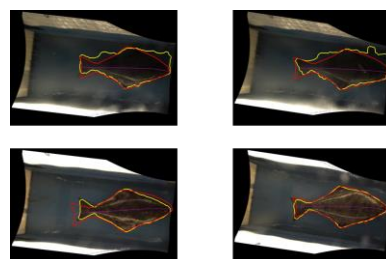
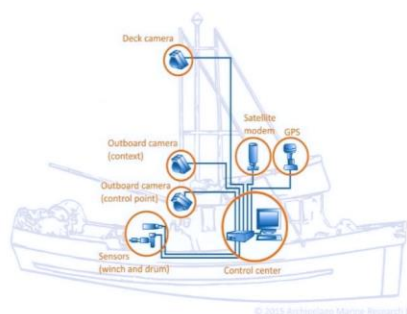


Alaska Region Electronic Technology Implementation Plan

Draft

January 28, 2021



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1. Introduction

The National Marine Fisheries Service (NMFS) is committed to the use of appropriate electronic technologies to collect timely, cost-efficient data needed to manage US federal waters fisheries. In 2015, NMFS finalized the Alaska Region Electronic Technologies Implementation Plan (NMFS 2015) to meet the milestone outlined in NMFS Policy Directive 30-133,¹ Policy on Electronic Technologies and Fishery-Dependent Data Collection. The 2013 Policy Directive called for the development of Regional Electronic Technology Implementation Plans to address regionally specific fishery dependent data collection issues and electronic technologies to address these issues. In 2018, NMFS finalized the Amendment to the Alaska Region Electronic Technologies Implementation Plan (NMFS 2018b) to update the 2015 plan.

In Alaska, NMFS and the North Pacific Fishery Management Council (Council) have been on a path of integrating electronic technology into fisheries monitoring programs for many years. The Alaska Region has Electronic Reporting (ER) systems in place for landing reports (also referred to as “fish tickets”), logbooks, and observer information. Additionally, we have implemented a variety of monitoring tools like motion-compensated flow scales and Vessel Monitoring Systems (VMS).

In the last five years, the Alaska Region has continued to improve monitoring through testing and implementing electronic monitoring (EM) in Alaska fisheries. In 2018, NMFS completed a significant milestone in the Alaska Region Electronic Technologies Implementation Plan by implementing regulations to allow EM as an alternative monitoring option to carrying an observer for catcher vessels using fixed gear² in the partial coverage category of the North Pacific Observer Program (50 CFR § 679.51). After the implementation of EM in the fixed gear fleet, the Council shifted the focus of the EM Workgroup to developing EM for use in the trawl fisheries. Due to the continued work by the Council and industry partners, NMFS issued an Exempted Fishing Permit (EFP) in January 2020 for evaluating the use of EM on pelagic trawl catcher vessels. The two-year EFP evaluates the efficacy of EM systems and shoreside observers for pollock catcher vessels using pelagic trawl gear in the Eastern Bering Sea and Gulf of Alaska. The EFP combines EM systems to 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 implementation and testing of EM programs combined with iterative improvements to existing ER programs help advance the improved monitoring goals set forth by the Council and NMFS.

¹ NMFS Policy Directive 30-133 was renumbered to 04-115 in 2019. Available at: <https://www.fisheries.noaa.gov/national/laws-and-policies/science-and-technology-policy-directives>

² Fixed gear includes hook-and-line and pot (trap) gear

2. Strategic Direction 2020 – 2025

2.1 Vision

To carry out the responsibilities for conserving and managing groundfish resources, the Council and NMFS require high quality, timely, and cost-effective data to support management and scientific information needs. Our vision is a comprehensive, integrated, and adaptable monitoring program for the groundfish and halibut fisheries off Alaska that enables verification of catch composition and quantity, including those species discarded at sea, and collection of biological information on marine resources. This holistic and adaptive program integrates at-sea and shoreside information from observers and a range of electronic monitoring and reporting technologies to achieve the necessary fishery-dependent information for the least cost.

2.2 Goals and Objectives

At the direction of the Council, NMFS created a strategic plan for EM and ER in the North Pacific (Loefflad et al. 2014). This plan was presented to the Council in April 2013. In June 2013, the Council adopted the strategic plan as a guidance document for incorporating EM into the Observer Program and created an EM workgroup that spearheaded the development of EM in the fixed gear sector. The strategic plan outlined the following goals and objectives:

- Goal I: NMFS has the infrastructure and regulatory requirements to support EM/ER operations
 - Objective 1: Communicate through planning documents and processes
 - Objective 2: Dedicate resources to support EM/ER data acquisition, post-processing, and integration
 - Objective 3: Continue to develop the regulatory framework to implement EM/ER requirements
 - Objective 4: Secure funding to advance EM/ER technologies and use
- Goal II: NMFS is advancing cost-effective EM/ER capabilities through science-based studies and technological developments
 - Objective 1: Conduct scientific research to advance the science of monitoring and data integration
 - Objective 2: Reduce costs by gaining efficiencies (e.g through data processing and/or improving data quality)
 - Objective 3: Understand all aspects of costs associated with EM technology integration, implementation, and processing
- Goal III: NMFS has a cost-effective, adaptable and sustainable fishery data collection program that takes advantage of the full range of current and emerging technologies
 - Objective 1: Implement EM/ER technology where appropriate and cost-effective to improve catch estimation and better inform stock assessments
 - Objective 2: Implement EM/ER technology where appropriate and cost-effective to enhance compliance monitoring
 - Objective 3: Improve procedures, methods or technology to enhance quality of EM data
- Goal IV: The Council and NMFS leverage global EM/ER developments while sharing Alaska perspectives with others

- Objective 1: Learn from the experience of others
- Objective 2: Influence and inform monitoring policies

A consistent theme throughout these goals is the focus on cost effective monitoring. In Alaska, the fishing industry pays (either directly through “pay as you go” or through landing fees) for the cost of both electronic monitoring and observers. Achieving cost-efficiencies continues to be a high priority for the fishing industry, the Council, and NMFS in order to meet the region’s many fishery management objectives.

Substantial progress has been made toward meeting the objectives identified in the Strategic Plan and this work has been accomplished through collaborative efforts with the Council, industry, stakeholders, and agency. The priorities identified in section 3 will continue to work toward these five goals.

2.3 Principles Guiding ET Development and Implementation

Through the implementation of ET and the Observer Program, the Council and NMFS have identified a number of principles that are important to successfully monitor the fisheries off Alaska (Table 1). These principles provide direction for NMFS and the Council in developing ET, guide decision making, and establish standards for assessing proposed actions.

Table 1. Summary of monitoring principles identified by NMFS and the Council and examples of data collection and ET program elements that support these principles.

Monitoring principles	Examples (not a comprehensive list) of how the monitoring principle have been incorporated into existing monitoring programs
Through monitoring, gather statistically reliable fishery dependent data to support management.	<ul style="list-style-type: none"> ● Full coverage and random deployment in partial observer coverage category achieves a statistically reliable sample of vessels ● Annual deployment performance review evaluates “monitoring effect” to determine if monitored vessels are representative of the population of vessels ● Annual flexibility to adapt the Annual Deployment Plan to respond to potential biases or address emerging issues
Improve discard estimates by minimizing variability and reducing data gaps	<ul style="list-style-type: none"> ● Allocation strategy for observer coverage in partial coverage category based on 15% baseline coverage, combined with optimization for variance ● Annual review and evaluation of sampled strata definitions ● The use of flow scales to obtain total catch estimates and motion compensated platform scales to improve observer data quality
Prioritize prohibited species catch (PSC) monitoring	<ul style="list-style-type: none"> ● Optimization allocation strategy can allocate available observer days above the 15% baseline according to PSC levels ● Census of salmon PSC and associated monitoring components including video, salmon storage, catch monitoring control plans (CMCPs) ● Full coverage on vessels with transferable PSC allocations ● Development of trawl EM to accomplish salmon PSC census

<p>Collect sufficient fishery-dependent data to support stock assessment, ecosystem assessment, and protected species needs</p>	<ul style="list-style-type: none"> ● Annual evaluation of data needs for stock assessment in the Annual Deployment Plan process ● Monitoring data is evaluated to determine if coverage meets Marine Mammal Protection Act requirements for each fishery
<p>Create data collection programs with flexibility to respond to evolving data and management needs in individual fisheries</p>	<ul style="list-style-type: none"> ● Annual flexibility in the deployment plan (strata definitions, allocation strategy, selection method) ● Vessel Monitoring Plans developed annually based on a template that can be modified as new issues arise ● Observer sampling priorities altered annually to respond to new data needs and incorporate electronic technologies
<p>Distribute the burden of monitoring fairly and equitably among all fishery participants</p>	<ul style="list-style-type: none"> ● The system of observer fees distributes the costs of monitoring equitably across all fishery participants ● Annual flexibility allows coverage rates to be adjusted to fairly distribute monitoring (e.g. zero selection pool)
<p>Minimize the impacts of monitoring on operational choices of fishery participants</p>	<ul style="list-style-type: none"> ● EM is an option for non-trawl vessels in the partial coverage category and is prioritized for vessels with operational impediments to carrying an observer ● Vessels < 40 ft. LOA are in the zero selection pool ● A separate trip definition was implemented to minimize impacts to vessels delivering to a tender
<p>Spend the limited, available funding efficiently to achieve sufficient coverage (both EM and observers) for the cost</p>	<ul style="list-style-type: none"> ● NMFS worked with the Council to develop a work plan (NPFMC and NMFS 2020) addressing the Council’s goal for cost efficiencies, which are included in section 3 (regional priorities)
<p>Foster and maintain positive public perception and stakeholder support</p>	<ul style="list-style-type: none"> ● Public and Council input during observer/EM annual review and deployment process ● Collaborative EM development through EM committee with all stakeholders ● Industry costs are limited to the established fee percentage ● Prioritizing improvements on cost efficiency

2.4 Collaborative and Phased Approach

Throughout the implementation of ER and EM programs, NMFS and the Council have strived to achieve a collaborative approach. In the case of EM development, the Council appointed the EM Workgroup to develop and refine an EM program on fixed gear catcher vessels for integration into the Observer Program. As the fixed gear EM program moved into implementation, the Council reconfigured the EM workgroup to shift focus and begin development of EM in the pelagic trawl pollock fisheries. At that time, the workgroup was elevated to “Committee” status, ensuring that the Council received direct updates and reports. Throughout this process, the EM Workgroup has been an important forum for all stakeholders, including the commercial fishing industry, agencies, and EM service providers, to cooperatively and collaboratively design, test, and develop EM systems, and to identify key decision points related to operationalizing and integrating EM systems in a strategic manner.

Another important component of EM development in Alaska fisheries has been a phased approach (Figure 1) starting with a proof-of-concept, moving through pilot projects, testing, and different stages of implementation before the program reaches maturity and is implemented through regulation. The Council and NMFS have developed this phased process for developing EM technology, and applying it to different gear sectors, in order to ensure that EM is continually providing quality monitoring data and that data users are able to adjust from observer data to EM data, or from no data to new data. As the Council and NMFS consider annually whether to use an EM selection pool as part of the Annual Deployment Plan, they will need to consider what is known about the reliability of the available EM technology, its suitability for the different fishing patterns or vessel configurations of the subject fleet, and the ability of vessel operators to successfully interact with the technology onboard.

Figure 1. Stages of EM development.

<ul style="list-style-type: none"> • Scale - A few volunteer boats • Data use - Demonstration • Management pathway - undetermined • Costs - unknown • Typical timeline - 1-2 years 	<p style="text-align: center;">Proof of Concept</p> <p style="text-align: center;"><i>Goal: Adaptive development of new technologies</i></p>	<ul style="list-style-type: none"> • EM Hardware - Custom construction • Vessel responsibilities - Limited/informal • Review software - Under development • EM Acceptance - Unknown • Data review protocols - Under development
<ul style="list-style-type: none"> • Scale - a few volunteer boats • Data Use - Program design • Management pathway - Initial management objectives defined • Costs - Gathering cost data • Typical timeline - 1-2 years 	<p style="text-align: center;">Pilot Program</p> <p style="text-align: center;"><i>Goal: Standardized testing</i></p>	<ul style="list-style-type: none"> • EM Hardware - System Components defined • Vessel Responsibilities - preliminary responsibilities defined • EM Acceptance - initially positive • Review software - Standardized and ready for initial testing • Data review protocols - Preliminarily defined
<ul style="list-style-type: none"> • Scale - A diverse portion of the fleet • Data Use - Fishery demographics used to enhance program design • Management pathway - Management objectives approved by Council • Costs - initially promising, now independently evaluated • Typical timeline - 1-2 years 	<p style="text-align: center;">Operational Testing</p> <p style="text-align: center;"><i>Goal: Independent evaluation under operational conditions</i></p>	<ul style="list-style-type: none"> • EM Hardware - Commercially available • Vessel Responsibilities - Preliminary Vessel Monitoring Plan (VMP) process • EM Acceptance - Mixed • Review software - Independent evaluation under operational conditions • Data review protocols - Defined
<ul style="list-style-type: none"> • Scale - All EM candidate vessels • Data Use - Gap analysis + limited use for fisheries management • Management pathway - Protocols for using EM data nearing completion • Costs - Start-up costs funded, long term costs-effectiveness deemed sustainable. Refinements to reduce costs being tested. • Typical timeline - 1-2 years 	<p style="text-align: center;">Pre-Implementation</p> <p style="text-align: center;"><i>Goal: Building scale/ finalizing program design</i></p>	<ul style="list-style-type: none"> • EM Hardware - cost effective and commercially available • Vessel Responsibilities - Defined in VMP • EM Acceptance - Growing • Review software - Commercially available and cost effective • Data review protocols - Defined
<ul style="list-style-type: none"> • Scale - All EM candidate vessels • Data Use - Data routinely used to meet management objectives • Management pathway - Operational • Costs - sustainably funded, cost effective and decreasing • Typical timeline - 3-4 years 	<p style="text-align: center;">Mature</p> <p style="text-align: center;"><i>Goal: Productive use of EM data</i></p>	<ul style="list-style-type: none"> • EM Hardware - Cost effective and commercially available • Vessel Responsibilities - VMP feedback process operational • EM Acceptance - Mostly positive • Review software - Commercially available and cost effective • Data review protocols - Defined

3. Regional ET Priorities

3.1 ET Prioritization Process

Given limited staff time and constrained financial resources, it is important to consider how to continue to prioritize among EM projects and to consider when would be the appropriate time to initiate workgroups or begin planning to coordinate ongoing industry efforts to develop EM. NMFS and the Council have an ongoing and interactive process to identify regional ET priorities. As an example, in February 2018, the Council and its Observer Advisory Committee (OAC) discussed a list of EM projects (NMFS 2018a) that had been proposed and for which staff time had been requested. As a result of that review, the Council prioritized development of EM on pelagic trawl vessels and identified next steps to move the work forward.³

In October 2019, the Council took a strategic look at its monitoring committees⁴ and modified the scope and structure of those committees into three groups:

- Fishery Monitoring Advisory Committee (FMAC)
- Partial Coverage Fishery Monitoring Advisory Committee (PCFMAC)
- Trawl EM Committee

The goal was to enable each of three monitoring committees to have a specific scope, which would be more efficient use of each committee member's time. Since the groups were established, the committees have continued to provide input on EM and other cost efficiency priorities. For example, the Cost Efficiencies Workplan (NPFMC and NMFS 2020) and resulting PCFMAC Report (NPFMC 2020) were presented in 2020. The disadvantage of dividing the OAC into three committees is that it can be more difficult to coordinate among the groups and determine how best to prioritize EM projects when the committees have differing perspectives and meeting schedules. In addition, it can be challenging for the committee members and the public to know where to bring up new EM ideas. NMFS will continue to work with the Council and its monitoring committees to refine the communication and EM prioritization process and potentially suggest ways to adapt the timing, structure, or scope of these groups, as needed.

3.2. EM Priorities

Table 2 outlines the suite of EM projects that are currently in progress, have been identified by the Council as high priorities, or have been suggested through the Council's monitoring committees but have not yet been identified as a priority.

³ See Council motion on Agenda item D1, Feb 11, 2018. Available: <https://meetings.npfmc.org/CommentReview/DownloadFile?p=fa6b900e-fd19-484f-beb5-c0912d823c8d.pdf&fileName=MOTION%20EM%20Priorities.pdf>

⁴ See Structure of Council Monitoring Committees Agenda item C3, October 2019. Available: <https://meetings.npfmc.org/Meeting/Details/823>

Table 2. Suite of identified current and potential future EM projects.

Project	Components	Fishery	Status	ET/ EM Goal and Objective
Maintain and improve existing monitoring systems that are used for compliance monitoring, assist onboard observer, or integrated into NMFS catch accounting system and stock assessment processes		All	Ongoing	Goal 3, Objective 3: Improve procedures, methods or technology to enhance quality of EM data
Continue development of EM for pelagic pollock trawl catcher vessels (CVs)	<ul style="list-style-type: none"> - Test maximized retention on American Fisheries Act (AFA) and Western Gulf of Alaska (WGOA) pollock trawl CVs with EM compliance - Develop monitoring solutions at shoreside processors to support EM maximized retention and sampling by shoreside observers (e.g. CMCPs to support EM & collection of biological data necessary for stock assessments) - Develop regulations for pelagic pollock trawl EM program 	Pelagic pollock CVs	In progress	<p>Goal 2, Objective 1: Conduct scientific research to advance the science of monitoring and data integration</p> <p>Goal 2, Objective 3: Understand all aspects of costs associated with EM technology integration, implementation, and processing</p> <p>Goal 3, Objective 1: Implement EM/ER technology where appropriate and cost-effective to improve catch estimation and better inform stock assessments</p> <p>Goal 1, Objective 3: Continue to develop the regulatory framework to implement EM/ER requirements</p>
Identify the most appropriate and cost efficient monitoring solutions for partial coverage fixed gear vessels	Improve data quality and use of current EM vessel through Vessel Monitoring Plan (VMP) approval process, education, and outreach to increase compliance	Fixed gear CVs	In progress	Goal 3, Objective 3: Improve procedures, methods or technology to enhance quality of EM data
	Integration of EM into the determination of baseline observer coverage necessary in fixed gear to meet data gaps, including exploration of existing data sources to provide information on average weights of discards and biological data for stock assessments		Identified priority	Goal 3, Objective 1: Implement EM/ER technology where appropriate and cost-effective to improve catch estimation and better inform stock assessments
	Evaluate criteria for determining best and most cost-efficient monitoring tool for partial coverage vessels		In progress	Goal 3, Objective 1: Implement EM/ER technology where appropriate and cost-effective to improve catch estimation and better inform stock assessments
	Evaluation of different criteria to define the 'zero selection' pool (fixed gear vessels <40-ft LOA) to meet both data needs and improve cost efficiency		Identified priority	Goal 2, Objective 2: Reduce costs by gaining efficiencies
	Test lower cost EM system that can be moved among vessels without dedicated EM technicians		In progress	Goal 2, Objective 2: Reduce costs by gaining efficiencies

Develop multi-faceted monitoring that covers diversity of fishing opportunities a single vessel may participate in	One EM system, multiple fisheries - e.g. allow trawlers with EM systems to also use them in fixed gear (or vice versa); or	Hook-and-line gear and pot CVs; Fixed gear & trawl CVs (boats that do both)	Identified priority	Goal 2, Objective 2: Reduce costs by gaining efficiencies
	Explore multi-regional VMPs between Alaska and the West Coast; and a single NMFS approval point for multiple regions.	CVs that fish in multiple regions	Not yet prioritized	Goal 2, Objective 2: Reduce costs by gaining efficiencies
Continue development of EM solutions for pelagic trawl vessels	Quantification and automated image identification of salmon species to generate salmon bycatch census counts in plants, to be used in rockfish and pollock fisheries	Pelagic trawl pollock and Central GOA Rockfish CVs	In progress (but delayed due to COVID)	Goal 2, Objective 1: Conduct scientific research to advance the science of monitoring and data integration and Objective 3: Understand all aspects of costs associated with EM technology integration, implementation, and processing
	EM on pelagic rockfish trawl vessels to verify no at-sea discards	Central GOA Rockfish CVs	Not yet prioritized	Goal 3, Objective 2: Implement EM/ER technology where appropriate and cost-effective to enhance compliance monitoring
Test Monitoring Cooperatives as a potential to reduce deployment costs	Combine random deployment determined by NMFS with pay-as-you-go observer coverage.	Partial Coverage CVs	Not yet prioritized	Goal 2, Objective 2: Reduce costs by gaining efficiencies
Test and evaluate the expansion of EM to non-pelagic trawl tender deliveries		Non-pelagic trawl CVs	Not yet prioritized	Goal 2, Objective 1: Conduct scientific research to advance the science of monitoring and data integration
Test integration of machine learning (ML) and artificial intelligence (AI) algorithms into EM review protocols	<ul style="list-style-type: none"> - Test ML/AI algorithms to determine if they can be integrated into existing EM review software to reduce review time and cost - Identify common species and data types that can use ML/AI 	All	Not yet prioritized	Goal 2, Objective 1: Conduct scientific research to advance the science of monitoring and data integration Goal 2, Objective 2: Reduce costs by gaining efficiencies
Test and evaluate ER tools for observers to record and transmit data	<ul style="list-style-type: none"> - Evaluate ER tools (e.g., ruggedized tablets) and software for observers to expedite data recording and transmission - Evaluate time savings and determine if this allows for additional data collection 	All	Not yet prioritized	Goal 2, Objective 1: Conduct scientific research to advance the science of monitoring and data integration

3.3 Data Integration and Modernization

Both the Alaska Regional Office and Alaska Fisheries Science Center have invested heavily in application development and IT infrastructure to support the collection and integration of fisheries dependent data to support fisheries management. Section 5 outlines the wide variety of

fisheries using electronic technologies and the EM and ER programs that have been implemented in Alaska. However, integrating new features and continuing to support technologies for these existing programs is a challenge. Outdated systems require substantial staff time to maintain and are often not compatible with current equipment or systems. In some cases, NMFS is faced with end-of-life technology, which is no longer supported by vendors. For example, NMFS staff continues to maintain systems built to accommodate individual fishing quotas (IFQs) in the 1990s. The following are examples of data integration and modernization needs:

- **Continue research for automation and integration of EM data.** NMFS continues research and development of innovative EM technologies. The overall objective is to develop machine vision systems that automate the count, measurement and identification of fish at the source of data collection. Ideally, video and/or imagery would not necessarily have to be transferred, reviewed, and stored because an onboard application will complete the processing of both sensor and image data into species enumeration and lengths. This type of system would reduce time lags and costs associated with current EM systems and post processing methods. The overall goal of the project is to help address challenges for collecting scientific data remotely to better support bycatch estimation and ecosystem based fisheries monitoring while reducing monitoring costs.
- **Refactoring the Observer Declare and Deploy System (ODDS).** NMFS has identified improvements for ODDS but has been limited by the availability of staff resources. Changes could include improvements to the linkage between ODDS and eLandings, changes to allow vessels that also fish trawl gear to be placed in the EM selection pool, and the trip cancellation and inheritance process.
- **Modernizing legacy fishery information systems.** NMFS has identified the need to re-engineer permitting, in-season activities (e.g. transfers), IFQ accounting, and fee processes. The goal is to improve our front-end applications (e.g. eFISH), Quota Share Management, Permitting, Quota Allocation, IFQ Accounting, Fee computation, and Cost recovery. The existing systems, having successfully served the Alaska Region for many years, are no longer capable of adapting to modern fisheries management. Re-engineering our fisheries management business processes and development of a fully integrated fisheries management data processing system will provide better service to the fishing industry and public.
- **Updating technology for Interagency Electronic Reporting System.** The eLandings system is a critical reporting tool for Federal, State, and international (Pacific halibut) fisheries. The use of eLandings increases the quality, timeliness, and accessibility of data for fisheries management, which is especially important for our catch share programs. The system was developed over a decade ago and while it continues to be functional and successful, it uses technology that is now outdated and requires upgrades to the system components. These updates are critical to improve the system's usability and accessibility, and make it more compatible with mobile devices.

4. Council Actions

The North Pacific Fishery Management Council and NMFS have made substantial progress in advancing ET-related actions and regulations since the 2015 Alaska ET Implementation Plan (Table 3). Major actions include the implementation of regulations in 2018 that enable fixed year vessels to opt into EM instead of observer monitoring pool (50 CFR § 679.51) and collaborations on several ET work plans such as the Trawl EM Cooperative Research Plan in 2018⁵ and the Cost Efficiencies WorkPlan (NPFMC and NMFS 2020).

Table 3. Brief summary of ET-related actions taken by the North Pacific Fishery Management Council and implementation of ET-related regulations since 2013.

Status	Year	Action
Past	2013	The Council adopted a EM/ET Strategic Plan (Loefflad et al. 2014), prepared by NMFS, for integrating electronic technologies into the North Pacific fisheries-dependent data collection program.
Past	2014	The Council created an EM Workgroup tasked with exploring EM as a catch accounting tool on fixed gear vessels.
Past	2015	The Council reviewed the Alaska ET Implementation Plan (NMFS 2015).
Past	2015	Regulations expanding use of video for compliance monitoring on all CPs and motherships that use flow scales (79 FR 68610; 50 CFR 679.28).
Past	2016-2017	Council supported pre-implementation of fixed gear EM to enable testing on a broader scale to evaluate how the proposed EM program elements would work to enable catch estimation.
Past	2018	Implementation of regulations that enable fixed year vessels to opt into EM instead of observer monitoring pool (82 FR 36991; 50 CFR § 679.51). ⁶
Past	2018	The Council and its Observer Advisory Committee (OAC) discussed a list of EM projects (NMFS 2018a). As a result of that review, the Council shifted the focus of the EM Workgroup (renamed the EM Trawl Committee) to developing EM for use in the pelagic-trawl catcher vessel fisheries
Past	2018	The Council approves the Trawl EM Cooperative Research Plan.
Past	2019	Implementation of regulations allowing deck sorting of Pacific halibut on trawl catcher/processors (50 CFR 679.120).
Past	2019	The Council took a strategic look at its monitoring committees ⁷ and modified the scope and structure of those committees into 3 groups.

⁵ See Trawl EM 2019 Cooperative Research Plan. Agenda item D4, December 2018. Available: <http://meetings.npfmc.org/Meeting/Details/313>

⁶ See EA/RIR analysis (NMFS 2017). Available at: <https://www.fisheries.noaa.gov/resource/document/ea-rir-amendment-114-fmp-groundfish-bsai-and-amendment-104-fmp-groundfish-go-a-and>

⁷ See Structure of Council Monitoring Committees Agenda item C3, October 2019. Available: <https://meetings.npfmc.org/Meeting/Details/823>

Past	2019	The Council took final action to increase the fee percentage from 1.25 percent to 1.65 percent to support both observers and EM in the Partial Coverage Observer Program (85 FR 41424). ⁸
Current	2020	The Council and the PCFMAC reviewed a Cost Efficiencies Workplan (NPFMC and NMFS 2020), resulting in the January 2020 Partial Coverage Fishery Monitory and Advisory Committee Report (NPFMC 2020).
Current	2020-2021	Fishing happening under a Exempted Fishing Permit (see section 5.1.1) to evaluate the use of EM for compliance monitoring, maximized retention, and shoreside observer sampling on pollock pelagic trawl catcher vessel fisheries.

5. Electronic Technologies Used in the Region

5.1 Summary of Fisheries using Electronic Monitoring

5.1.1. Compliance monitoring

The Alaska region has had success with the use of video for compliance monitoring and has implemented this methodology for all catcher/processors and motherships that use flow scales, the AFA pollock catcher/processors,⁹ the Rockfish and Amendment 80 Programs,¹⁰ and the Pacific cod freezer longline fishery in the Bering Sea. In all of these cases, video is being used to verify compliance with regulations for catch sorting and weighing.¹¹ For example, video is being used on catcher/processors in the AFA fishery to verify that salmon have been sorted and stored properly to enable observer sampling.

On January 6 2020, NMFS issued Exempted Fishing Permit (EFP) 2019-03 to evaluate electronic monitoring systems in the Eastern Bering Sea and Gulf of Alaska pollock pelagic trawl catcher vessel fisheries.¹² The two-year EFP evaluates the efficacy of electronic monitoring systems and shoreside observers for pollock catcher vessels using pelagic trawl gear in the eastern Bering Sea and Gulf of Alaska. The EFP combines EM systems that provide at-sea monitoring of vessels for compliance with fishery management objectives to achieve maximized

⁸ See EA/RIR analysis (NMFS 2020). Available at: <https://www.fisheries.noaa.gov/resource/document/environmental-assessment-regulatory-impact-review-proposed-regulatory-amendment>

⁹ More information about the American Fisheries Act (AFA) can be found at: <https://www.fisheries.noaa.gov/permit/american-fisheries-act-pollock-applications-and-forms>

¹⁰ More information about the Amendment 80 programs can be found at: <https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/bering-sea-and-aleutian-islands-amendment-80-groundfish-trawl-fishery>

¹¹ More information about the monitoring programs can be found at: <https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/catch-weighing-and-monitoring-alaska>

¹² More information can be found under Electronic Monitoring - Trawl Catcher Vessels at: <https://www.fisheries.noaa.gov/alaska/resources-fishing/exempted-fishing-permits-alaska>

retention, electronic reporting of catch and discard information, and shoreside observers to monitor salmon bycatch and collect biological information.

5.1.2. Catch estimation

In 2018, the Alaska region implemented EM as an alternative monitoring option to carrying an observer for small fixed gear vessels in the partial coverage category of the North Pacific Observer Program (50 CFR § 679.51).

5.2 Summary of Commercial Fisheries using Electronic Reporting

The suite of EM/ER tools that have been implemented include:

- Observer electronic reporting software (Atlas) for timely reporting of observer generated data
- eLogbook for timely reporting of catch and area information
- seaLandings for timely electronic reporting of at-sea production data
- Flow scales to obtain the total weight of species caught
- EM as a compliance tool to enhance observer data collection.

These tools, in combination with observer data collection, provide a single authoritative record of the amount of quota harvested and have greatly enhanced the ability for NMFS and cooperative managers to monitor and manage catch and bycatch.

The Interagency Electronic Reporting System (IERS) is an interagency project involving the three agencies that manage commercial fisheries in Alaska: NMFS, the Alaska Department of Fish and Game, and the International Pacific Halibut Commission. Commercial seafood processors are required to report data on seafood harvest to these three agencies. Traditional reporting involved a combination of paper forms, such as fish tickets and weekly production reports, and IFQ web-based reporting of halibut and sablefish. The IERS provides the Alaska fishing industry with a consolidated, electronic means of reporting landings and production of commercial fish and shellfish to multiple management agencies. The management agencies work together to implement the IERS to eliminate redundant fishery reporting to management agencies.

The IERS includes a suite of five reporting applications:

- eLandings - web-based access for seafood processors
- Agency Interface - locally installed access for fishery management agency personnel
- seaLandings - locally installed program which provides on-board data entry for catcher/processor and motherships that report at sea. seaLandings also includes an eLogbook for catcher/processors and motherships
- eLogbook for catcher vessels - locally installed program with an eLogbook for catcher vessels
- tLandings - locally installed program for salmon, shellfish and groundfish tenders with no web access

5.3 Summary of For-Hire and Recreational Fisheries using Electronic Reporting

The Alaska Department of Fish and Game (ADFG) manages a voluntary ER program¹³ for freshwater or saltwater charter sport fishing businesses.

5.4 Summary of Observer Programs / Study fleets using Electronic Reporting Programs

The Atlas software application allows fishery observers to enter and transmit data directly from a vessel or plant to NMFS. The Atlas software contains business rules that perform many quality control and data validation checks automatically, which dramatically increase the quality of the preliminary data. Data transmitted electronically arrive in a timely manner to managers. In addition to immediately useable scientific information on catch and bycatch, observers are able to communicate directly with Observer Program staff through Atlas in near real time to address questions regarding sampling as well as notify staff of potential compliance concerns.

The Atlas application is a cornerstone to enabling fine-scale fisheries management and both NMFS and the fishing industry has grown reliant on it. NMFS makes iterative changes to Atlas each year to incorporate sampling and data collection changes and to take advantage of technological advances.

Catch share fisheries in particular are required to carry a variety of tools for observer use, including motion compensated flow scales, motion compensated platform scales, and video monitoring systems that help ensure observers have access to all catch and to monitor for other compliance concerns. Electronic data capture technologies extend far beyond just EM, and incorporating technologies into the fishery observer program will help serve the stakeholders who rely on these data, as well as allow observers to extend their current data collection capabilities by freeing up precious time currently spent copying and transcribing data. Future projects which would improve data collection programs in Alaska include the use of expanded and integrated use of technologies such as electronic logbooks or other electronic reporting (ER); tablet-based data entry applications; electronic length-boards for fish measurement; and electronic calipers for crustacean data. Incorporating these tools into the current Atlas data capture and transmission software would streamline observations, increase observer capabilities, and improve data collection.

5.5 Summary of VMS Programs

NMFS requires the owners and operators of selected vessels participating in federally managed groundfish and crab fisheries off Alaska to obtain, install, and maintain an operational, NMFS-approved Vessel Monitoring System (VMS). Tracking of vessel location using VMS is required to monitor compliance with complicated time and area closures in the GOA and BSAI designed to protect Steller sea lions or essential fish habitat, to monitor compliance with area-specific

¹³ More information available from the Alaska Department of Fish and Game:
<https://www.adfg.alaska.gov/index.cfm?adfg=SFGuidesLicense.LogbookFAQ>

catch allocations, and to monitor compliance with requirements to redeploy or remove fishing gear from commercial fishing grounds.

The VMS units integrate global positioning system and communications electronics in a single, tamper-resistant package to automatically determine the vessel's position several times per hour. The units can be set to transmit a vessel's location periodically and automatically to an overhead satellite in real time. The VMS unit is passive and automatic, requiring no reporting effort by the vessel operator.

A vessel is required to use VMS when they use certain gear types, target certain species, fish in certain areas, or participate in certain management programs. Many vessels are required to use VMS under multiple categories. In 2019, VMS was used by 509 vessels out of 1,288 vessels that participated in groundfish or Pacific halibut fisheries in the BSAI and GOA. Approximately 40% of unique vessels operate VMS, the majority of the vessels without VMS are small operators that harvest a small proportion of catch. In 2019, approximately 99% of total groundfish and Pacific halibut harvested came from vessels with VMS.

A vessel is required to use a Vessel Monitoring System (VMS) when:

- The vessel has a species and gear endorsement on its Federal Fisheries Permit for directed fishing for pollock, Pacific cod, or Atka mackerel and these fisheries are open, except if the vessel is using jig gear or dinglebar gear (50 CFR 679.7(a)(18)).
- The vessel is operating in the Aleutian Islands or in adjacent State of Alaska waters (50 CFR 679.28(f)(6)).
 - If trawling in the Aleutian Islands: Vessels must set their VMS to transmit the vessel location at least 10 times per hour (50 CFR 679.28(f)(7)).
- The vessel has non-pelagic trawl or dredge gear onboard in the Gulf of Alaska or in adjacent State of Alaska waters (50 CFR 679.28(f)(6)).
- The vessel is in federal reporting areas 610, 620, or 630, and receives and processes groundfish from other vessels (50 CFR 679.28(f)(6)).
- The vessel is participating in the Rockfish Program (50 CFR 679.7(n)(3)).
- The vessel is fishing for sablefish in the Bering Sea or Aleutian Islands (50 CFR 679.42(k)(2)).
- The vessel is participating in the Crab Rationalization Program (50 CFR 680.23(d)).
- The vessel is participating as an Amendment 80 catcher/processor (see §679.5(s)).
- The vessel is participating in the Rockfish Program (50 CFR 679.7(n)(3)).
- The vessel is fishing for sablefish in the Bering Sea or Aleutian Islands (50 CFR 679.42(k)(2)).
- The vessel is fishing for IFQ sablefish in the GOA using longline pot gear (see §679.42(l)) or fishing for IFQ or CDQ halibut or CDQ sablefish in the BSAI using pot gear (see §679.42(m))

6. Challenges Impeding Implementation of ET Programs

NMFS continues to work with partners to address challenges with implementation of ET programs. Broad challenges facing ET programs are cost and agency staff time. ET programs can be expensive to set-up and maintain. Additionally, implementing ET programs require

substantial staff time such as developing policy, conducting outreach with stakeholders, and iterative programming development.

Another challenge is the migration to modern systems and platforms, which require dedicated funding and staff time. The need to modernize systems compete with other high priority projects. Additionally, the integration of new features and technologies to existing ET programs remain a continuing challenge for NMFS. Current ET programs include the Observer Declare and Deploy System (ODDS) for the deployment of fisheries observers in the partial coverage category of North Pacific groundfish and halibut fisheries and the Interagency Electronic Reporting System (IERS) for electronic reporting of commercial fish and shellfish. Both systems have required substantial staff time to accommodate changes and additions to functionality.

An additional challenge is the timeliness of data and feedback to vessels. In the EM program for small fixed gear vessels, there can be a substantial time lag before NMFS receives the data. The time it takes the vessel operator to send in harddrives and the video reviewer to process and review can result in delayed feedback to the vessel operator. The timeliness of data is particularly important when timely feedback could correct or prevent repeat vessel issues.

7. Research and Development

The Alaska Fisheries Science Center has launched several Intelligent Electronic Monitoring Projects to develop new, more efficient data collection systems. Integrating technological tools into fisheries monitoring continue to be critical to help meet the demand for highly accurate data. ET systems under development include stereo rail camera systems; salmon and halibut identification systems; and other species identification tools using artificial intelligence and machine learning techniques. While the existing EM program on fixed gear vessels operating in the groundfish and halibut fisheries capture information on the numbers of fish harvested, NMFS relies on observer information to calculate the tonnage of the harvest. NMFS has prioritized research of tools which could provide weight-based harvest information from EM systems through the use of EM systems which capture length, a proxy for weight.

Innovation work is iterative and incremental and in 2020, NMFS has prioritized both more formally documenting this work and seeking opportunities to integrate advances in our operational EM program. Towards these goals, an AFSC Processed Report is being prepared that summarizes the EM Research work conducted from the inception of the EM Research Program in 2014 through 2019. Further, the AFSC has applied for internal NMFS funding to investigate integrating AI/ML advancements in image review for our operational program. If funding is secured, this work will attempt to apply AI/ML algorithms to video imagery collected by third-party EM providers to improve review efficiency.

8. Data Standards and Interoperability of ET Systems

There are three regulatory approaches that have been used to create standards and implement EM/ER monitoring programs in Alaska: 1) prescriptive requirements; 2) type approval requirements; and 3) performance standards. In some cases, for example where EM is used for compliance monitoring, a combination of these regulatory approaches has been implemented to support the program.

Prescriptive regulations specifically define what activities must be undertaken, how to conduct those activities, and who is required to comply. In general, the recordkeeping and reporting regulations for electronic reporting in Alaska (50 CFR §679.5(e)) follow a prescriptive regulatory approach. Implementation of additional ER programs in Alaska would require modification to regulations at 50 CFR §679.5(e).

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/processor and motherships are an example of type-approval regulations (50 CFR §679.28). Any flow scale used to weigh catch at sea must be on a list of approved scales. Scales are included on the approved list when they pass type-evaluation and testing. Approved scales are laid out in an appendix to the regulations. This regulatory approach works for equipment, such as scales or Vessel Monitoring Systems (VMS), that are part of a well-established technology with larger international trade organizations determining what types of scales to approve for use in trade.

Performance-based regulations put more emphasis on specifying a performance standard for the desired outcome and do not deliberately constrain how compliance is achieved. In Alaska, regulations governing catch monitoring and control plans (CMCP) requirements (50 CFR §679.28(g)(7)) are an example of performance-based regulations. The regulations describe how a shoreside processor will meet a set of specific standards to ensure that proper accounting for catch will occur and the shoreside processor submits a plan to NMFS for approval that describes how they will meet those standards. One aspect of implementing performance-based regulations is that they take cooperation between NMFS and the regulated entity, especially in the first years of a program. Alaska has had success with these programs, but this regulatory approach does take staff time for both the agency and the regulated entities.

The regulations that are currently in place governing the use of video for compliance monitoring have been implemented using a combination of prescriptive requirements along with performance standards (50 CFR §679.28(e), 50 CFR §679.28(j) and 50 CFR §679.28(k)). Prescriptive requirements are used for specific types of equipment (for example, “16- bit or better color monitor”) where a performance standard would be overly complicated. But if there may be multiple ways to achieve the same goal, the regulations describe a performance standard that gives a vessel the flexibility to have the necessary system configurations to meet that goal. New regulations for EM in Alaska would likely implement this combined approach, with performance-based regulations for many of the requirements and either type approval or prescriptive approach where performance-based standards would be cumbersome.

9. Costs of EM programs

Understanding the cost for EM programs has been an ongoing effort in Alaska. EM costs are dependent on the number of vessels participating in the EM program, the number of new EM systems that need to be purchased and/or replaced on an annual or recurrent basis, field support services, video review, and other factors. As the fixed gear EM program was developed, costs were evaluated in the EA/RIR analysis (NMFS 2017). However, during that time, the EM

program was in pre-implementation and it was anticipated that costs would change as the program matures.

In 2021, the fixed gear EM program is budgeted to cost \$1M. This budget maintains 168 vessels, all of which were previously outfitted with EM systems, supports two EM service providers (Saltwater Inc. and Archipelago Marine Research Ltd.), and enables video review by Pacific States Marine Fisheries Commission. Table 4 reflects the portion of the program costs for one of the EM service providers over a 3-year period. The cost structure categorizes one-time, “amortized” (for infrastructure, equipment, and capacity building, where the benefit extends over several years and the cost is proportioned among each of those years), and recurring costs. Amortized costs are largely the cost of installed EM equipment and assumes a 5-year life, recognizing that the actual equipment life may be longer.

Table 4. Portion of fixed gear EM Program costs, as reported by Archipelago Marine Research Ltd. in 2017, 2018, and 2019.

Component	Cost Type	2017	2018	2019
Service Provider Fees and Overhead	Recurring	\$ 191,253.00	\$ 208,577.00	\$ 292,282.00
Service Provider Fees and Overhead	One Time	\$ 51,174.00	\$ 31,591.00	\$ 75,213.00
EM Equipment Maintenance and Upkeep	Recurring	\$ 93,961.00	\$ 92,019.00	\$ 84,963.00
Data Transmittal	Recurring			
New Equipment Purchases and Installation	Amortized	\$ 504,571.00	\$ 724,934.00	\$ 313,365.00
Total		\$ 840,959.00	\$ 1,057,121.00	\$ 765,823.00

With the ongoing development of EM programs in Alaska, first with fixed gear and now pollock trawl, the goal is to identify consistent reporting metrics for EM costs that can be used across programs, and aligns with NMFS requirements to report costs in specific categories to achieve consistency across the country. To address this goal, the Council’s Trawl EM Committee created a cost subgroup to crosswalk the various reporting categories used to-date in fixed gear and trawl fisheries with the NMFS framework. It was also suggested that as a secondary task, the subgroup should tackle the question of how to report EM costs by program without double counting when the same equipment is being used in multiple fisheries.

The subgroup met in November 2020 and was composed of members of the Trawl EM committee, NMFS, and EM Vendors. The conversation focused on developing a framework that is comparable across multiple EM systems with differing goals and consolidates cost categories in a logical way so that business confidential information is protected. The subgroup agreed to report cost in seven broad categories, split between administrative and sampling costs. The goal would be to include the cost template in future versions of this document after it has been vetted by the Council’s Trawl EM Committee and Fishery Monitoring Advisory Committee (FMAC) during their meetings later in 2021. The group has not yet consolidated data for inclusion in the ET implementation plan. Once that information is available, the EM costs would be included in the Observer Program Annual Reports that are presented to the Council each year in June.

Table 5. Reporting categories developed by the Trawl EM Committee subgroup for cost reporting across multiple EM programs.

Category	Description of costs included
Data analysis and storage of Federal Records	Program administration and support, data analysis and storage, performance monitoring, and certification of EM service providers
Service provider fees and overhead	Project coordination, EM software support, EM equipment management, issue logging and review, and technician and contractor training
Equipment maintenance and upkeep	Troubleshooting, service travel expenses, and pre-season start up services
Data transmittal	Shipping of data drives and shipping materials
Equipment purchases and installation	New systems, installation materials, spare parts and peripherals, new installation labor and travel, and freight/ shipping for new units
Data processing and storage	EM trip review and data processing, storage and archiving, data drive costs, and drive summary reports
Observer provider fee and overhead (EM plant observers)	Observers for plants under compliance monitoring approaches

10. EM Cost Transition Plans

Alaska monitoring programs are unique in that the majority of costs are borne by the fishing industry. These costs are paid directly by industry (called “pay-as-you-go”), paid through an observer fee, or collected from industry by NMFS through cost recovery.

Paid directly by industry (“Pay-as-you-go”)

Alaska’s longest running EM programs require video for compliance-monitoring on catcher/processors and motherships with flow scales and specific catch handling requirements (see section 5.1.1). In these programs, video cameras record the activities of vessel personnel, allowing observers to “see” more areas of the vessel and provide a record that NMFS can use to enforce requirements. The video is stored on the vessel and made available to NMFS for review upon request. Video data are not extracted from the images for management, instead, the video provides an audit option to confirm whether sorting standards were met and observers were provided the opportunity to collect unbiased samples of catch. These EM programs are established in regulation and are fully funded by the industry, with the vessels often acting as their own EM hardware provider. Under this model, the industry covers all the costs of hardware, short-term data storage aboard the vessel, and costs associated with image transfer to NMFS, upon request.

Observer fees

Section 313 of the Magnuson-Stevens Act (MSA) authorizes the Council to prepare a fishery research plan. The research plan would require observers or EM to be stationed on fishing vessels or shoreside processing facilities, as appropriate, to collect data necessary for the conservation, management, and scientific understanding of any fisheries. The MSA also authorizes the Council to establish a system of fees to pay for the cost of implementing the plan.

NMFS implements the Council's fishery research plan through the Observer Program, which provides the regulatory framework for stationing observers and EM systems to collect data. Observer coverage in the partial coverage category is funded through fees, which are based on the ex-vessel value of groundfish and halibut landed. The funds generated by fees can also be used for implemented EM programs in the partial coverage category as part of an integrated monitoring program.

As the fixed gear EM program developed and moved from a testing and pre-implementation phase into a regulated program, there was stepwise transition to an industry funded program:

- **2015-2016:** Alaska Longline Fishermen's Association (ALFA) secured \$492,553 in grant funding from the National Fish and Wildlife Foundation (NFWF) to outfit up to 60 volunteer longline vessels with EM systems with the goal of collecting information contributing to catch accounting. Partners include the AFSC, AKR, Pacific States Marine Fisheries Commission, and Archipelago Marine Research Ltd.
- **2016:** Saltwater Inc. received \$595,047 from NFWF to support EM development on pot gear vessels with a goal of collecting information contributing to catch accounting.
- **2017:** ALFA was awarded an additional \$577,959 from NFWF to expand the volunteer EM fleet up to 120 vessels.
- **2018-2019:** NMFS developed regulations to integrate fixed gear EM into the Observer Program. With much of the infrastructure costs already provided by NFWF, NMFS provided supplemental federal funding to supplement data review costs, data storage, and ongoing field support.
- **2020:** NMFS supported the fixed gear EM program using observer fee funding and begins to identify cost efficiencies in an integrated monitoring program.

Cost recovery

Section 304(d)(2) of the MSA authorizes and requires NMFS to recover the actual costs directly related to the management, data collection, and enforcement of any Limited Access Privilege program and the Western Alaska Community Development Quota (CDQ) Program. Limited access privilege programs are those that allocate a percentage of the total allowable catch of a fishery for exclusive use by a person and in Alaska they include American Fisheries Act (AFA), Aleutian Islands (AI) pollock, CDQ, Amendment 80, Central GOA Rockfish program, halibut and sablefish IFQ, and crab rationalization. The MSA mandates that cost recovery fees not exceed 3% of the annual ex-vessel value of fish harvested by a program subject to a cost recovery fee. Cost recovery fees recover the actual costs directly related to the management, data collection, and enforcement of the programs.

NMFS currently uses the cost recovery process to recoup agency's costs associated with video inspection and video review of the compliance video monitoring systems for catcher/processors

and motherships in the AFA, CDQ, Amendment 80, and Rockfish, as applicable to management of these limited access privilege programs.

NMFS will explore a cost-recovery approach to support EM costs, as defined by the NMFS Policy Directive 04-115-02 for Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries,¹⁴ as part of the model for the trawl EM program, since the pollock catcher vessels in the Bering Sea are part of the AFA limited access privilege program.

Mixed model

The trawl EM program, currently being tested as part of EFP 2019-03 (see section 5.1.1), is an example of a program that may incorporate multiple funding mechanisms. One group of catcher vessels participating in the program are required to pay directly ('pay-as-you-go') for at-sea observers in the full coverage category. Under the trawl EM program, the at-sea observers may be replaced by at-sea EM systems and shoreside observers. For these vessels, using a "pay-as-you-go" approach for the EM system costs and shoreside observers could be the best approach. While the EM video review might be best accomplished by NMFS paying for video review and recovering the costs from industry through cost recovery.

Alternatively, another group of catcher vessels participating in the EFP are in the partial coverage category and pay observer fees on their landings. For these vessels, the costs associated with shoreside observers and EM review could be funded through the observer fees and the costs of the EM equipment could either be 'pay-as-you-go' or funded through observer fees. The specifics of the trawl EM program are still in development and not yet analyzed but will likely fall into several funding categories.

11. Regional Communications and Outreach Plan

NMFS Alaska Region and the Alaska Fisheries Science Center partner to communicate ET updates and developments to our stakeholders. NMFS staff attend and participate at meetings of the North Pacific Fishery Management Council and its monitoring committees. Committees include members from industry, observer service providers, agency, and Council staff. As mentioned in section 3, NMFS continues to work with the Council and its monitoring committees to refine and improve the communication process based on stakeholder input.

NMFS staff participates in regular check in meetings when a program is under development or early in implementation. These meetings include members from industry, observer service providers, agency, and Council staff. Meetings provide an opportunity to work through issues as they come up through an open and transparent process.

NMFS communicates with the public through the NOAA fisheries website, targeted information bulletins to the fishing fleet, and annual workshop across multiple communities and covering topics such as eLandings, partial coverage, and EM. NMFS staff participates in working groups through the International Council for the Exploration of the Sea (ICES) and NOAA HQ to ensure continued communication with other NMFS Regions and internationally.

¹⁴ NMFS Policy Directive 04-115-02 Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries. Available at: <https://www.fisheries.noaa.gov/national/laws-and-policies/science-and-technology-policy-directives>

12. List of Tables

Table 12.1 - Summary of Fisheries Participation in Electronic Monitoring Programs

Summary of Fisheries Participation in Electronic Monitoring Programs									
Fishery	# EM Vessels (2019)	# Vessels in Fishery (2019)	Obs coverage	EM coverage	% video reviewed	Implementation type/Date	Funds	Purpose of EM	Comments
Bering Sea and Aleutian Island (BSAI) Non-Pollock Trawl Catcher/Processor (C/P)	67	67	200%	100%	As requested NMFS/OLE	Regs - 2007	Industry	Compliance monitoring combined with observers	Each program was implemented with specific compliance monitoring goals. In 2014, NMFS revised regulations related to at-sea motion compensated flow scales affecting all of the boats in these programs. Note: "200% coverage" indicates that these vessels carry 2 observers on all fishing days.
Bering Sea Pollock trawl Catcher/Processors and motherships			200%	100%	As requested NMFS/OLE	Regs- 2011	Industry	Compliance monitoring combined with observer	
Central Gulf of Alaska Rockfish Trawl C/P			100%	100%	As requested NMFS/OLE	Regs- 2012	Industry	Compliance monitoring combined with observer	
BSAI Pacific Cod Longline C/P			100% (some 200%)	100%	As requested NMFS/OLE	Regs- 2013	Industry	Compliance monitoring combined with observer	
Small boat fixed gear (longline and pot)	173	929	16-17%	30%	100%	Regs- 2018	Industry via observer fee starting in 2020	Catch Accounting	168 vessels in the operational EM fixed gear program; 4 vessels in the EM Innovation Program
Pelagic trawl catcher-vessels harvesting Walleye Pollock	47	116	24% (Gulf of Alaska); 100% (Bering Sea)	100%	100%	EFP - 2020	NFWF/Industry	Discard Compliance	EFP in 2020 and 2021

Table 12.2. Summary of Participation in Electronic Reporting Programs for Commercial Fisheries, including Groundfish, Pacific Halibut, and Crab.

Fishery/ Survey Name	# ER Vessels (2019)	# Vessels in Fishery (2019)	Data Submitted To/ Managed By	Required/ Volunteer	Reporting Frequency (Haul, trip, week, month)	Purpose of ER	Comments
Electronic reporting for landings or production (eLandings and seaLandings)	67 CP's 14 motherships linked to 28 CVs 71 shoreside processors reported landings for 1,209 CVs 26 shoreside registered crab receivers reported landings for 65 CVs 2 CP registered crab receivers reported crab landings	67 CP's 14 motherships linked to 28 CVs 71 shoreside processors reported landings for 1,209 CVs 66 vessels in the Rationalized Crab and Adak Community Allocation Crab Fisheries	eLandings server, NMFS, ADFG, IPHC	Required	Landing reports (aka "fish tickets") , and daily production reports are submitted by processing facilities and at-sea catcher/processors and motherships .	State, Federal, International	System is migrating to the Cloud and also converting to HTML5 technology
Electronic reporting for Tenders (tLandings)	71 tenders reported landings to 20 shoreside processors for 583 CVs		eLandings server, Sustainable NMFS, ADFG	Required	Landing (aka "fish tickets") are completed by tender vessels and submitted by processing facilities during the tender offload.	State, Federal	System is migrating to the Cloud and also converting to HTML5 technology
Electronic Logbooks	72 vessels submitted electronic logbooks	71 shoreside processors reported landings for 1,209 CVs	NMFS/OLE	Mixed	At-sea CPs submit eLogbook each day.	Federal	

Table 12.3. Summary of Participation in Electronic Reporting Programs for Recreational Fisheries.

Fishery/ Survey Name	Mode	# ER Vessels	# Vessels in Fishery	Data Submitted To/ Managed By	Validation Method	Required/ Volunteer	Reporting Frequency (Haul, trip, week, month)	Purpose of ER	Comments
Charter Boat Halibut Survey	Charter			ADFG	Mail survey				

Table 12.4. Summary of Participation in Electronic Reporting Programs for Observer Program /Study fleets.

Fishery/Study Fleet	# ER Vessels (2019)	# Vessels/ plants in Fishery (2019)	Required/ voluntary	Reporting Frequency (Haul, trip, weekly)	Purpose of ER	Comments
Electronic submission of Observer Data (ATLAS) - Pollock and non-pollock Trawl CPs, ALL CPs and motherships, AFA processing plants, AFA trawl CVs, CGOA Rockfish trawl CVs. All observed vessels in the partial coverage category.	418 vessels 6 Processing Plants	737 vessels 6 Processing Plants	Required	Daily or end of a trip. Real time for all processing vessels and shoreside plants. Catcher vessels may be daily or at the end of each trip.	Electronic Reporting of observer data	For vessels in the partial coverage category, electronic reporting of observer data is an observer provider responsibility.

Table 12.5. Summary of Participation in Electronic Vessel Monitoring System Programs.

Fishery/ Survey Name	# VMS Vessels (2019)	# Vessels in Fishery (2019)	Data Submitted To/ Managed By	Required/ Volunteer	Reporting Frequency (hourly/daily)	Purpose	Comments
BSAI and GOA groundfish fisheries	506	1288	OLE and NMFS Sustainable fisheries	Required	Minimum 10 per hour for vessels using trawl gear in the Aleutian Islands 2 per hour (30 min) for all other areas	Monitor and enforce compliance of closed areas; Catch Accounting; and Inseason Management	

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