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Electronic Monitoring in the West Coast Groundfish Fishery: Exempted Fishing Permit Project Report 2015-2017

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Executive Summary

In 2014, The Nature Conservancy (TNC), the California Groundfish Collective (CGC) and the Environmental Defense Fund (EDF) formed a partnership to manage an Exempted Fishing Permit (EFP) project in the West Coast groundfish Individual Fishing Quota (IFQ) fishery. The goals of this project were to 1) develop and implement the use of electronic video monitoring (EM) in lieu of human observers for catch compliance purposes; 2) inform the development of new regulations while preserving community access to the West Coast fishery through an alternative catch monitoring option; and 3) inform proposed EM programs in other fisheries.

The West Coast groundfish fishery transitioned to an IFQ program with individual accountability requirements in 2011. This program includes requirements for 100% monitoring for compliance at sea, and 100% monitoring of offloads on shore to ensure full individual accounting of every pound of retained and discarded IFQ species. Fishermen are required to use logbooks to report all fish retained and discarded during each fishing event (haul or pull) on every trip. Since this transition, the fishery has faced new monitoring challenges, including high costs and logistical problems associated with the requirement for 100% monitoring using human observer coverage.

The EFP process in the West Coast groundfish fishery has provided important opportunities to demonstrate the use of EM across multiple gear types as an option for compliance monitoring. The on-the-water learning generated by this EFP project has directly informed the development of new EM regulations on the West Coast, including program standards for whiting and non-whiting midwater trawl, fixed gear, and bottom trawl in the groundfish IFQ fishery. The program standards developed for the West Coast will likely influence EM programs across the U.S. and may benefit fishermen and managers seeking alternative monitoring options.

From 2015-2017, this EFP project deployed EM systems on three trawl vessels and three fixed gear vessels operating out of the ports of Fort Bragg, Half Moon Bay, and Morro Bay California. Three other EM EFP projects were also initiated, and the Pacific States Marine Fisheries Commission (PSMFC) is conducting EM video review for the EFP projects. The National Marine Fisheries Service (NMFS) monitors and enforces the terms of the EFPs. Vessels participating in the project follow catch-handling requirements for video review per a Vessel Monitoring Plan (VMP) and use state logbooks as well as specific EM logbooks developed by PSMFC to report priority species catch and discard data. This EFP project has produced a total of 174 unique fishing trips (32 in 2015, 48 in 2016 and 94 in 2017), which have been reviewed by PSMFC staff.

Participants in this EFP project are members of the CGC, which is a voluntary collective agreement between fishermen that creates an insurance pool of quota for constraining groundfish species. Fishermen in the CGC collect and share information about the catch of constraining species and use spatial fishing plans to mitigate risk and adapt their businesses.

Key lessons learned over the course of the three-year project include:

- EM systems can accurately validate logbook data provided by fishermen and are comparable to human at sea observers in validating required discard information
- Fishermen are able to develop and adapt new catch handling techniques to meet review requirements, reduce review time, and ensure the success of EM.
- Collaboration and regular communication between fishermen, NMFS, PSMFC, and private EM service providers is critical to success of the program. Establishing a single point of contact for a group of vessels can improve communication among stakeholders and streamline administration.
- A Collective Enforcement Agreement creates an opportunity for a cooperative approach to implementing EM that may increase efficiency for industry and managers.
- A comprehensive and adaptable individual VMP is imperative for compliance and enforcement.
- Many costs associated with implementing an EM program are variable and highly dependent on final program design.

The dedicated efforts of the project partners, fishermen, PSMFC and NMFS staff resulted in many of the project goals and objectives being met, and this project has provided valuable insight into the ongoing efforts to advance EM at the regional and national level. The learning generated through this EFP project and other concurrent EFP projects has informed the Pacific Fishery Management Council (PFMC) discussions and recommendations for EM regulations.

The project partners and participating vessels continue to work with NMFS and other stakeholders to resolve outstanding concerns with pending regulations that are expected to be implemented by 2020. This report briefly summarizes high-level findings from this project and shares lessons learned for others to consider.

Background

The West Coast groundfish fishery includes 90 different species that live on or near the bottom of the ocean. This diverse group of species including Pacific whiting, sole, rockfish, lingcod, and sablefish are harvested using different gear types such as trawl, Scottish seine, longline, and pot gear. For generations, this fishery has contributed to the cultural and economic fabric of coastal communities in Washington, Oregon and California, including the homeports of the vessels participating in this project: Fort Bragg, Half Moon Bay and Morro Bay.

The Magnuson Stevens Fishery Conservation and Management Act guides the Pacific Fishery Management Council (PFMC) and the National Marine Fisheries Service (NMFS) in managing the West Coast groundfish fishery, which has five main components: limited entry trawl, limited entry fixed gear, open access, recreational, and tribal. The limited entry trawl sector transitioned to an individual fishing quota (IFQ) management program in 2011. Since the implementation of the IFQ program, vessels operating with limited entry trawl permits may use alternative gear types (e.g. fixed gear) to harvest groundfish.

The IFQ program includes requirements for 100% monitoring for compliance at sea, and 100% monitoring of offloads on shore to ensure full individual accounting of every pound of retained and discarded IFQ species. Fishermen are required to use logbooks to report all fish retained and discarded during each fishing event (haul or pull) on every trip. Human observers verify and quantify discards at sea and Catch Monitors (CMs) verify and quantify retained catch during offloads on shore. Vessel owners/operators are required to procure and pay for certified at sea human observers and licensed first receivers are required to procure and pay for CMs. In many instances, the same certified human observer has typically performed both the at sea monitor and on shore CM duties.

The costs associated with monitoring requirements in the IFQ program present challenges for the fishing industry. Since 2015, the fishing industry has been responsible for covering all costs associated with at sea and on shore compliance. The average daily cost for an at sea observer is estimated at $500[1], and fishing trips tend to last between two and five days. Catch Monitors costs are approximately $75 per hour plus travel time and some service provider contracts require a minimum number of hours regardless of offload time. Offload times typically vary from 2 to 8 hours. In small California ports, vessels often incur all or part of CM costs. Observers monitor all activity during a fishing trip to ensure accurate reporting of catch and discards. During any given fishing trip, vessels can spend many hours steaming to fishing grounds and setting gear, which can result in a day or more of paid observer coverage during which there is no fishing activity to observe. Sometimes limited availability of human observers (to perform both at sea and on shore compliance monitoring) has added costs, particularly for vessels operating out of smaller or more remote ports. Low volumes of trips within a given port and long distances between port communities can create logistical challenges for procuring human observers. Vessels can be required to wait while observers travel between ports, resulting in missed weather windows; additionally, vessels are required to pay for any travel costs associated with moving human observers between ports.

[1] http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/electronic_monitoring/em_draft_impact_review.pdf

Based on information from NMFS's Economic Data Collection program, observer costs in the West Coast groundfish fishery constitute 30-60% of an average fixed gear or trawl vessel's total cost net revenue.[2]

These monitoring challenges are not unique to the West Coast. In May of 2013, NMFS issued a policy directive to all regions of the U.S. urging consideration of and providing guidance on the adoption of electronic technology solutions for fisheries monitoring.[3] At the same time, the PFMC was moving forward with consideration of regulatory objectives for electronic monitoring. In 2012, the PFMC commissioned a research project for the Pacific States Marine Fisheries Commission (PSMFC) to partner with vessels and test the feasibility of electronic monitoring (EM) for catch and discard accounting. Fishing vessels volunteered to test this technology while also carrying a human observer. The learning from this research project informed the PFMC's decision to permit out-of-cycle applications from interested stakeholders for Exempted Fishing Permits (EFPs) to test EM without the use of at sea observers. The EFP process in the West Coast groundfish fishery has provided an important opportunity to demonstrate the use of EM across multiple gear types in a high-volume, multi-species fishery, proving it can serve as a cost-effective option for catch compliance monitoring.

This report provides an updated description of and results from 2015-2017 for one EFP project that continues to operate in the West Coast groundfish fishery.

[2] https://www.nwfsc.noaa.gov/research/divisions/fram/economic/economic_data_reports.cfm
[3] http://www.nmfs.noaa.gov/op/pds/documents/30/30-133.pdf

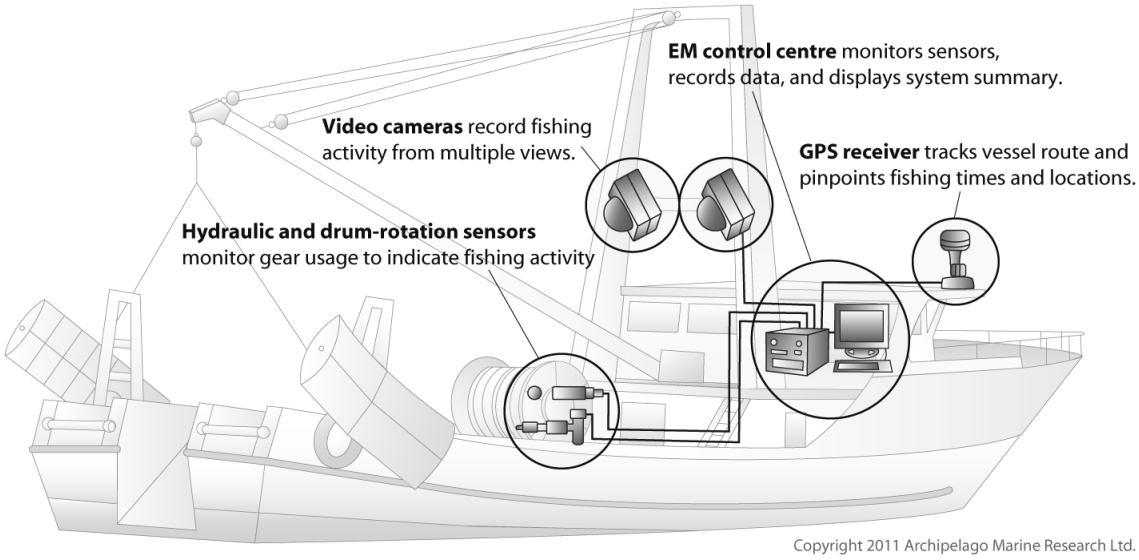
Project Description

In 2014, The Nature Conservancy (TNC), the California Groundfish Collective (CGC) and the Environmental Defense Fund (EDF) formed a partnership to develop and manage an EFP project in the West Coast groundfish fishery. The goals of this project were to 1) develop and implement the use of EM in lieu of human observers for catch compliance purposes; 2) inform the development of new regulations while preserving community access to the West Coast fishery through an alternative catch monitoring option; and 3) inform proposed EM programs in other fisheries.

During late 2014 and early 2015, the project partners collaborated with PSMFC to build upon the lessons learned from previous research projects and worked with NMFS staff to develop terms and conditions for EFPs. This work included drafting and submitting EFP proposals, assessing vessels' interest in participation, reviewing and negotiating exempted terms, developing vessel participation selection criteria, and attending and providing public comment at PFMC and advisory body meetings. The EM EFPs were recommended for approval by the PFMC and issued by NMFS in June 2015, permitting the project partners to include up to seven groundfish IFQ vessels (three fixed gear and four bottom trawl) to carry EM systems in lieu of human observers.

Over the project period from 2015-2017, EM systems were deployed on three trawl and three fixed gear vessels (Table 1). EM systems consist of closed-circuit cameras, drum rotation and hydraulic pressure sensors, a control box and monitor, and a GPS receiver (Figure 1).

Figure 1. Illustration of EM system aboard typical groundfish trawl vessel. Courtesy Archipelago Marine Research.



This integrated system collects video imagery and fishing activity information on a hard drive that vessel operators remove and mail to PSMFC for analysis and review following fishing trips. All equipment is designed to be tamper evident.

Video Review

Captains agreed to follow catch-handling requirements for video review per individual Vessel Monitoring Plans (VMP), and report landings and discard data using state logbooks as well as additional EM discard and priority species logbooks developed by PSMFC. This EFP project resulted in video footage gathered during 174 individual fishing trips, representing approximately 365 sea days and 1,949 individual fishing hauls. (Table 1)

Table 1: EFP participation and activity by gear type for 2015-2017.

	BOTTOM TRAWL	FIXED GEAR
VESSELS	3	3
TRIPS	118	56
HAULS	793	1156

The video footage from these 174 fishing trips resulted in more than 2,455 hours of sorting time that required review. The review of this video took PSMFC approximately 1,122 hours to complete. (Table 2).

Table 2: Hours of video review for the EFP project by gear type.

	BOTTOM TRAWL	FIXED GEAR
TOTAL REVIEW HOURS	840	282

Costs

Many costs associated with implementing an EM program are variable and highly dependent on final program design. The costs associated with using EM during the EFP project are distributed across the following categories:

- **Equipment and installation** - includes EM system control box, cameras, pressure sensors, removable hard drives, monitors and other related components which may be amortized across a five-year period, as well as equipment installation costs.
- **Fixed annual costs** – includes technical support for hardware systems, program management costs, and annual software license fees.
- **Variable annual costs** – includes program coordination, research and development and on-the-ground technical support or repair costs.
- **Annual video review and data analysis** – includes costs associated with viewing video footage, analyzing the data collected, video review, data analysis, data storage, and reporting.

RESULTS: YEAR ONE (2015)

After receiving approved EFPs in June 2015, the project partners developed and distributed a request for bids for EM service providers. After considering five proposals, the project partners hired Archipelago Marine Research (AMR) for the 2015 fishing season to provide, install and service EM systems, assist in the development of initial VMPs, and establish a network of service technicians in primary service ports. The project partners also hired a Project Manager, Ms. Lisa Damrosch, to coordinate all parties involved in the EFP, facilitate data collection to meet project goals, assist in development and troubleshooting of the VMP development, address technical and logistical challenges, assist in representing the project in public forums, and collaborate with external parties on compliance and reporting issues.

Costs (2015)

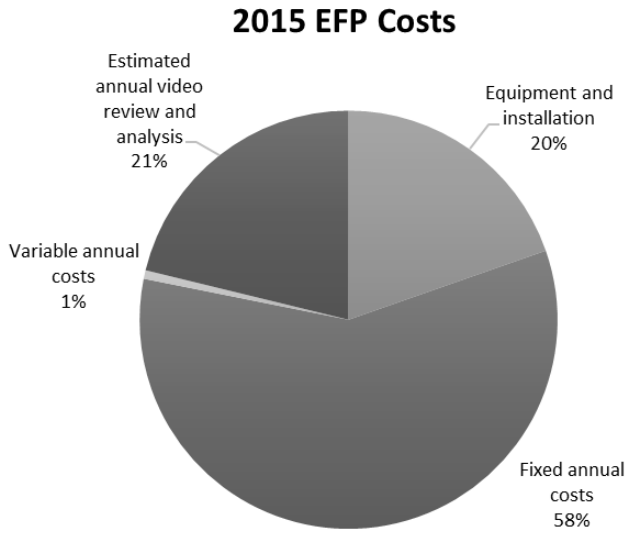


Figure 2: Cost breakdown for EM EFP Project- Year One (2015)

The estimated average total cost per vessel in 2015 was $15,192, with the largest expense type being fixed costs (Fig. 2). Annual video review and data analysis costs are currently paid by NMFS and were estimated for 2015 based on data provided by NMFS in the draft Regulatory Impact Review and Initial Regulatory Flexibility Analysis for the proposed rule for whiting and fixed gear EM programs.[4] Equipment costs for EFP participants in 2015 were covered through government grants and are not included in the EFP cost analysis – the costs included represent installation fees.

PARTICIPATION (YEAR ONE)

In 2015, five vessels (three fixed gear vessels and two trawl vessels) participated in the EFP, completing 32 trips. In July 2015, NMFS revoked the privilege to obtain an EFP from one trawl vessel as a result of the vessel failing to meet eligibility criteria.

	BOTTOM TRAWL	FIXED GEAR
VESSELS	2	3
TRIPS	14	18
HAULS	95	289

Table 3: Year One (2015) Project Participation by Gear Type

[4]http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/electronic_monitoring/em_draft_impact_review.pdf

Results (2015)

In 2015, PSMFC staff reviewed a total of 425 video hours of sorting time, representing 384 individual hauls (95 bottom trawl and 289 fixed gear) from this EFP project.

Estimated weights for discards recorded in logbooks by fishermen were compared to estimated weights for discards recorded by video reviewers. Figure 3 shows that in 2015, logbook weight estimates for all trawl vessels in the EFP project differed by 713 lbs compared to EM video reviewer estimates. Fixed gear vessel logbook estimates differed by 320 lbs.

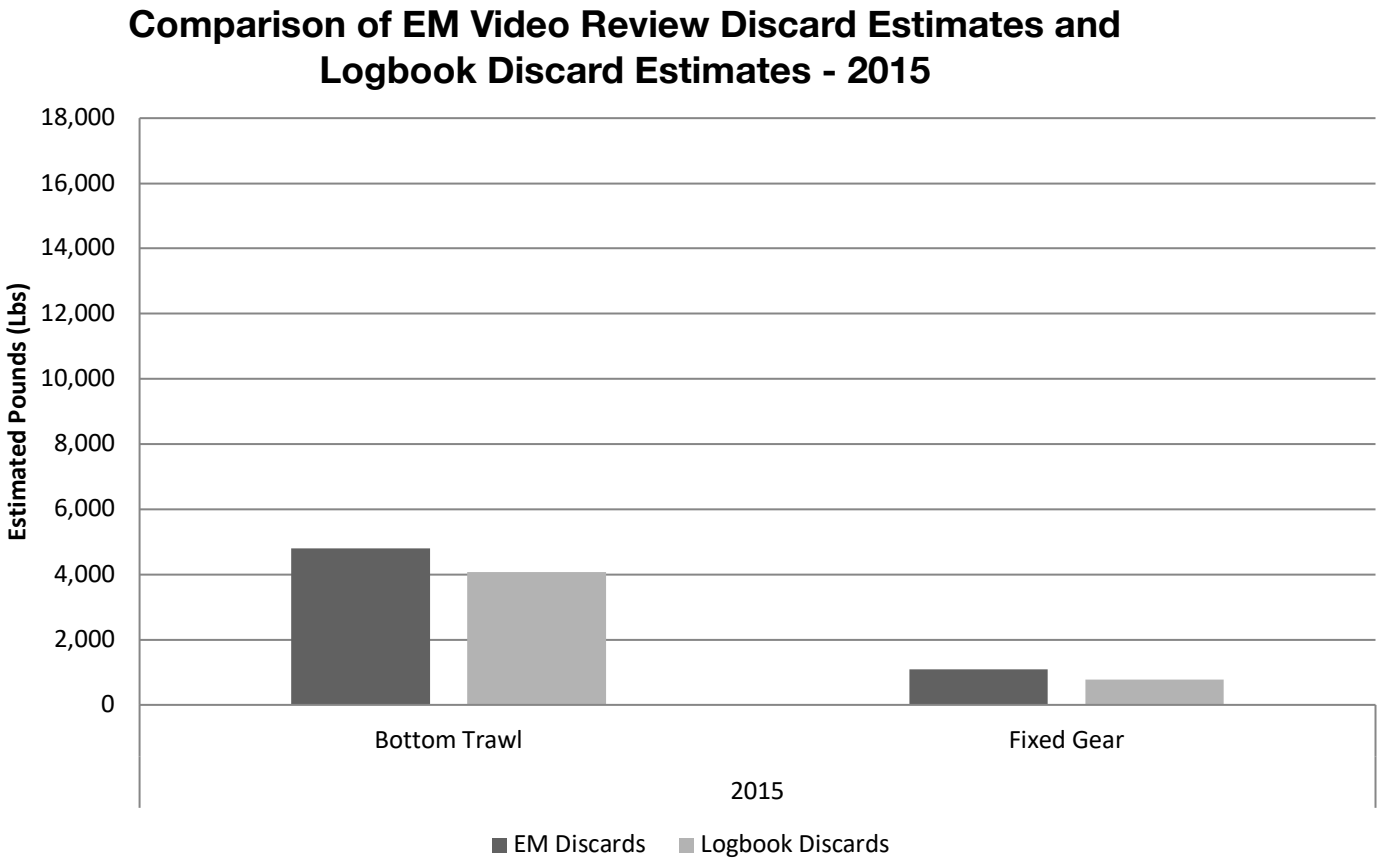


Figure 3: Comparing estimated discard weights from EM video review to estimated discard weights from logbook records for 2015.

RESULTS: YEAR TWO (2016)

The project partners secured approval to continue the EFP project in 2016 and add up to 10 additional vessels. In January 2016, the project partners began working with NMFS and PSMFC to develop a new, singular EFP document for 2016 that incorporated a Collective Enforcement Agreement (CEA).

The CEA is a cooperative approach to implementing EM in which all involved vessels and parties assume responsibility for compliance with the terms and conditions of the EFP and individual VMPs. This approach is intended to reduce NMFS enforcement costs related to an EM program. Given the need to ensure accurate catch accounting, NMFS Office of Law Enforcement needs a timely way to respond to technical issues, as well as noncompliance events. However, regulations and corresponding due process requirements may make timely response difficult. Under a CEA option, agreements become one of the criteria that vessels must satisfy to qualify for authorization to carry EM in lieu of an at sea observer. This option also provides fishermen members with the ability to more easily and quickly adapt monitoring plans as needed.

PARTICIPATION (YEAR TWO)

In 2016, four vessels (two fixed gear vessels and two trawl vessels) participated in the EFP, completing 48 trips. One fixed gear vessel did not fish in 2016 due to vessel construction, and a Scottish Seine vessel was added as a second trawler.

	BOTTOM TRAWL	FIXED GEAR
VESSELS	2	2
TRIPS	31	17
HAULS	230	415

Table 4: Year Two (2016) Project Participation by Gear type

The CEA must be vetted with NMFS and must be developed in cooperation with participating vessels. The core components of a CEA include criteria for participation, EM program and VMP requirements, prohibited activities, responsibility for enforcement, penalties and other remedial actions, and individual and collective liability.

As a condition of issuing this new type of EFP, NMFS required the project partners to assume primary responsibility for ensuring that vessels, vessel owners, and vessel operators participating in operations under the EFP complied with the terms and conditions of the EFP and CEA (however, NMFS retained full discretion to independently enforce the terms and conditions of the EFP). NMFS issued the new EFP referencing the CEA in August 2016 and all vessels switched to operating under this agreement at that time.

After distributing a request for bids for EM services and reviewing four competitive bids, the project partners again hired AMR for the 2016 fishing season to provide, install, and maintain EM systems.

Costs (2016)

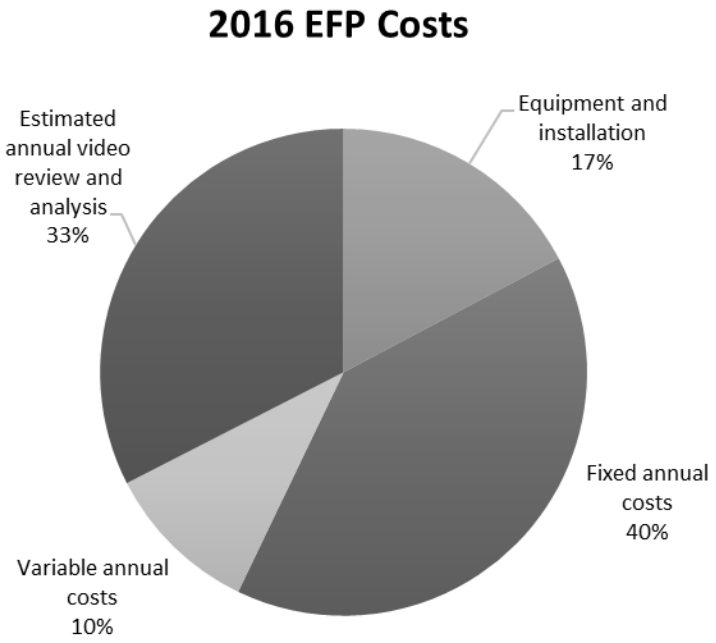


Figure 4: Cost breakdown for EM EFP Project- Year Two (2016)

The breakdown of costs associated with the EFP project in 2016 are presented in Figure 4. As in 2015, annual video review and data analysis costs are currently paid by NMFS and thus are presented as estimates based on data provided by NMFS[4]. Additional equipment costs in 2016 were again covered through government grants, though the project did incur installation costs. The estimated average total cost per vessel in 2016 was $11,233, indicating there was some savings between 2015 and 2016, mostly attributable to reduced EM service provider fees.

[4] http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/electronic_monitoring/em_draft_impact_review.pdf

Results (2016)

In 2016, PSMFC staff reviewed a total of 748 video hours of sorting time, representing 645 individual hauls (230 bottom trawl and 415 fixed gear) from this EFP project.

Estimated weights for discards recorded in logbooks were compared to estimated weights for discards recorded by video reviewers. Figure 5 shows that in 2016, logbook discard weight estimates for trawl vessels in total differed by 544 lbs compared to EM video reviewer estimates. Fixed gear vessel logbook discard weight estimates differed by 575 lbs.

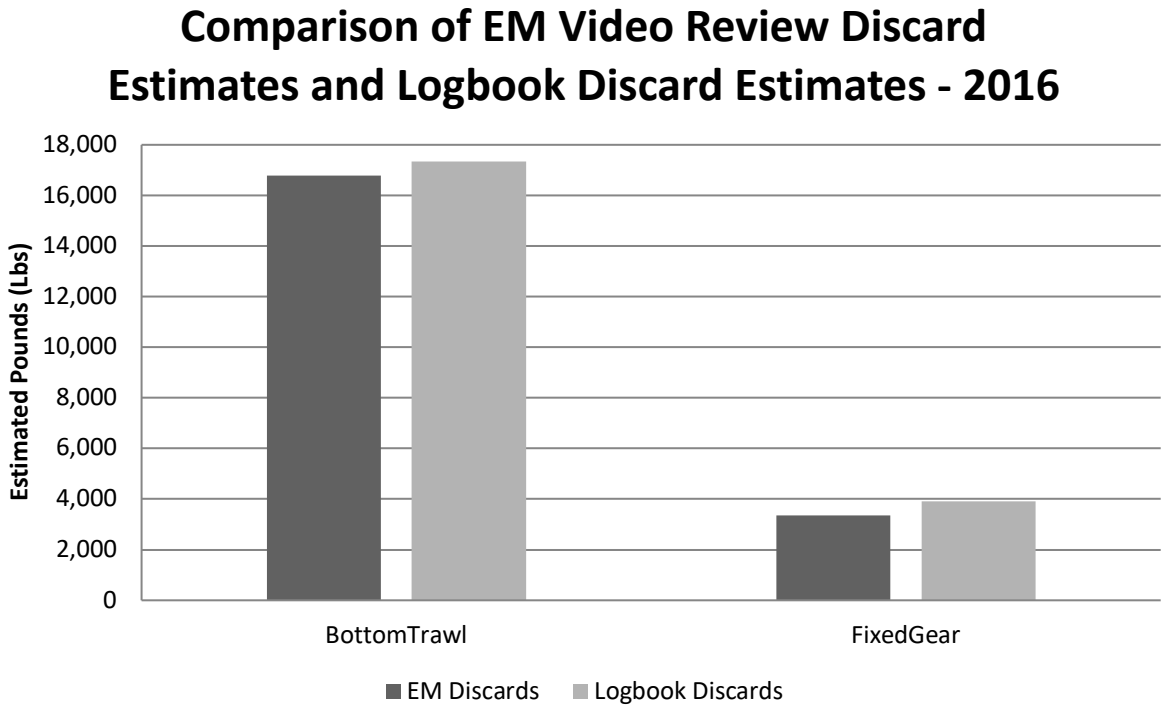


Figure 5: Comparing estimated discard weights from EM video review to estimated discard weights from logbook records for 2016.

At the March 2016 meeting, the PFMC chose to extend the expiration date of the EM EFPs for the bottom trawl, non-whiting mid-water trawl, whiting mid-water trawl, and fixed gear sectors through 2018.

In April 2016, the PFMC deemed draft regulations for whiting and fixed gear EM programs. After taking PFMC recommendations into consideration, NMFS published a proposed rule for whiting and fixed gear EM programs in September 2016.

RESULTS: YEAR THREE (2017)

Given the extension of EFPs through 2018 recommended by the PFMC, the project partners continued the EFP project in 2017 and continued to work with NMFS and PSMFC to fine tune VMPs and increase catch handling efficiency.

In early 2017, the project partners conducted a competitive bidding process and contracted AMR for the fishing season to maintain and service EM systems and provide technical support.

The project partners and participants also continued to engage in the regulatory development process to clarify cost analyses and advocate for preferred options to include in the pending trawl and mid-water trawl sectors EM program regulations. In the fall of 2017, Lisa Damrosch, the EFP project manager, published a report documenting the challenges of training, employing, and securing CMs when using EM. The report included recommendations to improve the availability and affordability of catch monitors for offloads and was submitted as formal public comment to the PFMC and advisory bodies in November 2017.

PARTICIPATION (YEAR THREE)

In 2017, six vessels (three fixed gear vessels and three trawl vessels) participated in the EFP, completing 94 trips.

	BOTTOM TRAWL	FIXED GEAR
VESSELS	3	3
TRIPS	73	21
HAULS	468	452

Table 5: Year Three (2017) Project Participation by Gear type

Costs (2017)

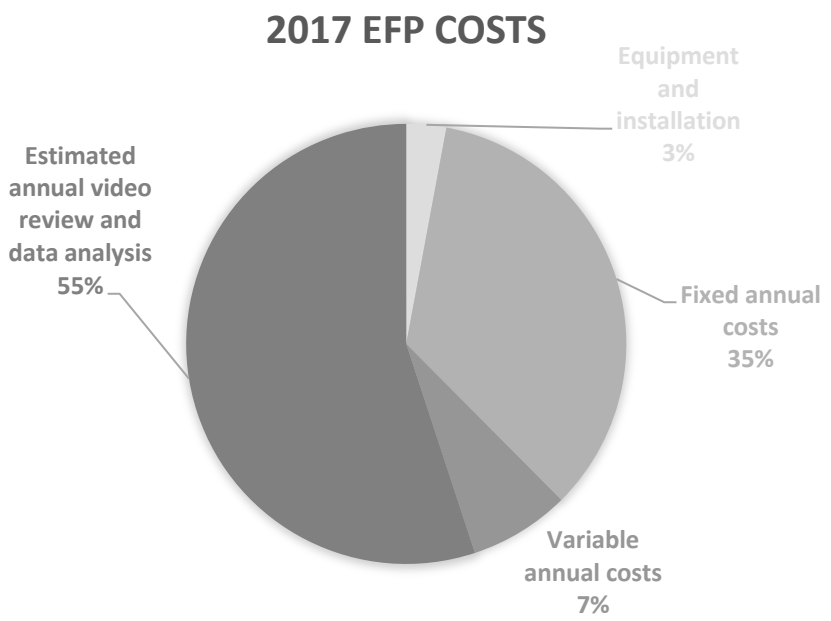


Figure 6: Cost breakdown for EM EFP Project- Year Three (2017)

The breakdown of costs associated with the EFP project in 2017 are presented in Figure 6. As in past years, the annual video review and data analysis costs were paid by NMFS and thus are presented as estimates based on data provided by NMFS[5]. Additional equipment costs in 2017 were again covered through government grants, though the project did incur small installation related costs for various equipment parts. The estimated average total cost per vessel in 2017 was $8,088, indicating additional savings compared to 2015 and 2016, mostly attributable to a reduction in fixed annual costs related to changing EM service provider fees.

[5] http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/electronic_monitoring/em_draft_impact_review.pdf

Results (2017)

In 2017, PSMFC reviewed a total of 1,281 video hours of sorting time, representing 920 individual hauls (468 bottom trawl and 452 fixed gear) from this EFP project. In 2017 the EFP project realized a 30% increase in fishing activity.

Estimated weights for discards recorded in logbooks were compared to estimated weights for discards recorded by video reviewers. Figure 7 shows that in 2017, logbook discard weight estimates for trawl differed by 2,973 lbs compared to EM video reviewer estimates, which represented less than a 3% difference. Fixed gear vessel logbook discard weight estimates differed by 499 lbs.

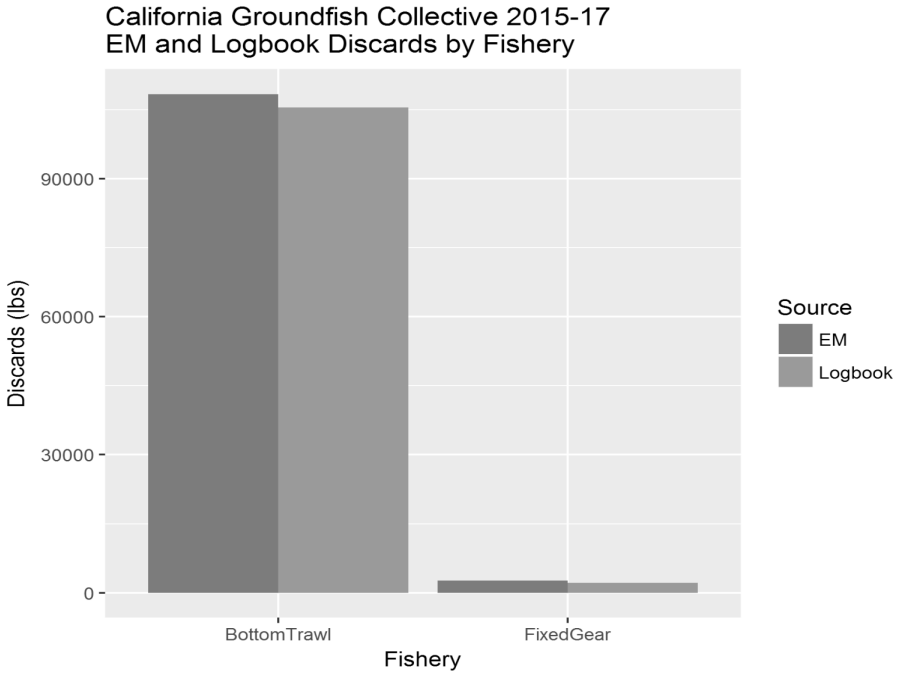


Figure 7: Comparing estimated discard weights from EM video review to logbook records for 2017.

One of the CGC vessels also participated in a review study with PSMFC in 2017 which allowed for discards of Pacific Sand Dabs. The result of this study was that Pacific Sand Dabs were added to the allowable discard list for 2018.

In April of 2017, the PFMC heard updates on EM EFP projects and took final action to approve EM programs for the bottom trawl and non-whiting midwater trawl sectors. At this meeting, the Council provided direction to NMFS to develop a process that does not require rulemaking to adjust the discard species list in a VMP and to examine the feasibility of using a sole video review provider (PSMFC) model indefinitely. This direction and revisions to the draft regulations including allowing Deep-sea sole, sanddabs, and starry flounder to the list of species that can be discarded were informed by this project and others.

While the EM program was originally slated for implementation shortly following the PFMC decision, NMFS has delayed promulgating the final rule for the whiting and fixed gear sectors, as well as publishing the proposed rule for bottom trawl and midwater trawl.

OVERALL RESULTS: 2015-2017

Costs (2015-2017)

The breakdown of costs associated with the EFP project for the project period are presented in Figure 8. In all years of the project, the annual video review and data analysis costs were paid by NMFS and thus are presented as estimates based on data provided by NMFS[6]. Additional equipment costs have been covered through government grants. The estimated average total cost per vessel per year over the course of the project period is $11,512.

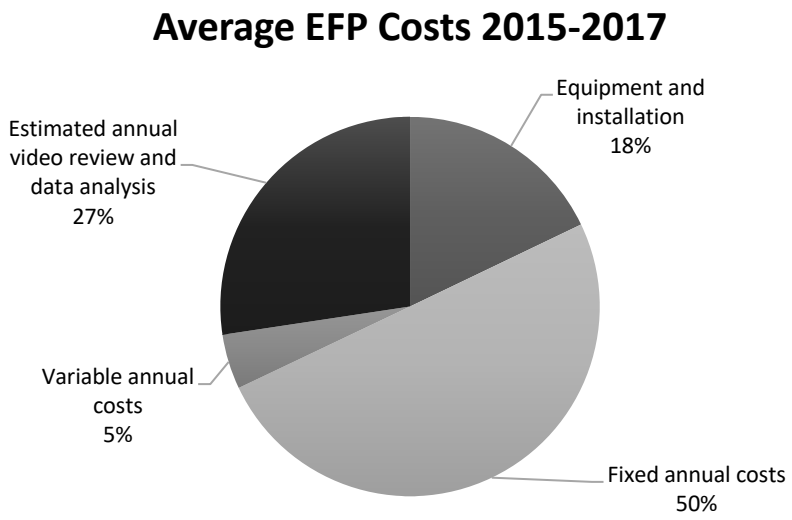


Figure 8: Cost breakdown for EM EFP Project for all three years (2015-2017)

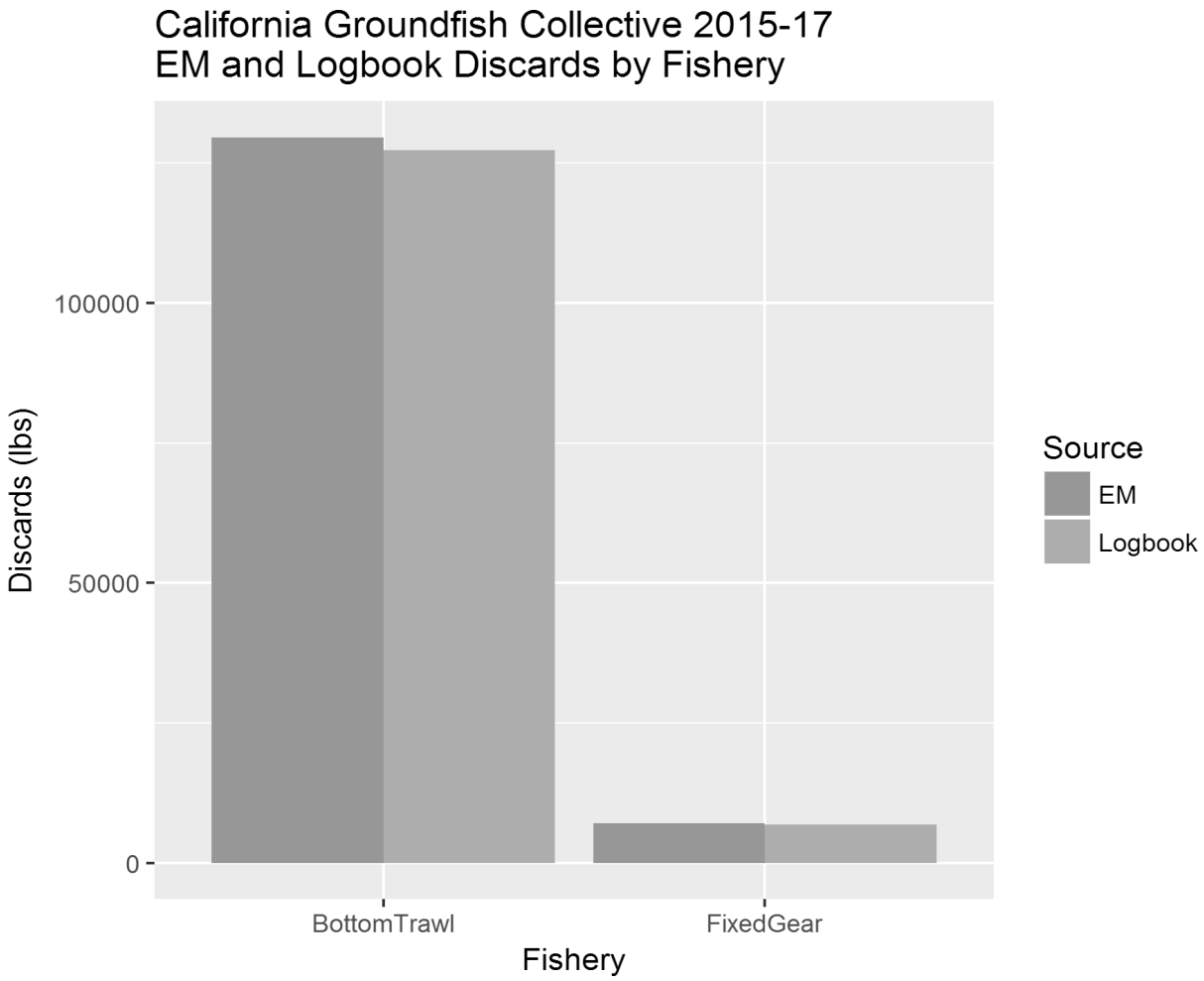


Figure 9: Comparing estimated discard weights from EM video review for project period (2015-2017)

Over the three-year project period, Figure 9 shows that logbook discard weight estimates for trawl differed from EM video reviewer estimates by 2%, and logbook discard weight estimates for fixed gear differed from EM video reviewer estimates by 3% overall.

Lessons Learned

The three-year EFP project has resulted in useful learning that was incorporated into recommendations during the regulatory development process, and which can also provide insight for the future EM programs in other fisheries.

EM systems can accurately validate logbook data provided by fishermen.

Over the project period, when comparing logbook estimates to EM video review estimates there is not a significant difference between the two (Fig.10; PSMFC). This remained true even as vessels in the program changed and allowable discard species increased due to better review capabilities for optimized retention trips. Over the 3-year project period, logbook estimates for trawl vessels in total differed by less than 3000 lbs over the three-year period or 2% when compared to EM video review estimates. Fixed gear vessel logbook estimates differed by less than 250 total pounds or 3% . Difference can vary by species. (Fig. 11; PSMFC)

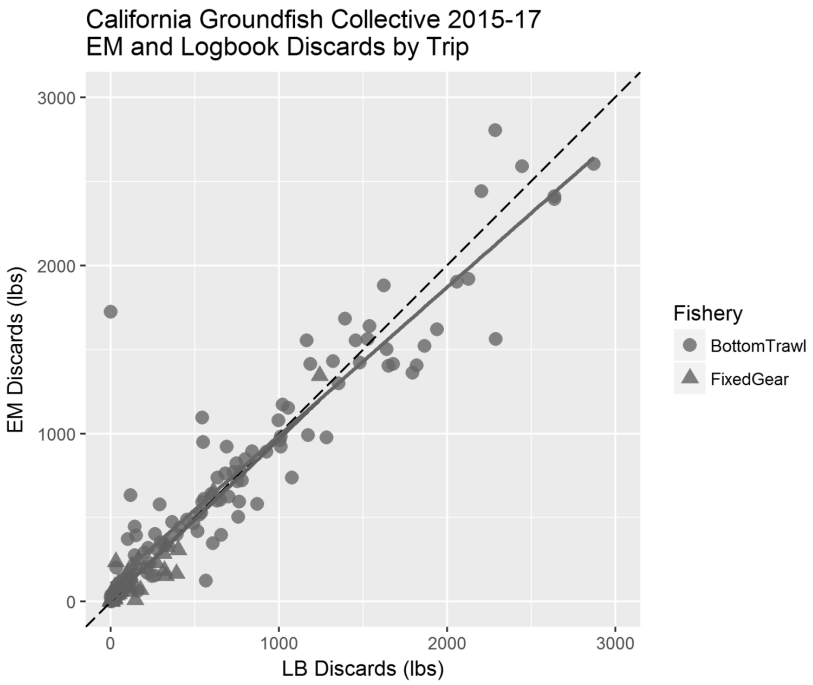


Figure 10: EM and logbook discard estimates by trip by gear type 2015-2017.

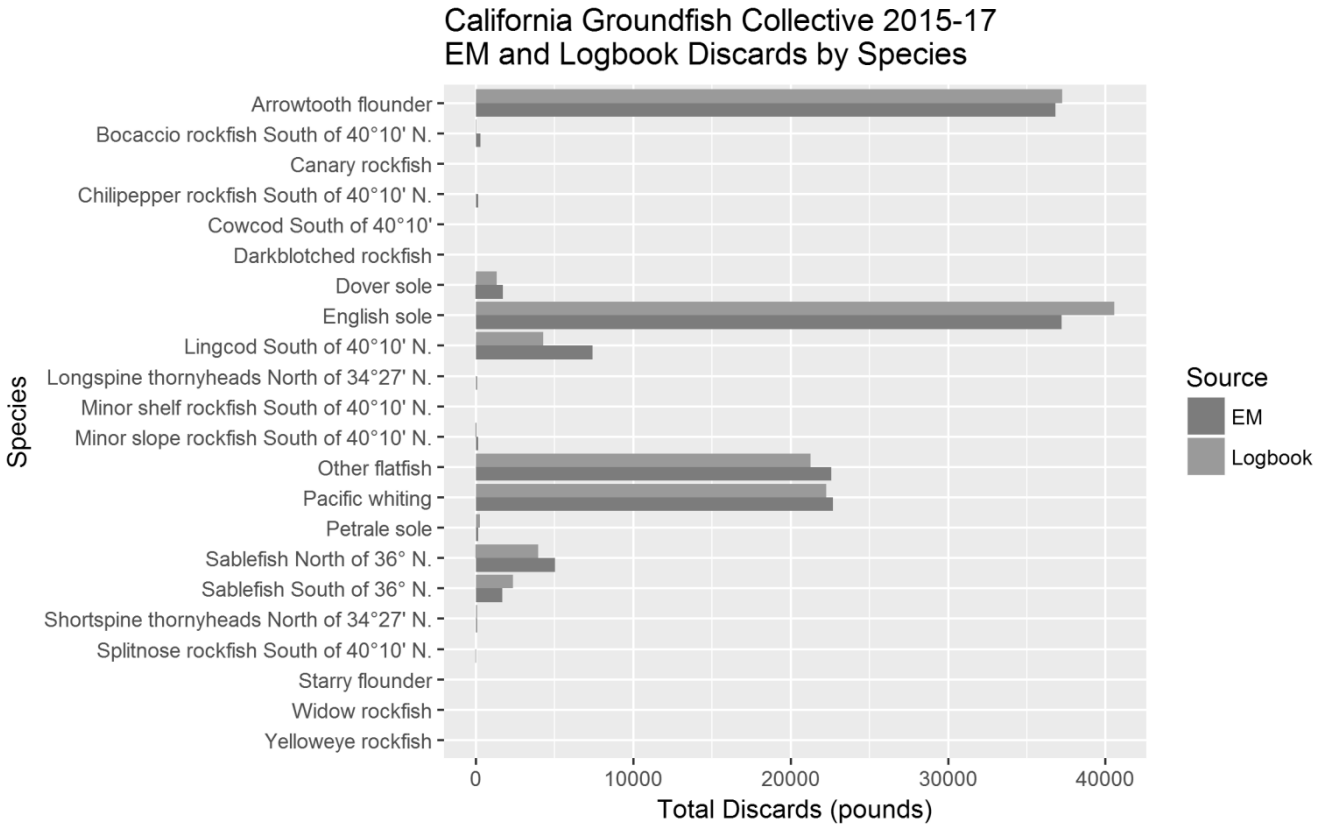


Figure 11: EM and logbook discard estimates by species 2015-2017

Increases in allowable discards does not decrease accuracy.

Since the beginning of the project period in 2015, the number of pounds discarded by bottom trawl vessels has increased, due in part to additional vessel participation in the EM EFP and participation in an additional study by PSMFC which allowed for an additional allowable discard species. The weight of discards made by trawl vessels participating in this project increased by 85% from 2016 to 2017, but the difference between logbook discard estimates and EM discard estimates remained at under 3%.

Fishermen can develop and adapt new catch handling techniques to ensure the success of EM.

Participating fishermen have demonstrated that when committed to participating in EM that they can change onboard behavior to meet video review requirements, reduce video review time, and ensure the success of EM in meeting compliance monitoring requirements. However, potential future participants in EM programs should understand that EM is not a passive replacement for human observers due to additional commitment and participation. Changes to catch handling may influence costs to the vessel due to increased sorting time, increased retained catch, and other considerations.

Placing clearly visible computer monitors in the wheelhouse allows for captains to easily view EM camera views to oversee crew catch handling. All crew members (and scientific observers when onboard the vessel) must be trained not only in catch handling, but also in camera awareness during fishing activity.

Collaboration across stakeholders is essential.

Captain and crew participation, collaboration across stakeholders, and frequent communication between all parties involved was essential during the development and implementation the EM project. This type of collaboration and communication should be incorporated into the development of EM programs elsewhere. In addition, working with a single point of contact for a group of vessels can improve communication and streamline administration of an EM program.

A Collective Enforcement Agreement creates an opportunity for a cooperative approach to implementing EM that may increase efficiency for industry and managers.

The use of a CEA requires close collaboration with NMFS to ensure compatibility with existing rules and regulations. The benefits of a CEA include:

- Reduced need for direct enforcement actions, reducing NMFS administration and enforcement costs while retaining flexibility
- Collective oversight and collective incentives for vessels to comply with EM rules and regulations
- Allows for more timely response to technical challenges or misuse of EM
- Non-compliance can be quickly addressed (the exemption to use EM systems can be quickly nullified for non-compliant vessels)
- Ability to enter into collective agreements with service providers, if desired
- Provides centralized contact points for service providers, PSMFC and NMFS
- Allows for adaptation of monitoring plans as needed without requiring revision of all EFP documents

The challenges of a CEA include:

- Developing and vetting the components and terms within the agreement in collaboration with all stakeholders, including NMFS
- Securing final approval and signatures
- Ensuring compliance if participation is widely distributed geographically

Many costs associated with implementing an EM program are variable and highly dependent on final program design.

Results from the project indicate that EM systems have the potential to reduce existing monitoring costs without compromising data quality or integrity. Actual costs, however, will depend on program goals (e.g., regulatory compliance vs. discard estimation) and the actual program design (e.g., audit vs. 100% video review [also known as a census approach]). Fishery characteristics such as the relative geographic isolation and number of ports, and the amount of fishing activity (by vessels or fleet) also drive EM costs.[6] In addition, any analysis of cost-effectiveness depends on a detailed accounting of the cost for deploying human fishery monitors. Given these ongoing uncertainties, a conclusive evaluation of the cost-effectiveness of EM programs is not yet possible. However, this project can inform the relative cost picture and help shape perspectives on how to advance EM regulations that have a likelihood of being more cost-effective than current monitoring approaches.

[6] Sylvia et al. 2016

Conclusion

This EFP project has served as an important demonstration of the use of EM in lieu of at sea observers for compliance monitoring in the West Coast groundfish fishery. This project implemented EM across multiple gear types in a high-volume, multi-species fishery, and project results have informed the development of new EM regulations.

The participants in this EFP project have identified challenges facing the implementation of EM in the groundfish fishery. For instance, vessels using EM face the challenge of limited or reduced availability of CMs for offloads. In ports with fewer landings, it can be difficult to hire, train and retain people to serve in CM roles given the education and training requirements and the inability of CM providers to recoup costs. CM service costs borne by first receivers are typically passed on to vessels, and the logistical challenges associated with moving CMs between remote ports can delay offloads and in some cases, may offset cost savings achieved by using EM. The project partners and other stakeholders are continuing to advocate for the evaluation of potential solutions to CM challenges, including revising educational and training requirements, the types of entities that can serve as certified CM providers, and testing the use of EM technology to monitor offloads.

The role of scientific observers and how they are assigned to EM vessels will need to be explored as EM transitions to regulations in order to ensure adequate data collection can continue without interrupting fishing operations or increasing workload on vessels and captains that are compliant under EM. Moving forward, a process for flexibility within the VMP will also be important as review capabilities and catch handling continues to improve.

The project partners and other stakeholders recognize there are significant outstanding questions related to the ongoing costs of EM. The full cost of an EM program is dependent on final EM program design, and pending decisions related to issues such as the required levels of video review and data processing, submission, and storage requirements will significantly impact the full cost of the EM program. These critical program standards will affect costs to the industry and to government and will determine whether EM can serve as a more cost-effective alternative to human at sea observers in the groundfish fishery.

Nevertheless, results from this EFP project indicate that EM systems have the potential to reduce existing monitoring costs without compromising data quality or integrity, and therefore may be an alternative compliance monitoring option for some fishing operations in the groundfish fishery.

The project participants look forward to continuing to work with the PFMC, NMFS and other stakeholders to resolve outstanding concerns and reach successful implementation of EM as an alternative catch monitoring option.

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