

**Report on RIR development and cost analysis**  
**EM Workgroup Meeting**  
**July 2016**  
**NPFMC Staff**

The purpose of this document is to update the Electronic Monitoring Workgroup (EMWG) on the status of the RIR in preparation for initial review at the October 2016 NPFMC meeting. After reviewing this document and discussing as a group, the EMWG should be aware of the following items, and provide feedback as necessary:

- Analytical approach
- Characterization of EM “cost factors,” as well as their trajectory over time and uncertainty given the developing nature of the Alaska Fixed-Gear EM program
- Draft RIR outline
- Sources of data and qualitative information
- Components of the analysis that could benefit from additional information, either prior to initial review or in the process of developing subsequent analyses (public review draft or future Observer Program Annual Reports)

The contents of this document are as follows:

- I. Key questions that need to be answered
- II. Narrative of analytical approach to:
  - EM program costs
  - Effect on Observer Program partial coverage category
- III. RIR outline. (Drafting is underway; staff determined that sharing an in-progress version would divert effort from filling information gaps to wordsmithing.)
  - Limited to section headings and high-level summary
  - Agencies, organizations, or companies from whom information is requested, or from whom writing contributions are anticipated, are identified below. *For those without sufficient time to review the entire outline prior to the EMWG meeting, staff has noted the sections of the outline in which those requests are described (see p.2).*
- IV. Available data sources, and general description of their contents/gaps. Summary tables that are ready to share.

For those with limited time to review this document prior to the meeting, the first priorities should be the Key Questions to be Answered (Section I) and the characterization of cost factors (Table 14 on p.30 of this document). Staff has provided and an “index” of information requests (by agency/organization) on the following page.

## **INDEX of requests for additional information, input, or drafting:**

(See **bolded text** in the following subsections where agencies/organizations are identified)

Electronic Monitoring Workgroup (EMWG) – Section III: 7.1

NMFS Alaska Region Office – Section I; Section III: intro, 4, 4.1, 5.1, 6.3, 6.4.1.3, 6.4.1.4, 7.2.3, 7.3, 8, 10.5, 10.6, 10.7, 10.8; Section IV: Data Sources

NMFS FMA Division – Section I; Section II; Section III: intro, 4.1, 5.1, 5.2, 6.1, 6.3, 6.4.1.4, 7.1, 7.2.3; Section IV: Data Sources

NOAA OLE – Section III: 8

Pacific States Marine Fisheries Commission (PSMFC) – Section III: 6.4.1.3, 7.3, 7.4

Alaska Fisheries Information Network (AKFIN) – Section III: 5.2, 7.1

Archipelago Marine Research, Ltd. (AMR) – Section III: 6.3, 6.4.1.2, 7.2

Saltwater, Inc. (SWI) – Section III: 6.3, 6.4.1.1, 6.4.1.3, 7.2

AIS, Inc. – Section III: 6.1

Alaska Longline Fishermen’s Association (ALFA) – Section III: 7.2.1

North Pacific Fisheries Association (NPFA) – Section III: 7.2.1

## **I. Key Questions Answer**

NPMFC staff welcomes feedback on (or additions to) this list, which is not meant to be exhaustive.

- What are the factors that determine the amount of funds – i.e., “budget” – available to support integrated EM in a given year (relative to the Observer Program partial coverage category)? Could there be a floor or a ceiling?
- Which EM program cost components are paid for via a portion of the 1.25% ex-vessel fee base, and which are funded by drawing on the existing staff and budget of NMFS divisions?
- What new ongoing tasks will EM create for **NMFS AKRO and FMA**?
- How will the EM provider contract be handled (bid out) during/after integration?
- What are the data objectives?
- What is a reasonable minimum/maximum size for the EM pool? Consider demonstrated interest in EM participation and the need to maintain adequate observer sampling in all seasons/fisheries/stat-areas.
- What is the selection model (vessel selection vs. trip selection)
  - If trip selection: staff assumes 100% review of hauls
  - If vessel selection: staff assumes that 15% to 100% of selected vessels’ *trips* could be reviewed during the selected period (100% of hauls would be reviewed, i.e. no subsampling within-trip)
- What is the impact of pre-implementation spending? Accurately characterize the program’s “running start” relative to start-up costs, and delineate those costs from ongoing EM costs.
- Which cost factors are likely to trend downward as program matures?
- How many ports will have trained local EM service technicians? Will vessels based in remote ports (e.g., Bering Sea communities) be able to join the EM Pool? Will fly-out service/installation be available to those vessels?

- Can we describe a profile of a vessel that is negatively impacted by integrating EM into the Observer Program?
- Are there any foreseeable scenarios where the development and integration of an EM program directly or indirectly causes fleet consolidation (Halibut/Sablefish QS holders selling shares or becoming “walk-ons,” or Pacific cod vessels exiting that fishery)?

## **II. Narrative of Analytical Approach to EM Cost & Effect on Observer Program Partial Coverage Category**

Developing a quantitative cost and effect analysis for the integrated EM program is proving to be a challenge because so many of the program elements that will drive costs remain unknown. It is the analysts’ understanding that the objective of the RIR is to adequately describe the cost factors, their relationship to program design elements, and to provide a basis for ongoing cost evaluation over the life of the program. Unlike analyses of EM programs in other regions of the U.S. and Canada, the analysts do not plan to arrive at a final program-level cost to provide EM in terms of dollars-per-day. However, the analysts do plan to meet the EMWG’s desire to sketch out estimated annual costs at the programmatic level, based on several scenarios of EM pool size (vessels) and effort (trips).

The most obvious scenario is based on the 2017 Pre-Implementation pool of 90 LL vessels and 30 pot vessels. The analysts will use the demographic characteristics of past EM participants and vessels that pre-registered for 2017 to model the fleet. Because the size of the EM pool in future years is unknown, it is also necessary to run “high” and “low” participation scenarios. Those scenarios will illustrate the difference between fixed and variable operating costs. The “low” scenario provides an opportunity to contemplate higher program costs per capita, especially if the contracted EM provider requires a minimum service level. The analysts will have to make assumptions about the distribution of vessel sizes in the EM pool; because the analysis is forward-looking, scenarios will include vessels in the Under-40’ category. Within each scenario, the analysts will describe the cost effect of varying one program design element (e.g., trip selection vs. vessel selection) while holding others constant; where reliable dollar-cost estimates are not available, the scale of the effect will be described qualitatively.

Some of the post-implementation operating costs for EM will presumably be funded by using a portion of the ex-vessel-based fees that are currently used to purchase observer-days for the partial coverage category of the Observer Program. The modeling of EM pools, described above, should provide a range of potential fee revenues that would be diverted to EM. The remainders can be analyzed in terms of how many observer-days could be purchased for the partial coverage category. That inventory of observer-days can be compared to minimum acceptable levels of observer coverage, which should be identified elsewhere in the EA/RIR. The analysis will also consider the reduced demand for observer days, as vessels in the EM pool are no longer selected to carry an observer.

Because the objective of this RIR is to develop a framework for the ongoing evaluation of EM costs (and cost effectiveness), the analysts will try a second approach. As opposed to adding up the known and estimated costs of various program elements to arrive at a programmatic total, one could also start with an annual budget and describe the level of services that could be provided within that constraint. The analysts are not certain that this approach will prove reliable due to the variable nature of demand for

services that are, themselves, difficult to assign a unit price (e.g., field support), but it needs to be tried at the initial review stage of this process.

The “starting budget” can be estimated in several ways. First, the analysts could take a percentage of the total available observer budget that corresponds to the number of vessels in the EM pool. That approach could also be applied to only the portion of the budget that comes from the previous year’s observer fee remittances (and sequestered funds), excluding additional Federal funds that are added to the budget each year; this version reflects the possibility that Federal funds might not be added to the monitoring budget in future years. Second, the analysts could apply the observer selection rate to the modeled effort level in the EM pool (trips and days fished); that calculation would yield an estimate of the decreased observer-demand due to the EM pool, and that number of observer-days could be multiplied by the average observer cost/day to arrive at an EM budget constraint. Third, the analysts could calculate the amount of funds available to purchase observer-days for the fixed-gear sector of the partial coverage category (by deducting funds needed to cover the trawl sector at a given selection rate and average cost/day) and simply designate half of that amount to the EM budget. Finally, a budget amount would be readily apparent if **FMA staff** is able to determine a minimum amount of human observer coverage that is required to collect adequate observer data from each stratum; the funds remaining after that number of observer-days are purchased would constitute the EM budget.

### **III. Draft Regulatory Impact Review (RIR) Outline**

Introduction: Boilerplate; List requirements of E.O. 12866

Information needed: Confirm whether this is both a regulatory and an FMP amendment (**NMFS AKRO staff**)

#### **1 Statutory Authority**

Boilerplate

#### **2 Purpose and Need**

As approved at the February 2016 NPFMC meeting

#### **3 Description of the Alternatives**

As approved at the February 2016 NPFMC meeting. To be described in an earlier section of the final EA/RIR/IRFA.

#### **4 Methodology for Analysis of Impacts**

- Section roadmap: Description of data sources,
- Boilerplate describing E.O. 12866 requirements
- Description of fishery data sources:
  - catch accounting system (exists in analytical template)
  - NMFS Observer Program database, *Valhalla*(?). Requesting description from **FMA or NMFS AKRO staff**. See analytical template for example of how CAS is described.

- Observer Program annual reports (2014, 2015)

#### **4.1 Regulatory Changes Under the Proposed Action Alternatives**

- Description of which parts of the program will be described in regulation, and which will be described elsewhere.
- In progress (**NPFMC/NMFS staff**)

#### **4.2 Fixed-Gear Fisheries for which Advanced Analysis Can Be Conducted**

- We are better suited to do “advanced” analysis of fixed gear vessels > 40’ LOA, and even more so for vessels between 40’ and 57.5’ LOA (data from 2016 EM longline vessels >57.5’ will not be available by the time the analysis is scheduled for release). LL and POT vessels in this size category have participated in cooperative research and pre-implementation studies. As a result, we can make more objective statements about the effect of operator responsibilities and the cost of running a program based on known EM fleet demographic characteristics. Also, because the Over-40’ vessels have been carrying observers, we can speak more clearly to the benefits-side for vessels that were seeking observer release waivers, and to the potential impact on the Observer Program.
- For Under-40’ vessels, we are limited to discussing theoretical benefits/costs of getting a different amount of fishery data from the Observer/EM program as a whole. Ex-vessel-based observer fees for the Under-40’ category would not change under the proposed alternatives, but the use of those funds might.

#### **4.3 Approach to Electronic Monitoring Cost Analysis**

- Refer to Section II of this document

#### **4.4 Approach to Analysis of Impact on Observer Program**

- Refer to Section II of this document

### **5 Description of Fixed-Gear Fisheries**

#### **5.1 Partial Observer Coverage Category**

- Definition of category and overlaps with current and future EM pool; Describe ADP process, selection rates, ODDS, funding/fee structure (standard price method), future status of Federal funds, and contract status (including estimated \$/day).
- What is monitored, what data is collected. Expected to reference another section of the EA/RIR (e.g., catch composition, discards, species of concern, compliance...). Touches on why it is important to have human observer coverage in all statistical areas.
- Benefits (to-date) of the restructured Observer Program. Requesting help from **NMFS AKR or FMA staff** in referencing existing analyses.

- History of requesting/granting observer releases, and any available anecdotes that reflect the industry’s attitude towards monitoring (again, requesting **NMFS AKR or FMA staff** input RE: “attitudes”)
- Data on days purchased, trips deployed. #Trips informs cost of trip-selection EM model. Describe how observed trips were distributed across landing ports (Observer Data), and how much coverage was achieved (%trips observed) in ports with only a small number of landings by the group of vessels that could opt into the EM pool.
  - Approximate breakdown of observer-days “spent” (invoiced) for fixed-gear vs. trawl. We can approximate this because we know the #“fishing days” for the fixed-gear fleet and the total number of invoiced observer-days for the partial coverage category. **FMA staff** would have to provide the exact number of days invoiced by gear type and by stratum if that level of precision is deemed necessary.
- Report historical observer fee payments: total, and by fixed-gear vessels in a vessel size class (and number of vessels in that class).
- Describe supporting services provided by NMFS but not paid for through the partial coverage provider contract – e.g., training, briefing/debriefing, programming, data mgmt., analytical staff

## 5.2 Vessels Eligible for the Electronic Monitoring Pool

- Section includes: fleet demographics, historical activity (2013-2015); data broken out by gear and vessel size categories to reflect the sequential nature of EM prioritization (< 40’, 40’-57.5’, and > 57.5’)
- Does not include: data on activity of CPs or CVs delivering to motherships; observer data on vessels < 40’ LOA (e.g., hauls/trip), because those vessels have not carried observers.

### Data:

- Vessel count by gear\*length\_category, and by area fished (identifies vessels that used both LL & POT)<sup>1</sup>
- Landings by port (port concentration)
- Species targeted by vessel size category
- Timing of fishing activity (month), by vessels size category, by area
- # Trips per year, by vessel size category, by area, by target
- Trip length (estimated)
- Hauls/trip
- Describe subset of fixed-gear vessels that have participated in EM cooperative research and pre-implementation (have requested summary information from **AKFIN and FMA staff**)
- Not currently planning to include:
  - “Diversification table” – This would show all the other non-fixed-gear fisheries in which these vessels participate (salmon, crab, trawl, herring...). The purpose of the table would be to identify periods of the year when fixed-gear vessels are doing other things (thus, not taking EM or observed trips). For a div. table to be useful, it would need to be done at the

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<sup>1</sup> Data issue: NPFMC staff has received data sets from both AKFIN (fish tickets) and NMFS AKR (Observer Program data). A small discrepancy in the vessel counts exists; not large enough to affect the direction of general analytical conclusions, but something that should be reconciled as we move towards public review.

vessel-level, and there are over 1,000 vessels. Aggregating to size category and/or region doesn't tell us anything useful. In other words, we don't need to pull data to make a statement such as: "some fixed-gear vessels target halibut and sablefish during the summer, while others participate in the directed salmon fishery."

- Historical ex-vessel revenue data – Revenue data is useful to this analysis insofar as it determines (has determined) the ex-vessel-based observer fees remitted by the fixed-gear fleet (and their processors). That information can be taken directly from the Observer Program's Annual Reports, in the form of total remittances by gear/size-category, and per capita fees. Vessel-level revenue data would only be useful if we could forecast the subset of fixed-gear vessels that would opt into the EM pool in the future. Moreover, the amount of funds available to support EM will not be directly determined by the vessels in the pool. More broadly, vessel revenue data is typically of greater interest when the proposed action is expected to directly affect the total amount of, or value of, future harvests; this is not the case for the EM analysis.
- Tax data – RIRs often describe the various state and local taxes that fishermen pay. That material is less relevant for actions that are not expected to affect the total amount of, or value of, future harvests.

## **5.2.1 Fixed-Gear Activity**

### **5.2.1.1 Vessel Counts, Number of Trips, and Trip Length**

### **5.2.1.2 Hauls Per Trip**

## **5.2.2 Fleet Demographics**

# **6 Background on Electronic Monitoring for Alaska Fixed-Gear Fisheries**

## **6.1 Current State of Electronic Monitoring Technology**

NPFMC staff requests drafting by **NMFS FMA staff**.

ALFA has provided a table defining five "stages" of development, and nine different approaches to (or components of) existing and nascent EM programs. Where applicable, EM programs from Alaska and other regions (U.S. and Canada) are rated according to their development stage under a given approach. Refer to Table 16 and Table 17 in this document.

- Other notes provided by ALFA:
  - Human review of video images of longline hauls to verify logbook data by applying average weights to discards is currently in use (West Coast, East Coast, Canada). The same approach has been used to directly estimate the catch of some species in Canadian fisheries.
  - Human review of video images of fish placed against measuring boards is currently in use (Canada).
  - Use of machine vision (stereo cameras) to determine length has been pilot tested and shown to work in controlled lighting situations. Testing began in the mid-1990s and

continues today in the Am 80 fleet. Feasibility of using machine vision “at the rail” is still being evaluated.

- Automated image review + species ID + data transmission is still in the proof of concept stage.
- Technologies in the development or conceptual phase (source: FMA staff)
  - Automated image analysis
  - Automated data transmission
  - Self-sampling with chute camera systems. Would include within-haul expansion of discard estimates.
- Requests update from **AIS, Inc.** on new EM package that might be coming to market in the near future (status of development, if/how it should be represented in the EM initial review package)

## 6.2 Electronic Monitoring Providers

NPFMC staff is developing a short overview of EM providers (active in AK, and others), involvement in AK fixed-gear fisheries, and technologies employed.

## 6.3 Cooperative Research and Pre-Implementation

Largely references other sections in the EA/RIR (Introduction, History, EA). Section should minimally comply with NMFS Regional Economist’s guidance that the RIR should be written so that it can stand alone.

Could also include:

- Research priorities under CRP and Pre-Implementation (2014-2017)
- #Vessels that have carried EM
- Start-up funding expended (would request **FMA staff** help to summarize this, if it has not already been produced for an earlier section of the analysis)
- Existing inventory/capacity (present and expected at end-2016 and end-2017). See Table 15 in this document.
  - Equipment, pre-wiring installations
    - Note: there’s no clear definition of what a pre-wiring involves, and the EM-readiness state of vessels that aren’t currently selected will vary (source: AMR)
  - #Experienced in-port EM technicians (requests input from **AMR & SWI**)
  - Fleet socialization, outreach efforts to date (request **AMR and/or NMFS AKR** update)
  - NMFS data infrastructure development/modification to date (request **NMFS AKR** update)

## 6.4 Description of Cost Factors for Electronic Monitoring

- Themes:
  - Fixed vs. Variable program costs... i.e., program overhead vs. cost drivers that scale with the size of the program and amount of effort in the EM pool
  - Recurring costs vs. One-time costs
  - Start-up costs (and monies already dedicated) vs. Operating costs

- Cost trajectory... cost factors that might cost less (or more) in the future depending on how the program and associated technology matures. We assume that many cost factors will trend downward to a point, as “implementation inefficiencies” are overcome.

Refer to Table 14 in this document

- Cost uncertainty... elements of a fully operational EM program that could cost more or less depending on policy/design choices that will not have been finalized by the time of public review, and that may continue to evolve in the years post-implementation.
  - Several overarching sources of uncertainty that span multiple cost categories include:
    - Data objective: Discards only? Estimate weight by applying avg. length? Logbook audit? If these evolve then the program’s cost profile will change.
    - Service delivery model: Even if we’re contracting out video review today, could the program move to a vertically integrated provider in the future? (Would NMFS have to audit the data received from a “full service” provider?) Will a single provider hold the Fixed-Gear EM contract? Will the contract include minimum service requirements, regardless of the size of the EM pool?
    - Selection method: Trip selection vs. Vessel selection
- Subsections: Monetary cost factors are discussed by category (Hardware/Software, Field Support Services, Data Analysis, Management/Administration); Non-monetary factors are discussed separately (operator responsibilities)

#### 6.4.1 Monetary Costs

##### 6.4.1.1 Hardware/Software

- Elements of LL and POT EM systems (incl. hard-drives)
- Reference “existing capacity” from Section 6.3
- Available estimates of equipment cost and depreciation schedules
  - Hardware cost estimates from AK Region Elec. Technologies Implementation Plan (Updated Table 6.1) -- \$9,200 for LL, \$11,000 for POT
  - Assumed 5-year depreciation period (SWI models and expected 15% annual “replacement/upgrade” cost – NPMFC staff requests any available information available on that parameter from SWI)
  - “Purchase” of EM hardware is up to 20% less costly than leasing arrangements (PFMC Whiting EM analysis)
- Direct costs to vessels: upgraded power supply (varies by vessel)
- **Trajectory/Uncertainty:**
  - Size of EM pool (e.g., expansion into Under-40’ fleet)
  - Actual depreciation and breakage rates
  - Software license costs may be affected by competition, contract status
  - Emergence of new licensed software; new contract provider with different hardware
  - Additional peripheral hardware required, unspecified to date (e.g., data-loggers, RFID tags)

#### 6.4.1.2 Field Support Services

- Concentration of fixed gear landings by port (top ports, Pre-Imp. EM service ports)
- Labor and travel cost estimates by type of service call and port (sources: AMR Service Summaries; SWI Tech. Report support services per vessel estimate)
  - Does EMWG want to formally request **AMR** to map out a “typical” LL vessel’s annual service demand in a non-confidential/non-proprietary format? The best service budget estimates available to NPFMC staff are currently in the form of a confidential 2016 Statement of Work.
- **Trajectory/Uncertainty:**
  - Number of system installs done prior to full EM integration; service/re-install replaces install as program matures; cost also depends on geographic density of vessels in EM pool
  - Cost of installs/re-installs depends on the extent of pre-wiring completed under pre-implementation, but overall the program will be moving away from completely stripping EM systems at the end of each year/selection-period
    - Some vessels might need de-install/re-install to go salmon fishing (e.g., if they have a shelter deck during EM LL fishing)
  - Travel costs decline as in-port technical capacity and fleet learning increases over time
    - Links to additional uncertainty about unpredictability of vessel effort timing
    - Will service provider keep a technician in port during the entire (limited access) PCod season? How many ports?
  - Multiple EM providers (within one gear type, or across all fixed-gear): specifics of the contract could lead to efficiency or duplication of effort
  - Trip vs. Vessel selection model
    - Planning *not* to rotate control centers in EM POT sector
  - Data retrieval: responsibility of operator or EM provider?
    - Operational EM programs tend to have the vessel operator retrieve data
    - Will data reviewer have vessels send in a partially full HD early in the season to make sure that camera angles/recording quality are working as expected?
    - Emerging technologies might eliminate the need to ship hard drives
  - Dockside monitoring
    - Not part of 2016/17 Pre-Imp. Plans, but could potentially re-emerge in the future
    - Need for DSM depends on data objectives and quality of EM rockfish species ID

#### 6.4.1.3 Data Analysis

- Data from PSMFC pre-implementation experience: rates of review (by target), estimated 2 FTE reviewers @\$50/hr or \$100k/yr (PSMFC, pers. comm.)
  - Requests **PSMFC** estimate (or rough characterization) of cost of project mgmt., reporting (e.g., Vessel Score Cards), etc. This cannot be estimated based on the projected amount of video review, and the amount of funds granted to PSMFC during pre-implementation are not itemized. This cost needs to be considered, because it is analogous to costs that are priced into the partial coverage observer contract.

- **Trajectory/Uncertainty:**
  - Amount of review
    - Policy decisions on % of hauls/trip, % of reviewed haul, data objective
    - Unknown #vessels, #trips, #hauls within EM pool in any given year; ADP selection rate
    - Effect of using e-Logbooks on the required amount of review (selection rate) to get high-quality fishery data
  - Rate of review: Might vary with software or hardware development (e.g., RFID); data objective (discards-only, all the way up to assessing discard viability); reference development automated image analysis (Section 6.1)
  - Data turnaround:
    - Policy decisions: NMFS specifies minimum standard?
    - Unknown concentration of effort in time (and how that interacts with other non-AK fisheries that PSMFC reviews video for)
    - PSMFC *could* provide self-assessment data (date HD received, date review completed), but pre-implementation experience would not necessarily be indicative of a fully implemented program and the ebbs/flows of fishing effort during the year
  - Development of open-source review software platform (request update from **SWI** on any developments/reports beyond what is in grant application abstract)
  - Third party reviewer (PSMFC) vs. full service EM provider; Non-profit vs. private enterprise
- Request input from **NMFS AKR** on steps/time/FTE to turn PSMFC data into a finished data set for management
  - Start-up: programming, infrastructure
  - Ongoing: application development, data auditing (?)

#### 6.4.1.4 Management and Administration

- Activities: deployment management, data processing/reporting, evaluating/approving VMPs, verification of proper EM installation incl. vessel visit (source: AK Region EM Tech. Imp. Plan), data storage, data audit, IERS (ongoing application development), outreach, industry training, ongoing staff time.
  - Request **NMFS AKR or FMA** information on outreach efforts to date, and whether they were funded through EM grants or general funds
  - Request **NMFS AKR or FMA** information on *new* tasks (start-up vs. ongoing) related to data processing and data assimilation into mgmt. pipeline, and whether EM program could/would require additional staff (Yes or No)
  - NPFMC staff has access to FY 2016 data on amounts of EM grants, total **FMA** funds available, and total costs for FMA labor/travel/equipment... though it's not clear how this can/should be used in the analysis
- Similar to observer program, “sea-day rates” can be misleading because they don’t include overhead, which can contribute “30% or more of total program costs” (source: AMR report on EM in BC groundfish trawl fishery)

- **Trajectory/Uncertainty:**
  - Amount of new vessels in EM pool (outreach, training, VMPs)
  - Required data storage time and image quality requirements; new technologies (compression, use of HD still images rather than video)
  - Reduced future Obs. Prog. costs RE: “automation of observer training manuals”... request **FMA staff** input on whether this makes additional funds available to EM/Observer pools, and whether it is relevant to this analysis

#### 6.4.2 Non-Monetary Costs

- Operator responsibilities defined in Pre-Imp Plans
- Categories: time (incl. EM logbooks), opportunity, impact on trip plans
- Pre-registration
- **Trajectory/Uncertainty:**
  - Travel to service ports: we can assume a service-call rate/vessel, but travel/time costs depend on geographic density of EM fleet and the number of service ports provided.
  - Development of automated data transmission
  - New operator responsibilities in the future (e.g., fish handling... esp. under full retention alternative)

## 7 Analysis of Impacts

- Refers back to Section 4 (Methodology)
- Evaluation is framed in terms of “cost effectiveness,” and not simple “gross cost.” Cost effectiveness is compared to other available monitoring alternatives (i.e., observers)
- Explicit statement that many program design choices that will shape the impacts are yet to be made, and may well evolve over the life of the EM program; *thus*, a major purpose of this RIR is to provide a baseline of “best available information” and a framework for thinking about EM that can be revisiting many times in the form of Observer Program Annual Reports.
- Note that an important outcome of this EA/RIR is to consider – or facilitate the future consideration of – whether or not the observer program (and monitoring efforts as a whole) will be able to collect adequate, reliable data in the case of future scenarios where costs (observe and EM) increase. This is in reference to the US District Court decision in *The Boat Company v. Pritzker*.
  - Reference 2015 SEA, if not done elsewhere in the document

### 7.1 Analysis of Impacts: Alternative 1 – No Action

Impact on harvesters:

- Economic and non-economic costs of carrying an observer (food, insurance, logistical considerations)
- Reference earlier summary from **FMA staff** of vessels that requested observer releases, and summary of activity of vessels that participated in EM CRP and Pre-Imp. (request also out to **AKFIN**)

- Vessels that claimed or experienced hardship under the Observer Program would not gain the benefit of an alternative path to monitoring compliance, especially now that the number of releases being granted has been reduced (due to shift from vessel selection to trip selection in ODDS)

Impact on the Observer Program:

- Reference background section on historical fee-remittances, observer-days purchased, observer-days deployed
- 2015 SEA description of cost and amount of observer coverage at different cost-levels
- Does the current Observer Program have data gaps? (Request **FMA staff** input)
  - Created by observer releases?
  - Created by cancelled trips?
- Observer Program is currently providing adequate fishery data. Alt.1 does not introduce the possibility that available funds will be spread across two strata (observers & EM)
  - Does **EMWG** find it appropriate to note that the amount of Federal funds that currently subsidize observer fees for purchasing sea-days might be reduced in the near-future?

Impact on Processors:

- No effect relative to status quo. If evaluated against the possibility of having to coordinate new dockside monitoring or hard-drive collection and shipping (in non-EM-service ports), Alt. 1 could have a small positive marginal effect on processors.

## 7.2 Analysis of Impacts: Alternative 2 – Electronic Monitoring for Catch Estimation

- Costs vs. Cost Effectiveness
- Elements of the EM provider contracting process that could affect program costs and impacts: #providers, hardware/software compatibility, contract length, minimum coverage levels, third party review, etc... (input welcome from **SWI/AMR**)

### 7.2.1 Impacts on Vessels in the EM Stratum

- No increase in monitoring fees relative to status quo
- Relieved of non-monetary and logistical costs of carrying an observer
- Operator responsibilities and other non-monetary costs described earlier
- Direct-to-vessel costs (power supply and other ancillary items)
- EM not expected to directly drive fleet consolidation
- This might be the appropriate place to discuss pros and cons of “EM cooperatives”
- Could moving out of the human observer pool reduce a vessel’s insurance costs (question for **ALFA/NPFA**)

### 7.2.2 Impacts on Other Vessels in the Partial Observer Coverage Category

- Data quality and optimal deployment

### 7.2.3 Impacts on NMFS Observer Program

- Reference FMA’s preliminary analysis of effects on observer deployment that have *already* occurred under the CRP and Pre-Imp. periods
- Effects on observer deployment and data quality (biological samples, effects of EM fleet concentration in one area/stratum)
- Uncertainty regarding division of funds between observer and EM sectors
- Paying for “overhead” of two programs instead of one
  - Additional costs: new application development, data auditing (additions from **NMFS AKR or FMA?**)
- Data integration (time lag?)
- Dockside monitor-days might come out of partial coverage observer-day budget

### 7.3 Analysis of Impacts: Alternative 2, Option 1 – Require Full Retention of Key Species

- Benefits: (refer to purpose and need?), increased data quality could allow for additional sampling. Need **NMFS AKR** general input on this Option)
- Opportunity cost of retaining less profitable fish
- Operational impact if fish handling/stowing procedures change
- Shoreside processors experienced additional costs and responsibilities in testing full retention in west coast fisheries (dock and storage space used on non-marketable species; ice; trucking to disposal sites, etc)
- Cost of dockside monitoring (if that is indeed required under the full retention option – **NMFS AKR?**); would be more costly in remote ports.
- Additional video review costs to ensure compliance with full retention? (**PSMFC** input?)

### 7.4 Analysis of Impacts: Alternative 3 – Electronic Monitoring for Logbook Compliance Monitoring

- Can use PSMFC review data to estimate marginal savings by reviewing less video data. However, given how PSMFC staffs its review team, it is not clear that a logbook audit program would mean that fewer reviewers (FTE) are kept on staff. (**PSMFC** input?)
- Effects depend on the proportion of video that is reviewed, the accountability measures (undefined), and who is responsible for the cost of additional review for non-compliant logbooks

## 8 Management and Enforcement Considerations

- NPFMC staff looks to **NMFS AKR and NOAA OLE staff** for direct writing contributions in this section.
- Includes response to Enforcement Committee comments?

## 9 Summation of Alternatives with Respect to National Net Benefits

Note: Sometimes this section is not completed until the Council identifies a preferred (or preliminary preferred) alternative. However, the proposed schedule for action leaves little time between initial and public review. NPFMC staff will have drafted a first run at this for initial review, focusing on the net benefits of an EM program more broadly, and not weighing the as-yet-undetermined elements even though they are likely to move the cost/benefit scale (e.g., full retention, logbook audit, % of video reviewed).

- Ideally, EM establishes a path for NMFS to get fishery data (discarded catch) from vessels that would otherwise be unobserved (Under-40' vessels, life raft exemptions[?]).
- Vessels that opt into the EM pool are theoretically realizing a benefit (by their own calculation) by avoiding the requirement to carry a human observer and the operational/social effects that might have been reducing their utility and engagement under the existing set of monitoring options.
- EM is not expected to drive fleet consolidation
- Note that a full quantitative accounting of costs and benefits is not possible because:
  - Some costs/benefits are non-monetary
  - Some aspects of the program are not yet determined. Elements that are determined (or will be) have cost profiles that are anticipated to change with the experience of time. ... In particular, it is difficult to gauge the impact on the Observer Program of integrating the EM category into the partial coverage category (“impact” in terms of monies available to purchase human observer-days). EM costs might be high at first and then trend downwards. However, even if costs come down the undetermined nature of the EM provider/reviewer contract(s) could put a floor on EM costs if participation/effort in the EM pool drops to a low level.

## 10 Initial Regulatory Flexibility Analysis

Note: some of these sections can be noted as “to be completed” at the initial review stage.

### 10.1 Introduction

Boilerplate. The language in the NPFMC Analytical Template states that the universe of entities considered in the IRFA is defined by segments of the industry on whom “the effects of the rule” primarily fall. The guidance from the NMFS AK Regional Economist notes that the bar should be set according to (1) directly regulated, and (2) adversely affected. It would seem that some harvesters might only benefit from gaining the option to carry EM rather than an observer. However, it is difficult to factually guarantee that a set of harvesters would certainly benefit from action (“certify”). Therefore, the typical practice suggests that we should include *all* fixed-gear harvesters in the universe of entities for analysis in the IRFA.

### 10.2 IRFA Requirements

Boilerplate

### **10.3 Definition of a Small Entity**

Boilerplate

### **10.4 Reason for Considering the Proposed Action**

Feb. 2016 purpose and need

### **10.5 Objectives of Proposed Action and Its Legal Basis**

Boilerplate, plus copied “objective” statement from introduction section of the EA/RIR/IRFA. Need confirmation as to whether this is both a regulatory amendment *and* an FMP amendment. This section should reference the later section of the EA/RIR/IRFA that goes through each MSA National Standard and notes how they are addressed by the preferred alternative. Review by **NMFS AKRO** staff is requested prior to release of public review draft.

### **10.6 Number and Description of Directly Regulated Small Entities**

AKFIN will provide ex-vessel revenue data for fixed-gear CVs that were active in 2015. That data will be used to classify vessels as small or non-small entities according to SBA standards. Vessels should be stratified by gear type (LL, POT, both) and vessel size category.

SBA classifications for processors are based on FTE employment across the plant’s ownership company *nation-wide*. We have poor data on employment and ownership affiliations. AK Department of Labor data is not generally available at the plant level, and certainly would not cover owned operations in other states. As a result, performing IRFA analyses of the processing sector is very difficult, and sometimes unreliable. NPMFC staff seeks guidance from **NMFS AKRO** as to whether shoreside processors are directly regulated by the proposed action. One could argue that processors are not directly regulated because the proposed action would not alter the observer fee structure (50% of fees are supposedly paid by the processor). However, one might consider processors to be directly regulated if the action requires (or could require) plants to change operations to allow for dockside monitoring (not part of the 2017 pre-implementation plan) or to assist in the retrieval and shipping of EM hard drives. For reference, the IRFA prepared for the Restructured Observer Program in March 2011 (Am. 86/76) did include processors as regulated entities, but estimated number of small entities was heavily caveated (Table 75 on p.223 of that analysis).

### **10.7 Recordkeeping and Reporting Requirements**

NPFMC staff requests input (potentially draft language) from **NMFS AKRO** staff prior to release of the public review draft.

### **10.8 Federal Rules that may Duplicate, Overlap, or Conflict with the Proposed Action**

NPFMC staff requests input (potentially draft language) from **NMFS AKRO** staff prior to release of the public review draft.

## 10.9 Description of Significant Alternatives to the Proposed Action

This section will be completed once the Council has identified a preferred alternative.

## IV. Data Sources, Available Information, and Tables Prepared

### Data Sources and summaries:

#### Fishery demographics:

- AKFIN data
  - Observer Program data on average #hauls/trip (2014 – July 2016) by gear, vessel size category, fishing area, and target
  - 2014-2015 vessel-level data on #trips by gear, landing port, target, and month (by vessel size category)
- NMFS Observer Data
  - “Category”: #CVs delivering shoreside, #trips, “days fished,” estimated days/trip... by gear type and vessel length category (2013-2015)
  - “Port”: same as above, but by landing port (2015 only)
  - “Month\_Port”: LL vs. POT fleet average trips per month for the 40’-57.5’ shoreside CV size category, by landing port (2013-2015)
    - Data set also contains “days fished” (imperfect analogy to trip length)
- Pot Fishery Demographics Report, prepared for EMWG, 2013 & 2014 data (Nov. 2015)
  - # pot vessels targeting PCod, by vessel length category
  - # landing events by vessel length category and by port/month/port\*month
- “Alaska Fixed Gear Fishery Characteristics,” 2013 data (Feb. 2015)
  - Total number of fixed-gear ports; Concentration of landings in certain ports
  - % vessels that make 1-3 trips per year, >3 trips per year (similar across size categories)
  - Prevalence of target species across vessel size categories
  - Length of fishing season, by region and vessel size category
- \*DRAFT\* Fleet profile for fixed-gear vessels < 40’ LOA (NMFS AKRO, in progress)
  - 2013-2015 data: #vessels, gear type (LL, POT, JIG), area fished, and target fishery; percent of retained catch in each vessel length category (by gear type and area); trips/year, primary ports (#vessel and #landings by vessel length group)
  - 2015 data: #trips by vessel size (and by gear, or by target)
  - *Note: will not be included in Oct. 2016 Initial Review Draft unless updated by NMFS AKRO staff before mid-August*

#### EM cooperative research and performance:

- EM Workgroup Pre-Implementation Plans for 2016 & 2017
  - # vessels, deployment model, service ports, operator responsibilities
  - To be determined: frequency of hard drive submission (data turnaround time), percentage and portion of hauls on selected EM trips that are reviewed (“subsampling”), data storage

requirements for NMFS, whether to limit EM pool to vessels fishing in the GOA management area

- Alaska Region Electronic Technologies Implementation Plan (FMA Division, January 2015), and “Update to Table 6.1”  
(<https://alaskafisheries.noaa.gov/sites/default/files/akremerimplementationplan.pdf>).
  - Unit costs for: EM control boxes and camera/sensor packages, hard drives, video review software license
  - Program overhead costs (estimated for a program of 90 LL vessels and 30 pot vessels): shipping (equipment and hard drives); training, travel and labor for installation/maintenance/repair
  - FTEs: contractors’ program management, port service technicians, video review
- PSMFC’s Final Report, Alaska Track 1: Review of the 2015 Season (Al-Humaidhi, et al., June 2016)
  - Vessels, trips, days/trip (by target), hauls/day, hauls/trip, and review-time/haul for LL vessels participating in 2015 cooperative research (40’ – 57.5’), by target species (halibut, sablefish, Pacific cod)
- Saltwater and NPFA’s technical memo on EM for pot vessels, “Electronic Video Monitoring for Small Vessels in the Pacific Cod Fishery, Gulf of Alaska” (Buckelew et al., July 2015)
  - Days/trip, hauls/trip, review-time/haul
  - Modeled per-vessel costs for a 55 vessel pot EM program (granting assumptions): equipment, installation, field service, data analysis, program management. Model aggregates many components and point estimates are not available to the reader: cost of budgeting/reporting/oversight/logistics, personnel recruiting/compensation/travel, data retrieval/review.
- *\*Confidential\** memo from Archipelago on estimated budget for 2016 pre-implementation work
  - Labor (\$), effort (days), travel (\$), and expenses (\$) for: project planning, project management, EM equipment and supplies, installation and service, project reporting, “contingency” (e.g., service events in remote ports, reserve camera/peripheral units)
- Existing hardware capacity
  - Longline EM: Archipelago has provided an inventory of EM equipment that has already been “sold into” the program, as well as an estimate of what will be installed by the end of 2016 and additional equipment that will be available for installation in 2017. If funds are available for “pre-wiring” during the last quarter of 2016, those installations would represent a shift of stocks from 2017 to 2016. Refer to Table 15.
  - Pot cod: expectation of 30 systems installed by end of 2017 (seeking confirmation by SWI)
- Archipelago’s 2015 and 2016 “Service Summaries”
  - Description of work items, and associated data for each record (port, hours worked, travel hours if applicable). Illustrates the high variability in terms of effort and cost across service events.
  - “Work items” include: new install, re-install, removal, control box removal, camera change, camera service/troubleshoot, camera view change, component adjustment, software update, adjust software settings, data retrieval.
- ALFA vessel debrief survey summaries (2015 and 2016 to-date)

- Install coordination time, troubleshooting at-sea (hrs.), troubleshooting in port (hrs.), alteration of fishing behavior (trip plan, fish-handling, haul/set time, deck configuration), safety concerns, additional equipment purchased by vessel
- For 2016 summary, it was noted whether or not vessel had had an EM system previously installed

Observer Program:

- Observer Program Annual Reports (2014 and 2015 fishing years)
  - Fees collected, amount sequestered, NMFS supplementary funds, total observer funds available, funds used to purchase observer-days (% from observer fees, % from Federal funds), number of days purchased, average cost per day, days used, and days carried to the following year
  - Observers trained, #debriefings and mid-cruise debriefings, size of FMA debriefing staff
  - Total number of observers deployed and total number of observer-days (*aggregates full and partial coverage categories, and observers on vessels and observers at processing plants*)
  - 2015 Partial coverage category: number of vessels, number of trips, number of trips observed (by gear type, vessels length category and area fished (GOA/BSAI))
  - Total FMA spending, 2014 & 2015. Total amount includes: division leadership/coordination, data analysis/interpretation, application development (ODDS) and data presentation, observer training and curriculum development, debriefing and quality control, operation of field offices in Anchorage/Kodiak/Dutch Harbor, gear inventory, partial coverage deployment, EM funding
    - FMA funds spent on deployment to partial coverage category (2015 only)
    - FMA funds spent on EM development (2015 only)
- FMA FY2016 program infrastructure budget (high-level), provided by FMA Division
  - EM Funds spent on: “standard cam” EM program, and other (“stereo cam” deployment, real-time reporting of effort/haul location, elec. reporting web tool, pot cod deployment, automation of observer training materials)
  - Total observer deployment funds available, and amount contributed by partial coverage industry fees
  - FMA Division overhead:
    - Available budget, total FMA labor costs (FTE + contractors), “gear,” travel, “remaining”
- Information on vessels that have requested observer releases since 2013, whether they were granted, and whether those vessels went on to participate in EM cooperative research (or 2016 pre-implementation). Demographic information on those vessels (landing ports, gear type, fisheries prosecuted). NPFMC staff understands that **FMA staff** will provide this information.

## Tables:

**Table 1** 2015 Partial observer coverage category vessel count, trips, and observer coverage, by gear type and FMP area

<b>Gear</b>	<b>Area</b>	<b>Vessel Size</b>	<b># Vessels</b>	<b># Trips</b>	<b># Observed Trips</b>	<b>% Observed</b>
<b>LL</b>	GOA	< 40'	333	1,431	0	0%
		40' - 57.5'	337	1,854	202	11%
		> 57.5'	167	1,040	238	23%
	BSAI	< 40'	64	476	0	0%
		40' - 57.5'	25	128	9	7%
		> 57.5'	44	154	30	19%
<b>POT</b>	GOA	< 40'	1	5	0	0%
		40' - 57.5'	15	150	27	18%
		> 57.5'	59	587	139	24%
	BSAI	40' - 57.5'	3	28	4	14%
		> 57.5'	43	450	99	22%
<b>TRAWL</b>	GOA	> 57.5'	68	2,239	538	24%
	BSAI	> 57.5'	22	228	57	25%

Source: Observer Program Annual Report, 2015 (NMFS, 2016).

**Table 2 Shoreside longline CVs (40' – 57.5' LOA): % of trips observed, by port (2013 through 2015)**

	2013		2014		2015	
	Total Trips	% Observed	Total Trips	% Observed	Total Trips	% Observed
Kodiak	411	12.9%	428	20.6%	454	12.1%
Sitka	354	4.5%	336	12.2%	359	13.1%
Seward	255	10.6%	195	10.8%	311	9.0%
Homer	206	4.4%	174	13.2%	154	5.8%
Juneau	137	3.6%	125	13.6%	142	9.2%
Dutch Harb.	133	3.8%	125	12.8%	65	6.2%
Petersburg	110	14.5%	110	11.8%	102	13.7%
Sand Point	117	5.1%	85	9.4%	62	9.7%
Wrangell	45	0.0%	49	12.2%	61	11.5%
Cordova	44	0.0%	42	2.4%	32	6.3%
Whittier	20	5.0%	22	4.5%	65	15.4%
Adak	56	1.8%	25	32.0%	25	8.0%
Yakutat	38	2.6%	31	19.4%	36	8.3%
Hoonah	30	0.0%	26	11.5%	24	4.2%
King Cove	32	3.1%	16	0.0%	24	4.2%
Ketchikan	21	4.8%	21	4.8%	20	5.0%
Akutan	18	27.8%	16	50.0%	18	0.0%
Atka	14	0.0%	23	47.8%	14	7.1%
Craig	18	0.0%	15	20.0%	17	0.0%
Alitak Bay	21	0.0%	20	50.0%	8	0.0%
St. Paul	20	0.0%	6	0.0%	9	11.1%
False Pass	8	0.0%	11	18.2%	9	11.1%
Port Alexander	3	0.0%	6	50.0%	3	66.7%
Other AK	2	50.0%	3	66.7%	4	25.0%
Valdez	3	0.0%	1	100.0%	2	0.0%
Bellingham	No observed trips					
Elfin Cove						
Kenai						
Nome						
Port Protection						
Port Armstrong						

Source: NMFS Observer Program

**Table 3 Shoreside pot CVs (40' – 57.5' LOA): % of trips observed, by port (2013 through 2015)**

	2013		2014		2015	
	Total Trips	% Observed	Total Trips	% Observed	Total Trips	% Observed
King Cove	68	0.0%	87	13.8%	68	10.3%
Kodiak	21	0.0%	12	33.3%	30	43.3%
Sand Point	7	0.0%	17	35.3%	29	10.3%
Dutch Harb.	2	0.0%	22	0.0%	21	4.8%
Homer	8	0.0%	15	0.0%	20	20.0%
Akutan			9	100.0%	7	42.9%
IFP	4	100.0%				
False Pass	No observed trips					

Source: NMFS Observer Program

**Table 4 Fixed-gear vessel count by gear type and vessel size category, 2014 and 2015**

Gear	Category	2014	2015	Total
<b>All Vessels</b>		1,069	1,040	1,231
<b>LL</b>	< 40'	439	390	517
	40'-57.5'	368	359	402
	> 57.5	181	209	218
	<b>Total</b>	<b>989</b>	<b>959</b>	<b>1,138</b>
<b>POT</b>	< 40'	2	2	3
	40'-57.5'	25	30	34
	> 57.5	93	99	112
	<b>Total</b>	<b>120</b>	<b>131</b>	<b>149</b>
<b>BOTH</b>	< 40'	1	1	2
	40'-57.5'	6	10	10
	> 57.5	33	39	44
	<b>Total</b>	<b>40</b>	<b>50</b>	<b>56</b>

Source: Fish Ticket data, provided by AKFIN.

**\*\* Note on “Days Fished” \*\***

The length of fishing trips is highly variable due to individual fishing plans, catch rates, market/processor demands, weather, and a range of other factors. Estimating a representative trip length for subunits of the Alaska fixed-gear fleet is a necessary exercise in order to understand the extent to which demand for observer-days might be reduced as more or fewer vessels opt into the EM selection stratum. Due to the known variability mentioned above, average trip length (days per trip) is sufficient for a general discussion of impacts. The best available information on trip length is derived by taking the difference between the date when fish are landed and the date on which gear was first set in the water; this is presented as “Days Fished” in the tables that follow. Days Fished is a close approximation of trip length, but not a precise measurement. Days Fished does not capture time out of port prior to the setting of gear, thus it likely underestimates the total number of days invoiced by an observer provider company for the trip. This underestimation will be greater for trips that fish farther from port. One might broadly assume that trips farther afield are more likely to occur in the Western GOA and BSAI areas, or on larger vessels with greater hold capacity, though the analysts do not possess the data necessary to test this assumption. As part of the ADP process, NMFS FMA staff develops internal methods to project the total number of

observer-days required to provide adequate coverage within its budget constraints. Those methods are too complex to be grafted onto the data available on Days Fished. However, a coarse adjustment could be made by adding between zero and one day to the Days Fished for each trip record.<sup>2</sup> Because that adjustment factor would not be constant across vessels of different sizes fishing in different areas, this analysis will proceed with estimating days per trip using Days Fished, and note the caveat regarding slight underestimation of trip length.

Days Fished is not the preferred metric for estimating the amount of video data that would be collected and reviewed on a fixed gear trip. Days fished might overestimate the amount of fishing activity that occurred on a trip for two reasons: the metric captures the unknown and variable time spent returning to port after filling the hold, and the number of gear hauls per day is likely to vary across trips and vessels. When the information is available, the analysts use stratified estimates of hauls per trip when considering the video review and reporting components of EM program costs.<sup>3</sup>

**Table 5 Hook-and-line (longline) gear participation and activity by CV size category, 2013 through 2015**

YEAR	CATEGORY	# Vessels	# Trips	Days Fished*	Days/Trip
<b>2013</b>	LL Vessels < 40'	489	2,535	6,494	2.6
	LL Vessels 40'-57.5'	378	2,138	9,151	4.3
	LL Vessels > 57.5'	186	1,492	9,272	6.2
<b>2013 Total</b>		<b>1,053</b>	<b>6,165</b>	<b>24,917</b>	
<b>2014</b>	LL Vessels < 40'	447	2,088	5,725	2.7
	LL Vessels 40'-57.5'	362	1,931	7,769	4.0
	LL Vessels > 57.5'	175	1,125	6,583	5.9
<b>2014 Total</b>		<b>984</b>	<b>5,144</b>	<b>20,077</b>	
<b>2015</b>	LL Vessels < 40'	388	1,909	5,451	2.9
	LL Vessels 40'-57.5'	349	2,037	8,480	4.2
	LL Vessels > 57.5'	174	1,152	6,672	5.8
<b>2015 Total</b>		<b>911</b>	<b>5,098</b>	<b>20,603</b>	

\* "Days Fished" allows for a close approximation of trip length, but not a precise measurement. Refer to a more detailed explanation above Table 5 in this document.

Source: NMFS Catch Accounting data, provided by AKRO SF. Observer Program data captures all activity by vessels participating in fisheries that are subject to observer regulations; this includes some fisheries that occur in state waters.

<sup>2</sup> The adjustment factor would be less than one day because some number of trips commences fishing on the same day that the vessel left port.

<sup>3</sup> Haul data is not available from the Observer Program for vessels of less than 40' LOA, as those vessels are currently in the zero-selection pool (i.e., they do not carry observers).

**Table 6 Pot gear participation and activity by CV size category, 2013 through 2015**

<b>YEAR</b>	<b>CATEGORY</b>	<b># Vessels</b>	<b># Trips</b>	<b>Days Fished*</b>	<b>Days/Trip</b>
<b>2013</b>	Pot Vessels < 40'	2	C	C	2.8
	Pot Vessels 40'-57.5'	22	110	278	2.5
	Pot Vessels > 57.5'	96	883	3,414	3.9
<b>2014</b>	Pot Vessels < 40'	1	C	C	2.3
	Pot Vessels 40'-57.5'	18	162	397	2.5
	Pot Vessels > 57.5'	93	1,092	3,928	3.6
<b>2015</b>	Pot Vessels < 40'	1	C	C	2.8
	Pot Vessels 40'-57.5'	18	178	461	2.6
	Pot Vessels > 57.5'	91	1,044	3,535	3.4

C = confidential (annual subtotals excluded in order to maintain confidentiality).

\* "Days Fished" allows for a close approximation of trip length, but not a precise measurement. Refer to a more detailed explanation above Table 5 in this document.

Source: NMFS Catch Accounting data, provided by AKRO SF. Observer Program data captures all activity by vessels participating in fisheries that are subject to observer regulations; this includes some fisheries that occur in state waters.

**Table 7 Hook-and-line gear CV participation and activity by landing port, 2015**

<b>Port</b>	<b>#Vessels</b>	<b>#Trips</b>	<b>Days Fished</b>	<b>Days/Trip</b>
Kodiak	186	1,050	4,251	4.0
Sitka	168	619	2,068	3.3
Homer	133	362	1,466	4.0
Seward	129	582	2,817	4.8
Petersburg	110	329	1,102	3.3
Juneau	90	259	1,136	4.4
Wrangell	64	153	577	3.8
Yakutat	61	265	852	3.2
Dutch Harb.	57	198	1,320	6.7
Sand Point	55	143	769	5.4
Hoonah	49	107	369	3.4
Cordova	46	112	423	3.8
Ketchikan	31	54	211	3.9
Akutan	28	72	495	6.9
King Cove	26	57	341	6.0
Bellingham	24	25	212	8.5
St. Paul	22	189	335	1.8
Craig	17	24	91	3.8
Whittier	15	79	342	4.3
Togiak	13	44	138	3.1
Savoonga	13	90	178	2.0
Alitak Bay	12	19	59	3.1
Atka	11	70	407	5.8
False Pass	8	15	102	6.8
Adak	8	32	228	7.1
Haines	6	14	35	2.5
St. George	5	68	68	1.0
Nome	5	20	57	2.9
Valdez	4	8	38	4.8
Pt. Protect.	4	5	9	1.8
Kenai	4	4	15	3.8
Dillingham	3	12	34	2.8
Elfin Cove	3	4	9	2.3
Other Alaska	3	4	12	3.0
Port Alex.	2	C	C	2.7
Tenakee Sp.	1	C	C	5.8
Hyder	1	C	C	2.0
<b>TOTAL</b>		<b>5,098</b>	<b>20,603</b>	<b>4.0</b>

Source: NMFS Catch Accounting data, provided by AKRO SF. C = confidential.

Note: Ports listed in descending order of #vessels that made a landing in 2015. Vessel count total is not displayed because vessels that made landings in multiple ports would be duplicated.

**Table 8 Hook-and-line gear CV participation and activity by landing port and vessel size category, 2015**

Port	LL Vessels < 40'				LL Vessels 40'-57.5'				LL Vessels > 57.5'			
	#Vessels	#Trips	Days Fished	Days/Trip	#Vessels	#Trips	Days Fished	Days/Trip	#Vessels	#Trips	Days Fished	Days/Trip
Kodiak	52	336	1,138	3.4	67	454	1,620	3.6	67	260	1,493	5.7
Sitka	50	164	422	2.6	83	359	1,273	3.5	35	96	373	3.9
Homer	44	135	415	3.1	54	154	597	3.9	35	73	454	6.2
Seward	8	40	156	3.9	55	311	1,315	4.2	66	231	1,346	5.8
Petersburg	40	163	409	2.5	43	102	401	3.9	27	64	292	4.6
Juneau	27	79	273	3.5	42	142	671	4.7	21	38	192	5.1
Wrangell	28	79	223	2.8	27	61	284	4.7	9	13	70	5.4
Yakutat	17	164	393	2.4	11	36	140	3.9	33	65	319	4.9
Dutch Harb.	8	32	161	5.0	17	65	439	6.8	32	101	720	7.1
Sand Point	9	27	111	4.1	24	62	294	4.7	22	54	364	6.7
Hoonah	29	66	193	2.9	13	24	104	4.3	7	17	72	4.2
Cordova	19	50	155	3.1	12	32	130	4.1	15	30	138	4.6
Ketchikan	11	22	71	3.2	12	20	78	3.9	8	12	62	5.2
Akutan	9	34	183	5.4	7	18	132	7.3	12	20	180	9.0
King Cove	6	11	41	3.7	8	24	144	6.0	12	22	156	7.1
Bellingham					2	C	C	3.5	22	23	205	8.9
St. Paul	13	174	244	1.4	3	9	37	4.1	6	6	54	9.0
Craig	7	7	26	3.7	10	17	65	3.8				
Whittier	5	14	56	4.0	10	65	286	4.4				
Togiak	13	44	138	3.1								
Savoonga	13	90	178	2.0								
Alitak Bay	4	5	14	2.8	4	8	20	2.5	4	6	25	4.2
Atka	5	49	213	4.3	4	14	128	9.1	2	C	C	9.4
False Pass					5	9	66	7.3	3	6	36	6.0
Adak					5	25	177	7.1	3	7	51	7.3
Haines	6	14	35	2.5								
St. George	5	68	68	1.0								
Nome	2	C	C	3.2	3	14	38	2.7				
Valdez	2	C	C	4.6	1	C	C	5.5	1	C	C	4.0
Pt. Protect.	4	5	9	1.8								
Kenai	3	3	12	4.0	1	C	C	3.0				
Dillingham	3	12	34	2.8								
Elfin Cove	3	4	9	2.3								
Other Alaska					3	4	12	3.0				
Port Alex.					2	C	C	2.7				
Tenakee Sp.	1	C	C	5.8								
Hyder	1	C	C	2.0								
<b>TOTAL</b>		<b>1,909</b>	<b>5,451</b>	<b>2.9</b>		<b>2,037</b>	<b>8,480</b>	<b>4.2</b>		<b>1,152</b>	<b>6,672</b>	<b>5.8</b>

Source: NMFS Catch Accounting data, provided by AKRO SF. C = confidential.

Note: Ports listed in descending order of #vessels that made a landing in 2015. Vessel count total is not displayed because vessels that made landings in multiple ports would be duplicated.

**Table 9 Pot gear CV participation and activity by landing port, 2015**

Port	#Vessels	#Trips	Days Fished	Days/Trip
Dutch Harb.	33	297	1,135	3.8
Kodiak	31	390	1,222	3.1
Akutan	25	166	594	3.6
King Cove	18	115	282	2.5
Sand Point	16	142	403	2.8
IFP**	13	58	180	3.1
Homer	6	43	142	3.3
False Pass	5	*	*	2.8
Atka	1	C	C	6.5
<b>TOTAL</b>		<b>1,227</b>	<b>4,010</b>	<b>3.3</b>

Source: NMFS Catch Accounting data, provided by AKRO SF. C = confidential.

Note: Ports listed in descending order of #vessels that made a landing in 2015. Vessel count total is not displayed because vessels that made landings in multiple ports would be duplicated.

\*= data redacted to preserve confidentiality.

\*\* IFP = Inshore Floating Processor (processes in State of Alaska waters only).

**Table 10 Pot gear CV participation and activity by landing port and vessel size category, 2015**

Port	Pot Vessels	Pot Vessels 40'-57.5'				Pot Vessels > 57.5'			
	< 40'	#Vessels	#Trips	Days Fished	Days/Trip	#Vessels	#Trips	Days Fished	Days/Trip
Dutch Harb.		3	21	67	3.2	30	276	1,068	3.9
Kodiak		3	30	84	2.8	28	360	1,138	3.2
Akutan		1	C	C	3.7	24	159	568	3.6
King Cove		7	68	154	2.3	11	47	128	2.7
Sand Point	Conf.***	3	29	62	2.1	13	113	341	3.0
IFP**						13	58	180	3.1
Homer		2	C	C	3.0	3	18	68	3.8
False Pass		1	C	C	2.7	4	*	*	2.8
Atka						1	C	C	6.5
<b>TOTAL</b>		<b>20</b>	<b>178</b>	<b>461</b>	<b>2.6</b>	<b>127</b>	<b>1,044</b>	<b>3,535</b>	<b>3.4</b>

Source: NMFS Catch Accounting data, provided by AKRO SF. C = confidential.

Note: Ports listed in descending order of #vessels that made a landing in 2015. Vessel count total is not displayed because vessels that made landings in multiple ports would be duplicated.

\*= data redacted to preserve confidentiality.

\*\* IFP = Inshore Floating Processor (processes in State of Alaska waters only).

\*\*\* Only 1 vessel <40' LOA fished pot gear in 2015, landing its catch in Homer, AK with an average trip length of 2.8 days/trip.

**\*\* Notes for Table 11 and Table 12\*\***

Activity by Port\*Month can be sliced many different ways. To remain presentable, these tables are focused on average number of trips per year, over the 2013 through 2015 time period. Average trip lengths can be layered on top of this information where observer-demand and video review quantity is concerned. This layering removes the information in the document one step farther from actual fishery data, but makes the information more accessible and addresses confidentiality restrictions. Aggregating across three years smooths some of the inherent annual variability in the timing of fixed-gear fishing effort. For the time being, trips per month (by port) is only presented for the 40'-57.5' vessel size

category. The EMWG may instruct NPFMC staff as to whether similar tables should be provided for the < 40' and > 57.5' vessel size categories.

To find a count of how many unique vessels delivered to a certain port, refer to Table 8 (LL) and Table 10 (POT). Those tables only display 2015 data in order to make the tables easier to read. Again, EMWG may instruct NPFMC staff to include all years (2013-2015) if it feels that more than the most recent snapshot is required.

**Table 11 Hook-and-line gear CV average trips per month by port, 40' to 57.5' LOA category, 2013 through 2015**

Port		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Avg.	
2017 EM Service Ports	Kodiak	59	77	56	14	26	13	12	12	35	55	31	42	431	
	Sitka			53	64	84	39	23	24	35	26	2		350	
	Homer	<1	3	14	16	28	37	7	28	19	22	3	1	178	
> 100 trips (area total 2013-15)	SE Alaska	Juneau			16	24	28	14	5	15	11	19	2	135	
		Petersburg			15	19	20	13	3	11	16	8	2	107	
		Seward	13	33	68	25	25	18	4	9	25	29	4	254	
		Wrangell			6	14	12	6	4	9	1	1		52	
		Yakutat			3	8	9	4	4	5	2	<1		35	
	Southcentral	Cordova		<1	6	10	7	3	3	6	3			39	
		Whittier	7	4	4	2	2	1	1	3	1	1	5	5	36
	WGOA/BSAI	Dutch Harb.	13	10	12	10	8	8	11	14	12	7	2	2	108
		Sand Point	1	4	6	3	9	7	9	14	17	15	4		88
		Adak			1	3	3	5	9	7	5	3			35
< 100 trips (area total 2013-15)	SE Alaska <sup>a</sup>			3	8	13	13	8	8	9	5	2		69	
	Southcentral <sup>b</sup>			<1		13	4	2	1	1				20	
	WGOA/BSAI <sup>c</sup>			<1	1	4	6	15	28	30	7			92	
	Other <sup>d</sup>			<1			<1	1	2	1	<1			5	
TOTAL		93	131	262	222	291	190	121	196	224	198	56	50	2,034	

Source: NMFS Observer Program data, provided by AKFIN.

Landing ports (by area) that received fewer than 100 cumulative landings from 2013-2015 are condensed to maintain confidentiality:

<sup>a</sup>SE Alaska: Hoonah, Ketchikan, Craig, Port Alexander, Elfin Cove, Port Armstrong, Port Protection; <sup>b</sup>Southcentral: Alitak Bay, Valdez, Kenai; <sup>c</sup>WGOA/BSAI: King Cove, Akutan, Atka, Nome, St. Paul, False Pass; <sup>d</sup>Other: Other AK, Bellingham (WA).

**Table 12 Pot gear CV average trips per month by port, 40' to 57.5' LOA category, 2013 through 2015**

Port	JAN	FEB	SEP	OCT	NOV	DEC	Annual Avg.
King Cove	33	7	25	9			74
Kodiak*	12	6	<1	<1	1	<1	21
Sand Point	12	4	2				18
Dutch Harbor*	7	1	1	2	2	2	15
Other**	8	3		1	2	8	22
TOTAL	72	22	28	13	5	11	150

Source: NMFS Observer Program data, provided by AKFIN.

\* Kodiak and Dutch Harbor are identified as primary service ports for the 2017 Pre-Implementation program; Sand Point might be designated as a service port depending on available funding.

\*\* Other (in descending order of landings received): Homer, Akutan, Inshore Floating Processor, False Pass. Ports aggregated to maintain confidentiality.

**Table 13 Average number of line hauls per fishing trip for fixed-gear CVs, by vessel category, gear type, target species, and fishing area (2014 through July 2016)**

Vessel Length	Gear	Target	Area	Avg. Hauls/Trip
40' - 57.5'	LL	Halibut	GOA	4.7
	LL	Halibut	BSAI	3.6
	LL	Sablefish	GOA	5.1
	LL	Pacific Cod	GOA	5.2
	LL	Pacific Cod	BSAI	2.0
	POT	Pacific Cod	GOA	2.2
58' +	LL	Halibut	GOA	9.7
	LL	Halibut	BSAI	8.3
	LL	Sablefish	GOA	8.9
	LL	Pacific Cod	GOA	4.3
	LL	Pacific Cod	BSAI	8.0
	POT	Sablefish	BSAI	16.3
	POT	Pacific Cod	GOA	4.0
POT	Pacific Cod	BSAI	4.7	

Source: NMFS Observer Program data, provided by AKFIN.

Notes: No observer data is available for the <40' vessel length category. Targeting of sablefish with pot gear will be permitted in the GOA beginning in 2017, and shorter trips with fewer hauls might be observed in the future due to the geographic and oceanographic nature of GOA fishing grounds.

**Table 14 Characterization of selected EM cost factors (viewed as annual costs over the life of the program)**

<b>Category</b>	<b>Cost Factor</b>	<b>Trajectory</b>	<b>Uncertainty</b>
<b>Hardware</b>	Control Center*	Decreasing	Start-up pool; Size of EM Pool; Depreciation/Breakage rate
<b>Hardware</b>	Camera/Sensor Package	Decreasing	Start-up pool; Size of EM Pool; Depreciation/Breakage rate; Undefined required peripherals
<b>Hardware</b>	Installation	Decreasing	Start-up pool
<b>Hardware</b>	Hard-Drives	Decreasing	New technologies
<b>Hardware</b>	Software Licensing	Null or Decreasing	Contract requirements; Competition
<b>Field Support</b>	Re-installation	Unknown	Demographics; Port capacity
<b>Field Support</b>	Ctrl. Center Rotation	Unknown	Deployment method; Port capacity
<b>Field Support</b>	Labor/Travel	Null or Decreasing	Demographics; Deployment method; Port capacity
<b>Field Support</b>	Project Mgmt.	Unknown	Contract requirements
<b>Field Support</b>	Training	Decreasing	Port capacity
<b>Field Support</b>	Data Retrieval	Decreasing	Operator responsibilities; Demographics; Automated data transmission
<b>Field Support</b>	Dockside Monitoring**	Null or Increasing	Undefined data objectives
<b>Data Analysis</b>	Video Review Time	Unknown	Data objectives; Size of EM Pool
<b>Data Analysis</b>	Review Labor/Training	Null or Unknown	Data objectives
<b>Data Analysis</b>	Software Licensing	Null or Decreasing	Contract requirements; "Open-source"
<b>Data Analysis</b>	Project Mgmt.	Unknown	Port capacity; Contract requirements; Competition
<b>Administrative</b>	Data Integration	Decreasing	Pre-Implementation work; Data objectives
<b>Administrative</b>	Data Auditing	Unknown	Data objectives; Contract requirements
<b>Administrative</b>	Data Storage	Decreasing	New technologies; Undefined requirements
<b>Administrative</b>	Deployment Mgmt.	Increasing	Demographics; Size of EM Pool
<b>Administrative</b>	Outreach	Decreasing	Size of EM Pool; Port capacity
<b>Administrative</b>	Project Mgmt.***	Unknown	Deployment method; Port capacity; Data objectives

\* The analysts make no assumptions about the future unit-cost of proprietary hardware, but note that market competition could be a factor.

\*\* Not part of the Pre-Implementation program. Cost of monitor-days could come out of the human observer side of the budget.

\*\*\* NMFS/FMA costs would not come out of the Observer Program's deployment budget, as is the case under status quo.

**Table 15** Inventory of Archipelago EM equipment for LL sector that has been, or is expected to be, available for use in the program (current, end of 2016, 2017)

	<b>Total # in project (Jul. 2016)</b>	<b>Estimated total installed to end of Period 4 (2016)</b>	<b>Available for 2017</b>
Control center	16	n/a (removed at end of each period)	16
Cameras	94	58	36
Network switches	43	23	20
Monitors	42	22	20
Keyboards	44	23	21
Pressure sensors	70	38*	32
GPS	41	23	18
Sleep sensors	25	18**	7

\* For vessels that do not have line drums, two pressure sensors will be installed.

\*\* Not all vessels have sleep sensors; some refused, and others stated that they do not require a sensor because the engine remains on at night.

**Table 16 Stages of EM Development (Source: Falvey, 2016)**

<b>EM Program Stage</b>	<b>Distinguishing Characteristic</b>	<b>EM Hardware</b>	<b>Vessel responsibilities</b>	<b>Review Software</b>	<b>Management pathway</b>
Mature	<ul style="list-style-type: none"> <li>• In Use</li> </ul>	<ul style="list-style-type: none"> <li>• Cost effective systems commercially available</li> </ul>	<ul style="list-style-type: none"> <li>• VMP feedback process operational</li> </ul>	<ul style="list-style-type: none"> <li>• Cost effective services/software commercially available</li> </ul>	<ul style="list-style-type: none"> <li>• Data routinely used to meet management objectives</li> </ul>
Pre-implementation	<ul style="list-style-type: none"> <li>• Finalize protocols and services</li> </ul>	<ul style="list-style-type: none"> <li>• Standardized Systems commercially available</li> <li>• Initial and long term costs evaluated/finalized</li> </ul>	<ul style="list-style-type: none"> <li>• VMP's independently evaluated</li> <li>• Field support service models/costs finalized</li> </ul>	<ul style="list-style-type: none"> <li>• Initial and long term data review protocols and costs independently finalized</li> </ul>	<ul style="list-style-type: none"> <li>• Protocols to incorporate data finalized</li> </ul>
Operational testing	<ul style="list-style-type: none"> <li>• Independent evaluation under operational conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Standardized systems systematically deployed on diverse vessel configurations</li> <li>• System performance independently evaluated</li> <li>• No onboard technical support</li> </ul>	<ul style="list-style-type: none"> <li>• Vessel compatibility demonstrated</li> <li>• Crew responsibilities defined</li> <li>• VMP's developed to accommodate individual vessel configurations</li> <li>• Data quality independently evaluated</li> <li>• Field support service models/costs under development</li> </ul>	<ul style="list-style-type: none"> <li>• Standardized review software ready for independent evaluation</li> <li>• Data review protocols defined and ready for independent evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Management objectives clearly defined and approved by Council</li> <li>• Evaluation criteria defined</li> <li>• Protocols for incorporating data under development</li> </ul>
Pilot testing	<ul style="list-style-type: none"> <li>• Standardized approaches</li> </ul>	<ul style="list-style-type: none"> <li>• System components initially defined</li> <li>• Standardized systems deployed on volunteer vessels</li> <li>• Limited onboard technical support</li> </ul>	<ul style="list-style-type: none"> <li>• Initial crew responsibilities defined</li> </ul>	<ul style="list-style-type: none"> <li>• Standardized review software ready for initial evaluation</li> <li>• Initial data review protocols defined</li> </ul>	<ul style="list-style-type: none"> <li>• Initial management objectives defined</li> <li>• Potential management pathways identified</li> </ul>
Proof of Concept	<ul style="list-style-type: none"> <li>• Adaptive development</li> </ul>	<ul style="list-style-type: none"> <li>• Custom construction of a limited number of systems.</li> <li>• Multiple system upgrades/year</li> <li>• Limited deployment with intensive technical support</li> </ul>	<ul style="list-style-type: none"> <li>• Vessel operational compatibility unknown</li> <li>• Minimal or Informal crew responsibilities</li> <li>• Possible onboard technician requirement</li> </ul>	<ul style="list-style-type: none"> <li>• Under development</li> <li>• Multiple upgrades/yr.</li> </ul>	<ul style="list-style-type: none"> <li>• Wait and see results</li> </ul>

Table 17 Status of various EM programs  
(refer to Table 16 for color-code)

<b>EM Approach</b>	<b>Comments</b>	<b>EM Hardware</b>	<b>Vessel responsibilities</b>	<b>Review Software</b>	<b>Management pathway</b>
Logbook Audit	Used in Canada, & U. S. West & East Coast	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>
Minor species catch estimation (Avg. Weight)	Used in Canada	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>
Length of critical species via measuring boards	Used in Canada	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>
Catch estimation of all discards (Avg. Weight)	Pre-implementation in Alaska	<b>Mature</b>	<b>Pre-implementation</b>	<b>Mature</b>	<b>Pre-implementation</b>
Stereo Cam with chute	Testing in A 80 fleet	<b>Pilot testing</b>	<b>Pilot testing</b>	<b>Proof of Concept</b>	<b>Pilot testing</b>
Stereo Cam no chute	Limited testing in partial coverage HAL fleet	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>
Auto species identification and video review	Limited testing in processing plants	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>
Dataloggers	Limited field testing in AK, WA	<b>Operational testing</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>
Finished data-set automatic transmission		<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>

(Source: Falvey, 2016)