increase under the action alternatives. The analysts do not have access to future business plans for the firms involved and do not project which firms will or will not benefit. Given the importance of the pollock fishery to observer providers, the action taken could have significant impacts on individual businesses.

Alternative 3 gives the Council the flexibility to allow EM only in the BS (option 1) or in the BS and GOA (option 2); it also excludes tender vessels from the EM program. The exclusion of tenders would have the greatest impact on WGOA vessels (applies primarily to Option 2) because tenders only consistently operate in the WGOA. The analysis has not found compelling reasons to exclude sectors based on the information provided to date. The Council's consideration of public testimony and other input may uncover some additional issues that warrant excluding pollock sectors from trawl EM. Overall, the costs are not expected to change dramatically if sectors are excluded, but benefits in data quality and good-will with stakeholders could be lost if they have invested time and money to develop the pollock trawl EM program. Benefits to the salmon resource and salmon accounting accuracy could be reduced if tender vessels are excluded. Allowing tender vessel to participate in the program and associated improvements in salmon bycatch data is thought to be a substantial benefit of the program. The greatest impact to industry participants would be to the small CVs that utilize tender vessels in the western GOA as well as tender vessels.

Losses in efficiency are associated with defining a regulated program that excludes portions of the existing participants in the EFP. This relates back to lessons learned in the development of EM programs. A broader approach reduces analysis and regulatory changes that would be required in the future to add more segments of the pollock fleet. This would increase costs to the stakeholders and the agency. Overall, it is anticipated that there will be a minimal change in costs by only selecting specific options under Alternative 3 relative to Alterative 2 as the additional costs to tenders involve tender EM systems, which are reported to be less expensive (and can be moved between tender vessels) than CV systems (as they often have fewer cameras and require no control center to monitor gear deployment). Video review of CV offloads to the tender vessels is also reported to be a relatively minor cost. All other costs associated with EM still exist, however participation of western GOA vessels may decline, based on conversations with program participants, if tenders are not included in the regulated program. Net benefits to the Nation are expected to be positive under any of the action alternatives selected by the Council. Increased net benefits are anticipated to result from increased producer surplus and improvements in salmon accounting.

Finally, the reader is referred to the summary table in Section 5.15 of the RIR for a more complete summary of the impacts of the alternatives on various sectors of the industry.

Comparison of Alternatives for Decision-making

The alternatives approved for analysis by the Council, including the no action, status quo alternative (Alternative 1) provide a reasonable range of alternatives for the Council to consider in their recommendations to NMFS. Under Alternative 2 and Alternative 3, participation by CVs and tenders would be voluntary. The Council initially indicated an interest in including all CVs and tenders when participating in the directed pollock fishery and tenders taking directed pollock deliveries in the BS and GOA in a regulated program (Alternative 2), similar to the approach taken in the EFP. Analysis of Alternative 2 will provide a thorough review of the potential effects of such an approach. Analysis of Alternative 3 will allow detailed consideration of the elements necessary to implement an EM option in two different pollock fisheries (CVs in the BS and GOA) but not on tenders. Analysis of the status quo, Alternative 1, will provide a basis to compare the potential effects of Alternatives 2 and 3 to the baseline. As a whole, analysis of these three alternatives will provide the Council with a more thorough understanding of the various complexities and unique characteristics of these fishery groups and the potential effects of implementing EM in any one or combination of those fishery groups. Table E-4 and

Table E-5 below provide a comparison of the alternatives in this analysis with respect to 1) their operational differences, and 2) environmental impacts.

Table E-4 Comparison of Operational Differences

	Alternative 1 Human observer program	**Alternative 2** EM on pelagic trawl pollock CVs and tenders delivering to shoreside processors in the BS and GOA	**Alternative 3** EM on pelagic trawl pollock CVs delivering to shoreside processors and not on tenders. Option 1: BS Option 2: BS and GOA
Observer Fee	Observer coverage in the full coverage category is industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers. Observer coverage in the partial coverage category is funded through a system of fees collected from fishery participants (vessels and processing plants) under authority of Section 313 of the Magnuson-Stevens Act.	GOA shoreplant observers would be funded through the 1.65 percent ex-vessel fee paid for deliveries from the partial observer coverage fisheries. It is assumed that a coverage rate of 30 percent of the GOA trips will be sampled, but the actual rate will be established annually in the ADP. The number of shoreplant observers that take BS pollock deliveries will also increase to ensure that all salmon on all trips are enumerated. These plants are currently in the full coverage category and are funded using the pay-as-you-go model.	GOA shoreplant observers would be funded through the 1.65 percent ex-vessel fee paid for deliveries from the partial observer coverage fisheries. It is assumed that a coverage rate of 30 percent of the GOA trips will be sampled, but the actual rate will be established annually in the ADP. The number of shoreplant observers that take BS pollock deliveries will also increase to ensure that all salmon on all trips are enumerated. These plants are currently in the full coverage category and are funded using the pay-as-you-go model.
Coverage Requirements (BS is full coverage)	CVs in the GOA are in the partial coverage observer category and are randomly selected to be monitored by an at-sea observer. The pelagic pollock trawl fishery in the BS is in the full coverage category.	Under a regulated EM program, the observer coverage rates to monitor deliveries from CVs and tender vessel offloads would be determined by NMFS through the ADP process.	Under a regulated EM program, the observer coverage rates to monitor deliveries from CVs would be determined by NMFS through the ADP process.
Data Retention Requirements		The EM program design should include requirements for a 12-month minimum retention period (for video, images, or other sensor data) once NMFS completes data reconciliation.	The EM program design should include requirements for a 12-month minimum retention period (for video, images, or other sensor data) once NMFS completes data reconciliation.

	Alternative 1 Human observer program	**Alternative 2** EM on pelagic trawl pollock CVs and tenders delivering to shoreside processors in the BS and GOA	**Alternative 3** EM on pelagic trawl pollock CVs delivering to shoreside processors and not on tenders. Option 1: BS Option 2: BS and GOA
Timeliness of Data		Data obtained under the Trawl EM Program do not directly feed into catch accounting or stock assessments. The data collected is used to verify reported data. Most data used for management is collected with eLandings. Other data continue to be collected by observers. The Trawl EM program would not affect the timeliness of these data sources; it would only affect what data source is used.	Data obtained under the Trawl EM Program do not directly feed into catch accounting or stock assessments. The data collected is used to verify reported data. Most data used for management is collected with eLandings. Other data continue to be collected by observers. The Trawl EM program would not affect the timeliness of these data sources; it would only affect what data source is used.
Data Quality / Data Collection	Observers collect biological samples and fishery-dependent information on total catch and interactions with protected species. Scientists use observer-collected data for stock assessments and marine ecosystem research.	From EM systems, sensor and imagery data would be collected at the haul level and from the shoreside observer sampling, catch data – including species composition – and biological specimens could be gathered at the trip level by observers in the shoreside processing plants.	From EM systems, sensor and imagery data would be collected at the haul level and from the shoreside observer sampling, catch data – including species composition – and biological specimens could be gathered at the trip level by observers in the shoreside processing plants.
Pollock Stock Assessments	At-sea observers collect species composition of pollock tows, recorded lengths by sex, and collected pollock otoliths. Additional sample collections included maturity structures and stomachs. All of these data were resolved at the individual tow level in the observer database.	The effects of the action alternatives on pollock would include a loss of some spatial and temporal resolution of the data used for stock assessment. This is because information on species composition, length, and age composition can only be collected at the resolution of the delivery, which contains catches from two or more tows done in different places and times.	The effects of the action alternatives on pollock would include a loss of some spatial and temporal resolution of the data used for stock assessment. This is because information on species composition, length, and age composition can only be collected at the resolution of the delivery, which contains catches from two or more tows done in different places and times.

Table E-5 Comparison of Environmental Impacts

	Alternative 1 Human observer program	**Alternative 2** EM on pelagic trawl pollock CVs and tenders delivering to shoreside processors in the BS and GOA	**Alternative 3** EM on pelagic trawl pollock CVs delivering to shoreside processors and not on tenders. Option 1: BS Option 2: BS and GOA
Data Collection			
Target Species (Pollock)	At-sea observers collect species composition of pollock tows, recorded lengths by sex, and collected pollock otoliths.	Loss of some spatial and temporal resolution of data used for stock assessments.	Loss of some spatial and temporal resolution of data used for stock assessments.
Non-Target Species	At-sea observers collect haul-level information on age and length samples. Length composition and specimen data for large sharks have not been historically collected.	Loss of some spatial and temporal resolution data used for stock assessments for Pacific cod and Pacific ocean perch. Alternative 2 has the potential for increased accuracy of large shark catch estimates.	Loss of some spatial and temporal resolution data used for stock assessments for Pacific cod and Pacific ocean perch. Alternative 3, Option 2 (BS and GOA) may result in more accurate estimates of large shark catch.
Marine Mammals	At-sea observers record species number, types of interaction, record species length, collect biological samples, take photos and videos, and record disposition (e.g. dead, released alive).	Loss of data including body measurements, tissue samples, and other biological specimens. However, EM video review allows many chances to review marine mammal interactions.	Loss of data including body measurements, tissue samples, and other biological specimens. However, EM video review allows many chances to review marine mammal interactions.
Seabirds	Seabird interactions are reported by at-sea observers.	EM systems would record seabird interactions. In contrast to marine mammals, vessel crew may retain albatross and eider carcasses.	EM systems would record seabird interactions. In contrast to marine mammals, vessel crew may retain albatross and eider carcasses.
Prohibited Species	Data on salmon PSC are only collected on observered CVs during offload. Data for other PSC species are collected from observers onboard the vessel.	Data from all PSC species will be collected during offload of trips.	Data from all PSC species will be collected during offload of trips.
Estimates of At-Sea Discards	At-sea discard estimates are derived from at-sea observer estimates of retention during species composition sampling.	Estimation of at-sea discard would change to use the information collected by vessel operators in their logbook. Logbook estimates are provided to shoreside processors and entered into eLandings, then verified by EM video review.	Estimation of at-sea discard would change to use the information collected by vessel operators in their logbook. Logbook estimates are provided to shoreside processors and entered into eLandings, then verified by EM video review.

1 Introduction

This EA/RIR analyzes proposed management measures that would apply exclusively to pollock CVs using pelagic trawl gear and tender vessels in the North Pacific Observer Program. The measures under consideration include alternatives that would allow an EM system to supplement existing observer coverage. The purpose of this action is to improve catch accounting for salmon, advance cost efficiency, and monitor for compliance with discard restrictions.

The use of EM under the compliance monitoring approach means that EM video does not directly feed into catch accounting or stock assessments. Instead, catch accounting uses industry reported data (verified through EM) and data collected by shoreside observers. Maximized retention ensures that unsorted catch will be delivered and sampled by shoreside observers, allowing for non-biased data to be collected at the trip level by shoreside observers at the processing plant.

This document is an EA/RIR. An EA/RIR provides assessments of the environmental impacts of a proposed action and its reasonable alternatives, the economic benefits and costs of the alternatives, the distribution of impacts, and identification of the small entities that may be affected by the alternatives (the RIR). This EA/RIR addresses the statutory requirements of the Magnuson Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, 16 U.S.C. 1801, *et seq*.), the National Environmental Policy Act, Presidential Executive Order 12866, and some of the requirements of the Regulatory Flexibility Act. An EA/RIR is a standard document produced by the North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) Alaska Region to provide the analytical background for decision-making.

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ). The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the regional fishery management councils. In the Alaska Region, the North Pacific Fishery Management Council (Council) has the responsibility for preparing fishery management plans (FMPs) and FMP amendments for the marine fisheries that require conservation and management, and for submitting its recommendations to the Secretary. Upon approval by the Secretary, NMFS is responsible for carrying out the Federal mandates of the Department of Commerce with regard to marine and anadromous fish.

The pollock fishery in the EEZ off Alaska is managed under the Fishery Management Plans (FMPs) for Groundfish of the Bering Sea / Aleutian Islands Management Area (BSAI) and for Groundfish of the Gulf of Alaska (GOA). The proposed action under consideration would amend these FMPs and Federal regulations at 50 CFR 679. Actions taken to amend FMPs or implement regulations governing these fisheries must meet the requirements of applicable Federal laws, regulations, and Executive Orders.

1.1 Purpose and Need

The purpose of this action is to improve catch accounting for salmon, advance cost efficiency, and monitor for compliance with discard restrictions. This action is needed to achieve the following objectives adopted by the Council in 2018: 1) improve salmon accounting, 2) reduce monitoring costs, 3) improve the quality of monitoring data, and 4) modify current retention and/or discard requirements as necessary to achieve objectives 1-3.

The Council adopted the following purpose and need statement to originate this action in June 2021.

To carry out their responsibilities for conserving and managing groundfish resources, the Council and NMFS must have high quality, timely, and cost-effective data to support management and scientific information needs. In part, this information is collected through a fishery monitoring program for the groundfish fisheries off Alaska. While a large component of this monitoring program relies on the use of human observers, the Council supports integrating electronic monitoring and reporting technologies into

NMFS North Pacific fisheries-dependent data collection program, where applicable, to ensure that scientists, managers, policy makers, and industry are informed with fishery-dependent information that is relevant to policy priorities, of high quality, and available when needed, and obtained in a cost-effective manner.

The Council and NMFS have been on the path of integrating technology into the fisheries monitoring systems for many years, with electronic reporting systems in place, and operational EM in some fisheries. An EM program for compliance purposes on pelagic pollock trawl catcher vessels and tenders both delivering to shoreside processors will obtain necessary information for quality accounting for catch including bycatch and salmon PSC in a cost-effective manner, and provide reliable data for compliance monitoring of a no discard requirement for salmon PSC. This trawl EM program has the potential to advance cost efficiency and compliance monitoring, through improved salmon accounting and reduced monitoring costs.

Regulatory change is needed to modify the current retention and discard requirements to allow participating CVs to maximize retention of all species caught (i.e., minimize discards to the greatest extent practicable) for the use of EM as a compliance tool on trawl catcher vessels in both the full and partial coverage categories of the Observer Program and meet monitoring objectives on trawl catcher vessels in the Bering Sea (BS) and Gulf of Alaska (GOA) pelagic pollock fisheries.

1.2 History of this Action at the Council

The development of the Trawl EM program through an exempted fishing permit (EFP 2019-03) [4] involved multiple phases as part of a cooperative research plan developed by the Trawl EM Committee as outlined in the timeline below (Table 1-1). Each phase of the program benefitted from a collaborative process and open communication between project partners, which includes agency staff, EFP permit holders (United Catcher Boats, Alaska Groundfish Data Bank, Inc., and Aleutians East Borough), EM service providers (Saltwater Inc., and Archipelago Marine Research Ltd.), video reviewers (Saltwater Inc., and Pacific States Marine Fisheries Commission), and observer providers (AIS Inc., Alaskan Observers Inc., and Saltwater Inc.). Check-in meetings with project partners began on January 15, 2020 and occurred every two weeks during the directed pollock seasons, and as requested by a project partner. Check-in meetings provided an opportunity for each project partner to give updates on how the EFP was progressing and identify any issues or concerns. During these meetings, the project partners engaged in open and collaborative discussions to troubleshoot issues as they came up and the meetings have proven to be an effective way to quickly address problems. The EFP has been managed over the past two years despite staffing issues, quarantine challenges, and equipment shortages. It has been a collaborative effort to make this situation work under unique circumstances. In addition, this Initial Review Analysis has included many contributing writers and reviewers from the Council, NMFS Alaska Regional Office (AKRO), the Alaska Fisheries Science Center (AFSC), NOAA Office of Law Enforcement (NOAA OLE), and NOAA General Counsel.

[4] The EFP application, permits, and reports can be found under the heading “Electronic Monitoring - Trawl Catcher Vessels” on the NMFS website: https://www.fisheries.noaa.gov/alaska/resources-fishing/exempted-fishing-permits-alaska.

Table 1-1 Timeline of Fieldwork / Pre-Implementation of Trawl EM Program

2018	**Pilot Project Phase I: Initial Testing** Test to determine if utilizing EM camera systems proves operationally effective for the BS pelagic trawl pollock CV fleet for 100% compliance monitoring of catch and discards per Council and NMFS requirements. • Collected EM footage on four volunteer pelagic trawl CVs in BS during pollock fishing while maintaining observer coverage. • Video from the camera systems was reviewed to validate the CV logbook and observer reports of all discard events that may have occurred.
2019	**Pilot Project Phase II: Larger Scale Test under existing requirements** Two projects funded by National Fish and Wildlife Fund (NFWF), to expand EM testing to more CVs in the BS/GOA and include CVs and tenders in the Western GOA (WGOA) and Central GOA (CGOA). • BS and CGOA-EM systems on 28 CVs to assess EM data quality, timeliness, and costs as compared to data collected by observers and those associated costs. • WGOA- EM systems on 14 CVs and two tenders to track unsorted catch from the net to the shoreside plant where species composition sampling and biological samples were taken.
2020-current	**Exempted Fishing Permit (EFP 2019-03)** EFP issued to evaluate the efficacy of EM systems and shoreside observers for pollock CVs using pelagic trawl gear in the BS and GOA. • EFP exempts 79 CVs from regulations that currently prevent full or maximized retention of all catch, and observer coverage requirements. • Project combines EM systems that provide at-sea monitoring of CVs for compliance with fishery management objectives to achieve maximized retention, electronic reporting of catch and discard information, and shoreside observers to monitor salmon bycatch and collect catch composition and biological information at the trip level.
2021	Council initiates an analysis of implementation of EM on pollock CVs using pelagic trawl gear and tender vessels transporting pollock catch in the BS and GOA, approves purpose and need and alternative set.

At the Council's June 2021 meeting, the PIs on the BS and GOA pelagic trawl pollock EM EFP (#2019-03) presented an interim report on the progress of the EFP through April 2021. The EFP report highlighted that the EFP objectives are being met: 1) maximized retention can be accomplished with limited changes in vessel activities, 2) EM is effective in capturing at-sea discard events to support catch accounting and may capture marine mammal incidents, 3) biological sampling goals can be met by shoreside observers for groundfish species with effective communication, and 4) salmon bycatch accounting is improved, specifically in the WGOA pollock fishery that currently relies on estimates with large variance under status quo methods. In addition, initial comparisons in the EFP report indicated that EM can be more cost-effective than at-sea observers, especially after the initial cost of system is installed in the first year.

The Council also received a report from the Trawl EM Committee at the June 2021 meeting and reviewed a draft set of alternatives developed by NMFS and Council staff. The Council adopted the purpose and need statement above and approved three alternatives to be analyzed (described in Section 2 of this document) to implement a regulated Trawl EM program, as recommended by the Trawl EM Committee. In addition, a preliminary analysis was presented to the Council's Science and Statistical Committee (SSC) at the February 2022 Council meeting.

The SSC reviewed the preliminary analysis in February 2022 and found that it represented a solid foundation for the initial analysis. The preliminary review was focused on overall trawl EM program design and objectives, and how data are collected and used. The intent was to provide early communication and seek feedback from the SSC regarding concerns about data types, quality, availability, and priorities. The SSC included several recommendations regarding specific data analyses and program descriptions to be included in the initial review.

Table 1-2 describes a timeline to implement a regulated Trawl EM program by January 2024, should an action alternative be selected.

Table 1-2 Draft Timeline for Trawl EM

Target Dates	Meetings / Deliverables
January / February 2022	Coordination of 2022 EFP, Preliminary Review by SSC of Trawl EM program design
March / May 2022	Continued work by staff on analysis of Trawl EM alternatives
May/June 2022	Trawl EM committee meeting, Council Initial Review of Trawl EM analysis
October 2022	Council Final Review of Trawl EM
October 2022 – March 2023	Development and publication of proposed rule for the Trawl EM program and associated shoreside observers
March – June 2023	Development and publication of final rule for Trawl EM program and associated shoreside observers (Target Final Rule in June 2023)
January 2024	Trawl EM – Regulatory Program Begins

1.3 Description of Management Area

This action pertains to all management areas in the GOA (Figure 1-1) and BSAI (

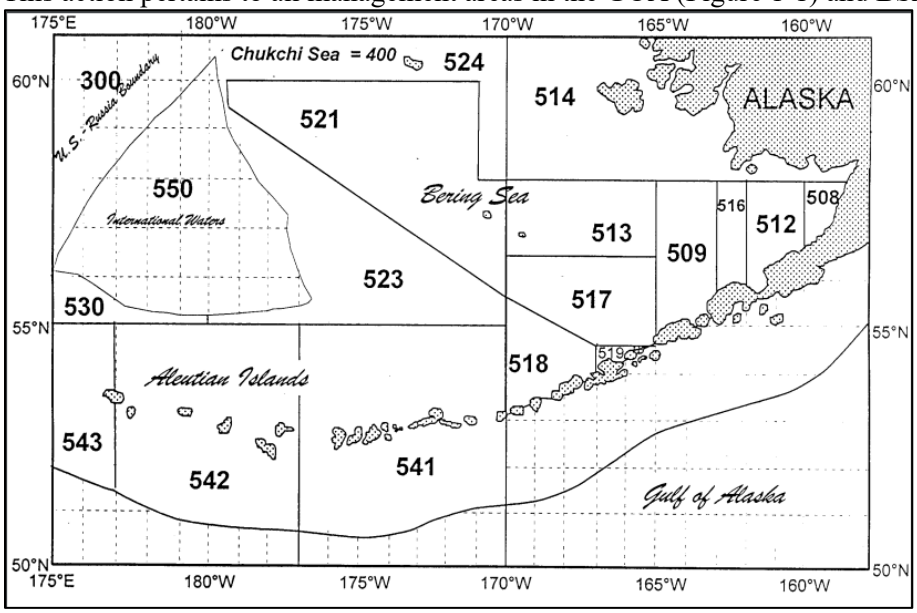

Figure 1-2).

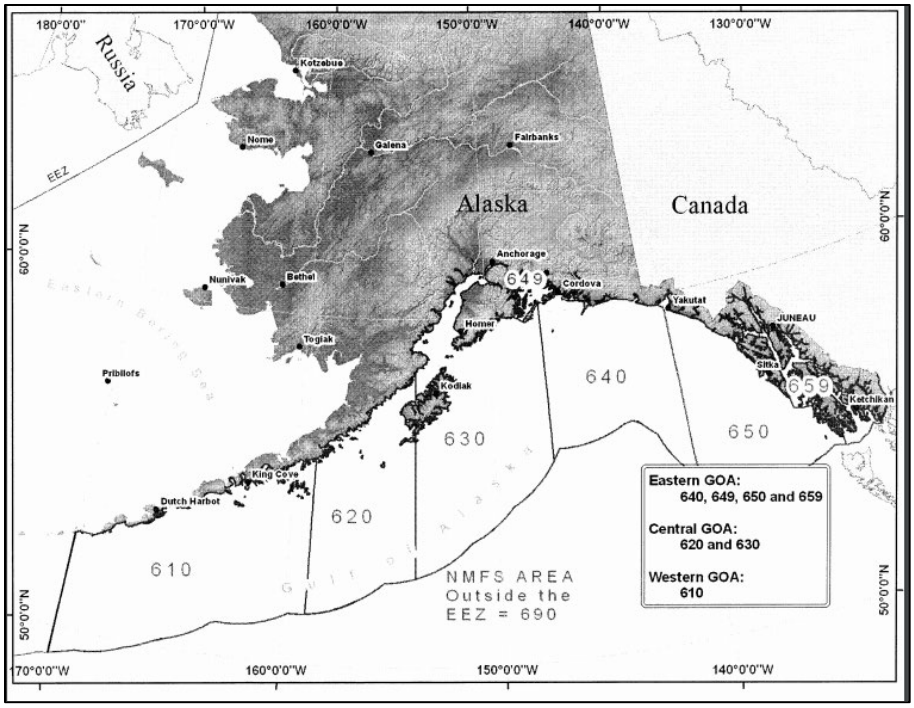

Figure 1-1 NMFS regulatory and reporting areas in the GOA[5]

[5] Figure 3 to 50 CFR 679

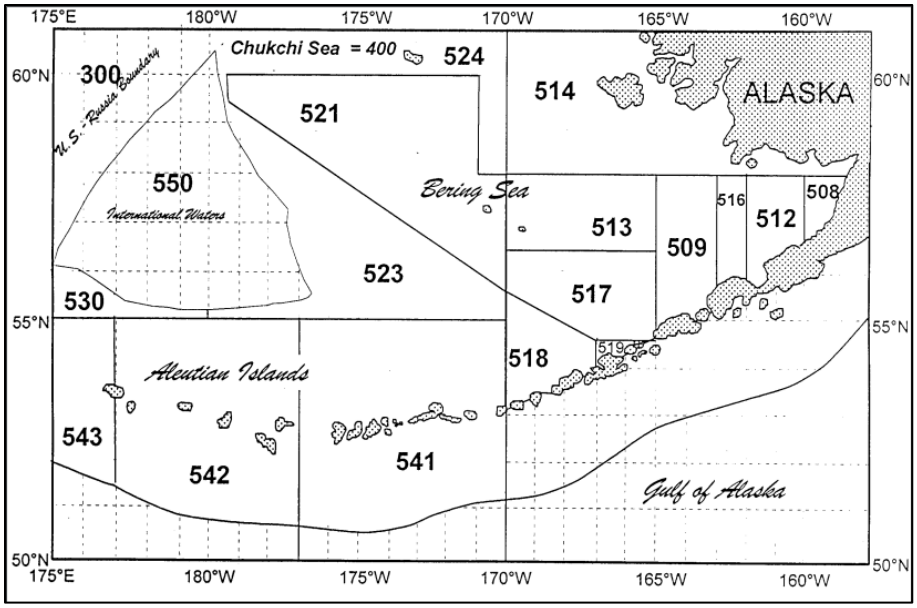

Figure 1-2 NMFS regulatory and reporting areas in the BSAI[6]

EA and RIR requirements

Environmental Assessment

There are four required components for an environmental assessment. The need for the proposal is described in Section 1.1, and the alternatives in Section 2. The probable ecological impacts of the proposed action and alternatives are addressed in Section 4, and social and economic impacts in Section 5. A list of contributors and persons consulted is included in Section 7.

Regulatory Impact Review

The preparation of an RIR is required under Presidential Executive Order (E.O.) 12866 (58 FR 51735, October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following Statement from the E.O.:

> *In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

As part of the RIR analysis, the need for the proposal is described in Section 1.1, and the alternatives in Section 2. Section 5.7 provides a description of the fisheries affected by this action, and Section 5.9 analyzes the economic and social impacts of the proposed alternatives, including the impacts on small entities.

[6] Figure 1 to 50 CFR 679

E.O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." A "significant regulatory action" is one that is likely to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in E.O. 12866.

1.4 Documents Incorporated by Reference in this Analysis

This impact assessment relies heavily on the information and evaluation contained in previous environmental analyses, and these documents are incorporated by reference. The documents listed below contain information about the fishery management areas, fisheries, marine resources, ecosystem, social, and economic elements of the groundfish fisheries. They also include comprehensive analysis of the effects of the fisheries on the human environment and are referenced in the analysis of impacts throughout this document.

Alaska Groundfish Harvest Specifications Final Environmental Impact Statement (NMFS 2007).

This EIS provides decision makers and the public an evaluation of the environmental, social, and economic effects of alternative harvest strategies for the federally managed groundfish fisheries in the GOA and the Bering Sea and Aleutian Islands management areas and is referenced here for an understanding of the groundfish fishery. The EIS examines alternative harvest strategies that comply with Federal regulations, the Fishery Management Plan (FMP) for Groundfish of the GOA, the Fishery Management Plan (FMP) for Groundfish of the BSAI Management Area, and the Magnuson-Stevens Fishery Conservation and Management Act. These strategies are applied using the best available scientific information to derive the total allowable catch (TAC) estimates for the groundfish fisheries. The EIS evaluates the effects of different alternatives on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, essential fish habitat, ecosystem relationships, and economic aspects of the groundfish fisheries. This document is available from https://alaskafisheries.noaa.gov/fisheries/groundfish-harvest-specs-eis.

Stock Assessment and Fishery Evaluation (SAFE) Reports for the Groundfish Resources of the BSAI and GOA (NPFMC 2021).

Annual SAFE reports review recent research and provide estimates of the biomass of each species and other biological parameters. The SAFE report includes the acceptable biological catch (ABC) specifications used by NMFS in the annual harvest specifications. The SAFE report also summarizes available information on the ecosystems and the economic condition of the groundfish fisheries off Alaska. This document is available from https://www.fisheries.noaa.gov//resource/data/2021-stock-assessment-and-fishery-evaluation-report-groundfish-resources-bering-sea and https://www.fisheries.noaa.gov//resource/data/2021-stock-assessment-and-fishery-evaluation-report-groundfish-resources-gulf-alaska.

Final Programmatic Supplemental Environmental Impact Statement (PSEIS) on the Alaska Groundfish Fisheries (NMFS 2004).

The PSEIS evaluates the Alaska groundfish fisheries management program as a whole and includes analysis of alternative management strategies for the GOA and Bering Sea/Aleutian Islands (BSAI) groundfish fisheries. The EIS is a comprehensive evaluation of the status of the environmental components and the effects of these components on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, essential fish habitat, ecosystem relationships, and economic aspects of the groundfish fisheries. A Supplemental Information Report (NPFMC and NMFS 2015) was prepared in 2015, which considers new information and affirms that new information does not indicate that there is now a significant impact from the groundfish fisheries where the 2004 PSEIS concluded that the impact was insignificant. The PSEIS document is available from https://alaskafisheries.noaa.gov/node/33552, and the Supplemental Information Report from https://alaskafisheries.noaa.gov/sites/default/files/sir-pseis1115.pdf.

North Pacific Observer Program Annual Report (NMFS 2020).

The Annual Report provides information, analysis, and recommendations based on the deployment of observers and EM systems by the North Pacific Observer Program. The latest report is available from https://www.fisheries.noaa.gov//resource/document/north-pacific-observer-program-2020-annual-report.

Annual Deployment Plan for Observers and EM in the Groundfish and Halibut Fisheries off Alaska (NMFS 2021).

The Annual Deployment Plan (ADP) documents how NOAA Fisheries intends to assign fishery observers and EM to vessels fishing in the partial observer coverage category (50 CFR 679.51(a)) in the North Pacific during the calendar year. The latest ADP is available from https://www.fisheries.noaa.gov//resource/document/2021-annual-deployment-plan-observers-and-electronic-monitoring-groundfish-and.

Final Environmental Analysis / Regulatory Impact Review for Amendment 114 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 104 to the Fishery Management Plan for Groundfish of the Gulf of Alaska, and Regulatory Amendments (NMFS 2017).

The Environmental Assessment/ Regulatory Impact Review for Amendment 114 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 104 to the Fishery Management Plan for Groundfish of the GOA, and Regulatory Amendments Analysis to Integrate Electronic Monitoring into the North Pacific Observer Program

This document evaluates a proposed management change to establish electronic monitoring (EM) as a part of the North Pacific Fishery Management Council (Council)'s fisheries research plan for the fixed gear groundfish and halibut fisheries of the Gulf of Alaska and Bering Sea and Aleutian Islands. The document analyzes alternatives that would allow an EM system, which consists of a control center to manage the data collection, connected to an array of peripheral components including digital cameras, gear sensors, and a global positioning system receiver, onboard certain fixed gear vessels to monitor the harvest and discard of fish and other incidental catch at sea, as a supplement to existing observer coverage. This analysis is available from https://repository.library.noaa.gov/view/noaa/19208.

Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis for Proposed Amendment 86 to the Fishery Management Plan for Groundfish of the Bering sea/Aleutian Islands Management Area and Amendment 76 to the Fishery Management Plan for Groundfish of the Gulf of Alaska: Restructuring the Program for Observer Procurement and Deployment in the North Pacific. (NPFMC 2011). Available at

https://www.fisheries.noaa.gov/resource/document/ea-rir-irfa-proposed-amendment-86-fmp-groundfish-bsai-and-amendment-76-fmp.

This Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis examines the environmental and economic effects of Amendment 86 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and Amendment 76 the Fishery Management Plan for Goundfish of the Gulf of Alaska to change the service delivery model for the North Pacific Groundfish Observer Program (Observer Program). The recommended action is intended to address a variety of longstanding issues associated with the existing system of observer procurement and deployment. The proposed action would replace the existing observer service delivery model, in which industry contracts directly with observer providers to meet observer coverage requirements in Federal regulations, with a new system (i.e., restructuring) in which NMFS contracts directly with observer providers and determines when and where observers are deployed. Vessels and processors under the restructured observer program would pay either a fee based on a percentage of ex-vessel revenue (not to exceed 2%), or a daily observer fee, to fund the program.

Final Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis for Amendment 93 to the Fishery Management Plan for Groundfish of the Gulf of Alaska: Chinook Salmon Prohibited Species Catch in the Gulf of Alaska Pollock Fishery. (NMFS 2012). Available at https://www.fisheries.noaa.gov/resource/document/ea-rir-irfa-amendment-93-fishery-management-plan-groundfish-gulf-alaska-chinook

This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis analyzing proposed management measures that would apply exclusively to the directed pollock fishery in the Western and Central Gulf of Alaska (GOA). The measures under consideration include setting prohibited species catch limits in the Central and Western GOA for Chinook salmon (Oncorhynchus tshawytscha), which would close the directed pollock fishery in those regulatory areas once attained; full retention of salmon species; and increased observer coverage on vessels under 60 feet length overall. The purpose of this action is to address prohibited species catch of Chinook salmon in the GOA, and establish measures that protect against the risk of high Chinook salmon removals in the GOA pollock trawl fisheries in future years.

Final Environmental Assessment/Regulatory Impact Review for Proposed Amendment 110 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. (NMFS 2016). Available at https://www.regulations.gov/document/NOAA-NMFS-2015-0081-0021

This Environmental Assessment/Regulatory Impact Review analyzes proposed management measures to address bycatch of Chinook salmon and chum salmon in the Bering Sea pollock fishery. The measures under consideration include modifying chum salmon bycatch management within existing industry incentive plan agreements, adding more incentives to avoid Chinook salmon, modifying season lengths for the summer pollock fishery, and reducing the prohibited species catch limit and/or performance standard threshold implemented in the existing Chinook salmon bycatch management program. All of the alternatives were designed to improve the current management for chum salmon and Chinook salmon bycatch by providing pollock fishery participants opportunities for increased flexibility to respond to changing conditions and greater incentives to minimize bycatch of both salmon species, to the extent practicable.

2 Description of 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. All of the alternatives were designed to advance cost efficiency and compliance monitoring through improved salmon accounting and reduced monitoring costs.

The Council adopted the following three alternatives and two options (which apply only to Alternative 3) for analysis in June 2021.

2.1 Alternative 1, No Action

Electronic Monitoring would not be implemented and catch monitoring would be provided by at-sea observers

2.2 Alternative 2

Electronic Monitoring is implemented on pelagic trawl pollock catcher vessels and tenders delivering to shoreside processors in the Bering Sea and Gulf of Alaska.

2.3 Alternative 3

Electronic Monitoring is implemented on pelagic trawl pollock catcher vessels delivering to shoreside processors and not on tenders.

Option 1: Bering Sea

Option 2: Bering Sea and Gulf of Alaska

2.4 Comparison of Alternatives

Depending on the Alternative and option selected by the Council, up to three separate pelagic trawl pollock fisheries may be included in this action: 1) CVs delivering to shoreside processing plants in the BS, 2) CVs delivering to shoreside processing plants in the GOA, and 3) CVs that deliver to tenders and tenders delivering to shoreside processing plants. While CVs may participate in multiple fisheries, under current regulations, these fisheries operate distinctly and are therefore treated separately to more specifically describe potential impacts within the alternative structure. A more complete description of the fisheries' operations can be found in Section 5.7 of this analysis. The following brief description of observer coverage provides context for comparison of the alternatives in this section.

Bering Sea Inshore Pollock Fishery Observer Coverage

The BS inshore pollock fishery has a cooperative fishery management structure (American Fisheries Act) with allocations internal to the cooperative for individual vessel pollock and Chinook prohibited species catch (PSC) allocations. This fishery operates in the full observer coverage category, where there is at least one observer present to monitor all fishing or processing activity (i.e., 100% observer coverage). Specific requirements for the full coverage category are defined in regulation at 50 CFR § 679.51(a)(2). Observer coverage for this fishery is industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers. In the full observer coverage category, observers collect independent estimates of catch, at-sea discards, PSC, and other data aboard the vessel. Observers also collect biological and ecosystem data and interactions with, and biological samples from, protected species. Requiring at least one observer on every vessel means that at-sea discards and PSC estimates are not based on self-reported data or extrapolated observer data from other vessels. The salmon bycatch (PSC) is determined by identifying each species and counting

each individual salmon at the shoreside processing plant. Receiving processing plants also have observers to assist with this data collection. Shoreside processing plants and CVs work together to maximize fish quality for the marketplace with strict delivery schedules and CV rotations. It is common for CVs to have some significant wait time between trips, which increases the number of days that the vessel pays for an observer while not harvesting or delivering. A subset of these CVs participate in the Pacific coast whiting fishery and due to their participation in that fishery, already have operational EM systems on board.

The Gulf of Alaska Pollock Trawl Fishery Observer Coverage

The GOA pollock trawl fishery is managed as an open access fishery. The fleet operations are diverse and can be divided into several distinct groupings, such as CVs that deliver to shoreside processing plants, and CVs that deliver to tenders with tenders delivering to shoreside processing plants. Some GOA pollock CVs also participate in the BS AFA pollock fishery and/or the Pacific whiting fishery. Additionally, trawl CVs that fish in the WGOA are some of the smallest in Alaska, with many that are less than 60 ft length overall (LOA), and participate as 58ft. limit seiners in salmon fisheries and other groundfish fisheries. These vessels fish with small crews in remote areas. Vessels under 60 ft LOA have no logbook requirements.

The GOA pollock fishery operates in the partial observer coverage category, where pollock trawl CVs are monitored by observers on randomly selected trips. Specific requirements for the partial observer coverage category are defined in regulation at 50 CFR § 679.51(a)(1). Observers in the partial observer coverage category are funded through a system of fees collected from fishery participants (vessels and processing plants) under authority of Section 313 of the Magnuson-Stevens Act. The fee is based on the ex-vessel value of groundfish and Pacific halibut and is assessed on landings by vessels not included in the full coverage category. The system of fees fairly and equitably distributes the cost of observer coverage among all vessels and processors in the partial coverage category. Observers in the partial coverage category are deployed using established random sampling methods to collect data on a statistically reliable sample of fishing vessels in the partial coverage category. On observed partial coverage trips, the vessel observer monitors the offload and conducts salmon census counts at the shoreside processing plant. Many of these smaller CVs deliver to tenders in the WGOA regulatory area with Chinook salmon PSC accounting based on at-sea species composition samples, not counts at the plant. At-sea sampling for rare species such as salmon can result in highly variable estimates. Vessels and processors in the partial coverage category are assigned observer coverage according to the scientific sampling plan described in the Annual Deployment Plan (ADP) developed by NMFS in consultation with the Council. Additionally, each year NMFS produces the North Pacific Observer Program Annual Report (Annual Report), which provides descriptive information, analysis, and recommendations based on observer deployment in the previous year. Together, the ADP and Annual Report ensure that the best available information is used to evaluate deployment, including scientific review and Council input, to annually determine deployment methods. The current structure of the Observer Program, including the definition of full and partial coverage, random deployment methods, and the fee system can be found in each year's Annual Report[7] and ADP[8].

The alternatives approved for analysis by the Council, including the no action, status quo alternative (Alternative 1) provide a reasonable range of alternatives for the Council to consider in their recommendations to NMFS. Under Alternative 2 and Alternative 3, participation by CVs and tenders would be voluntary. The Council initially indicated an interest in including all CVs when participating in the directed pollock fishery and tenders taking directed pollock deliveries in the BS and GOA in a regulated program (Alternative 2), similar to the approach taken in the EFP. Analysis of Alternative 2 will provide a thorough review of the potential effects of such an approach. Analysis of Alternative 3 will

[7] https://www.fisheries.noaa.gov/tags/north-pacific-observer-program?title=annual%20report&field_species_vocab_target_id=&sort_by=created
[8] https://www.fisheries.noaa.gov/tags/north-pacific-observer-program?title=annual%20deployment&field_species_vocab_target_id=&sort_by=created

allow detailed consideration of the elements necessary to implement an EM option in two different pollock fisheries (CVs in the BS and GOA) but not on tenders. Analysis of the status quo, Alternative 1, will provide a basis to compare the potential effects of Alternatives 2 and 3 to the baseline. As a whole, analysis of these three alternatives will provide the Council with a more thorough understanding of the various complexities and unique characteristics of these fishery groups and the potential effects of implementing EM in any one or combination of those fishery groups. The Council also recognized that there are some significant logistical and operational challenges in implementing EM. If the analysis identifies that one group of CVs or tenders is having unanticipated difficulties in addressing those logistical challenges and data are not available to proceed with a regulated program for a given group, these challenges could continue to be examined and addressed through an additional future EFP without slowing implementation for the remainder of the program.

3 Trawl EM Program Design

3.1 EM Program Components

This section describes the Trawl EM Program elements that would occur under Alternatives 2 or 3 if the Program were implemented. The implemented program would use EM systems to monitor compliance of retention requirements on trawl vessels. The use of EM under the compliance monitoring approach means that EM video does not directly feed into catch accounting or stock assessments. Instead, catch accounting uses industry reported data (verified through EM) and data collected by shoreside observers. Maximized retention ensures that unsorted catch will be delivered and sampled by shoreside observers, allowing for non-biased data collection by shoreside observers at the processing plant.

An important aspect of the Trawl EM Program would be onshore, where there is a comprehensive shoreside observer component. Shoreside observers collect fisheries-dependent data such as species identifications, catch composition, biological data, and PSC estimates. Combined with maximized retention, a robust shoreside monitoring component allows the Trawl EM Program to use EM for compliance monitoring while still collecting the necessary data for fisheries management.

The Trawl EM compliance monitoring approach is similar to the West Coast Trawl EM program in the Pacific whiting (hake) fishery (84 CFR 31146). Vessel operators are responsible for recording catch and discard data. Retained catch is weighed on certified scales at shoreside processing plants and discards from the vessel logbook are recorded into eLandings. This allows total catch to be debited from accounts in the catch accounting system.

EM systems include sensor information (e.g., GPS) and video imagery recording (i.e., no sound is recorded) that is used by video reviewers to verify compliance of retention requirements. The EM video systems are designed to record imagery from areas on the vessel where catch is transferred and there is the potential for discards. EM video systems record during fishing activity and offload, allowing for verification that the vessel has complied with program elements and that unsorted catch is accessible for sampling by a shoreside observer, leading to unbiased data collection. Additionally, video reviewers verify that amounts of unavoidable or allowable discards by the crew are recorded in the logbook and that logbook discard estimates are reasonable.

3.1.1 EM Program Goals and Objectives

In its 'Electronic Monitoring for Compliance on Pelagic Trawl Vessels Cooperative Research Plan' (approved December 2018) the Council adopted the following overarching goals for EM:

- Goal 1. Improve salmon accounting – to provide stable salmon accounting against the PSC hard cap for WGOA and CGOA pelagic trawl pollock CVs as well as the salmon PSC performance standard for BS pelagic trawl pollock CVs.
- Goal 2. Reduce monitoring costs – to develop cost efficiencies and free up money for other priorities (i.e., EM coverage in the GOA pollock fishery could allow for an increase in observer coverage/days for other fisheries in the partial observer coverage category) as well as provide a more cost-effective monitoring alternative to 100% human observer coverage for the BS shoreside CVs.
- Goal 3. Improve overall monitoring data for catch accounting and compliance – to explore innovative methods to account for bycatch species that have the potential to limit participation in the pollock fishery, which requires high retention of catch; to explore innovative methods to account for protected species; and to achieve more comprehensive coverage.
- Goal 4. Examine current regulatory retention and discard requirements as necessary to achieve Objectives 1-3 – given existing Improved Retention/Improved Utilization (IR/IU) and Maximum Retainable Amount (MRA) regulations, the proposed EFP will assess the viability of a

full/maximized retention pollock fishery coupled with a dedicated shoreside monitoring component as a potential future fishery management option.

The Council has also developed a list of program elements from the draft alternatives document[9] to be included in the analysis, understanding that new elements may be added and current elements may be modified in the future. The Council recognized the success of the collaborative approach of the EFP team and encouraged the continuation of this team to address complex issues as they arise in the analysis.

Table 3-1 identifies the objectives for the different components that have been identified for the Trawl EM program.

Table 3-1 Proposed Trawl EM Program Components and Objectives

Trawl EM Program Components	Objective
1. EM Deployment Design	Use best available information to design the EM deployment methods, including definition of the EM selection pool, which meet policy and data collection goals.
2. Participation	A pool of EM participants that are capable and committed to making EM work on their vessels.
3. Maximized Retention	Ensure that catch can be documented by shoreside processing plants and that unsorted catch can be provided to shoreside observers. Ensure that at-sea discards can be viewed, estimated, and documented during video review.
4. Equipment and installation	Appropriate EM equipment (wiring/sensors, cameras, monitors, hard drives) are properly installed on each CV, at the correct port, and in a timely fashion, with the least interruption to the fishing plan.
5. EM Operation	Each CV operator maintains a functioning EM system throughout the fishing trip and there is a process for maintaining quality control and addressing equipment failures.
6. Data and equipment retrieval (i.e. Hard drives with raw video data)	EM equipment with data returned to video reviewer in a timely manner that provides useable imagery and metadata.
7. EM data	Extract and integrate data from EM system in a timely manner so that data can be used to verify self-reported information.
8. EM data retention and storage	Retain EM data (video and data derived from video review) in an appropriate format.
9. Feedback mechanisms	All participants have the opportunity to provide timely feedback to address problems and improve the EM Program.
10. Fees/ Funding/ Costs	Use fees or other sources of non-federal funding to pay for the EM costs such as video review.
11. Catch logbook	Each CV operator maintains an accurate logbook with discarded catch of key target and bycatch species.
12. Integrate data for Catch Accounting	Incorporate self-reported data on at-sea discards into the Catch Accounting System in a timely way so that the data can be used for management; use data from EM as verification.
13. Observer sampling	Enable observers to collect trip-level catch composition and biological data at processing plants.
14. Salmon Accounting	Enable accurate accounting of salmon in processing plants.

3.1.2 Implementation Approach

Each of the components of the proposed Trawl EM Program would be implemented through various available implementation vehicles. These include regulations, the Annual Deployment Plan (and evaluated in the Annual Report), the EM service provider contract (or grant), EM video review provider

[9] Included in the June 2021 Council agenda under item C2: https://meetings.npfmc.org/Meeting/Details/2104

contract (or grant), the Vessel Monitoring Plan (which defines the placement of EM equipment onboard each individual CV, and sets out operator responsibilities for maintaining EM equipment and for fish handling practices conducive to camera monitoring), the Catch Monitoring Control Plan (which defines locations, equipment, communications, and fish handling techniques conducive to shoreside monitoring by an observer), and NMFS administration. Figure 3-1 provides an overview of how the different pieces of the EM program fit together under each of these implementation vehicles. The numbers in parentheses correspond to the fourteen EM program components identified in Table 3-1 above.

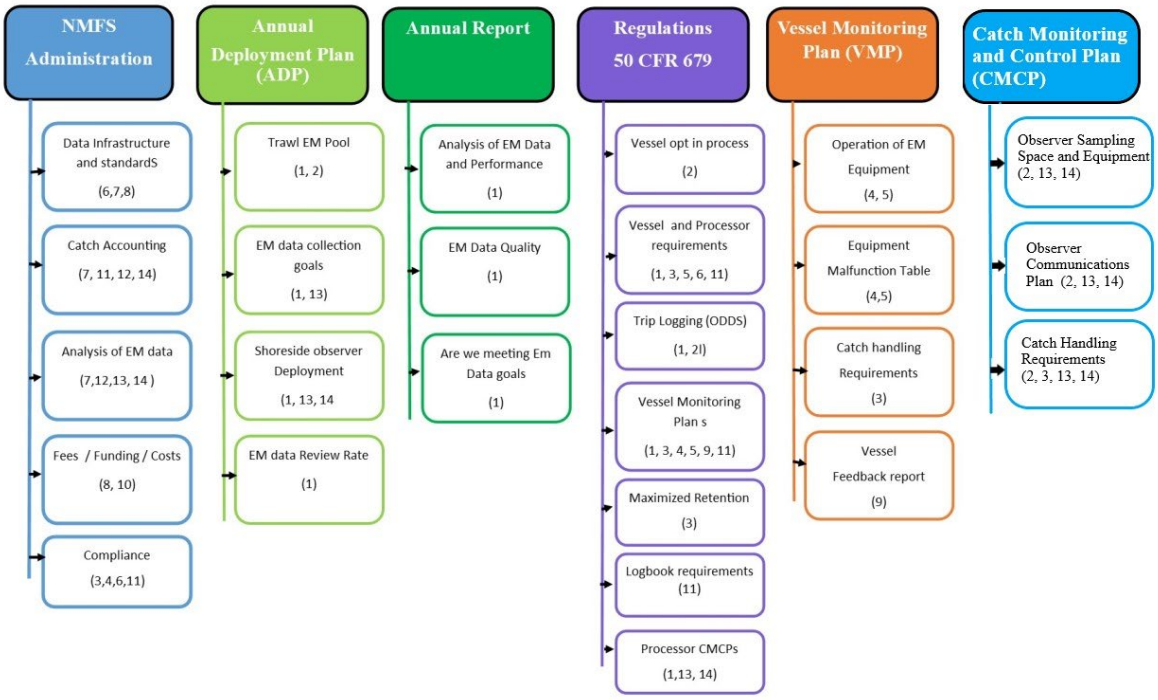

Figure 3-1 EM Program Components and Implementation Approaches

3.1.2.1 Annual Deployment Plan / Annual Report

Each year, NMFS prepares an Annual Deployment Plan that describes the process by which observers and EM will be deployed into the fisheries. The draft ADP evaluates different monitoring scenarios, each using different methods to allocate available monitoring effort to different portions of the Alaska fisheries. The draft ADP of this plan is shared with the Council and its monitoring committees generally associated with the October meeting. Input from the Council, stakeholders, and the public is considered in development of the final ADP. The final ADP is presented at the Council's December meeting and contains the deployment strata, deployment rates, and deployment methods for both observers and EM systems that will be used in the following year. Additional information about the ADP process can be found in Ganz and Faunce (in review) and Cahalan and Faunce (2020) as well as the most recent draft ADP (NMFS 2021 a) and final ADP (NMFS 2021 b). On an annual basis, NMFS also prepares an Annual Report that evaluates the performance of the prior year's ADP implementation. The Annual Report is generally presented to the Council in June and informs the Council and the public about how well various aspects of the program are working. The review highlights areas where improvements are recommended to 1) collect the data necessary to manage the groundfish and halibut fisheries, 2) maintain the scientific goal of unbiased data collection, and 3) accomplish the most effective and efficient use of the funds collected through the observer fees.

The trawl EM stratum will be included in both the Observer Program Annual Report and the ADP processes. Assessment of coverage rates achieved and identification of potential departures from the sampling design implementation will be included in the Observer Program Annual Report along with other sampling strata. Consistent with methods used with other sampling strata, annual report recommendations to improve data quality will be incorporated into the ADP process. Under the Trawl EM program, the ADP would include information on criteria for the partial coverage component of the program in the GOA deployment of compliance (at-sea) EM systems and associated shoreside observer monitoring for the trawl EM program.

3.1.2.2 Participation in the Trawl EM Program
3.1.2.3 Eligibility to Participate

Participation in the Trawl EM selection pool would be voluntary. Eligibility provisions for CVs to participate in the EM selection pools allow any harvester that meets the criteria to choose to request to opt-in to the Trawl EM selection pool as described in the ADP on an annual basis, if they are willing to adhere to the provisions of the Trawl EM program.

Factors that may affect eligibility to participate in the Trawl EM program, include, but are not limited to:

1. Actions leading to data gaps such as repeat occurrences of dirty cameras affecting video review.
2. Non-compliance with program elements such as discarding of catch, including PSC.
3. CV configuration or fishing practices that cannot provide the necessary camera views to meet data collection goals.

NMFS would establish an annual opt-in/opt-out process in Federal regulations for participating CVs. All CVs would be required to use Observer Deploy and Declare system (ODDS) to opt-in to the Trawl EM selection pool by the annual deadline of November 15. NMFS would notify the CV owner through ODDS of approval or denial to place a CV in the Trawl EM selection pool, based on the above eligibility criteria. Participating CVs, approved by NMFS, would be required to register trips in ODDS as described below.

3.1.2.4 Trip Registration in ODDS

Trip registration in ODDS for CVs participating in the BS is not currently required because these CVs are part of the full observer coverage category. Registration in ODDS is required for CVs participating in the GOA because these CVs are part of the partial observer coverage pool and fish for other species with other gear types. Following partial coverage regulatory requirements, participating CV operators are required to register a trip in ODDS and indicate whether they are going on a Trawl EM trip or a potentially observed partial coverage trip. Under the regulated trawl EM program, trip registration via ODDS may be required by CVs in the GOA. Registration in ODDS by CVs in the Trawl EM selection pool would assist in tracking Trawl EM compliance, analysis of EM use in the Annual Report, assist in coordination and communication with shoreside observers, and reduce regulatory confusion.

GOA trawl CVs sometimes use more than one gear type or target multiple species in a trip. The pre-implementation program only authorized the use of EM for pelagic trawl trips targeting pollock. Expanding beyond pollock was not within the scope of the EM EFP. Therefore, to allow flexibility based on species targeted and gear types used, participating EM CVs have been able to opt-in to EM on a trip-by-trip basis under the EFP. The flexibility to opt-in on a trip-by-trip basis is re-evaluated below.

Opt-in / Opt-out

In the BS, all participating trawl EM vessels were required to have EM on 100% of pelagic trawl pollock trips and all EM deliveries were sampled shoreside by observers. Under all alternatives, all BS participating CV vessels will continue to be under full coverage requirements: all trips will be monitored

at-sea for compliance with maximum retention requirements using EM and all deliveries will be sampled shoreside by observers.

In the Gulf of Alaska, CVs participating in the Trawl EM EFP were provided the flexibility to opt-in on a trip-by-trip basis. For each trip, GOA CVs registered in ODDS and indicated whether they were going on a partial coverage EM trip or a trip with an at-sea observer. The primary reasons to consider trip-by-trip opt-ins during pre-implementation are as follow:

- Maintain flexibility to participate in other fisheries and react to changing fishing conditions in order to maximize economic efficiency of trips. For example, if pollock fishing is not consistent, vessels may opt-out of the Trawl EM EFP to allow them to deploy non-pelagic trawl gear to target other open access directed fishing, instead of coming in with partially full holds. This flexibility is only really used in the Central GOA, however it is available in other parts of the GOA
- Flexibility to reduce shoreside observer costs when the pace of pollock fishing is reduced. During the EFP, pollock CVs in the Central GOA organized a voluntary catch share plan. These plans are implemented to help management and also facilitate PSC avoidance. A benefit is that it slows fishing down which allows for more precise management and avoidance of PSC. The downside is that shoreside observers are not optimally being used when there are only a couple vessels delivering each week. In this instance, the permit holders informed vessels they would log remaining trips as partial coverage, so they could release the shoreside observer(s).

While the agency understands the desire by GOA participants to maintain this flexibility in a regulatory program, the agency does not support this approach due to the following reasons (discussed in detail in the following subsections):

- Inconsistent with other EM implementation approaches,
- Provides more uncertainty in ADP process and therefore less cost efficiency
- Likely to decrease efficiency of observer resources in partial coverage,
- Increases confusion for shoreside observers on which trips to sample.

Inconsistent with other EM implementation approaches

Under Alternatives 2 and 3, trawl vessels participating in the proposed EM program would be required to opt-in to the program on an annual basis. Vessels who wish to use EM in lieu of an at-sea observer must first make a request to NMFS to be considered for EM. Once NMFS approves a trawl gear vessel to be in EM, the vessel will remain in the trawl gear EM pool for one calendar year. This approach would be similar to fixed gear EM program in that deployment strata would be assigned for the entire year.

Currently, CAS uses the list of EM vessels for defining the deployment strata for the year. Vessels opting into or out of different deployment strata mid-year would require changes to CAS and potentially eLandings. CAS needs to assign, at the time of landing, the strata for which the catch belonged, for both observed and unobserved landings. An annual list of EM participants would make this assignment reliable and would be consistent with fixed-gear EM.

Uncertainty in ADP process

The annual ADP process relies on projections of effort to estimate costs and appropriate sample rates for the following year (including costs under observer and EM contracts). Under the trip-by-trip opt-in model currently used under the EFP, vessel operators are able to opt into the EM program for specific trips. This trip-specific participation in the program would complicate effort projections since analysts would need to be able to estimate both total trawl effort for the upcoming year and the proportion of trips that would occur in the EM program. This process will need to be modified under the proposed alternative to account for differential costs/contract issues for deployment of shoreside observers for trawl EM versus trip-

specific at-sea deployment. This process is affected by uncertainty associated with the effort projections for the upcoming year and the need to account for budget and fee collection cycles. Allowing vessels to opt-in on a trip-specific basis increases the uncertainty associated with projecting both shoreside days and at-sea days, and uncertainty with how much funding must be made available for EM review and data storage. Increasing uncertainty requires NMFS to be more conservative with both EM and observer cost estimates to ensure deployment costs do not exceed the funding available.

An annual opt-in process that deterministically identifies participating vessels greatly reduces the uncertainty associated with projecting shoreside days versus at-sea days and the impacts on the trip-selection pool. By requiring vessels to participate in the EM program for the entire year, effort projections would be generated based on the list of participating vessels and general trends in fishing activities.

Decrease efficiency of observer resources in partial coverage

Being able to opt-in on a trip-by-trip basis would limit the ability for NMFS to predict the number of trips in either trawl EM or partial coverage. In this case, NMFS would need to assign observer coverage conservatively. This would mean ensuring that there are sufficient numbers of observers available to cover observer monitoring requirements if most participating vessels continue to use EM. In addition, NMFS would need to consider a scenario where trawl vessels opt-out and instead choose to carry an observer under partial coverage requirements. NMFS would need to reduce the ADP trawl coverage rate to compensate for these types of uncertainty. In both scenarios this may result in NMFS allocating limited observer resources where there is a chance that they are not needed due to an inability to accurately predict participation rates. While some of these impacts may be mitigated through increased communication in-season, it would still likely result in less efficiency in the use of observers. This may run counter to the current NPFMC monitoring priorities of improving cost efficiencies in the observer program.

Increases confusion for shoreside observers on what to sample

Trip-specific EM participation has complicated shoreside sampling conducted by shoreside observers in GOA. Shoreside observers must be able to identify which deliveries are from trips that participate in the EM program to randomly select deliveries to monitor. This becomes difficult when trips from a participating vessel might be non-EM trips. During the EFP, communication challenges were assessed and modifications were made to resolve many deficiencies. One common problem was confusion for both processing plant staff and shoreside observers related to vessels opting-in on a trip-by-trip basis. This resulted in some data loss as shoreside observers were told a trip was not EM when it was. Poor communication and confusion also led to sampling inefficiency when observers inadvertently sampled non-EM trips. These data needed to be deleted, as these trips were not randomly selected for sampling and there was no EM data to confirm minimal discards.

These communication and related sampling issues reduce overall data quality and program efficiency. Communication between participating vessels, processing plant staff, and observers can mitigate this situation; however, sampling mistakes resulting from misidentification of EM-deliveries result in inefficiencies and data loss, and may result in an inability to meet sampling goals. If participating vessels were in the EM strata for all their pelagic pollock trips, both processing plant staff and shoreside observers would be able to identify participation based on a list of vessels.

Using EM for all trips taken by participating vessels while pollock is open may provide stability to fishery participants in terms of the quality of bycatch information being used across the fleet. The pool of EM vessels will be receiving highly precise accounting information due to the full accounting of catch. This reduces situations where accounting relies on at-sea sampling, which can lead to high variability in discard estimates due to the small sampling fractions associated with at-sea sampling and subsequent statistical expansion from observed trips to unobserved trips.

Therefore, NMFS prefers an annual opt-in with a requirement that vessels that choose to participate in Trawl EM would be required to operate their EM systems and follow all requirements when directed fishing for pollock is open.

3.1.3 EM System

EM systems include four primary components: cameras, sensors, the control center, and hard drives. The typical EM camera setup includes three cameras that are placed to show all areas of the deck and eliminate blind spots. Additional cameras are placed as necessary to meet data needs and accommodate unique setups. The EM system integrates data from a suite of sensors, including GPS, hydraulic pressure, and drum rotation monitors to determine set and haul positions and collect effort data. The control center records video and sensor data onto the hard drives, which are removed after offload and mailed to the NMFS-specified EM reviewer for imagery review.

A unique aspect of the Trawl EM EFP was the testing of the utility of EM systems to monitor deliveries of catch on tender vessels. This was possible because the GOA pollock fishery operates differently from the BS pollock fisheries; some GOA CVs deliver catch to tender vessels instead of shoreside processing plants.

EM systems were redesigned for use on tender vessels to monitor CV offloads from CVs and ensure unsorted catch from EM CVs is delivered to the shoreside processing plant where it can be sampled by observers. Since processing plant staff may not know which tenders will be deployed until shortly before a season begins, it was challenging to predict which tenders to install EM systems on. This unique problem was solved through innovation by Saltwater Inc., who developed and tested a mobile EM system that can be quickly deployed by tender operators.

An example of the tender vessel EM set-up is below in Figure 3-2.

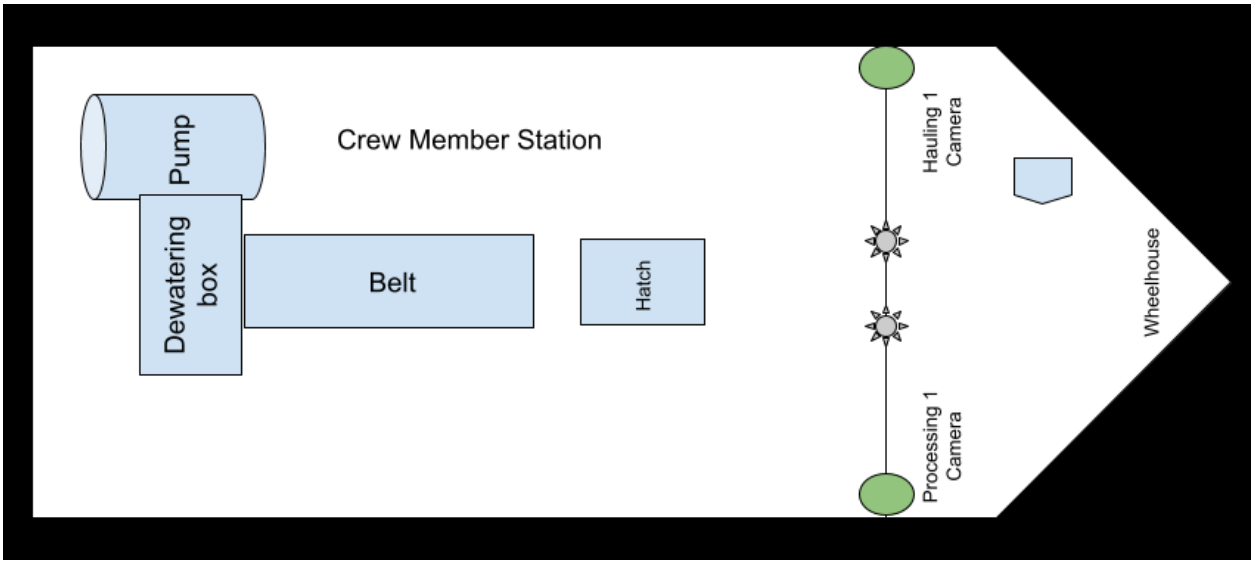

Figure 3-2 Tender EM Set-up

In the first year of the Trawl EM EFP, EM reviewers, EM Service Providers, the NMFS Alaska Region, and the AFSC FMA met several times to discuss EM systems on tender vessels including setup, system functionality, tender-specific Vessel Monitoring Plans, and to review video to intentionally look for blind spots. EM review of tenders focuses on the transfer of catch at the delivery of fish to the tender and at tender offload at the shoreside processing plant.

3.1.3.1 Type Approval

Type-approval regulations lay out a process to grant approval to a product that meets a minimum set of regulatory, technical, and/or safety requirements. The regulations governing the use of flow scales on catcher/processors and motherships are an example of type-approval regulations (50 CFR 679.28). NMFS may establish type-approval for EM systems in this program. Examples of minimum requirements include but are not limited to:

- Be tamper resistant
- Protected to limit access to system configuration settings such as password protection
- Record data reliably, consistently, and securely
- All data should be encrypted using advanced encryption standards, and ensure that encrypted data can only be unencrypted by authorized EM data reviewers
- All system settings, function tests, shut downs and malfunctions should be recorded in data logs
- Cameras should withstand extreme environmental conditions encountered on marine fishing vessels such as being housed in waterproof, low profile fixtures
- Cameras should provide high quality image resolution and frame rates to permit verification of catch handling, processing, and discarding
- Sensors must fully monitor vessel activity such as a dedicated GPS receiver to deliver time, date, latitude, longitude, heading, vessel speed, and positional accuracy to the control center
- Data must be transmitted in a format that is reliable and accessible to authorized EM data reviewers. If using proprietary software, it must be provided to the authorized EM data reviewers.

3.1.3.2 EM Coverage Requirements

CVs participating in the Trawl EM Program would be required to operate their EM systems on every trawl EM trip. The CV operators would ensure video recording is initiated two hours prior to deploying fishing gear on a Trawl EM trip and/or prior to transfer of catch onto a participating tender vessel. EM cameras would be required to be operational and recording as established in the vessel monitoring plan (VMP).

Currently the VMPs require cameras to be recording until completion of offload. As a result, the EM system captures offload activity. Several things were learned from offload observations that increased data quality of catch information. During the 2020 A season, large numbers of sharks were being caught. The offload review indicated that some of these sharks were removed from the hold but were not weighed or recorded. This was an unknown data gap that was immediately addressed through education and outreach by NMFS and the EFP permit holders to plant managers and CV operators. In addition, one of the goals of the Trawl EM program is to improve accounting of salmon PSC. The offload period is a time when discards of Chinook salmon have occurred; therefore, offload data are valuable to verify precise accounting of salmon PSC data. NMFS plans to define a sampling plan to review offload data, which could include random selection of EM trips to review offloads to meet data selection goals.

3.1.3.3 Vessel Monitoring Plan

After a CV opts-in to the Trawl EM program and is notified they are in the EM pool, the CV operator would be instructed to coordinate with EM Service Providers for EM equipment installation and service. The CV operator is encouraged to participate in installation, and development and approval of the VMP. The EM service providers will explain catch handling requirements and describe the operation of the EM system, including common steps for troubleshooting. The service providers also go through each section of the VMP with the CV operator and answer any questions.

Vessel operator responsibilities would be specified within regulations and within the VMP. The VMP sets out operator responsibilities for maintaining EM equipment and provides guidance to CV owners and

operators about their responsibilities to maintain a functioning EM system. The CV operators' primary responsibilities fall into three broad categories: 1) ensuring the EM system is operating, 2) retention of catch per regulation and 3) recording necessary information in the logbooks. All of these items are addressed clearly in the VMP. The VMP also describes how an EM system is specifically configured on a CV and how fishing operations on that CV will be conducted to effectively monitor fishing activities to document catch. The camera setup for monitoring fishing also works for monitoring offloads. VMPs are unique to the CV. After the VMP is completed by the EM technician with the CV operator, the VMP is sent to NMFS for review and approval.

VMPs would be approved by the agency. In most scenarios, the development of the VMP addresses most issues and the VMP approval process is efficient. Agency staff review VMPs to ensure they meet data collection goals and have all of the required elements. Agency staff also look at the camera views and may suggest slight modifications prior to approval. Finally, approved VMPs are entered into agency databases for access during video review. VMPs are approved for one calendar year; however, they can be edited throughout the year if data issues are identified.

3.1.3.4 EM Function Test

The CV operator must run a function test prior to deploying gear on a trip. The purpose of the function test is to ensure the system is working prior to fishing activity to prevent loss of data should there be an equipment malfunction. The function test checks that the system is receiving data from the sensors, can record, hard drives have sufficient space to record and requires the operator to check the camera views are clear and working. This function test is described in the VMP with instructions provided in an appendix.

During pre-implementation, function tests were required before leaving port; however, this proved to be problematic to some CV operations during a normal fishery and the Trawl EM Committee recommended relaxation of this requirement. The CV operator is strongly advised to conduct the function test prior to leaving port. A CV operator choosing to test after leaving port is taking a risk--if the test identifies a critical malfunction they must return to port prior to fishing.

During the 2021 fishery, this flexibility of performing function tests post port departure but prior to gear deployment was used occasionally, however most trips completed function tests prior to leaving port.

3.1.3.5 EM Equipment Malfunctions

During pre-implementation, the VMP included a section on equipment malfunction, CV operator responsibilities, and troubleshooting guidance. Equipment malfunctions are classified as "High" priority or "Low" priority in the malfunction tables in the VMP (Table 3-2). Low priority malfunctions will typically have a "work around" and will not affect the ability of a CV to depart on a trip, but, once identified, the issue must be resolved prior to taking an additional trip. High priority malfunctions typically result in the inability for the EM system to log the required critical data components. Due to the different monitoring levels and operational differences between the BS and the GOA pollock fisheries, there will be different protocols for dealing with High priority malfunctions. If the system passed the function test at the dock or at least two hours before deploying gear, and remains continuously powered during the trip, the CV is NOT required to return to port in the event of a High priority malfunction. The VMP outlines the guidance on troubleshooting malfunctions based on factors such as High/Low priority, when the malfunction was discovered, and malfunction type. If the malfunction cannot be resolved following the troubleshooting guide and/or with remote support, CV operators are instructed to continue to run the system with all functional parts, and contact the service provider immediately (from sea if possible) to schedule service at the time of landing. CV operators are also instructed to record all malfunctions in their logbook, including the time and date of the malfunction. Some CVs may choose to carry additional hard drives and spare parts, such as cameras, network switches and sensors to enable self-service of the EM system. System malfunctions can occur at the dock, prior to departure, or while the CV

is at sea. All system malfunctions must be recorded in logbooks and reported as soon as possible to EM Service Providers and EFP Managers. NMFS anticipates similar CV operator responsibilities related to equipment malfunctions would be part of the VMP and regulations in the implemented program.

Table 3-2 Example of Equipment Malfunctions

Malfunction Type	High/Low Priority	Potential Solution	Action if Malfunction Not Resolved
Control Center	**High**	Restart system	Troubleshoot and repair prior to next haul. If cannot repair, must contact EM service provider ASAP to report issues / schedule repair. Repair must occur prior to the next trip.
Loss of continuous power during fishing or offloading	**High**	Check power supply to system	Troubleshoot and repair prior to next haul. If cannot repair, must contact EM service provider ASAP to report issues / schedule repair. Repair must occur prior to the next trip.
Loss of continuous power while transiting	**Low**	Check power supply to system	May continue to transit (move to/from fishing grounds). Troubleshoot and attempt repair prior to next haul. If cannot repair, must contact EM service provider ASAP to report issues / schedule repair. May continue to fish during low priority malfunctions, but repair must occur prior to the next trip.
Insufficient lighting	**High**	Replace lights	May fish but cannot retrieve gear at night.
Critical camera (views of deck, horizon, stern ramp, and factory (if applicable))	**High**	Restart system; replace with spare camera	Troubleshoot and attempt repair prior to next haul. If cannot repair, must contact EM service provider ASAP to report issues / schedule repair. Repair must occur prior to the next trip.
Non-critical camera	**Low**	Restart system; replace with spare camera	Attempt to repair prior to retrieving gear. If cannot repair, must contact EM service provider ASAP to report issues / schedule repair. Repair must occur prior to the next trip.
Keyboard / Mouse	**High**	Replace with another keyboard / mouse	Before departing on another trip, must contact EM service provider to get a new keyboard or mouse.
Hydraulic Sensor	**Low**	Restart system	Must trigger video recording manually. Before departing on another trip selected for EM coverage, must contact EM service provider to schedule repair.

3.1.3.6 Maximized Retention

Vessel operators would be required to retain most catch in order to provide observers at the shoreside processing plant with unsorted catch to collect needed catch composition and biological information. Retention of all catch is not possible under the EFP because some catch events have unintentional discards. Some large species like sharks cannot be securely or safely stored. Additionally, in early phases of pre-implementation the CVs participating indicated a product quality issue when large amounts of jellyfish were retained. Therefore, requirements were clearly stated in the VMP that all catch was to be retained and discards were only allowed in certain cases.

Allowable discards:

- Small amounts of pollock and other incidental species removed from the deck and fishing gear during cleaning and other similar CV operations.
- Large individual marine organisms, such as marine mammals, shark species other than spiny dogfish, and skates that are causing problems at the pump.

- Unavoidable discard of catch resulting from an event that is beyond the control of the CV operator or crew provided. Events beyond the control of the CV include:
    - Safety/stability;
    - The opening of a blow-out panel because the catch is otherwise too large to bring up the CV's stern ramp;
    - Net bleeds/venting of an overfull codend;
    - Discards due to mechanical failure.

3.1.3.7 Catch Handling Procedures

All catch and discards must be handled within view of the cameras as defined in the camera descriptions and deck diagram in the VMP. All catch handling from the previous haul must be complete prior to retrieving the next haul. Every CV is unique and in some cases a CV VMP may include additional catch handling, stowage, and discard procedures. As video review occurs, the video reviewers may identify additional requirements, which may require VMPs to be modified as necessary. An example of an additional catch handling procedure is the requirement of a single discard location for allowable discards that allows the reviewer a clear camera view to estimate these discards.

3.1.3.8 Logbooks

Logbooks are necessary for Trawl EM data flow. The Trawl EM program does not work without a logbook component. As such, logbooks will be required by all participants of trawl EM. While many data, like location and effort, are collected by the EM systems, logbooks collect other data necessary for catch accounting and stock assessment. These data are either used to report catch in eLandings or annotated by EM reviewers during review. These logbooks can either be paper logbooks as currently used by the majority of the fleet or electronic logbooks that meet the requirements and are approved by NMFS. Therefore, a logbook requirement will be necessary for the Trawl EM program.

Discard information is reported in the logbook and these data are transferred to the processing plant during offload and are recorded in the eLandings report. These are the data necessary to account for at-sea discards. The implemented trawl EM program will verify compliance with reporting at-sea discard information in the logbook. Additionally, since most data are collected at the trip level, concern has been raised about the loss of haul level data. Although haul level information on catch and bycatch is not available from the Trawl EM program, for some analyses catch or biological data at the trip level back-calculated to the haul using information from the logbook may provide a sufficient substitution, as well as provide a novel source of size data for sharks.

CVs less than 60ft. LOA that participate in the WGOA do not currently have a logbook requirement. These CVs will be required to maintain a logbook to participate in the Trawl EM program. WGOA participants, Aleutians East Borough, and Saltwater Inc. developed an electronic logbook to collect information necessary to support Trawl EM. This sub-project has been successful but has not been able to be scaled up to other CVs at this time. There are many benefits of an electronic logbook, however requiring the use of an electronic logbook is not ready for regulatory implementation. This remains a goal for the future. Participants will be required to maintain a paper logbook under the regulated program.

3.1.3.9 Communications and Notifications of Deliveries for Shoreside Sampling

To facilitate the observer's selection of trips (offloads) to sample, participating CVs and tenders are required to communicate with shoreside observers and participating processing plants to provide timely offload schedule information for all Trawl EM trips. Once fishing has concluded, CVs and tenders are required to notify the shoreside observer of expected offload time, estimated hail weight, and whether the

CV or tender has a deck load. Notification will be through a communication means determined by AFSC FMA, such as using the prior notice of landing or the ODDS system.

3.1.3.10 Equipment and Installation (EM Service Provider)

The EM Service Provider provides services for installation and maintenance of EM systems, coordination with vessels to submit VMPs, inseason troubleshooting and logging of EM system issues, and maintaining communication with agency staff and video reviewers. Additional services may include:

- EM Equipment provision and installation services
- Equipment maintenance and service/repair oversight
- EM Technician and Contractor training and support
- Call center provision and staffing
- Logging/ reporting to the agency on all vessel reported issues or service requests
- Communications with video reviewer on data review issues including requests for onboard changes from the reviewer, and support for data review software
- Vessel communications for video reviewer reported issues follow up and service scheduling
- Creation and provision of technical bulletins and vessel training materials
- Annual VMP updates and signature collection for submission to agency
- Annual program FAQ's and program updates, document creation and distribution
- Provision of data drives and mailers to both vessels and/or processing plants
- Reporting to agency leads on outstanding issues and annual (or otherwise scheduled) program cost reporting.

3.1.4 Shoreside Processing Plant Elements

3.1.4.1 Catch Monitoring Control Plan (CMCP)

Under Alternatives 2 and 3, shoreside processing plants that would be taking EM Trawl pollock deliveries would need to put in place a Catch Monitoring and Control Plan (CMCP) prior to accepting EM deliveries. A CMCP is a plan submitted by the owner and manager of a processing plant, and approved by NMFS, detailing how the processing plant will meet the catch monitoring and control standards to be determined by federal regulations. The BSAI processing plants already have a CMCP in place for the AFA pollock and salmon sorting processes, but the GOA shoreside processing plants do not at this time. If processing plants need to modify their current CMCP to incorporate slightly different requirements of EM offloads, that would be addressed.

The CMCP was not initially a requirement of the EM Trawl EFP. Throughout the first year of the EFP, issues were identified and addressed in near real time through collaborative meetings (including the permit holders, AFSC FMA, and Alaska Regional staff). It quickly became apparent that the observers at GOA shoreside processing plants were unable to collect all the necessary data, but the observers at BSAI shoreside processing plants were keeping up with the workload and able to randomize sample selection. After a preliminary assessment of the data collection efforts, and feedback from the observers in the field, the permit holders implemented Catch Handling Plans at the GOA shoreside processing plants in 2021. The Catch Handling Plans duplicated some elements of a CMCP and helped to address observer issues at the plant, helping to confirm that importance of CMCP requirements for this program.

Under a regulated program, the CMCP requirements will include elements to enable an observer's ability to collect and process random samples and collect the required prohibited species data. These would include (but are not limited to): designation of a plant liaison for each shoreside processing plant who will be responsible for orienting new observers to the plant and assisting in the resolution of observer concerns; a safe location for observer sampling; specifications as to how the fish will move throughout the plant; and how the plant would enable observer's access to communication equipment to facilitate

transmission of their data. Other specifics could include information as to how salmon PSC will be sorted and securely stored until the observer is able to collect the necessary biological information.

In addition, the CMCP would include communications and observation area requirements. More information is included on these two aspects in the sections below.

3.1.4.2 Observer Equipment and Sampling Stations

The BSAI processing plants already have CMCPs in place for the AFA pollock and salmon sorting processes, but the GOA does not have any at this time. Based on feedback from observers there will be minimal updates to the BSAI observation areas, but GOA shoreside processing plants will have to work with NMFS to accommodate the observers sampling at the plants. BSAI shoreside plants have requirements regarding observer sample stations for salmon monitoring, these can be found in 50 CFR 679.28(g)(7)(vi). These regulations will need to be reviewed to ensure that all observer equipment needs will be met for collecting additional data such as biological specimens and species composition.

Each CMCP would designate an observation area. The observation area is a location designated by the CMCP where an observer may collect composition and biological samples, and monitor the flow of fish during a delivery. NMFS will establish a specific list of attributes that will be required for each observation area in Federal regulations for participating shoreside plants. The owner and manager of the shoreside plant must ensure that the observation area meets the outlined specifications.

All observation areas that will be required at the plant will be discussed in the CMCP. Some of these attributes may include but are not limited to:

- Total minimum area allocated for observer station
- Location of observer station (indoors vs outdoors)
- Distance from collection point
- Collection point parameters (such a diverter mechanism)
- Minimum passage widths
- Table dimensions
- Scale requirements (such as types/max height/test weights etc.)
- Flooring (non-slip/grating etc.)
- Lighting (type/amount etc.)
- Other attributes (hose etc.)

In both the GOA and the BSAI, observer sampling areas at shoreside processing plants will need to be assessed and proper parameters will need to be determined by NMFS for observers to collect all necessary data. Additionally, the GOA shoreside processing plants will need to streamline the salmon sorting process and account for this in a CMCP.

3.1.4.3 Observer Communication Requirements

In the GOA and the BSAI communication between observers, CVs, and shoreside processing plant personnel has proven to be imperative to ensure that reliable and adequate data are collected. Without frequent and clear communication, observers will be unable to collect data required for fisheries management. Details that need to be communicated to observers include vessel name, status (EM trip or not, non-EM participant, or observed), total catch on board, expected time of arrival, and approximate processing time or processing rate.

The CMCP should describe necessary communication equipment such as radios, pagers, or cellular phones to facilitate communications within the plant. The plant owner must ensure that the plant manager provides observers with the same communications equipment used by plant staff. Currently, the AFA/CDQ/Rockfish/AI pollock shoreside plants are required to meet catch monitoring requirements regarding observer communications in 50 CFR 679.28(g)(7)(viii).

For the GOA in particular, throughout the EFP observers and industry have had to overcome major communications issues including obtaining/communicating accurate delivery information, plant processing rate, and vessel status. In order to overcome some of these issues, industry and agency staff meet regularly to discuss solutions. The EFP evolved and there have been two tools developed to increase communications between the plants, vessels, and observers: based on observer comments.

1. Instead of the plant communicating offload information, CVs call the shoreside observer directly prior to CV arrival at the processing plant. This allows observers to obtain the information necessary to determine which CVs to include in random samples, and how to format the sampling design prior to any CVs arriving at the dock. The implemented Trawl EM Program will include a notification requirement to assist observer sampling.

   Observer Comment *"Prior to the updated (2021) language in the EFP, observers had no contact with the vessels. The plants were often unable to provide offload times, hail weights, trip status, etc. Once the new language was implemented, things started to improve, but 100% adoption was never achieved. During the last two weeks of the season we seemed to reach peak-adoption by the captains, which meant that most captains were following the permit requirements."*

2. The second solution, the pre-deployment meeting between NMFS staff and observers, was implemented in the first season of the EFP and was revised over time. The pre-deployment meetings helped observers understand their duties and responsibilities, but lacked the involvement of shoreside plant personnel. At this meeting, observers discuss the details of the CMCP/Catch Handling Plan to ensure they know how to they access the information needed to develop a sampling design prior to each sampled EM offload as well as how to safely access catch from the flow of fish. Additionally, this meeting provides an opportunity to discuss where observers can store and work up species composition samples and how/where salmon and halibut will be stored until it can be accessed at the end of each delivery. Pre-cruise meetings have been used in other fisheries such as the Amendment 80 Halibut Deck Sorting (A80 HDS), and the AFA pollock fisheries. The pre-cruise meetings in these fisheries are either optional or required depending on the regulations: CDQ- 50 CFR 679.32(c)(3)(i)(E)(*4*), Rockfish 50 CFR 679.84(c)(7), Longline 50 CFR 679.100(b)(1)(v), A80 HDS 50 CFR 679.120(c).

   Observer Comment **"***There are certain physical difficulties in collecting unbiased samples on the sorting line that need to be expressed to the lead sorter so they know how to direct the pumping crew and can also serve as a point of communication to other sorters. The other sorters need to be somewhat familiar with what we are trying to achieve but are often switched out with other workers from the plant (some of them seem to always work the sorting line but many of them seem to rotate through and do other tasks)."*

Depending on the plant, the observers used a variety of communication tools in the first two years of the EFP. Initially, most GOA plants would use word of mouth or white boards to communicate delivery information. While these tools did communicate information, it was not adequate and observers did not always have the most up-to-date information because delivery times and dates would often change. Some other plants used spreadsheets that were shared with observers via personal emails. This was problematic for three main reasons: 1) not all the of the shoreside observers had access to the information; 2) some shoreside observers did not have 24-hr access to offices to access the computer; and 3) shoreside observers had MSA confidential information in their personal emails. Although all these emails were deleted either inseason by the shoreside observers or at the time of debriefing, this stopgap solution was contrary to data non-disclosure requirements. In 2021, most shoreside processing plants transitioned over to issuing cell phones to shoreside observers. While this was an improvement, there are still outages and sometimes shoreside observers will miss notifications or calls about offloads.

> ***Observer Comment*** *"Again, communication was the biggest challenge. Even with the new EFP language (2021), we had issues with the offload schedule. We experienced the following on multiple occasions: 30 minutes or less prior notification of an offload, only 1 (AM) delivery schedule provided on a given day, inability to get in touch with plant management to address questions about the offload schedule, and not being provided with important schedule updates. When trying to address these issues with the plant, the response was typically something like, "schedule changes happen all the time so we can't ensure you get the correct information." With this excuse, the plant can justify nearly any failure to communicate and they know it. So long as that remains the case, this issue will never be resolved. This is one area where we felt our duties (as observers) and our time were disrespected by certain plant staff."*

In both the GOA and the BS, NMFS would determine the minimum necessary electronic or communication devices that will be required for observers. Additionally, observers will need a computer with a reliable internet connection to communicate and transmit data to NMFS via ATLAS.

3.1.5 MRAs and Trip Limits

Maximum Retainable Amounts (MRAs) (50 CFR § 679.20(e)) are management tools used to limit catch of incidentally caught species so that total harvest can be managed up to, but not over, the TAC by the end of the year. When NMFS prohibits directed fishing for a groundfish species, retention of the catch of that species is allowed up to an MRA. An MRA is calculated as the percentage of the retained catch of a species closed for directed fishing (incidental catch species) to the retained catch of a species open for directed fishing (basis species). The MRA tables (Tables 10 and 11 to 50 CFR part 679) show allowable retainable proportions of incidental catch species relative to retained basis species open to directed fishing. MRAs can lead to a regulatory discard requirement if/when catches of incidental species subject to MRAs exceed the allowable amount at a given time. Amounts caught in excess of the established MRA percentage are required to be discarded under status quo.

MRAs act to reduce the potential of "top off" fisheries where vessels target species, which would otherwise be incidental catch. Alternatives 2 and 3 allow for an EM option on pelagic trawl vessels targeting pollock, which greatly reduces the potential of "top off" behavior. Incidental catch when targeting pollock using pelagic trawl gear typically represents less than 2% of overall catch and is primarily limited to Atka mackerel, Pacific cod, and Pacific ocean perch (POP). During the course of the EFP, there was little financial incentive to target incidental catch on pollock trips and exceeding an established MRA was not a significant issue for participating BS CVs while operating under the EFP. Most processors that receive AFA pollock deliveries do not pay for species other than pollock and Pacific cod. This limits most incentives to target non-pollock species. In the GOA, the incentive for catching POP is low due to the Rockfish Program; POP caught in the pollock fisheries is deducted from the incidental catch allowance. The incidental catch allowance is set each year based on the expected incidental harvest in other target fisheries. In the EFP, when CVs caught POP as incidental catch, the processors were not set up to process it, leading to processing the POP into fish meal.

In the GOA, there is a 136 mt (300,000 lb) retention limit on pollock aboard CVs, requiring vessels to discard any pollock above 300,000 lbs. The pollock trip limit (50 CFR § 679.7(b)(2)) was established in 1998 and revised in 2009 when the Council took emergency action to reduce impacts to Steller sea lions by temporally or spatially dispersing pollock harvests in the GOA. Pollock caught in excess of the 300,000 lb trip limit must be discarded. Both MRAs and pollock trip limits are discard requirements, that are exempted for EM participants.

The Trawl EM Program relies on maximized retention with minimal discards, making it necessary to exempt participating CVs from MRAs and trip limit regulations. Concerns were raised by managers and CVs not participating in the Trawl EM program about the potential impacts of removing MRAs and trip limits including modifying fishing behavior to take advantage of the removal of these regulations. Some

CV operators were concerned that removal of MRAs and pollock trip limits would give advantages to participating CVs. The EFP PIs, in consultation with NMFS, designed performance metrics intended to formulate flexible enforcement steps over the course of the EFP to curtail potential abuse of exemptions to the GOA pollock trip limit and MRAs. The goal was to control fishing behavior so that CVs continue to mostly stay under the limits over the long term, yet provide added flexibility that is needed due to the maximized retention requirement of the EFP.

The pre-implementation performance metric designed sought to reduce/eliminate financial incentives of exceeding trip limits under maximized retention. All participating vessels were required to surrender the ex-vessel value above the prescribed limits (GOA 300,000 lbs pollock limit and GOA-BSAI MRA amounts as published in Table 10 and Table 11 to 50 CFR part 679). Processors will be allowed to process the overages and sell the product but vessels will be responsible for remitting any fines/overage proceeds to the North Pacific Fisheries Research Foundation on behalf of the project administrators to help fund the EM project. The EFP permit holders track and invoice overages based on fish tickets. In addition to forfeiting the value, CVs were tracked separately on pollock trip limits and MRAs to prevent egregious overages or changes in behavior. The performance metrics sought to provide disincentives to changing fishing behavior.

Pollock trip limit - GOA only: All participating vessels were required to surrender the ex-vessel value above the pollock trip limit of 300,000 lbs of pollock.

EFP year 1 (2020): The first two offenses result in documented warnings and conversations with EFP permit holders. The third offense results in a monetary fine assessed to the permit holders. In 2020, $100,211 from 13 vessels (62 instances) were collected from participating CV owners/operators for exceeding the performance metric for pollock trip limit. Of the 62 instances of trips over 300,000 lbs, there were 3 egregious overages (>345,000 pounds) from 3 unique vessels and 4 trip overage violations based on the 4-trip average (4 unique vessels).

EFP year 2 (Fall 2021): Starting in fall of 2021, the performance metrics were slightly modified where offenses were determined by averaging every 4 pollock trips over the course of the year. In 2020 and through the first half of 2021, the value of ***each*** trip in excess of 300,000 lbs was collected, even when the vessel's 4 trip average fell below 300,000 pounds. The goal of the performance standard was to keep vessels below 300,000 pounds on a 4-trip average, however the way it was initially written was excessively punitive by requiring vessels to forfeit proceeds from every trip above 300,000 lbs. Based on feedback and communication between all parties it was determined that only collecting the value in excess of 300,000 lbs on each 4-trip average would meet the goal of the performance standard. This was put into effect beginning in Fall 2021. In 2021, $75,418 from 9 vessels (61 instances of overages) were collected from participating CV owners/operators for exceeding the performance metric for pollock trip limit. Of the 61 instances of overages, there were 6 egregious violations from six unique vessels and 3 trip overage violations based on the 4-trip average from 2 unique vessels.

BSAI-GOA MRA overages: Vessels were allowed up to three (3) offenses (MRA overages) annually. Upon a fourth overage, the vessel may be removed from the EFP participating vessel list. They may also be prohibited from participating in any future EM Pollock EFP. Incidental catches were compared to the pelagic pollock fleet overall (BS, Western GOA and Central GOA fleets independently) to determine if incidental catches (both discarded catch and retained catch) are problematic for all or most fishery participants in that area. If problematic overall (i.e., fleet wide across EM and non-EM vessels), then project managers continued to monitor EM vessel overages but take no further action. If an individual vessel overage stands out in comparison to the fleet, then these incidents will be considered overages if valued at >$250, and the vessel will be asked to forfeit the value. Overages were monitored on a trip-by-trip basis.

Under Alternative 1, when an incidental catch species is closed for MRA, that species is required to be discarded. However, a trawl EM vessel operates under maximized retention. Therefore, under

Alternatives 2 and 3, the trawl EM vessel is required to retain the incidental catch species, even if it is closed for MRA. Any retention of the incidental catch species is technically an MRA overage, but these were not counted against the participating EM vessels, because participating EM vessels were required to retain the incidental catch as a requirement of the trawl EM program. The permit holders tracked all overages, even if the participating EM vessel's overage was due to the maximized retention requirements of the trawl EM program. The permit holders consulted with AKRO staff on all MRA overages. The results from the first two years of the EFP are reported below. FP year 1 (2020): 96 total overages of which 21 were considered offenses and subject to the fee where $7,419 was collected from 7 participating CV owners/operators for exceeding the performance metric for MRAs. Four vessels had two or more MRA overages. The permit holders identified offenses where the overage was not solely due to the maximized retention requirements of the trawl EM program.

EFP year 2 (2021): 52 total overages, of which 13 were considered offenses and subject to the fee where $7,887 was collected from 8 participating CV owners/operators for exceeding the performance metric for MRAs. Six vessels had two or more MRA overages.

These performance metrics have proven to be an effective tool to manage changes in CV behavior. However, implementing similar performance metrics through regulations may present some difficulty due to limitations on MSA authority to collect the value of fish in excess of a limit. Below are two options to approach MRAs and trip limits.

Option 1: Exempt participating trawl EM vessels from MRAs and trip limits regulations. The Council conducts a reevaluation of exemptions every three years. NMFS will track MRAs and pollock trip limits and report to the Council in the annual in-season management report on trends related to exceeding MRA and pollock trip limits in the GOA. Pollock trip limits were implemented as a mitigation measure for Steller sea lions and removing this may require consultation.

Option 2: Exempt participating trawl EM vessels from MRAs and trip limits regulations. In addition, a regulation would require participating Trawl EM vessels to join an incentive plan run by an industry group and approved by NMFS. The incentive plan can function similar to the performance metrics system in the EFP. One example of an incentive plan in regulation is the Salmon bycatch incentive plan agreements that apply to vessels participating in the BS pollock fishery (50 CFR 679.21(f)(12)). The incentive plan could be designed such that all participating Trawl EM vessels need to be a part of an incentive plan with established goals to avoid exceeding pollock trip and MRA limits. The incentive plan could also be used to increase communication among vessels to avoid PSC. Similar to the performance metrics system, this would allow for a flexible approach to avoid negative impacts to the fishery. There could be separate incentive plans created for CVs in BS and GOA, based on the characteristics of the fleet. The incentive plan agreement could include an annual report to the Council and a reevaluation of the incentive plan every three years.

3.1.6 Observer Data Collection

3.1.6.1 Coverage Requirements

CVs participating in the Trawl EM program in the BS are in the full coverage observer category and have observer monitoring associated with every trip. This program is currently limited to pelagic fishing, and the AI has been reallocated to AFA cooperatives for harvest in the BS. Under this program, the responsibilities associated with the at-sea collection of species composition samples, PSC data collection, biological samples, and other sampling assigned by the AFSC FMA normally conducted by at-sea observers (on non EM trips) will be completed by observers stationed at the shoreside plant. Currently, observers assigned to vessels disembark the vessels at the offload and complete their data collection for salmon PSC at the processing plants, and are assisted by the observers stationed at the plant. Effectively,

two observers (at least) are therefore working to account for salmon PSC – one on each vessel and at least one at the plant. Processing plants participating in the trawl EM program will require additional observers to account for the removal of vessel observers.

Under status quo (Alternative 1), trawl CVs in the GOA are in the partial coverage observer category and are randomly selected to be monitored by an at-sea observer. Under an implemented trawl EM program (Alternatives 2 & 3), the goal is to achieve shoreside observer monitoring at a rate of 1 in every 3 trips (33%). In addition, select CVs may deliver to tender vessels participating in the EFP. Under Alternative 2, those GOA tender vessels will be included in the observer sampling design of 33% in the GOA. Tender vessels may only accept catch from GOA CVs participating in the EFP. Similarly, participating CVs may only deliver catch to shoreside processing plants or tender vessels that are also participating in the EFP; EFP tender vessels must deliver to shoreside processing plants participating in the EFP. Under a regulated EM program, the observer coverage rates to monitor deliveries from CVs and tender vessel offloads would be determined by NMFS through the ADP process.

Vessels that opt into the Trawl EM selection pool will not be fully exempt from carrying observers on board. NMFS will maintain the right to deploy observers on EM CVs for the purpose of filling any data gaps that are not yet apparent, or collecting data for research projects requested by data users. Examples of data collections that may require observers to be on board Trawl EM CVs include sampling of marine mammals, birds, sharks or skates, as these animals are often discarded and not available to shoreside observers.

3.1.6.2 Data Collection Priorities

Under the EM program, shoreside data collections will replace at-sea sampling and data collections that would have occurred on CVs had an observer been deployed. These shoreside collections should mirror standard at-sea observer data collections and will include additional data collections based on management and scientific needs. Note that EM data is confidential and not subject to FOIA.

CMCPs are currently required for shoreside processing plants taking deliveries from AFA and CDQ pollock, CG rockfish, and AI directed pollock (50 CFR 679.28 (g)). The regulations at 50 CFR 679.28 have proven to be adequate for monitoring salmon bycatch in the BS and AI pollock fisheries. Some of the requirements outlined in the BSAI CMCPs include the standard requirements for observation areas/stations, communication with observers, and access to fish (including salmon bins). These requirements are vital in aiding the observer to collect reliable salmon retention data for each offload. With the addition of EM pollock pelagic trawl, and removal of observers from these CVs, data collection duties previously conducted by at-sea observers were transferred to the observers at the shoreside processing plants. The additional collection of composition and biological data at the shoreside processing plants were necessary to fill the data gap that would emerge without observers collecting these types of data at sea on the CVs. This resulted in an increased workload of the shoreside observer, and one or more additional observers were needed per shift to collect the composition and biological data as outlined by the AFSC FMA while continuing to monitor the sorting lines for salmon.

A preliminary review of the data collection efforts was done by NMFS and EFP PIs in March of 2020, and it became apparent that the project was not meeting its sampling goals. Although there were multiple elements that impacted the data collection efforts in 2020, it became clear that one observer at the plant could not cover all the species composition, biological data collections, and conduct the salmon monitoring at the same time. The species composition and biological data collection efforts fell below goals initially set by the Trawl EM EFP in March 2020. In the 2020 B season additional observers were placed at the plants so that at least two observers would available during each 12-hour shift to cover the EM pollock offload duties outlined by the AFSC FMA. With the addition of the extra observers at the plant, the sampling effort and monitoring goals were greatly improved.

3.1.6.3 Data Collection Methods

The current priority for Trawl EM is improved salmon accounting. To do this under the current framework, the sorting process must be monitored by an observer at the plant's sorting line. AFA deliveries typically have two observers present during an offload, one observer can monitor the sorting belts for salmon, or collect biological samples from salmon, while the other can collect species composition and biological samples from non-PSC species throughout the offload. To set up a sampling design for composition samples, observers must first obtain an estimate of the offload size and anticipated duration of sorting. This information can be provided by or obtained from the CV or plant personnel prior to the start of the offload process. Once the species composition samples are selected, the observers can collect the biological data from within these samples as outlined by the Observer Program.

3.1.6.4 Species Composition

Species composition samples should be collected throughout each monitored offload when possible. These samples will serve as the source of fish (population) for biological specimens for each delivery as well as provide a means for auditing the fish ticket information provided by the plant. When at least two observers are available to assist with a single EM offload, one observer will monitor catch as it flows across the belt while the other collects and processes composition samples.

3.1.6.5 Biological Sampling

Observers currently collect sex and length data and other biological specimens such as otoliths from pollock and other species from within species composition samples collected at the plant. The collection of species composition and biological specimen data is determined annually by AFSC FMA in collaboration with their data users. Figure 3-3 below provides an example of the data collection objectives that were in place in 2021. Note that shoreside observers did not collect halibut viability data because all halibut were considered dead; however, halibut length data were collected for every halibut encountered dead.

Predominant Species	Sex/Length Data	Biological Data (All specimen fish must have an associated s/l/w specimen)	Halibut Condition
Bering Sea Pollock	**Every Sampled Offload** ~100 pollock **and** ~100 squid (unsexed) **and** ~25 Rougheye **and** ~25 Sablefish	**Every Sampled Offload** 2 pollock otolith pairs with maturity scan for all female otolith fish **and** ~ 8 pollock sex/length/weight specimens (must not be from an otolith fish) **Every Sampled Offload** 25 Rougheye otolith pairs	**Every Sampled Offload** Measure and Assess the Viability of **ALL** Halibut
Gulf of Alaska Pollock	**Every Sampled Offload** ~ 150 Pollock **and** ~ 30 Pacific Cod	**Every Sampled Offload** 25 Pollock otolith pairs with maturity scan for all female otolith fish **and** 5 Pacific Cod otoliths	**Every Sampled Offload** Measure and Assess the Viability of **ALL** Halibut

Figure 3-3 Example of 2021 EM EFP Biological Sampling Goals

3.1.6.6 Halibut Monitoring (L/W and count)

While monitoring the sorting of salmon throughout the offload process, the observer monitoring the sorting activity will also monitor the sorting/retention of halibut. This collection, similar to the process of conducting a salmon retention count, aims to provide a total accounting of all halibut within the offload. Salmon and halibut must be removed and set aside in a designated storage area/container (e.g., observer basket, crab tote etc.) until the end of the offload process. Once the salmon retention count and its associated specimen collections have been completed, each halibut is measured and weighed.

3.1.6.7 Salmon Data Collection

Conducting an accurate and reliable salmon count is prioritized above all other data collections. When monitoring the flow of fish during an offload, an observer's attention must remain on the line and should not be diverted or focused on other tasks. The final salmon retention count will occur at the end of each offload and will be conducted in a manner consistent with current AFSC FMA salmon data collection protocols outlined in the observer manual. It is important that each pollock offload (whether BSAI or selected GOA trips) has a precise salmon retention count and is associated with the appropriate delivery (eLandings number). CMCPs are essential for accurate salmon accounting and enable NMFS to work with each processing plant to account for salmon bycatch in the processing plant.

An observer spends the majority of an offload on the sorting line looking for salmon along with all the plant sorters. During this time, they should not be collecting other samples; hence the need for two observers to be on shift simultaneously. Throughout this EFP, participants have been discussing how to better use observer time to meet sampling goals. The time spent sorting PSC was identified as the largest time sink that may present options for efficiency.

The agency would like to explore alternate methods to continue to collect precise salmon and halibut PSC data and allow for increased opportunities to collect biological samples and other data. Ideas include adding elements to the CMCP similar to sorting bin monitoring on trawl catcher processors and development of EM systems that can identify and track salmon through sorting activities. NMFS will continue work on technology and operational changes to provide opportunities for observers to focus on collection of other data during offloads rather than focusing solely on salmon PSC sorting.

Salmon genetic collections will be conducted at a rate set by AFSC FMA for BS and GOA (see flowchart below as an example). The frequency and subsequent quantities of genetic specimens vary by fishery and will be collected following AFSC FMA data collection protocols. Salmon encountered may contain small, embedded tags called coded wire tags (CWTs) and/or larger external tags. Tag recovery will be conducted by observers per AFSC FMA guidelines.

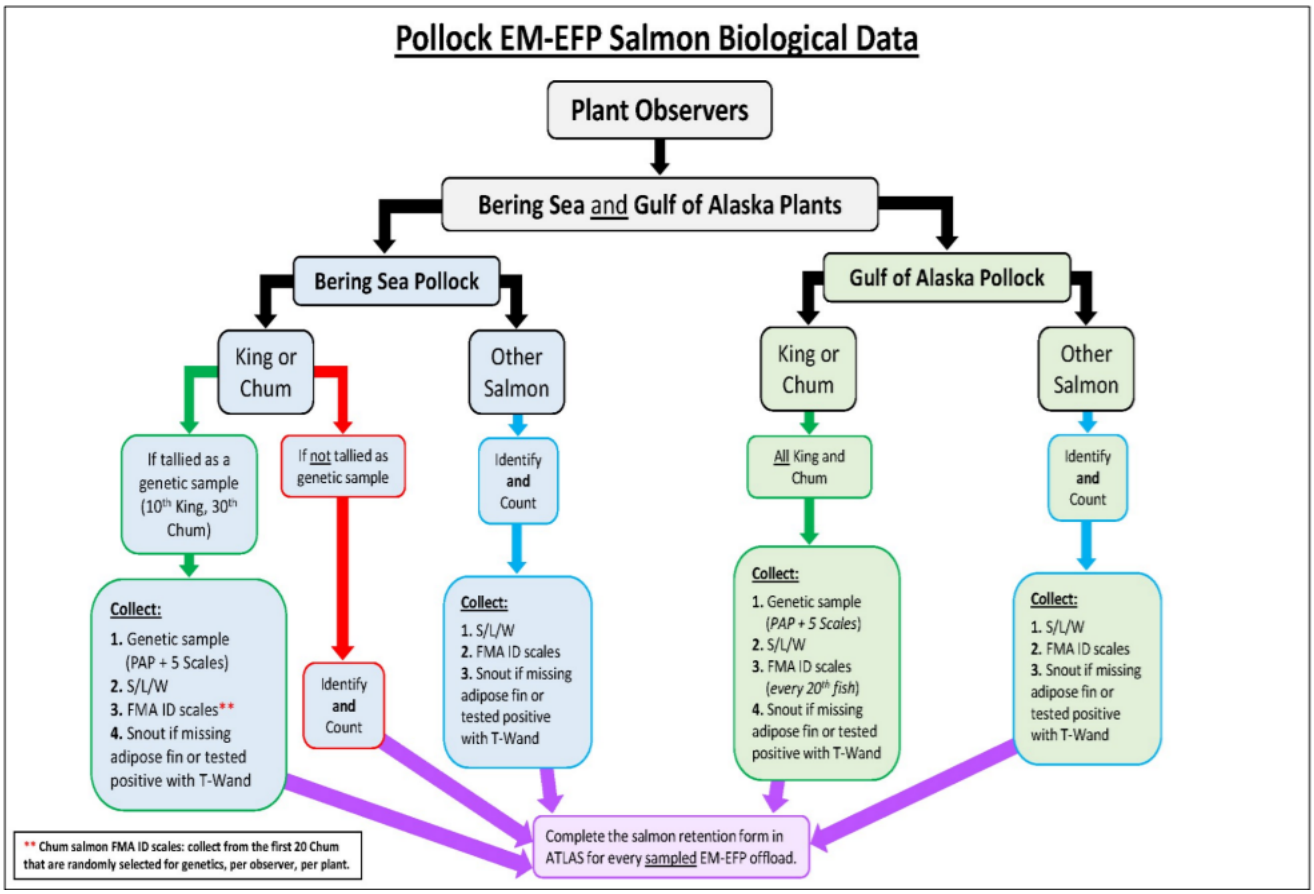

Figure 3-4 Pollock EM-EFP Salmon Biological Data Flow

3.1.6.8 Prior Notice of Landings or Similar Mechanism for Notification

One major component of the regulations for this program will include outlining a vessel reporting mechanism in which vessels can convey necessary information to observers prior to their arrival in port. NMFS will need to determine a regulatory mechanism and timeline for the delivering vessels to report necessary information prior to landing. Vessel operators will be required to notify NMFS upon completion of fishing. This will be similar to a prior notice of landings and the data collected would be used to assist observers in determining their sampling design. The system design may include a web form (with phone support) to report necessary details about delivery. The information conveyed would include the estimated date of delivery and location (which processor), estimated total catch, and whether EM was used.

3.1.6.9 Deployment of Observers on EM Vessels as Needed to Support Stock Assessment

If specified in the ADP, observers may be deployed onto a portion of trips that are also being monitored by EM systems in order to provide data to stock assessment analyses. This overlap in coverage (EM imagery and observer standard data collections) will allow catch and specimen data collections to be aligned with at-sea locations and other data from the video record, thus allowing the development of indices relating EM and observer data. At-sea data collections using both systems would supplement the shoreside data collections and provide increased data resolution.

3.1.7 Video Review

3.1.7.1 Video Review Entities

Video review in the trawl EM program is used for compliance monitoring and is integral to ensuring that vessels are complying with program requirements. During pre-implementation, the EFP project managers worked with two video review entities: Saltwater Inc. (SWI) and the Pacific States Marine Fisheries Commission (PSMFC). SWI reviewed video for GOA CVs and GOA tenders. PSMFC reviewed video for GOA CVs and BS CVs. Both entities have familiarity with electronic monitoring through involvement with the Alaska fixed gear EM program and participation with EM programs in other Regions. The review teams at SWI and PSMFC consist of current and former NMFS-trained observers with experience in the North Pacific. Both entities established video review protocols and training for their review team specific to this program. Training differs between the video review entities and may include exercises such as data validation and discard estimation.

3.1.7.2 Video Review Protocols

During pre-implementation, every haul on every trip was reviewed. Additionally, all offloads to tenders were reviewed. The two EM video review entities developed in-depth protocols for their review team to assess compliance with the trawl EM EFP. This provided an additional opportunity within the EFP to test different review protocols. For video review, NMFS did not place restrictions on the development of review procedures, but was available for feedback on program objectives and data collection needs. Once review procedures were established, NMFS ensured that reviewer protocols met data collection goals and compliance monitoring objectives. For example, reviewers were free to use their choice of review software, establish their own methods for identifying video gaps or, establish specific procedures for vessel feedback.

In general, there were commonalities between two review procedures. Reviewers can go directly to video footage when gear is in operation based on information collected by sensors in the EM system or the identified haul times from the vessel logbook. The video reviewers can review at various speeds and use multiple camera views as needed to enable collection of data. Reviewers focus on the horizon and stern camera, viewing the net for any fish discards from rips or tears in the trawl net. Once catch comes onto deck, the reviewer focuses on the deck and handling of the fish. For this program, EM systems were set up to show all areas of the deck to ensure that operators complied with maximized retention requirements. In most cases on a pollock CV, there is minimal fish handling because the fish typically flow straight into refrigerated seawater tanks. If discards occur, the reviewer will estimate the weight and compare to estimated discard weight from the vessel logbook. Issues identified through video review are reported to the vessel through the vessel feedback form.

Each video review entity developed review procedures individually leading to some differences in review protocols. This was an opportunity to evaluate differences in review protocols to help inform standardization for the implemented program. For example, SWI conducts a blind review where vessel logbooks are not formally assessed until video review for the trip is completed. While both entities fully review video during fishing activity, the blind review could help identify discards outside of fishing activity that were not reported in the vessel logbook. This was particularly important in the WGOA where the majority of participating vessels were under 60ft and therefore not subject to logbook requirements prior to participation in the EFP. As part of the EFP, these under 60ft vessels became subject to logbook requirements and there was a learning period where vessel operators had to learn the proper logbook reporting procedures for reporting discards. The blind review can help identify discards outside of fishing activity, but also lengthens the time for video review. Under alternatives 2 and 3, NMFS will work with video review entities to establish a consistent and standardized review protocol that meets the data collection goals and maintains cost-efficiency for the program.

During the Trawl EM EFP pre-implementation, it was identified that the stern cameras provide additional data that may not be available to at-sea observers under Alternative 1 – no action. During retrieval of the trawl net, the areas in the stern of the CV are dangerous and the at-sea observer typically does not have access due to safety reasons. Video cameras have clear views of the stern and when combined with a horizon view provide data that are not typically available to at-sea observers such as fish leaving the net from overfull nets (spillage) or rips and tears in the net. These discards are captured on camera and estimated by the video reviewers under alternatives 2 and 3. In the EFP, CV operators consistently attempt to estimate these discards in the logbook, allowing for comparisons between the discard estimates in the logbook and those by video reviewers. For more information on comparisons on discard estimates, see Section 4.10.

Under alternatives 2 and 3, NMFS would continue to work with EM video reviewers to ensure that review protocols meet data collection goals and verify compliance with the program. NMFS will establish reporting requirements for EM review, entry of logbook data, and how the EM review data would be made available to NMFS.

3.1.7.3 Feedback Mechanisms

A core part of this program is communication between the vessel operators, EM service providers, and the video reviewers. Prompt and open communication to the vessel allows issues to be addressed quickly and give participants the chance to improve performance.

3.1.7.4 Vessel Feedback Report

EM reviewers used a vessel feedback report to communicate with the vessel operators on their performance. The primary use of these reports is for education and outreach. The vessel feedback report is emailed to the vessel operators after the review of a hard drive. Throughout the pre-implementation EFP, most vessel feedback reports do not indicate any issues, providing vessels updates that they were complying with all the program requirements. If there were identified data quality or functionality issues in the vessel feedback form, vessel operators and EM service providers worked together to troubleshoot the issue and typically resulted in improved compliance, with little additional outreach from agency staff.

The vessel feedback reports provides enhanced communication between the agency, EM service providers, video reviewers, and the vessel operator. The use of the vessel feedback report helps address data quality or technical issues in a timely manner to reduce loss of data. It also acts as a way to communicate with vessel operators on how they can improve data quality by improving their catch handling to result in high quality data.

The vessel feedback report (**Figure 3-5**) has four main sections with multiple elements under each section as follows:

1) Reporting issues: feedback on the operation of the EM system. These metrics include hard drive and logbook submission in required time period and completeness of hard drive and logbooks. This section confirms the video was recording during all parts of the trip including the offload.

2) Functionality issues: feedback on the EM system including if a function test was performed at least two hours before setting gear for a CV or accepting a delivery for a tender. This section identifies any critical malfunctions that occurred and whether the operator noted the issue in the logbook.

3) Data quality issues: feedback related to data quality. This section identifies any sensor or time gaps in EM data, compliance with catch handling procedures identified in the VMP, issues with camera views, and lighting or other issues that may affect data quality.

4) Catch related issues: This section of the vessel feedback report notes any discards that occurred, whether these were reported accurately in the logbook and that the vessel was compliant with the maximized retention requirements.

Drive Report for Sensor and Video Review

This document summarizes EM data review for the following drive(s). This report may not be inclusive of all EM issues. This report may contain sensitive or confidential information and is intended only for the vessel owner(s), vessel operator(s), or authorized representative(s). If you are not the intended recipient, you may not access this report or share the information with any other unauthorized person, and must immediately destroy all copies. By downloading this document you acknowledge notification of any potential violations of the terms and conditions of the exempted fishing permit.

Report ID:	**Vessel Name / Date**	**Date of Data Set Begin:**	**10/xx/2020**
Vessel Name:		**Date of Data Set End:**	**10/xx/2020**
Date of Report:		**Date Drive Received:**	**10/xx/2020**
Completed By:		**Number of Fishing Trips on Drive:**	**3**

Trip Number:	Return Date:	Fish Ticket Number
1	10/xx/2020	E20xxxxxx
2	10/xx/2020	E20xxxxxx
3	10/xx/2020	E20xxxxxx

Note this is a sample. The data presented here is not real. It is very rare for multiple events to be reported on a drive report. Most drive reports have at most one category with a note. I grabbed examples from multiple different reports over the year to show how we communicate various issues.

	Event	Present: (Y/N/P/NA)	Comments:
Reporting Issues	Hard drive submitted in the required time period	Yes	
	Hard drive submitted with a complete data set	Yes	
	Logbooks submitted in the required time period	Partial	Trip 2 logbooks submitted late due to internet issues.
	Logbooks submitted complete	Partial	Sample TEXT Trip 2, Haul 2: Rockfish kept for personal use not recorded in the logbook Please record all personal use in logbook
	Number of trips on hard drive does not exceed maximum trips allowed under vessel's EFP	NO	Drive submitted after 4th trip (3 trips are allowed per vdrive)
	Vessel recording continued through offload	Yes	
Functionality Issues	Pre-Trip Function Test Completed	Yes	
	If a critical malfunction occurred, the vessel stopped fishing until it was resolved or downgraded (Note: they are allowed to complete the haul if gear is already deployed)	N/A	
Data Quality Issues	Sensor and Video Data Complete (No Time Gaps)	Partial	Sample TEXT Trip 1, Haul 6: 3 sensor/video gaps during the beginning of the tow, ~1.5 minutes each. These did not impact review. Trip 2, Haul 4: During the middle of the tow, the system rebooted itself and lost the forward deck camera. This did not impact review as the other views covered what we needed to see. These issues did not occur again for the remaining trips on the drive. There was a note in the logbook that recorded the system reboot and forward deck camera issue.
	All catch handled inside of camera view and consistent with VMP. Camera views are unobstructed, lighting adequate, etc. Ability to identify the species of fish caught and/or discarded or the fate of the catch is uncompromised by image quality	Yes	
Catch-related Issues	All discarding occurred at VMP designated control point	Yes	
	All fish retained other than operational discards, animals larger than 6-ft, unavoidable discards	Yes	SAMPLE TEXT Trip 2 Haul 2: Had a 25,000 lb net bleed/overfull net. Recorded in logbook.
Other Notes:			

Figure 3-5 Example Vessel Feedback Report

Under alternatives 2 and 3, NMFS proposes to continue to provide vessel feedback reports and include elements of the vessel feedback report to be moved into the Electronic Monitoring Service Provider (EMSP) web portal, which is currently used to provide feedback for vessels in the fixed gear EM program. This would create uniformity amongst the EM programs and leverage an already existing application. Instead of the EM video reviewer emailing vessel feedback form to the vessel, the EMSP web portal would send vessel feedback directly to the vessel. Use of the EMSP web portal would streamline the vessel feedback process and help with tracking issues over time. The EMSP web portal can track all EM issues for a vessel and their resolutions. This would simplify tracking EM history for vessels and help identify trends over time.

3.1.7.5 Video Review During the EFP

Video review time in Table 3-3 and Table 3-4 refer to time spent on data review annotations/video review. There is additional time needed by video to conduct data processing, reference review resources, enter data, conduct QA/QC, and send vessel feedback forms before the EM data can be used and interpreted by agency staff. For the purposes of this analysis, video review only refers to data review annotations/video review time.

Table 3-3 Descriptive Information on Video Review

Categories	PSMFC				SWI			
	BS CV		GOA CV		GOA CV		GOA Tender*	
	2020	2021	2020	2021	2020	2021	2020	2021
Number of hauls reviewed	1807	3321	604	674	445	277	66	24
Number of trips reviewed	513	1055	255	298	250	150	21	12
Number of unique vessels reviewed	24	46	17	30	14	13	11	4
Number of drives reviewed**	198	396	104	120	106	61	20	13
Avg number of hauls per trip	3.5	3.1	2.0	2.0	1.8	1.9	3.1	2
Avg review time per trip (excluding offload) (minutes)***	16.5	19.8	11.5	13.3	75.6	51.6	103.2	49.8
Avg review time for offload only (minutes)***	23	N/A	15	N/A	17.4	N/A	28.2	N/A

*Hauls for tenders refer to CV deliveries to tenders
**Some PSMFC drives had both GOA and BS trips, therefore there is some overlap between these numbers
***Review time includes only the data review annotations/video review and does not include data processing, referencing review resources, documentation, and QA/QC.

Travel and turnaround time for video review (Table 3-4) differ between the two video review entities for many reasons. The amount of time required for an EM hard-drive to arrive at the video review entity differed in part due to the workflow and fishery characteristics of their respective fleet. SWI reviews video for WGOA vessels who operate in an open access fishery, leading to a race for fish. When the fishery is open, there is concentrated fishing effort in a short time window, leading to corresponding heavy pulses of video review workload. For PSFMC, the majority of trips are from the BS, where the fishery is rationalized and spread over a longer time period, allowing a more steady stream of video review workflow. Additionally, for 2020 and 2021, the CVs in the CGOA (primarily reviewed by PSMFC) have operated under voluntary catch shares agreements, further spreading out the catch over a longer time frame despite this being an open access fishery. Review time for both review entities are affected by rare instances of hard-drive issues (e.g., lost hard-drive or software malfunctions). For all ports, hard drive travel time could be delayed by poor weather, postal service staffing issues, or other logistical reasons.

In addition, the WGOA fleet primarily operates with smaller vessels that are less than 60ft. These smaller vessels typically have three cameras (instead of four cameras on larger vessels). For discard events, this

configuration provides fewer redundant views and requires more review time to replay the video imagery at a slower rate and, as needed, multiple times. Additionally, the WGOA fleet operating under the race for fish, often set gear before catch is completely stowed from the previous haul, making hauls longer and extending review times. This type of catch handling also requires reviews to be completed at a slower pace than if hauls were shorter and completely stowed before setting additional gear. This fleet also saw improved data submission time from 2020 to 2021, after the initial learning curve and increased outreach by SWI to the vessel operators.

Table 3-4 Travel and Turnaround Time for Video Review

Categories		PSMFC				SWI					
		BS CV		GOA CV to Shoreside		GOA CV to Shoreside		GOA CV to Tender		GOA Tender trips	
		2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
Duration of a trip (days)	Avg	3.5	3	3	3	2.4	2.2	1.9	2.3	4.4	2.5
	Min	1	1	1	1	1	1	1	1	2	1
	Max	7	10	7	12	18**	4	3	4	8	5
Drive travel time (trip end until arrival at EM Reviewer) (days)	Avg	6.5	6.5	5.5	6	11	6.6	8.8	6	6	4.8
	Min	1	1	1	1	0***	1	3	3	2	3
	Max	38	21	9	18	63****	21	16	15	11	7
Time at EM reviewer (Drive arrival until completion of review and feedback forms are sent) (days)	Avg	4	47.5*	4	40*	26.2	29.2	33.4	26.3	26.7	20.4
	Min	0	3	0	4	1	2	1	7	4	6
	Max	16	226*	18	99*	60	50	58	39	55	51
Review time for a single trip (minutes)*****	Avg	16.5	19.8	11.5	13.4	73.2	46.2	60.6	45	99.6	45.6
	Min	2	2	2	2	19.8	16.8	22.8	15	39	4.2
	Max	61	118	50	72	420	219	169.2	88.8	195	142.8

*Extended time was due an issue affecting six drives making data initially inaccessible, but the EM Service Provider was able to troubleshoot and provide access to the data.
**Rare circumstance in which the vessel returned to port due to equipment issues, but did not offload due to stand down, and eventually went back out to fish again and deliver.
***Reviewer in the field available to collect hard drive
****Hard drive was missing due to incorrect submission by the vessel. The drive was recovered and reviewed.
*****Review time includes only the data review annotations/video review and does not include data processing, referencing review resources, documentation, and QA/QC. Reported times does not include review of offload video that was required in 2020.

Table 3-5 shows completeness of video data during the EFP. The table identifies video gaps and the percentage of gaps that affected EM video review. Effects of gaps on EM video review does not necessarily mean that data was affected. In the majority of cases, effects on EM video review means that video review times or processes were extended or delayed, but review of catch data was still completed. For example, video reviewers note that it is fairly normal to see ~1 min gaps outside of hauling events that do not impact the quality of the data.

Table 3-5 Completeness of Video Data

Categories	PSFMC								SWI**			
	BS CV				GOA CV				GOA CV		GOA Tender	
	2020		2021		2020		2021		2021*		2021*	
	#	%	#	%	#	%	#	%	#	%	#	%
Trips with incomplete video	24	4.7%	58	5.5%	6	2.4%	7	2.3%	35	23.3%	0	0.0%
Trips where incomplete video affected EM review	20	3.9%	54	5.1%	4	1.6%	5	1.7%	17	11.3%	0	0.0%

* Data from SWI unavailable for 2020
**SWI included additional gaps that were marked by a reviewer for missing data or data that looked problematic.

The two years of the EFP operated during COVID-19 pandemic with wide-ranging supply chain issues including those for EM equipment. Over the last few years, Archipelago Marine Research, Inc. (AMR) has seen four different models of cameras due to challenges in reliability and due to supply chain issues with both processor chips for the cameras and other camera module components. Each time a new model needs to be sourced, there is significant work required to ensure that new models are fully compatible with the existing models, and that all models can communicate sufficiently with EM system software and video recording modules. Changes in camera processor speeds and firmware functionality for these new models over the last couple of years have resulted in a slightly higher rate of system watchdog (which preform specific operations after a set period of time) restarts which result in short sensor and video time gaps that are typically 1.5 to 3 minutes in length. These watchdogs are built into the EM system software and are designed to detect non-responsive cameras and reboot the EM system to bring these non-responsive cameras back online as quickly as possible to reduce the overall video gaps. AMR is actively developing new control center hardware and system software intended to reduce these gaps and provide improved functionality overall. These changes will enhance the AMR's ability to communicate with a wider variety of current camera manufacturers' communication protocols, which will help reduce the overall number of video gaps.

SWI also encountered camera issues due to a manufacturer defect in camera hardware, leading to a replacement of 22 cameras. However, most the cameras were replaced prior to the fishing season so data was not affected.

Video review also identifies equipment issues that affect the EM data. EM video reviewers include hardware issues as part of the vessel feedback form, prompting EM service providers and vessel operators to resolve the issue. Often, EM service providers are already aware of issues, but video review is an additional tool to keep the project team updated on statuses of fixes and new equipment issues. For example, during the course of the EFP, some models of cameras encountered issues with some imagery displaying off-color, generally with a saturated pink or purple hue. AMR worked with the camera manufacturer to determine a fix and it was determined that a temporary switch to a different operating mode within the camera itself can bring affected cameras back to true color. This issue has been largely resolved by the camera manufacturer with newer models that have improved extreme low and bright light handling capabilities. Video review is also used to identify insufficient video recording time, which is used to keep the cameras recording after a designated sensor trigger is no longer active. The run-on time is designed to capture the fish processing on deck and the deck cleaning activities that occurs after the hydraulics are tuned off. During the first few EM trips for a vessel, video review identifies whether all fish were processed and stowed within the programmed run-on time, this allows the EM service provider to make changes to the run-on time to ensure that fish processing could be fully captured.

The impact of the equipment or video capture issues depends on what is missing (Table 3-6). The highest impact scenario is when the hard drive is missing, or fails and is not recoverable, leading to a loss of all data for those trips. Video gaps can impact data differently depending on whether it is during fishing activity or not. Issues are individually evaluated by the video reviewer to assess whether data will be impacted and will communicate such issues through the feedback mechanism.

Table 3-6 Issues that Impact Data Quality and Video Review

Categories	Potential impacts on data quality and video review	Level of impact
Hard drive missing or hard drive failure	Inability to extract information from the hard drive would lead to loss of all data for those trips.	High
Missing video - from hauling activity until all catch is stowed	Could lead to the inability to verify no discards during hauls, such as net bleeds. If discards are observed, the reviewer's estimate could be affected. Variable impacts depending on when video gap is occurring and which camera.	High
Missing video - during steaming activity	For deckloads or when catch is not completely stowed, inability to verify no discards during steaming and cannot confirm the chain of custody.	Medium
Missing video - during offload	Discards could be missed that occur during offload, including sharks and fish removed for personal consumption. For deckloads or when catch is not completely stowed, inability to verify no discards during offload and cannot confirm the chain of custody.	Medium
Poor catch handling	Poor catch handling could lead to inability to monitor catch, identify discard species, or affect the discard estimate.	Medium
Image quality - poor camera angles	Depends on severity and whether blind spots occur. Could lead to inability to properly monitor catch, discards to be missed, or affect reviewer estimates or speciation of discards	Medium
Image quality - dirty cameras, water spots, obstruction	If occurs during fishing activity, could lead inability to properly monitor catch, discards to be missed, or affect reviewer estimates or speciation of discards	Medium
Image quality - night lighting, tinted cameras, sun glare	Depends on severity. Could lead inability to properly monitor catch, discards to be missed, or affect reviewer estimates or speciation of discards	Medium
Logbook delayed or missing	Has no effect on EM review or EM data, but may affect data in eLandings.	Low
Missing sensor data	Variable impacts depending on the sensor and whether it leads to missing data. Missing rotation and/or the pressure sensor would lead to video not triggered for hauls, but remaining sensors should continue to trigger recordings or vessel could initiate manual record.	Low

3.1.7.6 EM Data Retention

In April 2020, NOAA released NMFS Procedure 04-115-03[10] on third-party minimum data retention period in electronic monitoring programs for federally managed U.S. fisheries. This procedural directive applies to the video, images, or other sensor data collected during fishing operations, as well as associated metadata (e.g., trip sail date, vessel information). This procedural directive does not apply to federal records. Based on this procedural directive, EM program design should include requirements for a 12-month minimum retention period once NMFS officially completes data reconciliation and catch monitoring for the fishery. This recommendation is a minimum retention period and does not prevent NMFS or the Councils from recommending a longer retention period depending on the needs and objectives of the program. Further, EM service providers and participating vessels may retain EM data for longer than 12 months if so desired for business or other purposes.

Video review entities should make readily available, in an accessible format, and in a timely manner if NOAA staff requests any EM data during the catch monitoring or data retention period for the fishery. NMFS will ensure that third party video review entities consider all EM data as observer information for confidentiality purposes as required under Magnuson-Stevens Act.

3.1.8 Integrating Trawl EM Data into Catch Accounting & Stock Assessment

3.1.8.1 Catch Accounting

This section outlines how data from the Trawl EM program will be incorporated into the Catch Accounting System (CAS). The purpose of the CAS is to assess the amount and type of total catch and bycatch in groundfish and halibut fisheries off Alaska. Observer information, EM data, dealer landing reports ("fish tickets"), and at-sea production reports are combined to provide an integrated source for fisheries monitoring and management decision making. An important aspect of the CAS is to provide near real-time delivery of accurate data for in-season management decisions. To meet this objective, data from industry is reported through eLandings and is fed into the NMFS database every half-hour. Data from observers and fixed gear EM are integrated into the AFSC FMA database as soon as they become available, and are incorporated into the CAS every night.

The CAS relies on observer data, information from electronic monitoring (EM), production, and landings information to generate estimates of total groundfish catch, including at-sea discards, as well as estimates of PSC and other non-groundfish incidental catch. The estimates of PSC are based on at-sea sampling by observers or data from fixed gear EM used in conjunctions with observer data. Observer data are used to create PSC rates (a ratio of the estimated PSC to the estimated total catch in sampled hauls). This observed information from the at-sea samples is used to create PSC rates that are applied to unobserved vessels. For trips that are unobserved, the PSC rates are applied to industry reported landings of retained catch. Expanding on the observer data that are available, the extrapolation from observed vessels to unobserved vessels is based on varying levels of aggregated data (post-stratification). Data are matched based on processing sector (e.g. catcher/processor or CV), week, target fishery, gear, and federal reporting area. A detailed description of the current catch estimation methods was published by Cahalan et al. (2014).

The Trawl EM program combines: maximized retention requirements; EM on 100% of trips for all vessels (both CVs and tenders) in the program; and shoreside observers. The information derived from the EM video is not used directly in the CAS and instead is available for verification and potential revisions to eLandings landings reports and observer reports. The data used for management comes from elandings landing reports, or observers in the shoreside processing plants that monitor offloads to collect biological data and obtain species composition information and offload data on PSC.

[10] Available at: https://www.fisheries.noaa.gov/national/laws-and-policies/policy-directive-system

Information on both retained and discarded groundfish on Trawl EM trips come from landing reports. This is true even on partial coverage Trawl EM trips in the GOA where an observer is not selected to sample the offload at the shoreside processing plant. If there is any groundfish that is discarded at sea on the Trawl EM trip, the CV notes this information in their logbooks, provides a discard report to the plant, and the discards are reported on the eLandings landing report. Some species, such as sharks, are permitted to be discarded and are self-reported. Data for these discards is collected in the logbook and then reported on the eLandings landing report. The self-reported discards can be verified via the information derived from the Trawl EM video review. There is video on 100% of Trawl EM trips in both the BSAI and GOA and video from every trip is reviewed.

On Trawl EM trips where there is a shoreside observer monitoring the offload, the observer will collect information on the amount of salmon and halibut PSC during the offload. This information will be used to create rates used to estimate salmon and halibut PSC on Trawl EM trips where there is no offload sampling. Information on other PSC, including crab and herring, will come from the eLandings landing report. Crab and herring will be sorted at the plant and reported by the plant on the landing report. Observers in the plant will provide some "spot check" verification of the self-reported information. For example, the observer could watch sorting of the crab and herring and verify the counts and/or weights.

Data on non-groundfish (e.g. squid, smelt, prowfish, etc.) will also come from the landing report. Since many of these species have not been previously reported by all processing plants, outreach to processing plant personnel has been done to encourage them to enter this information on the landing report. In some cases, there is lower species resolution on landing reports than in observer data. For example, during the Trawl EM EFP, there were landings that contained smelt and NMFS determined that it was challenging for staff in the processing facility to accurately distinguish between osmerid species of Eulachon, capelin, and surf smelt. To avoid misidentification, shoreside processing plants will report catch of these species under one reporting code – Family Osmerideae group code. As a result, the catch of species in a species group that comes from CVs in the Trawl EM program will be an aggregate estimate for the osmerid group. The stock assessment would rely on data from observers to understand the relative proportions of species within the osmerid group.

Table 3-7 below summarizes the data source that will be used in CAS for the different scenarios in the Trawl EM fishery:

1. Full observer coverage CV delivery with offload sampling: CVs in the BS are in the full coverage category and there will be an offload sampling and salmon census record for all trips.
2. CV delivery shoreside with offload sampling: This category includes partial coverage category CVs that were selected by an observer for shoreside sampling during the offload at the shoreside processing plant. There will be offload data for the trip. This applies to about 30% of the trips in the GOA.
3. CV delivery shoreside - no offload sampling: This could be a partial coverage trip that was not selected for shoreside sampling, or a selected trip where we do not have the offload data (i.e. observer was unable to monitor or the offload data has not yet been loaded). This is the scenario for about 70% of trips in the GOA.
4. CV delivery to a tender - offload sampling: This will occur when tender offloads are randomly selected by the shoreside observer to be sampled during the tender delivery. All of the catch from the CVs that delivered to the tender will be sampled at the same time. This scenario applies to about 30% of the tender offloads. Tender offloads are only permitted in the GOA.
5. CV delivery to a tender - no offload sampling: This is the remainder of the tender offloads that are not randomly selected for shoreside sampling (~70% of tender offloads). Tender offloads are only permitted in the GOA.

Table 3-7 Data Sources to be used in CAS

Catch Category	BSAI	GOA			
	Shoreside Deliveries	Shoreside Deliveries		Tender Deliveries	
	Offload Sampling (100%)	Offload Sampling (~30%)	No Offload Sampling (~70%)	Offload Sampling during the tender delivery(~30%)	No Offload Sampling during the tender delivery(~70%)
Retained Groundfish	Landing report	Landing report	Landing report	tLanding report for each CV	tLanding report for each CV
Groundfish discarded at sea	Landing report	Landing report	Landing report	tLanding report for each CV	tLanding report for each CV
Salmon PSC	Offload salmon retention counts collected by observer in processing plant.	Offload salmon retention counts collected by observer in processing plant.	PSC rates from trips where offload sampling occurred are applied to the landing.	Offload salmon retention counts collected by shoreside observer during tender offload.	PSC rates from trips where offload sampling occurred are applied to the landing.
Halibut PSC	Offload retention counts collected by observer in processing plant.	Offload retention counts collected by observer in processing plant.	PSC rates from trips where offload sampling occurred are applied to the landing.	Offload retention counts collected by shoreside observer during tender offload.	PSC rates from trips where offload sampling occurred are applied to the landing.
Other PSC (herring, crab)	Landing Report	Landing Report	Landing Report	Processing plants apportion the catch to tLanding reports for CVs that delivered to the tender	Processing plants apportion the catch to tLanding reports for CVs that delivered to the tender
Non-groundfish (e.g. squid, smelt, prowfish, etc.) brought back to dock	Landing Report	Landing Report	Landing Report	Processing plants apportion the catch to tLanding reports for CVs that delivered to the tender	Processing plants apportion the catch to tLanding reports for CVs that delivered to the tender

Sharks were identified early on as problematic for CVs to retain, and EM reviewer's observation indicated that CV operators were not able to accurately estimate the weights of large sharks. In addition, it was identified that some retained sharks were not being reported in eLandings. These issues were discussed among the EM EFP participants, and Dr. Cindy Tribuzio, the lead shark assessment author, was included in solving this issue. Collaborative problem solving resulted in new catch handling and reporting requirements for sharks. When CVs encounter large sharks, they are instructed to measure them and

report these lengths in their logbook. These lengths will be made available to stock assessment authors. The new reporting requirement and a length/weight lookup was included in the VMP so that CV operators could translate these measurements into more precise estimates of shark weight. These weights are reported on the eLandings report, resulting in more accurate accounting for shark incidental catch. These large sharks also presented an opportunity to collect data not typically available. Dr. Tribuzio and the industry participants developed protocols to allow collection of biological data from these sharks that may result in new data on sharks in the North Pacific.

During the first year of the EM EFP pre-implementation, jellyfish catch was identified by the industry as problematic for fish quality. When CVs encounter large amounts of jellyfish, it has negative impacts on product quality because jellyfish can clog pumps necessary for efficient fishing operations. The industry participants raised these concerns and asked to be allowed to discard jellyfish. Additionally, both EM reviewers and industry participants indicated that estimating these jellyfish discards was difficult. The agency consulted with the EM reviewers to assess the risk of allowing jellyfish discards. EM reviewers indicated that they could determine if other fish were mixed with the jellyfish so the risk that these discards may provide opportunity for salmon discards was minimal. AFSC stock assessors were asked about the impact of loss of these jellyfish data. It was identified that while some jellyfish data are used in the ecosystem report, the loss of these data collected by observers or the Trawl EM program would not impact current data needs. Currently, jellyfish are allowed to be discarded.

3.1.8.2 Timeliness of EM Data

Timeliness of EM data is less of a concern under a compliance monitoring design. Hard drives containing EM data need to be shipped to reviewers. The drives then enter a queue to be reviewed. Therefore, the design of any EM program needs to assess how EM will affect the timeliness of data necessary for management and stock assessment.

EM data obtained under the Trawl EM Program do not directly feed into catch accounting or stock assessments. The data collected is used to verify reported data. Most data used for management is collected with eLandings. Other data continue to be collected by observers. The Trawl EM program has not affected the timeliness of these data sources; it only affects what data source is used. Both of these data sources continue to be readily available to managers so there is little to no additional delay in these data due to Trawl EM. However, if logbook inaccuracies are noted during video review, the larger weight/number will be used (EM reviewer vs. vessel report). If the EM video review shows the larger weight/number then the processing plant will be notified to make a change in eLandings. These changes may take up to several weeks to be entered and available in the CAS. In the Trawl EM EFP, these changes have only been made for sharks and skates. None of these changes required an action (closure) by inseason management to the fisheries. Because of the low impact of these changes, NMFS does not expect large shifts in discard estimates during the year within CAS after video review is completed. In addition, there will be the ability to remove a vessel from the EM program. If an EM vessel is consistently underreporting any species required to be reported then the vessel may not be able to continue participation in the EM program.

3.1.8.3 Incorporating Information into Stock Assessments

A workshop was held on EM data in AFSC stock assessments in September 2021.[11] Five primary areas of concern for stock assessment were discussed that span all gears (trawl and fixed gear EM):

1. Loss of haul-level information.

[11] https://meetings.npfmc.org/CommentReview/DownloadFile?p=8f0f7099-3367-49a5-af93-48b03670ab9b.pdf&fileName=EM_data_workshop.pdf

2. Biological samples: reduced spatial resolution and/or distribution shifts of sampled fish in a Trawl EM program.
3. Selection bias and getting observers where needed to ensure sufficient at-sea catch weight and biological specimen data are available to support catch estimation and inform stock assessment parameters for the fixed gear EM portion of the fleet.
4. Coordinated effort for authors to voice concerns regarding fishery-dependent data.
5. Access to data.

Workshop participants noted there are substantial concerns with the changes in the data streams that need to be addressed to ensure that data are collected and processed in a manner that can most effectively be used within stock assessments.

The following sections address these topics as they related to the Trawl EM program.

Haul-Level Effort and Fishing Location Information

Before trawl EM, at-sea observers collected information about haul times, locations, and size from vessel logbooks and added it to their data. The replacement of at-sea observers by EM systems under the Trawl EM program has removed the ability of stock assessment analysts to estimate haul-level effort (tow duration) from observer data on EM trips. Haul-level information is available from vessel logbooks sent along with the EM hard drives for video review. The self-reported logbook data are keypunched into electronic form by the video reviewers during the EM video review process. The keyed-in haul-level information that is necessary includes:

- Duration of tow
- Location of fishing
- Hail weight of each haul

NMFS is in the process of developing the infrastructure to enable the haul-level logbook data collected during the video review process to be transmitted to NMFS and incorporated into NMFS' databases so that it is available for analysts. Table 4-2 summarizes how haul-level information will be collected under the Trawl EM program from either the EM system or the vessel logbook.

Table 4-2 Collection of Haul-Level Information

Data element	Data Source
Haul start position	EM system, logbook provides a backup source
Haul retrieval position	EM system, logbook provides a backup source
Haul start data/time	EM system, logbook provides a backup source
Haul retrieval date/time	EM system, logbook provides a backup source
Bottom depth	Vessel logbook
Fishing depth	Vessel logbook
Haul Hail weight	Vessel logbook
Landing Report ID (to link haul-level data to catch estimates)	NMFS database

Since species composition of the catch will be captured in fish ticket data for each trip and estimated at the spatial level of NMFS reporting area, spatially-explicit information on fishery removals is not available and haul-level analytics would be missing (e.g., location or time of day analyses of catch

composition data). A potential approach to help analysts evaluate haul-level catch estimates would be to back-apportion fish ticket landings to the hauls within the EM trip, noting however that the back apportioning process does not necessarily recreate haul-level data since apportioning simply applies mean catch values (e.g. species compositions) to all hauls proportional to weight. Any variability between hauls attributable to sources other than haul size will be lost. As part of the infrastructure being developed, NMFS could provide these back-apportioned catches, although it will be important to flag these estimates as being different from estimates produced by at-sea observers. Methods will also need to be developed to utilize this information while taking into account its lower resolution and assumptions.

Length Composition and Specimen Data

Length composition data and specimens (i.e. otoliths and salmon genetic information) from the Trawl EM EFP will be collected by shoreside observers for sampled trips (see Section 3.1.6 for explanation of observer sampling). The AFSC FMA will provide this information to stock assessment analysts and AKFIN. As mentioned above, the information on catch will be captured in fish ticket data for each trip and estimated at the spatial level of NMFS reporting area in CAS, so spatially explicit information and haul-level analytics of the length composition and biological data would be missing. However, AFSC FMA and AKRO would link the observer data collected at the trip-level with the effort and location information from the logbook to enable analysts to evaluate some haul-specific aspects of the trip. Age and length distributions may vary between hauls, both spatio-temporally and with catch composition, and this variability will be lost.

3.2 Enforcement Considerations

3.2.1 Enforcement

NOAA OLE recognizes it is important to raise enforcement concerns early so issues that may affect enforceability and the overall success of a trawl EM program can be addressed prior to implementation. NOAA OLE will continue to work with the Trawl EM Committee, Enforcement Committee, NMFS staff, and Council staff to address enforcement concerns should this program go forward.

The sections below describe 1) recommendations for enforcing a trawl EM program, and 2) enforcement tools provided by a trawl EM program.

3.2.2 Recommendations to be able to Enforce an EM Program

An effective trawl EM program would 1) improve salmon accounting, 2) may reduce monitoring costs, 3) improve the quality of monitoring data, and 4) modify current retention and/or discard requirements as necessary to achieve objectives 1-3. As noted earlier in this analysis, the Trawl EM EFP program design and objectives are different from those of the existing fixed gear EM program. The fixed gear program was designed to use EM for *catch accounting* of retained and discarded catch whereas the trawl EM program is designed to use EM for *compliance monitoring* to ensure that catch can be sampled by shoreside observers based at processing plants. Compliance monitoring means the EM video would be used to verify that maximized retention requirements were followed, but the EM video does not provide data for catch accounting. This section describes compliance tools needed to ensure a functioning trawl EM program.

A trawl EM system that meets enforcement needs would integrate GPS as a compliance, data, and management tool, and the EM system would include these functions:

- Tamper resistance[12] and low/no maintenance,
- Independent date/time stamp with transmitted position or tagging in EM dataset,

[12] E.g. battery backup if generator fails.

- Records of fishing effort; two-way communications, data transmission; electronic signatures; etc.,
- Data to owner/operator for compliance, and
- Mapping overlay of federal areas, transit restrictions, management units, gear restrictions, and restricted/closed areas.

Any components or tools for compliance implemented by this program should be consistent with other regulatory programs. Examples of tools that should be consistent across regulatory programs include the ODDS system, VMS transmission requirements, and electronic logbooks, if required. This minimizes the number of regulatory requirements a vessel owner must comply with, which maximizes compliance. Having consistent requirements aids enforcement and allows NOAA OLE to provide better and more informed guidance.

NOAA OLE would need access to EM systems aboard participating trawl vessels, and would board vessels either at sea or while at the dock to verify the systems are functioning correctly and are in compliance with the vessel's VMP. VMPs should be required to be carried on board vessels at all times, and made available to any enforcement agency requesting the document. Regarding EM camera enforcement, enforcement officers would need to be able to verify that EM cameras are maintained in approved locations and that retention and handling procedures are being followed.

Regarding opt-in (GOA only) for trawl EM, the current EFP model with its allowance for opting in trip-by-trip in the GOA is challenging. In addition, it makes it more difficult for observers to know which trips are designated for EM. NOAA OLE recommends, at minimum, a season-by-season opt-in, but it would be optimal for opt-in to be on an annual basis. Section 3.1.2.2 of the analysis includes more information on an annual opt-in.

Regarding tenders (again, exclusive to the GOA at this time), there is mixing of hauls on tenders, making it difficult to know which CV salmon came from when it arrives at a shoreside plant. Observers consider a delivery from a tender as one offload which cannot be assigned to a specific haul (or potentially even a single vessel). However, if it were possible to track salmon to specific vessels and hauls, that would both enable tracking of regulatory compliance by NOAA OLE and make back-apportioning of salmon by NMFS achievable.

With regard to data review, problems in the fixed gear EM program are compiled in a web portal, the Electronic Monitoring Service Provider (EMSP) Portal, which sends out email notifications to program participants describing the exact details of the issue/s encountered negatively impacting viable EM video data collections. NOAA OLE finds great utility in this feature, and recommends that similar functionality be built into a trawl EM program. It is noted that this would likely create novel programming requirements for full coverage CVs and tenders. Data reviewers and EM service providers should report all substantive potential issues, including system and catch handling-based EM issues negatively impacting video data collections observed aboard vessels, directly to NOAA OLE. Data reviewers would provide a list of said issues that may be observed during video review, and procedures should be in place for documenting and transferring these data to NOAA OLE to determine if potential violations occurred. EM service providers and vessel owners should report malfunctions or any divergence from an approved VMP. In addition, data retention should be for a minimum of 12 months to allow for compliance review and potential investigations.

Strong and clear regulations provide guidance to vessel owners and operators about their responsibilities to maintain a functioning EM system. These would likely include following the specifications set forth in their VMP: requiring EM function tests for every trip, informing the EM provider when system failures have occurred, keeping the cameras clean, and ensuring that the systems are not tampered with (not turning the system off when it is required to be on, not intentionally obstructing camera views or blocking sensors). To aid enforcement, VMPs should be clear, specific, and updated to reflect the most up-to-date information about a vessel's operations. VMPs should be available to NOAA OLE immediately upon

request. Regulations would specify that the vessel must comply with its VMP while using the EM system at sea.

Regulations would also include a provision to prohibit a vessel from fishing in the case of chronic EM equipment system failures due to flagrant disregard for the requirements of an EM program. NOAA OLE would only invoke this regulatory provision to prohibit a vessel from fishing under the most extreme circumstances when all other methods of bringing a vessel into compliance have failed. This regulatory provision would work in concert with issuing violations for failure to comply with the VMP and regulations. NOAA OLE will work with other agency staff, EM service providers, and EM video reviewers to establish a method for reporting EM system issues and/or malfunctions, as needed.

Overall, to the extent practicable, NOAA OLE prefers uniformity between the fixed gear EM program and a potential trawl EM program.

3.2.3 Enforcement Tools Provided by an EM Program

EM could provide some support for enforcement of other regulations. For example, during EM video review, the data reviewers would record potential violations (e.g. harassment or take of a marine mammal, illegal discards, etc.) and report it to NOAA OLE. It is likely that not all potential violations would be reported to NOAA OLE. Thresholds for reporting violations would need to be developed.

3.3 Fees and Funding for Observer Coverage and EM

There are several funding mechanisms and different cost allocation for observers and EM under the status quo. Observer coverage in the full coverage category is industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers. Observer and EM coverage in the partial coverage category is funded through a system of fees collected from fishery participants (vessels and processing plants) under authority of Section 313 of the Magnuson-Stevens Act. This section addresses approaches for the Council and NMFS to incorporate the Trawl EM program into the Council's Fisheries Research Plan and the associated fees, funding, and coast allocation for different components of the program.

3.3.1 Magnuson-Stevens Act Authority for the Fisheries Research Plan and Fee Collection

Under section 313 of the Magnuson-Stevens Act, the Council may prepare, in consultation with the Secretary of Commerce, a North Pacific Fisheries Research Plan (Research Plan) for all fisheries under the Council's jurisdiction, except salmon. Any such plan would require observers to be stationed on fishing vessels and on fish processors, or shoreside processing facilities as appropriate. NMFS implements the Council's fishery research plan through the Observer Program. The Observer Program provides the regulatory framework for stationing observers and EM systems to collect data necessary for the conservation, management, and scientific understanding of any fisheries under the Council's jurisdiction, including halibut.

Pursuant to the Magnuson-Stevens Act, the research plan also establishes a system of fees to pay for the cost of implementing the plan, which may vary by fishery, management area, or observer coverage level. The fees collected under section 313 authority may be expressed as a fixed amount that reflect actual observer/EM costs or a percentage, not to exceed 2 percent, of the unprocessed ex-vessel value of the fish harvested under the jurisdiction of the Council. Moreover, the total amount of fees collected cannot exceed the combined cost of 1) stationing observers, or electronic monitoring systems, on board fishing vessels and fish processors; 2) the actual cost of inputting collected data; and 3) assessments necessary for a risk-sharing pool, less any amount received for such purpose from another source or from an existing surplus in the North Pacific Fishery Observer Fund. Finally, the fees must be fair and equitable to all participants in the fisheries under the jurisdiction of the Council, including the Northern Pacific halibut

fishery, and may not be used to pay any costs of administrative overhead or other costs not directly incurred in carrying out the plan.

Starting in 2013 under the restructured observer program, processors and registered buyers have been required to pay an ex-vessel value-based fee to NMFS to support the funding and deployment of observers on vessels and in plants in the partial observer coverage category. In 2017, the Council incorporated fixed-gear EM into the Observer Program and extended the use of the partial coverage observer fee to the fixed gear EM program.

Landings by vessels in the partial coverage category are assessed a 1.65 percent fee which is paid to NMFS by processors and registered buyers and is used to fund the deployment of observers and EM. A 1.65 percent fee was chosen based on the Council's interest in balancing the need for revenue to support the Observer Program with the need to minimize impacts on the industry sectors included in the restructured Program. The partial coverage observer fee is based on a percent of the ex-vessel value (based on standard ex-vessel prices from prior years) of the groundfish and halibut subject to the fee. The intent of the Council and NMFS is for owners and operators of CVs delivering to shoreside processors or stationary floating processors to split the fee liability 50/50 with the processor, such that each operation pays 0.825 percent of the total ex-vessel value of the landing. While vessels and processors are responsible for their portion of the fee, the owner of a shoreside processor and Registered Buyer permit holders are responsible for collecting the fee, including the vessel's portion of the fee, at the time of landing and remitting the full fee amount to NMFS. The fee liability is determined by multiplying the standard price for groundfish by the round weight equivalent for each species and gear combination, and the standard price for halibut by the headed and gutted weight equivalent. The fee liability for each landing is calculated by multiplying the fee percentage by the sum of the individual species/gear combination amounts. In January 15 each year, NMFS invoices processors for their total fee liability determined by the sum of the fees reported for each landing for each processor for the prior calendar year.

Use of fee proceeds

Sections 313(b)(2)(C), (H), and (I) of the Magnuson-Stevens Act, direct how fee proceeds can be used, but are not explicit as to what implementation costs can be covered by fee proceeds. For example, Section 313 (b)(2)(C) states: Any system of fees shall "provide that fees collected not be used to pay any costs of administrative overhead or other costs not directly incurred in carrying out the plan." For example, NMFS would not consider administrative costs of AFSC FMA leadership salaries or travel to be within the scope of the fee. Although MSA does not allow for fees collected to be used to pay for administrative overhead, it is implicit that fee proceeds could be used toward other administrative agency costs associated with implementation. Section 313(a)(2) states that the Research Plan implemented under the section may establish a system of fees "[t]o pay for the cost of implementing the plan". This provision grants broad authority to collect costs associated with implementation, however, Section 313(b)(2) defines and appears to limit recoverable costs. According to Section 313(b)(2)(A), the total amount of fees cannot exceed the combined cost of "(i) stationing observers, or electronic monitoring systems, on board fishing vessels and United States fish processors, (ii) the actual cost of inputting collected data,…". Further, under Section 313(b)(2)(C), fees may "not be used to pay any costs of administrative overhead or other costs not directly incurred in carrying out the plan." This language raises the question about what specific costs are associated with "stationing observers or electronic monitoring systems" on board fishing vessels and at fish processors, and "inputting collected data." The terms "stationing observers, or electronic monitoring systems" and "inputting collected data" are undefined in the Magnuson-Stevens Act. To add to the issue, there are no regulatory definitions and none were promulgated in the earlier Research Plan.

Through the analysis that was developed to support the restructured observer program (NPFMC 2011) and the action incorporate fixed-gear EM into the observer program (NMFS 2017b) NMFS, has used its expertise and past experience in "stationing observers" and "inputting collected data," and developed a reasonable standard describing what costs are captured by these terms. Although there is broad authority

to collect fees for costs associated with the Research Plan, NMFS established a nexus between administrative and implementation costs and their relationship to placing or stationing observers aboard vessels and at processors and for stationing fixed-gear EM systems aboard vessels. NMFS intends to use a similar process for stationing electronic monitoring systems on trawl vessels. Other activities, such as video review (including data processing) and data storage, would be conducted by a video reviewer. These activities are part of "inputting collected data" and therefore could be paid for using fees.

All of the agency activities necessary to station observers or electronic monitoring systems on fishing vessels or in processors and to input collected data that are essential functions specific to the execution of the Research Plan could also fall under the fee authority in the MSA. Some activities may be administrative by nature, and if they are essential to Research Plan operations and NMFS would not be conducting them were it not for the Research Plan then NMFS could use fee proceeds to cover those costs. For example, the administrative costs association with training and briefing observers or training EM video reviewers; or the agency administration of the Observer Declare and Deploy System (ODDS). However, NMFS currently does not use fee proceeds to fund observer-related administrative tasks and NMFS does not intend to use fee proceeds in the future to fund the similarly noted administrative tasks associated with EM.

NMFS recognizes that the ongoing contribution of the Federal government in supporting the existing Research Plan must continue. NMFS does not intend to use fee proceeds to offset the government's contribution to the Research Plan, because it recognizes that fee proceeds would best be used to procure and optimize the observer coverage or electronic monitoring needed in Alaska. NMFS intends to continue to fund and expand, to the extent National resources are available, the agency contribution in support of the Research Plan. However, to the extent new activities are required of NMFS in association with integrating EM into the Research Plan, NMFS may use fee proceeds that are available. Depending on the types of activities that must be funded, they could reduce the total number of observer days and amount of EM review services that NMFS is able to purchase.

3.3.2 Funding and Cost Allocation

The NMFS Procedural Directive 04-115-02, Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries (Cost Allocation PD) defines two cost categories and requires industry to be responsible for sampling costs of Council-initiated EM options. Table 3-8 provides a summary of the costs associated with the Trawl EM program and the cost allocation among different funding sources. The following sections provide more detail on these costs and the potential funding sources under the proposed alternatives.

Table 3-8 Summary of the Trawl EM cost categories and allocation among proposed funding sources

Cost Category (per NMFS Procedure 04-115-02)	**Trawl EM Cost**	**Responsible Parties**	**Funding Source**
Sampling Cost	Partial Coverage Shoreside Observers (GOA)	Contracted Observer Provider (currently AIS)	Partial Coverage Observer Fee
Sampling Cost	Full Coverage Shoreside Observers (BSAI -AFA)	Shoreplant operator and Full Coverage Observer Providers	Participating Processor
Sampling Cost	Purchase EM Equipment	Vessel Owner/Operator and EM service provider	Participating CV

Sampling Cost	EM Field Services/Maintenance	Vessel Owner/Operator and EM service provider	Participating CV
Sampling Cost	Video Review	EM Review service provider	Partial Coverage Observer Fee - GOA
			New BSAI EM Review Fee
Sampling Cost	Data Storage	EM Review service provider	Partial Coverage Observer Fee - GOA
			New BSAI EM Review Fee
Administrative Cost	Annual Deployment Plan	NMFS	NMFS
Administrative Cost	CAS / Data management	NMFS	NMFS
Administrative Cost	ODDS, EM opt in / out process	NMFS	NMFS
Administrative Cost	Contract / grant development and management	NMFS	NMFS
Administrative Cost	Video review training	NMFS	NMFS

3.3.2.1 Observer Coverage

GOA

Under all alternatives, vessels using pelagic trawl gear in the GOA will remain part of the partial coverage category as it relates to fees. This is the same process that was implemented with fixed gear EM as an option. As described above, the partial coverage program is funded through a fee-based mechanism that reflects the value a vessel or processor extracts from the fishery, which 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 to collect data necessary to manage the commercial groundfish and halibut fisheries.

BSAI

Under Alternative 1, status quo, BSAI vessels are part of the full coverage category and not subject to the partial coverage observer fee. Vessel operators are required to take an observer on every trip. Shoreside processors are required to have two observers to monitor deliveries of AFA pollock. The vessel owner and shoreside operators are responsible for sourcing and paying for an observer directly from certified observer provider companies.

Under Alternatives 2 and 3, shoreside observers will be required and the cost of those observers will be the responsibility of the shoreside operator. Under Status quo, shoreside processors are required to

maintain at least 2 shoreside observers. Under Alternative 2 and 3, this requirement will be modified to require the amount of observers necessary to meet sampling goals as defined in the catch monitoring and control plan. The number of observers could range from 2 to 4 depending on several factors. This change is seeking to provide flexibility to have sampling goals be adaptable to changing data needs.

The implementation of EM removes observers from vessels. Those vessel observers assisted shoreside observers in collecting data on BS pollock deliveries, including full accounting of salmon PSC. Under Alternatives 2 and 3, these shoreside observers would not be available to assist in sampling goals during offload. In order to meet data collection goals during pre-implementation, the number of observers necessary to meet sampling goals was evaluated. This provided an opportunity to understand some of the factors that impact the number of observers at a plant. The factors that affect the number of observers include:

- Percentage of vessels utilizing the Trawl EM option
- Pace of the fishery \ offload
- Communication
- Sampling goals

3.3.2.2 EM equipment purchase and services.

Under Alternative 1, status quo, there is no EM equipment to purchase or maintain. Under Alternatives 2 and 3, the responsibility to purchase EM equipment and maintain the EM systems with annual servicing would be an operator cost, if they voluntarily participate in the program.

Many lessons were learned from implementation of fixed gear EM options. Under that program, the cost of the EM equipment maintenance is paid by the observer fee supporting contracts with EM providers. The initial purchase of EM equipment however, was funded through grants provided by the National Fish and Wildlife Foundation. One challenge experienced is when vessels are non-compliant with the VMP resulting in removal from the program, the agency has difficulty retrieving the EM equipment for use on another vessel. Similarly, fees are used to support EM systems on vessels which are not harvesting groundfish or halibut in the partial coverage program, yet have not opted out of the program. The EM system is one of the most significant costs of the program and limited funding to purchase EM systems can limit overall participation in EM. By requiring the vessel operator to source and maintain the EM equipment, the trawl EM program will allow for more flexibility in using available resources to meet data sampling goals.

3.3.2.3 EM Review Services

GOA

Under all alternatives, vessels using trawl gear in the GOA will remain part of the partial coverage category as it relates to fees. This is the same process that was implemented with fixed gear EM as an option. As described above, the partial coverage program is funded through a fee-based mechanism and NMFS uses these fees to procure EM review services.

BSAI

As indicated in Table 3-4, the Cost Allocation PD EM review and data storage as a sampling cost and requires industry to be responsible for these costs. The Cost Allocation PD states, “For EM programs that are initiated by a Council…industry will be responsible for the sampling costs of such programs.” The Cost Allocation PD further states that “NOAA Fisheries is specifically authorized and required by the MSA to collect fees to cover the actual costs of certain activities, including data collection and analysis, associated with Limited Access Privilege Programs (LAPPs). To be consistent with this policy, NMFS

has explored three different approaches to implement video review in the BSAI portion of the trawl EM program.

The first approach that NMFS explored would be to utilize cost recovery method authorized under section 303A(e) of the Magnuson-Steven Act (MSA), 16 U.S.C. § 1853a(e) to fund EM video review. Cost recovery as authorized in MSA Section 303A(e) provides for NMFS to collect a fee from limited access privilege holders to recover funds NMFS pays to implement such programs. In 2017, NMFS published a Catch Share Policy, following the release of a draft policy in 2010, which included a public comment period in addition to broad input via NOAA engagement with the public and stakeholders. One of the policy's guiding principles is that "incremental government costs for management, data collection and analysis, and enforcement of limited access privilege programs shall be recovered from participants as required by the MSA." The policy further states that, "Cost recovery aims to recover a variety of government costs attributable to the private sector use of a public resource." The policy is clear that cost recovery funds reimburse the public for some of these government costs, as consistent with the MSA. This guiding principle, like the others in the policy, were developed through the aforementioned public process, and they demonstrate NOAA Fisheries' resulting interpretation of cost recovery.

Under the Cost Allocation PD, NOAA Fisheries may collect fees from industry to pay for administrative costs, sampling costs, or both, as consistent with statutory and regulatory requirements." Here, the inclusion of "sampling costs" is in conflict with the Catch Share policy, since sampling costs are the industry's responsibility. Therefore, at present, the use of cost recovery to fund industry sampling costs would conflict with both the Catch Share policy and the Cost Allocation PD. A review and possible change to either national policy would require a process for public comment, an assessment on how any changes in policy would impact other regions and fisheries, as well as detailed justification and rationale for why such a change to NMFS policy is needed that is consistent with the original intent of the policy. Revisiting either or both national policies would be a multi-year process.

Since the use cost recovery under Section 303A(e) of the MSA to fund EM video review is in conflict with current policy, NMFS recommends implementation of a second approach, which would use the fee authority under Section 313 of the MSA. NMFS would develop a new "BSAI EM Review Fee" using lessons learned from the implementation of other fee collections and seek to reduce the complexity of this fee collection compared to other fee collection programs. The goals of this new fee collection will be to develop an equitable and transparent fee system to cover the costs of data review, storage, and transmission of data for BSAI vessels opting into trawl EM under Alternatives 2 or 3

NMFS is currently considering the following model for implementation of the BSAI EM Review Fee. Due to timing of fee collection and availability to the agency, the EM Review fee would be collected based on the EM review costs from the previous year. During review of EM video, EM reviewers will differentiate between GOA and BSAI reviews, allowing the agency to track actual costs for the BSAI review. The annual cost of EM review, data storage and transmission will then be divided among vessels that opt in and are selected to participate in the BSAI trawl EM option. The agency would use the pollock history assigned to participating vessels to divide the cost equitably among participants. Billing would occur to vessel operators and failure to pay the fee could result in removal from the Trawl EM program in the following year. This approach removes many of the complexities related to implementing the fee as part of the eLandings systems, who collects fees, and calculation of ex-vessel value, etc. It also allows for a different fee timeline to support operational efficiency and improve transparency in the collection and use of fee to support Trawl EM in the BSAI.

The last approach that NMFS considered for video review would be a Third party model, similar to what is being considered on the West Coast. The Pacific Fishery Management Council (PFMC) is also working on implementing and maximizing EM for trawl vessels operating off the West Coast (WA, OR, and CA). Some vessels operating in the BSAI and GOA also operate in these fisheries. There was a desire expressed by both the Council and PFMC to make both EM programs similar to avoid regulatory

confusion and increase efficiency in meeting data collection goals. The primary difference between the West Coast model and the proposed approach for Alaska is how video review is accomplished and the structure built to support EM review and data storage. The third party model requires vessel operators to contract directly with EM reviewers for data review. In addition, this approach establishes secondary video review (audit) that is conducted by NMFS and a process for permitting of EM reviewers. These additional developments could increase the cost of the EM program annual management and reduce the agency's flexibility to change EM review procedures in-season. Since the North Pacific has the ability to use Section 313 of the MSA, NMFS does not recommend the third party review model in Alaska.

3.3.2.4 Contract / grant development and management

NMFS is considering several different options for implementing EM services under an operational and regulated EM program beginning in 2024.

Approach 1: Grant between NMFS and PSMFC

Since 2014, PSMFC has been working with NMFS, EM service providers, and the fishing industry to test and develop cost effective EM/ER technology solutions in Alaska. In recent years this development has been focused on Trawl EM with funding from National Fish and Wildlife Foundation (NFWF) grant. Under this approach, NMFS provides funding for the Pacific States Marine Fish Commission (PSMFC) grant on an annual basis, depending on Congressional appropriations, the availability of discretionary NMFS EM/electronic reporting (ER) funds, and the availability of funds collected through fee collections. Annual funding for EM/ER efforts include operational deployments costs (i.e., imagery review and data storage from the fixed gear EM program and maintaining EM equipment for a sub-set of the fixed gear EM fleet) as well as providing support for PSMFC staff working on EM research and development projects.

For the trawl EM EFP, the majority of video review has also been performed by PSMFC during pre-implementation using a NFWF grant sourced by industry partners, and data was provided to NMFS. It should be noted that review from some vessels was administered through a NFWF grant to Saltwater, Inc., and under this approach that video review would be solely conducted by PSMFC.

EM is still very much an emerging and evolving field of technology and data collection. If a grant could be used to collect, review, and process operational data, it would enable PSFMC to leverage EM expertise in the research and development of new EM approaches, such as using EM in processing plants for salmon tracking. The existing Electronic Technologies grant with PSFMC expires in June 2023, and PSMFC will need to design and apply for grant funding if this is their desired approach.

Approach 2: Federal contract for EM with one or more EM service provider(s)

Under this approach, the NOAA Contracting Office would administer a federal contract for an EM reviewer similar to the process used to award the existing partial coverage observer contract. Standard federal contracting requirements would apply and a request for proposal would be solicited through FedBizOpps.gov. Due to the substantial lead time required for processing a multi-year contract, and in order to have a contract in place by January 1, 2024, work on a standalone contract would need to begin in 2023. NMFS has not yet started to develop an EM reviewer contract, in part due to uncertainty in funding, and also because there is currently a mechanism in place through the PSMFC grant to continue EM operations and deployment. An additional constraint with this approach would be the timing of when observer fees become available. Since observer fees are not released to NMFS until approximately May of each year, an EM review contract could not be awarded until June at the earliest. NMFS would need to find additional funds and a mechanism to cover EM review for the first year. For these reasons, NMFS has requested federal funds for EM deployment in 2024, to bridge the gap between pre-implementation and an operational EM program funded by observer fees.

Approach 3: Combined federal contract with one or more EM review provider(s) and partial coverage observer provider(s)

A third approach would be similar to Approach 2, with the key difference being that this approach would include EM review and observer service providers under a single contract. A similar approach was discussed with NOAA Acquisition and Grants Office staff during the Council's May 2016 Observer Advisory Committee (OAC) meeting as a possibility for the implementation of fixed gear EM. The contract could be awarded to multiple EM reviewers and observer service providers, and individual components of the contract would be administered through task orders. This option could potentially reduce the administrative burden of managing two separate contracts by incorporating them into a single contract.

4 Environmental Impacts

This Section evaluates the potentially affected environment and the degree of the impacts of the alternatives and options on the various resource components, together with relevant past, present, and reasonably foreseeably actions. The socio-economic impacts of this action are described in detail in the Regulatory Impact Review (RIR) chapter of this analysis (Section 5).

Recent and relevant information, necessary to understand the affected environment for each resource component, is summarized in the relevant section below. For each resource component, the analysis identifies the potential impacts of each alternative, and evaluates these impacts. If significant impacts are likely to occur, preparation of an EIS is required. Although an EA should evaluate economic and socioeconomic impacts that are interrelated with natural and physical environmental effects, economic and social impacts by themselves are not sufficient to require the preparation of an EIS (see 40 CFR 1508.14).

4.1 Methods for Environmental Impact Analysis

4.1.1 Resource Components Addressed in the Analysis

Table 4-1 below shows the components of the human environment and whether the proposed action and its alternatives have the potential to impact that resource component and thus require further analysis. Extensive environmental analysis on all resource components is not needed in this document because the proposed action is not anticipated to have environmental impacts on all resource components.

No effects are expected on the majority of resources listed in Table 4-1 because the potential switch from human observers to a regulated trawl EM program would not result in changes in harvest, gear type, timing of fishing, or location of fishing. As a result, further analysis in this chapter is included only for social and economic resources, the only resource components which the proposed action may impact.

Table 4-1 Resources potentially affected by the proposed action and alternatives.

Potentially affected resource component							
Groundfish	**Prohibited Species**	**Ecosystem Component Species**	**Marine Mammals**	**Seabirds**	**Habitat**	**Ecosystem**	**Social and economic**
N	N	N	Y	Y	N	N	Y

N = no impact anticipated by each alternative on the component.
Y = an impact is possible if each alternative is implemented.

4.1.2 Effects of Aggregate Past, Present, and Reasonably Foreseeably Future Actions

This EA analyzes the effects of each alternative and the effects of past, present, and reasonably foreseeable future actions (RFFA). Based on Table 4-1 the resources with potentially meaningful cumulative effects are marine mammals, seabirds, and social and economic resources. The aggregate effects on the other resources have been analyzed in numerous documents and the impacts of this proposed action and alternatives on those resources is minimal, therefore there is no need to conduct an additional aggregate impacts analysis.

Each section below provides a review of the relevant past, present, and RFFA that may result in cumulative effects on the resource components analyzed in this document. A complete review of the past, present, and RFFAs are described in the prior NEPA documents incorporated by reference (Section 1.4) and the supplemental information report (SIR) NMFS prepares to annually review of the latest information since the completion of the Alaska Groundfish Harvest Specifications EIS. SIRs have been developed since 2007 and are available on the NMFS Alaska Region website. Each SIR describes changes to the groundfish fisheries and harvest specifications process, new information about

environmental components that may be impacted by the groundfish fisheries, and new circumstances, including present and reasonably foreseeable future actions. NMFS reviews the reasonably foreseeable future actions described in the Harvest Specifications EIS each year to determine whether they occurred and, if they did occur, whether they would change the analysis in the Harvest Specifications EIS of the impacts of the harvest strategy on the human environment. In addition, NMFS considered whether other actions not anticipated in the Harvest Specifications EIS occurred that have a bearing on the harvest strategy or its impacts. The SIRs provide the latest review of new information regarding Alaska groundfish fisheries management and the marine environment since the development of the Harvest Specifications EIS and provide cumulative effects information applicable to the alternatives analyzed in this EA.

Actions are understood to be human actions (e.g., a designation of northern right whale critical habitat in the Pacific Ocean), as distinguished from natural events (e.g., an ecological regime shift). The Council on Environmental Quality (CEQ) regulations require consideration of actions, whether taken by a government or by private persons, which are reasonably foreseeable. This requirement is interpreted to indicate actions that are more than merely possible or speculative. In addition to these actions, this aggregate effects analysis includes the effects of climate change.

Actions are considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or NMFS's publication of a proposed rule. Actions only "under consideration" have not generally been included, because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action's area and time frame will allow the public and Council to make a reasoned choice among alternatives.

4.2 Target Groundfish (pollock)

Walleye pollock (*Gadus chalcogrammus*; hereafter referred to as pollock) is a semi-pelagic schooling fish widely distributed in the North Pacific Ocean, with the largest concentrations found in the Eastern Bering Sea (EBS). Pollock in the GOA are managed as a single stock. Pollock in the BSAI are managed separately for the Aleutian Islands, Bogoslof Island, and the EBS. Pollock stock assessments for GOA and EBS are on an annual cycle while assessments for Aleutian Islands and Bogoslof Island are on a biennial cycle with full assessments in even years and partial assessments in odd years. Information on pollock in this section is taken from the 2021 Stock Assessment and Fisheries Evaluation (SAFE) Report, specifically sections on GOA pollock (Monnahan et al. 2021) and EBS pollock (Ianelli et al. 2021).

4.2.1 Status

As detailed in the 2021 SAFE Report, the GOA stock of pollock is not being subject to overfishing, is not overfished, and is not approaching an overfished condition. Since 1997, GOA pollock have been managed under Tier 3 of the NPFMC tier system. A stock's Tier status refers to the type and amount of information that is available to estimate the condition and maximum sustainable yield (MSY) of the stock. Although the 2021 GOA pollock stock assessment (Monnahan 2021) identified some aspects of the stock that merit close tracking, there were no elevated concerns about stock assessment, population dynamics, environment/ecosystem, or fisheries performance categories. Assessment authors recommended no reduction from maximum permissible ABC for 2022.

Alaska pollock is the dominant species in terms of catch in the BSAI region. In 2020 pollock accounted for 72% of the BSAI's FMP groundfish harvest and 93% of the total pollock harvest

in Alaska. The EBS pollock stock is generally considered to fall within NPFMC Tier 1, but assessment authors use Tier 3 calculations as the basis for harvest specifications. The EBS pollock stock is being fished below the overfishing level and is not approaching an overfished condition. Since approximately

2014, the EBS entered a warm phase of unprecedented duration, with ecosystem effects on recruitment and fish condition. The 2021 SAFE Report identified level 2- substantially increased concerns in each of the categories of stock assessment, population dynamics, environment/ecosystem, and fisheries performance categories.

4.2.2 Incorporating Information into Stock Assessments

For the EBS and GOA pollock, there are several issues that need to be addressed concerning the transition to EM in the pollock fishery. Under Alternative 1, on-board observers collect species composition of pollock tows, recorded lengths by sex, and collected pollock otoliths. Additional sample collections included maturity structures and stomachs. All of these data were resolved at the individual tow level in the observer database. Logbooks are required for most participants in federal fisheries in Alaska including nearly all of the vessels in the GOA and EBS pollock fisheries. Historically, this information was not digitized and hence has been unavailable for scientific analyses within stock assessments unless it was also recorded by onboard observers.

Under Alternatives 2 and 3, there is a loss of spatial and temporal resolution of the data used for stock assessment, since information on species composition, length, and age composition can only be collected at the resolution of the delivery (i.e., at the trip level), which would contain catches from two or more tows done in different places and times. Some level of spatial resolution is still possible, as long as the tow data can be made available for each EM delivery. Tow locations and other tow specific information are available both in logbooks and by extracting this information from the EM data stream. There are ongoing efforts at AKRO to create a database with this information and to link it to the data collected by plant observers. Capturing information on tow locations and other tow-specific information is a priority for any further expansion of EM for the pollock fisheries. Under Alternatives 2 or 3, AKRO would continue to require that tow specific information be collected in logbooks and available in the data stream for AFSC stock assessment authors.

4.2.2.1 GOA pollock

The practice of tendering in the western GOA further reduces the resolution of the data since catches from several vessels are mixed together before being brought into port and are made available for sampling by plant observers. However tendering accounts for a small percentage of the overall pollock catch in the GOA, so consequences of tendering on data availability are likely to be minor. Capturing the information on tow locations and other tow specific information is a priority for vessels that participate in tendering operations.

The stock assessment model for GOA pollock assumes a unit stock that does not have any spatial or seasonal structure. This is a fairly common approach in stock assessment even when there are spatial and seasonal differences in fishery catch characteristics, since all models are approximations of a complex reality. Separate assessments are done for pollock in the Central/Western area and the eastern GOA to account for some of these spatial differences. The data used to fit the assessment model for the C/W pollock is only at the resolution of the NMFS statistical area, i.e., areas 610, 620, 630, and 640. Estimation of fishery age composition is based on these spatial strata as well as seasonal strata. Age composition estimation utilizes catch, length and age data aggregated by these spatial strata. NMFS statistical area strata are included in the pollock data provided by plant observers. Therefore, the loss of spatial resolution in pollock sampling due to EM does not negatively impact the stock assessment modeling for GOA pollock.

A second issue is whether sampling is at sufficient levels to support estimation of fishery statistics used in the stock assessment. In general, the total number of length and ageing structures sampled for GOA pollock has been maintained over the last two years of the EM EFP implementation in the pollock fishery.

The number of measured pollock ranged from 27,000 to 34,000 during 2017-2019, and was 23,000 in 2020 but 28,000 in 2021, suggesting that increased sampling from plant observers compensated for the reduced sampling by at-sea observers. Sampling for ageing structures and associated information showed a similar pattern. The total number of otolith samples ranged from 4,100 to 5,600 in 2017 to 2019, and was 4,500 in 2020 and 4,600 in 2021. Increased deployment of plant observers will be necessary to maintain sampling levels if the pollock fishery continues to switch from at-sea observers to EM.

It is important to further comment that spatially-resolved fishery data has a number of other uses in addition to informing the assessment model. Tow-level fishery catches are used to generate maps of fishing distribution that are included in the stock assessment, as well to develop a time series of fishery catch per unit effort (CPUE) that is included in the Ecosystem and Socioeconomic Profile (ESP). This information is used to evaluate the fishery performance component of the risk table that is a required element in the stock assessment, and is used to justify whether or not to recommend a reduction in the ABC. Other uses of spatially resolved fishery data include the evaluation of fishing impacts for EFH analyses, and producing maps of bycatch to support measures to control bycatch. Future development of spatially-explicit modeling approaches to stock assessment could also be hampered if this kind of information is no longer available.

4.2.2.2 EBS pollock

Haul level information is used in the stock assessment to categorize the stratum-specific catches, age and size samples. These data are then used to derive the catch-at-age estimates for tuning the model. Presently, the categorization into strata is fairly coarse and corresponds to NMFS management areas. Consequently, we expect that these biological samples will adequately attribute the source of the data to management areas in the same way as presently grouped. We anticipate *de minimis* impacts on specific differences between pre- and post- EM implementation in terms of categorizing biological samples to NMFS management areas. A second way the haul-level data are used presently is for qualitative evaluation of catch distribution and similarly, with fleet dispersion. Under the EM program, we expect similar data to be available, provided the appropriate data-streams are established (e.g., logbooks). Therefore, the impact on management advice as presently applied is expected to be unchanged. Secondary impacts on research and developing future approaches to more seasonally and spatially resolved information may be affected. While there may be data gains that can provide more detail on spatial patterns of the fishery, resolution of size, age, and other biological data at the trip level may be less useful than the previous sampling that occurred at the haul level. Projecting this loss of precise resolution may affect studies implementing opportunistic acoustic-data collections (e.g., Barbeaux et al. 2013) for refined evaluation of fishing responses and biological aspects (Watson and Haynie 2018). Nonetheless, the extrapolations by NMFS management area, and combined with logbook data on ADF&G statistical areas should suffice and retain sufficient resolution for future studies.

4.2.3 Effects of the Alternatives on Target Groundfish (pollock)

Under Alternatives 2 and 3, the primary target species is pollock. The effects of the action alternatives on pollock would include a loss of some spatial and temporal resolution of the data used for stock assessment, as noted above. This is because information on species composition, length, and age composition can only be collected at the resolution of the delivery, which contains catches from two or more tows done in different places and times. The potential impacts of Alternative 2 or 3 would be minimal. Fishing times and locations would not change and the pollock stocks would otherwise not be affected. The only impact would be the difference in spatial and temporal data collection. Some of these data impacts can be mitigated by using delivery and logbook data to extrapolate to haul data.

Effects of Aggregate Past, Present, and Reasonably Foreseeable Actions on Target Species

No RFFAs were identified as likely to have an impact on pollock within the action area and timeframe. Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference, the aggregate impacts of the proposed action are determined to be not significant.

4.3 Non-pollock Groundfish species

4.3.1 Incorporating Information into Stock Assessments

Several non-pollock groundfish species are also caught by vessels in the Trawl EM program and therefore several stock assessments may be impacted by this regulatory change, including: GOA Pacific cod, Eastern Bering Sea Pacific cod, GOA Pacific ocean perch, GOA and BSAI sharks and GOA and BSAI skates. These species are the most common bycatch species in the pollock fishery. Due to the nature of these stock assessments, the data collected and impacts to the assessments are varied. Therefore, the following sections address potential issues in each of those assessments.

4.3.1.1 EBS Pacific cod

Presently, the fishery data used for this stock is compiled by fisheries, regions, and seasons for total catch accounting. Alaska Department of Fish and Game (ADF&G) port samplers sample deliveries for size and age data from state water fisheries. The assessment adds these data to the general fishery component. Under any of the defined alternatives, it is unlikely that there would be issues related to the lack of haul-level effort nor for length composition and specimen data.

4.3.1.2 Gulf of Alaska Pacific cod

Catches of Pacific cod are compiled by gear type and regions, but are fit by the assessment at the management scale (Gulf-wide) on an annual basis. Bycatch from the trawl fishery is fit separately from other sources of catch, including the directed longline and pot fisheries. Lack of haul-level effort and fishing location information will likely have little impact on the assessment, or future development of possibly spatially-explicit assessment models, as long as catch can be identified to the NMFS management area resolution (Western, Central, and Eastern GOA). Length composition data from the trawl fishery are also currently used in the assessment at a NMFS management area resolution. Similar to the impact of the reduced spatial resolution of catch data, impacts of reduced spatial resolution of the length composition data will likely be negligible as long as data can be identified to the NMFS management area.

4.3.1.3 Gulf of Alaska Pacific ocean perch

Over time Pacific ocean perch have become an increasingly predominant bycatch species in the GOA pollock fishery, comprising a significant proportion of catch in some instances at the haul level. In the stock assessment, all sources of catch from the GOA trawl fisheries (whether directed or as bycatch) are compiled into a single catch data source. Thus, lack of haul-level effort or fishing location information will have a negligible impact on assessment results. It should be noted that for possible future developments of the assessment, the ability to attribute catch to the NMFS management area (Western, Central, and Eastern GOA) needs to remain. Both length and age data collected from the trawl fisheries, whether from pollock fishery bycatch or from the directed rockfish fishery, are also used in the assessment. Loss of haul-level information in age and length samples will have little impact on assessment results; however, the age and length samples need to remain identifiable to the NMFS management area.

4.3.1.4 Gulf of Alaska shark stock complex and Bering Sea/Aleutian Islands shark stock complex

There are four species within the two shark stock complexes: spiny dogfish, Pacific sleeper shark, salmon shark and "other" sharks. The spiny dogfish is a relatively small species, and falls under the retention requirements. The remaining species are considered "large sharks", of which discards are permitted because of the large size creating storage, safety and logistical concerns (e.g., blocking chutes). As part of the trawl EM EFP, gaps in the data collection for large sharks were identified, suggesting that either at-sea observers may not have had access to large sharks or it was unclear who was responsible for recording the catch, resulting in some shark catches not being recorded. Both shark stock complex assessments are evaluated at the FMP level, with no area allocations. Haul-level data are not used for management purposes. Length composition and specimen data were not historically collected in this fishery. As part of the requirements which allow for the species to be discarded, large shark lengths are recorded in the logbooks and will be provided to stock assessment authors. This is an advancement in data available for these species. These data may allow for investigations of more enhanced data-limited stock assessment methods.

4.3.1.5 Gulf of Alaska skates and Bering Sea/Aleutian Islands skates

Skates are required to be retained, unless an individual animal is "large." In which case, the species (or group) and estimated weight are recorded in the logbook. In both the GOA and the BSAI, a small portion of the total catch occurs on pollock pelagic trawl gear vessels. The stock assessments for both areas are conducted at the FMP level, with catch apportioned to the NMFS management area. It is unlikely that loss of haul-level data would impact management advice for these stocks. Similar to large sharks, the logbook recording requirements may improve data available for the assessments.

4.3.2 Effects on non-pollock groundfish species

With regard to Pacific cod and Pacific ocean perch, lack of haul-level effort and fishing location information will likely have little impact on stock assessments, as long as catch can be identified to the NMFS management area resolution. Some of these data impacts can be mitigated by using delivery and logbook data to extrapolate to haul data.

With regard to sharks, Alternative 2 has the potential for increased accuracy of large shark catch estimates from the pollock PTR CV fleet. The shark stock complexes are managed at the FMP level and haul level vs. trip level data are not a concern. The data recorded in the trawl EM logbooks will provide new information for this stock assessment. The inclusion of tender vessels is not a concern for this stock assessment. There are likely no affects to sharks from Alternative 3, Option 1 (Bering Sea only) because ~50% of large shark catch in the pollock PTR fleet results from CVs, which are all full coverage. The GOA is the area that this action will likely have the greatest effect on the shark stock complex assessment. All of the large shark catch in the pollock PTR fleet in the GOA is from CVs, which are partial coverage. Since the beginning of the trawl EM EFP, most of the large shark catch has come from vessels in the EM EFP. Therefore, Alternative 3, Option 2 (BS and GOA) may result in more accurate estimates of catch, as well as advancements in the data available for stock assessment.

4.3.3 Effects of Aggregate Past, Present, and Reasonably Foreseeable Actions on Non-pollock groundfish Species

No RFFAs were identified as likely to have an impact on non-target species within the action area and timeframe. Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the aggregate impacts of the proposed action are determined to be not significant.

4.4 Marine Mammals

The North Pacific Ocean supports one of the richest assemblages of marine mammals in the world. Twenty-two species are present from the order Carnivora, superfamilies Pinnipedia (seals, sea lions, and walrus), Ursoidea (polar bears), and Musteloidea (sea otters), and from the order Artiodactyla, infraorder Cetacea (whales, dolphins, and porpoises). Some marine mammal species are resident in waters off Alaska throughout the year, while others migrate into or out of North Pacific fisheries management areas. Marine mammals occur in diverse habitats, including deep oceanic waters, the continental slope, and the continental shelf, including inshore waters. NMFS maintains management authority for all marine mammal species in the North Pacific and Arctic, except northern polar bears, Pacific walrus, and northern sea otters, which are managed under the authority of the U.S. Fish and Wildlife Service (USFWS).

The MMPA, the Endangered Species Act (ESA), and the Fur Seal Act are the relevant statutes for managing marine mammal interactions with human activities, including commercial fishing operations. The MMPA was enacted in 1972 with the purpose of ensuring that marine mammal populations continue to be functioning elements of the ecosystems of which they are a part. One of the incentives for enacting the MMPA was to reduce takes of marine mammals incidental to commercial fishing operations. While marine mammals may be lawfully taken incidentally in the course of commercial fishing operations, the 1994 MMPA Amendments established a requirement for commercial fishing operations to reduce incidental mortalities and serious injuries (M/SI) of marine mammals to insignificant levels approaching a zero rate, commonly referred to as the Zero Mortality Rate Goal (ZMRG). ZMRG is considered to be met for a marine mammal stock when the M/SI level from all commercial fisheries is 10% or below the Potential Biological Removal level (PBR) of that marine mammal stock (69 FR 43338, July 20, 2004). Likewise, the ESA was enacted to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve such conservation. In practice, the ESA outlines a program to protect endangered species on the brink of extinction, and threatened species that are likely to be on the brink of extinction in the near future, and to pursue their recovery. The ESA also requires designation of any habitat of endangered or threatened species, which is considered to have physical or biological features essential to the conservation of the species and which may require special management considerations or protection.

The AFSC FMA provides information to managers on marine mammal direct and indirect interactions with fisheries. The 2021 Observer Sampling Manual explains that the role of observers under the MMPA is to conduct statistically reliable monitoring of fishing operations and to record information on all interactions between fishing operations and marine mammals (AFSC 2021).

Observers are important sources of data for the marine mammal stock assessment reports (86 FR 38991, July 23, 2021 (2020 SARS))[13] and the List of Fisheries (LOF; 86 FR 3028, January 14, 2021) for compliance with the Marine Mammal Protection Act. Under the restructured Observer Program, NMFS is monitoring the take of all marine mammals in the BSAI and GOA groundfish fisheries and deploys NMFS-trained observers on vessels per the annual deployment plan (ADP).

Under the MMPA List of Fisheries, NMFS annually classifies U.S. commercial fisheries into one of three categories according to the level of mortality and serious injury of marine mammals. The Alaska BS pollock trawl fishery was a Category II fishery in 2020 (2021 LOF, 86 FR 3028, January 14, 2021), meaning there is occasional incidental mortality and serious injury (M/SI) of marine mammals. The Alaska GOA pollock trawl fishery was a Category III fishery in 2020 (2021 LOF), meaning there is either a remote likelihood of or no known M/SI of marine mammals in this fishery.

Table 4-2 and Table 4-3 below list the marine mammal species and/or stocks incidentally killed or injured in the BSAI and GOA pollock trawl fisheries (2021 LOF). Of the species that have had documented

[13] https://media.fisheries.noaa.gov/2021-07/NOAA-TM-AFSC-421.pdf?null%09

interactions with the BSAI and GOA pollock trawl fisheries the bearded seal, Steller sea lion, and fin whale are listed under the ESA. The rest of this analysis focuses on these most vulnerable species. For bearded seals, the minimum estimated mean annual level of human-caused M/SI for the portion of the Alaska bearded seal stock in U.S. waters between 2014 and 2018 is 6,709 seals: 1.8 in U.S. commercial fisheries, 6,707 in the Alaska Native subsistence harvest (2020 SARS). Between 2014 and 2018, M/SI of bearded seals in U.S. waters occurred in two of the federally managed U.S. commercial fisheries in the North Pacific monitored for M/SI by fisheries observers: the BSAI pollock trawl and BSAI flatfish trawl fisheries. As noted above, the minimum estimated mean annual M/SI rate incidental to U.S. commercial fisheries between 2014 and 2018 is 1.8 bearded seals, based exclusively on observer data (2020 SARS).

In addition, between 2014 and 2018, M/SI of Western Steller sea lions was observed in 10 of the federally managed commercial fisheries in Alaska that are monitored for M/SI by fisheries observers: BSAI Atka mackerel trawl, BSAI flatfish trawl, BSAI Pacific cod trawl, BSAI pollock trawl, BSAI Pacific cod longline, GOA Pacific cod trawl, GOA Pacific cod longline, GOA flatfish trawl, GOA rockfish trawl, and GOA pollock trawl fisheries, resulting in a mean annual M/SI rate of 22 sea lions (2020 SARS).[14] The minimum estimated mean annual level of human-caused M/SI for endangered Northeast Pacific fin whales between 2014 and 2018 is 0.6 whales due to ship strikes. Ship strikes are a known threat for this stock and reductions in sea-ice coverage may lead to range extension and increased susceptibility to ship strikes from increased shipping in the Chukchi and Beaufort seas (2020 SARS).[15]

Table 4-2 BSAI Pollock Trawl Fishery

Marine mammal species and/or stocks incidentally killed or injured	ESA or MMPA Status
Bearded Seal, AK	Threatened, Depleted, Strategic
Beluga Whale, Bristol Bay	None
Beluga Whale, Eastern Bering Sea	Strategic
Beluga Whale, Chukchi Sea	None
Harbor Seal, AK	None
Northern Fur Seal, Eastern Pacific	Depleted, Strategic
Ribbon Seal, AK	None
Spotted Seal, AK	None
Steller Sea Lion, Western U.S.	Endangered, Depleted, Strategic

[14] https://media.fisheries.noaa.gov/2021-08/STELLER%20SEA%20LION%20%28Eumetopias%20jubatus%29%20-%20Western%20U.S.%20Stock.pdf
[15] https://media.fisheries.noaa.gov/2021-08/FIN%20WHALE%20%28Balaenoptera%20physalus%29%20-%20Northeast%20Pacific%20Stock.pdf

Table 4-3 GOA Pollock Trawl Fishery

Marine mammal species and/or stocks incidentally killed or injured	ESA or MMPA Status
Dall's Porpoise, AK	None
Fin Whale, Northeast Pacific	Endangered, Depleted, Strategic
Northern Elephant Seal, North Pacific	None
Steller Sea Lion, Western U.S.	Endangered, Depleted, Strategic

In accordance with the MMPA (16 U.S.C. 1387(e)) and 50 CFR 229.6, any vessel owner or operator participating in a fishery listed on the LOF must report to NMFS all incidental mortalities and injuries of marine mammals that occur during commercial fishing operations, regardless of the category in which the fishery is placed (I, II, or III) within 48 hours of the end of the fishing trip.[16] "Injury" is defined in 50 CFR 229.2 as a wound or other physical harm. In addition, any animal that ingests fishing gear or any animal that is released with fishing gear entangling, trailing, or perforating any part of the body is considered injured, regardless of the presence of any wound or other evidence of injury, and must be reported.

While EM would not change fishing behavior, trawl vessels would need to continue to comply with existing Federal regulations, which include protections for Steller sea lion rookeries and haul-outs. As the western distinct population segment of the Steller sea lion is listed as endangered under the ESA, current Steller sea lion protection measures close much of the Aleutian Islands region to trawling up to 10 or 20 nautical miles offshore from rookeries and haul-outs (BSAI Amendment 20 and GOA Amendment 25), with less restrictive zones for hook-and-line and pot gear.

In 2014, NMFS published a final EIS, biological opinion, and final rule to implement modified Steller sea lion protection measures (79 FR 70286, November 25, 2014). The 2014 biological opinion included the following Reasonable and Prudent Measures as necessary and appropriate to minimize the impact of incidental take of western distinct population segment of Steller sea lions (NMFS 2014): NMFS will monitor the take of ESA-listed marine mammals in the BSAI groundfish fisheries. In order for any incidental takes to be exempt from the prohibitions of section 9 of the ESA, NMFS must comply with the associated terms and conditions below, which implement the Reasonable and Prudent Measures:

1. NMFS-trained observers will be deployed on vessels in these fisheries per the Observer Program's Annual Deployment Plan.

[16] Mortality/injury reporting forms and instructions for submitting forms to NMFS can be found at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-authorization-program#reporting-a-death-or-injury-of-a-marine-mammal-during-commercial-fishing-operations or by contacting the Alaska Regional Office Protected Resources Division (Suzie Teerlink, 907-586-7240). Forms may be submitted via any of the following means: (1) Online using the electronic form; (2) emailed as an attachment to nmfs.mireport@noaa.gov; (3) faxed to the NMFS Office of Protected Resources at 301-713-0376; or (4) mailed to the NMFS Office of Protected Resources (mailing address is provided on the postage-paid form that can be printed from the web address listed above). Reporting requirements and procedures are found in 50 CFR 229.6.

2. NMFS will use observer data to estimate the minimum mean annual mortality for each fishery.
3. NMFS will evaluate the observer coverage to determine if changes in coverage are warranted to better assess take of listed marine mammals.

4.4.1 Incorporating Information into Stock Assessments

Marine mammal stock assessments rely, in part, on data collected by at-sea observers. At-sea observers collect information on marine mammal interactions with fisheries and collect biological samples when available. The AFSC FMA reviews observer data before sending written reports, biological samples, and photographs to the AFSC's Marine Mammal Laboratory (MML). The MML processes these biological samples and evaluates photographs to understand which species were interacting with fishing gear. When genetics are needed to match an individual to a specific population, that analysis is done by the Southwest Fisheries Science Center (SWFSC). Upon review of observer data, biological samples and photographs, the MML identifies any changes that need to be reconciled between the MML database and the Observer program database. The AFSC FMA then updates their database based on recommendations from the MML. The MML then assigns serious injury determinations and develops estimates of bycatch which are then incorporated into various MML reports, such as the annual Tech Memo summarizing all human-caused mortality and injury to Alaska marine mammals, the list of fisheries and the annual marine mammal stock assessment report. It should be noted that mammal bycatch estimates are made independent of the CAS, and as noted above are estimated by the MML.

A switch to EM would affect information flow into marine mammal stock assessments in several ways and is discussed in the following section.

4.4.2 Effects on Marine Mammals

None of the alternatives would change the management of the fisheries, the location of the fisheries, fishing effort, or the marine mammal protection measures in place. Spatial and temporal concentration effects by these fisheries, vessel traffic, gear moving through the water column, or underwater sound production, which could affect marine mammal foraging behavior, would not be affected by the proposed action. Significant incentives for compliance with marine mammal protection management measures, such as area closures, would remain in place under all of the alternatives. In addition, NMFS would have to examine how these alternatives meet the requirements of the 2014 biological opinion since they rely heavily on observers and the data they collect.

Under Alternative 1, NMFS places at-sea observers on trawl vessels. Observers record the species, number, and types of interaction (including location, date and time, interaction type (e.g., killed by gear, entangled in gear - trailing gear, entangled in gear - not trailing gear, previously dead), gear type, catch composition, and fishing depth) with marine mammals, and record the length, collect biological specimens, take photographs and videos, and record disposition (e.g., dead, released alive) of marine mammals caught in the gear. Tissue samples are particularly important for obtaining genetic confirmation of species identification, especially for similar, closely related species. Correct identifications are critical for accurate bycatch estimates and understanding the effect of bycatch on marine mammal populations. Biological specimens collected by at-sea observers also contribute to long-term MML research on marine mammal stock structure, vital rates, and foraging behavior. Among other things, at-sea observers also record important data on marine mammal sightings, which provide information about the distribution and behavior of marine mammals, including threatened and endangered species, in Alaska. They also contribute to studies on marked animals (e.g., branded Steller sea lions) and individuals with distinct features/markings (e.g., killer whale dorsal fins and saddle patches).

Alternative 1 would leave at-sea observer coverage in place and data collected by at-sea observers would continue according to status quo. In addition, the terms and conditions of the 2014 biological opinion would continue to be met.

Under Alternatives 2 and 3, trawl vessels would be able to carry EM instead of an at-sea observer. Under Alternatives 2 and 3, a loss in data would occur, however some data could be gained as well. The types of data that would be lost include: body measurements, tissue samples, and other biological specimens. While photos and/or video may be available from the EM, it is possible that EM may not provide the close up images or structure specific images that might help confirm ID, determine sex, or inform body condition. Other types of data that could be affected by EM include: ID photos and videos, ability to distinguish between animals killed by gear (which should be included in the bycatch estimate) and those that are previously dead (which should not be included in the bycatch estimate), ability to ID marine mammals that do interact with gear, but that do not come onboard, and opportunistic marine mammal sightings that do not involve interactions with fishing gear that contribute to distribution and abundance analyses. Alternatively, EM may provide more coverage in some instances. For examples, when gear is retrieved, an observer is not always looking or may not have the correct visual angle to be able to ID an animal to a species level. EM records video from multiple locations, which may provide more opportunity to capture marine mammal interactions during EM review. Additionally, EM video allows for pausing and rewinding, allowing an EM reviewer many chances to review a marine mammal interaction and consult with experts, an ability that at-sea observers do not have.

The loss of tissue samples is particularly critical because these samples provide genetic information to determine which stock an animal belongs to using genetics in tandem with photo ID. EM cannot provide this information and under the MMPA, fishermen are not allowed to collect biological samples from marine mammals. This could have serious management implications for fisheries because there are multiple species of marine mammals with stocks that have both overlapping ranges and a different conservation status. If mortality cannot be assigned to a specific stock, mortality will be assigned to all stocks from which the mortality might have occurred. In addition, the inability to identify an animal to the species level prevents that data from being used in any stock assessment report, and therefore that bycatch is not counted against stock-specific threshold indicators (e.g., potential biological removal level) and cannot be used for management (e.g., classifying fisheries based on the level of marine mammal interactions on the annual List of Fisheries rule, or identifying when bycatch reduction measures might be needed). However, the ability to ID an animal to the species level is also problematic for onboard observers and EM may provide imagery data that helps to identify animals that observers may not be able to.

Under Alternatives 2 and 3, cameras would be able to record dead marine mammals coming on board the vessel. The cameras may be able to document marine animals that interacted with gear prior to coming onboard (or never coming onboard). EM cameras would allow for an unobstructed view of interactions at the stern of vessels, an ability that human observes currently do not have for safety reasons. EM would also allow for repeated reviewing of any event captured. However, the resolution of these captured interactions may not be of high enough quality to be able to ID to a species level and the ability to capture the incident depends on the camera angle and type of interaction. During the course of the EFP (#2019-03), there were interactions with two humpback whales, a Steller sea lion, and an orca with participating EM vessels. The video from the EM system helped in identification, however, because no observer was onboard, no biological samples or identification photos were collected.

Under Alternatives 2 and 3, with regard to the 2014 biological opinion, at-sea observers would no longer routinely be deployed on trawl EM trips on participating EM CVs. However, EM monitoring would be deployed on 100% of EM designated trips and would be used to estimate the minimum mean annual mortality of Steller sea lions. In some cases, NMFS may need to evaluate the configuration of the EM system on the vessel to determine whether changes in camera views are warranted to better assess take of listed marine mammals.

Effects of Aggregate Past, Present, and Reasonably Foreseeable Actions on Marine Mammals

No RFFAs were identified as likely to have a direct impact on marine mammals within the action area and timeframe. Potential indirect impacts could involve a reduction in data used to inform marine mammal reports and management decisions. However, these losses may be offset by potential data gains with the ability to replay and rewind EM video. Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the aggregate impacts of the proposed action are determined to be not significant.

4.5 Seabirds

North Pacific waters support extremely large concentrations of seabirds. Over 80 million seabirds are estimated to occur in Alaska annually, including 40 to 50 million individuals from the numerous species that breed in Alaska (Table 4-4; USFWS 2009). An additional 40 million to 50 million individuals do not breed in Alaska but spend part of their life cycle there. These include short-tailed and sooty shearwaters and three albatross species: the black-footed albatross, the Laysan albatross, and the endangered short-tailed albatross (Table 4-4; USFWS 2009).

As noted in the Final Programmatic Supplemental Environmental Impact Statement (PSEIS) on the Alaska Groundfish Fisheries (NMFS 2004 and 2015), seabird life history includes low reproductive rates, low adult mortality rates, long life span, and delayed sexual maturity. These traits make seabird populations extremely sensitive to changes in adult survival and less sensitive to fluctuations in reproductive effort. The problem with attributing population changes to specific impacts is that, because seabirds are long-lived animals, it may take years or decades before relatively small changes in survival rates result in observable impacts on the breeding population.

Table 4-4 Seabird species in Alaska

Type	Common name	Status
Albatrosses	Black-footed	
	Short-tailed	Endangered
	Laysan	
Fulmars	Northern fulmar	
Shearwaters	Short-tailed	
	Sooty	
Storm petrels	Leach's	
	Fork-tailed	
	Pelagic	
	Red-faced	
	Double-crested	
Gulls	Glaucous-winged	
	Glaucous	
	Herring	
	Mew	
	Bonaparte's	
	Slaty-backed	
Murres	Common	
	Thick-billed	
Jaegers	Long-tailed	
	Parasitic	
	Pomarine	

Type	Common name	Status
Guillemots	Black	
	Pigeon	
Eiders	Common	
	King	
	Spectacled	Threatened
	Steller's	Threatened
Murrelets	Marbled	
	Kittlitz's	
	Ancient	
Kittiwakes	Black-legged	
	Red-legged	
Auklets	Cassin's	
	Parakeet	
	Least	
	Whiskered	
	Crested	
Terns	Arctic	
Puffins	Horned	
	Tufted	

The PSEIS identifies how the BSAI groundfish fisheries activities may directly or indirectly affect seabird populations (NMFS 2004 and 2015). Direct effects may include incidental take (lethal) in fishing gear and vessel strikes. Indirect effects may include reductions in prey (forage fish) abundance and availability,

disturbance to benthic habitat, discharge of processing waste and offal, contamination by oil spills, presence of nest predators on islands, and disposal of plastics, which may be ingested by seabirds.

The impacts of the North Pacific groundfish fisheries on seabirds were analyzed in the Harvest Specifications EIS (NMFS 2007) which evaluated the impacts of the alternative harvest strategies on seabird takes, prey availability, and seabird ability to exploit benthic habitat. The focus of this analysis is similar, as any changes to the groundfish fisheries in the BSAI could change the potential for direct take (death) of seabirds. Potential changes in prey availability (seabird prey species caught in the fisheries) and disruption of bottom habitat via the intermittent contact with non-pelagic trawl gear under different levels of harvest are examples of indirect effects on seabirds and are discussed in NMFS (2007). However, prey availability changes could also be closely associated with changes in seabird take levels. Therefore, all impacts to seabirds are addressed by focusing on potential changes in seabird takes (direct effects).

Of particular concern is the impact on seabirds listed under the ESA. Three species of seabirds are currently listed as either threatened or endangered; the endangered short-tailed albatross (*Phoebastria albatrus*), the threatened Alaska-breeding population of Steller's eider (*Polysticta stelleri*), and the threatened Spectacled eider (*Somateria fischeri*). In 2021, NMFS completed reinitiation of formal consultation under section 7 of the ESA with USFWS to ensure that the BSAI and GOA groundfish fisheries are not likely to jeopardize the continued existence of endangered short-tailed albatross, threatened spectacled eider, or threatened Alaska-breeding population of Steller's eider or adversely modify the designated critical habitat for either eider species. There is no designated critical habitat for the short-tailed albatross. The reason for this reinitiation was the take of the two eider species due to vessel collision. Prior to 2019, there had been no reported takes of either the spectacled eider or the Alaska-breeding population of Steller's eider by vessels operating in Federal fisheries off Alaska. However, in October of 2019, twenty-two spectacled eider fatally collided with a demersal longline vessel. Then, in March of 2020, one Steller's eider believed to be from the Alaska-breeding population, fatally collided with a fishing vessel in the trawl groundfish fishery of the BSAI. The vessel strike was recorded on the vessel's electronic monitoring system and the mortality was reported by the vessel captain to USFWS using the Threatened and Endangered Bird Species Encounter and Reporting Form (found at https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods). Neither of these vessels were actively engaged in fishing at the time of the bird strike mortality events.

In March of 2021, the USFWS finalized a new Biological Opinion (USFWS 2021) which superseded the 2015 Biological Opinion (USFWS 2015). In their 2021 Biological Opinion, USFWS concluded that the GOA and BSAI groundfish fisheries are not likely to jeopardize the continued existence of the short-tailed albatross, spectacled eider, or the Alaska-breeding population of Steller's eider; nor are they likely to result in the destruction or adverse modification of critical habitat of the spectacled or Steller's eider. In their 2021 Biological Opinion, USFWS anticipates take of up to six short-tailed albatross bi-annually (every 2 years); up to 25 spectacled eider every 4 years; and up to 3 Steller's eider from the Alaska-breeding population every 4 years in the BSAI and GOA FMP areas using hook-and-line or trawl gear (combined). These incidental take limits apply starting in 2021. The 2021 Biological Opinion left in place most of the conservation measures that were specified in the previous 2015 Biological Opinion but did add new recommendations for vessel lighting. The 2021 Biological Opinion stipulates that NMFS will recommend that 1) to the maximum extent practicable vessels will minimize the use of external lighting at night and avoid the use of sodium lighting and other high-wattage light sources, except when necessary for vessel and crew safety and 2) all lights should be angled or shielded downward toward the surface of the water, except when necessary for safe vessel operation.

Trawl-induced seabird mortality is difficult to quantify because birds that strike the cables may fall into the water and go unobserved (Dietrich and Melvin 2007, NMFS 2020, Zador and Fitzgerald 2008). When discussing seabird bycatch attributed to trawl gear, it is important to remember that standard observer sampling does not account for all seabird mortality. This discussion focuses only on the numbers reported, which were generated from the standard observer sample, i.e., birds caught in the codend part of

the net and brought aboard the vessel. A number of efforts are underway at AFSC FMA to better understand the amount of cryptic mortality related to trawl vessels and how to properly extrapolate that to provide a fleet-wide estimate.

Seabird bycatch related to trawl gear (CV and C/P combined) constitutes about 11% (range 4 to 24%) of the overall estimated 2011 through 2020 seabird bycatch (Krieger and Eich 2021). As seabirds fly and forage around vessels, they can become entangled in trawl gear or strike a vessel cable or the vessel itself. Seabirds are attracted to the CV's trawl net when it is being set and retrieved. There may also be some discard of whole fish as decks and equipment are washed or fish spill overboard while the codend is being emptied. Fishing mode and other vessel-related attributes also affect seabird attendance. One component of a North Pacific 2002 pilot electronic monitoring study indicated that bird attendance around CV's was infrequent or low during towing operations and was high only during setting or hauling of the net, while the net was on the surface (McElderry et al. 2004).

More information on seabirds in Alaska's EEZ may be found in several NMFS, Council, and USFWS documents:

- The URL for the USFWS Migratory Bird Management program is at http://alaska.fws.gov/mbsp/mbm/index.htm.
- Section 3.7 of the PSEIS (NMFS 2004) provides background on seabirds in the action area and their interactions with the fisheries. This may be accessed at https://alaskafisheries.noaa.gov/sites/default/files/pseis0604-chpt_3_7.pdf.
- The annual Ecosystem Status Reports have a chapter on seabird bycatch: https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands
- The NMFS Alaska Seabird Bycatch webpage: https://www.fisheries.noaa.gov/alaska/bycatch/seabird-bycatch-alaska.
- The BSAI and GOA groundfish FMPs each contain an "Appendix I" dealing with marine mammal and seabird populations that interact with the fisheries. The FMPs may be accessed from the Council's home page at http://www.alaskafisheries.noaa.gov/npfmc/default.htm.
- Washington Sea Grant has several publications on seabird takes, and technologies and practices for reducing them: https://wsg.washington.edu/seabird-bycatch-prevention-in-fisheries/
- The seabird component of the environment affected by the groundfish FMPs is described in detail in Section 3.7 of the PSEIS (NMFS 2004) and updated in the PSEIS Supplemental Information Report (NPFMC and NMFS 2015).
- Seabirds and fishery impacts are also described in Chapter 9 of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007).
- U.S. Fish and Wildlife Service (USFWS). 2021. Biological Opinion on the Proposed Modification of the EPA General Permit AKG524000 for Offshore Seafood Processors in Alaska and on the NMFS Groundfish Fishery for the Gulf of Alaska, Bering Sea, and Aleutians Islands. Anchorage, AK: 80 pp. Document available at https://ecos.fws.gov/tails/pub/document/18939343.
- NMFS. 2020. Programmatic Biological Assessment on the Effects of the Fishery Management Plans for Alaska Groundfish Fisheries on the Endangered Short-tailed Albatross, the Threatened Alaska-breeding Population of Steller's Eider, and the Threatened Spectacled Eider (Polysticta stelleri). Document available at: https://media.fisheries.noaa.gov/2021-11/AK-Groundfish-Seabird-BA-March-2020.pdf
- Seabird Bycatch and Mitigation Efforts in Alaska Fisheries Summary Report: 2007 through 2015 (Eich et al. 2016). Document available at: https://repository.library.noaa.gov/view/noaa/12695

- Seabird Bycatch Estimates for Alaska Groundfish Fisheries Annual Report: 2020 (Krieger and Eich 2021). Document available at: https://repository.library.noaa.gov/view/noaa/32076

4.5.1 Seabird Bycatch Estimates

4.5.1.1 Data Sources

Estimates of seabird bycatch are generated in the NMFS Catch Accounting System (CAS). The CAS uses information from multiple data sources to estimate total groundfish and halibut catch, including at-sea discards and estimates of bycatch of other species including seabirds. Data from the Observer Program, dealer landing reports (also known as fish tickets), and at-sea production reports are combined to provide an integrated data source for fisheries monitoring and in-season decision-making. Starting in 2018, NOAA Fisheries integrated EM into the Observer Program and CVs that fish with demersal longline gear were able to request entry into the fixed-gear EM sampling stratum. The total number of fixed gear CVs allowed into the fixed-gear EM stratum is determined by available funding, and vessels that opted into EM are not required to carry an observer (NMFS 2017a). At-sea monitoring data, from both observers and EM, are a key part of the CAS and allow the agency to gain an independent measurement of the amount and types of species caught in the commercial groundfish and halibut fisheries in the BSAI and GOA. Observer data provide a direct estimate of species composition and weight whereas data from EM provide a direct estimate of species counts that are converted to weight using observer data. NMFS uses both of these datasets to calculate catch and bycatch rates for unobserved fishing trips. In addition to catch (species) composition data, at-sea observers collect biological samples, fishery-dependent information on total catch and interactions with protected species (AFSC 2021), including fisheries bycatch of seabirds. The AFSC FMA structures at-sea observer and EM data collection using a statistically reliable sampling design (NMFS 2017a). The CAS uses these monitoring data to estimate seabird mortality, as described in the next section. Information collected by observers and EM provides the best available scientific information to manage the fisheries and to develop measures to minimize bycatch.

Observers collect data on seabird bycatch as part of their species composition sample. Observers identify each bird in their sample to the most accurate species or species group that they can. Species identification is verified for bird specimens by debriefers and by seabird specialists using a subsample of birds collected through the NOAA Pacific Seabird Necropsy Program (necropsy program). The necropsy program provides birds collected by observers from bycatch and ship strikes to a vendor to necropsy and verify the species identification. This process results in corrections to misidentifications and more refined species identifications in cases where the observer used a species group code.

As mentioned above, 2018 was the first year that EM was integrated into the Observer Program under regulations. In order to carry an EM system, the fixed-gear vessels must have a NMFS-approved VMP that describes how fishing operations on the vessel will be conducted and how the EM system and associated equipment are configured to meet the data collection objectives, including quantification of seabird bycatch. The VMP specifies that if any seabirds are caught, the vessel operators must hold seabirds up to the camera for 2 to 3 seconds and show certain key parts of the animal, such as the beak, to the hauler view camera.[17] The ability to identify seabird species is similar when using observers and EM. During 2016 trials, experts found that protocols for displaying seabirds to the camera and the camera picture quality were sufficient for accurate seabird identification as long as fishermen adhered to the catch handling protocols (NMFS 2017b).

[17] An example VMP template with the specific seabird handling protocols is available at https://alaskafisheries.noaa.gov/fisheries/electronic-monitoring

4.5.1.2 Estimation Methods

Since 2007, NOAA Fisheries Alaska Region has produced bycatch estimates in the CAS using a ratio estimator (Cahalan et al. 2014). In the CAS, NMFS uses observer data to create seabird bycatch rates (a ratio of the estimated bycatch to the estimated total catch in sampled hauls). NMFS uses the observed information from the at-sea samples to create bycatch rates that are applied to unobserved trips. For trips that are unobserved, the bycatch rates are applied to industry supplied landings data of retained catch. Expanding on the observer and fixed gear EM data that are available, the extrapolation from observed trips to unobserved trips is based on varying levels of aggregated data (post-stratification). NMFS matches data based on processing sector (e.g., CP or CV), week, target fishery, gear, and Federal reporting area. Further detail on the estimation procedure, including levels of post-stratification, is available in Cahalan et al. (2014, 2010).

At each data run, the CAS produces estimates based on current data sets, which may have changed over time. Data can be updated as a result of observer debriefing, data quality checks, and analysis. Examples of the possible changes in the underlying data are changes in species identification, deletion of data sets where data collection protocols were not properly followed, and changes in the landing or at-sea production reports where data entry errors were found. The totals in this report include some changes from previous reporting, and reflect the most recent data and estimates of the CAS.

Effects of EM on seabird bycatch estimates are discussed in the following section.

4.5.2 Effects on Seabirds

Short-tailed albatross (*Phoebastria albatrus*) are listed as endangered under the ESA. In addition to the endangered short-tailed albatross, two species of eider are also listed under the ESA. These are the threatened spectacled eider (*Somateria fischeri*) and the threatened Alaska-breeding population of Steller's eider (*Polysticta stelleri*). Two other populations of Steller's eider occur in waters off Alaska but only the Alaska-breeding population is listed under the ESA.

The USFWS consulted with NOAA Fisheries Alaska Region under section 7 of the ESA on the effects of the groundfish fisheries on the endangered short-tailed albatross, threatened spectacled eider, and threatened Alaska-breeding population of Steller's eider. In its March 8, 2021 biological opinion, the USFWS determined the groundfish fisheries off Alaska are likely to adversely affect short-tailed albatross, but they are not likely to jeopardize the continued existence of short-tailed albatross, spectacled eider, or Steller's eider (USFWS 2021). In its 2021 Biological Opinion for Alaskan groundfish fisheries, USFWS provides incidental take statements for short-tailed albatross, spectacled eider, and threatened Alaska-breeding population of Steller's eider:

- The reported take should not exceed six albatrosses in a 2-year period.
- The reported take should not exceed 25 spectacled eiders in a floating 4-year period.
- The reported take should not exceed three Steller's eiders in a floating 4-year period.

Under Alternative 1, seabird bycatch estimates are produced using a ratio estimator in the NOAA Fisheries Alaska Region CAS. Methods are provided in Cahalan et al. (2014) with additional description specific to seabirds provided in Krieger and Eich (2021).

The majority of observed seabird bycatch in fisheries occur in the hook-and-line fisheries; however, small numbers of seabird bycatch have been observed in trawl and other fisheries. Observer protocols are not set up to monitor trawl fisheries in the same way that hook-and-line are monitored. Trawl bycatch is difficult to quantify (NMFS 2015, Fitzgerald et al. in prep). Less than 3 percent of the total estimated seabird bycatch from trawl fisheries (all targets) from 2011 through 2020 occurred on CVs (203 birds; Krieger and Eich 2021). When looking specifically at seabird bycatch estimated for BSAI pollock trawl CVs from 2016 through 2020, total bycatch was estimated to be 13 birds (annual average of 3 birds per

year) (Table 4-5). No seabird bycatch was estimated for GOA pollock trawl CVs from 2016 through 2020.

Table 4-5 Seabird Bycatch (Number of Birds) Estimated for BSAI Pollock Trawl CVs. Data Source: NOAA Fisheries Alaska Region Catch Accounting System (CAS)

Species/Species Group	2016	2017	2018	2019	2020	Grand Total	Ann Avg.
Northern Fulmar	6	3	0	0	0	9	1
Shearwaters	0	0	0	0	1	1	2
Murre	3	0	0	0	0	3	0
Total	**9**	**3**	**0**	**0**	**1**	**13**	**3**

No take of short-tailed albatross or spectacled eider have ever been documented in the BSAI or GOA groundfish fishery when using trawl gear (AFSC 2014, Krieger and Eich 2021). However, in March of 2020, one Steller's eider believed to be from the Alaska-breeding population, fatally collided with a fishing vessel in the trawl groundfish fishery of the BSAI that was participating in the Trawl EM EFP. The vessel was not fishing at the time of the collision. The vessel strike was recorded on the vessel's EM system and, as required in the VMP, the mortality was reported by the vessel captain to USFWS.

The changes to the Observer Program proposed under Alternatives 2 and 3 are not expected to affect current rates of interaction. No changes in the indirect effects of fisheries on prey (forage fish) abundance and availability, benthic habitat as utilized by seabirds, and processing of waste and offal, all of which could affect seabirds, are expected under the alternatives. With maximized retention, the discharge of processing waste and offal will be minimized, which is beneficial for seabirds. It will be beneficial because seabirds are attracted to offal and therefore the reduction in offal should result in a decrease of seabird attendance around these vessels, which should result in fewer opportunities for interactions and thus bycatch.

The amount of seabird bycatch is not expected to change under Alternatives 2 and 3. The only difference between Alternative 1 and the action alternatives is the reporting of seabird bycatch. EM systems would record seabird interactions however, due to camera angles, cameras are not able to see all of the same parts of the vessel the same way as an observer. However, given that seabird bycatch can happen at any time, including when vessel crew and observers are not located in a particular area of the vessel or are asleep, camera footage may provide more coverage. EM systems may be able to record seabird species if the crew is instructed to hold the birds up to the camera for identification. Additionally, since seabirds are relatively small, it is reasonable to expect that the majority of them would make it to the processing plant with the rest of the catch. Information on seabirds delivered to the processing plant could be collected by observers as long as the carcasses were made available to them. Under all of the alternatives, if no observer is onboard, vessel owners or captains are instructed to report any ESA-listed seabird injury or mortality immediately to NMFS (1-800-853-1964 or 907-586-7228) or to the USFWS using the *Threatened and Endangered Bird Species Encounter and Reporting Form* (found at https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods).

In contrast to the situation with marine mammals, under all of the alternatives if no observer is onboard, the 2021 Biological Opinion states that unidentified albatross and eider carcasses should be retained for future identification, or, at minimum, pictures documenting the species should be taken for verification, a report will be filled out, and the carcass processed as detailed below:

1. Three photos should be taken: one of the front with wings outstretched; one from the back with wings outstretched; and one of the head and beak, preferably near a measurement board or other reference of size for the beak.

2. A report of the threatened and endangered species encounter should include the name of the person making the report, name of the vessel (optional), date of encounter, time, coordinates, photographs, species, cause of death or injury, if known, and any other pertinent information. The report may be made on the USFWS *Threatened and Endangered Bird Species Encounter and Reporting Form* (found at https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods).

3. If an observer is not on board, a verbal report should be called-in and a written report will be made out as described above and the carcass immediately frozen, or kept as cold as possible. Due to the rarity of these species, every effort should be made to salvage the carcass. The carcass should labeled with the vessel name, latitude and longitude, assumed cause of death, and the numbers and colors of any leg bands (leg bands should be left attached). If unable to keep the carcass, take photos and provide the information described in numbers 1 and 2 above. A report should be submitted using the USFWS *Threatened and Endangered Bird Species Encounter and Reporting Form* (found at https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods).

Given that overall takes of seabirds in this fishery are relatively uncommon and because this action is not expected to result in changes to the timing and prosecution of the fishery, the effects on seabirds under any of the Alternatives are not expected to be significant and are not expected to occur beyond the scope analyzed in previous NEPA and ESA documents.

4.5.3 Effects of Aggregate Past, Present, and Reasonably Foreseeable Actions on Seabirds

Reasonably foreseeable future actions for seabirds include ecosystem-sensitive management; rationalization; traditional management tools; actions by other federal, state, and international agencies; and private actions, as described in Sections 8.4 and 9.3 of the Harvest Specifications EIS (NMFS 2007). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to seabirds by considering these species more in management decisions, and by improving the management of fisheries through the restructured Observer Program, catch accounting, seabird avoidance measures, and vessel monitoring systems. Changes in the status of species listed under the ESA, the addition of new listed species or critical habitat, and results of future Section 7 consultations may require modifications to groundfish fishing practices to reduce the impacts of these fisheries on listed species and critical habitat. Additionally, since future TACs will be set with existing or enhanced protection measures, we expect that the effects of the fishery on the harvest of prey species and disturbance will not increase in future years.

Any action by other entities that may impact seabirds will likely be offset by additional protective measures for the federal fisheries to ensure ESA-listed seabirds are not likely to experience jeopardy or adverse modification of critical habitat. Direct mortality by subsistence harvest is likely to continue, but these harvests are tracked and considered in the assessment of seabirds.

Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the aggregate impacts of the proposed action are determined to be not significant.

4.6 Habitat

Fishing operations may change the abundance or availability of certain habitat features used by managed fish species to spawn, breed, feed, and grow to maturity. These changes may reduce or alter the abundance, distribution, or productivity of species. The effects of fishing on habitat depend on the

intensity of fishing, the distribution of fishing with different gears across habitats, and the sensitivity and recovery rates of specific habitat features.

In 2005, NMFS and the Council completed the EIS for EFH Identification and Conservation in Alaska (NMFS 2005b). The EFH EIS evaluates the long-term effects of fishing on benthic habitat features, as well as the likely consequences of those habitat changes for each managed stock, based on the best available scientific information. The EFH EIS also describes the importance of benthic habitat to different groundfish species and the past and present effects of different types of fishing gear on EFH. Based on the best available scientific information, the EIS analysis concludes that despite persistent disturbance to certain habitats, the effects on EFH are minimal because the analysis finds no indication that continued fishing activities at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term. The EIS concludes that no Council managed fishing activities have more than minimal and temporary adverse effects on EFH for any FMP species, which is the regulatory standard requiring action to minimize adverse effects under the Magnuson-Stevens Act (50 CFR 600.815(a)(2)(ii)). Additionally, the analysis indicates that all fishing activities combined have minimal, but not necessarily temporary, effects on EFH.

The Council and NMFS have updated available habitat information, and their understanding of the impacts of fishing on habitat, in periodic 5-year reviews of the EFH components in the Council fishery management plans (NPFMC and NMFS 2010) and (NPFMC and NMFS 2016). These 5-year reviews have not indicated findings different from those in the 2005 EFH EIS with respect to fishing effects on habitat, although new and more recent information has led to the refinement of EFH for a subset of Council-managed species. Maps and descriptions of EFH for groundfish species are available in the applicable fishery management plan.

4.6.1 Effects of the Alternatives

The effects of the alternatives on EFH would be negligible. The potential changes in habitat impacts as a result of the alternatives are minimal because none of the alternatives would change when or where the pelagic pollock trawl fleet fishes. Therefore, there would be no effects on EFH that would be any different from status quo.

4.6.2 Effects of Aggregate Past, Present, and Reasonably Foreseeable Actions on Habitat

No RFFAs were identified as likely to have an impact on EFH within the action area and timeframe. Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference, the aggregate impacts of the proposed action are determined to be not significant.

4.7 Ecosystem and Climate Change

Ecosystems consist of communities of organisms interacting with their physical environment. Within marine ecosystems, competition, predation, and environmental disturbance cause natural variation in recruitment, survivorship, and growth of fish stocks. Human activities, including commercial fishing, can also influence the structure and function of marine ecosystems. Fishing may change predator-prey relationships and community structure, introduce foreign species, affect trophic diversity, alter genetic diversity, alter habitat, and damage benthic habitats.

The pollock pelagic trawl fishery potentially impacts the ecosystem by relieving predation pressure on shared prey species (i.e., species that are prey for both target groundfish and other species), reducing prey availability for predators of the target groundfish, altering habitat, imposing PSC and bycatch mortality, or by ghost fishing caused by lost fishing gear. Ecosystem considerations for the groundfish fisheries are

summarized annually in the annual Ecosystem Status Reports.[18] These considerations are summarized according to the ecosystem effects on the groundfish fisheries, as well as the potential fishery effects on the ecosystem.

Changing climate and oceans are affecting the nation's valuable living marine resources and the people, businesses and communities that depend on them. From warming oceans and rising seas, to droughts and ocean acidification, these impacts are expected to increase with continued changes in the planet's climate system.

In 2018, the Council adopted a Council's Bering Sea Fishery Ecosystem Plan (BS FEP) as a framework to continue incorporating ecosystem goals and actions into fishery management. The BS FEP documents current procedures and best practices for ecosystem-based fishery management, provides brief, targeted, and evolving descriptions of the interconnected physical, biological, and human/institutional Bering Sea ecosystem and through ecosystem thresholds and targets, and directs how that information can be used to guide fishery management options. Additionally, through the framework of the FEP, the Council has established a Climate Change Taskforce to evaluate the vulnerability of key species and fisheries to climate change, and to strengthen resilience in regional fisheries management. The intention is to address the following objectives: (1) coordinate to synthesize results of various ongoing and completed climate change research projects; (2) evaluate the scope of impacts on priority species identified in initial studies; and (3) strategically re-evaluate management strategies every 5-7 years; (4) include synthesis to evaluate climate-resilient management tools. Results will inform "climate ready" tactical and strategic management measures, which will help ensure a productive Bering Sea marine ecosystem and healthy fisheries for decades to come.

Additionally, NOAA Fisheries has developed a Climate Science Strategy as part of a proactive approach to increase the production, delivery, and use of climate-related information needed to reduce impacts and increase resilience with changing climate and ocean conditions. The Climate Science Strategy is designed to be customized and implemented through Regional Action Plans (RAPs) that focus on building regional capacity, partners, products and services to address the seven objectives.

[18] https://www.fisheries.noaa.gov//alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

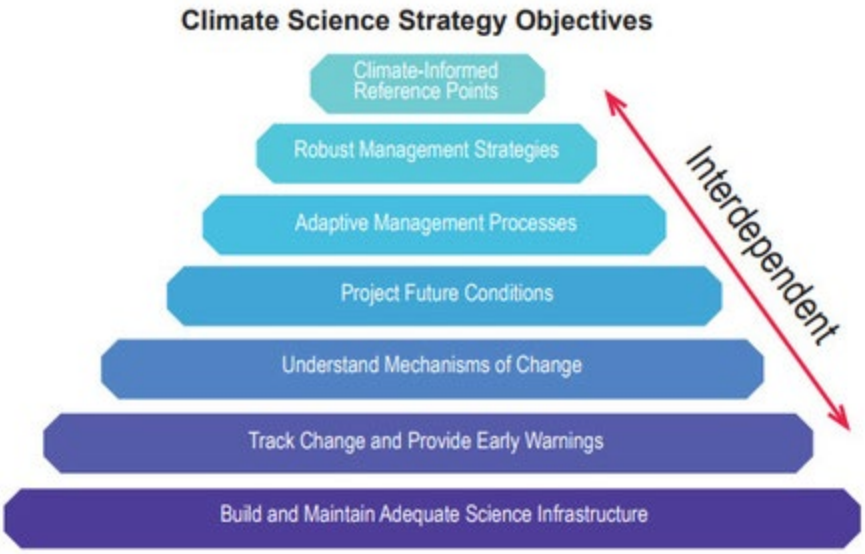

Figure 4-1 NOAA Fisheries Climate Science Strategy's Seven Priority Science Objectives

The Alaska Fisheries Science Center has developed three RAPs on climate, for the Bering Sea, the Gulf of Alaska, and the Arctic. The RAPs focus on building regional capacity, partners, products, and services tailored to each specific region, and identify current and new climate research activities over the time period of the RAPs, as well as evaluating remaining key scientific gaps for each region.

4.7.1 Effects on the Ecosystem

The action alternatives in this analysis would allow for the discard of jellyfish. When CVs encounter large amounts of jellyfish, it has negative impacts on product quality because jellyfish can clog pumps necessary for efficient fishing operations. AFSC stock assessors were asked about the impact of loss of these jellyfish data if they are discarded. It was identified that while some jellyfish data are used in the ecosystem report, the loss of these data collected by observers would not impact current data needs. Therefore, the impacts of the alternatives at the ecosystem scale are not likely to be significant under any alternative analyzed in this document.

4.7.2 Effects of Aggregate Past, Present, and Reasonably Foreseeable Actions on the Ecosystem

No RFFAs were identified as likely to have an impact at the ecosystem scale within the action area and timeframe. Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference, the aggregate impacts of the proposed action are determined to be not significant.

4.8 NEPA Summary

One of the purposes of an environmental assessment is to provide the evidence and analysis necessary to decide whether an agency must prepare an environmental impact statement (EIS). The Finding of No Significant Impact (FONSI) is the decision maker's determination that the action will not result in significant impacts to the human environment, and therefore, further analysis in an EIS is not needed. The Council on Environmental Quality regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." An action must be evaluated at different spatial scales and settings to determine the context of the action. Intensity is evaluated with respect to the

nature of impacts and the resources or environmental components affected by the action. These factors form the basis of the analysis presented in this Environmental Assessment/Regulatory Impact Review.

This section will be completed for the final action draft.

4.9 Impacts and Changes to Data Collection

4.9.1 Impacts on the Partial Coverage Component of the Observer Program

Under this program, trawl vessels participating in the program will carry an EM system in lieu of an at-sea observer while catches will be monitored shoreside for specimen and biological data collections. If time allows, observers will also collect species composition data; however, catch and bycatch estimation would rely on landings data and EM records of any at-sea discards allowed under the full retention requirements of the program.

Vessels in the trawl EM program will be required to opt-in to the program annually for the full year. The number of vessels able to participate will vary from year to year through the annual ADP process. This This differs from the fixed gear EM program where number of vessels is held relatively constant; vessels remain in the EM pool until they opt-out or are removed by NMFS. As a result, the fixed gear EM pool does not vary with available funding and is not responsive to changes in monitoring priorities. Under the proposed trawl EM program the number of vessels participating will vary according to the number of vessels opting in, the amount of funding available, and how sampling effort is allocated under the ADP process.

The ADP process relies on projections of effort to estimate costs and appropriate sample rates for the following year. Under the trip-by-trip opt-in model currently used under the EFP vessel operators are able to opt into the EM program for specific trips. This trip-specific participation in the program would complicate effort projections since analysts would need to be able to estimate both total trawl effort for the upcoming year, but also the proportion of trips that would occur in the EM program. By requiring vessels to participate in the EM program for the entire year, effort projections would be generated based on the list of participating vessels and general trends in fishing activities.

Additionally, trip-specific participation has complicated shoreside sampling conducted by observers in the partial coverage portion of the program (GOA). Observers must be able to identify which deliveries are from trips that participate in the EM program in order to randomize selection of deliveries to be monitored. This becomes difficult when trips from a participating vessel might be non-EM trips. Communication between participating vessels, processing plant staff, and observers can mitigate this situation; however, sampling mistakes resulting from mis-identification of EM-deliveries result in inefficiencies and may result in an inability to meet sampling goals.

By moving vessels from the trawl stratum to the trawl EM stratum, the number of observed trips will decrease while the number of monitored shoreside deliveries will increase. Because there will be fewer trips monitored at-sea by observers, there will be increased focus on the observer data collected at-sea where biological data such as length data and specimens can be linked explicitly to haul-specific catch and effort; these data become of greater importance to stock assessors and other data users. Although biological data and specimens will be collected from shoreside delivery, the overall decrease in NMFS's ability to collect biological data that is linked to specific fishing events will result in an inability to assess variability in fish size or age within trips or at a geographically fine-scale.

Lastly, with the decrease in the number of fishing trips that are observed at-sea, the opportunities for additional at-sea data collections will be impacted. Each year AFSC FMA supports researchers at the AFSC and other institutions by training and supporting observer data collections for research projects. Data collections for these research projects are typically carried out by observers while they are deployed and in 2022 observers are participating in 10 projects, including those focused on genetic variability of

BS herring, size and age estimation for Pacific sleeper sharks, and the occurrences of soft-shell PSC crab in BSAI non-pelagic trawl fisheries. At-sea data collections for these research projects would be constrained to the portion of the fleet not in the EM program.

While there is an expectation that the use of at-sea EM compliance monitoring paired with shoreside catch sampling will cost less per trip than current observer-based monitoring, this may not be the case in an implemented program. Depending on cost differentials between the trawl EM program and at-sea observer monitoring, the increase in the number of sampled deliveries in the trawl EM stratum might not balance the decrease in the number of trips sampled by observers. If EM does cost more than observer coverage, there will be at best, no gain, and at worse a decrease in overall monitoring coverage. On the other hand, if the cost of monitoring trawl EM trips are less than the costs for observed trips, then moving vessels from being observed at-sea to trawl EM strata will result in lower costs for the same number of monitored trips, resulting in a potential increase in available funds that could be used elsewhere, as determined through the ADP process. Regardless of the costs, the movement of vessels from observer coverage into EM coverage will decrease in the number of trips that are observed at-sea and result in an overall decrease in the numbers of biological specimens and data collected at sea. This effect may be controlled somewhat through the allocation of sampling effort in the ADP; however, sample allocation across all strata will depend on available funding, sampling objectives and priorities, and analytic results. Allocation of monitoring effort and tools will be presented annually in the draft ADP.

If there are cost-savings under implementation of trawl EM, these cost savings will be used to ensure other sampling needs are met through the ADP process. This could include prioritizing monitoring of sectors with high PSC bycatch, increased sampling in non-survey years, or responsiveness to acute management issues. The flexibility to respond to management needs through sample allocation is a result of being able to adjust the number of vessels in the EM program according to ADP objectives. There is not a pre-specified use for any cost-savings, but rather the funds will be used to bolster sampling needs according to the objectives and priorities of the ADP.
While for pollock fisheries these impacts may have minimal implications for the assessments, this would not necessarily be the case for other fisheries. In the GOA, all vessels in the program, inclusive of tender vessels accepting deliveries from CVs carrying EM, will have full coverage EM monitoring at-sea (cameras recording for 100% trips). From the EM record, effort and location data will be recorded. Shoreside sampling will occur for a randomly selected portion of trips with randomization occurring at the point of delivery; observers stationed at shoreside sampling plants will select deliveries to be monitored.

Shoreside monitoring (coverage) rates will be determined each year through the Annual Deployment Plan (ADP) process. Currently, NMFS is reassessing the Observer Program monitoring design as part of the ongoing partial coverage cost efficiencies analysis (see June 10, 2022 Council motion C-1). This two-year analysis will include evaluations of baseline coverage needs, the zero-coverage pool, sampling strata definitions, and allocation of monitoring tools (at-sea observers, shoreside observers, and EM). Deployment of EM in the pelagic trawl fisheries and associated shoreside monitoring of deliveries by observers will be included in this analysis. Starting in 2024, the trawl EM stratum will be included in the draft and final ADPs. Shoreside monitoring rates will be defined in the ADP along with monitoring rates for the other sampling strata (fixed gear EM, at-sea observers, and shoreside observers, *etc*.).

Allocation of Budget Between EM Coverage and Observer Coverage

Determining the balance between fixed gear EM, trawl EM, and at-sea observer coverage, and shoreside monitoring will depend on the sampling goals set annually in the ADP. Allocation of monitoring effort between these different strata will be balanced through the ADP process to ensure monitoring needs are met within the available budget. Monitoring effort allocated will depend on the funding allocated to trawl EM coverage and the sample effort allocation methods developed through the 2024 ADP objectives and priorities (i.e., the cost efficiencies analysis; (see June 10, 2022 Council motion C-1)). Factors that will

be taken into account will include budget, monitoring priorities under the ADP, and other current issues as appropriate. For example, if PSC issues in the GOA are identified, the ADP may specify increased sample rates (meaning more vessels, higher sampling rates, or both). Alternatively, in a GOA non-survey year, through the ADP may allocate additional sampling effort to at-sea data collections. As a result, the number of vessels in the trawl EM stratum will vary between years depending on where monitoring effort needs to be focused. This flexibility is necessary in order to be able to balance the various monitoring needs in the ADP.

4.9.2 Impacts on Data Collection

Observers collect biological samples and fishery-dependent information on total catch and interactions with protected species. Managers use data collected by observers and EM to monitor quotas, manage groundfish and PSC, and document and reduce fishery interactions with protected resources. Scientists use observer-collected data for stock assessments and marine ecosystem research. With the implementation of trawl EM, several distinct types of data will be available through this program. From the EM systems, sensor and imagery data will be collected at the haul level and from the shoreside observer sampling, catch data – including species composition – and biological specimens can be gathered at the trip level by observers in the shoreside processing plants.

Updating and/or implementation of Catch Monitoring Control Plans (CMCPs) will help observers to collect high quality data in shoreside processing plants where due to plant layouts and high volumes of delivered catch, sampling can be challenging. Shoreside observer responsibilities will follow the same monitoring priorities outlined under the EFP unless otherwise directed by AFSC FMA in response to emerging priorities: salmon enumeration, salmon tissue collections, halibut enumeration, halibut length, sample collections for biological data (e.g., length data and otolith collections), and fish ticket verification (species composition samples, including herring and PSC crab). The impact to data availability due to implementation of EM on trawl vessels fishing pollock will include loss of haul-specificity of data collections such as biological specimens (e.g., otoliths) and haul sizes since the link between haul locations obtained from the EM record since the catch will be monitored at the end of a trip. The overall number of biological specimens should remain constant if sufficient numbers of observers are deployed to shoreside processing plants in order to sample EM deliveries. If too few observers are assigned to monitor deliveries however, the numbers of biological specimens will decrease.

EM sensor data will provide effort data associated with the shoreside data collections, specifically locations and times where fish from which specimens were collected were caught, and associated haul size and fishing depth will be available from logbook data. It is important to note however, that locations and times of hauls containing individual collected specimens will not be available. Although effort data will be available for each haul, it is not possible to associate catch data and specimens with individual hauls. However, it would be possible to approximate the spatial location of the catch based on the haul level data, especially since pollock CVs operating under trawl EM typically take very few hauls per trip and those tend to be in the same areas.

EM imagery will allow for verification of maximized retention and any discard events. In addition, the video review will provide information on marine mammal mortalities of animals that are brought onboard the vessel. On fishing trips where marine mammal encounters are reported to NOAA, the EM imagery could also include verification of species recorded, length measurements, and other data. However, tissue samples, biopsies, and specimens cannot be collected. Similarly, on trips where seabird bycatch is indicated in the vessel logbook, EM imagery will be reviewed and seabird bycatch data will be captured. Species identification, however, will be difficult since birds that are mixed into the trawl catch have few identifiable characteristics that will be visible to EM reviewers. Alternative methods of species identification are being investigated (artificial intelligence algorithms, drowned bird identification guides specific to EM imagery, etc).

PSC data collection in the BSAI and GOA has remained unchanged as salmon retention data remain the observers' top priority throughout the EFP. In addition to collecting salmon retention and genetic data, shoreside observers will also collect data on Pacific halibut (this data point has not been collected as a census in the offload data since 2009).

4.9.3 Reducing Data Gaps

4.9.3.1 EFP Sampling Goals

The sampling goals of the Trawl EM EFP were to mirror the data collection of observers deployed on vessels at the shoreside processors as closely as possible. The minimum sampling goals for the BSAI were 100% of the EM trips, and in the GOA 33% of the EM trips. Based on Figure 4-2 below all BSAI sampling goals of the EFP were met. In the GOA, a majority of the sampling goals were met, but there were still some unique variables outside the agency's control preventing these goals from being achieved.

Variables that impacted EFP sampling goals:

- In the BSAI, the A-season 2020 plant observers were deployed with the expectation that "regular" plant observers (those required by the AFA) and the "EM shoreside observer" would work together to accomplish all sampling. This assumption is predicated on the assumption that vessel observers would also be able to follow their fish into the processing plant to assist with PSC sampling. However, due to the global pandemic, vessel observer could not disembark their vessels. This left far too much work for the plant observers to manage. In order to maintain the necessary data collections for PSC, shoreside observers were asked to prioritize salmon monitoring at the plants.
- In the GOA, the A-season 2020 plant observers were meant to be able to move between plants in Kodiak. Communications between the observers and the plants was confusing, and often lacking. Further, in response to the global pandemic, some plants closed their campuses, preventing the observers from sharing plants. In order to maintain the necessary data collections for PSC, shoreside observers were asked to prioritize salmon monitoring at the plants.
- In the BSAI, B-Season 2020 communications between plant personnel and observers were vastly improved, and more shoreside observers were deployed than during than A Season 2020. The increased deployment of shoreside observers at the plants was necessary, as the agency knew ahead of time that observers could not assist each other with salmon monitoring across multiple plants due to the pandemic. Additionally, the work load at the processing plants was often too large to share observers, or there were multiple EM trips that needed to be sampled at the same time at different plants.
- In the GOA, B-Season of 2020 was also the first season that the GOA shoreside processing plants introduced the Catch Handling Plans to address the communication issues identified in A Season of 2020. The introduction of these Catch Handling Plans in the GOA, which mimicked the BSAI CMCP, was a key component in the project reaching its sampling goals when compared to the previous season without Catch Handling Plans.
- In A season of 2022 the pandemic took a toll on many shoreside observers, including the BSAI. While dealing with the many variables of collecting data in remote ports, on top of the pandemic, observers continued to make PSC the priority and all salmon retention data was collected, but the species composition and biological data fell short of the sampling goals.

Overall, the sampling goals that were set out by the EFP are attainable under normal circumstances. The fact that nearly all sampling goals were met in both the B Season of 2020, and the A and B Season of

2021, shows that even at the height of a global pandemic these data can be collected shoreside and sampling goals can be met. The agency and PIs made modifications throughout the project allowing for sampling to progress, under very difficult circumstances, and NMFS do not see any barriers to meeting our sampling goals in the future given sufficient resources (shoreside observers).

Once the Trawl EM program is implemented, NMFS will continue to work with stock assessors to evaluate the program and monitor for future data gaps. In addition, NMFS will retain the right to deploy observers on vessels if any data needs are identified.

Figure 4-2 Sampling Goals

	First 3mos of EFP	A Season 2020	B Season 2020	*A/B Season 2021*	*A Season 2022*
Bering Sea (Goal 100%)					
PSC Census	100%	100%	100%	100%	100%
Pollock Biological Data (otoliths and lengths)	98%	99%	97%	96%	77%
Species Composition	98%	80%	98%	99%	77%
Gulf of Alaska (Goal 30%)					
PSC Census	32%	31%	33%	33%	36%
Pollock Biological Data (otoliths and lengths)	5%	13%	32%	25%	27%
Species Composition	1%	2%	32%	25%	27%

*The first 3 months of EFP data were used to determine if the project was working, and weekly meetings took place between the PI's, and Agency staff.
**Communication issues and number of observers were adjusted over the first year (2020) of the EFP so that sampling goals could be met.

4.9.3.2 Improved Data from Tenders

Inclusion of tenders accepting deliveries from CVs in the EM program represents an opportunity to collect data from tender vessels that was not previously possible. Tendering activity has previously been identified as a monitoring issue (see AFSC and AKRO 2017, AFSC and AKRO 2019 for examples). Prior to the onset of the Trawl EM EFP, observers did not sample tender deliveries as there was no guarantee that the catch was unsorted and the deliveries may carry fish from more than one vessel. Sampling aboard tenders was not feasible, as these vessels do not have space to sampling and there are significant safety concerns associated with transferring to and from tender vessels at sea. Under the Trawl EM EFP, observers began closing this data gap by collecting data on catches delivered to tender vessels, including not only PSC (salmon retention data), but also species composition and biological data from these deliveries.

4.9.4 Expanded Data Gaps

Removing observers from vessels would increase the data gap in marine mammal and bird specimen collections. Observers will no longer be able to collect marine mammal and seabirds specimens unless

they are delivered to the processor in the total catch. With cameras in place on the vessels there is the potential for alternate monitoring, but in the EFP mammal and bird interactions or sightings have only been captured if the incident takes place during gear retrieval or when catch is transferred into the holds. The camera systems on the vessels are recording even when the vessel is steaming or underway, and those data are accessible to the video reviewer. These two types of data gaps are prime reasons why the agency will retain the right to deploy observers on vessels at-sea.

4.10 Impacts on Prohibited Species Catch Data

The primary PSC species encountered by vessels targeting pollock with pelagic trawls are salmon species. One of the primary goals of the trawl EM program was to increase the accountability and precision of PSC estimation. The agency differentiates salmon PSC by Chinook salmon and non-Chinook salmon. Other PSC species encountered include Pacific herring, Pacific halibut and crab species.

NMFS estimates total groundfish catch and PSC for the trawl fisheries based on Observer Program data and mandatory fishing industry reports. In the CAS, NMFS uses the observer data to create PSC rates (a ratio of the estimated PSC to the estimated total catch in sampled hauls). The observer information from offload counts on observed trips is used to create the PSC rates that are then applied to industry supplied landings of retained catch on unobserved trips. Depending on the observer data that are available, the extrapolation from observed vessels to unobserved vessels is based on varying levels of aggregated data (post-stratification). Data are matched based on processing sector (e.g., CV), week, fishery (e.g., pollock), gear (e.g., pelagic trawl), and Federal reporting area. Further detail on the estimation procedure, including levels of post-stratification is available in Cahalan et al. (2014).

The implementation of Trawl EM on pelagic trawl vessels would not change fishing behavior, rather the action alternatives would focus on improving accounting of groundfish catch and PSC estimation using EM systems. Therefore, there should be little to no impact on PSC rates as a result of any alternative. There would be limited change to how the agency estimates PSC compared to status quo, with the principle changes being where the data used for estimation is collected and allowing for more precision in estimates.

The implementation of Trawl EM is likely to increase our accountability of PSC. EM systems are used to verify compliance with retention requirements allowing for PSC data to be collected during offload. Under Alternative 1 - status quo, data on salmon PSC are only collected on observed vessels during offload (i.e., for the partial coverage observer category in GOA, this means only on trips where an at-sea observer is onboard). Data for other PSC species are collected from observers onboard the vessel. Under Alternatives 2 and 3, data from all PSC species will be collected during offload of trips. This may result in less estimation variance since all PSC will be enumerated shoreside and PSC estimates will no longer depend on sample size limitations of observer PSC data collections on CV (at-sea samples).

Other changes that affect PSC estimation are limited to improve accountability, precision of PSC estimation and use of PSC including:

- CMCPs implemented in GOA processing plants to support collection of precise PSC data.
- All PSC estimation collected during offload instead of reliance on at-sea samples yielding potentially high-variance estimates (including vessels delivering to tenders)
- Increased participation in the prohibited species donation program.

4.10.1 Chinook and Non Chinook Salmon PSC

Sampling of salmon is a priority for NMFS. One of the primary goals of the EFP to test the efficacy of Trawl EM was improving salmon PSC estimation. As mentioned above, the participation in Trawl EM has not shown changes fishing behavior during pre-implementation and is not expected to impact PSC rates under any alternative. There is no change in how PSC is calculated in CAS. Under Alternative 2 and

3, the Trawl EM option provides monitoring options that are likely to increase precision of salmon PSC estimates.

4.10.2 Bering Sea Salmon

In the BS, Amendment 91 and Amendment 110 implemented PSC limits for salmon and included multiple monitoring requirement to increase accountability of PSC and precision of PSC estimation on salmon. Under alternative 2 and 3, the EM systems help support these PSC accounting requirements and the combination of current regulation and the EM system help improve accountability of PSC. There is no change to the process in which salmon PSC data are collected or how CAS estimates salmon PSC under any alternative. EM systems provide more verification that all salmon are retained and available to be counted regardless of whether the observer is on deck during dumping of catch.

4.10.3 Gulf of Alaska Salmon

In the GOA, some of these monitoring requirements implemented in the Bering Sea under Amendment 91/110 were found to be necessary to support observer collection of PSC data. Participating processors in the GOA would be required to have a CMCPs that are designed with PSC estimation and accounting in mind. This is discussed in more detail in section 3.1.4.1.

Catch of CVs fishing for pollock is generally either dumped or mechanically pumped from a codend (i.e., the end of the trawl net where catch accumulates) directly into refrigerated seawater tanks. Because of the size of the codends, opportunities for sorting of any species, including salmon PSC, are extremely low. At-sea observers attempt to obtain random species composition samples by collecting samples of catch as it flows from the codend into the refrigerated seawater tanks. Therefore, in the GOA pollock fishery, at-sea observer samples are semi-randomly collected on-deck directly from the moving catch and sample fractions vary. For uncommon species such as salmon, a larger sample size is desired, but large sample sizes are generally not logistically possible on pollock CVs. For this reason, whenever possible, estimates of CVs' salmon PSC are based on counts of the salmon PSC that are generated from offload sampling that occurs during delivery to a shoreside processor.

To facilitate collection of salmon data from offload sampling, Amendment 93 to the GOA groundfish fishery management plan required retention of all salmon by all vessels participating in pollock fisheries until the catch is delivered to a processing facility where an observer is provided the opportunity to count the number of salmon and to collect biological samples from the salmon used in determining river of origin. Only vessels that took an observer had accountability that all salmon were retained and data from these vessels could be used to estimate PSC. In the GOA, only a portion of vessels were observed meaning rates derived from observed vessels were then extrapolated to non-observed vessels. Under alternatives 2 and 3, EM systems and EM review of all fishing activity provides the accountability needed to allow for salmon PSC accounting during offload for all pelagic trawl pollock trips. The way salmon data is collected is discussed more in Section 3.1.6 of the document. There is no change to the process in which salmon PSC is collected in the GOA or how CAS estimates salmon PSC under any alternative except for tender vessels as discussed below.

4.10.4 Salmon PSC and Tenders

Under alternative 1, the status quo is that offload sampling is not available for CVs that deliver catch to tender vessels due to lack of observer coverage on tender vessels and because there was not way to ensure that catch had not been sorted at-sea. Rates associated with vessels delivering to tender vessels were derived from at-sea observer samples. There is high variability in those estimates and one of the focuses of the EFP for trawl EM was to determine monitoring options on tender vessels that may allow for more precision in estimation of salmon PSC. Alternative 2 would implement EM systems on tender vessels and require participating trawl EM CVs to either deliver catch to an EM tender or a participating processing

plant. The EM system is used to verify no sorting or discard of salmon, enabling offload sampling of salmon PSC from tender deliveries.

4.10.5 Halibut PSC

Halibut PSC in pollock fisheries is rare relative to other species. Under alternative 1, the status quo in both the BS and the GOA are that the data used to estimate halibut PSC was derived from data collected from at-sea observers. Under Alternative 2 and 3, halibut is required to be retained and EM systems are used to verify full retention of catch, and thus enable offload sampling of halibut similar to salmon PSC. Catch is sorted at delivery and shoreside observers count and sample halibut PSC. This enables more precise estimation of halibut PSC and EM system allow for verification that all halibut PSC was retained and available for offload sampling. As a result, CAS was modified to use offload accounting of halibut PSC for estimation of PSC. It should be noted that all participating processing plants were required to be a participant of the Prohibited Species Donation Program to enable processors to donate any halibut PSC sorted during offload.

4.10.6 Other PSC Species

Other PSC species encountered in pollock directed fishing include Pacific herring and crab species. Crab bycatch is very rare in the pollock fisheries. Herring however can be more common than other PSC species in pollock directed fishing catches. Under alternative 1, the status quo sampling is that PSC data used for estimation in CAS was derived from species composition sampling from at-sea observers. As discussed in prior sections, these estimates lacked precision due to sample size and the prevalence of these species in the catch. Under Alternative 2 and 3, the estimation of these PSC species is derived from sorting and weighing of total PSC by the shoreside processor receiving the delivery. These data are reported in eLandings. The shoreside observer verifies that these PSC species are being sorted and enumerated by processing plant staff. As a result, estimation of PSC in CAS was changed to use the data recorded on eLandings for these species.

4.11 Impacts on Estimates of At-Sea Discards

Under alternative 1, status quo, at-sea discard estimates are derived from at-sea observer estimates of retention during their species composition sampling. At-sea observers collect species composition and record the percentage of catch of each species retained. On trawl CVs, these estimates sometimes lack precision because there can be many points of discard on a CV and it may be difficult for an observer to track all discarded catch, particularly while they are also collecting species composition samples. However, on pelagic trawl vessels, particularly those targeting pollock, discards are uncommon with most catch being put directly into the vessel's hold. The observer's estimate of percent retained is used to determine the species-specific weight of discarded catch for a specific haul. These data are then used by the CAS to derive species-specific discard rates that are applied to landings data to estimate total discards (as described above in section 4.1). Because discard estimation relies on discard rates that are applied across vessels, discard estimates are not available for individual vessels.

Under Alternatives 2 and 3, the estimation of at-sea discard would change to use the information collected by vessel operators in their logbook. Vessel operators are required to report any at-sea discards in their logbook. These logbook pages are provided to the shoreside processor and entered into eLandings. Vessels participating in Trawl EM get vessel specific discard estimates instead of a fleet wide rate applied to them. Vessel logbook estimates are verified by EM video review. Video review can also capture discard events not reported by the vessel operator.

The review of video data allows for verification of maximized retention. EM reviewers can independently make estimates of any discard events and these data can be used to verify compliance with reporting of these at-sea discards to ensure vessels are following maximized retention rules under this program.

Multiple cameras are used and the EM review software allows the EM reviewer to pause the video, allowing EM reviewers to attempt to identify any discards to the species level. Any discard event is recorded and these data are provided to NMFS. During the two years of pre-implementation, it was noticed that vessel operators tend to overestimate discards compared to the EM review estimates. As requested by the SSC at the February, 2022 NPFMC meeting, this section will dive deeper into the at-sea discard estimation and verification of these data.

Over the two years of the EFP, there were 5,445 estimates made for discards by EM reviewers. Table 4-6 shows the frequency of at-sea discard events recorded by species group.

Table 4-6 At-Sea Discard Event Frequency

Species Group	2020	2021	Total
Multi-Species			
Multi-Species discard	1,133	3,115	4,248
Groundfish			
Pollock	10	69	79
Pacific Cod	59	95	154
Flatfish	21	25	46
Rockfish	28	19	47
Shark	303	394	697
Skate	23	33	56
Other - Groundfish	7	5	12
Prohibited Species			
Salmon (Chinook)	1	-	1
Crab	14	21	35
Halibut	1	-	1
Non-Groundfish /Birds / Marine Mammals			
Other - Non Groundfish	6	53	59
BIRD	1	2	3
Marine mammal -Cetacean		4	4
Marine Mammal - Seal/Sea Lion		3	3
Grand Total	**1605**	**3840**	**5445**

Table 4-7 shows frequency of discard events by their size. Eleven discard events did not have a weight associated with the event. These data included marine mammal and bird incidents. Over half of the discard events were less than .005 mt (11 pounds) and 85% of them were under 0.1 mt (220 pounds).

There were 816 discard events recorded greater than 0.1 mt (220 pounds). Of these events, shark species represented 70% of discard events greater than 0.1 mt. While sharks represented 70% of the individual events, the total weight estimate was approximately 13%. Multi- species represent 29 % of discard events over .1 mt, however represented 83% by weight. Less than 1% of discard events greater than 0.1 mt were other categories. Less than 2% of discard events were greater than 1 mt. The vast majority of these events were multi species discard events.

Table 4-7 Discards by Size of Event

Mt	Pounds	Frequency	Cumulative %
0.0025	6	1,581	29%
0.005	11	1,147	50%
0.01	22	927	67%
0.05	110	794	82%
0.1	220	163	85%
0.5	1,102	652	97%
1	2,205	50	98%
10	22,046	83	99%
More than 10 mt	Greater than 22,000	37	100%

4.11.1 Multi Species Discard

Table 4-6 shows that the species grouping with the highest frequency is labeled as multi-species. Most of the larger at-sea discard events (events greater than 1 mt) were associated with the multi species category. These events are discard events that do not allow the EM reviewer to identify catch by species. The most common cause is spillage events when catch is spilled from the codend during the haulback. For example, fish that flow outside the net during retrieval of the codend. The stern and horizon cameras capture of these events allowing for EM reviewers to make estimates of this amount of catch discarded.

Discards related to safety also fall into this category. These safety discard events include over-full nets, bad weather or a combination of both that result in the vessel operator discarding fish from the net. Smaller multi species discard events are cleaning of the deck or net after fish is dumped into refrigerated seawater tanks.

Vessel operators must record discard events to species. In most multi-species discard events, the vessel operators recorded these events in their logbook as a discard of the primary target species of pollock. This may result in underestimates of non-target (pollock) species; however, since the pollock fishery is

typically 99% pollock, this underestimate of less common species is mostly noise and is unlikely to impact management. In instances where catch is not as clean, vessel operators did estimate these discard events to contain more species than pollock, including rockfish species like Pacific Ocean perch, and some flatfish species. The agency could use the trip level (eLandings) species composition to calculate the species composition of these multi-species discard events if data needs warrant it. This may enable less underestimation of less common species and more accurate estimates of catch to the species level.

4.11.2 Shark Discards

The species grouping with the second highest frequency of discards is sharks (Table 4-6). Sharks are an allowable discard. The need for vessel operators to estimate the weight of sharks accurately was identified early in the EFP. The EDP project team identified the challenges for vessel operators when estimating the size of large sharks and, as a result, the methods used to estimate shark weight were changed. Starting in 2021, vessel operators are required to record the shark's length and then use a length-weight chart provided in their VMP to estimate the shark's weight. This process enables more accurate estimation of shark discards.

4.11.3 Data Quality Comparison

During the EFP, the agency compared estimates made by EM review with eLandings to assess data quality. During pre-implementation, this was a manual process focusing on events where data was missing in eLandings. For example, the EM reviewer identified a discard event and the eLandings did not have a discard estimate for that trip. In those instances, the agency worked with the PIs, vessel operator, and shoreside processor to edit the eLandings report to ensure the data was reported. This also enabled an opportunity to discuss the discard and reporting to increase compliance.

Under alternatives 2 and 3, the agency will develop a more automated process for comparing these data and ensuring discards are reported. The agency may focus on events where the difference is greater than 10% and the largest value will be used for estimation. This is conservative and will ensure complete accounting.

An early concern was that there may be incentives to under report at-sea discards. However, comparison of these data indicated that vessel operators do not under-report. This was noted early on in the EFP and was continually tracked during the EFP. Table 4-8 shows the comparison of vessel estimates of at-sea discard with EM reviewer on at-sea discard estimates. Data from both EM reviewers were combined to prevent any confidentiality issues and these were compared to at-sea discards estimates reported in eLandings by vessel participating in trawl EM. Overall vessel operators reported 1,280 mt more catch than EM reviewers recorded. Table 4-8 also shows the difference at the species level. In most cases, there was a higher estimate provided by vessel operators than EM reviewers.

Table 4-8 Comparison of Vessel Estimates of At-Sea Discards (mt)

Species Group	EM Review	eLandings (at-sea discard)	Difference
Multi-Species			
Multi-Species discard	912.46	na	912.46
Groundfish			
Pollock	39.54	1,242.12	-1,202.58
Pacific Cod	2.89	0.22	2.67
Flatfish	0.27	7.75	-7.48
Rockfish	0.43	93.43	-93.00
Shark	144.53	117.86	26.67
Skate	0.68	0.67	0.01
Other - Groundfish	0.18	6.72	-6.54
TOTAL	**1,100.98**	**1,468.78**	**-1,280.25**

4.11.4 Data Changes

During discussion with the SSC at the February, 2022 NPFMC meeting, the SSC requested information on how likely data would change after the activity was initially reported. Analysts understood this SSC comment to mean changes to the data after EM video review and the impact it may have on the various users of this data. Data changes are likely to continue as the agency continues to monitor and quality control check data used in fishery management. During the EFP, data discrepancies were identified and rectified, however we did not have the same tracking of issues and the tracking of the resolution in place to quantify these changes.

The most common data quality changes made resulted from missing data in the eLandings report during EM review. A common example experienced in the EFP is where vessels did not record the weight of a shark, only the length. In those cases, the processing plant personnel were unable to enter a value in eLandings resulting in the data being missing.

Missing data can also be a compliance issue. In a regulated program, these issues would be tracked in the EMSP web portal, similar to the fixed gear EM program, with follow up by NMFS to facilitate correction of any discrepancies and allow for education of the vessel operator to prevent future occurrences. Additionally, the agency will implement programming to compare EM review data and vessel reported data to help identify data issues. By automating this process, it is expected that the program will increase the timeliness of identifying and correcting data issues. These processes will occur in-season and the goal is to rectify any issues as quickly as possible. This is similar to debriefing shoreside observers to verify data.

5 Regulatory Impact Review

This Regulatory Impact Review (RIR) will describe BS and GOA pelagic pollock fisheries, the costs of human observers versus EM in those fisheries, compare the action alternatives against each other as well as the No Action Alternative, net benefits to the Nation, impacts on small entities (Regulatory Flexibility Act requirements), and Paperwork Reduction Act burdens. When considering these sections, it is noted that the complete costs of an EM program are complex, include many components and are often driven by the scale of the program and specific program design elements. This analysis divides these costs into three general categories: 1) monetary costs such as purchasing and installing hardware, providing field services, training and employing video data reviewers, and administering the program; 2) non-monetary costs such as impacts on vessels' and processors' business practices, that are generally described by time and satisfaction rather than in dollars and 3) potential costs or benefits in terms of what the program provides and how well the alternative addresses the management issues identified in the purpose and need statement. This analysis considers these general cost categories although more specific cost reporting categories are also provided in the document.

5.1 Statutory authority

Under the Magnuson-Stevens Act (16 U.S.C. 1801, et seq.), the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ). The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the regional fishery management councils. In the Alaska Region, the North Pacific Fishery Management Council (Council) has the responsibility for preparing FMPs and FMP amendments for the marine fisheries that require conservation and management, and for submitting its recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the Federal mandates of the Department of Commerce with regard to marine and anadromous fish.

The groundfish fisheries in the EEZ off Alaska are managed under the BS and Aleutian Islands (AI) Management Area (BSAI) FMP and the Fishery Management Plan for Groundfish of the GOA (GOA FMP). The proposed action under consideration would amend both FMPs and Federal regulations at 50 Code of Federal Regulations (CFR) §679. Actions taken to amend FMPs or implement regulations governing these fisheries must meet the requirements of applicable Federal laws, regulations, and executive orders.

5.2 Purpose and need for action

To carry out their responsibilities for conserving and managing groundfish resources, the Council and NMFS must have high quality, timely, and cost-effective data to support management and scientific information needs. In part, this information is collected through a fishery monitoring program for the groundfish fisheries off Alaska. While a large component of this monitoring program relies on the use of human observers, the Council supports integrating EM and reporting technologies into NMFS North Pacific fisheries-dependent data collection program, where applicable, to ensure that scientists, managers, policy makers, and industry are informed with fishery-dependent information that is relevant to policy priorities, of high quality, and available when needed, and obtained in a cost-effective manner.

The Council and NMFS have been on the path of integrating technology into the fisheries monitoring systems for many years, with electronic reporting systems in place, and operational EM in some fisheries. An EM program for compliance purposes on pelagic pollock trawl CVs and tenders both delivering to shoreside processors will obtain necessary information for quality accounting for catch including bycatch and salmon PSC in a cost-effective manner, and provide reliable data for compliance monitoring of a no discard requirement for salmon PSC. This trawl EM program has the potential to advance cost efficiency and compliance monitoring, through improved salmon accounting and reduced monitoring costs.

Regulatory change is needed to modify the current retention and discard requirements to allow participating CVs to maximize retention of all species caught (i.e., minimize discards to the greatest extent practicable) for the use of EM as a compliance tool on trawl CVs in both the full and partial coverage categories of the Observer Program and meet monitoring objectives on trawl CVs in the BS and GOA pelagic pollock fisheries.

1. Alternatives
    1. Alternative 1, No Action
    2. Alternative 2, Electronic Monitoring implemented on vessels (both CVs and tenders) in the Bering Sea and Gulf of Alaska
    3. Alternative 3, Electronic Monitoring implemented on CVs delivering to shoreside processors (CVs only, no tenders)
        1. Option 1 Bering Sea
        2. Option 2 Bering Sea and Gulf of Alaska

Depending on the Alternative and option selected by the Council, different pelagic pollock fisheries may be impacted by this action: 1) CVs delivering to shoreside processing plants in the BS[19], 2) CVs delivering to shoreside processing plants in the GOA, 3) CVs that deliver to tenders and tenders delivering to shoreside processing plants[20] and 4) Community Development Quota (CDQ) pelagic pollock fisheries if the harvests are made by CVs[21]. While CVs may participate in multiple fisheries, under current regulations, these fisheries operate distinctly and are therefore treated separately to more specifically describe potential impacts within the alternative structure. CVs delivering unsorted codends to motherships are not required to have observers onboard when fishing pelagic pollock, since all fish are observed on the mothership. EM will not be necessary on CVs operating in this mode for the same reasons. Observer coverage requirements for motherships is not be modified under this action.

The BS inshore pollock fishery has a cooperative fishery management structure (American Fisheries Act) with allocations to the cooperative by NMFS and the cooperatives assigning individual vessels pollock allocations and Chinook PSC limits. This fishery is required to have 100 percent observer coverage under a pay-as-you-go cost model. The salmon bycatch (PSC) is determined by identifying the species and counting each individual salmon at the shoreside processing plant. Receiving processing plants also have observers to assist with this data collection. Shoreside processing plants and CVs work together to maximize fish quality for the marketplace with strict delivery schedules and CV rotations. It is not uncommon for CVs to have some significant wait time between trips, which increases the number of days in which the vessel pays for an observer while not harvesting or delivering. A subset of these CVs participates in the Pacific coast whiting fishery and due to their participation in that fishery, already have operational EM systems on board.

Starting in 2005, a framework was established that allocated the AI pollock directed fishery to the Aleut Corporation to implement a provision of the Consolidated Appropriations Act of 2004 (Public Law 108–199, Sec. 803), which requires that the AI directed pollock fishery be allocated to the Aleut Corporation for the purpose of economic development in Adak, Alaska. NMFS will reallocate the projected unused amount of Aleutian Islands pollock CDQ and Aleut Corporation pollock directed fishing allowance from the Aleutian Islands subarea to the BS subarea as allowed under BSAI FMP Amendment 82. Reallocations have been necessary to provide opportunity for harvest of the total allowable catch of pollock, consistent with the goals and objectives of the BSAI FMP.

[19] The AI pollock fishery has not been fully prosecuted for a variety of reasons, but the Council may wish to consider allowing CVs to use EM in that fishery if it is viable in the future.
[20] Traditionally tender vessels have operated in the WGOA, but the motion does not limit EM use on tender vessels to that area.
[21] CDQ pollock has been harvested by CPs. The motion as currently written is not explicit regarding whether any catch taken by CVs would be eligible to use EM.

The GOA pollock trawl fishery is managed as an open access fishery and the fleet is diverse and can be divided into several distinct groupings. Some GOA pollock CVs also participate in the BS American Fisheries Act (AFA) pollock fishery and/or the Pacific whiting fishery, some CVs deliver to shoreside processing plants, and some CVs deliver to tenders. CVs that participate in the GOA pollock fishery are in the partial coverage category for monitoring. Trawl CVs that fish in the Western Gulf of Alaska (WGOA) are some of the smallest trawl vessels that fish pollock in Alaska, fishing with small crews operating in remote areas. Under the current monitoring plan, pollock trawl CVs are monitored by observers on randomly selected trips. Observers in the partial coverage category are deployed using established random sampling methods to collect data on a statistically reliable sample of fishing vessels in the partial coverage category. On observed partial coverage trips, the vessel observer monitors the offload and conducts salmon census counts at the shoreside processing plant. Many of these smaller CVs deliver to tenders in the WGOA regulatory area with Chinook salmon PSC accounting based on at-sea species composition samples, not counts at the plant. At-sea sampling for rare species such as salmon can result in highly variable estimates. Vessels and processors in the partial coverage category are assigned observer coverage according to the scientific sampling plan described in the Annual Deployment Plan (ADP) developed by NMFS in consultation with the Council. Additionally, each year NMFS produces the Annual Report, which provides descriptive information, analysis, and recommendations based on observer deployment in the previous year. Together, the ADP and Annual Report ensure that the best available information is used to evaluate deployment, including scientific review and Council input, to annually determine deployment methods. The current structure of the North Pacific Groundfish and Halibut Observer Program (Observer Program), including the definition of full and partial coverage, random deployment methods, and the fee system can be found in each year's Annual Report[22] and ADP[23].

Many of these smaller CVs deliver to tenders in the WGOA regulatory area with Chinook salmon PSC accounting based on at-sea species composition samples, not counts at the plant. At-sea sampling for rare species such as salmon can result in highly variable estimates.

The alternatives approved for analysis by the Council, including the no action, status quo alternative (Alternative 1) provide a reasonable range of alternatives for the Council to consider in their recommendations to NMFS. The Council initially indicated an interest in including all CVs and tenders in the BS and GOA in a regulated program (Alternative 2), similar to the approach taken in the EFP (as discussed in section 1.2 of the EA). Analysis of Alternative 2 will provide a review of the potential effects of such an approach. Analysis of Alternative 3 will allow detailed consideration of the elements necessary to implement an EM option in two different pollock fisheries (CVs in the BS and GOA) but not on tenders. Analysis of the status quo, Alternative 1, will provide a basis to compare the potential effects of Alternatives 2 and 3 against. As a whole, analysis of these three alternatives is intended to provide the Council with a more thorough understanding of the various complexities and unique characteristics of these fishery groups and the potential effects of implementing EM in any one or combination of those fishery groups. The Council also recognized that there are some significant logistical and operational challenges in implementing EM. If the analysis identifies that one group of CVs or tenders is having unanticipated difficulties in addressing those logistical challenges and data are not available to proceed with a regulated program for a given group, these challenges could continue to be examined and addressed through an EFP without slowing implementation for the remainder of the program.

None of the alternatives considered include EM for the CVs delivering unsorted codends to motherships. CVs operating in this mode do not take fish onboard their vessels and are exempt from observer coverage, because there are no fish on the CV to observe. For the same reasons that these vessels have been exempted from observer coverage, they are not included in the EM requirements under this proposed action.

[22] https://www.fisheries.noaa.gov/tags/north-pacific-observer-program?title=annual%20report&field_species_vocab_target_id=&sort_by=created
[23] https://www.fisheries.noaa.gov/tags/north-pacific-observer-program?title=annual%20deployment&field_species_vocab_target_id=&sort_by=created

5.3 Methodology for analysis of impacts

The costs and benefits of this action are described in the sections that follow, comparing the no action Alternative 1 with the action alternatives. The analysis then provides a qualitative assessment of the net benefit to the Nation of each alternative, with "no action" as the baseline.

This analysis was prepared using data from the NMFS Catch Accounting System (CAS), which is the best available data to estimate total catch and PSC in the groundfish fisheries off Alaska. Total catch estimates are generated from information provided through a variety of required industry reports of harvest and at-sea discard, and data collected through an extensive fishery Observer Program. In 2003, NMFS changed the methodologies used to determine catch estimates from the NMFS blend database (1995 through 2002) to the CAS (2003 through present). Currently, the CAS relies on data derived from a mixture of production and observer reports as the basis of the total catch estimates. This analysis relies solely on total catch and PSC estimates of fishery harvest and processing data beginning in 2012.

Summaries of the available data are provided through the Alaska Fisheries Information Network (AKFIN). AKFIN has access to the CAS data, Commercial Fisheries Entry Commission (CFEC) Fish Ticket data, and Alaska Department of Fish and Game (ADF&G) Commercial Operators Annual Report (COAR) data from which it can supply catch and discard records, as well as estimates of gross ex-vessel and first wholesale revenues.

Cost data for shoreside observers and EM were provided by the service providers. EM service providers agreed to group costs into predetermined categories for consistent reporting of costs. These groupings are described in detail in the "Approach to Electronic Monitoring Costs" section. Shoreside observer costs for plants taking deliveries of pollock in the GOA use a range of cost estimates. This is necessary because of the uncertainty around the estimate and the confidential nature of the data. Shoreside observer cost data was developed after discussions with observer providers. At-sea observer costs were used as published in the North Pacific Observer Program 2020 Annual report[24].

Fishing vessel safety data are provided by the National Institute for Occupational Safety and Health (NIOSH) who manages the Commercial Fishing Incident Database (CFID). CFID is a national surveillance system that contains information on work-related fatalities and vessel disasters in the United States (U.S.) fishing industry. For Alaska, CFID contains fatality data and vessel disaster data since 2000.

5.4 Data that would be useful but are unavailable

Certain information would have been useful for the analysts and the document reviewers. Some of these data are reported to NMFS but, due to confidentiality concerns, are not available to the analysts or cannot be reported in this RIR. Analysts used the most similar analogs available, however these may not be at the appropriate scale to match the structure of the alternatives and often lead to more uncertain estimates. These data include:

- accurate and available cost per day estimates for GOA shorebased observers in the regulated fishery,
- estimates of plant days to monitor GOA deliveries relative the change in EM days and observer days,
- EM cost data by sector and area,
- specific EM unit cost information for CVs and for tenders,
- at-sea observer costs specific to pelagic pollock trawl CVs, and 2021 at-sea observer costs

Note that this list may be expanded after the initial review of the document.

[24] https://repository.library.noaa.gov/view/noaa/30732/noaa_30732_DS1.pdf?download-document-submit=Download

5.5 Lessons Learned from other EM Programs

As EM is being more widely used in fisheries around the world and an increasing library of literature has been created regarding development, implementation and use of EM systems[25]. The increased use of EM around the world and in Alaskan fisheries has resulted in the development of a structure to aid the implementation of new EM programs. In general, fishery managers should:

- gauge the industries support for implementing and using a specific EM program for their fleet,
- create an EM working group to help design the EM program and foster industry support for a regulated program,
- design and optimize the EM program to best fit the monitoring needs while minimizing the disruption to fishing operations,
- test the proposed EM equipment and data collection procedure in real world conditions to determine and correct any problems prior to implementing a regulated program,
- during the testing and design process work with all stakeholders (fishers, processors, observer providers, EM providers, and management agencies) to ensure the needs and concerns of each group are understood and addressed to the extent practicable,
- determine funding sources and fee obligations and clearly articulate them to the industry,
- implement the program, but provide for the opportunities to readily adapt to future technology innovations within the regulations and reviews of the program to ensure it is meeting the objectives defined for the program.

For Alaska Fisheries this structure was generally described in a presentation to the Council as lessons learned[26] and summarized below:

- Plan ahead and clearly identify the program objective up front;
- If possible, plan for a comprehensive implementation rather than a narrow one;
- Developing the regulations is complicated and time- consuming so there are many advantages to a rule-making package that applies to multiple sectors, as long as vessel responsibilities are similar; and
- Integrate EM with the Observer Program, so that deployment and funding decisions can take into account the whole monitoring context.

This basic structure was followed in the development and potential implementation of the Trawl EM program. It also reflects staff's notes that the Council may wish to slightly broaden its alternatives to consider the possibility of directed trawl CV harvest of pollock in future years of the CDQ and AI fisheries, to eliminate the need to develop separate rule-making packages for those fisheries should their prosecution change in the future.

5.6 Development of pollock trawl EM

History of EM development for pollock CVs using pelagic trawl gear in the eastern BS and GOA
EM on pelagic trawl pollock CVs and tenders delivering to shoreside processing plants has been in development since 2018 (Table 5-1). After the implementation of the regulated fixed gear EM program, the Council changed priorities for the EM Committee from a focus on fixed gear vessels to a focus on

[25] van Helmond, ATM, Mortensen, LO, Plet-Hansen, KS, et al. Electronic monitoring in fisheries: Lessons from global experiences and future opportunities. Fish Fish. 2020; 21: 162– 189. https://doi.org/10.1111/faf.12425

[26] https://media.fisheries.noaa.gov/dam-migration/nopac-electronic_monitoring-ccc.pdf

developing EM as a tool for meeting monitoring objectives on trawl CVs in the BS and GOA pelagic pollock fisheries.

Trawl EM Committee
In 2018 the Council reconstituted the EM Committee to include industry representatives and participants that are stakeholders in the CV pelagic trawl pollock fisheries along with agency staff and EM service providers to reflect the Council priority of developing EM as a tool for meeting monitoring objectives on trawl CVs in the BS and GOA pelagic pollock fisheries. The pollock trawl fisheries were selected by the Council due to their high catch volume and low discards with fewer impacts to PSC species. In June of 2018, the Council adopted three monitoring objectives proposed by the trawl EM Committee after its May 2018 meeting: 1) improve salmon accounting; 2) reduce monitoring costs; and 3) improve the quality of monitoring data. A fourth objective was added by the trawl EM Committee at their meeting in August of 2018: 4) modify current retention and/or discard requirements as necessary to achieve Objectives 1-3.

In June of 2018, the Council directed its trawl EM Committee to develop a cooperative research plan for 2019 and to initially focus on using EM for compliance purposes. The cooperative research plan focused on developing an EM program for compliance purposes on pelagic pollock trawl CVs and tenders both delivering to shoreside processors with a defined retention requirement.

Pilot Project Phase I: Initial Testing (2018)
Phase I of the cooperative research approach involved a voluntary EM pilot project to help inform whether utilizing EM camera systems would be operationally effective for the BS pollock CV fleet for 100 percent compliance monitoring of catch and discards based on Council and NMFS requirements. The pilot project involved four volunteer vessels from United Catcher Boats (UCB) and Mid-Water Trawlers Cooperative (MTC) fishing the 2018 BS pollock B season (under "normal" fishing operations—current area fished, effort, gear used) with 100 percent observer coverage, as required by regulation, while simultaneously operating the EM systems onboard their vessels. Upon completion of a recorded trip by a participating CV, normal logbook information transmissions to NMFS (via the existing shoreside catch monitor) were completed. In addition, EM video data, along with copies of both the vessel and observer logbooks, were transmitted to the Pacific States Marine Fisheries Commission (PSMFC) for review via methods similar to those utilized for the Pacific Whiting fishery. PSMFC reviewed 100 percent of the EM video data. Video from the camera systems were used to validate the vessel and observer logbook reporting of all discard events that may have occurred.

While pelagic pollock trawl vessels in the North Pacific share many characteristics with the west coast whiting fleet, this research demonstrated some key differences and some potential challenges. Those issues are addressed in this EA/RIR for compliance with retention requirements established for the North Pacific fisheries.

Pilot Project Phase II: Larger Scale Test under existing requirements (2019)
Phase II included two projects funded by National Fish and Wildlife Foundation (NFWF), to expand EM testing to more boats in the BS/GOA, including vessels and tenders operating in the WGOA. The BS/GOA project was submitted by UCB, Alaska Groundfish Data Bank (AGDB), and Alaska Whitefish Trawlers association and deployed EM systems on 28 CVs in the BS and Central Gulf of Alaska (CGOA) to assess EM data quality, timeliness, and costs as compared to data collected by observers and those associated costs. The WGOA project was submitted by the Aleutians East Borough on behalf of the Peninsula Fishermen's Coalition and catcher and tender vessel operators fishing the WGOA. The project placed EM systems on 14 CVs and two tenders to track unsorted catch from the net to the shoreside plant where full counts of discards and biological samples were taken.

Exempted Fishing Permit 2020-current
An EFP was issued on January 6, 2020 to evaluate the efficacy of EM systems and shoreside observers for pollock CVs using pelagic trawl gear in the BS and GOA. The EFP exempts participants from

regulations that currently prevent full or maximized retention of all catch, and observer coverage requirements. The project combines EM systems that provide at-sea monitoring of vessels for compliance with fishery management objectives to achieve maximized retention, electronic reporting of catch and discard information, and shoreside observers to monitor salmon bycatch and collect biological information. The partners for this EFP include NMFS Alaska Region, NMFS Alaska Fisheries Science Center, EFP permit holders (Ruth Christiansen of UCB, Julie Bonney of AGDB, and Charlotte Levy of Aleutians East Borough), EM providers (Saltwater Inc., and Archipelago Marine Research Ltd.), video reviewers (Saltwater Inc., and PSMFC), and an observer provider (Saltwater Inc.).

Table 5-1 History of Trawl EM Field Work and Pre-Implementation Timeline

Field work/Pre-implementation Timeline	
2018	Collect EM footage on a handful of trawl CVs during pollock fishing while maintaining observer coverage **Summer:** Apply for two NFWF grants for 2019 research **November:** Two NFWF grants approved for 2019 research
2019	**Dec-March:** Install & operationalize EM on a large variety of trawl pollock CVs in both the GOA and BS **May:** Begin to develop an EFP application to exempt participating vessels from certain regulations (i.e., observer coverage, discard requirements); Confer with ADFG and International Pacific Halibut Commission (IPHC) to ensure EFP allows for full/maximized retention across regulating bodies (ADFG/IPHC/NMFS) **Mid-June:** Complete draft EFP for review by the Alaska Fisheries Science Center (AFSC) / NMFS AK region **June/July:** Apply for grant funding to continue EM research and funding support for the EFP through 2020/2021 in all areas **May:** Update Fishery Monitoring and Advisory Committee (FMAC) about EFP development and implications for the 2020 ADP **October:** EFP application review and approval by the Council
2020 and 2021	Fish using EFP and EM systems in CGOA, WGOA, and BS pelagic pollock fisheries; continue EM research in all areas
2021	**June:** Council initiates an analysis to implement EM on pollock CVs using pelagic trawl gear and tender vessels transporting pollock catch in the eastern BS and GOA, approves purpose and need and alternative set.

5.7 Description of pollock fisheries

5.7.1 Observer Program

In 2013, the Council and NMFS restructured the Observer Program to place all vessels and processors in the groundfish and halibut fisheries into one of two categories: full coverage and partial coverage. When fishing in State of Alaska waters, vessels that possess a Federal Fisheries Permit (FFP) are subject to the federal observer coverage requirements when catching species that are debited from a federal total

allowable catch limit (TAC). A vessel may be in full coverage for some fisheries, and in partial coverage for others.

Catcher/processors, motherships, and CVs that are participating in a catch share program (limited access privilege program (LAPP) that has transferable PSC allocations are placed in the full coverage category by definition. Catch share programs with transferable PSC allocations include the BS pollock fisheries (both AFA and CDQ), the Central GOA Rockfish Program, and groundfish CDQ fisheries other than those for halibut and fixed-gear sablefish[27]. For the purpose of this action, it is simple to assume that CVs are currently placed in full coverage when fishing AFA pollock or fishing CDQ groundfish with trawl gear.

The partial coverage category for groundfish is defined in regulation as all fisheries that are not in full coverage[28]. Vessels and processors in the partial coverage category are assigned observer coverage according to the scientific sampling plan described in the Annual Deployment Plan (ADP) developed by NMFS in consultation with the Council. The ADP for 2022[29] defines the three partial coverage deployment pools[30], or "strata". Vessels in the observer trip-selection pool for 2022 are:

- Hook-and-line vessels greater than or equal to 40 ft LOA,
- Pot vessels greater than or equal to 40 ft LOA, and
- Trawl vessels.

NMFS recommends an observer deployment allocation strategy of an adjusted 15% plus optimization based on discarded groundfish, halibut PSC, and Chinook PSC. Based on the preliminary budget for the draft ADP, NMFS estimated total expenditures in 2022 of $5.119M resulting in estimated coverage rates of:

- Hook-and-line – 18.21%
- Pot – 17.48%
- Trawl – 28.10%
- Fixed Gear EM – 30%
- Trawl EM EFP – 100% EM (plus shoreside monitoring of 30% GOA and 100% in BS).

However, it is noted that in the partial coverage category, NMFS has the flexibility to deploy observers when and where they are needed based on the ADP. NMFS's goal is to achieve a representative sample of all fishing events.

Full coverage entities are invoiced by the provider and pay an amount that reflects actual costs. Observer providers submit copies of all invoices for observer coverage, and NMFS compiles them to calculate the average cost of full coverage. NMFS estimates the cost per day for full observer coverage in its Observer Program Annual Report.

Section 313 of the Magnuson-Stevens Act authorizes NMFS to assess a fee up to 2 percent of the unprocessed ex-vessel value of the fisheries under the jurisdiction of the Council, including the halibut fishery. Annually, NMFS prepares an annual report and consults with the Council to develop the ADP.

[27] The Council has approved a LAPP for the BSAI trawl CV Pacific cod fisheries. The Proposed Rule is still under development for that program.
[28] Specific partial coverage definitions are included for halibut/sablefish IFQ CVs, CVs fishing CDQ, certain CPs, and stationary floating processors.
[29] https://meetings.npfmc.org/CommentReview/DownloadFile?p=e99644cb-fe7e-4c18-a26d-e7a7d17e6c7c.pdf&fileName=PRESENTATION_2022%20Draft%20ADP%20for%20PCFMAC.pdf
[30] Vessels included in the no-selection pool are fixed-gear vessels less than 40 ft LOA and vessels fishing with jig gear, which includes handline, jig, troll, and dinglebar troll gear.
.

The ADP describes how observers and EM will be deployed in the partial coverage category for the upcoming calendar year. Deployment requirements for observers and EM in the full coverage category are established in regulations 50 CFR part 679. Observer and EM selection rates for a given year are dependent on the available budget generated from the observer fee and supplemental funds. Regulations at § 679.55(c) defined that the observer fee is assessed on all landings accruing against a Federal (TAC) for groundfish or a commercial halibut quota made by vessels that are subject to Federal regulations and not included in the full coverage category.

The intent of the Council and NMFS is for vessel owners to split the fee liability 50-50 with the processor or registered buyer. While the intent is that vessels and processors are each responsible for paying their portion of the ex-vessel value fee, the owner of a processor is responsible for collecting the fee, including the vessel's portion of the fee, at the time of landing and for remitting the full fee amount to NMFS.

Annually, NMFS publishes in the Federal Register (FR), a notice of the standard ex-vessel prices for groundfish and halibut for the calculation of the observer fee under the Observer Program (84 FR 68409, December 16, 2019). Each year the notice provides information to vessel owners, processors, registered buyers, and other participants about the standard ex-vessel prices that will be used to calculate the observer fee assessed against landings of groundfish and halibut. NMFS sends invoices to processors and registered buyers subject to the fee by January 15 of each year for the previous year's fee liabilities. Fees are due to NMFS on or before February 15.

NMFS implemented the Council's recommended original observer fee for the partial coverage category of 1.25 percent of ex-vessel value (77 FR 70061, November 21, 2012). However, due to higher-than-expected observer deployment costs since 2013, and to the diminishing availability of supplemental Federal funding and declining fee revenues, additional funding was determined to be necessary to deploy observers and EM at coverage rates adequate to meet the Council's and NMFS' monitoring objectives. In October 2019, the Council unanimously recommended to increase the observer fee to 1.65 percent that increase became effective January 1, 2021 (85 FR 41424, July 10, 2020). Trawl CVs in the partial coverage category that use EM will continue to pay the partial coverage observer fee and it will help fund trawl EM vessel costs that are the responsibility of the industry (Section 3.3.2)**Error! Reference source not found.** of the EA for discussion on cost responsibilities).

5.7.2 Description of the Bering Sea Pollock Fishery

Walleye pollock (*Gadus chalcogrammus*; hereafter referred to as pollock) is a semi-pelagic schooling fish widely distributed in the North Pacific Ocean. Pollock in the central (Areas 620 and 630) and western (Area 610) GOA are managed as a single stock independently of pollock in the Eastern BS (Areas greater than 500 but less than 540) and Aleutian Islands (AI) Management Areas (Areas 541, 542, and 543).

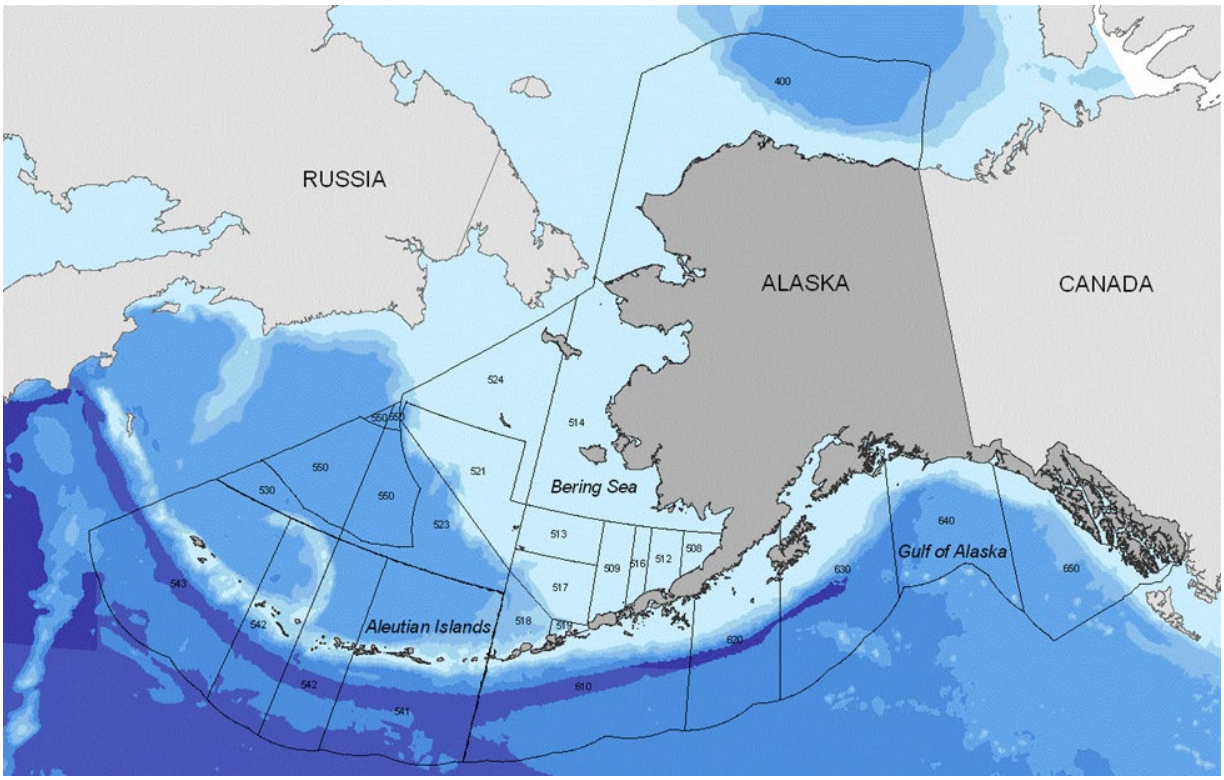

Figure 5-1 Management Areas of the BSAI and GOA

Prior to 1999, the BS directed pollock fishery had been a managed open-access fishery, commonly characterized as a "race for fish." In 1998, however, Congress enacted the AFA to rationalize the fishery by limiting participation and allocating specific percentages of the BS directed pollock fishery TAC among the competing sectors of the fishery. Under 50 CFR 679.20(a)(5)(i)(A), the annual BS pollock TAC, after subtracting first for the CDQ directed fishing allowance (10 percent) and second for the incidental catch allowance (approximately 4 percent), is further allocated by sector for a pollock directed fishery as follows: Inshore—50 percent; catcher/processor—40 percent; and motherships—10 percent. The BSAI portion of this action applies to participants in the AFA inshore sector.

As of January 1, 2000, all vessels and processors wishing to participate in the non-CDQ BS pollock fishery are required to have valid AFA permits on board the vessel or at the processing plant. AFA permits also may limit the take of non-pollock groundfish, crab, and prohibited species, as governed by AFA "sideboard" provisions. With the exceptions of applications for inshore vessel cooperatives and for replacement vessels, the AFA permit program had a one-time application deadline of December 1, 2000, for AFA vessel and processor permits. Applications for AFA vessel or processor permits were not accepted after this date, and any vessels or processors for which an application had not been received by this date became permanently ineligible to receive AFA permits.

The AFA provided for the development of pollock cooperatives. Ten such cooperatives were developed: seven inshore cooperatives, two offshore cooperatives, and one mothership cooperative. Vessels join AFA cooperatives and NMFS assigns the pollock allocation attached to that vessel to the cooperative it joins to determine the amount of pollock each cooperative is allowed to harvest. In 2022, there were still seven inshore pollock cooperatives, but only six were assigned cooperative quota based on vessels participating in the cooperatives.

The BS shoreside (shoreside and inshore are used interchangeably to refer to the inshore fleet) pollock fishery allows the owners of AFA qualified pollock vessels to also divide Chinook PSC allocations between cooperatives. The apportionment of Chinook salmon to cooperatives provides additional

incentives for members to stay within their individual (determined by the cooperative) and cooperative limits. Salmon bycatch (PSC) is determined by counting each individual salmon at the shoreside processing facility, because all shoreside processing plants taking AFA pollock deliveries are required to have observer coverage at the plants when deliveries are made.

Processors and vessels work together to maximize fish quality for the marketplace with strict delivery schedules and vessel rotations. It is not uncommon for vessels to have some significant wait time between trips which increases the number of days an observer is assigned to the vessel. The trawl CVs that participate in the BS pollock shoreside fishery are larger and have been carrying observers for decades so the perceived negative impact of having an additional body on board is not the same as for the smaller fixed gear vessels. The main incentive for EM for this segment of the trawl sector is to lower the vessel's monitoring costs. It is anticipated these vessels would bear the total cost of EM just as they currently pay 100 percent of the human observer costs. It is important to note that a subsector of these vessels participate in the Pacific coast whiting fishery and already have operational EM systems on board. These vessel operators have already made a majority of the initial investment that would be required to have an operational EM system for the pelagic pollock fisheries in Alaska.

The pollock fishery is divided into two seasons—the winter "A" season in which most roe production occurs, and the summer/fall "B" season. Regulations at 50 CFR 679.20(a)(5)(i)(B)(1) apportion the directed fishery to the "A" season (45 percent) and the "B" season (55 percent). The "A" season opens on January 20 and typically ends in April, and the "B" season typically runs from July through the end of October. The "A" season fishery has historically focused on roe-bearing females, and is concentrated north and west of Unimak Island and along the 100-meter contour between Unimak and the Pribilof Islands. In addition to roe, the processors of "A" season pollock also generate other primary products such as surimi and fillet blocks, but yields on these products are slightly lower than in the "B" season, when pollock carry a lower roe content and are thus primarily targeted and processed for surimi and fillet blocks.

5.7.2.1 Summary Participation Data for the Bering Sea Trawl Pollock Fishery Harvesters

This section focuses on participation in the BS directed pollock fishery by the Inshore CV sector and the processors that accept delivery of their catch. Data are presented for effort, catch, value, and geographic location of participants. Data are generally presented for the years 2012 through 2021. Data for 2022 are incomplete at the time this analysis was being developed, but to the extent unusual trends are identified based on discussions with in-season managers and the fishing industry, they are described.

Table 5-2 provides information on the number of CVs that landed directed pollock harvests during the A and B seasons and in total for the years 2012 through 2021. Directed pollock harvests included both "B" (bottom pollock) and "P" (pelagic pollock) target trips. The target designation is assigned based on the catch composition of the landing. Both "B" and "P" targets could have used pelagic gear, but the "B" target trips were less than 95 percent pollock, but the majority of the catch was pollock. Information is also provided on the number of CVs that participated in the trawl EM EFP program when it was operational (2020 and 2021).

More CVs tended to participate in the A season (ranged from 67 to 74) than the B season (ranged from 63 to 73), with the exception being 2014 and 2015. Some CVs only fished in one of the seasons and some CVs fished in both seasons, since the total number of vessels (ranged from 73 to 81) is greater than participated in any one season. However, in recent years the difference has declined. The number of CVs participating in the trawl EM EFP more than doubled from 2020 (21) to 2021 (46). Only one vessel that participated in 2020 did not participate in 2021. The increased level of participation may be an indication of acceptance of the program and provide a better indication of future participation levels than 2020.

Table 5-2 Summary of the pollock pelagic trawl fishery in the BS by season (A, B) and year 2012-2021 and EM EFP participants in 2020 and 2021 (grey shading).

	CVs			Trips			Landings(mt)			Ex vessel value (Millions of real 2021 $)		
Year	A	B	Total	A	B	Total	A	B	Total	A	B	Total
2012	74	73	81	744	1,232	1,976	215,500	318,495	533,995	$93.9	$138.7	$232.6
2013	71	69	79	747	1,193	1,940	220,578	332,116	552,694	$83.4	$125.7	$209.0
2014	67	70	78	743	1,145	1,888	223,267	337,711	560,978	$85.2	$129.4	$214.7
2015	68	73	79	735	1,176	1,911	227,150	352,048	579,198	$84.5	$131.1	$215.6
2016	70	68	81	776	1,181	1,956	233,530	354,812	588,342	$78.9	$119.8	$198.7
2017	73	64	77	823	1,150	1,973	248,458	346,325	594,783	$81.6	$112.3	$193.9
2018	71	65	73	853	1,164	2,017	258,998	344,235	603,233	$84.9	$113.0	$197.9
2019	71	65	73	874	1,204	2,078	269,585	347,987	617,573	$87.2	$111.1	$198.3
2020	71	67	76	890	1,295	2,185	279,465	330,961	610,427	$94.7	$109.6	$204.3
EFP	18	14	21	198	272	470	48,291	50,075	98,366	$13.1	$13.5	$26.6
%	25%	21%	28%	22%	21%	22%	17%	15%	16%	14%	12%	13%
2021	72	63	74	780	1,059	1,839	262,801	339,619	602,420	*NA*	*NA*	*NA*
EFP	42	35	46	434	564	998	135,241	166,150	301,391	*NA*	*NA*	*NA*
%	58%	56%	62%	56%	53%	54%	51%	49%	50%	*NA*	*NA*	*NA*

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Estimates of the number of pollock trips were calculated using the "DEPLOYMENT_TRIP_PK" field. That field represents the best estimate of a CV trip that delivered to a shoreside processor and is the deployment trip definition used for logging trips in the ODDS. If the field were used for at-sea deliveries it would represent a week. Since this action focuses on shorebased deliveries it is more accurate than using a count of weeks fished. The number of trips taken and landings were always larger in the B season, primarily due to the seasonal apportionments and reapportionments of pollock in the BS. On an annual basis, from 1,839 and 2,185 trips were taken to harvest from 533,995 mt to 617,573 mt of groundfish.

Figure 5-2 shows the average groundfish catch per trip. In general, catch per trip ranged from just over 250 mt to just under 350 mt for the years and seasons considered. Catch per trip tended to increase over the period, but 2020 catch per trip was more similar to 2012 and was fairly consistent over the years 2014 through 2019. Data from 2020 was influenced by a variety of factors related to COVID, and changes in the data that year should take into account the unusual circumstances faced by the industry.

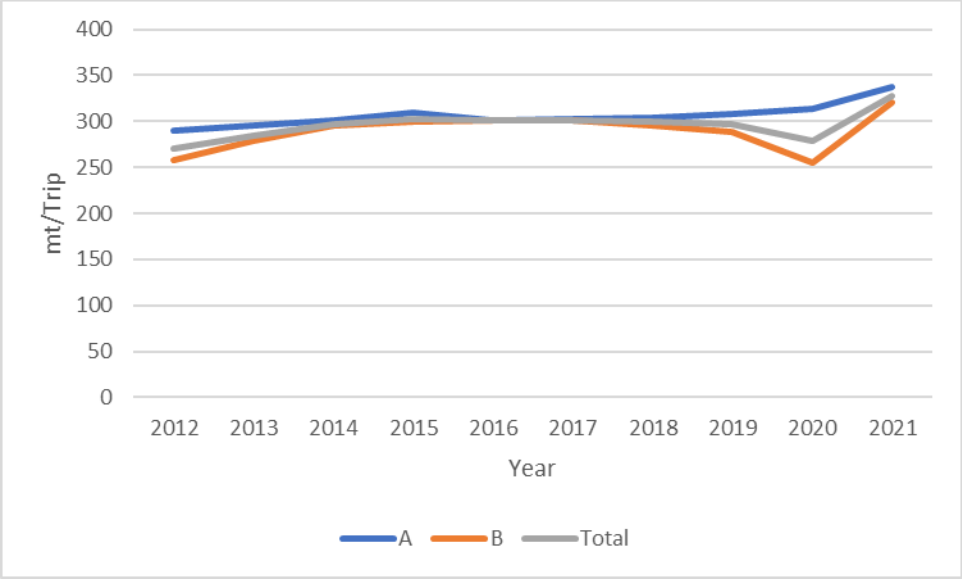

Figure 5-2 Average metric tons of BS pollock landings per trip from 2012 through 2021 by season and total.

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

The average real ex-vessel gross value per trip ranged from about $90,000 to $120,000 and the average annual real gross ex-vessel value was less than $105,000 per trip. These ex-vessel values were substantially lower in the 2020 B season and were influenced by the impacts of COVID the industry was experiencing. Values for 2021 were unavailable at the time the information was generated.

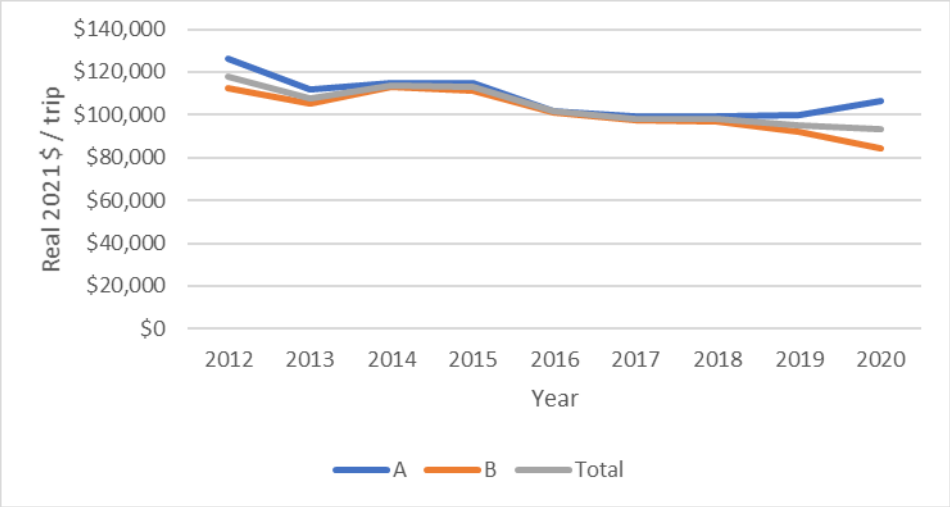

Figure 5-3 Average Nominal Ex-vessel value of BS pollock landings per trip from 2012 through 2021.

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Figure 5-3 provides information on the relative annual gross ex-vessel value of pollock as a percentage of gross first wholesale value. The ex-vessel price ranged from 29 percent to 37 percent of first wholesale value. Percentages varied over the period with no long-term trend. Ex-vessel value was a smaller percentage of first wholesale value in 2019 than other years, but increased in 2020 to second largest percentage during the period.

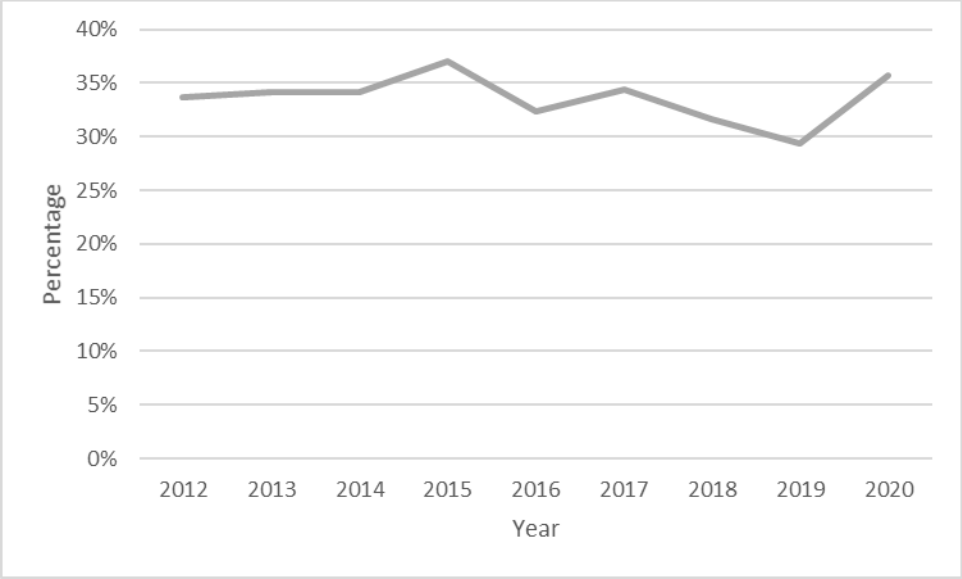

Figure 5-4 Annual BS pollock ex-vessel value as a percentage of BS pollock first wholesale value.

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-3 shows the number of trawl CVs that reported pollock target fishery landings from 2012 through 2021. Overall, participation is relatively consistent across years in total and by region. The Seattle metropolitan statistical (MSA) area was reported as the vessel owner's address for most of the CVs participating in the fishery. Lincoln County, Oregon was listed as the owner's address for the second most vessels participating. As shown in

Table 5-4, the Seattle MSA was listed as the owner's address for 65 percent to 76 percent of the CVs annually. Lincoln Country, Oregon was reported as the vessels owner's home for 11 percent to 15 percent of the CVs, annually. All of the other regions listed had less than 10 percent of the CVs by owner's address. Information on the number of trawl CVs that participated in the Trawl EM EFP is also provided for 2020 and 2021. During 2021, 83 percent of the vessels owners were listed as either being from the Seattle MSA or Lincoln County, Oregon.

Table 5-3 Number of trawl CVs participating in BS pollock trawl fishery by Community or State of ownership and EM EFP participants in 2020 and 2021 (in grey)

Region	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EFP	2021	2021 EFP	Total
Kodiak	5	4	4	3	3	4	4	3	4	2	3	3	5
Other AK	2	2	2	2	2	2	2	1	1		2	1	2
AK Total	7	6	6	5	5	6	6	4	5	2	5	4	7
Lincoln County OR	12	11	10	9	10	8	9	9	9	7	10	9	13
Other OR	3	2	2	2	2	2	2	1	2	2	1	1	4
OR Total	15	13	12	11	12	10	11	10	11	9	11	10	15
Other WA	4	4	4	5	4	3	3	4	2	0	3	3	6
Seattle MSA	53	56	56	58	60	58	53	55	58	10	55	29	66
WA Total	57	60	60	63	64	61	56	59	60	10	58	32	70
Other States Total	2												2
Total	81	79	78	79	81	77	73	73	76	21	74	46	87

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-4 Percentage of trawl CVs participating in BS pollock trawl fishery by Community or State of ownership and EM EFP participants in 2020 and 2021 (in grey)

Region	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EFP	2021	2021 EFP	Total
Kodiak	6%	5%	5%	4%	4%	5%	5%	4%	5%	10%	4%	7%	6%
Other AK	2%	3%	3%	3%	2%	3%	3%	1%	1%	0%	3%	2%	2%
AK Total	9%	8%	8%	6%	6%	8%	8%	5%	7%	10%	7%	9%	8%
Lincoln County OR	15%	14%	13%	11%	12%	10%	12%	12%	12%	33%	14%	20%	15%
Other OR	4%	3%	3%	3%	2%	3%	3%	1%	3%	10%	1%	2%	5%
OR Total	19%	16%	15%	14%	15%	13%	15%	14%	14%	43%	15%	22%	17%
Other WA	5%	5%	5%	6%	5%	4%	4%	5%	3%	0%	4%	7%	7%
Seattle MSA	65%	71%	72%	73%	74%	75%	73%	75%	76%	48%	74%	63%	76%
WA Total	70%	76%	77%	80%	79%	79%	77%	81%	79%	48%	78%	70%	80%
Other States Total	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-5 shows the number of CVs that operated in the 2021 BS and GOA trawl pollock fisheries by whether they used EM, observers, or both by area. The footnote for the table also indicates that three of the GOA vessels that used EM for some of the trips also used tender vessels for some of the trips. This information is presented to show that vessels tended to use EM (53) or they did not (46), but there are 15 vessels that used EM for some trips and not others or in one area but not the other.

Table 5-5 A count of 2021 pollock CVs by area and if they used EM

	Vessels	
EM Usage by Area	Count	Percent
EM in GOA	13	11%
EM in BSAI	29	25%
EM in BSAI and GOA	11	10%
Total Only Used EM	53	46%
EM & no EM in GOA*	8	7%
EM in BSAI and no EM in GOA	1	1%
EM in BSAI, EM & no EM in GOA	1	1%
No EM BSAI, EM in GOA	1	1%
EM & no EM in BSAI	3	3%
EM & no EM in BSAI, no EM GOA	1	1%
Total Used Both EM & Observers	15	13%
No EM in BSAI	26	23%
No EM in GOA	18	16%
No EM in either BSAI or GOA	2	2%
Total Only Used Observers	46	40%
Grand Total	114	100%

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)
* Three of these vessels utilized tender vessels for some, but not all, trips.

Processors

From 2012-2021, landings were made to processors located in Akutan, King Cove, Sand Point (not all years), and Dutch Harbor/Unalaska (Table 5-6). A processor was not listed on all of the 2021 landings. The processor reporting was incomplete because AKFIN had not received the 2021 Fish Ticket data when

these data were provided to the analysts by AKFIN (3/28/22). Fish Tickets are used as part of its processor cross reference algorithm when there is no direct processor match using the information available when the data request was processed. Once Fish Ticket data are available, it could potentially increase the number of processors in a community, but that is not expected to occur for BS landings.

Table 5-6 Number of processors taking deliveries from the BS Pollock Trawl Fishery by Location, 2012-2021

Community	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EFP	2021	2021 EFP	Total
Akutan	1	1	1	1	1	1	1	1	1	1	1	1	1
Dutch Harbor/Unalaska	4	4	4	4	4	4	4	4	4	4	4	3	5
King Cove	1	1	1	1	1	1	1	1	1	1	1	1	1
Sand Point	1	1		1	1		1	1			1	1	1
Total	7	7	6	7	7	6	7	7	6	6	7	6	9

Note: Westward, Alyeska, and the Northern Victor were reported as Dutch Harbor/Unalaska and not Bellevue or Seattle.
Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Due to confidentiality rules, more specific landings information cannot be reported at the community level. However, annual summary data are provided in Table 5-7 that shows the trip and landings information presented for the CVs as well as real first wholesale gross value (in 2021 dollars). Those data are then used to generate value per metric ton and first wholesale gross value per trip. Value per metric ton of fish delivered, in general, declined from 2012 through 2017, but increased in 2018 and 2019, before declining again in 2020. The same general trend was realized when value per trip was calculated.

Table 5-7 First wholesale value of BS pollock trip landings from 2012 through 2020 (2021 real $)

Year	Trips	Landings (mt)	Gross First Wholesale Value (millions of 2021 $)	$/mt	$/Trip
2012	1,976	533,995	$689.9	$1,292	$349,159
2013	1,940	552,694	$611.9	$1,107	$315,424
2014	1,888	560,978	$628.1	$1,120	$332,659
2015	1,911	579,198	$583.0	$1,007	$305,072
2016	1,956	588,342	$613.1	$1,042	$313,470
2017	1,973	594,783	$564.8	$950	$286,244
2018	2,017	603,233	$625.2	$1,036	$309,965
2019	2,078	617,573	$674.5	$1,092	$324,593
2020 (Obs)	1,715	512,060	$478.7	$935	$279,104
2020 EFP	470	98,366	$92.7	$942	$197,153
2021 (Obs)	841	301,029			
2021 EFP	998	301,391			

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

The gross first wholesale value per EM trip is considerably lower than observed trips in 2020. Gross first wholesale value data for 2021 are not yet available to compare across years, but in 2020 larger vessels accounted for a much smaller percentage of EM trips. Vessels that were 125ft. length overall (LOA) or longer accounted for 49 percent of the observed trips and only 29 percent of the EM trips. This is also reflected in the landings per EM trip (210 mt) being about 90 mt less than observed trips (299 mt). During 2021, the difference in landings per observed trip (358 mt) and EM trip (302 mt) was only about 56 mt. and the percentage of observed and EM trips by vessels 125ft. LOA and greater was about the same (about 45 percent). This seems to indicate that the difference in revenue per EM and observed trip will not be as large in 2021.

Table 5-8 provides an estimate of the days fished during the 2019 through 2021 year by port of delivery. This information is provided because of the port of delivery can impact the number of days an observer is on a vessel during a trip and housing costs may differ by port they are stationed. The number of trips were estimated in the same way that was presented for tables earlier in this section. Average days fished was calculated as an average of the difference between the reported start and landing date of each trip (for example a trip that started on the 20th and landed on the 22nd would be calculated as two days fished). Days fished were averaged over all the trips by year, port, and program. Rounding errors and the potential for offloads to occur at more than one port may result in the totals not equaling an exact sum of the subgroups reported. For example, the 2019 total is estimated to be 2,078 trips and 6,234 days fished. When the trips are summed for the four ports it equals 2,082 trips (difference of four trips or 0.2%) and the days fished sum to 6,296 days (62 days or 0.1%). Because the observer may be on the vessel for more time than the difference in the reported start and landing date, the data sub-group has recommended adding one or two days per trip to provide a reasonable range of observer days.

Table 5-8 Estimated number of trips and fishing days by port of landing

Year/Processor Location	Program	CVs	Trips	Avg. Days Fished/Trip	Estimated Days Fished	Estimated Days Fished + 1 day per trip	Estimated Days Fished + 2 days per trip
2019							
Akutan	Observer	34	831	2.7	2,209	3,040	3,871
Dutch Harbor/Unalaska	Observer	43	1,159	3.3	3,840	4,999	6,158
King Cove	Observer	10	91	2.7	243	334	425
Sand Point	Observer	1	1	3.5	4	5	6
2019 Total	Observer	73	2,078	3.0	6,234	8,312	10,390
2020							
Akutan	Observer	19	613	3.2	1,932	2,545	3,158
Akutan	EM	15	259	2.8	730	989	1,248
Akutan Total		34	872	3.1	2,703	3,575	4,447
Dutch Harbor/Unalaska	Observer	35	1,050	3.8	3,995	5,045	6,095
Dutch Harbor/Unalaska	EM	10	178	3.3	585	763	941
Dutch Harbor/Unalaska Total		45	1,228	3.7	4,544	5,772	7,000
King Cove	Observer	6	52	3.8	197	249	301
King Cove	EM	3	34	2.9	97	131	165
King Cove Total		9	86	3.4	292	378	464
2020 Total		76	2,185	3.5	7,648	9,833	12,018
2021							
Akutan	Observer	13	304	2.6	780	1,084	1,388
Akutan	EM	24	366	2.8	1,017	1,383	1,749
Akutan Total		34	670	2.7	1,809	2,479	3,149
Dutch Harbor/Unalaska	Observer	22	496	3.5	1,712	2,208	2,704
Dutch Harbor/Unalaska	EM	25	554	3.2	1,785	2,339	2,893
Dutch Harbor/Unalaska Total		47	1,050	3.3	3,465	4,515	5,565
King Cove*	Observer	4	16	2.7	43	59	75
King Cove*	EM	6	50	2.9	146	196	246
King Cove Total*		9	66	2.9	191	257	323
Sand Point	Observer	6	25	3.2	80	105	130
Sand Point	EM	11	28	3.3	93	121	149
Sand Point Total		17	53	3.3	175	228	281
2021 Total		74	1,839	3.1	5,701	7,540	9,379

* Processor codes that were blank in 2021 were assigned to King Cove based on where those vessels delivered in previous years and the amount of catch associated with those deliveries. This assumption may need to be revised when the 2021 data are finalized.

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db and Trawl_EM_Trips 3-23-22)

Figure 5-5 provides additional detail on the number of EM trips (bottom two figures) and observer trips (top three figures) by month. Month is determined by when the landing was reported and not the start date of the trip. The information shows the same general pattern by month for EM and observer trips in 2020 and 2021. This is expected since vessels tended to use EM or observers and, in general, most vessels fished during the A and B seasons.

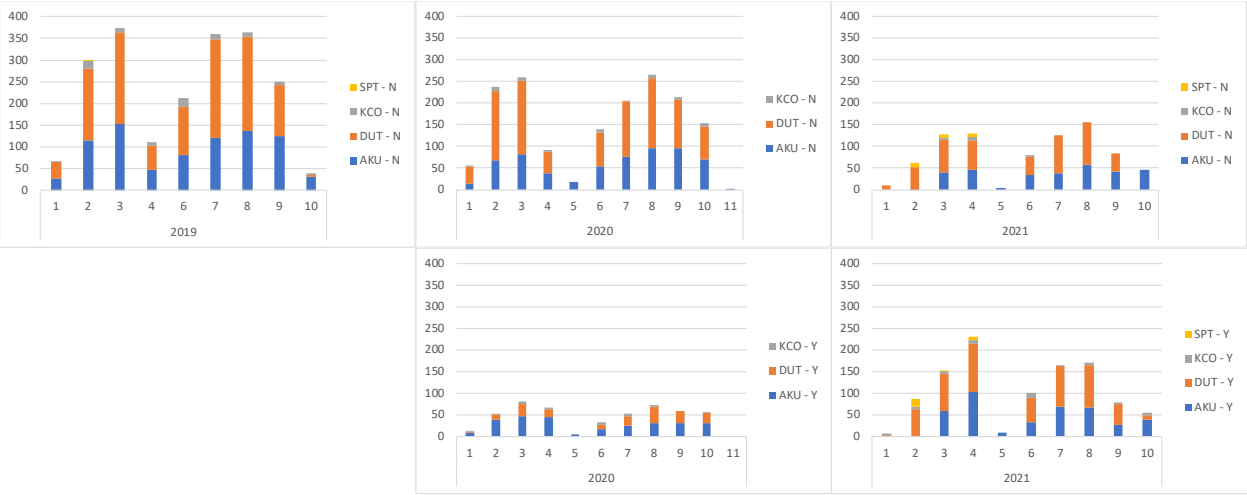

Figure 5-5 BS pollock trips by year, program, port, and month.

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db and Trawl_EM_Trips 3-23-22)

5.7.3 CDQ Program

The pollock CDQ program was approved by the Secretary in 1992 (57 FR 23321, June 3, 1992) and currently assigns 10 percent of the BS pollock apportionment to the CDQ program. Six non-profit corporations (often referred to as CDQ groups) represent 65 communities to help provide economic development in western Alaska. The CDQ program's goals are to alleviate poverty, provide economic and social benefits to residents, and achieve sustainable local economies. Legislative action under Section 305(i)(1)(C) of the Magnuson-Stevens Act enabled allocations to CDQ groups of groundfish, halibut, crab, and bycatch species and a decennial review allows for program and allocation adjustments.

The six-CDQ groups have historically formed partnerships with pollock harvesting firms, either through ownership or lease agreements. CDQ pollock is then harvested and processed by those partners with a portion of the value paid to the CDQ corporation. While CDQ groups are reported to have an ownership interest in trawl CVs that harvest pollock,[31] they typically utilize CPs to harvest their CDQ allocations. The pollock quota assigned to the CVs under the AFA are either harvested by those CVs or transferred to other CVs for harvest in the inshore sector.

Because CDQ pollock is typically harvested by CPs, the CDQ pollock harvests were not specifically listed as being eligible to use EM under the proposed Trawl EM program. Staff assumes that because the alternatives apply to the BS that if CVs are used to harvest BS pollock allocations in the future, those vessels may participate in the Trawl EM program.

5.7.4 Description of the AI Pollock Fishery

As currently defined in the Council's alternatives, trawl CVs that may participate in the AI pelagic pollock fishery are not included in the proposed EM program. If the Council wished to provide the

[31] https://media.fisheries.noaa.gov/dam-migration/cdq-program-summary-1018.pdf

opportunity for CVs that may participate in that fishery in the future the alternatives could be modified. This section provides a short discussion of that fishery for background.

The Aleut Corporation has been allocated pollock since 2005. Pursuant to 50 CFR 679.20(a)(5)(iii)(B)(2)(i) through (iii), the AI pollock TAC, after subtracting first for the CDQ Directed Fishing Allowance (DFA) (10 percent) and second for the incidental catch allowance (ICA) (2,500 mt established for 2022), is allocated to the Aleut Corporation for a pollock directed fishery. In the Aleutian Islands subarea, the A season is allocated up to 40 percent of the Aleutian Islands pollock acceptable biological catch (ABC). In most years since the allocation was implemented, a majority of the pollock has been reallocated to the BS DFA and assigned to AFA sectors in proportion to their initial allocation.[32] For example, 10,000 mt of 2020 Aleutians Islands Aleut Corporation pollock DFA was added to the 2020 BS pollock DFA (Table 5-9). The 2020 BS subarea DFA was increased by 10,000 and made available to the AFA sectors. The reasons for the reallocations have been described in the EFP applications to determine if the pollock fishery could be viable.[33] Stellar sea lions were listed as "threatened" under the Endangered Species Act in 1990. Directed pollock fishing in the AI was closed beginning in 1999, in part due to concerns about Steller sea lions. In 2001 some Stellar sea lion protection measures were relaxed, but no allowance was made for pollock fishing inside critical habitat in the AI. In 2015 NMFS reopened Al pollock fishing that was restricted but generally kept closures inside 10 miles from rookeries and 3 miles from haulouts east of 178 degrees longitude in Area 542 and in Area 541. These area closures, net damage resulting from trying to fish areas the pollock are located, and the increased abundance of Pacific ocean perch in the pollock fishing areas have resulted in much of the Aleut Corporation pollock allocation being reallocated to the BS. NMFS staff noted that in 2021 and 2022 (as of March 21) there was no effort in the Aleut Corporation pollock fishery because the AI shoreside processing plant was not operating. The Aleut Corporation was initially allocated 14,600 mt both years.

[32] Inshore sector - 50 percent, C/P sector - 40 percent, and mothership sector -10 percent of the BS DFA
[33] https://media.fisheries.noaa.gov/dam-migration/efp-popby-app-1118.pdf

Table 5-9 Aleut Corporation pollock allocations and reallocations, 2005 through 2022 (only initial allocation)

Year	Initial Allocation	Reallocations		Final Allocation
		Metric Tons	% of Initial Allocation	
2005	15,100	13,900	92%	1,200
2006	15,300	14,403	94%	897
2007	15,500	-	0%	15,500
2008	15,500	-	0%	15,500
2009	15,500	-	0%	15,500
2010	15,500	-	0%	15,500
2011	15,500	12,500	81%	3,000
2012	15,500	10,500	68%	5,000
2013	15,500	13,000	84%	2,500
2014	15,100	11,750	78%	3,350
2015	14,700	12,554	85%	2,146
2016	14,700	13,000	88%	1,700
2017	14,700	14,700	100%	-
2018	14,700	12,200	83%	2,500
2019	14,700	14,600	99%	100
2020	14,700	10,000	68%	4,700
2021	14,600	12,600	86%	2,000
2022	14,600			

Note: Aleut Corporation allocation started in 2005.

Source: https://media.fisheries.noaa.gov/dam-migration/bsai-pollock-reallocation-1999-present.pdf

5.7.5 Description of the GOA Pollock Fishery

The GOA pollock fleet is very diverse and can be divided into distinct groupings. Some GOA pollock vessels participate in the BS AFA pollock fishery and/or the Pacific whiting fishery, some vessels deliver shoreside, and some vessels that have fished in the WGOA deliver to tenders.

Many of the smallest vessels deliver to tenders in the WGOA regulatory area with Chinook salmon PSC based on at-sea composition samples, not complete enumeration at the plant; at-sea sampling for rare species such as salmon can result in imprecise and highly variable estimates.

The following section is a summary of the 2022 Federal Register Notice for the GOA Groundfish Specifications (87 FR 11599, March 2, 2022). In the GOA, pollock is apportioned by season and area, and is further allocated for processing by inshore and offshore components. 50 CFR 679.20(a)(6)(i) requires the allocation of 100 percent of the pollock directed fishing allowance in all GOA regulatory areas and all seasonal allowances to vessels catching pollock from the directed fishery for processing by the inshore component.

The pollock TACs in the Western Area (610 - Shumagin) and Central Regulatory Areas (620- Chirikof and 630-Kodiak) of the GOA are apportioned among Statistical Areas 610, 620, and 630 (Figure 5-6). These apportionments are currently divided into two equal seasonal allowances of 50 percent to the A season (January 20 through May 31) and 50 percent to the B season (September 1 through November 1) (§§ 679.20(a)(5)(iv)(B) and 679.23(d)(2)).

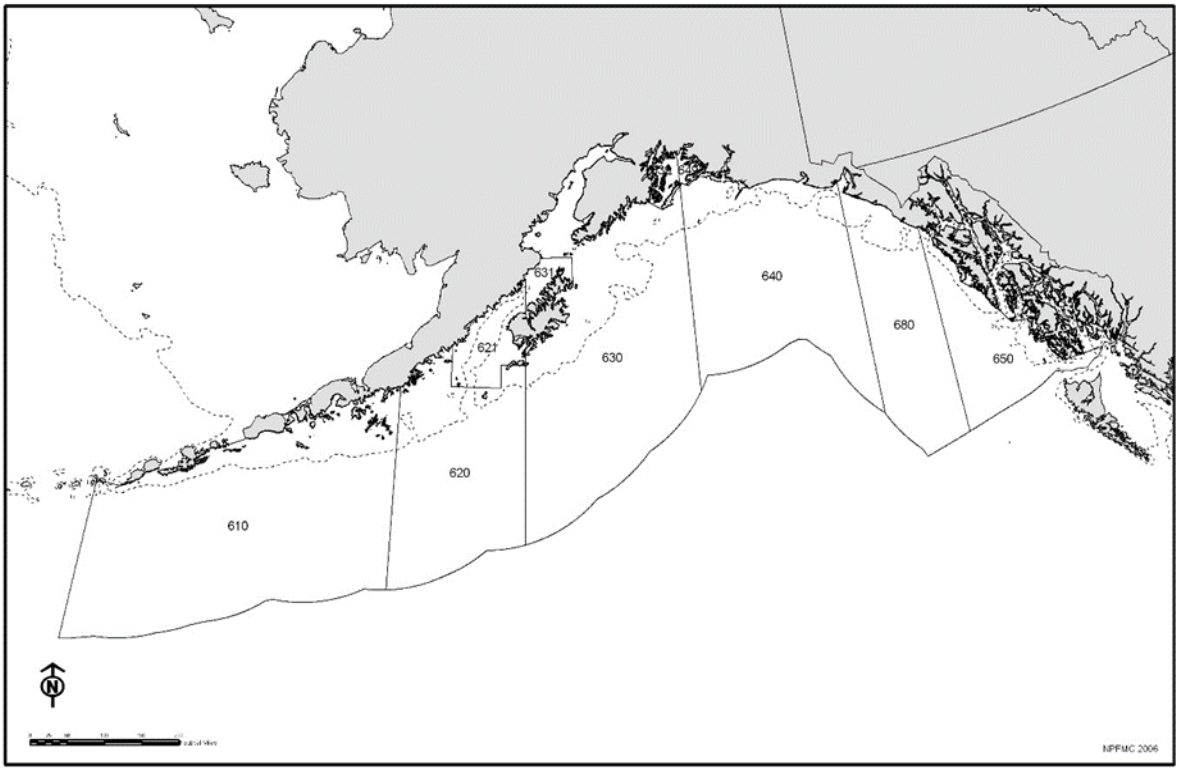

Figure 5-6 GOA groundfish management areas (pollock)

Regulatory changes that were effective in 2021 revised the number of GOA pollock seasons from four seasons to two seasons (85 FR 38093, June 25, 2020). The GOA pollock stock assessment continues to use a four-season methodology to determine pollock distribution in the Western and Central Regulatory Areas of the GOA to maintain continuity in the historical pollock apportionment time-series. Pollock TACs in the Western and Central Regulatory Areas of the GOA are apportioned among Statistical Areas 610, 620, and 630 in proportion to the distribution of pollock biomass determined by the most recent NMFS surveys, pursuant to 50 CFR 679.20(a)(5)(iv)(A). For purposes of specifying pollock TAC between two seasons for the Western and Central Regulatory Areas of the GOA, NMFS summed the A and B season apportionments and the C and D season apportionments as calculated in the 2021 GOA pollock assessment. This yields the seasonal amounts for the new A season and the B season, respectively. The revised A season dates are the same as the first two seasons combined under the four-season structure. The new B season starts on September 1 and ends November 1. The C season under the old four-season structure began August 25. The fishery closes for the year, by regulation, on November 1 under both the new and old seasonal structures.

Pollock seasonal allowances that are underharvested or overharvested may be added to, or subtracted from, subsequent seasonal allowances for the Western and Central Regulatory Areas as determined to be necessary by the Regional Administrator (§ 679.20(a)(5)(iv)(B)). The rollover amount is limited to 20 percent of the subsequent seasonal TAC apportionment for the statistical area. Any unharvested pollock above the 20-percent limit could be further distributed to the other statistical areas, in proportion to the estimated biomass in the subsequent season in those statistical areas and in an amount no more than 20 percent of the seasonal TAC apportionment in those statistical areas (§ 679.20(a)(5)(iv)(B)). The pollock TACs in the West Yakutat (WYK) District (6,722 mt in 2022), are not allocated by season.

On an annual basis, the number of trawl CVs participating in the GOA pollock fishery since 2012 has ranged from 55 (2020) to 69 (2018). The current environment of low A season pollock TACs in Area 610 and a reduced A season Pacific cod opportunity could result in additional non-AFA vessels (GOA

dependent) increasing their participation in Areas 620 or 630 during the pollock B season, subject to holding the necessary License Limitation Program (LLP) area-endorsement. Conversely, some GOA vessels that had historically focused on the CGOA areas (620/630) have recently been attracted to the relatively larger pollock TAC in the Area 610 B season. Those vessels are still able to fish in the CGOA B season when the pace of those fisheries is spread out over time by internal voluntary catch sharing agreements that allocate trips to vessels when they are present. In general, the reader should note that vessels with trawl endorsements for all GOA trawl areas can move opportunistically so long as they secure a market. The decision to trade-off one season/area versus another is dynamically influenced by relative seasonal TAC availability, a vessel's expectation of TAC remaining to be fished when returning from the first area it prosecutes, and the relative ex-vessel prices being paid and operational cost of fishing in a certain area. Those factors can change from year to year.

Vessels endorsed to fish pollock in both the BSAI and the GOA are limited by seasonal exclusivity regulations (§679.23(i)). These regulations restrict the movement of vessels that are less than 125ft. LOA between the BSAI and the parts of the GOA that are west of the 157-degree west longitude line. CVs that participate in the BSAI pollock fishery A season (January 20 through June 10) may not participate in the WGOA pollock fishery until the B season; likewise, vessels that fish in the GOA A season may not participate in the BSAI pollock fishery until that area's B season (June 10 through November 1). This restriction does not prevent vessels from moving between the BSAI pollock fishery and the parts of the GOA that are east of the 157-degree line, which includes much of the CGOA. Vessels participating in Pacific cod are limited in their ability to switch areas by a mandatory stand down period (§679.23(h)). Vessels moving between Pacific cod (or pollock) in the BSAI or WGOA may not cross into the other area to fish without taking a 72-hour stand down. Vessels moving between the CGOA and BSAI must take a 48-hour stand down before fishing in the other area. These rules were enacted to slow the pace of the fishery as an stellar sea lion mitigation measure, and to rationalize in-season management in the context of large effort influxes that could have potentially flowed between the BSAI and GOA after the AFA program was enacted for BSAI pollock.

The GOA pollock fleet is very diverse and can be divided into several distinct groupings: 1) vessels that also fish in the BS AFA pollock fishery; 2) vessels that also fish in the BS AFA pollock fishery and the Pacific whiting fishery; 3) vessels that also fish in the Pacific whiting fishery; and 4) vessels that participate only in the GOA pollock fishery. Typically, GOA pollock vessels that also fish outside the GOA are larger vessels with sizes ranging in length from 80ft.-124ft. All these vessels have the capacity to deliver 300,000 pounds or more. Vessels that fish exclusively in the GOA pollock fisheries are typically smaller, ranging in size from 58ft. to less than 100ft. These vessels' delivery capacity ranges from 100,000 pounds to more than 300,000 pounds. Table 5-10 shows the number of CVs that delivered to shoreside processors in 2020 and 2021, broken out by length category and area the pollock harvest was made. The general trend is that smaller vessels fish in the GOA and larger vessels fish in the BSAI, as expected.

Table 5-10 CV counts by monitoring type, length, and area 2020 – 2021

	2020			2021		
Monitoring/Length	BSAI	GOA	Total	BSAI	GOA	Total
		Observed				
<60ft.		7	7		4	4
60ft. to <90ft.	2	11	12		13	13
90ft. to <100ft.	5	12	14	5	13	15
100ft. to <125ft.	25	6	29	14	1	15
125ft. To <150ft.	11		11	5		5
150ft+	12		12	8		8
Observed Total	55	36	85	32	31	60
		EM				
<60ft.		14	14		14	14
60ft. to <90ft.	4	7	8	4	9	10
90ft. to <100ft.	9	8	11	12	6	13
100ft. to <125ft.	5	2	5	16	5	17
125ft. To <150ft.				6		6
150ft+	3		3	8		8
EM Total	21	31	41	46	34	68
		All Vessels				
<60ft.		21	21		17	17
60ft. to <90ft.	6	16	18	4	16	17
90ft. to <100ft.	14	17	22	15	17	23
100ft. to <125ft.	30	6	32	29	6	31
125ft. To <150ft.	11		11	11		11
150ft+	15		15	15		15
All Vessels Total	76	60	119	74	56	114

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db) and lengths from Federal Fisheries Permit data

The vessels that participate in the GOA pollock fishery are in the partial coverage sector for monitoring; however, EM is not yet a regulatory option for trawl gear. Observer coverage rates have ranged from 18 percent to 28 percent for the period 2016 to 2019 and are specified in the annual deployment plan.

Incentives differ across the four distinct groupings listed above. Vessels that use EM in another ocean may opt into EM for the GOA as well since they are familiar with the technology (first three categories) and activating a system is simpler than arranging for an observer. For the fourth grouping, incentives differ by vessel size class and delivery mode. Vessels that are less than 60 feet have similar incentives as the fixed gear sector (limited space, fewer personalities in a confined space). Many of these smaller vessels deliver to tenders in the WGOA regulatory area with Chinook salmon PSC based on at-sea composition samples, not census counts at the plant; at-sea sampling for rare species such as salmon can result in imprecise and highly variable estimates - most operators (and fishery managers) would prefer to use accurate enumeration. To build the needed chain of custody to ensure that salmon are not discarded at-sea by vessels that deliver to tenders, 100 percent EM coverage would be required for both the tenders and the fishing vessels.

For GOA-only vessels that are larger and deliver exclusively to shoreside processing plants, the incentives for using EM are less clear. It is possible that regulatory relief from some discard requirements could be structured to provide additional incentives.

Accurate discard data is essential for fishery managers to administer catch limits, including a "hard cap" for salmon in the WGOA. Trawlers that fish in the WGOA are some of the smallest in Alaska, fishing with small crews in remote areas. Under the current monitoring plan, all CVs pollock trawlers are monitored by observers on selected trips (approximately 20 percent of trips), and counts of salmon bycatch are extrapolated from observer samples. Industry, NMFS, and the Council are interested in improved monitoring of this fishery due to concerns over salmon accounting, observer safety, and the cost of onboard observers.

Gulf of Alaska Pollock Trip Limits

The GOA pollock trip limit was initially implemented in December 1998 when the Council took emergency action to implement measures consistent with NMFS' proposed Reasonable and Prudent Alternatives (RPAs) to reduce impacts to Steller sea lions. That action for the GOA included: creating four pollock seasons[34] with limits on the percentage of the TAC, which could be taken from any one season; expanding the closure areas around rookery and haul-out sites; and establishing a 300,000-pound trip limit for pollock in the western and CGOA management areas. In response to Council recommendation, on January 22, 1999, NMFS implemented an emergency action to apply Steller sea lion protection measures, including the action described above, to the 1999 fishing season. The reason for the emergency trip limit action was defined in the Federal Register notice to temporally or spatially disperse pollock harvests in the GOA.

The second part of regulation § 679.7(b)(3) stipulated those tender vessels cannot retain on board at any one time more than 272 mt (600,000 pounds) of pollock. The Alaska Board of Fisheries, following the action of the Council, implemented similar regulations within State waters on July 27, 1999. The State trip limit regulation is worded similarly to the NMFS regulation above (see 5 Alaska Administrative Code [AAC] 28.073). The area incorporated into the State trip limit regulation includes State waters adjacent to the Federal management areas 610, 620 and 630, between 147 and 170 degrees west longitude. It should be noted that there is a small discrepancy between the State and Federal regulations. The Federal regulations include management area 640 (between 140 and 147 degrees west longitude) whereas the State regulation cited above extends to the eastward boundary of management area 630 at 147 degrees west longitude. Therefore, State regulations do not currently include management area 640. There is a small pollock fishery in the Prince William Sound area that is currently managed by the State to include the 300,000 pound trip limit, so the regulation discrepancy does not result in different State and Federal management approaches; however, Federal regulations require discards above the 300,000 pound trip limit in contrast to State regulations that require retention above the 300,000 pound trip limit.

The 1999 GOA pollock trip limits were analyzed in the November 2001 Steller Sea Lion Protection Measures, Final Supplemental Environmental Impact Statement (SEIS), and the pollock trip limit was determined to be one of several necessary Steller sea lion protection measures for the Federal groundfish fisheries off Alaska at the time (in the 2001 biological opinion).

GOA trip limit regulations were revised and those changes were implemented May 25, 2009. The revised GOA pollock trip limit regulation prohibited CVs from retaining more than 136 mt (300,000 lb.) of unprocessed pollock during a calendar day and landing more than 136 mt (300,000 lb.) of pollock during a fishing trip. NMFS also prohibited a vessel from landing a cumulative amount of unprocessed pollock from any GOA reporting area that exceeds 136 mt (300,000 lb.) times the number of days the pollock fishery is open to directed fishing in a season. The objective of this rule was to prevent certain pollock catch and delivery practices that allowed some vessels to circumvent the intent of the original trip limit regulations. Trip limits were implemented in 1999 (until they were amended in 2009) had become less effective as multiple trips during a day and partial offloads of pollock product during a trip had allowed for increasing amounts of pollock to be caught in some areas of the GOA. These delivery practices caused

[34] As noted in this analysis the number of seasons is currently two.

seasonal pollock quotas to be exceeded and potentially could have been in conflict with Steller sea lion protection measures under Endangered Species Act (ESA) intended to disperse pollock catches in the GOA.

Gulf of Alaska Pollock Voluntary Catch Sharing Plan

Information in this section was derived from an Appendix provided by AGDB for the GOA Trawl Bycatch Management, preliminary analysis presented to the Council at its December 2016 meeting.

Voluntary Catch Sharing Plans (CSPs) have been used in the Central GOA trawl pollock fisheries around Kodiak Island. After the Amendment 97 Chinook salmon PSC hard caps became effective during the last half of 2012, the fleet has discussed possible CSPs for every pollock season, in both Central GOA areas (620/630). The reasons for implementing a voluntary agreement are varied. Some CSPs were spurred by concerns about salmon bycatch closing the fishery, which is of greatest concern during the fall seasons when salmon bycatch rates are the highest (B season). At times, the fleet has agreed to a CSP during the A (roe) season in order to save salmon PSC for the fall when it is most needed. CSPs have also developed during times when the remaining pollock TAC is small, and NMFS will not open the fishery because the 24-hour harvesting capacity of the fleet exceeds the remaining available quota. CSPs have also been agreed when low remaining TAC amounts allow only short pulse fisheries (three days or less) in order to avoid exceeding the TAC.

Voluntary CSPs also develop due to market factors. A CSP might be necessary when the timing of the groundfish trawl fishery conflicts with Central GOA salmon processing. When a race for fish does not exist, CSPs might occur so that the fleet can work with processors to provide better fish grades and improved product quality. The fleet and processors have an interest in avoiding small fish, which have been numerous on the grounds due to a large 2012-year class. CSPs allow vessels to target pollock with higher roe content, and allow processors to work with vessels to develop delivery schedules that result in higher product quality. CSPs also increase the profitability of each delivery. Some fleets and their affiliated processors prefer pollock deliveries with minimal amounts of other species, while others encourage mixed landings where pollock, Pacific cod, and flatfish are delivered together. Processors that desire mixed deliveries allow longer trip durations so that vessels can maximize catches of high-valued MRA species such as skates and sablefish. Vessels making mixed deliveries might make fewer directed pollock trips than they would if they were in a race for fish, but have decided that the higher value of mixed trips are a reasonable trade-off.

Organizing voluntary agreements has frequently been challenging, and requires a significant amount of trust within the fleet, between the fleet and NMFS, and in AGDB who monitors compliance with the agreements to the extent possible. The vast majority of the fleet complies with the agreements, but there are always individuals looking to bend the rules to their favor. Voluntary CSP's have been, and continue to be, uncertain and fragile.

The four biggest hurdles for developing voluntary CSPs are: (1) how to allocate the fish; (2) how to develop a closed class of participants for the fishery; (3) how to set and meet bycatch objectives; and (4) how to get 100% consensus from the participants. Building structure around each of these provisions creates opportunities for gaming the system.

The first and foremost challenge is the self-reported vessel tanking capacities that are included in the agreements and used to allocate individual pollock quotas and associated Chinook PSC limits. Any vessel that packs 300,000 pounds or more is limited to the regulated daily pollock trip limit of 300,000 pounds. All other vessel tanking capacities are self-reported. It is well known across the fleet that certain vessels have inflated their self-reported capacity, which allows them to receive a larger pollock and Chinook PSC allocation. There is no way to hold these vessels accountable due to the voluntary nature of the CSPs.

The second hurdle is the development of a closed class of participants. There are 97 trawl CV LLP licenses that can be used to fish in the Central GOA, but the typical pollock fleet size is usually around 40 vessels per fishing season. Methods used to control over-capitalization of the fishery and prevent redistribution of the pollock fishery across non-historical participants via new vessel entry include requiring vessels to be in the position to fish at or near the start of the fishery, requiring vessels to catch their own allocation of pollock (no catching or leasing pollock that was allocated to a different vessel), and requiring a vessel to demonstrate that it has a market for its catch. Each of these provisions can be manipulated to benefit an individual vessel. Three examples of manipulating the CSP are described below:

1) *Fishing start "drop-dead" date:* Even though vessels agree to be in the area ready to fish by a designated date or on their way to the grounds by that date, this has proven to be a gray area exploited by some vessels wishing to participate in more than one area during the same season ("double dippers").

2) *Active participation requirements of harvesting vessels: under- and over-harvest of vessel allocations:* Vessels are polled at certain agreed upon dates during the season to assess whether or not they intend to catch their full allocation. Quota that is not expected to be caught is reallocated to actively participating vessels. Some vessels insist that they will catch their quota by the closure date when it is apparent to most that they are not able to do so. These vessels' unharvested quota remains in the water.

   Overages occur for individual vessel allocations for a variety of reasons: efficiency (they would rather deliver a full trip), clean-up trips where vessels aggregate partial trips, and cases where vessels intentionally catch a different vessel's allocation even though the rules prohibit this. These latter instances occur when a vessel is inefficient and cannot catch its allocation before the fishery ends, or when a vessel breaks down and is unable to catch its own allocation or the vessel leaves the area with some quota left unharvested. The agreements state that any money for pollock caught in excess of a vessel's allocation shall first be covered by another vessel in the same processor fleet (voluntary cooperative) at 100 percent of the ex-vessel value; if the cooperative exceeds its allocation the ex-vessel funds will be donated to a non-profit organization of the vessel's or cooperative's choosing. There is no way to monitor compliance to this provision in the agreements.

3) *Unanticipated effort enters the fishery:* Even though the agreements work to develop a closed class of participants, there is no certainty that new vessels will not join the fishery. In 2012, unanticipated effort by some Western GOA vessels in the Area 620 pollock fishery forced an early closure and caused the Area 620 C season quota (fishery was managed using four seasons at that time) to be exceeded by 2,100 mt. The voluntary CSP fell apart and CSP vessels raced to catch their allocation before the fishery closed, resulting in increased Chinook salmon PSC and the seasonal pollock quota being exceeded.

The third hurdle is setting and meeting bycatch objectives to minimize Chinook PSC to the extent practicable and allow the available pollock quota to be harvested. Individual vessel incentive measures include:

1) Each vessel receives a pro rata share of the pre-determined seasonal Chinook PSC limit based on its pollock allocation. Each vessel's individual fishing behavior is controlled in some way by its bycatch allocation.

2) Individual vessel performance standards and consequences for poor vessel performance to mitigate impact to the processor's cooperative fleet are determined at the voluntary cooperative level. There is no requirement to define or share these standards and consequences.
3) If a cooperative exceeds its cooperative amount of Chinook salmon PSC then the vessels within that processor fleet group agree to stand down for three days of pollock fishing. Compliance for this provision is unknown since no cooperative has ever exceeded its allocation.
4) Processor fish ticket counts are used to monitor each individual vessel's bycatch behavior by trip, and the overall processor fleet's performance.
5) Chinook hot spot reporting is required based on a predetermined Chinook delivery limit as the trigger for an alert. Ninety percent of the fleet complies and reports complete information, whereas it is difficult to get the required information from the other ten percent. There are no consequences for poor or non-reporting, and no authority to issue closures for hotspots. During the fall 2016 seasons, 45 hotspot notices were issued, and the fleet's feedback to AGDB was that vessels continued to fish in those hot zones with no repercussions.

The fourth hurdle is getting 100 percent consensus for each agreement (recall there were four pollock seasons and now there are two and two management areas, so up to eight of these agreements had to be worked out every year during fleet meetings in Kodiak):

1) Fleet meetings needed to implement a CSP can be contentious and it is sometimes necessary to meet eight or nine times prior to a season in order to come to an agreement. Sometimes an agreement is not reached.
2) Special considerations to accommodate a single holdout who refuses to sign the agreement. There is no agreement if 100 percent consensus is not reached. One holdout has prevented the implementation of a CSP on several occasions.

While the CSP has been a useful tool and could continue to be under the trawl EM program, there is no guarantee it will be implemented for each year and season. During years/seasons it has been implemented it is reported to have improved prosecution of the pollock fishery and reduced salmon PSC.

5.7.5.1 Summary Participation Data for GOA Pollock Fishery

5.7.5.1.1 Harvesters Delivering Shoreside

Information in this section of the document shows the participation of trawl CVs in the GOA pollock target fisheries. Both pelagic (P) pollock targets (pollock accounted for greater than 95% of weight) and bottom (B) pollock targets (majority of the catch was pollock but less than 95%) are included. Seasons were adjusted to reflect the current GOA pollock fishing seasons. Prior to 2021, there were four seasons, as discussed earlier. The old A and B seasons were combined into the A season presented in this section; the C and D seasons were combined in the B season presented in this section. Like for the BS, the number of trips was estimated using the "DEPLOYMENT_TRIP_PK" field included in the data. This was identified as the best source of information for trips. Only shoreside deliveries are included (tender deliveries are discussed in section 5.7.5.2).

Table 5-11 provides estimates of the number of CVs participating in GOA pollock target trips, the estimated number of trips taken, landed weight on those trips, and estimated gross ex-vessel value of the landings in 2021 dollars. The same level of information is also provided on participation in the EM EFP during 2020 and 2021. Value information was not available for 2021 when the data were generated.

From 56 to 69 vessels participated in the fishery over the 10 years considered. On average, fewer vessels fished during the past three years than in earlier years. More catch and trips were taken during the 2014 through 2019 period, but the increase in gross ex-vessel value was not commensurate with those increases.

Table 5-11 Summary of pollock pelagic trawl CVs delivering shoreside in the GOA by season (A and B) and year 2012-2021, and EM EFP participants in 2020 and 2021 (grey shading).

	CVs			Trips			Landed Weight (mt)			Gross ex-vessel value in millions of real 2021 $		
	Season			Season			Season			Season		
Year	A	B	Annual	A	B	Annual	A	B	Annual	A	B	Annual
2012	57	61	67	428	432	860	48,233	48,758	96,992	$22.0	$20.9	$42.8
2013	56	51	64	408	355	763	48,341	35,332	83,673	$20.9	$15.3	$36.2
2014	56	60	68	640	643	1,283	72,765	58,960	131,725	$23.7	$19.2	$42.9
2015	57	56	62	751	782	1,533	84,332	73,732	158,064	$23.4	$20.8	$44.2
2016	55	62	68	566	1,142	1,708	59,773	112,089	171,862	$12.2	$25.5	$37.6
2017	51	61	65	675	872	1,547	79,540	99,392	178,933	$15.9	$23.7	$39.6
2018	59	61	69	668	732	1,400	77,617	72,781	150,398	$22.4	$21.6	$44.0
2019	55	52	62	572	557	1,129	66,875	46,981	113,855	$19.7	$13.9	$33.5
2020	45	50	60	451	527	978	52,643	48,650	101,293	$14.7	$12.6	$27.3
2020 EM	23	24	31	201	275	476	22,749	23,895	46,644	$6.3	$5.8	$12.1
2021	38	51	56	412	519	931	51,273	45,846	97,119			
2021 EM	16	32	34	125	307	432	15,922	26,413	42,335			
Total	75	75	80	5,571	6,561	12,132	641,392	642,522	,283,914	$174.8	$173.4	$348.3

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-12 provides an expanded view of the information in the previous table by including information at the CGOA/WYK and WGOA levels. The number of vessels fishing in the CGOA/WYK is typically 2 to 3 times greater than the number fishing in the CGOA/WYK areas. This general trend is also reflected in the number of trips, catch, and gross ex-vessel value.

Table 5-12 Summary of pollock pelagic trawl CVs delivering shoreside in the GOA by area, season (A and B) and year 2012-2021, and EM EFP participants in 2020 and 2021 (grey shading).

		CVs			Trips			Landed Weight (mt)			Gross ex-vessel value in millions of real 2021 $		
		Season			Season			Season			Season		
Year	Area	A	B	Annual	A	B	Annual	A	B	Annual	A	B	Annual
2012	CGOA/WYK	38	55	60	343	292	635	39,612	28,903	68,515	$18.6	$13.3	$32.0
2012	WGOA	22	26	29	85	151	236	8,621	19,855	28,477	$3.3	$7.5	$10.9
2012	GOA Total	57	61	67	428	432	860	48,233	48,758	96,992	$22.0	$20.9	$42.8
2013	CGOA/WYK	41	42	49	348	311	659	42,556	33,631	76,187	$18.8	$14.7	$33.4
2013	WGOA	21	14	24	64	47	111	5,785	1,701	7,486	$2.1	$0.6	$2.7
2013	GOA Total	56	51	64	408	355	763	48,341	35,332	83,673	$20.9	$15.3	$36.2
2014	CGOA/WYK	43	44	49	596	464	1,060	68,908	48,903	117,811	$22.5	$16.1	$38.6
2014	WGOA	17	21	25	46	181	227	3,857	10,058	13,914	$1.3	$3.1	$4.3
2014	GOA Total	56	60	68	640	643	1,283	72,765	58,960	131,725	$23.7	$19.2	$42.9
2015	CGOA/WYK	50	44	55	715	444	1,159	82,119	46,994	129,112	$22.7	$13.2	$35.9
2015	WGOA	12	19	20	36	344	380	2,214	26,739	28,952	$0.7	$7.6	$8.3
2015	GOA Total	57	56	62	751	782	1,533	84,332	73,732	158,064	$23.4	$20.8	$44.2
2016	CGOA/WYK	44	41	54	449	537	986	51,731	58,796	110,527	$10.2	$11.7	$21.9
2016	WGOA	20	27	29	123	607	730	8,042	53,293	61,335	$2.0	$13.8	$15.8
2016	GOA Total	55	62	68	566	1,142	1,708	59,773	112,089	171,862	$12.2	$25.5	$37.6
2017	CGOA/WYK	43	35	47	619	460	1,079	75,517	54,226	129,743	$15.1	$10.8	$25.9
2017	WGOA	12	29	29	56	412	468	4,023	45,166	49,190	$0.9	$12.9	$13.8
2017	GOA Total	51	61	65	675	872	1,547	79,540	99,392	178,933	$15.9	$23.7	$39.6
2018	CGOA/WYK	51	40	55	620	408	1,028	74,503	45,392	119,895	$21.6	$13.3	$34.9
2018	WGOA	14	28	28	48	326	374	3,114	27,389	30,503	$0.9	$8.2	$9.1
2018	GOA Total	59	61	69	668	732	1,400	77,617	72,781	150,398	$22.4	$21.6	$44.0
2019	CGOA/WYK	48	44	54	542	301	843	65,335	26,582	91,917	$19.1	$7.8	$26.9
2019	WGOA	12	26	27	30	257	287	1,539	20,399	21,938	$0.5	$6.1	$6.6
2019	GOA Total	55	52	62	572	557	1,129	66,875	46,981	113,855	$19.7	$13.9	$33.5
2020	CGOA/WYK	44	42	54	442	305	747	52,062	30,056	82,118	$14.6	$8.2	$22.8
2020	CGOA/WYK EM	22	16	25	192	121	313	22,168	11,269	33,437	$6.2	$3.0	$9.2
2020	WGOA	5	28	28	9	223	232	581	18,594	19,175	$0.1	$4.4	$4.5
2020	WGOA EM	5	18	18	9	154	163	581	12,626	13,207	$0.1	$2.9	$3.0
2020	GOA Total	45	50	60	451	527	978	52,643	48,650	101,293	$14.7	$12.6	$27.3
2020	GOA EM	23	24	31	201	275	476	22,749	23,895	46,644	$6.3	$5.8	$12.1
2021	CGOA/WYK	38	39	46	412	271	683	51,273	27,907	79,180			
2021	CGOA/WYK EM	16	19	23	125	124	249	15,922	13,403	29,324			
2021	WGOA	-	24	24	-	252	252	-	17,939	17,939			
2021	WGOA EM	-	19	19	-	185	185	-	13,011	13,011			
2021	GOA Total	38	51	56	412	519	931	51,273	45,846	97,119			
2021	GOA EM	16	32	34	125	307	432	15,922	26,413	42,335			
Total		69	74	80	2,932	2,649	12,132	329,061	315,050	1,283,914	$87.0	$87.8	$348.3

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

The community and state of the owners of the CVs participating in the GOA pollock fishery are presented in Table 5-13. Typically, less than half of the vessels participating in the fishery are owned by persons that report an Alaskan address. Most of the vessels owned by persons reporting an Alaskan address list Kodiak as the owner's address, followed by Sand Point, King Cove and other Alaskan Communities. Seattle MSA and Lincoln County, Oregon were reported to be the home of owners of the most vessels outside of Alaska. Kodiak residents overtook Seattle MSA residents as the owners of the most CVs active in the fishery in 2019. That trend continued through the rest of the years presented.

Table 5-13 CVs participating in GOA pelagic pollock trawl fishery delivering shoreside, by Community or State of ownership and those participating in EM EFP 2020 and 2021.

Community/State	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EM	2021	2021 EM	Total
King Cove	2	1	3	1	3	3	3	1	1	1	1	1	3
Kodiak	17	17	19	18	18	18	19	20	21	7	20	8	23
Other AK	2	3	4	2	4	4	4	3	1		1		4
Sand Point	7	6	7	6	6	6	6	6	6	6	5	5	7
AK Total	28	27	33	27	31	31	32	30	29	14	27	14	37
Lincoln County OR	8	7	7	7	7	7	7	7	7	5	6	4	8
Other OR	3	1	1	1	1	1	1	1	3		3	2	5
OR Total	11	8	8	8	8	8	8	8	10	5	9	6	13
Other WA	7	6	6	6	7	7	7	5	4	1	4	1	8
Seattle MSA	21	22	20	21	21	18	21	18	14	8	14	11	29
WA Total	28	28	26	26	28	25	28	23	18	9	18	12	36
Other States Total	1	1	1	1	1	1	1	1	3	3	2	2	3
Grand Total	67	64	68	62	68	65	69	62	60	31	56	34	80

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-14 shows the estimated number of trips and the average days per trip. Those estimates are used to generate the estimated number of days fished by CVs delivering pollock to specific ports. Estimates of the number of days fished are presented three ways to account for the uncertainty of the days an observer must be working during the trip. The actual numbers of days fished and actual number of observer days are influenced by many factors that could cause these estimates to be larger or smaller than what will occur in the future. Some of the factors include the GOA pollock TACs, catchability of pollock, location of pollock fishing, observer coverage rates, changes in delivery locations, use of observers relative to EM, etc.

Table 5-14 Estimated number of days fished for trawl CVs in the GOA pollock fishery

Year/Processor Location	Program	CVs	Trips	Avg. Days Fished/Trip	Estimated Days Fished	Estimated Days Fished + 1 day per trip	Estimated Days Fished + 2 days per trip
2019							
Akutan	Observer	6	66	1.7	114	180	246
Dutch Harbor/Unalaska	Observer	3	18	1.3	23	41	59
False Pass	Observer	4	20	0.9	18	38	58
King Cove	Observer	5	17	1.7	28	45	62
Kodiak	Observer	45	705	2.0	1,422	2,127	2,832
Sand Point	Observer	32	301	1.6	474	775	1,076
2019 Total	Observer	62	1,127	2.1	2,335	3,462	4,589

Table 5-14 (cont) 2020

Akutan	Observer	6	21	2.1	44	65	86
Akutan	EM	5	29	2.2	65	94	123
Akutan Total		11	50	2.2	108	158	208
Dutch Harbor/Unalaska	Observer	3	3	1.5	4	7	10
Dutch Harbor/Unalaska	EM	5	8	1.1	9	17	25
Dutch Harbor/Unalaska Total		7	10	1.2	12	22	32
False Pass	Observer	0	-		-	-	-
False Pass	EM	0	-		-	-	-
False Pass Total		0	-	0.0	-	-	-
King Cove	Observer	3	3	2.9	9	12	15
King Cove	EM	3	5	1.5	7	12	17
King Cove Total		6	8	1.9	15	23	31
Kodiak	Observer	32	410	2.1	863	1,273	1,683
Kodiak	EM	23	262	2.2	576	838	1,100
Kodiak Total		49	672	2.1	1,439	2,111	2,783
Sand Point	Observer	10	69	1.5	101	170	239
Sand Point	EM	15	172	1.4	245	417	589
Sand Point Total		25	241	1.4	346	587	828
2020 Total		60	2,185	1.9	4,191	6,376	8,561
		2021					
Akutan	Observer	5	28	1.9	54	82	110
Akutan	EM	6	35	2.0	69	104	139
Akutan Total		8	63	1.6	104	167	230
Dutch Harbor/Unalaska	Observer	1	5	1.8	9	14	19
Dutch Harbor/Unalaska	EM	0	-	2.0	-	-	-
Dutch Harbor/Unalaska Total		1	5	2.0	10	15	20
False Pass	Observer	0	-		-	-	-
False Pass	EM	0	-		-	-	-
False Pass Total		0	-	0.0	-	-	-
King Cove	Observer	9	113	1.3	150	263	376
King Cove	EM	6	16	1.7	28	44	60
King Cove Total		13	129	2.3	303	432	561
Kodiak	Observer	28	308	2.2	665	973	1,281
Kodiak	EM	18	205	2.3	469	674	879
Kodiak Total		40	512	1.7	868	1,380	1,892
Sand Point	Observer	10	48	1.4	66	114	162
Sand Point	EM	18	177	1.5	257	434	611
Sand Point Total		28	225	2.0	461	686	911
2021 Total		56	931	1.9	1,792	2,723	3,654

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

5.7.5.1.2 **Shoreside Processors**

Table 5-15 provides an overview of the GOA pollock trawl fishery and includes harvester and processor information for 2012 through 2021. The real gross values for the fishery are presented in 2021 dollars. Annually from seven to 13 processors were active in the fishery. The real gross ex-vessel value ranged from just over $70 million in 2021 to just over $119 million in 2016. The relative changes over the period were driven by many factors including product prices, TACs, and deliveries. A summary of the pollock markets is available in the Economic North Pacific Stock Assessment and Fishery Evaluation Report (SAFE) document.[35]

Table 5-15 Summary of GOA trawl CV pollock fishery with processor and first wholesale value

Year	CVs	Trips	Processors	Landed (mt)	Gross ex-vessel value (millions 2021 $)	Gross first wholesale value (millions 2021 $)
2012	67	860	13	96,992	$42.8	$99.3
2013	64	763	13	83,673	$36.2	$98.2
2014	68	1,283	12	131,725	$42.9	$114.4
2015	62	1,533	9	158,064	$44.2	$114.5
2016	68	1,708	11	171,862	$37.6	$119.1
2017	65	1,547	9	178,933	$39.6	$106.5
2018	69	1,400	9	150,398	$44.0	$110.7
2019	62	1,129	9	113,855	$33.5	$88.5
2020	60	978	10	101,293	$27.3	$70.7
2021	56	931	7	97,119	$0.0	$0.0
Total	80	12,132	21	1,283,914	$348.3	$922.0

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-16 shows the location of the processing plants that took pollock fishery deliveries harvested with trawl gear in the GOA. Kodiak is the port that is home to the most plants, but that number has declined from a high of 8 in 2013 to three in 2021. The number of plants taking deliveries in other locations has been more consistent, usually one plant in Akutan, Dutch Harbor/Unalaska, King Cove and Sand Point accepting deliveries. As a result, the reduction in the total number of processing plants over the time period considered is primarily a reflection of the declining number of plants operating in Kodiak.

Table 5-16 Number of processors in the GOA Pollock Trawl Fishery delivering shoreside by Location, 2012-2021

Community	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EM	2021	2021 EM	Total
Akutan	1	1	1		1	1	1	1	1	1	1	1	1
Dutch Harbor/Unalaska	1	1	1	1	2	1	1	1	2	2	1		4
False Pass								1					1
King Cove	1	1	1	1	1	1	1	1	1	1	1		1
Kodiak	7	8	7	6	6	5	5	4	4	4	3	3	11
Sand Point	1	1	1	1	1	1	1	1	1	1	1	1	1
Seward	1	1	1										1
Total	13	13	12	9	11	9	9	9	9	9	7	6	21

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

[35] https://www.fisheries.noaa.gov/alaska/commercial-fishing/groundfish-economic-status-reports-gulf-alaska-and-bering-sea-aleutian-islands

Table 5-16 shows the number of GOA pollock target trips by month for the years 2019 through 2021, broken out by trips that utilized observers and trips that were under the Trawl EM EFP. The stacked bars indicate the proportion delivered to various ports. No chart is provided for EM in 2019 because the EFP was not in place that year. From 2020 to 2021 there is an increase in the relative number of EM trips. In 2021 the number of trips were similar for observed trips and EM trips.

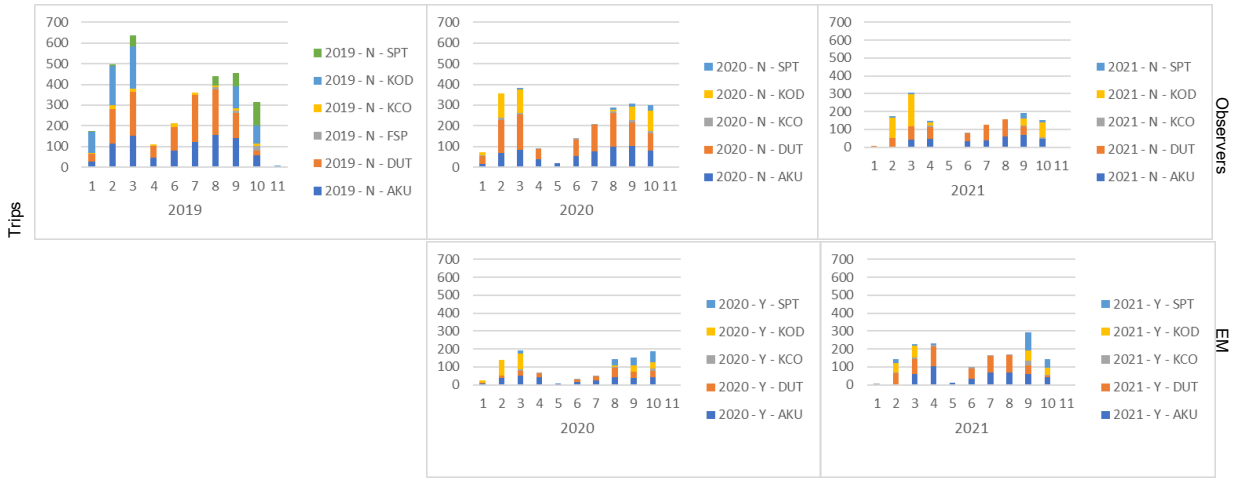

Figure 5-7 GOA shoreside trips by port of delivery and observer or EM, 2019 through 2021

Source: AKFIN summary of CAS data (Trawl_EM_Trips 3-23-22)

5.7.5.2 Pollock catcher vessels using tenders to deliver shoreside

Table 5-17 shows the number of CVs that used tender vessels to deliver pollock to shoreside processors from 2012 through 2021. The table also shows where the pollock were harvested and the port where the tender vessel delivered the pollock. Tender vessel use in the fishery was very limited in the BS, with only one CV delivering to one tender vessel in 2019. The use of tender vessels for pollock harvested from the CGOA/WYK was also limited. Only one CV delivered to one tender vessel after 2016. The pollock was delivered to King Cove in 2018. Tenders were more widely used in the WGOA and that is the focus of the remainder of the section.

Table 5-17 Summary of CVs using tenders to deliver pollock to shoreside processors

Delivery Port/Vessel Count	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
BS (Harvest Area)											
Dutch Harbor/Unalaska											
CVs								1			1
Tender Vessels								1			1
CG/WYK (Harvest Area)											
Akutan											
CVs		4	1								4
Tender Vessels		3	1								4
King Cove											
CVs	5			2	1		1				7
Tender Vessels	4			2	1		1				5
Kodiak											
CVs	1										1
Tender Vessels	1										1
Sand Point											
CVs	5				1						6
Tender Vessels	2				1						3
WGOA (Harvest Area)											
Akutan											
CVs			1								1
Tender Vessels			2								2
Dutch Harbor/Unalaska											
CVs	4		1		1		5	2	6		11
Tender Vessels	2		1		4		3	3	9		15
False Pass											
CVs								4			4
Tender Vessels								6			6
King Cove											
CVs	8	5	7	5	7	7	7	2	2	3	10
Tender Vessels	5	4	6	7	6	7	8	2	1	3	15
Sand Point											
CVs	4			1	13						13
Tender Vessels	7			1	3						9
Total CVs	**16**	**9**	**10**	**6**	**21**	**7**	**11**	**7**	**7**	**3**	**33**
Total Tender Vessels	**15**	**7**	**10**	**8**	**14**	**7**	**11**	**11**	**10**	**3**	**48**

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-18 is a summary of the WGOA pollock fishery by whether the CV delivered to a tender vessel or directly to a shoreside plant. Since 2017 all of the CVs that delivered to a tender vessel also made at least one delivery that year to a shoreside processing plant. The vast majority of targeted pollock catch was delivered to a shoreside processing plant by the CV, rather than using a tender vessel. Tenders were most widely used in 2016 to make deliveries and all but one of the CVs that delivered to tenders were less than 60ft. LOA. The first wholesale value of WGOA pollock varied from less than $10 million to over $40 million (in 2021 dollars). Tender vessel deliveries generally accounted for 10 percent to 20 percent of the first wholesale value, but varied more widely by firm.

Table 5-18 comparison of CVs operating in the WGOA delivering to tenders and shorebased plants, 2012 through 2021

CV delivered to:	CVs	Tenders	Trips	Landings (mt)	Gross Ex-vessel Value (Millions 2021 $)	Gross First Wholesale Value (Millions 2021 $)
Shoreplant Delivery	29	n/a	233	24,396	$9.3	$25.2
Tender Delivery	13	14	38	4,081	$1.6	$4.2
2012 Total	29	15	236	28,477	$10.9	$29.4
Shoreplant Delivery	24	n/a	106	6,853	$2.5	$8.2
Tender Delivery	5	4	16	632	$0.2	$0.8
2013 Total	24	5	111	7,486	$2.7	$9.0
Shoreplant Delivery	25	n/a	218	11,786	$3.6	$10.8
Tender Delivery	9	9	25	2,129	$0.7	$2.0
2014 Total	25	10	227	13,914	$4.3	$12.8
Shoreplant Delivery	20	n/a	363	24,151	$6.9	$17.7
Tender Delivery	6	8	36	4,801	$1.4	$3.5
2015 Total	20	9	380	28,952	$8.3	$21.2
Shoreplant Delivery	29	n/a	644	48,552	$12.4	$33.6
Tender Delivery	21	13	125	12,783	$3.4	$8.8
2016 Total	29	14	730	61,335	$15.8	$42.4
Shoreplant Delivery	28	n/a	448	43,686	$12.2	$26.2
Tender Delivery	7	7	30	5,504	$1.6	$3.3
2017 Total	29	8	468	49,190	$13.8	$29.5
Shoreplant Delivery	28	n/a	342	25,211	$7.5	$18.7
Tender Delivery	10	11	48	5,292	$1.6	$3.9
2018 Total	28	12	374	30,503	$9.1	$22.6
Shoreplant Delivery	27	n/a	265	19,572	$5.9	$15.7
Tender Delivery	7	11	28	2,367	$0.8	$1.8
2019 Total	27	12	287	21,938	$6.6	$17.5
Shoreplant Delivery	28	n/a	232	17,670	$4.1	$12.5
Tender Delivery	7	10	11	1,505	$0.4	$1.1
2020 Total	28	11	232	19,175	$4.5	$13.6
Shoreplant Delivery	24	n/a	252	17,167		
Tender Delivery	3	3	3	772		
2021 Total	24	4	252	17,939		
Total all Years	40	43	3,297	278,909	$76.1	$198.0

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-19 provides information on the CV owners that utilized tender vessels to deliver targeted WGOA pollock to shoreside processors from 2012 through 2021. Vessels whose owner listed an Alaskan address accounted for 15 of the 26 vessels that used tenders over the entire time period, but in recent years vessels owned by persons outside Alaska accounted for more of the tender vessel usage.

Table 5-19 CVs participating in WGOA pollock trawl fishery delivering to tenders, by Community or State of ownership and those participating in EM EFP 2020 and 2021.

Community/State	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EM	2021	2021 EM	Total
King Cove	2	1	2	1	3	3	3	1	1	1	1	1	3
Kodiak							1						1
Other AK	1	1	3	2	3	2	2	2					4
Sand Point	6	2	2	2	6	1	1	1	1	1			7
AK Total	9	4	7	5	12	6	7	4	2	2	1	1	15
Lincoln County OR							1	1	1				1
OR Total							1	1	1				1
Other WA					2		1	1					2
Seattle MSA	3		1		6				1				8
WA Total	3		1		8		1	1	1				9
Other States Total	1	1	1	1	1	1	1	1	3		2	2	4
Total	**13**	**5**	**9**	**6**	**21**	**7**	**10**	**7**	**7**	**5**	**3**	**3**	**26**

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-20 shows that seven processors took WGOA pollock deliveries from tender vessels over the period considered. Dutch Harbor/Unalaska was the community listed for three of the processors and each of the other listed communities had one processor. The only plant that used tender vessels every year was located in King Cove. The location of that plant and the fleet that fishes for them makes the use of tenders creates efficiencies.

Table 5-20 Number of processors in the WGOA pollock trawl fishery receiving deliveries from tenders by community, 2012-2021

Processing Community	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 EM	2021	2021 EM	Total
Akutan			1										1
Dutch Harbor/Unalaska	1		1		1		1	1	2	1			3
False Pass								1					1
King Cove	1	1	1	1	1	1	1	1	1	1	1	1	1
Sand Point	1			1	1								1
Total	3	1	3	2	3	1	2	3	3	2	1	1	7

Source: AKFIN summary of CAS data (Trawl_EM 3-28-22_db)

Table 5-21 provides information on the number of CVs, tenders, trips, and days fished by trips that used tender vessels in the WGOA from 2019 through 2020. Trips were estimated using the trip identification number that was desribed in more detail earlier. The average days fished is the difference between the start and landing dates reportred in the data. Additional days are added per trip to account for the uncertainty of how long the observer may have been engaged on the trips. Only information for the WGOA was included because tender vessel usage in that area accounted for most of the tender vessel usage. It is also noted that tender usage by CVs delivering to King Cove during the years considered in the table was less than previous years.

Table 5-21 Tender vessel activity in the WGOA from 2019 through 2020

Year/Community	Obs or EM	CVs	Tenders	Trips	Average Days Fished	Estimated Days Fished	Est. Days Fished + 1 day / trip	Est. Days Fished + 2 days / trip
2019								
Dutch Harbor/Unalaska	Obs	3	3	17	1.2	20	37	54
False Pass	Obs	4	7	45	0.9	41	86	131
King Cove	Obs	2	3	9	1.3	12	21	30
2020								
Dutch Harbor/Unalaska	Obs	3	3	13	1.5	19	32	45
Dutch Harbor/Unalaska	EM	4	8	39	1.0	41	80	119
King Cove	EM	2	3	8	1.2	9	17	25
2021								
Dutch Harbor/Unalaska	Obs	1	1	6	1.9	12	18	24
King Cove	Obs	1	2	2	1.8	4	6	8
King Cove	EM	3	4	20	1.1	22	42	62

Source: AKFIN summary of CAS data (Trawl_EM_Trips 3-23-22)

5.7.6 Raw Fish Taxes

Raw fish taxes (in some boroughs or municipalities referred to as severance taxes as allowed in State law) in Alaska are established by the State of Alaska, boroughs, and municipalities. The pollock fishery generates substantial amounts of raw fish tax revenue for the communities that are home to the shoreside processors. The fisheries business tax for pollock (a developed fishery) is 3 percent and is collected by the State of Alaska from shoreside processors based on the price paid to the fishermen for the unprocessed fish. When the processing activity takes place inside a municipality the Tax Division shares 50 percent of tax collected with the incorporated city or organized borough where the processing took place. If an incorporated city is within an organized borough, the Tax Division divides the 50 percent shareable amount equally between the incorporated city and the organized borough. When processing activity occurs outside a municipality, the Tax Division shares 50 percent of the tax collected from processing activities outside an incorporated city or an organized borough through an allocation program administered by the Alaska Department of Commerce, Community and Economic Development[36]. The Aleutians East Borough (Akutan, False Pass, King Cove, and Sand Point) and the Kodiak Island Borough (Kodiak) have established raw fish taxes. Aleutians East Borough raw fish tax is 2 percent of the landed value; the Kodiak Island Borough raw fish tax is 1.075 percent of the landed value. Dutch Harbor/Unalaska is located in the Aleutian West Census area and does not have a raw fish tax. The municipality of Akutan has established a 1.5 percent raw fish tax and the municipalities of Dutch Harbor/Unalaska, King Cove, and Sand Point have 2 percent raw fish taxes.

[36] For simplicity, it is assumed that 50 percent of the fisheries business tax is assigned to community it was collected from in Table 5-23.

Table 5-22 Shoreside processor's raw fish tax liabilities as a percentage of ex-vessel value

Municipalities	Fisheries Business Tax	Borough	Municipalities
Akutan	3%	2%	1.5%
Dutch Harbor/Unalaska	3%		2%
False Pass	3%	2%	
King Cove*	3%	2%	2%
Kodiak	3%	1.075%	
Sand Point	3%	2%	2%

Source: Table 1B of Alaska Taxable Report.
https://www.commerce.alaska.gov/web/Portals/4/pub/OSA/taxable%20reports/2021%20Alaska%20Taxable%20Report%20FINAL%20January%2025%20Errata.pdf?ver=2022-01-25-125017-950

Based on the estimated real ex-vessel value of the pollock fishery reported in this paper and the tax liability fee percentages above, estimates of total raw fish taxes are provided in Table 5-23. Over the years considered the shoreside sector's pollock raw fish (and severance) tax liability ranged from about $12.5 million to $14.0 million.

Table 5-23 Estimated raw fish taxes (millions of real 2021 $) from shoreside pollock fishery

Community	2015	2016	2017	2018	2019	2020
Akutan & Dutch Harbor/Unalaska	$8.32	$7.98	$8.03	$7.94	$7.85	$8.09
Kodiak, False Pass, King Cove, & Sand Point	$1.69	$1.33	$1.12	$1.55	$1.27	$1.03
State (50% of Fisheries Business Tax)	$3.90	$3.54	$3.50	$3.63	$3.48	$3.47
Total	$13.91	$12.86	$12.65	$13.12	$12.60	$12.59

Source: Reported tax rates and AKFIN supplied ex-vessel values.

It is also important to note that the shoreside pollock industry pays other taxes to the state and the municipalities they operate. These taxes include a seafood marketing assessment, sales taxes, bed taxes corporate taxes, fuel taxes, etc. Fish processors and harvester are also required to pay fees for a variety of licenses and purchase bonds to operate in Alaska.

It is not anticipated that implementation of the trawl EM program for the BS and GOA pollock fisheries will have a substantial impact on raw fish taxes received by the communities that are home to the shoreside processors or the other taxes, licenses, and fees that are currently required. Information on municipalities' reliance on the raw fish taxes is also presented in Table 1B of the Alaska Taxable Report[37] and Social Impact Assessments recently presented to the Council.[38]

5.7.7 Pollock Products and Markets

The portfolios of products shore-based and at-sea processors produce are similar. In both sectors the primary products processed from pollock are fillets, surimi and roe, with each accounting for approximately 40 percent, 40 percent, and 10 percent of first-wholesale value. Other products accounted for the remaining 10 percent. The total estimated first wholesale value for BS and GOA pollock were presented in the processor sections above.

[37]https://www.commerce.alaska.gov/web/Portals/4/pub/OSA/Official%20Alaska%20Taxable%202020.pdf?ver=2021-02-01-094707-703

[38] https://meetings.npfmc.org/CommentReview/DownloadFile?p=0ad7128a-134c-4457-84a7-f787aa7170b4.pdf&fileName=C3%20Rockfish%20Reauthorization%20SIA%20.pdf
https://meetings.npfmc.org/CommentReview/DownloadFile?p=b8e19123-5e2d-4dd6-a541-5eed3c5788dc.pdf&fileName=C4%20Trawl%20CV%20Cod%20Analysis%20.pdf

Additional information on products produced and markets for those products are presented in the Economic SAFE document[39] presented to the Council at their February 2022 meeting. That is the most recent information available, but the market information is somewhat dated.

5.7.8 Dockside Monitoring for Salmon PSC

The North Pacific Observer Program 2020 Annual Report states that observers are assigned to monitor shoreside deliveries of pollock to obtain a count of the number of salmon caught as bycatch and to obtain tissue samples for genetic analysis from these fish in each observed pollock delivery. All deliveries of pollock associated with trips that were observed at-sea were also observed dockside. While all BSAI pollock deliveries (from both observed and EM trips) are expected to be observed shoreside, this is not the case in the GOA. In the GOA pollock trips are randomly selected for at-sea observer coverage are also expected to be sampled shoreside for salmon by the vessel observer. Pollock trips in BSAI are expected to be 100 percent observed or EM monitored at-sea and 100 percent observed shoreside. EM pollock trips that occur in the GOA are expected to be 100 percent monitored for compliance, compared to about 18 percent observed in the partial coverage category. About 30 percent of EM trips are expected to be observed shoreside. In 2020, 100 percent of BSAI pollock deliveries were observed. In the GOA, 17.7 percent of deliveries from trips within the trawl stratum and 31.8 percent of deliveries from trips within the partial coverage trawl EM stratum were monitored shoreside using AFSC FMA specified methods with the following priorities: salmon accounting and data collections, other PSC monitoring, collection of biological data and specimens, and species composition sampling.

Bycatch estimates of Chinook salmon in the GOA are estimated using methods described in Cahalan et al. (2014). In the event that a delivery cannot be monitored (e.g., the case in a delivery to a tender or non-pollock delivery), then estimation of bycatch comes by applying salmon bycatch rates to landed catch. Estimates of stock of origin from salmon bycatch are produced by the AFSC's Auke Bay Laboratories (e.g., Guthrie et al. 2019).

It is anticipated that BS pollock fisheries salmon bycatch will continue to be 100 percent monitored either at-sea or by shoreside plant observers. In the GOA pollock fisheries, there will potentially be better salmon bycatch estimation associated with more shoreside monitoring by observers, less reliance on potentially high variance at-sea sampling, and EM employed on tender vessels.

5.7.9 Salmon Bycatch in Shoreside Delivery Pollock Fisheries

Salmon are a very important economically and culturally. A primary purpose of trawl EM in the pollock fishery is to ensure that an accurate estimation of salmon bycatch is maintained or improved. Salmon bycatch is reported in two categories "chinook salmon" and "non-chinook salmon". Four species of salmon (sockeye, coho, pink, and chum) are aggregated into the "non-chinook salmon" species category. Chum salmon, however, comprises over 99.6 percent of the total bycatch in the BS non-chinook salmon category. In the BS pollock fishery, about 99.5 percent of the "non-chinook salmon" bycatch is taken in the B season.

Table 5-24 provides information on the estimated salmon bycatch taken by pollock CVs delivering to shoreside processors. Non-chinook bycatch is orders of magnitude greater in the BS than the GOA and had demonstrated an increasing mortality trend. In 2021, 20 percent BS non-chinook salmon 10-year total was taken. Bycatch of non-chinook salmon in the GOA accounts for only 1.6 percent of the BS and GOA total over the 10-years and has varied from a low of 281 fish to a high of 8,013 fish.

[39] https://meetings.npfmc.org/CommentReview/DownloadFile?p=bc83c1f0-2cc5-49a4-850c-ee822082b6be.pdf&fileName=D7%20Groundfish%20Economic%20SAFE.pdf

Table 5-24 Estimated salmon bycatch in the BS and GOA CV shoreside delivery pollock fishery, 2012 through 2021

Area/Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
BS											
Non-Chinook	19,070	110,558	145,672	177,275	145,984	154,875	147,426	173,000	214,429	326,430	1,614,719
Chinook	8,057	7,877	9,138	10,637	10,027	15,191	7,029	10,817	15,851	6,977	101,601
GOA											
Non-Chinook	281	598	1,387	887	1,954	4,430	8,013	4,792	2,134	1,052	25,528
Chinook	15,852	12,141	10,689	13,008	18,953	21,249	14,330	20,798	10,492	10,245	147,757
Total											
Non-Chinook	19,351	111,156	147,059	178,162	147,938	159,305	155,439	177,792	216,563	327,482	1,640,247
Chinook	23,909	20,018	19,827	23,645	28,980	36,440	21,359	31,615	26,343	17,222	249,358

Source: AKFIN summary of CAS data (Trawl_EM_PSC(4_19_22)).

Total chinook salmon bycatch mortality in the pollock fishery is slightly higher in the GOA (59.3 percent of the 10-year total). Because the total pollock harvest is greater in the BS, the rate of chinook salmon bycatch per ton of pollock harvested would be considerably higher in the GOA. Total Chinook salmon bycatch averaged just under 25,000 fish annually over the 2012 through 2021 period, with 2021 having the lowest total Chinook salmon bycatch of any year reported.

5.8 Approach to Cost Analysis

The overall cost reporting structures for the EM program and the associated metrics that will be used for comparisons against traditional monitoring using observers was developed to ensure consistency. Using a consistent reporting structure for all EM providers allowed participants to provide data that have similar costs grouped in the same manner. It will also aid in providing a structured comparison of EM costs against observer costs.

EM costs estimates are based on data supplied by EM providers for the 2021 EFP. The most recent year of data is anticipated to best reflect the costs of the program in the future. While it is acknowledged that technological changes and program design and scale will impact future costs, the most recent data is thought to best reflect future costs assigned to the categories utilized in this analysis.

Costs for observers are estimated based on costs realized in the pelagic pollock fishery in the BS pay-as-you-go structure and the GOA partial coverage fee-based program (except for GOA plant observers). Costs for both at-sea observers, when EM is not utilized, and plant observers for both EM and non-EM deliveries are included in the estimates. However, GOA plant observer costs are based on a broad range of costs per day because of uncertainty and data confidentiality. At-sea observer costs are estimated based on annual average sea day costs for the partial coverage program and the full coverage program as reported in the North Pacific Observer Program 2020 Annual Report.

5.8.1 Components of EM costs

The Trawl EM Committee created a cost subgroup to identify consistent reporting metrics for Alaska EM costs that can be used across programs (fixed gear and trawl), and dovetail with the NMFS cost categories laid out in the cost allocation procedural directive. The subgroup included representatives from the fixed gear EM program, the trawl EM EFP, EM providers and agency staff. Table 5-25 includes the six proposed cost reporting categories supported by the subgroup. Costs are reported rolled up to the six overall categories to limit the specific reporting of proprietary information by providers. Categories were chosen because they were determined to balance cost transparency with the recognition that EM service providers, EM video review providers, and human observer providers have varying service delivery

models and different internal cost tracking systems. Cost categories were developed to begin moving away from the 5-year amortized cost model for equipment and installation services that was previously used by some EM programs, because this system eliminates the need to estimate depreciation for various pieces of equipment that may have different useful life spans that often depend on how well the equipment is taken care of on the vessel. The proposed cost categories are defined as being ongoing (will reoccur in varying levels each year) or a one-time cost (original purchase and installation of new systems on a vessel). The one-time purchase only applies to installing the EM system on a vessel the first time. Vessel operators that have already incurred the initial cost will have no further costs assigned to that category.

Table 5-25 Cost Reporting Categories Used in the Analysis

Service Provider Fees and Overhead (Ongoing)
EM Equipment Maintenance and Upkeep (Ongoing)
Data Transmittal (Ongoing)
Vessels Original Equipment Purchases and Installations (One time)
Data Review (Ongoing)
Data Storage (Ongoing)

Each category may contain a mix of variable costs and fixed costs. Fixed costs do not change regardless of the size or scope of the program and their variable cost per unit might actually decrease as more vessels join the EM fleet or take more trips. Variable costs scale positively with the amount of activity in the program or the services provided. Some variable costs increase in a somewhat linear fashion as an EM program scales up. For example, a greater amount of fishing effort (trips) would increase the shipping cost associated with submission of removable hard drives to the video reviewer. Other variable costs may increase more like a stair step, in that a certain amount of vessels or effort can be covered at the same cost acting effectively like a fixed cost, up to a certain threshold, after which the costs increase significantly and jump up to the next stair. For these "stair-step" costs, the per unit cost may vary significantly depending on the amount of effort. For a hypothetical example, one technician may be able to service 10 vessels but as soon as the eleventh vessel is added, that requires an additional technician to service all the vessels which jumps one up to the next step of costs, therefore the unit cost per vessel varies significantly by the total number of units. This stair step cost structure is important to remember when costs are reported as average unit costs as the unit cost not only depends on where you are on that step but also that total costs include a combination of different units, many of which scale differently so average per unit costs are driven by which unit you are describing (in the denominator) and how it relates in scale to the other units driving total costs.

Finally, there are many program design choices that will affect the implemented program's cost profile, but are yet to be made or will be constantly reevaluated over the life of the program. The analysts refer to these as cost uncertainties. These uncertainties are noted throughout the following subsections. Some uncertainties relate to the program's data objectives; others relate to the service delivery model (number of EM service providers, number of EM service ports); while others might occur at a finer scale (i.e., the number of trips that can be included on a single hard drive).

For all the reasons described above, the analysts[40] express great reservation about estimating the cost of the EM program in terms of annual costs per vessel, per trip, or per sea-day. Such unit cost estimates conflate fixed/variable costs and one-time/ongoing costs, ignore the trajectory of cost factors over time and program maturity, and are too simplistic to recognize the cost impact of program design choices that are yet to be made (uncertainties). Despite these reservations, average unit cost estimates are reported in

[40] The same concerns have been communicated to the analysts by observer and EM providers during discussions related to the appropriate use and collection of cost data.

this document, however it is important to note that these costs are not expected to scale linearly and therefore should not be extrapolated by unit as the program matures and expands.

The following sections provide a general overview of each of the proposed categories as well as some context on what associated activities, responsibilities and task costs would be captured under each of the proposed cost sub-categories.

5.8.1.1 Service Provider Fees and Overhead

This category is used to capture costs related to the overall infrastructure required for both physical work locations (e.g., office/equipment storage, locations) and human resources (e.g., program staff and technician wages) that are required to facilitate an EM program's overall coordination. This section is intended to capture costs associated with provider communication costs, software support fees, and costs associated with training of new technicians and remote port contractors. It also encompasses costs associated with project reporting and data analysis support services. Vessel monitoring plan updates and distribution are also captured within this category. It is anticipated that the Project Coordination sub-category is likely to have the most variability between providers based on differences within each provider's service delivery models and operational business practices. Individual service providers worked with their contracting authorities to better define the specific items and tasks being captured under Project Coordination, to ensure consistency. The list of costs grouped under this category includes:

- Project Coordination (Vessel Monitoring Plan (VMP) work, logistics, etc.)
- Startup Coordination: meetings, costs, etc. as part of program launch
- Ongoing Coordination: costs to refine program goals and outcomes
- EM Software Support
- EM Equipment Management
- Data Analysis Service (reported issues data review)
- Technician and Contractor Training
- Program Reporting / Issues Logging / ODDS Oversight

5.8.1.2 EM Equipment Maintenance and Upkeep

EM Equipment Maintenance and Upkeep includes ongoing costs associated with vessel services to troubleshoot and resolve technical issues and includes the equipment replacement costs for damaged or malfunctioning equipment as needed. Pre-season startup services and contracted labor used for remote port services are also captured under this category. The list of costs grouped under this category includes:

- Troubleshoot/Resolve Technical Issues (port staff and contractors)
- Service Travel Expenses (if not in service port)
- Season Start-up services (pre-installed vessels)
- Ongoing equipment and peripherals replacement
- Freight/Shipping
- Service Costs for Existing Vessels
- EM Spare Parts and Peripherals

5.8.1.3 Data Transmittal

Data Transmittal includes the costs for the pre-paid data drive shipping envelopes and the costs associated with shipping data drives to the ports and processing plants. It is anticipated that in the future this category will also include costs associated with electronic data transmission services, as technology evolves. The list of costs grouped under this category includes:

- Costs for shipping Data drives to ports
- Shipping envelope purchase costs

5.8.1.4 Equipment Purchases and Installation (new vessel systems only)

Equipment Purchases and Installation includes original vessel EM system purchases including all the labor and expenses that are incurred during installation of the EM system on the vessel. This is currently the only suggested category that is considered to be a one- time cost, as once the new system is installed, any replacement equipment would fall under the Equipment Maintenance and Upkeep cost category. The list of costs grouped under this category includes:

- New Installations
- New Full EM System Costs,
- New Installation Service Labor and Travel
- Installation Materials
- Freight/Shipping

5.8.1.5 Data Review

- Logbook and data entry
- Video Review
- Transmittal of post processed data to agency

5.8.1.6 Data Storage

Data Storage includes all overhead and data storage costs that are incurred by the EM data review contractor. Costs associated with the short- and long-term archiving of the raw EM sensor and video data are also included. The list of costs grouped under this category includes:

- Data Storage and Archiving (In accordance with NMFS policy directive on data storage requirements)

5.8.1.7 Plant Observer Provider Fees and Overhead

Plant Observer Provider Fees and Overhead captures all costs associated with supplying the shoreside plant observer services. Costs include all coordination labor, observer wages, and all observer transportation. Food and lodging costs are paid by the plant and not included in these costs. This was a more contentious issue during the COVID years as plant operators were more reluctant to house observers with their crew, resulting in higher costs to feed and house observers. For example, during the 2021 pollock A season, COVID cases caused some BS pollock plant closures. Concerns over COVID testing and introducing potential carries of the virus into the workforce population were substantial.

5.8.2 Cost Category Development

As stated earlier, the Trawl EM Committee created a cost subgroup to crosswalk the various reporting categories used in fixed gear and trawl fisheries with the NMFS framework, and Alaska needs. The subgroup met November 10, 2020 and began to develop a cost reporting format that can be used across similar EM programs, allow for better cost transparency, and simplify cost reporting and budget predictions. The subgroup reported their progress to the Trawl EM Committee at their May 2021 meeting. The Committee recognized the productive and efficient work to date of the cost subgroup and recommended an additional meeting to work on outstanding issues and finalize the reporting structure for

use reporting costs of the 2021 trawl EM program and the regulatory analysis. The subgroup met November 23, 2021 to refine remaining sub-categories, specify reporting methods for one-time EM purchase costs, and identify comparable metrics for all costs. These cost reporting categories are broad categories that would be reported in the annual report to allow for transparency and not require overly detailed information from providers (Table 5-25). However, the agency may require more detailed reporting in contracts and invoices that will not be reported at a level less aggregated than the general cost categories.

The subgroup noted that data transmission is a cost borne by industry and not reported to the Agency, it is a cost that is easily tracked and important to include to compare current costs of shipping hard drives to future potential developments of transmitting data over internet. The subgroup determined it was appropriate to divide data processing and storage costs, which were previously considered a single category, into two categories: Data Review and Data Storage. These categories were separated to specifically identify data review costs. Data review costs occur in one year while data storage costs can accrue for longer than one year. The group discussed that the Data Review category should include logbook and data entry to compare costs across programs and between paper and eLogbooks, while noting that further discussion of eLogbook implementation should occur at the FMAC to include representatives from all fisheries.

The subgroup discussed the Plant Observer Provider Fees and Overhead in the context that it may not be necessary as it would not apply to all programs and is not necessarily an EM program requirement (for example fixed gear EM does not include a shoreside component) and can be difficult to separate out from existing shoreside observer costs (for example shoreside observer components associated with AFA program or Trawl EM). Ultimately, the group decided it was important to keep this category to capture these costs as they are currently not borne by the Agency or participating vessels. Members of the subgroup noted that additional discussion is needed to identify how to track the cost of EM systems purchased for other programs that are leveraged for additional coverage and participation and how often to include the costs of "crossover" vessels that participate in multiple programs.

To help identify comparable metrics for all costs, the group discussed what denominator to use for overall program costs to compare across different programs. There was interest in knowing costs per sea day to compare to observer days, monitored day (the number of days a camera is on regardless of whether or not the footage is reviewed), review day, and by vessel. Most of these cost metrics can be calculated post processing, but will require assumptions that were not identified in the subgroup report.

The group agreed that future reporting of trawl EM costs should adhere to the subcategories identified above. As a result, those categories are used in this analysis.

5.9 Analysis of impacts

5.9.1 Costs of current observer program

Costs for human observers are estimated based on costs realized in the pelagic pollock fishery in the BS pay-as-you-go structure and the GOA partial coverage fee-based program. At-sea observer costs are estimated as the costs that would have been incurred for at-sea observers on trips in the trawl EM program in 2021 to represent the monitoring costs that would have accrued had the trawl EM EFP not occurred. Estimates include costs for at-sea observers, when EM is not utilized, and plant observers for both EM and non-EM deliveries are included in the estimates.

5.9.1.1 At-Sea observer coverage

To estimate at-sea observer costs, analysts used the average "fully-loaded" cost per day of observer coverage in the partial coverage and full coverage categories, as reported in the 2020 Annual Report

(AFSC 2020). There are several factors that impact how comparable the average observer coverage costs per day are between in the partial coverage category and the full coverage category.

- The partial coverage contract is a federal contract between NMFS and the observer provider company, whereas the full coverage observer providers do not operate under a federal contract. Instead, full coverage observer providers are permitted by NMFS and contract observer services directly with vessels.
- Federal contracts are subject to Federal Acquisition Regulations, Fair Labor Standards Act, and Service Contract Act requirements, and applicable Department of Labor Wage Rate Determination which establish, among other things, minimum wage and benefits for observers, including overtime. Some of these same regulations and requirements can also apply to full coverage observer providers depending on the size of the companies.
- All travel costs and expenses incurred in partial coverage are reimbursed in accordance with the Government's Travel Regulations. These include specified per diem rates, which are paid regardless of actual expenses.
- The costs associated with the partial coverage component include costs associated with maintaining the ODDS call center, including logging trips for operators who do not do so online.
- The costs associated with the partial coverage component are a daily fee NMFS pays for each sea day, and a reimbursable cost for travel as defined in the National Oceanic and Atmospheric Administration (NOAA) contract. Because NMFS only pays for sea days, the daily rate charged to NMFS must factor in an estimate for the contractor's fixed costs. Note that in 2020, a "sea day" includes observer days at shoreside processing plants. Increasing the proportion of time spent at-sea or at plants would increase the efficiency of the overall program. Higher coverage rates equate to greater efficiency and lower costs per day, while lower coverage rates equate to lower efficiency and greater costs per day.
- Observers in the partial coverage category are often deployed out of many small, remote port locations, which increases travel and lodging costs. While NMFS constrained the number of ports from which observers were deployed in the latter half of 2020, the contract also had to absorb quarantine costs in each of these ports
- Observers in the partial coverage category are often only deployed on a vessel for one trip which is significantly shorter (one to five days) than the typical vessel deployment for full coverage observers (60 to 90 days), requiring more travel between vessels.
- Partial coverage by its very nature is inefficient on a cost per unit basis compared to full coverage. This is because partial coverage samples the fleet, reducing the overall monitoring costs. However, predicting where observers will be deployed and in what amount is difficult with random selection procedures. The risk and uncertainty regarding the number of observed days is borne solely by the partial coverage observer provider and increase costs on a per unit (daily rate) basis. Due to the inherent differences between the full and partial coverage categories, the most salient comparison of costs is a "fully loaded" daily rate, which is calculated as the total funds expended divided by the number of observed days.

5.9.1.1.1 **Full Coverage**

Observer coverage in the full coverage category is industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers. Section 5.9.1 describes the full coverage observer program in more detail. The costs associated with the full coverage category are paid by the commercial fishing industry directly to certified observer providers. The services carried out by observer providers include paying observers, deploying observers to vessels and shoreside processors, recruiting, training and debriefing. There are currently four active certified providers in Alaska. Since 2011, certified observer providers have been required to submit to NMFS

copies of all of their invoices for observer coverage. The regulations require the submission of the following:

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

Data collected from the observer coverage invoices were used to calculate the average cost of observer coverage in the full coverage category for 2020. The observer invoice data are confidential under section 402(b)(1) of the Magnuson-Stevens Act. Therefore, summarized information may be provided in this report only when the cost data used in the summary statistic derives from invoices submitted by at least three observer providers. This confidentiality requirement limits the detail of the average cost data that may be reported to the public, as noted below.

In 2020, 154 vessels and processing facilities were billed for observer coverage in the full coverage category. The total number of observer days represented by these invoices in 2020 was 39,039. The average "fully-loaded" cost per day of observer coverage in the full coverage category in 2020 was $375, down 3% from 2019 when it was $385. This 'fully-loaded' average combines invoiced amounts for the daily rate per observer day plus all other costs for transportation and other expenses. The 2020 Annual report also provides a daily rate that includes incidentals, for the pelagic trawl CVs of $415 (figure 2-3 in Annual Report). Analysts use both the fully loaded daily rate for the full coverage fleet and the pelagic trawl CV rate of $415 to provide a range of estimates for at-sea observer costs Full coverage vessels may be contributing a larger, unknown share of observer costs that are not invoiced. For example, some fishing companies may arrange travel or lodging for an observer, or observers may ride a vessel to/from Seattle from the fishing grounds rather than incurring travel expenses.

To estimate a range of potential costs for at-sea monitoring that would have occurred on vessels that participated in the EFP, analysts multiplied the sea days of all EM trips by the cost of a fully loaded sea day as reported in the annual report. Sea days are calculated using two separate methods: 1) estimated days fished, which assumes one of the days the vessel is gone is a day that the vessel did not harvest and retain catch (for example a trip that left on the 20th of the month and returned on the 22nd would be two days) and 2) estimated days +1 which assumes the vessel harvested and retained catch every day the vessel was gone (for example a trip that left on the 20th of the month and returned on the 22nd would be three days). The range of these cost estimates is provided in Table 5-26. At the low range of the at-sea monitoring cost estimates is a total cost of $1,140,375, estimated using sea days calculated as the estimated days fished multiplied by a per day observer cost of $375 (The average "fully-loaded" cost per day of observer coverage across the entire full coverage category in 2020[41]). The high range of these estimates is a total cost of $1,750,055, estimated using sea days calculated as days fished +1 multiplied by a per day observer cost of $415 (The average cost per day that includes incidentals for pelagic trawl CVs as reported in the Annual Report).

[41]2020 costs are the most recent available as the 2021 Annual Report is currently being prepared. Analysts will update using 2021 sea day costs when available. Note that these costs included COVID-safety protocols that are unlikely to be incurred in future years.

Table 5-26 estimates of 2021 BS costs for at-sea monitoring on EM trips

		fully loaded day		Total at-sea cost estimate for EM days	
	EM days	low	high	low	high
days fished	3,041	$375	$415	$1,140,375	$1,262,015
days +1	4,217	$375	$415	$1,581,375	$1,750,055

Sources: Sea days from AKFIN summary of CAS data (Trawl_EM_Trips 3-23-22). Cost per day from NPOP annual reports see https://repository.library.noaa.gov/gsearch?terms=North%20Pacific%20Observer%20Program%202019%20Annual%20Report&collection=

5.9.1.1.2 Partial Coverage

Section 5.9.1 describes the partial coverage observer program, deployment design, cost structures and funding mechanisms. Changes to these aspects of the partial coverage observer program are not anticipated to change regardless of the Alternative or option selected by the Council.

However, the number of vessels selecting into the Trawl EM pool and the associated costs of the Trawl EM program as compared to those of the observer program will impact the amount of overall funding available for other partial coverage strata as described in Section 4.9.1 of the EA. To estimate the approximate cost of covering the vessels participating in the trawl EM EFP in 2021 that would have otherwise been covered by the partial coverage observer program, analysts used the fully loaded sea day cost as reported in the annual report and multiplied this by the days fished.

As reported in the North Pacific Observer Program Annual Report, in 2020, the average cost per observer sea day in the partial coverage category was $1,381 (based on the cost of $2,729,486 for 1977 observer days). The average cost per observer sea day is a combination of a daily rate, which is paid for the number of days the observer is on a vessel or at a shoreside processing plant, and reimbursable travel costs. In 2020, the reimbursable travel costs also included quarantine days. The contractor also needs to recoup their total costs and profit through the daily sea day rate, which includes costs for days the observers are not on a boat. These days include training, travel, deployment in the field but not on a boat, and debriefing. In 2020, the number of observer sea days included deployment days at shoreside processing plants for situations where vessel observers were not able to enter processing plants to complete their sampling, due to COVID restrictions. Federal funds were used to pay for shoreside observers to complete this sampling.

The average annual cost per sea day in partial coverage have ranged between $895 and $1,381 since 2014 North Pacific Observer Program (NPOP) Annual Report. Much of this variation is associated with number of sea days used each year, as the cost of "optional" sea days are less expensive than "guaranteed" sea days under the federal contract. Additionally, there is variation from year-to-year in travel costs. Guaranteed days are the minimum number of sea days purchased by the government, and therefore contain the fixed costs incurred by the observer provider.

The specific costs of at-sea observers for the pollock pelagic trawl CV portion of the partial coverage program may vary from those calculated for the entirety of the partial coverage fleet due to specific, operational differences (i.e., differences in logistical challenges as the pollock fleet operates out of fewer ports than other partial coverage fleets). However, given discussions with observer providers, confidentiality concerns associated with estimating a more specific observer cost for an individual sector as well as the fact that the observer fee is distributed across all partial coverage sectors as a flat fee, the analysts determined that the fully loaded average cost per sea day in the partial coverage fleet was the most appropriate input to the cost estimates in this section.

In 2020, the observer fees collected in the pollock trawl fishery accounted for 13% of all fees collected in the GOA (Annual report Table 2-3 p.24). Since 2018, the target deployment rates for the trawl partial

coverage strata have ranged from 16% to 30% (Table 5-27). While these targets are based on trips, as an observer cannot be deployed on a partial trip, analysts use days to estimate the approximate cost of covering the vessels participating in the trawl EM EFP in 2021 that would have otherwise been covered by the partial coverage observer program.

Table 5-27. Trawl strata target observer coverage rate 2018-2022 (Source: NMFS Annual Deployment Plans)

Year	Partial coverage target rate
2018	20%
2019	24%
2020	20%
2021	16%
2022	30%

To estimate a range of potential costs for at-sea monitoring that would have occurred on vessels that participated in the EFP, analysts multiplied a percentage of the sea days of GOA EM trips by the average cost of a fully loaded sea day for 2019 or 2020 as reported in the annual report (Table 5-28). Sea days are calculated using two separate methods: 1) estimated days fished At the low range of these estimates is a total cost of $172,369, estimated using sea days calculated as 16% estimated fishing days (for example a trip that left on the 20th of the month and returned on the 22nd would be two days) multiplied by a per day observer cost of $1309 (The average "fully-loaded" cost per day of observer coverage in the partial coverage category in 2019). The high range of these estimates is a total cost of $523,675, estimated using a 30% coverage rate of sea days, calculated as estimated fishing days +1 (for example a trip that left on the 20th of the month and returned on the 22nd would be three days) multiplied by a per day observer cost of $1381 (The average "fully-loaded" cost per day in 2020). Coverage rates of 16% and 30% are used to provide a range based on previous years target coverage rates in the trawl strata. However, 30% is the most comparable to the EM cost estimates, which are provided for the 2021 EFP year, in which the target coverage rate for shoreside monitoring was 30%.

Table 5-28 estimates of costs for at-sea monitoring on GOA EM trips in 2021

				fully loaded cost per day		Total at-sea cost estimate for EM days	
	EM days	16%	30%	low	high	low	high
days fished	823	132	247	$1,309	$1,381	$172,369	$340,969
days +1	1,264	202	379	$1,309	$1,381	$264,732	$523,675

Sources: Sea days from AKFIN summary of CAS data (Trawl_EM_Trips 3-23-22). Cost per day from NPOP annual reports see https://repository.library.noaa.gov/gsearch?terms=North%20Pacific%20Observer%20Program%202019%20Annual%20Report&collection=

5.9.1.2 Monitoring at Shoreside Processors

Dockside monitoring by observers occurs in the pollock fishery to enable complete enumeration of salmon bycatch and to conduct biological sampling. For trips in the BSAI trawl pollock fishery, both for CVs in the trawl EM pool and those not in trawl EM, a complete enumeration ("census") of salmon will be completed during the offload. Offload monitoring for salmon will also take place for vessels in the trawl EM pool that deliver either to a tender or shoreside processor in the GOA. Trips will be randomly selected and offloads will be monitored by observers in shoreside processing facilities. For vessels that do not participate in EM and deliver to shoreside processors in the GOA pollock fishery, trips that are randomly selected for at-sea observer coverage will be completely monitored for Chinook salmon bycatch by the vessel observer during offload of the catch at the shoreside processing facility. For non-EM trips in the GOA pollock fishery that are delivered to tender vessels and trips outside of the pollock fishery,

salmon counts and tissue samples will be obtained from all salmon found within observer at-sea samples of the total catch.

If COVID protocols at shoreside processing plants prevent vessel observers from entering the processor to complete any further sampling, NMFS may alter data collection procedures to accommodate safety protocols. This would follow the methods developed in 2020, where shore-based observers completed the sampling for pollock trawl vessels regardless of whether the vessel was observed at-sea or if it participated in the trawl EM EFP.

As stated in the EFP report to the Council[42], throughout 2020, Saltwater, Inc. served as the Observer Company providing dedicated observers at the following shoreside processing plants taking pollock deliveries from participating EM CVs: Trident Kodiak, APS, Ocean Beauty Seafoods (OBSI), Trident Akutan, Trident Sand Point, Northern Victor, Unisea, and Peter Pan King Cove[43]. It has been noted that A.I.S., Inc. (AIS) also provided shoreside observers to fill gaps because of the issues faced by processors during COVID. At the Peter Pan facility, AFA observers were used to support the project; at the other facilities project specific shoreside observers were deployed. For 2021, Alyeska and Silver Bay Kodiak were added to the group of processing plants participating in the EFP. Additionally, two observer provider companies were selected for placing observers at the shoreside plants; Saltwater is providing observers for Trident Akutan and all plants in Kodiak while Alaska Observers, Inc. (AOI) is providing observers for Unisea, Northern Victor, and Alyeska. The firms and observer providers are the same in 2022.

5.9.1.2.1 **BS/AFA**

Discussions were held with the shoreside processing plant observer providers to determine a reasonable range of expected cost per day when the proposed Trawl EM program is projected to be implemented in 2024. These estimates used the data presented in the 2020 Trawl EM status report to the Council[44] as the starting point for those discussions. The following points were considered, based on discussions with observer providers, to generate a reasonable range of cost per day:

- The budget for Trawl EM resulted in lower plant observer costs than would be anticipated in the regulated program. Observer providers made concessions to stay within that budget to support development of the program, but those rates are not anticipated to allow the firms to operate at normal profit margins under a regulated program.
- The costs for plant observers in the partial coverage fisheries are dependent on future observer contracts. The current contract runs to 2024 and it is not possible to speculate how various aspects of that contract will change when the new contract is implemented.
- Trawl EM program regulations may impact the shoreside processing plant (plant) observer wages, especially if specific observer experience levels are required to be a plant observer.
- Costs and providers are different in the GOA relative to the BS, as described in other sections. The full coverage designation for AFA pollock taken in the BS and partial coverage designation for pollock harvested from the GOA contribute to the cost difference but there are other factors including travel, delivery patterns, etc. that cause the substantial difference in costs.
- Future inflation rates are unknown, but observer providers have realized substantial increases in wage rates (tight labor market makes finding and retaining observers more difficult).

[42] https://meetings.npfmc.org/CommentReview/DownloadFile?p=84d1969a-7fce-4d29-bd7a-d3a0ae91f9da.pdf&fileName=C2%20EM%20EFP%20Interim%20Report.pdf
[43] AIS also provided shoreside observers to help fill coverage gaps.
[44] https://meetings.npfmc.org/CommentReview/DownloadFile?p=84d1969a-7fce-4d29-bd7a-d3a0ae91f9da.pdf&fileName=C2%20EM%20EFP%20Interim%20Report.pdf

Cost per day is considered the appropriate unit for shoreside monitoring cost estimates in this analysis although it has weakness and does not always fit well with how EM and observer providers think about costs and cost categories. This is the traditional metric that has been used for at-sea observers. Plant observers typically sign a 90-day contract when they agree to an assignment, but often do not stay at the plant that long. Plant observers begin being compensated as soon as they arrive at the plant's location and are paid for each day there, regardless of whether fish are moving through the plant. The current contract requires the plants to provide food and housing for the observer, so those costs are not included in the daily rate estimate. During the COVID years this has been a source of contention, especially in the GOA, because of medical concerns about housing observers in facilities utilized by plant workers. Also, COVID had other impacts that tended to distort costs. It is very difficult to untangle all these impacts.

Based on the information presented and Trawl EM reported rates, it is assumed that the travel costs per observer is about $1,000 to $1,300 each way. This takes into account the increased transportation costs being realized by the industry. Tight labor markets have resulted in increased wage rates being paid by observer providers. On April 1, 2022 inflation, as estimated by the Bureau of Labor Statistics[45], was reported to be 7.87 percent and the long-term average was about 3.5 percent. For this analysis a range of 4 percent to 6 percent is used to estimate increases on observer costs over time. Incorporating these costs and assumptions into the estimates, as well as discussions with observer providers, the following daily plant observer rates for the BS plants are generated. A range of costs and inflation rates are presented to reflect uncertainty of the actual rate that would be charged over the years considered.

Table 5-29 Estimated daily BS plant observer costs.

Year	Low/day		Mid/day		High/day	
	4% Inflation	6% Inflation	4% Inflation	6% Inflation	4% Inflation	6% Inflation
2024	$380		$410		$430	
2025	$395	$403	$426	$435	$447	$456
2026	$411	$427	$443	$461	$465	$483
2027	$427	$453	$461	$488	$484	$512
2028	$445	$480	$480	$518	$503	$543
2029	$462	$509	$499	$549	$523	$575

Source: 2021 EFP report and discussions with industry members.

5.9.1.2.2 Partial coverage in the GOA

Shoreside plant observers in the GOA are defined in the partial coverage category. The ADP defines coverage goals for these plants when operating processing pollock from the directed pollock fishery. Because of the structure of the observer coverage and the fact that currently one observer provider has the contract to provide that coverage, outside of the EFP, makes providing estimates of costs challenging. Actual cost data cannot be reported because of confidentiality restrictions. Layering on top of that all the uncertainty as described for the BS estimates and the differences in the in the observer compensations and costs, results in a broad range of costs utilized in this analysis. For example, the observer providers in the partial coverage category may pay observers a different base wage, may provide additional insurance coverage, pay different food and housing rates, and have different overhead rates to address the increased logistical challenges under the partial coverage fisheries in the GOA.

[45] https://ycharts.com/indicators/sources/bls

As noted, the observer contracts expire about the time this action could be implemented. Depending on how the new observer contract is structured it could impact the rates charged for GOA shoreside coverage and may result in rates that are less than the high rates assumed in this analysis.

Similar to the BS estimates, a low, middle, and high rate is assumed. The low rate is slightly lower than the low rate for the Western GOA used in the 2020 Trawl EM EFP status report to the Council ($508 /day). This rate was still greater than the BS rate because it is assumed there are greater cost efficiencies in the BS coverage structure and in the BS observer providers may contract directly with industry. The high rate is the upper end of the GOA at-sea observer daily cost ($1,400/day to $1,600/day). The middle rate is the mid-point of the low rate ($500) and the upper bound of the high rate ($1,600). The range is expected to cover the actual cost of the daily rate for shoreside, it is uncertain which rate will most closely reflect what will be realized in 2024 and beyond.

Table 5-30 Range of assumed daily rates for GOA shoreside observer costs, 2024 through 2029

Year	Low/day		Mid/day		High/day	
	4% Inflation	6% Inflation	4% Inflation	6% Inflation	4% Inflation	6% Inflation
2024	$500		$1,050		$1,600	
2025	$520	$530	$1,092	$1,113	$1,664	$1,696
2026	$541	$562	$1,136	$1,180	$1,731	$1,798
2027	$562	$596	$1,181	$1,251	$1,800	$1,906
2028	$585	$631	$1,228	$1,326	$1,872	$2,020
2029	$608	$669	$1,277	$1,405	$1,947	$2,141

Source: 2021 EFP report and discussions with industry members.

5.9.2 Costs of EM

There are numerous challenges associated with estimating the costs of an EM program. These are described later in this section and in section 5.9.2.9. These challenges present additional difficulties when attempting to estimate costs of EM at numerous and uncertain levels of scale and participation that could encompass the scope of a potential future regulated program. Therefore, the analysts' approach is to present the costs of 2021 trawl EM EFP (the most recent year for which costs are available), as provided by the EM service providers and reviewers (Archipelago Marine Research, Saltwater Inc. and PSMFC) and qualitatively describe how the different cost factors may scale with the expansion of participation and how different variables of program design and demographics (i.e. number and location of vessels) may affect these costs. The most recent year of data is anticipated to best reflect the costs of the program in the future. While it is acknowledged that technological changes will impact future costs, the most recent data is thought to best reflect future costs assigned to the categories utilized in this analysis. Costs are reported in the categories agreed upon by the cost reporting subgroup as described in section 5.8.2.

5.9.2.1 EM costs of the current EFP

The total costs for the ongoing EM components of the 2021 EFP were $392,002. Total costs by subcategory and average unit costs per CV, trip, haul and day are reported in Table 5-31. Note that there is large variability in per unit costs and these average per unit costs only apply to the design and scope of the 2021 EFP. Differing levels of participation, effort, scope and program design specifics will entail very different cost structures, impacting both the range of individual costs and average costs per unit. These costs were provided to the analysts by representatives from the two participating EM service providers: Archipelago Marine Research and Saltwater Inc., and the two EM data reviewers: Saltwater Inc. and PSMFC. These costs contain all EFP participants, including CVs and tenders operating in the BS and the GOA. This encompasses the suite of effort most analogous to Alternative 2. One- time costs are also

reported in Table 5-31 and totaled $276,653 which included new equipment purchases and installation costs for 15 CVs and two tenders. One-time costs are reported separately as they occur only once for vessels that are new participants.

Table 5-31 Total costs and average per unit costs for the 2021 Trawl EM EFP. Numbers in parenthesis correspond to the level of participation and effort in the 2021 EFP. *Day represents estimated fishing days, for example a trip that leaves on the 20th and returns on the 22nd is considered two days.

		Average per unit cost for 2021 EFP			
Ongoing costs	**Total costs**	**CV (68)**	**Trip (1503)**	**Haul (4272)**	**Day* (3864)**
1. Service Provider Fees and Overhead	$188,559	$2,773	$125	$44	$49
2. EM Equipment Maintenance and Upkeep	$86,832	$1,277	$58	$20	$22
3. Data Transmittal	$5,720	$84	$4	$1	$1
5. Data Review	$101,488	$1,492	$68	$24	$26
6. Data Processing and Storage	$9,403	$138	$6	$2	$2
Total ongoing costs	$392,002	$5,765	$261	$92	$101

One-time costs	**Total costs**	**CV (15)**	**Tender (2)**
4. Equipment Purchases and Installation	$276,653	$17,496	$7,106

Source: Discussions with EFP EM service providers and data reviewers.

Analysts do not attempt to estimate costs of a future regulated program due to the uncertainties associated with the range of potential size, scale and design specifics. Table 5-5 displays the count and percent of pollock CVs that participated in the 2021 EM EFP. In both the BSAI and GOA 46% of CVs only used EM, 13% used a combination of EM and observers and 40% used only observers. Given these current levels of effort in the fishery, there is a potential for 46 additional CVs (40%) that could adopt EM if full participation were to be realized in the future, and 15 CVs (13%) that are already equipped with EM but could use it more frequently. These participation levels are reported again here to provide context of the scale of the 2021 EFP. Costs are not estimated for a future EM program at this level of full expansion due to the caveats and nuances associated with the EM costs reported for the EFP.

Discussions with service providers underscore the difficulty of attempting to predict costs associated with undefined and unspecified future programs, given the uncertainty in participation levels, types, timing, location and effort; as well as yet to be determined specifics of how the regulated program will operate. Providers heavily cautioned against using any average costs for the current program to extrapolate to a different level of effort or scope of a fully realized program due to the uncertainty of the specifics of a future program design and associated impacts on cost. The following sections provide a qualitative description of the factors that influence costs and may impact overall costs of a future regulated program for each cost sub-category based on personal communication with EFP service providers and data reviewers. A summary of the cost reporting categories and associated subcategories supported by the cost reporting subgroup as well as the timing the costs are incurred (ongoing or one-time) the expected trajectory of costs given technology innovation and maturity of the program as well as cost drivers (specific program design and participation variables that influence costs) is presented in Table 5-32.

Table 5-32 Summary of EM cost categories and factors that influence costs

Cost Category	Timing	Trajectory	Cost drivers
1. Service Provider Fees and Overhead	ongoing		
Project Coordination		Higher during startup phase for increased outreach, communication and education. Once established, relatively constant, marginal yearly increases	Number and types of participants, program design, innovation, timing and notice of scale-ups, geographic locations/distribution
EM Software and Data Review Support		Future potential cost savings due to technology, software innovations	Number of vessels, participation in other programs
Technician/Contractor Recruitment and Training		Relatively stable year to year, small impact on overall costs	Number of participants, changes in technology/program design
2. EM Equipment Maintenance and Upkeep	ongoing		
Existing Vessel Services		May increase gradually as the equipment ages and requires equipment replacement services	Number of vessels, geographic locations/distribution, program requirements (number of cameras, etc.)
EM Spare/Replacement Parts and Accessories		May increase as equipment and technology advances happen, costs increase as systems age and control centers need to be replaced	Future program design, requirements for electronic cloud-based data transmission/e-log
3. Data Transmittal	ongoing		
Drive Shipping Expenses (Envelopes & Freight)		Stable if effort remains similar, could eventually decrease with cost competitive broadband access (e-data transfer) or in port review	Directly related to number of vessel trips, trips per drive
4. Equipment Purchases and Installation	one time		
New Vessel Equipment		Equipment costs themselves are relatively constant once an established installation hardware list is made.	Costs of new vessel equipment will correlate with program data requirements, technology changes.

Cost Category	Timing	Trajectory	Cost drivers
New Vessel Installation Labor		Varies from vessel to vessel depending on the complexity of the camera cable runs, the vessel's infrastructure for mounting cameras, and how difficult it is getting cables between decks.	Number of vessels, locations and boat schedules. Installing multiple systems simultaneously in a port saves travel costs
New Vessel Installation Expenses		Highly variable	Location (travel and shipping costs)
5. Data Review	ongoing		
Logbook and data entry		May decrease if use of electronic logbooks becomes more prevalent	Number of vessels, logbook pages, discards, tows
Video review		May decrease if automated (AI) technology becomes practical and efficient	Data review protocols, number of vessels, trips, tows; length of time to complete haul-back & store catch; number and quantity of discards
Transmittal of post processed data to agency		Relatively stable year to year, small impact on overall costs	Vary only slightly by amount of data transmitted
6. Data Processing and Storage	ongoing	Costs for data storage continue to decrease	Amount of data stored (number of drives, hauls, length of trip, amount of movement recorded during trip etc.), for how long, reliability, how much access is required.

5.9.2.2 Service Provider Fees and Overhead

Service provider fees and overhead are ongoing costs but can vary significantly based on the maturity of the program and the number and types of participants and program design.

Project Coordination

A major factor in project coordination costs are the meetings, outreach, relationships, and education that are critical for both successful logistics and industry "buy-in" for a new program. These costs will decrease as the design phase ends and will become relatively constant, with marginal increases from year to year, for an established, operational program. While the costs may decrease, the services will remain key to efficient project operations, "buy in", and data quality throughout the life of a successful program. The number and types of industry participants - CVs, tenders, processing plants-- also impact these costs. For example, implementing protocols for plant observers in the GOA required more coordination and communication than for those in the BS where plants have existing observer operations. The number of vessels and geographic locations where the work occurs operationally can affect costs. Large increases in the number of vessels will result in higher work-loads that may require increased staffing or additional contract labor. Increasing the geographic locations (ports) where work needs to occur can increase travel costs and may require additional labor resources (technicians and contractors) to cover work in these additional ports. Some providers may be more equipped than others to handle efficient scaling up of

programs with current staff resources, given advance notice and flexibility to efficiently plan and coordinate. That said, it is difficult to determine a threshold (i.e., number of new vessels, geographic distribution) at which program expansion would create significant additional costs much less the potential magnitude of such costs.

EM Software and Data Review Support

EM Software and Data Review Support costs are anticipated to be relatively constant under an established/operational program. However, software upgrades can decrease overall costs by decreasing keypunching, review time, etc. Software advancements to improve and reduce data review times through the use of existing AI algorithms are currently under development. While there can typically be higher costs when this type of development work is occurring, the longer-term benefits will result in overall future cost savings that come with more automated data review. Program design should encourage innovation to promote technology and software changes that may decrease future costs.

The specifics of program design and participation can also impact the overall EM software and data review support costs. EM software license fees are often charged per system so if multiple vessels share a control center, only one license fee is required. Similarly, vessels that use EM systems in more than one program only pay one annual software fee (e.g., whiting program vessels do not pay a second license fee for the pollock program).

Technician/Contractor Recruitment and Training

Technician/contractor recruitment and training costs are expected to be relatively stable year to year and are not a huge cost driver. However, the addition of new technicians and contractors affect these costs but it is difficult to determine at what level of expansion this would be required. Some providers try to reduce costs by doing group trainings and therefore only conducting training once for multiple new technicians or contractors, however this can incur additional travel costs.

5.9.2.3 EM Equipment Maintenance and Upkeep

Program requirements such as the number of cameras, computer capacity, etc., will affect the costs of EM equipment maintenance and upkeep. Also, how well individual vessel operators take care of the equipment onboard their vessel will impact how long equipment lasts before it needs to be replaced.

Existing Vessel Services

Existing vessel service costs may increase gradually with time as the equipment ages and requires replacement and upgrade services. This includes both costs for services completed by port-based contractors as well as in-season services where travel is often required. As number of vessels increase, services and labor costs will increase and the location this occurs will affect these costs due to required travel.

EM Spare/Replacement Parts and Accessories

As equipment ages, minor equipment replacements for cameras, sensors and user interface items (keyboards and monitors) are required on an ongoing basis. The cost of these replacements may increase as technology improves. Future planning should include broader scale replacements with updated and improved control center technologies that contribute to improved and enhanced data collection, as well as allow for cost-savings measures associated with more automated data review. Many of these upgrades may involve increased up-front costs that allow for future cost savings. For example, future updated control centers may increase costs but will include the hardware and software functionality for electronic cloud-based data transmission and remote 2-way connection to the system (cellular and/or satellite) for

system adjustments, thus decreasing data transmission and service costs. Program design requirements that impact the ability of providers to schedule broad scale system replacements can impact these costs.

5.9.2.4 Data Transmittal

Data transmittal costs will reflect shipping and postal rates until broadband access in Alaska ports becomes cost competitive. Some providers have tested in port review systems, which have the potential to decrease data transmittal costs and improved data turnaround time, if they can be effectively implemented at scale.

Drive Shipping Expenses (Envelopes & Freight)

Assuming no technology change, this cost is directly related to shipping and postal rates and the number of vessel trips. These costs are relatively easy to predict if future effort is known. Program design requirement such as the maximum number of trips allowed on a single drive (currently three in the EFP) will impact these costs.

5.9.2.5 Equipment Purchases and Installation

Equipment purchases and installation are a one-time cost for new vessels entering the program and thus function differently than all the other cost categories which are ongoing costs that occur every year. As such these costs are directly related to the number of new vessels (that do not have existing systems from a different EM program) joining the program in a given year. The number of ports and vessel schedules will also affect these costs as installing multiple systems simultaneously in a port saves travel costs, but often does not coordinate with vessel schedules.

New Vessel Equipment

Costs of new vessel equipment will correlate with program data requirements and technology changes. Given constant technology requirements, equipment costs are relatively constant once an established installation hardware list is made.

New Vessel Installation Labor

The installation labor will vary from vessel to vessel depending primarily on the complexity of the camera cable runs, the vessel's infrastructure for mounting cameras, and how difficult it is to get cables between decks. Provider costs can be reduced if vessel crew assist with cable runs and pre-installation preparation of the vessel for hydraulic sensors, cable penetration glands and camera mount fabrication, however these costs should be reflected as opportunity costs for crew labor. Clustered installations of multiple vessels in the same or similar locations during a specific time period can reducing labor costs.

New Vessel Installation Expenses

New vessel installation expenses are highly variable and dependent primarily on the travel costs involved with getting to the installation ports. If travel to a specific port is needed, having multiple vessels ready for install and in those ports will help spread costs. Installation expenses in 2021 were higher than average due mostly to the costs of getting to Dutch Harbor for several installs. Vessels often prefer to do EM system installations while the vessel is in the shipyard for other work. This can be very problematic as shipyard work is often behind schedule, and depending on what work is being done in the shipyard, the vessel may not be suitable for the EM installation at the agreed upon installation date (hydraulics apart, and deck/gantries being welded/painted etc.). This can result in multiple return visits by the installation technicians before they can complete the work.

5.9.2.6 Data Review

Data review protocols and software directly impact costs, as does the desired timeliness of data turnaround, amount of data, experience of reviewers, innovation, experience of the fleet, and review software. New technologies in development such as in-port data review have the potential to significantly reduce data turnaround time and improve data quality by allowing immediate corrections to crew handling or system performance issues.

Logbook and data entry

Logbook and data entry costs are directly related to the number of vessels, logbook pages, discards and tows. Increasing any of these variables will increase costs. If more vessels move to using electronic logbooks, the cost to enter and debrief paper logs will decrease. Electronic logbooks save time for agency staff, plant staff, vessel captains, data entry and data review. These costs scale directly with the expansion of vessels using paper logbooks.

Video Review

Video review costs are directly related to effort metrics such as the number of vessels, trips, and tows as well as specifics of the operation such as the length of time to complete haul-back and store catch; and the number and quantity of discards. The experience of the data reviewers and experience of the fleet can also impact review costs. Future innovation and automation may significantly reduce these costs.

Transmittal of post processed data to agency

Data transmittal costs will depend upon providers and program design. Saltwater has developed a data base and "data portal" which will support submission of EM data directly into the web service being developed by NMFS AK Region. These costs will vary slightly by the amount of data that is transmitted.

5.9.2.7 Data Processing and Storage

Costs for data storage generally decrease with time as technology costs decrease. Data storage costs are related to the amount of data stored, which is driven by effort such as number of trips and tows as well as the number of cameras, the amount of movement recorded and the quality of the recordings. These costs are also driven by the amount of time data must be stored (currently 3 years according to the NMFS policy directive) and how frequently it must be accessed. Current cost estimates from PSMFC include approximately $500 per 75TB to be moved from PSMFC servers to cloud storage, then $1.10/TB per month for archive storage.

Costs by area (BS or GOA) and participant (CV or tender)
The current EM service providers and data reviewers track their overall costs for the pollock EM program in their entirety for the program as a whole. Costs are not tracked based on the specifics of where the vessels are fishing or in which program they participate (i.e., BS, GOA, shoreside deliveries vs tenders). Additionally, each provider services overlapping portions of the fleet (Table 5-33) therefore costs incurred by specific providers do not correspond with any single type of program participant. This presents a challenge when attempting to estimate specific costs based on the Alternatives and Options as currently structured.

Table 5-33 EM providers and data review providers for each portion of the 2021 EM EFP

	EM provider(s)	Data reviewer(s)
BS	AMR	PSMFC
BS and GOA	AMR, SWI	PSMFC, SWI
GOA	AMR, SWI	PSMFC, SWI
GOA tenders	SWI	SWI

Analysts discussed with the providers different methodologies to apportion costs to the separate areas as structured in the Alternatives and Options and determined there is no single metric that adequately represents how the costs of the overall program may be spread into the different Alternatives and Options. Specific cost categories scale differently based on different variables of participation and effort. For example, the costs of data review may scale mostly linearly with the number of hauls or trips, while the costs of equipment and maintenance may be virtually the same for a vessel that takes 15 trips in the BS or a vessel that does two trips in the GOA. Additionally, given overlap in participation, these costs may actually represent a single vessel and some vessels that participate in the west coast whiting fishery[46] can spread costs more efficiently. Given these challenges and caveats the analysts do not present potential costs by Alternative and Option, but rather show the proportion of vessels and multiple measures of effort (number of trips, hauls and days fished) that occurred in each area and program during the 2021 EFP (Table 5-34). Each of these metrics have limitations and caveats associated with how they represent potential cost apportionment among programs however, the following generalizations are applicable:

1. Service Provider Fees and Overhead are related to a combination of vessels and effort as some of these costs are based on the amount of data generated and tracked and some of these costs are more based on the number of vessels participating, acknowledging that the variability in costs per vessel is quite large.
2. EM Equipment Maintenance and Upkeep costs are likely more driven by the number of vessels
3. Data Transmittal, data review and data storage are more likely related to effort.
4. One-time costs for Equipment Purchases and Installation are dependent upon the new vessels participating and more driven by specifics such as the location and availability of the vessel.

[46] Of the 68 CVs that participated in the 2021 EFP, 15 also fished in the West Coast Region, 5 that fished in both the BS and GOA, 9 that fished in the BS and 1 that fished in the GOA.

Table 5-34 participation and effort by program component in 2021 EM EFP. *Metrics reported are for CVs that delivered to tenders. 4 tenders accepted EM deliveries in 2021. **Given overlapping participation totals may differ from sum of each element

	CVs		Trips		Hauls		Days	
Area	number	%	number	%	number	%	number	%
BS	34	59%	1,055	70%	3,321	78%	3,041	79%
BS and GOA	12	18%	na	na	na	na	na	na
GOA	22	41%	448	30%	951	22%	823	21%
using tenders in GOA*	3	4%	20	1%	24	1%	22	1%
Total**	68		1,503		4,272		3,864	

Tender costs

Parsing out the costs of tenders in the 2021 EFP is not possible given current cost tracking methods. Additionally, many of the costs associated with a CV delivering shoreside are also incurred for a CV delivering to a tender, except that there is an additional step of monitoring the offload from the CV to the tender. Given discussions with providers, some costs differ specifically from those for CVs. Project coordination costs are substantially larger for the tender program. Tenders have not been included in the project for as long and there have been some "growing pains" as the program evolved. Tenders add a different element which has required different onboard equipment, data protocols, and increased coordination between participants (tenders, plants, CVs, data reviewers). Tenders often use mobile systems which can require more coordination of equipment installation and VMPs however, in locations that can support it, these can mostly be done remotely with tenders sending photos of camera setups and views over the internet that can then be reviewed and approved by the agency. Tender equipment costs should be somewhat reduced from those of CVs as tenders do not require control centers and only require two cameras and therefore the installs should be less complex and less costly.

5.9.2.8 Non-monetary costs

Certain costs associated with trawl EM may not be described in dollar values but may affect vessels' and processors' business practices and have impacts related to efficiency, time and satisfaction. Many of these costs may be related to specific program design elements that have yet to be determined. Analysis of these costs will be completed in more detail after the Council selects a Preliminary Preferred Alternative (PPA) and there is more certainty regarding the design of the program. Design elements that could impact non-monetary costs may include, but are not limited to the following:

- Catch Monitoring and Control Plans (CMCPs) or Catch Handling Plans in the GOA

  Requirements for CMCPs, communications and observation areas are discussed in section 3.1.4.1 of the EA. Adherence to these requirements may impose costs on shoreside processing plants in the GOA that may have to implement new protocols to participate in the EM program. These costs will differ by plant depending on current operations and with some plants requiring very little changes and other plants potentially requiring more costly adjustments.

- Maximum Retainable Amounts (MRAs) and trip limits

  MRAs and trip limits are discussed in section 3.1.5 of the EA. The specific design of performance metrics to reduce/eliminate incentives of exceeding trip limits under maximized retention may impose costs financially or in the form of reduced efficiency of operations.

- ODDS- opt in on trip-by-trip or annual basis

ODDS registration requirements are discussed in section 3.1.2.4 of the EA. Under the proposed alternatives, EM is only authorized for pelagic trawl trips targeting pollock. GOA trawl CVs sometimes use more than one gear type or target multiple species in a trip. Under the EFP, participating EM CVs have been able to opt-in to EM on a trip-by-trip basis, to allow flexibility based on species targeted and gear types used in a trip. The flexibility to opt-in on a trip-by-trip basis is being re-evaluated and participating CVs may be restricted to opt-in on an annual basis as part of the regulated Trawl EM program. Annual opt-in requirements would reduce flexibility for program participants as they would no longer be allowed to take trips with multiple targets or gear types, thus reducing efficiency of operations. It is difficult to determine how many trips this would impact but 13% of CVs that participated in the 2021 EFP used a combination of EM and no EM (Table 5-5).

5.9.2.9 Challenges and uncertainty with estimating costs

There are many challenges and uncertainties associated with estimating costs of EM. Some of these are outlined below and will be expanded upon after the Council selects a PPA.

- Proprietary information (less than 3 providers) requires rolling up to large categories and overall costs (for both EM and observer costs)
- Different companies have different structures and cost models
- Despite cost reporting subgroup there may still be nuances/differences to how each company defines each category.
- Providers do not track costs in ways that allow parsing by alternative or option (i.e., BS v. GOA, CVs v tenders)
- Impacts of scaling and program design- how would these costs change as the participation changes and specific program design changes and this is different for each provider based on their current staffing and ability to scale up/ thresholds where a new stair-step of costs may be reached.
- Vessels participate in multiple programs- some in west coast, some in BS and GOA so costs are spread across different areas, while some vessels participate in one area
- Unknown program design specifics that may influence costs (i.e., Design of program and fees can affect incentives to maintain equipment)
- Technology changes- some costs will decrease as technology improves- i.e., data drives; some costs will go up- i.e., control centers that can do more may cost more
- Multitude of different fishery operations- rationalized program, race to fish, shoreside, tenders
- Unknown future effort levels based on TACs and changes in management.
- COVID- impact on costs

5.9.2.10 Shoreside Plant Observer Fees and Overhead: GOA

Shoreside plant observers are not required to monitor GOA pollock deliveries since these trips are currently observed on the vessels/trips that are selected for coverage. Regulations would be modified under the EM program to ensure that EM pollock deliveries to plants are randomly sampled at the rate defined for that year[47] in the ADP. The monitoring rate defined in future ADPs will depend on total funding, sampling effort allocation between various sampling strata, and monitoring priorities for that year. The number of EM days will not always equal the total number of observer days for GOA based plants because some of these firms are AFA and may take deliveries from the BS that require plant observer coverage.

Under the EM program, shoreside observer costs are assumed to fall within the daily rate range reported in Section 5.9.1.2. Changes in total shoreside observer costs will be determined by the daily rate and

[47] Assumed to be about the 30 percent rate that was used under the EM EFP, but will depend on the ADP that is developed annually.

number of shoreside observer days that would be required. The number of shorebased observer days are anticipated to increase for plants taking EM deliveries to meet the monitoring requirements associated with any change in observer duties. As described in Section 3.1.4.1 of the EA, it is not possible to forecast exactly how many observers will be needed at each plant. Instead, each CMCP will be reviewed and the number of observers will be determined on a plant-by-plant basis. The CMCPs are reviewed and approved by NMFS on an annual basis. NMFS's goal is to not define the number of plant observers in regulation, but provide flexibility to increase or decrease the number of observers at a plant to meet any changing sampling goals. However, for this section of the analysis, to estimate future plant observer costs, we make the following assumptions:

- Dutch Harbor and Akutan shoreside processors receiving pollock EM deliveries of AFA pollock will need a range of 3-5 observers per plant (a minimum of 2 per shift), depending on the number of vessels participating in EM.
- Shoreside processors (not in Dutch Harbor or Akutan) receiving AFA pollock deliveries will need a range of 2-3 observers per plant.
- GOA (or non-AFA) shoreside processors receiving pollock will need a range of 3-4 observers at Trident-Kodiak, and 2-3 observers to cover the other plants. Note that sharing observers between plants was not effective in Kodiak.

A reason for the increased number of plant observers that may be required during offloads is to collect necessary biological samples from salmon (and other species) that had been taken by at-sea observers. Note that the duties of a plant observer include collecting tissue samples from Chinook and chum salmon as specified in the 2022 Observer Sampling Manual (AFSC 2022) to support the goal of collecting genetic samples from salmon caught as bycatch in groundfish fisheries to identify stock of origin. Note that sampling priorities and quantities change annually, and the Observer Sampling Manual is updated. The sampling protocol was established in the 2014 ADP (NMFS 2013). Under this protocol, observers on vessels delivering to shoreside processors in the GOA trawl pollock fishery monitor the offload to enumerate salmon bycatch and obtain tissues for genetic analysis from the salmon bycatch. Under the EM program these duties, in addition to other sampling duties normally conducted at-sea (collection of biological data and specimens for pollock, PSC monitoring, species composition sampling) would fall on plant observers, since an observer would not be onboard the CV.

The 2020 EM report to the Council indicated there were 557 EM plant observer days at GOA plants (390 in Kodiak and 167 in Sand Point). The plant observer days in 2020 were impacted by COVID as it tended to increase the number of shoreside observer days. Efficiencies are expected to be realized when the COVID impacts are removed or lessened. In 2021, there were 548 EM observer days at plants located in the GOA (473 days in Kodiak and 75 in Sand Point).

Table 5-35 Shoreside observer days 2020 and 2021

Location/Year	Days Plant Had Observer	Plant Observer Days	EM Plant Observer Days	% EM days
Dutch Harbor/Unalaska/Akutan				
2020	1,235	4,561	780	17.1%
2021	1,049	4,183	1,599	38.2%
King Cove, Kodiak, Sand Point				
2020	613	1,294	557	43.0%
2021	798	2,033	548	27.0%

Source: Personal Communication with Observer Program staff and shoreplant observer providers

It is difficult to determine with any precision how many EM plant observer days will be needed in the GOA pollock fishery in the future, given the countervailing forces and uncertainly. Information presented

earlier in this section described changes in the number of shoreside plant observers that may be assigned to plants, but does not estimate the total observer days. Estimating the total number of days depends on many assumptions around the days plants will operate, the number of observers needed, and the number of vessels delivering to the plant that are using EM. However, using the 548 GOA plant EM observer days reported in the 2021 trawl EM days and the broad range of daily costs considered, the estimated annual costs are presented in Table 5-36 using the daily plant observer rates presented in Table 5-30.

Table 5-36 GOA plant observer costs based on 548 days and a range of cost per day

Year	Low/day		Mid/day		High/day	
	4% Inflation	6% Inflation	4% Inflation	6% Inflation	4% Inflation	6% Inflation
2024	$274,000		$575,400		$876,800	
2025	$284,960	$290,440	$598,416	$609,924	$911,872	$929,408
2026	$296,358	$307,866	$622,353	$646,519	$948,347	$985,172
2027	$308,213	$326,338	$647,247	$685,311	$986,281	$1,044,283
2028	$320,541	$345,919	$673,137	$726,429	$1,025,732	$1,106,940
2029	$333,363	$366,674	$700,062	$770,015	$1,066,761	$1,173,356

Source: Analyst estimates based on personal Communication with Observer Program staff and shoreplant observer providers

5.9.2.11 Shoreside Plant Observer Fees and Overhead: Bering Sea

The 2020 EM report to the Council indicated that there were 770 full coverage observer days at BS plants. That number increased to 1,599 in 2021, based on EM plant provider data. Using the 1,599 full coverage plant observer days reported in 2021 and the broad range of daily costs considered, the estimated annual costs for EM plant days are presented in Table 5-37 using the assumed range of daily costs presented in

Table **5-29**.

Table 5-37 BS plant observer costs based on 1,599 days and a range of cost per day

Year	Low/day		Mid/day		High/day	
	4% Inflation	6% Inflation	4% Inflation	6% Inflation	4% Inflation	6% Inflation
2024	$607,620		$655,590		$687,570	
2025	$631,925	$644,077	$681,814	$694,925	$715,073	$728,824
2026	$657,202	$682,722	$709,086	$736,621	$743,676	$772,554
2027	$683,490	$723,685	$737,450	$780,818	$773,423	$818,907
2028	$710,829	$767,106	$766,948	$827,667	$804,360	$868,041
2029	$739,263	$813,133	$797,625	$877,327	$836,534	$920,124

Source: Analyst estimates based on personal Communication with Observer Program staff and shoreplant observer providers

5.10 Cost Responsibilities and Funding Mechanisms

A thorough description of cost responsibilities and potential funding mechanisms are provided in Section 3.3 of the EA. That information is not repeated in the RIR.

5.11 Data quality

Information on changes in data quality is provided in Section 4.9 of the EA. Refer to that section of the document for a more detailed discussion. In summary, that section focuses on the impacts and changes to

the data collection structure, how the proposed program will reduce sources of bias, and reduce gaps that currently exist in the data. The reducing data gaps discussion provides a focus review of tender vessel deliveries to shoreside processors.

Finally, that section of the document addresses the targeting of observer coverage to address data needs that occur under the current structure or may arise under the Trawl EM program. Regulatory flexibility built into the Trawl EM and observer data collections system will aid in NMFS being able to adjust required coverage in the two structures to help alleviate data gaps and weaknesses.

5.12 Impacts on observer coverage in other partial coverage fleets

See section 4.9.1 of the EA (Impacts on the rest of partial coverage). In summary, that section states there is an expectation that the use of at-sea EM compliance monitoring paired with shoreside catch sampling will cost less per trip than current observer-based monitoring. If the cost of monitoring trawl EM trips is less than the cost for observed trips, then moving vessels from observed to trawl EM strata would result in lower costs for the same number of monitored trips, resulting in a potential increase in available funds that could be used elsewhere as determined through the ADP process. Increasing the number of observed trips results in an overall decrease in the numbers of biological specimens and data collected at-sea. Sample allocation across all strata will depend on available funding, sampling objectives and priorities, and analytic results.

If there are cost-savings under implementation of trawl EM, these cost savings will be used to ensure other sampling needs are met by prioritizing monitoring of sectors in the ADP. Prioritization may be based on sectors with high PSC bycatch, increased sampling in non-survey years, or responsiveness to acute management issues. The flexibility to respond to management needs depends on funds available that are in part determined by the relative cost of EM and changes in the cost of shoreside observers relative to at-sea observers.

Determining the balance between fixed gear EM, trawl EM, and at-sea observer coverage, and shoreside monitoring will depend on the sampling goals set annually in the ADP. Allocation of monitoring effort between these different strata will be balanced through the ADP process to ensure monitoring needs are met within the available budget. As a result, the number of vessels in the trawl EM stratum will vary between years depending on where monitoring effort needs to be focused.

5.13 Impacts on Observer Providers and Observers

Estimated changes of observer costs are provided in Section 5.9.1 and in Section 5.15, in terms of changes in costs to the fishing industry and many of those costs directly corresponds to changes in revenue for observer providers. In addition to direct changes in revenue, EM may raise concerns about employment impacts for observers and observer providers, especially when it is likely that at-sea observer sampling schemes will be scaled back with EM. These concerns could be realized in both the BS and GOA, but may be mitigated, depending on the providers business plan, by employing experienced observers for video review, fisher liaison, data processing and following up on anomalies in imagery (Michelin et al., 2018). However, if a firm did not want to include EM services in their business model, it could negatively impact revenue generated by the firm and employment within the firm for observers and other professional staff.

It is anticipated that additional observers will be needed to serve as plant observers at both BSAI and GOA plants, but fewer observers will be needed at-sea. Because the tradeoff of plant observers for at-sea observers is not one-to-one, it is likely that fewer full time observer positions will be available for support of the pollock industry. The exact number of jobs lost cannot be calculated, but depending on the number of vessels that elect to use EM it could impact 100 at-sea pollock positions or more while creating up to about 20 additional shoreplant observer positions.

5.14 Safety

The safety of members of the fishing industry and the observers that monitor those fisheries is of utmost importance. Individuals often work in conditions that are dangerous because of weather, machinery used in the fishing industry, and taxing working conditions. As a result, the most beneficial aspect of the trawl EM EFP was that observers were collecting data on a stable and safe platform. By moving observer sampling duties to shoreside processors they were able to sample without the safety concerns of sampling at-sea. Some shoreside processors do not have sampling areas that protect observers from the elements, and those types of issues can be addressed as the processors work with NMFS to create the CMCP.

While the pollock fishery is a relatively safe fishery by Alaskan fishery standards[48], it is still a challenging working environment. NIOSH developed the Commercial Fishing Incident Database (CFID) to track fatalities in the U.S. commercial fishing industry. The CFID contains information for each fatal event, including characteristics of the crewmembers and vessels involved. Much of the data are abstracted from US Coast Guard investigative reports. Data from CFID has allowed NIOSH and stakeholders to identify fishery- and region-specific risks and develop relevant prevention strategies. Since 2003, NIOSH's CFID contained nine reported incidents in the pollock fishery[49]. The most recent incident occurred in 2018.

Table 5-38 NIOSH CFID reported incidents in the pollock fishery

Incident Type	Fatalities	Year	Miles from Shore	Person Involved	Vessel Activity
Fatal Fall Overboard	1	2003	1	Crew	Transit Inbound
Fatal Fall Overboard	1	2007	0	Processor	Anchored
Fatal Fall Overboard	1	2007	0	Observer	Moored
Nonfatal Vessel Disaster	0	2009	0		Fishing
Fatal Fall Overboard	1	2011	5	Crew	Transit Inbound
Fatal Onboard Injury[1]	1	2014	94	Crew	Transit Outbound
Fatal Onboard Injury	1	2016	0	Crew	Moored
Fatal Onboard Injury[2]	1	2017	45	Crew	Unknown
Fatal Onboard Injury	1	2018	0	Observer	Moored

Source: NIOSH CFID data, 2022. Notes: 1 catcher/processor 2 Mothership

Replacing human observers on some pollock vessels could reduce the safety risks faced by these individuals. However, since 2003 the two reported incidents involving observers occurred while the CV was moored.

Depending on how the program is structured and the allowable uses of EM video, members of the industry may have concerns that use of footage could result in liability issues in the context of safety standards of work environment on-board (van Helmond, et al., 2020). This could be a concern for vessel owners if footage is used to monitor occupational health and safety regulations. This has been reported as more of a concern in fisheries without experience with EM (Plet-Hansen et al., 2017).

5.15 Summary of Impacts by Alternative

[48] https://meetings.npfmc.org/CommentReview/DownloadFile?p=6868abae-259a-41af-8946-0533fec230ca.pdf&fileName=B9%20NIOSH%20Report.pdf
[49] Personal communication with Samantha Case, NIOSH.

Based on the general trends from the information provided above, this section will provide a brief qualitative summary of the expected changes in costs and benefits by alternative. The change associated with each action alternative is compared to the No Action alternative. Quantitative estimates of changes in the cost and benefits under the alternatives are not provided because of the uncertainty associated with the change in costs under each alternative.

A summary table that provides a comparison of the impacts by alternative is presented first. For most issues that are discussed the impacts of selecting Alternative 2 or 3 will be the same. Often those cells are combined in the summary table. A section is then provided that focuses on the impacts of each alternative.

Table 5-39 Summary of Impacts by Alternative

Issue	Alternative 1	Alternative 2	Alternative 3
AFA Harvesters BS	Pollock harvesters will be required to have 100 percent observer coverage that is obtained by contracting with approved observer providers. Investments made in EM that are specific to the pollock fishery will be forgone.	BS harvesters will have the opportunity to select human observer coverage or EM to fulfill their full coverage at-sea monitoring requirements. Precise cost estimates of the difference in cost depends on many factors that make it impossible to provide a point estimate for the difference in cost of selecting one monitoring system or the other. However, based on the acceptance of the program under the Trawl EM EFP and the rough cost estimates provided in this analysis it is assumed that all or most of the BS fleet will utilize EM when the opportunity is provided under a regulated system.	
Harvesters GOA	Pollock harvesters will be required to have observers on vessels/trips that are selected under the ODDS program. Harvesters will continue to be required to pay their portion of the 1.65 percent ex-vessel fee to fund the partial coverage Observer Program. Investments made in EM that are specific to the pollock fishery will be forgone.	GOA pollock harvesters will have the opportunity to select human observer coverage or EM to fulfill their partial coverage at-sea monitoring requirements. The daily cost estimates for the GOA at-sea observers are about 3.5 times that of a BS at-sea day for a variety of reasons described in Section 5.9.1. Acceptance of the program under the Trawl EM EFP has not grown as rapidly in the GOA as the BS based only on changes in participation from 2020 to 2021. However, stakeholders in the GOA anticipate that all or most of the GOA vessel operators, including only those that fish the GOA pollock fishery will select EM under a regulated system. The impacts to GOA CVs and shoreplants taking deliveries of GOA pollock are expected to be the same under Alternative 3, Option 1 and Alternative 1 (no action).	
Processors AFA	AFA pollock processors will be required to have full observer coverage when processing AFA pollock. Plants that are processing	These processors will realize an increase in the number of observer plant days as it is anticipated that three or four observers will be required at each BS plant. AFA plants that are	

Issue	Alternative 1	Alternative 2	Alternative 3
	pollock harvested from the GOA will not be subject to full observer coverage if they are not also processing AFA at the same time. The number of observers in the plant could be reduced relative to the number needed under the Trawl EM EFP.	located in the GOA and tend to take fewer AFA deliveries will have fewer plant observers. Those observers will need to monitor all AFA offloads and select GOA pollock deliveries. A specific number of observers for each plant will not be defined in regulation to allow NMFS to adjust coverage to meet sampling needs as they may change. Also, under EM there is the potential to utilize cameras on sorting lines at the plant to potentially reduce the number of observers required. Overall, the increase in the number of observers needed is expected to increase costs for plant observers relative to the No Action alternative, but the increase in cost is relatively small compared to the value of the pollock fishery.	
Processors Open Access	Non-AFA processors would not be required to have observer coverage for pollock deliveries. They are currently only required to have observers to sample pollock and salmon delivered from trawl EM EFP trips, that program would expire and the observer coverage at the plant would no longer be required.	GOA processors would not be required to have plant observers to monitor open access pollock deliveries Under Alternative 3, Option 1 because the monitoring and sampling takes place at-sea by observers on the vessel. Under all other Action Alternatives the sampling responsibilities and salmon counts would be done at the plant on EM trips. The added plant observer requirements will increase plant observer costs relative to the No Action alternative. However, the improved salmon accounting and total cost savings of the program (by regulation processors pay half of the 1.65 percent ex-vessel observer fee) should benefit the shoreside processors.	
Tenders	Tender vessels would continue to operate as they do currently. They would not be required to carry an observer and the current salmon sampling procedure would continue.	Alternative 2 would allow tender vessels to use EM in the pollock fishery. This has mainly been utilized in the Western GOA where smaller CVs utilize tender vessels to deliver to reduce costs. Tender vessels are not currently required to have observer coverage so the addition of EM would increase monitoring costs. The	Alternative 3 would exclude tender vessels from using EM. The same salmon accounting that is used under the No Action alternative would continue under Alternative 3. While tender operators may avoid the relatively small increase in costs, it may have negative impacts on the fleet's salmon bycatch estimation. Stakeholders in the

Issue	Alternative 1	Alternative 2	Alternative 3
		increased costs would allow for better salmon bycatch estimation that could benefit the tender fleet if it prevents the fishery from closing early because of improved salmon bycatch estimates (especially if a few salmon as sampled that generates a high PSC rate that gets extrapolated over the sector) and provide managers more accurate data.	GOA anticipate that CVs that utilize tenders in their normal operations will opt out of the EM program if tenders are not included.
Communities	The communities that are home to the harvesters and processors would continue to benefit from expenditures by the fleets/processors/observers, income flowing into the community by residents that have jobs in the pollock fishery, and raw fish taxes, sales taxes, fuel taxes, bed taxes, etc. that provides benefits to the communities.	Communities impacts will be similar to the No Action alternative. The pollock fleets are expected to operate similarly to the No Action alternative and deliver to their historical processors. To the extent that EM providers and observer providers are located in different communities and are impacted differently under the program, it could have a modest positive or negative impact on those communities.	
Observer Providers	Observer providers will continue to provide about the same number of observer days, in aggregate, as they have in the past, all else being equal. They will bid for partial coverage contracts through the federal government and contract directly with pollock harvesters and processors in the full coverage, AFA fishery. The tight labor market may make staffing a sufficient number of qualified observers more challenging.	Observer providers that do not also provide EM support could be most negatively impacted by EM. They may have fewer observers working for them and bill fewer at-sea observer days. The increase in the number of plant days is not expected to offset the number of foregone at-sea observer days. It is more difficult to determine the impacts on firms that will provide services for both EM and human observers. For those firms it will depend on what services they provide and how well they are able to transition from providing human observers to the pollock fleet to also providing EM services.	
Observers	Observers will be hired and compensated by observer providers. About the same number of positions will be available at-sea and in plants as prior to the Trawl EM EFP. Tight	There are expected to be more plant observer positions and fewer at-sea positions available in the pollock fishery. Overall, the number of observer days is expected to decline. It is not currently known what the requirements or pay grades will be for plant observers. They could	

Issue	Alternative 1	Alternative 2	Alternative 3
	labor markets and overall inflation may result in increased wages.	be similar to at-sea observer rates or plant observers may require special training that could increase the daily compensation rate. The labor market impacts described under the No Action alternative also apply under these alternatives.	
EM Providers	EM providers will not be able to offer EM services to the pollock fisheries. They will lose some revenue that had been generated under the Trawl EM EFP.	EM providers will have a larger and likely stable market for their services. The AFA pollock shoreside fishery has functioned well since the early 1990s and is expected to continue to function well. EM providers will be able to offer equipment, services, and software to the fleet and expand their current market. EM service providers that also provide human observer services may or may not benefit from the program. How they are positioned in each program will determine whether they benefit or not.	
Pollock Resource	The pollock resource will not be impacted by the action. Full accounting of pollock harvests will be conducted using the current methodologies. Haul-by-haul data can continue to be collected by at-sea observers and they can continue their current biological sampling protocols.	EM trips will no longer collect haul-by-haul data. This loss of information is described in more detail in Section 4.2.3 of the EA. Overall, it is not anticipated to have a negative impact at the level that will compromise the overall quality of the data used for management of the resource.	
Salmon Resource	Salmon bycatch estimates will continue to be conducted as they have been. Census counts will be taken at plants when an observer is present and sampling methodologies will be employed for tender deliveries and unobserved plant deliveries. Applying estimates to unobserved deliveries in the GOA can result in estimates that are less accurate than complete enumeration of salmon.	Salmon accounting is expected to be improved as a result of census counts of salmon in all AFA and for selected trips in GOA pollock fisheries (if EM is selected for the tender sector). Complete enumeration of salmon will reduce/eliminate the need to apply samples from a subset of vessels' harvests to all unobserved vessels harvesting pollock in that area and vessel class. Given the importance of salmon, better accounting for salmon PSC in a cost-effective manner is a primary goal of the proposed EM program.	
Other Fisheries	The impacts on other fisheries are primarily due observer coverage levels that can be funded under the fee collection system. Changes in the fee percentage or the ex-vessel values of fisheries in partial coverage will impact the number of observer days that are available. The number of days could increase or decrease	Impacts on non-target species are described in Section 4.3.3 of the EA. In summary, changes haul-level effort and fishing location information for will likely have little impact on stock assessments for Pacific cod and Pacific ocean perch, as long as catch can be identified to the NMFS management area resolution.	

Issue	Alternative 1	Alternative 2	Alternative 3
	depending on fees generated and future observer contracts.	Alternative 2 has the potential for increased accuracy of large shark catch estimates from the pollock pelagic trawl CV fleet. The shark stock complexes are managed at the FMP level and haul level versus trip level data are not a concern. The data recorded in the trawl EM logbooks will provide new information for this stock assessment. The inclusion of tender vessels is not a concern for this stock assessment. There are likely no affects to sharks from Alternative 3, Option 1 (BS only) because about 50 percent of large shark catch in the pollock pelagic trawl fleet results from CVs, which are all full coverage. The GOA is the area that will likely have the greatest effect on the shark stock complex assessment. All of the large shark catch in the pollock pelagic trawl fleet in the GOA is from CVs, which are partial coverage. Most of the large shark catch since the beginning of the trawl EM EFP has come from vessels in that program. Therefore, Alternative 3, Option 2 (BS and GOA) may result in more accurate estimates of catch, as well as advancements in the data available for stock assessment. Other fisheries in the partial coverage category are expected to benefit as a result of lower monitoring costs in the GOA pollock fishery under the assumption that EM costs are lower than observer coverage costs. Any cost savings would be used according to the monitoring priorities and sampling effort allocation under the ADP, potentially increasing the number of observer days in other partial coverage fisheries. Nothing in the program is expected to reduce ex-vessel value of the pollock fishery, so Observer Program fees collected are not anticipated to be negatively impacted by implementing trawl EM on the pollock fisheries.	
Safety	The BS and GOA pollock fisheries have historically been safe fisheries. The safety of observers and crew will continue to be of paramount importance.	Improvements in safety would be associated with having fewer observers at-sea. However, because the trawl CV pollock fisheries have been relatively safe, the improvements are likely small. In terms of fatal accidents involving observers, only two have occurred since 2003 and those both were while the vessel was moored.	

Issue	Alternative 1	Alternative 2	Alternative 3
Overall Costs of Coverage	The cost of observer coverage is expected to be about the same under the No Action alternative. It is assumed that there would be some changes as a result of the EFP expiring in the future. Partial coverage fleets will continue to pay the ex-vessel fee (could be modified in the future but is not foreseen at this time) and the AFA pollock sector will use the pay-as-you-go model. Inflation, new observer contracts, and other external factors will have the greatest impact the overall coverage costs.	Overall costs are expected to decline for BS CV operators. The amount of the decline will be determined by the difference in future costs of at-sea days and EM days. Plant observer costs are expected to increase at plants that are in the full coverage category when taking AFA deliveries. Plants that take deliveries of fish harvested in the GOA will be required to have more observer coverage for pollock deliveries, but it will be funded by the observer fee on ex-vessel landings. These plants will also be required to have a CMCP for the program since they will now have plant observer coverage. CVs harvesting GOA pollock will be required to pay the ex-vessel fee and that fee will cover certain EM costs or human observer coverage. Tender vessels that may elect to have EM coverage will be covered by the ex-vessel fee, but will be an additional cost. Overall, the costs of allowing vessels to voluntarily select EM is expected to reduce total monitoring costs.	

5.15.1 Alternative 1, No Action

The No Action alternative would maintain the current monitoring structure for the BS and GOA pollock fisheries. EM would not be authorized for CVs or tenders in the pelagic pollock trawl fleet. While Alternative 1, is technically status quo, in terms of regulations, given the ongoing EFP work, there would be impacts and changes associated with not allowing EM for CVs or tenders in the pelagic pollock fleet. Current participants in the EFP would return to using human observers and EM systems would no longer be authorized for monitoring. This represents a loss in value for vessels that do not participate in other EM programs (such as the pacific whiting fishery) and have no other use for their camera systems.

Not allowing EM to be used in the North Pacific pollock fisheries creates sunk costs associated with the EFP work incurred and new costs in terms of loss of trust in process and deteriorating relationships may result. Loss of potential cost savings of EM EFP development may result in higher costs for monitoring relative to the costs realized by some vessel operators in 2020, 2021, and 2022.

AFA deliveries of pollock would be monitored at the plant and on the CV, with full observer coverage required at both the plant and on the vessel. The plants and CV operators contract with an approved observer provider for coverage. Compensation levels for observer coverage is negotiated between the vessels/plants and the observer provider. In 2020, 154 vessels and processing facilities were billed for observer coverage in the full coverage category. The total number of observer days represented by these invoices in 2020 was 39,039. The average “fully-loaded” cost per day of observer coverage in the full coverage category in 2020 was $375, for a total cost of more than $14.6 million. This coverage allowed all salmon to be counted for accurate estimates of salmon bycatch. It is expected that under the No Action alternative that increasing labor, travel, and other overhead costs will result in the total cost of observer coverage increasing, all else being equal. Cost increases for future years are not estimated, but the analysis does note that the cost-per-day in 2020 was less than 2019, which may be in part due to inefficiencies resulting from addressing COVID issues.

Pollock harvested from the GOA is monitored under the partial coverage category for CVs. Shoreside processors and tender vessel would not be required to have observer coverage for the pollock fishery, since it is an open access fishery. Observer coverage levels for GOA CVs is determined in the ADP and coverage by vessel and trip is done through the ODDS. Vessels in the GOA operating in the partial coverage Observer Program would continue to pay the observer fee and would be placed back into the trawl observer coverage strata. The overall impacts on deployment rates in different partial coverage strata are uncertain and discussed further in Section 4.9.1 of the EA. Allocation of monitoring effort between the different strata will be balanced through the ADP process to ensure monitoring needs are met within the available budget. Factors that will be taken into account will include budget, monitoring priorities under the ADP, and other current issues as appropriate. For example, in a GOA non-survey year the ADP may allocate additional sampling effort to at-sea data collections. The coverage rates for 2021 was established at 16 percent for the trawl CV sector fishing in the GOA. CV operators and shoreside processors are required to pay a percentage (currently 1.65 percent) of the pollock ex-vessel value to fund observer coverage. Paying a percentage of landed value helps distribute the cost so that only the operators of vessels that are selected for coverage do not have to pay the entire fee. As reported in the North Pacific Observer Program Annual Report, in 2020, the average cost per observer sea day in the partial coverage category was $1,381 (based on the cost of $2,729,486 for 1,977 observer days). This funding was collected under the 1.25 percent fee and is expected to increase under the revised fee percentage.

Salmon bycatch estimates in the partial coverage fleet are derived from a statistically determined sampling protocol. That methodology will continue unless modified. Deliveries to tender vessels have been noted as a potential weakness in this method since observers do not sample tender deliveries as there is no guarantee that the catch is unsorted, and the deliveries may carry fish from more than one vessel. Potential gains in data quality as discussed in Section 4.11 of the EA will not be realized.

The pollock fishery has been relatively safe for both harvesters and observers. BS pollock is harvested under a LAPP that allows vessels greater flexibility to avoid bad weather conditions. GOA pollock fisheries have been harvested under voluntary catch share plans some years/seasons that also allowed participants to avoid bad weather conditions. As a result, there have been no crew or observer fatalities in the fisheries since 2017.

Providers of at-sea observers will have more billable days (gross revenue) if the EFP lapses and EM is not implemented. This could benefit providers that focus on providing human observers and are not involved in providing EM services. Providers of EM services under the EFP would lose that revenue and depending on their business model may be unable to recoup that revenue by providing human observers for the pollock fishery.

5.15.2 Alternative 2, Electronic Monitoring implemented on vessels (both catcher vessels and tenders) in the Bering Sea and Gulf of Alaska

EM would be implemented for both CVs and tenders on a voluntary basis in the BS and GOA pollock fisheries. Implementing EM allows CV operators to replace human observers with an approved EM system to monitor compliance with retention requirements. In the BS pollock fishery, when a vessel has EM they would not be required to carry an observer on every AFA pollock trip. Depending on the actual cost difference in observer pay-as-you-go, observer days, and EM daily costs the CV operator could reduce costs. The acceptance of the EM EFP and expansion in participation year to year in the BS indicates that the CV operators are realizing cost savings under the EFP. The actual cost savings that will be realized with Alternative 2 are uncertain and depend on numerous factors including changes in observer costs, program design, scope and scale. In the GOA, EM replaces a vessel being selected for coverage under the ODDS program.

Potential cost savings based on current EFP are derived from replacing at-sea observers with EM. Plant monitoring costs will increase under EM in both the BS and GOA, as the number of plant observers

needed to cover the increased responsibilities that had been borne by at-sea observers are shifted to the plants. Additional costs of EM coverage on tender vessels would be direct cost increases, since they are currently exempt from observer coverage.

Table 5-40 is provided to summarize the costs that have been presented throughout this analysis (rounded from estimates reported in previous tables) and to provide a comparison of Alternative 1 and Alternative 2 costs in terms of general direction of the different broad cost categories. Note that these costs of EM do not include the one-time costs of purchasing and installing EM equipment for new vessels. Because of the uncertainty associated with the estimates, caution should be used when comparing the specific cost values. The intent of the table is to indicate that there are expected cost savings associated with moving to a regulated EM program. As stated throughout the document, there are many factors that make direct comparisons of costs between the No Action and Action Alternatives problematic, but there are anticipated cost savings. For example, as more vessel operators utilize EM, at-sea observer costs will decrease and EM costs will increase (in a non-linear fashion) and shoreplant observer costs will increase. EM costs increase in a non-linear fashion due to efficiencies associated with economies of scale. For example, a person that provides support for EM vessels may be able to support six vessels, and if they are currently only supporting four vessels the current cost per vessel would be greater than under an expanded program.

Costs associated with shoreside observers should be considered rough estimates. The analysis notes that the number of shoreplant observers will increase with the implementation of EM. An exact number of observers per plant would not be defined in regulation, so that the number could be changed to meet monitoring goals and objectives that may change over time. In the summary table, it is assumed that the shoreside plant observer costs would double under Alternative 2 relative to the Status Quo. The actual difference between the two estimates could be higher or lower, depending on the number of plants that take deliveries from CVs in the EM program, the number of observers at the plant, and the actual cost per shoreside observer day.

Table 5-40 Comparison of Alternative 1 and Alternative 2 Costs

Estimated costs of Alternative 1 (for effort associated with 2021 trawl EM EFP)

Description	Area	Low Estimate	High Estimate
Partial coverage at-sea Observer Cost	GOA	$172,000	$524,000
Full coverage at-sea observer cost	BS	$1,140,000	$1,750,000
Full coverage shoreside monitoring cost	BS	$304,000	$344,000
Total	BS and GOA	$1,616,000	$2,618,000

Estimated costs of 2021 trawl EM EFP (Alternative 2 at EFP level of effort, scope, scale)

Description	Area	Low Estimate	High Estimate
ongoing EM costs (does not include one-time equipment costs)	BS and GOA	$392,000	$392,000
partial coverage shoreside monitoring cost	GOA	$274,000	$877,000
full coverage shoreside monitoring cost	BS	$608,000	$688,000
Total	BS and GOA	$1,274,000	$1,957,000

Source: Summary of costs presented in Section 5.9 of the RIR

Given these tradeoffs, the EM program is expected to expand (given discussions with industry, there is the potential for all operators in the BS to join the program as well as numerous, if not all operators in the GOA) if the regulated program is implemented. Expansion of the program could reduce average EM cost per day as the fixed costs are spread over more participants. It is noted that some cost categories change in a stair-step fashion, and those costs would not change until a certain threshold is reached.

Processing plant operators will be required to have more plant observer days. The actual number of plant observer days for future pollock fisheries is not estimated in this paper. However, In the GOA there were 548 EM days reported. Those days would not have been required without EM. Given the range of daily rates assumed for the GOA fishery, these days would cost from a range of about $275,000 to $875,000. These days would be paid for by the 1.65 percent observer fee collected on partial coverage deliveries. The broad range of projected costs reflects the uncertainty in the what the future costs will be under EM.

Salmon bycatch accounting would be improved. The sampling and enumeration method to account for salmon PSC will not change for GOA CVs delivering shoreside. However, the fact that all trips in the EM strata will have 100% EM review for discards at sea and are then randomly selected for shoreside sampling after the trip has occurred has the potential to reduce bias and improve data quality. Additionally, a complete enumeration of salmon would occur for selected tender offloads, replacing estimates derived from at-sea sampling improving the sampling selection by being both more random and representative. Given the cultural and economic importance of both Chinook and other salmon, accurate accounting of salmon bycatch is important. Salmon bycatch issues continue to be elevated in importance among policy makers, fishery managers, salmon fishers, and other stake holders. Making census counts of all salmon delivered by verifying at-sea discards do not occur would benefit the resource, management, and the public perception of the accuracy of salmon bycatch accounting in the pollock fisheries.

As noted under the No Action alternative the pollock fishery has historically be relatively safe. Implementing EM will reduce the number of observers that are deployed in the pollock and reduce their exposure to risk. This would be a benefit of the program as safety is a high priority.

Observer providers that only provide human observers are expected to lose revenue and EM-only providers' revenue is anticipated to increase. The analysts do not have access to future business plans for that various firms involved and do not project which firms will or will not benefit. Given the importance of the pollock fishery to observer providers the action taken could have significant impacts on individual businesses.

5.15.3 Alternative 3, Electronic Monitoring implemented on catcher vessels delivering pollock harvested from the BS and/or GOA to shoreside processors (CVs only, no tenders).

Alternative 3 gives the Council the flexibility to allow EM only in the BS (option 1) or in the BS and GOA (option 2). It also excludes tender vessels from the EM program. The exclusion of tenders would have the greatest impact on western GOA vessels (applies primarily to Option 2) because tenders only consistently operate in the GOA. However, the analysis has not found compelling reasons to exclude sectors based on the information provided to date. The Council's consideration of public testimony and other input may uncover some additional issues that warrant excluding pollock sectors from trawl EM. Overall, the costs are not expected to change dramatically if sectors are excluded, but benefits in data quality and good-will with stakeholders could be lost.

Under Alternative 3, Option 1 - EM would be implemented only on CVs operating in the BS. For CVs that operate only in the BS (do not operate in the GOA), this Alternative would be functionally equivalent to Alternative 2, because tenders are traditionally not used in the BS pollock fishery. For vessels that operate in both areas they would still need to have observer coverage for the GOA pollock fishery even though they may have already paid for an EM system to be installed and operating on their vessel. As shown in Table 1.6, 11 percent of the 114 CVs that participated in the EFP during 2021 used EM in both areas. These vessels, and likely more, would lose that opportunity.

Stakeholders from both the GOA and BS fleets have participated in the development and management of the EFP. Not allowing the GOA fleet to participate in the program could damage BS participants and policy makers relationships with GOA participants that have invested time and money into making EM work in their area.

Losses in efficiency are associated with defining a regulated program that excludes portions of the existing participants in the EFP. This relates back to lessons learned in the development of EM programs. Studies referenced in Section 5.5 have recommended a broader versus narrower approach when implementing an EM program. A broader approach reduces analysis and regulatory changes that would be required in the future to add more segments of the pollock fleet. This would increase costs to the stakeholders and the agency.

Alternative 3, Option 2 – would also result in losses in efficiency associated with defining a regulated program that excludes portions of the existing participants in the EFP. This option would eliminate potential increases in data quality by not including tenders. Allowing tender vessel to participate in the program and associated improvements in salmon bycatch data is thought to be a substantial benefit of the program. It would also damage relationships with EFP managers/participants who have worked hard to make tender participation viable in the EM program. The greatest impact would be on the small CVs that utilize tender vessels in the western GOA as well as vessels and processors that may be impacted if the data quality improvements would have resulted in fewer fishery closures due to salmon bycatch limits.

It is anticipated that there will be a minimal change in costs relative to Alterative 2 as the additional costs to tenders involve tender EM systems, which are reported to be less expensive (and can be moved between tender vessel) than CV systems (as they often have fewer cameras and require no control center to monitor gear deployment). Video review of CV offloads to the tender vessels is also reported to be a relatively minor cost. All other costs associated with EM still exist, however participation of western GOA vessels may decline, based on conversations with program participants, if tenders are not included in the regulated program. It was noted that CVs whose normal operations require tenders will not participate if tender vessels are excluded from the program.

5.16 Summation of Alternatives with Respect to National Net Benefits

It is anticipated that all of the alternatives that provide vessel owners the option of using EM would result in positive net benefits to the Nation through increased producer surplus and better accounting of chinook and other salmon species. Better accounting of salmon is anticipated in the GOA because 1) potential biases are removed and the sampling will be more random and representative, 2) the observer coverage rate set through the ADP will appropriately balance monitoring priorities set by NMFS and the Council for the partial coverage category, and 3) if tender vessels are included under Alternative 2 the shoreside plant observer will oversee a complete enumeration of all salmon delivered on the pollock trip versus the samples that were collected at-sea. BS accounting of salmon will remain about the same with complete accounting of salmon at the full coverage plants. This section will be completed after the Council selects a preferred alternative.

5.17 Paperwork Reduction Act

This section provides a summary of the estimated costs and time burdens required to complete new and revised data submissions for the proposed Trawl EM program as well as a summary of the information needed to complete the submissions. Each of the listed data collections will require a new Office of Management and Budget (OMB) approval for the burden on the public or revising an existing OMB burden approval as required under the PRA.

Data are collected by NMFS to monitor the pollock fishery and determine salmon bycatch. The agency must comply with the Paperwork Reduction Act (PRA) requirements when collecting these data.

The PRA requires that agencies estimate burden to understand what is involved for the public to comply with an information collection. Burden includes the value of both the time and the effort required to fulfill an information collection along with the financial cost. Some common burden activities include:

- Reviewing instructions,
- Compiling materials necessary for collection,
- Acquiring, installing, and utilizing technology and systems,
- Adjusting existing ways to comply with previous instructions and requirements,
- Searching data sources,
- Completing and reviewing collected information, and
- Compiling and sending information.

The agency is required to include the number of respondents, the frequency of response, and the total number of burden hours per year. To value all personnel burden hours, labor is supposed to be grouped by clerical and other unskilled workers, skilled-labor (including craft-labor and other technical workers), professionals and managers, and executives. All wages for these groupings must reflect the full cost of labor, including benefits. The Bureau of Labor Statistics' wage data will be used as the estimate unless better information is available to value those hours. The estimates will also be consistent with other current data submissions that collect similar data. For example, it is anticipated that the time and costs to comply with logbook submissions will be similar to other PRA time and costs estimates in place for other similarly situated sectors completing logbooks.

Data collections that fall under the PRA requirements in the Trawl EM program may be grouped into two classes. The first is new data collections that result directly from the Council's Trawl EM program. The second is modification of existing data collections that are currently approved under the PRA requirements.

Two electronic reporting systems that are used in Alaska fisheries are eFISH and eLandings. eFISH is a public web application that provides information and services to harvesters and processors in the following management programs or groups: IFQ, Crab Rationalization, CDQ Groundfish, GOA Rockfish, A80, and AFA. It maintains information such as quota account balances and transfers; eLandings provides industry with the ability to submit landing reports, which in turn generates fish tickets that document IFQ fisher/processor quota harvest, and processor production information from a single application. Both of these web-based applications are anticipated to be used to implement and manage the BS and GOA pollock fisheries.

Information to Aid in Completing Supporting Statement Part A **(Justification)**

The new or expanded data collections are necessary to implement, monitor and enforce the proposed Trawl EM program for the pollock fishery. Data collections are necessary to track the quota issued under the program to ensure that all harvest, processing, ownership, and use limits are adhered to by program participants. The data are not available from other sources and the benefits derived from participation in the program are expected to outweigh any additional data collection costs that are incurred by program participants and the Alaska Region.

New and revised data collections that will include:

- An annual application to opt into the EM program;
- Appeal if application to participate in EM is denied;
- Trip registration in ODDS (EM or other trip type) – add BS and include GOA;
- Develop and approval of a vessel monitoring plan (annual but may be edited during the year if necessary), developed by the CV operator and EM provider and sent to NMFS has completed the plan;
- Require that specific information is recorded in logbooks regarding EM trips;
- Vessels less than 60ft. LOA would be required to have and complete a logbook for EM trips;

- Shoreplants in the GOA would be required to develop and submit a CMCP (may only require plants that currently receive deliveries under the CGOA Rockfish Program to modify their current CMCP; and
- Complete a delivery notification form (likely web based).

THE REMAINDER OF THIS SECTION WILL BE COMPLETED AFTER THE COUNCIL SELECTS ITS PREFERRED ALTERNATIVE.

5.18 Affected Small Entities

Section 603 of the Regulatory Flexibility Act (RFA) requires that an initial regulatory flexibility analysis (IRFA) be prepared to identify whether a proposed action will result in a disproportionate and/or significant adverse economic impact on the directly regulated small entities, and to consider any alternatives that would lessen this adverse economic impact to those small entities. NMFS prepares the IRFA in the classification section of the proposed rule for an action. Therefore, the preparation of a separate IRFA is not necessary for the Council to recommend a PA. This section provides information about the directly regulated small entities that NMFS will use to prepare the IRFA for this action if the Council recommends regulatory amendments.

This section also identifies the general nature of the potential economic impacts on directly regulated small entities, specifically addressing whether the impacts may be adverse or beneficial. The costs and benefits of each alternative is addressed in the impact analysis sections of this RIR and is not repeated in this section, unless the costs and benefits described elsewhere in this RIR differs between small and large entities.

Identification of Directly Regulated Entities

The alternatives would directly regulate owners and operators of harvesters and processors that participate in the BSAI and GOA shoreside pollock fisheries including trawl CVs and shoreside processors. This action may also impact observer and EM providers that support the pollock fisheries, but they are indirectly impacted. Observer may also be indirectly impacted. Observers are individuals so they do not meet the Small Business Administration (SBA) definition of a small entity. Therefore, neither observer providers nor observers are considered directly regulated entities in the IRFA prepared for this action.

Count of Small, Directly Regulated Entities

The RFA recognizes and defines three kinds of small entities: 1) small businesses, 2) small non-profit organizations, and 3) small government jurisdictions. Small entities that might be directly regulated by this action would be harvesting or processing entities (LLP license owners and/or vessel owners) that fall into the "small business" category and tender vessels that CVs use to deliver pollock to shoreside processors.

A small business includes any firm that is independently owned and operated and not dominant in its field of operation. Businesses classified as primarily engaged in commercial fishing are considered small entities if they have $11 million in annual gross receipts for all businesses in the commercial fishing industry (NAICS[50] 11411). Based on that definition a total of X[51] trawl CVs, and X tender vessels would be considered small entities. Catcher processors are not directed regulated by this action.

The SBA's final rule (81 FR 4469, February 26, 2016) modified the size standard for "seafood product preparation and packaging" (NAICS code 311710) that applies to seafood processors. SBA's final rule modified the definition of a small entity operating as a seafood processor to include all entities that are

[50] North American Industry Classification System
[51] Numbers will be clarified during final action once the Council has chosen a preferred alternative.

independently owned and operated, not dominant in their field of operation, and have a combined annual employment of fewer than 750 employees. Of the plants that took deliveries of pollock from CVs from 2019 through 2021 that are currently, X firms would be considered a small entity.

The RFA defines "small governmental jurisdiction" as the government of a city, county, town, school district or special district with a population of less than 50,000. Small governmental jurisdictions are not directly regulated under the proposed action.

Impacts to Small, Directly Regulated Entities

The alternatives and associated costs and benefits are fully described and analyzed in this RIR. Based upon the best available scientific data, and consideration of the objectives of this action, it appears that there are no alternatives to the Preferred Alternative that have the potential to accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that have the potential to minimize any significant adverse economic impact of the proposed rule on small entities. TO BE COMPLETED WHEN A PREFERRED ALTERNATIVE IS SELECTED.

6 Magnuson-Stevens Act and FMP Considerations

6.1 Magnuson-Stevens Act National Standards

Below are the 10 National Standards as contained in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). In recommending a preferred alternative at final action, the Council must consider how to balance the national standards.

A brief discussion of this action with respect to each National Standard will be prepared for final action.

National Standard 1 — Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

National Standard 2 — Conservation and management measures shall be based upon the best scientific information available.

National Standard 3 — To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

National Standard 4 — Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be; (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

National Standard 5 — Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

National Standard 6 — Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

National Standard 7 — Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

National Standard 8 — Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of National Standard 2, in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

National Standard 9 — Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

National Standard 10 — Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

6.2 Section 303(a)(9) Fisheries Impact Statement

Section 303(a)(9) of the Magnuson-Stevens Act requires that a fishery impact statement be prepared for each FMP or FMP amendment. A fishery impact statement is required to assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for (a) participants in the

fisheries and fishing communities affected by the plan amendment; (b) participants in the fisheries conducted in adjacent areas under the authority of another Council; and (c) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery.

The EA/RIR prepared for this plan amendment constitutes the fishery impact statement. The likely effects of the proposed action are analyzed and described throughout the EA/RIR. The effects on participants in the fisheries and fishing communities are analyzed in the RIR. The effects of the proposed action on safety of human life at sea are evaluated under National Standard 10, in Section 6.1. Based on the information reported in this section, there is no need to update the Fishery Impact Statement included in the FMPs.

The proposed action is relevant to the pollock pelagic trawl fishery in the EEZ off Alaska, which is under the jurisdiction of the North Pacific Fishery Management Council. Impacts on participants in fisheries conducted in adjacent areas under the jurisdiction of other Councils are not anticipated as a result of this action.

6.3 Council's Ecosystem Vision Statement

In February 2014, the Council adopted, as Council policy, the following:

Ecosystem Approach for the North Pacific Fishery Management Council

Value Statement

The Gulf of Alaska, Bering Sea, and Aleutian Islands are some of the most biologically productive and unique marine ecosystems in the world, supporting globally significant populations of marine mammals, seabirds, fish, and shellfish. This region produces over half the nation's seafood and supports robust fishing communities, recreational fisheries, and a subsistence way of life. The Arctic ecosystem is a dynamic environment that is experiencing an unprecedented rate of loss of sea ice and other effects of climate change, resulting in elevated levels of risk and uncertainty. The North Pacific Fishery Management Council has an important stewardship responsibility for these resources, their productivity, and their sustainability for future generations.

Vision Statement

The Council envisions sustainable fisheries that provide benefits for harvesters, processors, recreational and subsistence users, and fishing communities, which (1) are maintained by healthy, productive, biodiverse, resilient marine ecosystems that support a range of services; (2) support robust populations of marine species at all trophic levels, including marine mammals and seabirds; and (3) are managed using a precautionary, transparent, and inclusive process that allows for analyses of tradeoffs, accounts for changing conditions, and mitigates threats.

Implementation Strategy

The Council intends that fishery management explicitly take into account environmental variability and uncertainty, changes and trends in climate and oceanographic conditions, fluctuations in productivity for managed species and associated ecosystem components, such as habitats and non-managed species, and relationships between marine species. Implementation will be responsive to changes in the ecosystem and our understanding of those dynamics, incorporate the best available science (including local and traditional knowledge), and engage scientists, managers, and the public.

> The vision statement shall be given effect through all of the Council's work, including long-term planning initiatives, fishery management actions, and science planning to support ecosystem-based fishery management.

In considering this action, the Council is being consistent with its ecosystem approach policy. This action expands the tools available for appropriate and conservative monitoring of fishing activities, and improves data collection of PSC. This is directly supportive of the Council's intention to provide best data possible for scientists, managers, and the public in order to ensure sustainable fisheries for managed species and their effects on associated ecosystem components.

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