

Electronic Monitoring Project Prioritization

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1 Introduction

In September 2017, the Observer Advisory Committee (OAC) discussed a list Electronic Monitoring (EM) projects that have been proposed or for which staff time has been requested. The OAC recommended that the Council schedule a time to consider how to prioritize among these EM projects, and consider when would be the appropriate time to initiate workgroups or begin planning to coordinate ongoing industry efforts. In October 2017 the Council passed a motion requesting staff to:

“...provide the EM/ER Strategic Plan of 2013 and descriptions of proposed EM projects. This information will help the Council prioritize projects and determine whether and when an EM workgroup should be appointed to shepherd new projects.”

This purpose of this discussion paper is to provide background information on Electronic Technology Strategic Plan and the EM/ER Implementation plan and to summarize prospective new EM projects to help the Council prioritize among the potential projects and identify next steps.

2 Background

NMFS and the Council have been on a path of integrating electronic technology into fisheries monitoring programs in the North Pacific for many years. We have advanced electronic reporting (ER) systems in place for landing reports (aka “fish tickets”), logbook, and observer information; we have implemented a variety of monitoring tools like motion-compensated flow scales and Vessel Monitoring Systems (VMS); we have integrated video monitoring into fisheries in a compliance capacity on catcher/processors and motherships; and, most recently, we have incorporated electronic monitoring (EM) into the Observer Program for the fixed gear vessels in partial coverage.

As part of the effort to integrate electronic technologies into the North Pacific fisheries-dependent data collection program, two documents were developed to help guide the process: 1) an EM/ER strategic plan; and 2) an EM/ER implementation plan.

Strategic Plan for Electronic Monitoring and Electronic Reporting in the North Pacific

The EM/ER strategic plan ([Loefflad et al., 2014](#)) was presented to the Council by NMFS in June 2013. A strategic plan provides an assessment of (1) where an organization is now, (2) where it wants to be in the future, and (3) how it will get there. The EM/ER strategic plan provided a vision for integrating electronic technologies into the North Pacific data collection programs:

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Vision -- A future where electronic monitoring and reporting technologies are integrated 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, available when needed, and obtained in a cost-effective manner.

The strategic plan provided a “big-picture” view to help guide development and implementation of electronic technologies. The plan also laid out a series of goals and objectives to implement electronic technologies and outlined specific actions to accomplish these goals and objectives.

The Council adopted the strategic plan as a guidance document for incorporating EM into the Observer Program. At that same time, the Council recognized the small-boat, halibut and sablefish fisheries as the highest priority for integration of EM and they recommended use of a catch estimation approach to develop EM for these fisheries. To help accomplish this goal, the Council created an EM Workgroup and tasked it to: identify EM performance standards, operational procedures, and sampling and deployment plans appropriate for IFQ vessels and also look at implementation vehicles and potential phase-in approaches. The Council recommended that the EM Workgroup use 2 specific sections of the strategic plan to focus its efforts to develop a catch estimation EM program for the IFQ fisheries (Appendix A, items noted in green):

- Goal II, Objective 1, Strategy: Evaluate EM technologies in the 2013-14 EM project on volunteer vessels in the < 57.5 ft longline and pot vessels
- Goal III, Objective 1, Strategy A: Implement EM as appropriate based on scientific research from goal II

A considerable amount of work has been accomplished since the EM/ER strategic plan was adopted by the Council in 2013. Appendix A provides an update on the activities that have been occurring to address the strategies that were identified in the original document (the specific areas that the Council directed the EM Workgroup to focus on are highlighted in green).

Alaska Region Electronic Technologies Implementation Plan

Concurrent with the development of the North Pacific EM/ER strategic plan, NMFS was also looking at electronic technologies at the national level. In May 2013, NMFS issued Policy Directive 30-133, *Policy on Electronic Technologies and Fishery-Dependent Data Collection*,¹ which 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. The Policy Directive did not state that electronic technologies were appropriate for all of a region’s fisheries or fishery management plans. Rather, it called for the identification of fisheries or fishery management plans for which electronic technologies are appropriate.

In January 2015, NMFS presented the Alaska Region Electronic Technologies Implementation Plan ([NMFS 2015](#)). The document provided information about five specific EM/ER initiatives that were being undertaken at that time and discussed some of the costs and funding needs for the initiatives. Appendix B provides a summary of these initiatives and their current status.

The implementation plan also included a summary of fisheries where electronic technologies have been implemented in Alaska and identified potential fisheries where EM and ER could be expanded. Appendix C provides an update of this information.

3 List of EM Projects for prioritization

A major milestone with EM implementation in Alaska was achieved this year with the incorporation of EM into the Observer Program for the fixed gear vessels in partial coverage. Currently, NMFS is working on logistics and

¹ Available at: <http://www.nmfs.noaa.gov/op/pds/documents/30/30-133.pdf>

implementation tasks to support this program including: reviewing and approving Vessel Monitoring Plans, developing methods to use pot data in catch estimation, and incorporating EM into the 2017 Annual Report. There are also aspects of the EM program that will continue to be evaluated through the ADP process such as assessing pre vs post-selection of EM trips, and reprogramming ODDS and CAS to allow vessels that use both fixed gear and trawl gear at different times in the same year to be in the EM pool when using fixed gear and in the observer pool when using trawl gear.

In addition to supporting the fixed-gear EM program as an ongoing activity, five other EM projects have been proposed as potential next steps (Table 1):

- Deck sorting of halibut Prohibited Species Catch (PSC) with EM for compliance monitoring
- Implementation of EM on fixed gear catcher vessels <40ft Length Overall (LOA)
- Evaluation of alternative sampling methods for salmon on CGOA Rockfish trawl CVs
- Full retention on AFA Pollock CVs with EM compliance
- Full retention on WGOA pollock trawl CVs with EM compliance

Given that there are limited staff resources, NMFS is seeking input from the Council about 1) the relative priority of the 5 potential EM projects listed in Table 1; and 2) next steps for stakeholder engagement.

Of the five proposed EM projects, the Council has already identified that the development of deck-sorting protocols for halibut PSC on catcher/processors is a high priority for testing and implementation. In addition, both the Council and NMFS have highlighted the lack of monitoring information from fixed gear vessels less than 40 ft. LOA. In December 2016, the Council supported the EM Workgroup recommendation to develop a demographic study of the under 40 ft. fleet that would inform the development of a plan for specific field research in that fleet. Demographic data were prepared over the summer of 2017 and reviewed by the OAC in September 2017. This project is on the list of observer program related analytical tasks, however there have not been staff available to work on the project and no further work has occurred.

Based on previous direction from the Council, NMFS would presume that halibut deck-sorting and the less than 40 ft fleet would be the highest priorities for further EM development. However, there is a growing interest in EM in trawl fisheries and stakeholders have begun to engage with NMFS on funding requests, field-testing, and discussion of EFP projects. Therefore, NMFS would like feedback from the Council on the relative priority of EM in <40ft fixed gear fleet and the trawl EM projects.

Next steps for EM workgroup?

The main task of the EM Workgroup was to design and test the EM program for fixed gear vessels >40ft LOA and with the implementation of the regulations, these activities are largely complete. Now that EM has been incorporated into the Observer Program and the ADP and annual report process, the OAC provides a forum to review aspects of the EM program and stakeholder input. NMFS also continues to communicate and coordinate with EM service providers and video reviewers at Pacific States to address logistical and implementation issues that arise with the fixed-gear EM program.

If the next highest priority is to conduct research and design EM deployment on the vessels <40ft LOA, then the EM Workgroup would be an appropriate forum to continue stakeholder engagement. On the other hand, if the Council recommended that development of EM in trawl fisheries is a higher priority, then it could make sense to evaluate membership of the workgroup with a focus on trawl gear. NMFS has already been approached by stakeholders in the trawl fisheries to initiate EM research and program development. Absent a consolidated trawl-focused EM workgroup, the agency will continue to work with individual stakeholders from the trawl fisheries on their projects. However, there are likely overlapping issues and solutions in applying EM to the various trawl fisheries and, in that case, there could be benefit in addressing EM more holistically within a trawl-focused EM workgroup.

Table 1. Summary of the potential upcoming EM projects

Project	Key Stakeholders	Project Description	Use of EM	Would it need reg change?	Status
Deck sorting of halibut Prohibited Species Catch (PSC)	Non-pollock trawl CPs that are decksorting (A80, TLAS, and CDQ)	Compliance monitoring for sorting halibut on-deck of CPs. In addition, EM could also be potentially be used to obtain length and count of deksorted halibut, and reduce workload for observers during decksorting.	Compliance Monitoring and potentially Catch estimation	Yes	Testing is being conducted under an EFP and NMFS has begun work on the regulatory analysis. An update of the regulatory timeline will be presented in June 2018.
Implementation of EM on fixed gear catcher vessels <40ft LOA	Fixed gear CVs <40ft LOA	Currently there is no observation on these vessels -- EM would be used to obtain data for catch estimation or potentially use something like "EM lite" for verification of catch estimation assumptions of areas fished, etc	Catch estimation	No. Could be done under existing EM regs & ADP	In December 2016, the Council requested a discussion paper. Demographic data were prepared over the summer of 2017. Currently, no staff are assigned to the project.
Evaluation of alternative sampling methods for salmon	Rockfish Trawl CVs	A collaborative study between industry and NMFS to evaluate alternative sampling methods for salmon bycatch in the CGOA rockfish fishery. The project would look for ways to enable dockside monitoring for salmon. One of the alternative methods being tested is industry counts in the plant with EM for compliance monitoring.	Compliance Monitoring	Yes	SK funding was received in 2017. Feld work will start during the 2018 Rockfish Program fishing season.
Full retention on AFA Pollock CVs with EM compliance	BSAI pollock trawl CVs	Overall objective would be to replace vessel observers, but need to clarify the exact goals of the project. Could be compliance monitoring of full retention of all species (including salmon, halibut, herring PSC) in pollock fishery - but need to verify that all data currently being collected by at sea observers could be obtained at the dock. Alternatively, this could be a logbook auditing program where discards are reported in the logbook and audited from EM data. Or could be a combination with compliance monitoring for some discards (e.g. PSC) and logbook audit for other discards.	Compliance monitoring (logbook audit approach?)	Yes	A few vessels are taking cameras to test the feasibility during 2018. An EFP might be needed for further testing.
Full retention on WGOA pollock trawl CVs with EM compliance	WGOA pollock trawl CVs	Might have similar goals to BSAI Pollock fishery, but would need to verify that all data currently being collected by at sea observers could be obtained at the dock. Also need to figure out how to fit this into the partial coverage program.	Compliance monitoring (logbook audit approach?)	Yes	Staff are currently not assigned to this project. An EFP might be needed for further testing.

Appendix A. Summary of actives relative to EM/ER Strategic Plan goals and objectives

Table A-1. The goals and objectives that were identified in the Electronic Monitoring (EM) and Electronic Reporting (ER) Strategic Plan along with a summary of activities that have been occurring to address the strategies that were described in the original document. The actives listed in **green** were specific areas that the Council tasked the EM workgroup to focus their work. Items listed in **orange** highlight where this discussion paper and new proposed EM projects fit into the strategic plan.

Goals, Objectives, and Strategies	Activities
Goal I: NMFS has the infrastructure and regulatory requirements to support EM/ER operations	
<i>Objective 1: Communicate through planning documents and processes</i>	
<ul style="list-style-type: none"> Strategy A: Develop an EM/ER strategic planning document in collaboration with the Council to guide actions 	<ul style="list-style-type: none"> NMFS presented and Council adopted Strategic Plan released - 2013 EM/ER Implementation plan developed - 2015
<i>Objective 2: Dedicate resources to support EM/ER data acquisition, post-processing, and integration</i>	
<ul style="list-style-type: none"> Strategy A: Provide IT infrastructure that supports catch estimation and/or compliance monitoring Strategy B: Assign EM development work to scientific staff for a comprehensive assessment, evaluation, and advancement of technologies Strategy C: Include EM and IT support staff in planning and budget requests for offices with data stewardship responsibilities 	<ul style="list-style-type: none"> Infrastructure has been developed to bring EM data into observer program and AKR database. Video review and data processing protocols developed and implemented. Development of EM data storage requirements ongoing at national level NMFS staff AKR and AFSC have been and continue to actively work on EM regulations, implementation, and research. Continuing need, especially for IT support; ongoing aspect of NMFS budget and planning process
<i>Objective 3: Continue to develop the regulatory framework to implement EM/ER requirements</i>	
<ul style="list-style-type: none"> Strategy A: Develop requirements to use EM for catch estimation Strategy B: Adapt and improve existing EM/ER regulations to ensure compatibility with emerging technology and changing fisheries management 	<ul style="list-style-type: none"> Regulations (including Vessel Monitoring Plan process & operator responsibilities) allowing EM as option for fixed gear vessels in partial coverage – 2018 Council’s EM Workgroup conducted EM cooperative research and pre-implementation to develop EM program for fixed gear vessels – 2014-2017 Regulations requiring tender vessels to report electronically via “tLandings” – 2017 Revised regs for VMS type-approval standards and specifications –2015 Regulations revised for at-sea scales & EM on C/Ps and motherships - 2014 Regs for equipment (including EM) and operational requirements for freezer longliners - 2013

Goals, Objectives, and Strategies	Activities
<p><i>Objective 4: Secure funding to advance EM/ER technologies and use</i></p> <ul style="list-style-type: none"> • Strategy A: Monitor and initiate action on opportunities within NMFS for internal funding • Strategy B: Apply for external grant funding through appropriate sources • Strategy C: Use observer fees to fund research and development 	<ul style="list-style-type: none"> • Funding procured for EM pre-implementation on longline & pot vessels and EM innovation research through NMFS internal Request for Proposal opportunities • Funding procured by industry for EM pre-implementation on longline & pot vessels through National Fish and Wildlife Foundation (NFWF). • No activity -- NMFS determined this strategy to be an invalid approach prior to publication of EM regs.
<p>Goal II: NMFS is advancing cost-effective EM/ER capabilities through science-based studies and technological developments</p>	
<p><i>Objective 1: Conduct scientific research to advance the science of monitoring and data integration</i></p> <ul style="list-style-type: none"> • Strategy A: Improve catch estimation methods by incorporating data gathered through electronic monitoring • Strategy B: Develop methods that can improve EM data to fill existing gaps such as length compositions, species identifications, and fish weights • Strategy C: Evaluate EM technologies in the 2013-14 EM project on volunteer vessels in the < 57.5 ft longline and pot vessels • Strategy D: Provide support to partners in cooperative research and industry volunteers 	<ul style="list-style-type: none"> • Methods in place use longline data in Catch Accounting System. Methods to use pot data ongoing • Ongoing work in the Annual Report and ADP process to evaluate and improve EM deployment to be strategically used in conjunction with observers • Ongoing EM innovation research to test automated review and collection of length compositions from EM data ✓ Specific strategy identified by Council as focus area for EM Workgroup. Work conducted through EM Workgroup and EM pre-implementation led to implementation of new regulations in 2018. • EM Workgroup provides forum for all stakeholders to cooperatively and collaboratively design, test, and develop EM systems
<p><i>Objective 2: Reduce costs by gaining efficiencies in data processing and/or improving data quality</i></p> <ul style="list-style-type: none"> • Strategy A: Develop automated review and data extraction technologies to reduce costs, improve timeliness, and improve data quality • Strategy B: Identify fish handling practices and integration methods that will facilitate automation and improve data quality 	<ul style="list-style-type: none"> • Ongoing research and development of innovative EM technologies by AFSC. 2018 deployment outlined in Appendix E of 2018 ADP
<p><i>Objective 3: Understand all aspects of costs associated with EM technology integration, implementation, and processing</i></p> <ul style="list-style-type: none"> • Strategy A: Evaluate associated costs of EM cooperative research • Strategy B: Evaluate costs of existing EM programs in the North Pacific 	<ul style="list-style-type: none"> • Analysis supporting action to incorporate EM into observer program included evaluation of costs – NMFS 2017 • Analysis supporting regulations to revise the use of flow scales and EM for compliance monitoring included evaluation of costs and benefits – NMFS 2014

Goals, Objectives, and Strategies	Activities
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| <ul style="list-style-type: none"> Strategy C: Evaluate trade-offs of using observer fees to fund EM systems versus human observers | <ul style="list-style-type: none"> Draft 2018 ADP included evaluation of EM costs and maximum size EM fleet that can be afforded. Additional analysis will be an ongoing component of the ADP process. |
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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 assessment

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| <ul style="list-style-type: none"> Strategy A: Implement EM as appropriate based on scientific research from goal II | <ul style="list-style-type: none"> ✓ Specific strategy identified by Council as focus area for EM Workgroup. EM as option for fixed gear vessels in partial coverage – 2018. |
| <ul style="list-style-type: none"> Strategy B: Expand use of e-logbooks to increase the timeliness and fill data gaps | <ul style="list-style-type: none"> Elogbooks expanded to all CPs and motherships that are required to use a flow scale. Ongoing effort to update and improve elogbook software to include features for fishermen & make it easier to use |
| <ul style="list-style-type: none"> Strategy C: Expand observer data entry application (ATLAS) requirements to improve the quality and timeliness of observer data | <ul style="list-style-type: none"> Since fall 2016, all observer data has been transmitted to NMFS electronically in the full and partial coverage categories. A discussion paper reviewed by the OAC in May 2016 identified gaps and overlapping requirements that could be modified to reduce impacts and ensure electronic reporting. |
| <ul style="list-style-type: none"> Strategy D: Continue ongoing development and support of elandings system | <ul style="list-style-type: none"> Ongoing collaboration among NMFS, ADFG, and IPHC to support and develop Interagency Electronic Reporting System (IERS), including implementation of tlandings to enable reporting from tender vessels; integration of COAR reporting in elandings; addition of observer fees into elandings. Assessment of costs/benefits of IERS - 2015 |

Objective 2: Implement EM/ER technology where appropriate and cost-effective to enhance compliance monitoring

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| <ul style="list-style-type: none"> Strategy A: Monitor, evaluate and improve existing EM compliance monitoring programs | <ul style="list-style-type: none"> Monitoring and audits of video from EM compliance monitoring ongoing Regulations revised to expand and improve EM compliance monitoring program CPs and motherships - 2014 |
| <ul style="list-style-type: none"> Strategy B: Expand use of EM in compliance applications | <ul style="list-style-type: none"> Several proposed projects to expand EM for compliance monitoring Council motion to review and prioritize next steps – October 2017 Evaluation of next steps – Feb 2018 |

Objective 3: Improve procedures, methods or technology to enhance quality of EM data

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| <ul style="list-style-type: none"> Strategy A: Evaluate and develop solutions to incrementally improve EM and data quality | <ul style="list-style-type: none"> Analysis supporting action to incorporate EM into observer program included evaluations of data quality Ongoing evaluation of observer and EM deployment as part of the Annual |
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Goals, Objectives, and Strategies	Activities
<ul style="list-style-type: none"> Strategy B: Address challenges to managing a fishery using an integrated system approach that incorporates data collected through a variety of sources that includes electronic reporting (e.g., e-ticket, e-logbook, VMS, and sensors), video systems, scales, and observers 	<p>report process</p> <ul style="list-style-type: none"> Evaluate proposed projects to expand EM to address sampling issues Ongoing evaluation of observer and EM deployment as part of the ADP and Annual report process Ongoing component of all Council actions, and inclusion of Monitoring and Enforcement section of each Council analysis
<p>Goal IV: The Council and NMFS leverage global EM/ER developments while sharing AK perspectives with others</p>	
<p><i>Objective 1: Learn from the experience of others</i></p>	
<ul style="list-style-type: none"> Strategy A: Organize and participate in local, national, and international forums on EM/ER and fishery dependent systems Strategy B: Collaborate with partner organizations 	<ul style="list-style-type: none"> Ongoing participation on wide variety of forums on EM/ER, including: 2nd National EM Workshop; FIS ER Professional Specialty Group; AFS emerging technologies session; International Fisheries Observer & Monitoring Conferences, and more. EM Workgroup - forum for all stakeholders, including fishing industry, agencies, and EM service providers, to cooperatively and collaboratively design, test, and develop EM systems
<p><i>Objective 2: Influence and inform monitoring policies</i></p>	
<ul style="list-style-type: none"> Strategy A: Assist in national EM policy and procedures Strategy B: Engage in Council processes that inform monitoring policy 	<ul style="list-style-type: none"> Ongoing participation by AKRO and AFSC staff in NMFS Electronic Technologies working group Ongoing -- Engagement in EM Workgroup and OAC; collaboration among NMFS and Council staff; M&E aspects of analytical documents

Appendix B. Update on Electronic Technologies Implementation Plan initiatives

Table B-1. Summary of five high-priority EM/ER initiatives outlined the Alaska Region Electronic Technologies Implementation Plan (NMFS 2015) and an update on their current status.

Category	Project Title	Goal	Linkage to EM/ER strategic plan	Status
Electronic Monitoring	EM for catch estimation in the small boat, fixed-gear fleet	Assess the efficacy of EM for catch accounting of retained and discarded catch, and to identify key decision points related to operationalizing and integrating EM systems into the Observer Program for small, fixed-gear vessels.	- Goal III, Objective 1, Strategy A - Goal I, Objective 3, Strategy A	Regulations incorporating EM into the Observer Program for the fixed gear vessels in partial coverage implemented in 2018.
	Video Compliance Monitoring	Implement EM/ER technology where appropriate and cost effective to enhance compliance monitoring on catcher/processors and motherships	Goal III, Objective 2, Strategies A & B	Regulations expanding use of video for compliance monitoring on all CPs and motherships that use flow scales implemented in 2015. Work to audit the video to ensure compliance with regulations and improve system performance is ongoing.
	Deck sorting of halibut Prohibited Species Catch (PSC)	Evaluate and test protocols and technology to enable monitoring and PSC estimation of deck sorted halibut on trawl CPs in order to reduce halibut mortality	Goal II, Objective 1, Strategy A	Exempted fishing permit (EFP) projects are continuing to develop the components of a regulated program. NMFS has begun work on a regulatory Analysis and an update is planned for the Council in June 2018.
Electronic Reporting	Interagency Electronic Reporting System	Provide and maintain a high quality, real-time fishery reporting system that supports sustainable fisheries while fostering positive relationships among partner agencies and with industry.	Goal III, Objective 1, Strategies B & D	Collaboration among NMFS, ADFG, and IPHC to support the existing IERS implementation is ongoing, including: implementation of elogbook; implementation of tlandings to enable reporting from tender vessels; integration of COAR reporting in elandings; addition of observer fees into elandings.
	Atlas	Provide and maintain a high quality, near real time reporting system for observer data that supports sustainable fisheries and provides support and guidance to observers deployed in the field.	Goal III, Objective 1, Strategy C	Work to support Atlas for the existing regulated fisheries is ongoing. Since fall 2016, all observer data has been transmitted to NMFS electronically in the full and partial coverage categories. A discussion paper reviewed by the OAC in May 2016 identified gaps and overlapping requirements that could be modified to reduce impacts and ensure electronic reporting.

Appendix C. Summary of existing monitoring tools and fisheries where additional EM/ER might be applicable

Table C-1. Summary of the existing monitoring tools currently implemented in the North Pacific. Catch share programs require a more intensive suite of monitoring tools for management and are therefore listed separately from the non-catch share programs. Green cells indicate fisheries where electronic technologies have already been implemented and regulated programs are in place. Fisheries where additional ER and EM could potentially be suitable are noted; yellow cells indicate fisheries that are identified as potential areas for testing and implementation.

Program Type	Fishery	Current Requirements								Additional ER Potentially Suitable?	Potential EM Application?
		ER for Landings, Tender deliveries, & Production (IERS)	Paper logbook ²	ER for logbook (elogbook in IERS)	ER for Observer data (Atlas)	Flow Scale	VMS	Video	Observer Coverage		
Catch Share	BSAI pollock trawl CP & mothership (AFA)	Y	N	Y	Y	Y	Y	Y	200% (i.e. 2 observers on all trips)		
	BSAI non-pollock trawl CP (Amendment 80)	Y	N	Y	Y	Y	Y	Y	200%		Y - video to monitor deck sorted halibut PSC
	Central GOA Rockfish Trawl CP	Y	N	Y	Y	Y	Y	Y	200%		Y - video to monitor deck sorted halibut PSC
	BSAI Pacific cod Longline CP	Y	N	Y	Y	Y	Y	Y	200%		
	BSAI rationalized crab CP	Y	Y	Few- voluntary	N	Y	Y	N	100% (State observer prog)	Y- elogbook	
	BSAI pollock trawl CV (AFA)	Y	Y	Few- voluntary	Y ³	n/a	Y	N	100% (i.e. 1 observer on all trips)	Y- elogbook	Y- to monitor compliance with no discard of salmon PSC
	CGOA Rockfish Trawl CV	Y	Y	N	Y	n/a	Y	N	100%	Y- elogbook	Y-compliance monitoring shoreside &/or estimation of halibut PSC
	IFQ Sablefish CP	Y	Y	Available & used voluntarily	Y	N	Y- AI only	N	100%		
	IFQ Halibut CP	Y	Y	Available & used voluntarily	Y	N	Y- AI only	N	100%		
	IFQ Sablefish CV	Y	Y	N	Y ⁴	n/a	Y- AI only	Y ⁵	Partial	Y- elogbook	
	IFQ Halibut CV	Y	Y ⁶	N	Y	n/a	Y- AI only	Y	Partial	Y- elogbook	
	IFQ Halibut & Sablefish <40' LOA CV	Y	Y ⁶	N	Y	n/a	Y- AI only	N	None		Y – EM for catch estimation

² Paper logbooks are required by NMFS for vessels >60ft

³ Vessels <125' may not provide daily transmission capabilities.

⁴ A provision in the contract for the deployment of observers in the partial coverage category ensures electronic transmission of observer data upon completion of each trip.

⁵ Fixed gear vessels in the partial coverage category have choice to opt into EM selection pool as an alternative to observer coverage.

⁶ Paper logbooks are required by IPHC for vessels >26 ft fishing for halibut; vessels >60ft are also required to submit paper logbooks by NMFS and there is a shared IPHC-NMFS paper logbook.

Program Type	Fishery	Current Requirements								Additional ER Potentially Suitable?	Potential EM Application?
		ER for Landings, Tender deliveries, & Production (IERS)	Paper logbook ²	ER for logbook (elogbook in IERS)	ER for Observer data (Atlas)	Flow Scale	VMS	Video	Observer Coverage		
Non-Catch Share	BSAI Turbot longline CP	Y	Y	Available & used voluntarily	Y	N	Y	N	100%		
	GOA Trawl CP	Y	Y	Available & used voluntarily	Y	N	Y	N	100%		
	GOA Longline CP	Y	Y	Available & used voluntarily	Y	N	Y	N	100%		
	BSAI Pacific cod Trawl CV	Y	Y	N	Y	n/a	Y	N	Partial with option to opt-in to 100%	Y- elogbook	Y- compliance monitoring of no discard
	GOA pollock Trawl CV	Y	Y	N	Y	n/a	Y	N	Partial	Y- elogbook;	Y- compliance monitoring of no discard
	GOA non-pollock Trawl CV	Y	Y	N	Y	n/a	Y	N	Partial	Y- elogbook;	Y-compliance monitoring & estimation of halibut PSC
	Pot CP	Y	Y	Available & used voluntarily	Y	N	Y	N	100%		Y – video for catch estimation
	Longline & Pot >=40'LOA CV	Y	Y	N	Y	n/a	Y	Y	Partial	Y- elogbook;	
	Longline & Pot <40'LOA CV	Y	N	N	N	n/a	Y- AI only	N	None		Y – video for catch estimation & PSC monitoring
	Jig	Y	Y	N	N	n/a	Y- AI only	N	None		