

TRAWL EM INITIAL REVIEW

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OUTLINE

-
- Introduction/Timeline
 - Trawl EM overview
 - Data/stock assessment updates since preliminary review
 - RIR/Cost elements and comparisons



TIMELINE OF TRAWL EM DEVELOPMENT

- 2018 Trawl EM Committee Formed
- 2018-19: Pilot Projects
- 2020-now: Exempted Fishing Permit
- June 2021: Council initiated analysis, approved purpose and need and alternative set
- February 2022: Preliminary review (SSC only)
- **June 2022: Initial review**
- October 2022: Final review
- October 2022-June 2023: Development and publication of proposed/final rule
- January 2024: Regulatory program begins



PURPOSE AND NEED

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

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

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

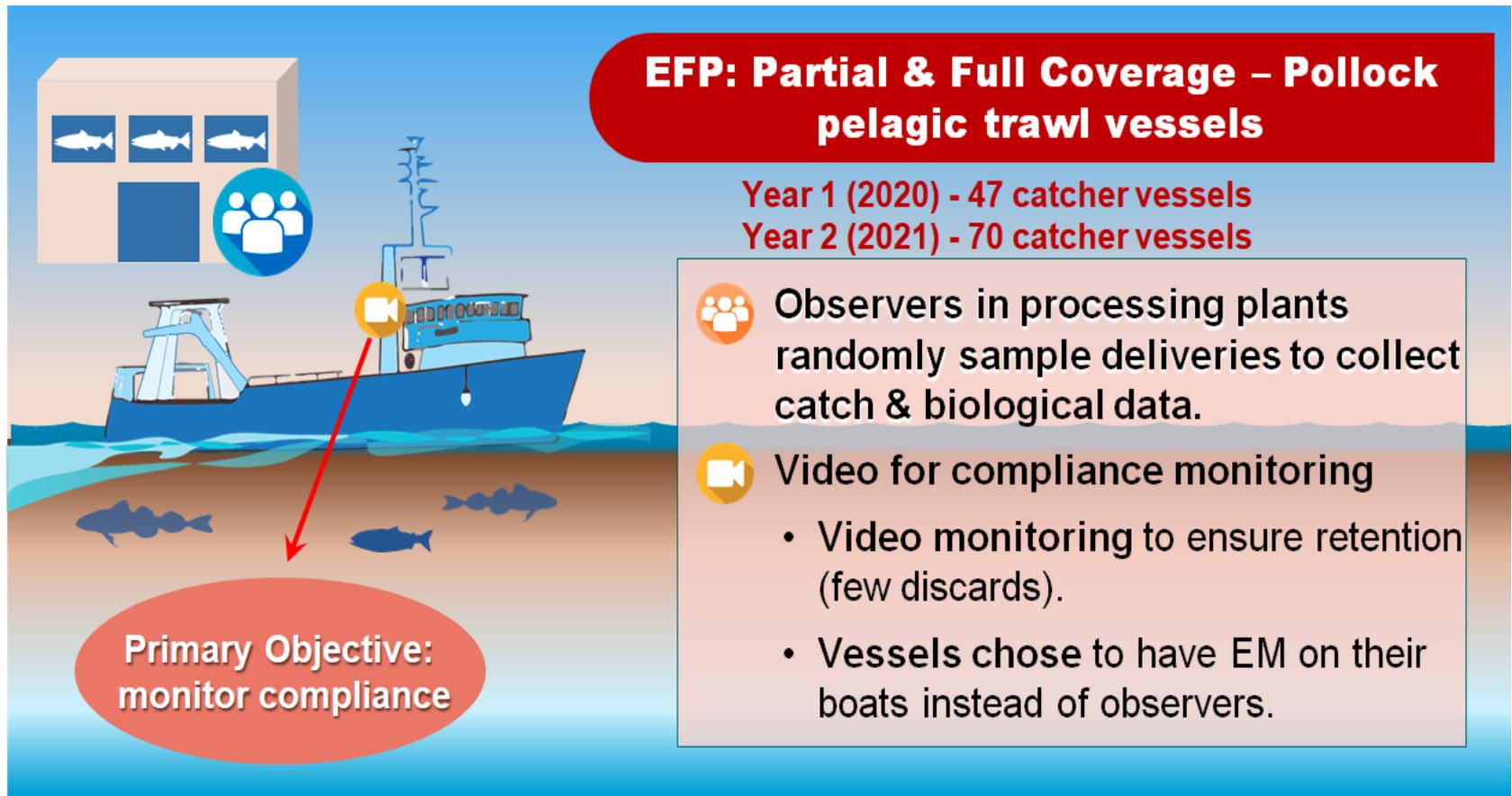


ALTERNATIVES

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



OVERVIEW OF EM IN ALASKA



EFP: Partial & Full Coverage – Pollock pelagic trawl vessels

Year 1 (2020) - 47 catcher vessels
Year 2 (2021) - 70 catcher vessels

Observers in processing plants randomly sample deliveries to collect catch & biological data.

Video for compliance monitoring

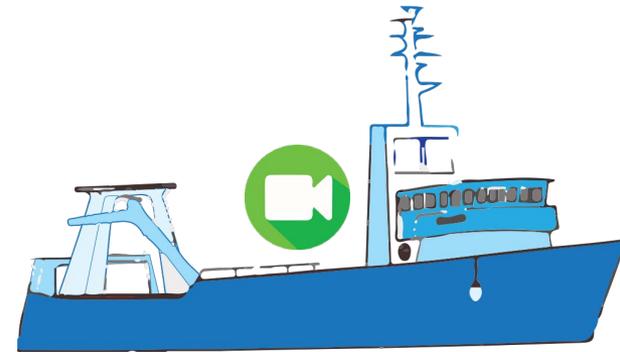
- Video monitoring to ensure retention (few discards).
- Vessels chose to have EM on their boats instead of observers.

Primary Objective: monitor compliance



EM FOR COMPLIANCE MONITORING

- ❑ Maximized Retention rules - “Almost all” catch retained for delivery
 - ❑ Most trips have no discard events
- ❑ Exceptions to retention requirements
 - ❑ Marine mammals
 - ❑ Sharks (too big)
 - ❑ Jellyfish (product quality)
 - ❑ Discards for vessel stability and safety
- ❑ **ALL** discards reported in logbook and eLandings
- ❑ Cameras record **ALL** hauls
- ❑ **ALL** hauls are reviewed to verify logbook and eLandings data
- ❑ Vessel logbook data, verified through EM, is used for catch accounting
- ❑ Shoreside observers sample unsorted catch in the plant
- ❑ Vessel Monitoring Plan (VMP) is a flexible tool that outlines operator responsibilities, annually created specific to each vessel.



EM VIDEO

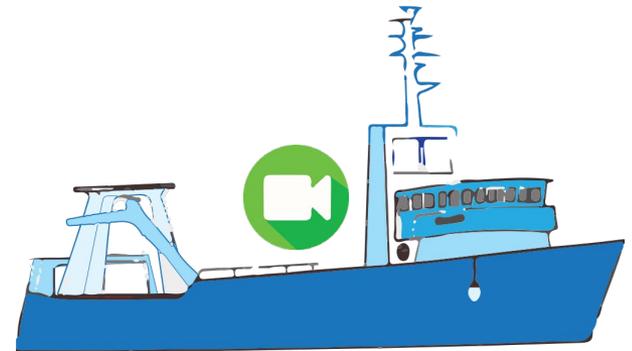
Voluntary program, vessels opt into the program annually

EM recording

- ❑ On EM trips, cameras are recording 100% of the time
 - ❑ EM system starts 2 hours prior gear deployment
 - ❑ Camera records from gear deployment for the entire trip to the end of offload
- ❑ Bering Sea: Trawl EM CVs record all pelagic trawl pollock trips delivering shoreside (100% of trips)

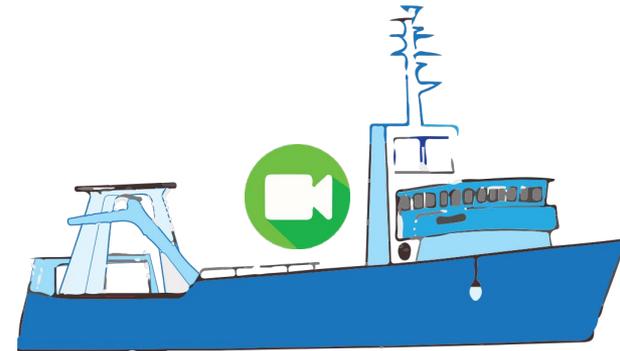
Video review for Trawl EM

- ❑ 100% of hauls are captured on video
- ❑ 100% of video is reviewed



SSC SUGGESTIONS FROM PRELIMINARY ANALYSIS

- MRAs
- Tenders
- Impacts of loss of haul-level spatial information on pollock stock assessment team
- Discard estimates after video review
- Formal direct mechanism for gathering feedback
- Specimen and biological samples
- Salmon PSC calculations



MAXIMUM RETAINABLE AMOUNT (MRA)

SSC: With the relaxation of MRAs, an overview of what the sector could potentially target without those restrictions would be useful.

- Maximized retention and shoreside data collection make it necessary to exempt participating CVs from regulations that require discarding including Maximum Retainable Amount (MRA) for species closed to directed fishing (50 CFR § 679.20(e))
- Incidental catch is less than 2% of overall catch and is mostly comprised of Atka mackerel, Pacific cod, and Pacific ocean perch (POP)
- Limited financial incentives to target incidental catch
- Vessel performance standards were developed to limit changes in behavior and incentivize vessel to not exceed limits, including forfeiting value of overages



DATA FROM TENDERS

SSC: Provide details on how catches and biological data could be assigned to trip or haul-level information when catches from multiple CVs are mixed on tenders, or how pooled data can be tracked and analyzed appropriately.



- Catch data: All retained and discarded groundfish from Trawl EM CVs use landings reports for inseason management. Same process for CVs that deliver shoreside and to tenders.
- Biological data: Shoreside observers sample tenders and GOA CVs within the same strata, at a ~30% rate within the EFP (set by ADP)
 - EFP 2020: 23% of total pollock harvest by EM boats (by weight) were delivered by tenders in WGOA
 - EFP 2021: 10% of total pollock harvest by EM boats (by weight) were delivered by tenders in WGOA
 - AKRO will link haul specific information from logbooks with trip level data collected by shoreside observers.



STOCK ASSESSMENT DATA STREAM UPDATES

SSC: The pollock stock assessment team should be closely consulted concerning whether loss of haul-level spatial information will impact any ongoing or future analyses and how the data changes will be treated in the assessment

- Status quo: At-sea observers collect data at the individual haul level.
- Proposed regulatory Trawl EM program: Shoreside observers collect data at the trip level. Vessels record tow specific information in logbooks.
 - Some loss of spatial and temporal resolution. **Some data impacts can be mitigated with haul information from logbooks.** AKRO will link haul specific information from logbooks with trip level data collected by shoreside observers.
 - **Pollock: trip level information does not negatively impact stock assessments**, but may affect development of future approaches to the assessments and/or other uses for spatially resolved fishery data.
 - Pacific cod and Pacific ocean perch: trip level information will likely have little impact on stock assessments.
 - Sharks: trip level information will likely have little impact on stock assessments. **Trawl EM may provide additional or new information for scientists.**



CHANGES TO DISCARD ESTIMATES FROM EM VIDEO REVIEW

SSC: Evaluate the potential for large shifts in discard estimates during the year within CAS as compliance monitoring is completed on video review.

- Vessel logbook data (eLandings) is used for catch accounting, verified by EM video review
- All hauls are recorded and reviewed
- Discards are required to be reported in vessel logbook
- Vessels tended to overestimate for discard estimates
- Over two years of EFP, there were 5,445 estimates made for discards by EM reviewers
 - Over half of discard events were less than 0.005 mt (11 lbs)
 - 85% of discard events were under 0.1 mt (220 lbs)
 - 816 discard events greater than 0.1 mt, sharks represented 70% of these
 - For discards greater than 0.1mt, multispecies represent 29% of discard events (83% by weight)
 - Discard estimates are specific to the vessel, no rates are calculated



FORMAL DIRECT MECHANISM FOR GATHERING FEEDBACK

SSC: There should be a formal direct mechanism for gathering feedback directly from the captains and fleet and processors more generally.

- Under the EFP: vessel feedback form is emailed from video reviewers to vessel captains, and project managers
- Bimonthly check-in meetings with project managers, agency staff, observer providers, EM reviewers, EM Service Providers
- Lessons learned on the importance of communication
- Received feedback from Trawl EM committee last week on communication



COMMUNICATION IS KEY

Direct communication between vessel and shoreside observer **DOES NOT** replace plant to observer communications!



 = GOA communication only

 = All communications (BSAI and GOA)



See Section 3.1.4.3 in the Draft EA/RIR



CATCH SAMPLING SHORESIDE METRICS

- Early in the EFP, it was identified that shoreside observers were not able to meet sampling objectives due to many factors. The team met and discussed options to improve.

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



See Section 3.1.6. in the Draft EA/RIR

CATCH MONITORING CONTROL PLAN

What is a Catch Monitoring Control Plan (CMCP)?

A plan submitted by the owner and manager of a processing plant, and approved by NMFS, detailing how the processing plant will meet the catch monitoring and control standards that are determined by federal regulations.

Why have a CMCP?

A CMCP is in place for all BSAI processing plants that take AFA pollock deliveries, but these are not currently in place for the GOA.

Proven benefits of CMCP's:

- ❑ Tracking salmon for accurate retention counts
- ❑ Detailed communication guidelines
- ❑ Description/diagrams of the observer sample collection points and observer stations
- ❑ Flexible tool that can help meet sampling goals



***May be a cost for plants, especially in the GOA**
***Outreach needed: GOA processing plants**

See Section 3.1.4.1 in the Draft EA/RIR



OBSERVER DATA COLLECTION: VESSEL VS PLANT

Data type	Vessel Observer	Shoreside Observer
Haul specific	Y	*
Trip specific	Y	Y
Species composition	Y	Y
Biologicals	Y	Y
Halibut	Y	Y
Salmon	Y	Y**



Plant observer may have more opportunities to collect data on a safe and stable platform

* Some haul specific data can be approximated using trip data and haul data reported in logbooks

** Next slide for details



Data will be collected from tender vessels at shoreside processing plants by observers, and transfers monitored by EM data reviewer.

SHORESIDE BIOLOGICAL SAMPLES

SSC: Confirmation that this program will not result in a loss of overall specimen and biological samples, particularly in the GOA where this can be most challenging.

SSC: Provide more detailed numbers in the next iteration, including examples of biological samples before and after the EFP.



SHORESIDE BIOLOGICAL SAMPLING

Shoreside observer sampling rates (2022)

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

Vessel observer sampling rates (2022)

Predominant Species	Sex/Length Data	Biological Data (All specimen fish must have an associated s/l/w specimen)
Gulf of Alaska Pollock	Every Sampled Haul ~ 50 Pollock and ~ 10 Pacific Cod	Every Sampled Haul 8 Pollock otolith pairs with maturity scan for all female otolith fish and 1 Pacific Cod otolith pair with maturity scan for all female otolith fish



- *Tender vessels are included in the observer sampling scheme.
- *The Agency retains the right to deploy observers on vessels.



SEABIRDS

	Observer	EM Reviewer
Monitoring Seabird Avoidance	Yes	Yes*
Species Identification	Yes	Some
Interaction Type	Yes	Some
Photograph	Yes	Some
Biological Specimens	Yes	No**
Rehabilitation (very rare)	Yes	No

* EM can only review what is in camera frame

**Physical specimens include whole carcass (observer-salvage permits)

- USFWS has protocols for vessel operators to collect whole bird carcasses. Without observers onboard vessels these specimens may be able to be recovered.



See Section 4.5 in the Draft EA/RIR



MAMMALS

	Observer	EM Reviewer
Identify to species	Yes	Yes*
Mammal Condition	Yes	Some
Interaction Type	Yes	Some
Photograph	Yes	Some
Biological specimens	Yes	No

***physical specimens include Sex/Length/Tissue**

- **Most common specimen type collected by observers is photographs.** These can be collected by EM reviewers, but they may not capture details (e.g., froth around nose/mouth; free flowing blood).
- **EM cannot collect any physical specimen data** such as sex, snouts, deep tissue samples. *These are important for stock ID, contaminant testing, and stable isotope profiles etc.
- EM cannot capture any physical sample data and **views may or may not capture information on brands, tags, and marking** as it is dependent on animal size, camera resolution, and camera placement.



SALMON PSC

SSC: An illustrative example of how salmon PSC calculations would be different under this program would be helpful, including a GOA and BSAI example.



SALMON RETENTION DATA UNCHANGED

Salmon retention remained the priority for observers at the plant (and the EM reviewers).



Observer duties:

- ☐ Collect and report **salmon retention** data
- ☐ **Identify species, count, sex and weigh** all the salmon
- ☐ Collect **salmon genetics** data on all sampled deliveries according to protocols in FMA observer manual.
- ☐ **FMA ID scales** for salmon according to protocols in FMA observer manual.
- ☐ Collect **tagged salmon data** according to protocols in FMA observer manual.

If observers are unable to collect all requested data shoreside then they are instructed to continue monitoring for salmon, and prioritize all salmon related retention and biological data.



CMCP's are critical to salmon retention data!

See Section 3.1.6.4 in the Draft EA/RIR



CATCH ACCOUNTING IMPROVEMENTS



- More precise **PSC** accounting
 - Salmon (full enumeration)
 - Crab (full enumeration)*
 - Halibut (full enumeration*)
- Crab and Salmon species identified, sex, and measurement.*
- Halibut measurements*
- Fish ticket **bycatch verifications**.
- No at -sea discard rates
- **Safe stable** sampling platforms!



Potential for additional data collections if EM is expanded at plants!



REGULATORY IMPACT REVIEW (RIR)

COST ELEMENTS
AND
COMPARISONS

APPROACH TO COST ANALYSIS

- Many uncertainties and challenges associated with estimating costs
 - **Differing levels of participation, effort, scope and program design specifics will entail very different cost structures, impacting both the range of individual costs and average costs per unit.**
 - Proprietary information (less than 3 providers) requires rolling up to large categories and overall costs (for both EM and observer costs)
 - Different companies have different structures and cost models
 - Despite the cost reporting subgroup's discussions there may still be nuances/differences to how each company defines each category.
 - **Providers do not track costs in ways that allow parsing by alternative or option (i.e., BS v. GOA, CVs v tenders)**
 - Impacts of scaling and program design- how would these costs change as the participation changes and specific program design changes and this is different for each provider based on their current staffing and ability to scale up/ thresholds where a new stair-step of costs may be reached.
 - Vessels participate in multiple programs- some in west coast, some in BS and GOA so costs are spread across different areas, while some vessels participate in one area
 - Unknown program design specifics that may influence costs (i.e., Design of program and fees can affect incentives to maintain equipment)
 - Technology changes- some costs will decrease as technology improves- i.e., data drives; some costs will go up- i.e., control centers that can do more may cost more
 - **Multitude of different fishery operations- rationalized program, race to fish, shoreside, tenders**
 - **Unknown future effort levels based on TACs and changes in management.**
 - **COVID- impact on costs**



APPROACH TO COST ANALYSIS

- Estimate range of costs of at sea observers (Alt 1) for fishing effort from 2021 EM EFP
 - Based on costs reported in Observer Program 2020 Annual Report
- Estimate range of costs of 2021 EM EFP (Alt 2)
 - EM costs reported by providers in cost categories identified by subgroup
 - Shoreside observer costs estimated based on discussions with providers
- Qualitatively describe comparisons and how costs may change with potential regulated program



AT SEA OBSERVER COSTS

- Multiplied the sea days of all EM trips by the fully loaded sea day cost of an at sea observer as reported in the 2020 annual report.
- Sea days are calculated using two separate methods:
 - 1) estimated days fished, which assumes one of the days the vessel is gone is a day that the vessel did not harvest and retain catch (for example a trip that left on the 20th of the month and returned on the 22nd would be two days)
 - 2) estimated days +1 which assumes the vessel harvested and retained catch every day the vessel was gone (for example a trip that left on the 20th of the month and returned on the 22nd would be three days).
- Recent clarification on data that this is underestimate and trip start is when gear goes in the water. Current estimate of days +1 is better estimate for days fished. Future version of document will include new days +1 and days +2 for better proxy of at-sea days.



AT SEA OBSERVER COSTS-FULL COVERAGE

- Industry-funded through a pay-as-you-go system whereby fishing vessels procure observer services through NMFS-permitted observer service providers
- The average “fully-loaded” cost per day of observer coverage in the full coverage category in 2020 was \$375
- The 2020 Annual report also provides a daily rate that includes incidentals, for the pelagic trawl CVs of \$415

Table 5-26 estimates of 2021 BS costs for at-sea monitoring on EM trips

	EM days	fully loaded day		Total at-sea cost estimate for EM days	
		low	high	low	high
days fished	3,041	\$375	\$415	\$1,140,375	\$1,262,015
days +1	4,217	\$375	\$415	\$1,581,375	\$1,750,055

Sources: Sea days from AKFIN summary of CAS data (Trawl_EM_Trips 3-23-22). Cost per day from NPOP annual reports see <https://repository.library.noaa.gov/gsearch?terms=North%20Pacific%20Observer%20Program%202019%20Annual%20Report&collection=>



AT SEA OBSERVER COSTS- PARTIAL COVERAGE

- Since 2018, the target deployment rates for the trawl partial coverage strata have ranged from 16% to 30%
- The average “fully-loaded” cost per day of observer coverage in the partial coverage category was \$1309 in 2019 and \$1,381 in 2020 (As reported in the North Pacific Observer Program Annual Report)

Table 5-28 estimates of costs for at-sea monitoring on GOA EM trips in 2021

	EM days			fully loaded cost per day		Total at-sea cost estimate for EM days	
	16%	30%		low	high	low	high
days fished	823	132	247	\$1,309	\$1,381	\$172,369	\$340,969
days +1	1,264	202	379	\$1,309	\$1,381	\$264,732	\$523,675

Sources: Sea days from AKFIN summary of CAS data (Trawl_EM_Trips 3-23-22). Cost per day from NPOP annual reports see <https://repository.library.noaa.gov/gsearch?terms=North%20Pacific%20Observer%20Program%202019%20Annual%20Report&collection=>



FULL COVERAGE SHORESIDE PLANTS

- AFA plants are in the full coverage category (pay-as-you-go) whether they are physically located in the BSAI or GOA. See p. 179 of RIR.
- AFA shoreside plants located in Dutch Harbor/Unalaska or Akutan will realize an increase in the number of observer plant days.
 - Under the Status Quo an AFA inshore processor must provide an observer for each 12 consecutive-hour period of each calendar day during which the processor takes delivery of, or processes, groundfish harvested by a vessel engaged in a directed pollock fishery in the BS. This means 2 observers plus the at-sea observer.
 - Under EM it is anticipated that three to five shoreplant observers will be required at each BS plant. Two observers working when plant is taking pollock deliveries.
- AFA plants that are located in the GOA will also have additional plant observers, though likely not as many as AFA plants in Dutch Harbor/Unalaska or Akutan (2 to 3 plant observers).
- A specific number of observers for each plant will not be defined in regulation to allow NMFS to adjust coverage to meet sampling needs as they may change.
- Increasing the number of plant observers needed is expected to increase costs plant operators must pay for coverage relative to the No Action alternative. The analysis does not address how increased plant observer costs and vessel observer cost savings will be negotiated between the parties involved.



FULL COVERAGE SHORESIDE PLANTS

- Full coverage plant operators contract directly with an approved observer provider.
- Compensation for observer coverage is negotiated between the vessels/plants and the observer provider.
- The average “fully-loaded” full coverage cost per day for an observer in 2020 was reported to be \$375 in the North Pacific Observer Program annual report.



FULL COVERAGE SHORESIDE PLANTS

- Based on discussions with observer providers and the average cost per day in 2020, a low (\$380/day), medium (\$410/day), and high (\$430/day) is assumed for full coverage plant observers.
- The values attempt to account for increasing observer travel costs, tight labor markets, overhead costs and general inflation.
- These values should be considered estimates and no specific value is given a higher probability of occurring when the program may be implemented in 2024.
- Based on 1,588 plant observer days in 2021 under the EM EFP, the assumed rates result in full coverage plant observer costs of \$608k to \$688k.



PARTIAL COVERAGE SHORESIDE PLANTS

- Shoreside plants in the partial coverage category do not have plant observers under the No Action Alternative. The observer assigned to the vessel monitors the offload, enumerates PSC, and takes required biological samples.
- At-sea coverage rates are determined in the ADP and for pelagic trawl was set at 16% in 2021. Note the rate ranged from 16% to 30% from 2018-2022.
- Plants are currently required to pay half of the 1.65% observer fee assessed on the ex-vessel value of deliveries.
- The 1.65% fee funds the at-sea observer coverage and the ADP determines sampling rates that can be funded with the available funds.
- One observer provider has the contract with NMFS for the partial coverage fleets. That contract expires in August 2024.
- Estimating future daily costs for shoreplant observers challenging. Information we do have is that in 2020 the average partial coverage at-sea day cost was reported be \$1,381/day in the 2020 North Pacific Observer Program's annual report.



PARTIAL COVERAGE SHORESIDE PLANTS

- Actual cost data cannot be reported because of confidentiality restrictions.
- Confidentiality restrictions, uncertainty regarding actual costs, future contracts to provide partial coverage, and whether shoreplant observers will be compensated the same as at-sea observers results in a broad range of cost estimates for the shoreside partial coverage observers.
- Partial coverage shoreside plant observer costs were estimated to fall within a range that included a low (\$500/day), mid (\$1,050/day), and high (\$1,600/day) rate. These rates were based on the reported at-sea partial coverage rate and discussions with the observer provider.
- During 2021, there were 548 observer days at plants located in the GOA under the EFP. The analysts did not attempt to project the number of days that would be needed under the regulated program, but will depend on participation in the voluntary program, available funding, actual future daily rates, and coverage rates for plants determined in the ADP.
- Using the 2021 EFP shoreplant days and range of assumed daily costs, a total annual cost for shoreplant partial coverage was estimated to range from \$274k to \$877k.



EM COSTS

Table 5-31 Total costs and average per unit costs for the 2021 Trawl EM EFP. Numbers in parenthesis correspond to the level of participation and effort in the 2021 EFP. *Day represents estimated fishing days, for example a trip that leaves on the 20th and returns on the 22nd is considered two days.

	Total costs	Average per unit cost for 2021 EFP			
		CV (68)	Trip (1503)	Haul (4272)	Day* (3864)
Ongoing costs					
1. Service Provider Fees and Overhead	\$188,559	\$2,773	\$125	\$44	\$49
2. EM Equipment Maintenance and Upkeep	\$86,832	\$1,277	\$58	\$20	\$22
3. Data Transmittal	\$5,720	\$84	\$4	\$1	\$1
5. Data Review	\$101,488	\$1,492	\$68	\$24	\$26
6. Data Processing and Storage	\$9,403	\$138	\$6	\$2	\$2
Total ongoing costs	\$392,002	\$5,765	\$261	\$92	\$101
One-time costs					
4. Equipment Purchases and Installation	\$276,653	\$17,496	\$7,106		

p. 162

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



Cost categories developed by subgroup described p. 152-154



EM COSTS

Table 5-34 participation and effort by program component in 2021 EM EFP. *Metrics reported are for CVs that delivered to tenders. 4 tenders accepted EM deliveries in 2021. **Given overlapping participation totals may differ from sum of each element

Area	CVs		Trips		Hauls		Days	
	number	%	number	%	number	%	number	%
BS	34	59%	1,055	70%	3,321	78%	3,041	79%
BS and GOA	12	18%	na	na	na	na	na	na
GOA	22	41%	448	30%	951	22%	823	21%
using tenders in GOA*	3	4%	20	1%	24	1%	22	1%
Total**	68		1,503		4,272		3,864	



EM COSTS

Table 5-34 participation and effort by program component in 2021 EM EFP. *Metrics reported are for CVs that delivered to tenders. 4 tenders accepted EM deliveries in 2021. **Given overlapping participation totals may differ from sum of each element

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	number	%	number	%	number	%	number	%
BS	34	59%	1,055	70%	3,321	78%	3,041	79%
BS and GOA	12	18%	na	na	na	na	na	na
GOA	22	41%	448	30%	951	22%	823	21%
using tenders in GOA*	3	4%	20	1%	24	1%	22	1%
Total**	68		1,503		4,272		3,864	

Cost category	Variables
1. Service Provider Fees and Overhead (Ongoing)	Related to a combination of vessels and effort- some costs are based on the amount of data generated and tracked, some based on the number of vessels participating- the variability in costs per vessel is quite large.
2. EM Equipment Maintenance and Upkeep (Ongoing)	More driven by the number of vessels
3. Data Transmittal (Ongoing)	More likely related to effort
4. Vessels Original Equipment Purchases and Installations (One time)	Dependent upon the new vessels participating and more driven by specifics such as the location and availability of the vessel.
5. Data Review (Ongoing)	More likely related to effort
6. Data Storage (Ongoing)	More likely related to effort

COST UNCERTAINTIES

- **fishery characteristics**
- number of participants
- types of participants
- geographic location/distribution of participants
- overlapping participation in other programs
- timing and notice of scale ups
- trips per drive
- future TACs
- boat schedules
- vessel infrastructure- complexity of cable runs, camera mounts
- use of electronic vs paper logbooks
- number of tows
- number of vessels
- number of trips
- number of logbook pages
- number and quantity of discards
- length of time to complete haul-back & store catch
- amount of data transmitted
- amount of data stored
- how long data is stored
- number of drives
- length of trip
- amount of movement recorded during trip
- **program design**
- program requirements
- maturity of program
- treatment of systems
- data review protocols
- how much data access is required
- technological, software innovations
- age of systems
- **external costs**
- costs of broadband
- travel costs
- shipping costs
- hardware costs

Table 5-32 p. 163-4 provides a summary of EM cost categories and factors that influence costs



SUMMARY OF ESTIMATED COSTS

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

Description	Area	Low Estimate	High Estimate
Partial coverage at-sea Observer Cost	GOA	\$172,000	\$524,000
Full coverage at-sea observer cost	BS	\$1,140,000	\$1,750,000
Full coverage shoreside monitoring cost	BS	\$304,000	\$344,000
Total	BS and GOA	\$1,616,000	\$2,618,000

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

Description	Area	Low Estimate	High Estimate
Ongoing EM costs (does not include one-time equipment costs)	BS and GOA	\$392,000	\$392,000
Partial coverage shoreside monitoring cost	GOA	\$274,000	\$877,000
Full coverage shoreside monitoring cost	BS	\$608,000	\$688,000
Total	BS and GOA	\$1,274,000	\$1,957,000

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CONCLUSIONS OF COST ESTIMATES

- Expected overall cost savings with EM
 - Exact difference uncertain, likely larger than in document due to estimated fishing days (at sea observers)
 - Difficult to parse out by sector
- Potential changes in distribution of costs
 - Differs by sector (pay-as-you-go vs. observer fee)
- Uncertainty of future costs
 - Program design, scope, scale, flexibilities, contracts



SALMON PSC ACCOUNTING

- It is anticipated that salmon bycatch accounting will improve under the action alternatives.
- The sampling and enumeration methods for salmon PSC will not change under this action.
- Under Alternative 1, observers in the partial coverage category are deployed using established random sampling methods to collect data on a statistically reliable sample of fishing vessels. The vessel observer monitors the offload and conducts a full enumeration of salmon at the shoreside processing plant. Only deliveries with an at-sea observer are monitored.



SALMON PSC ACCOUNTING

- EM (under Alternative 2 or Alternative 3 option 2) is expected to improve salmon accounting on shoreside delivery partial coverage trips by:
 - reduced extrapolation of salmon bycatch estimates from sampled tender vessel deliveries across that strata,
 - ensuring at-sea discards do not occur and by having greater coverage of the CVs deck than one observer can provide,
 - increasing the percentage of partial coverage trips that are monitored for discard/retention compliance at-sea (it is assumed that vessels with EM will account for a larger percentage of trips than currently covered by at-sea observers),
 - all EM trips will have 100 percent EM review for discards at-sea, and
 - full enumeration of salmon bycatch at the plant on larger percentage of partial coverage shoreside deliveries than are currently monitored by at-sea observers in the plant (note that under the EFP plants had 30 percent coverage and trawl CV's target coverage was 16 percent in the 2021 ADP), which results in less extrapolation of salmon bycatch rates to unobserved trips.



SAFETY

- The safety of members of the fishing industry and the observers that monitor those fisheries is of utmost importance.
- The pollock fishery is a relatively safe fishery by Alaskan fishery standards, but it is still a challenging working environment.
- A beneficial aspect of the trawl EM EFP was that observers were collecting data on a stable and safe platform. By moving observer sampling duties to shoreside processors they were able to sample without the safety concerns associated with sampling at-sea.
- NIOSH developed the Commercial Fishing Incident Database to track incidents/fatalities in the U.S. commercial fishing industry. Since 2003, NIOSH's CFID contained nine reported incidents in the North Pacific pollock fisheries. The most recent incident occurred in 2018.
- Two of the fatalities were at-sea observers, but the fatalities occurred while the vessel was moored at the dock.



THANK YOU

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