Supplemental NMFS Report on the Whiting Electronic Monitoring (EM) Final Alternative and Regulations

Prepared by the NMFS West Coast Regional Office

NMFS is providing this supplemental report to inform the Pacific Fishery Management Council's decision-making on an EM program for the whiting fishery.

Exempted Fishing Permit (EFP) Update

Pacific States Marine Fisheries Commission (PSMFC) has begun analyzing discrepancies between logbook and EM data from EFP trips and prepared the attached report summarizing the results for whiting trips to date. As you can see from the report, there is close agreement between logbook and EM discard estimates on the majority of shorebased and mothership trips (Discrepancies were less than 1,000 lb on 97 percent and 80 percent of trips, respectively). On shorebased trips, about half the vessels overestimated discards and half the vessels underestimated them. In the mothership fishery, EM estimates tended to be greater, likely because the position of the cameras gives reviewers a clearer view of discards in the water as the net is being retrieved. There were 7 instances where the discrepancy was greater than 10,000 lb, which accounted for most of the total discrepancy from shorebased trips. There were no instances where the EM data was missing and not able to be used to validate the logbook data.

PSMFC has also begun analyzing fixed gear and bottom trawl trips to date and we plan to share the results with the Council at a future meeting. We are now working on the business rules that will be used to determine in what situations the discards debited from vessel account system using logbook data should be updated using the EM data. We are cognizant of the end of year quota pound trading deadline and are working with EFP sponsors to reach out to participating vessels about the business rules and corrections process, so that vessel accounts can be updated before the end of the year with minimal disruption.

We are also talking with EFP sponsors about planning and improvements for the second year of the EFPs. We have had inquiries from approximately eight vessels that are interested in joining the EFPs next year, including approximately six bottom trawl, one longline, and one seine. We are interested in working with these vessels and would like to add them to the EFP program next year. While we previously expressed concerns about the potential workload of the EFP program, we believe that adding these vessels would have minimal impact on staff workload and would provide needed information to support the Council's future decisions on EM programs for fixed gear and bottom trawl vessels. Bottom trawl gear continues to have low participation in the EFP and adding these vessels would increase the sample size. We would like the Council's support in adding these vessels to the EFP.

Potential Industry Cost Estimates

During the September 2015 Council Meeting, NMFS advised the Council on the Council's preferred Alternative (see below). At the Council's request, we have also prepared industry cost estimates to assist the Council in understanding the potential costs to the industry of a whiting EM program should all costs of the program be paid for by the industry – either directly or through cost recovery. Should industry pay a non-governmental third party directly for video review, NMFS will still incur auditing costs (see table below). Note that we used cost information from published reports and anecdotal sources, multiplied by estimated levels of effort, to generate these estimates so they have some inherent uncertainty.

- The table below shows the industry per-trip costs of using EM or observers for the shorebased and mothership vessels based on the fleet sizes associated with EM EFP (19 vessels participating in shorebased fishery and 12 in the Mothership Fishery) The full spreadsheet analysis is also attached. These estimates are draft, awaiting review and comment via the Council's advisory bodies.
- Costs of cameras and hard drives are not included in the analysis as the participating vessels have already procured cameras and hard drives.
- The analysis uses $500 per day as estimate of observer costs. This may be a high estimate especially for at-sea vessels. At-sea rates may be as low as $365 per day. Depending on the port, shorebased rates may range from $425 to $475. Therefore the estimates of cost -savings may be high.
- Compliance Monitor costs are not included in the analysis because they are required regardless if EM is in place or not. For some vessels, efficiencies gained from using the observer as a catch monitor for the same trip may be lost in the EM program, resulting in higher catch monitor costs that undercut cost savings from using EM. (NMFS will discuss this issue as this analysis undergoes review by Council advisory bodies).
- The major costs appear to be from reviewing the video, storing the video, the field services needed to keep the equipment in working order, and the costs of administering the program including managing the logbook program.
- When compared to estimated industry payments for observer services, EM trip costs were lower, including under a non-governmental third party reviewer scenario.
- It is also important to consider how the program would interact with cost recovery. If PSMFC continues to conduct the video review, NMFS will be incurring costs for video review, data storage, and program administration, from both NMFS and PSMFC staff time, which we believe would be recoverable through cost recovery fees. Since the shorebased fishery has reached the 3-percent fee cap, shorebased vessels would only be responsible for the costs of the EM systems (many of which have already been purchased), and field services. The mothership fishery could see an increase in fees due to the EM program (0.7 % if NMFS does the video review, 0.3% if industry pays a third party directly for the video review and NMFS incurs costs of auditing the third party) as well as incurring the costs of equipment and field services.

Major Cost Elements Related to Electronic Monitoring in Shorebased and At Sea (Mothership) Catcher Vessels						
Per Trip Analysis						
Percent Level of Video Review is			100%			
		Shorebased		At-Sea		Shorebased %
Average Video Review Cost per Trip		$132.37		$1,143.05		27.1%
Average Storage Cost per Trip		$139.57		$1,288.36		28.6%
Average Field Service Cost/trip		$141.42		$443.23		29.0%
Average Admin Cost/trip		$82.22		$661.28		16.8%
Hard Drive Submission Cost per trip		$3.00		$15.00		0.6%
Total Costs per Trip		$488.37		$3,390.61		100.0%
Average Days per Trip		2.3		13.0		
Observer Cost Per Day		$500		$500		
Total Observer Cost Per Day		$1,161.96		$6,484.04		
Industry Cost Savings		$673.58		$3,093.43		
If Industry pays 3rd party reviewer, NMFS will need to have video reviewers and other services to do the audit.						
If NMFS needs to have the capability of reviewing and storing 50% of the video, the audit costs can be approximated						
at 50% of the Video Review Cost and Average Storage Cost.						
Audit Cost		$135.97		$1,215.70		
Total Costs per trip with Audit		$624.34		$4,606.31		
Industry Cost Savings with Audit		$537.61		$1,877.73		
Number of Trips		962		32		
						Total
Projected Total EM Costs		$469,816		$108,499		$578,315
Projected Total EM Costs w Audit		$600,618		$147,402		$748,020
Projected EM Fleets Estimates--Based on 2011-14 fleet averages and EM EFP						
	Vessels	Average Trips Per Vessel	Average Trip length (Days)	# of Trips	Total Days	
Shorebased	19.0	50.6	2.3	961.4	2234.2	
At-Sea	12.0	2.6	13.0	31.7	410.8	

Excerpt from Agenda Item H.4.a NMFS Report September 2015 Groundfish Electronic Monitoring Exempted Fishing Permits Update and NMFS Recommendations for the Whiting Regulatory Amendment

EM Program Funding

The Council's FPA stated that a certified third party would conduct the video review once a certification process has been established, and until then NMFS or its agent would conduct the video review. NMFS agrees that a transitional phase would be needed for the whiting EM program in which NMFS or its agent would conduct the video review. However, NMFS 5 believes that this language is not approvable as written based on guidance received from the Department of Commerce Office of General Counsel. According to this guidance, NMFS and the industry cannot both be eligible to fund the same requirement in regulation. A particular program cost is either NMFS's or the industry's responsibility, with NMFS's role defined by its legal obligations to pay for government services. Therefore, the question of who must fund video review relies on a determination from NMFS of its responsibilities in the proposed EM program, rather than a Council action. NMFS believes that it may be appropriate for a third-party service provider funded by industry to conduct EM video review, as the Council proposes, provided that NMFS has the standards and processes in place to monitor the provider's performance and ensure data quality. In this model, the third party would gather data from the video and provide it to NMFS, and NMFS would set standards for the provider and video review and monitor the provider's performance to ensure data quality.

NMFS believes that an Observer Program-like infrastructure, with training, certification, and data QA/QC procedures, would be needed to adequately monitor a third-party service provider video review. As NMFS does not yet have sufficient information to develop standards or infrastructure to support third-party video review, NMFS believes it must conduct the video review itself, likely through a cooperative agreement with PSMFC, to ensure adequate data quality. In this case, the Council's regulatory amendment/EA should assume industry fully funds a third-party video review to analyze the full range of potential cost impacts to the industry. This would allow NMFS to follow-up with a secondary rulemaking in a future year to establish standards in regulation for third-party service provider video review and industry funding.

NMFS strongly recommends that the Council revise its final preferred alternative to require only industry-funded third-party video review, to be consistent with appropriations law. NMFS would specify in the rulemaking any arrangement for NMFS or its agent to conduct video review in place of a third party.

Preliminary Report:
Pacific whiting Electronic Monitoring Exempted Fishing Permit
Review of the 2015 Season to date

Alia Al-Humaidhi and Dave Colpo

Pacific States Marine Fisheries Commission

205 SE Spokane Street, Suite 100

Portland, OR 97202

Publication Date: October 2015

The Pacific whiting 2015 Electronic Monitoring (EM) Exempted Fishing Permit (EFP) has had 18 active vessels to date. Six vessels fished both in the shoreside and mothership catcher sectors, two fished in the mothership catcher sector exclusively and ten fished in the shoreside sector exclusively. To date, the video has quantified nearly half a million pounds of discard (Table 1). To help keep these numbers in perspective, the Shoreside and Mothership Quotas were approximately 275 and 157 million pounds respectively.

Table 1. Summary of vessel count, trip count and estimated pounds of discard from EM and Logbooks.

Fishery	Vessel Count	Trip Count	EM Discard Lbs	Logbook Discard Lbs	EM Discard lbs - Logbook Discard lbs	Total Quota Available
Shoreside Hake	16	364	166,796	120,430	46,366	274,712,403
Mothership Catcher Vessel	8	14	330,930	259,730	71,200	156,969,131
Total	18	378	497,726	380,160	117,566	431,681,534

Shoreside Hake Sector

In the shoreside sector, trip level comparisons of the video recorded discards and the logbook recorded discards reveal that 97% of the trips had less than 1,000 pound differences between the two data sources with nearly 50% of the trips having less than 10 pound differences. Both values are estimated weights and thus have inherent error (Figure 1).

At the trip level, the video recorded discard estimates tended to be larger than the logbook recorded discard estimates. Video reviewers can see fish in the water as the net comes to the surface and while it is being pulled towards the vessel much more effectively than fishers onboard the vessel. This could account for the larger values recorded by the reviewers.

The shoreside fishery is managed as an individual fishing quota fishery and thus has what amounts to vessel level management. When discard estimates were aggregated to the vessel level, half of the vessels recorded more discarded catch on their logbooks than the video reviewer and half recorded less (Figure 2).

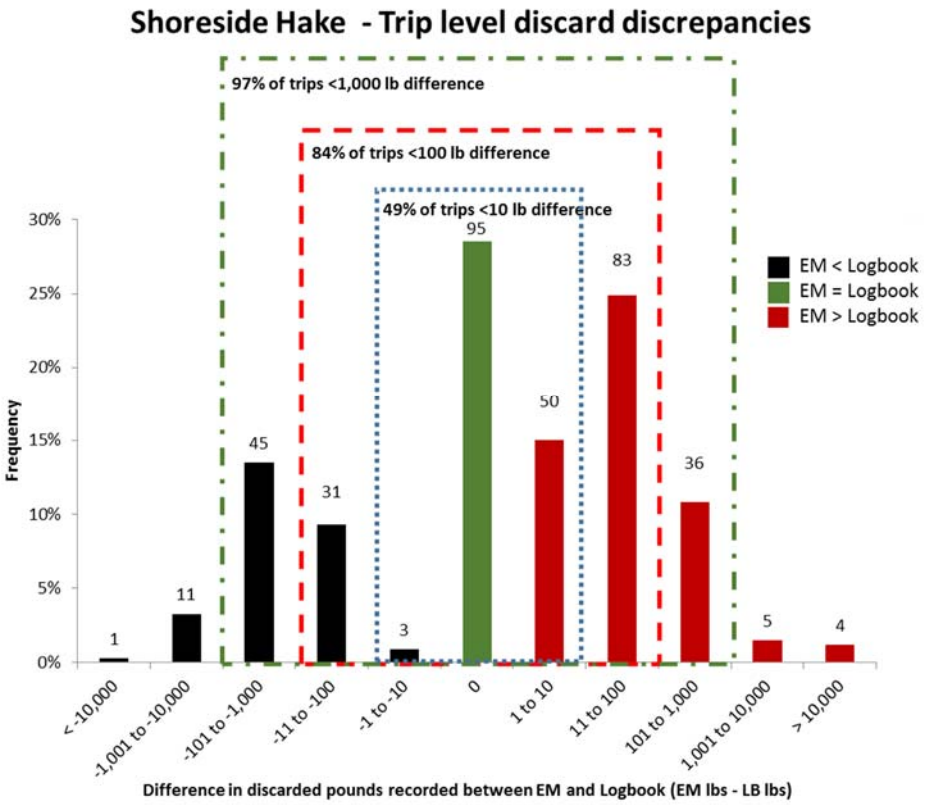

Figure 1. Shoreside hake sector. Histogram of difference in discarded pounds recorded between EM and logbook at the trip level.

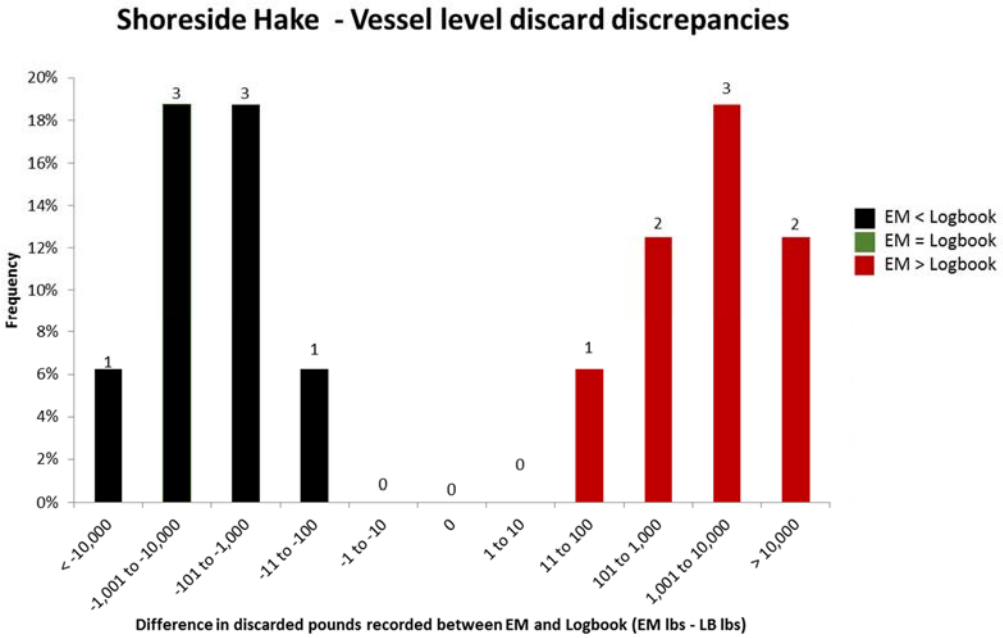

Figure 2. Shoreside hake sector. Histogram of difference in discarded pounds recorded between EM and logbook at the vessel level.

There were five trips where differences were larger than 10,000 pounds at the trip level. One of which was a large discard that was recorded on the vessel's logbook but not by the video reviewer. The other 4 were instances where the vessel logbook had a discard recorded but the magnitude of discard was estimated as much larger by the video reviewer. PSMFC has plans to discuss methods of discard estimation with the fleet once the 2015 fishing season comes to a close (Table 2).

Table 2. Shoreside hake sector. Magnitude of differences that are greater the 10,000 pounds.

Larger than 10,000 lbs difference	
Vessel 1	30,530
Vessel 3	17,105
Vessel 3	10,207
Vessel 2	10,021
Vessel 4	(19,915)

Mothership Catcher Vessel Sector

In the mothership catcher vessel sector, haul level comparisons of the video recorded discards and the logbook recorded discards reveal that 80% of the hauls had less than 1,000 pound differences between the two data sources with 55% of the trips having less than 100 pound differences. Both values are estimated weights and thus have inherent error. This sector is managed as a coop and thus, the sector level values will drive the management decisions made. In this case, as seen in table 1, there is a 71,000 pound difference at the sector level between what video reviewers have recorded and what was recorded on the vessel logbook (Figure 3).

At the haul level, the video recorded discard estimates tended to be larger than the logbook recorded discard estimates. Video reviewers can see fish in the water as the net comes to the surface and while it is being pulled towards the vessel much more effectively than fishers onboard the vessel. This could account for the larger values recorded by the reviewers. PSMFC has plans to discuss methods of discard estimation with the fleet once the 2015 fishing season comes to a close.

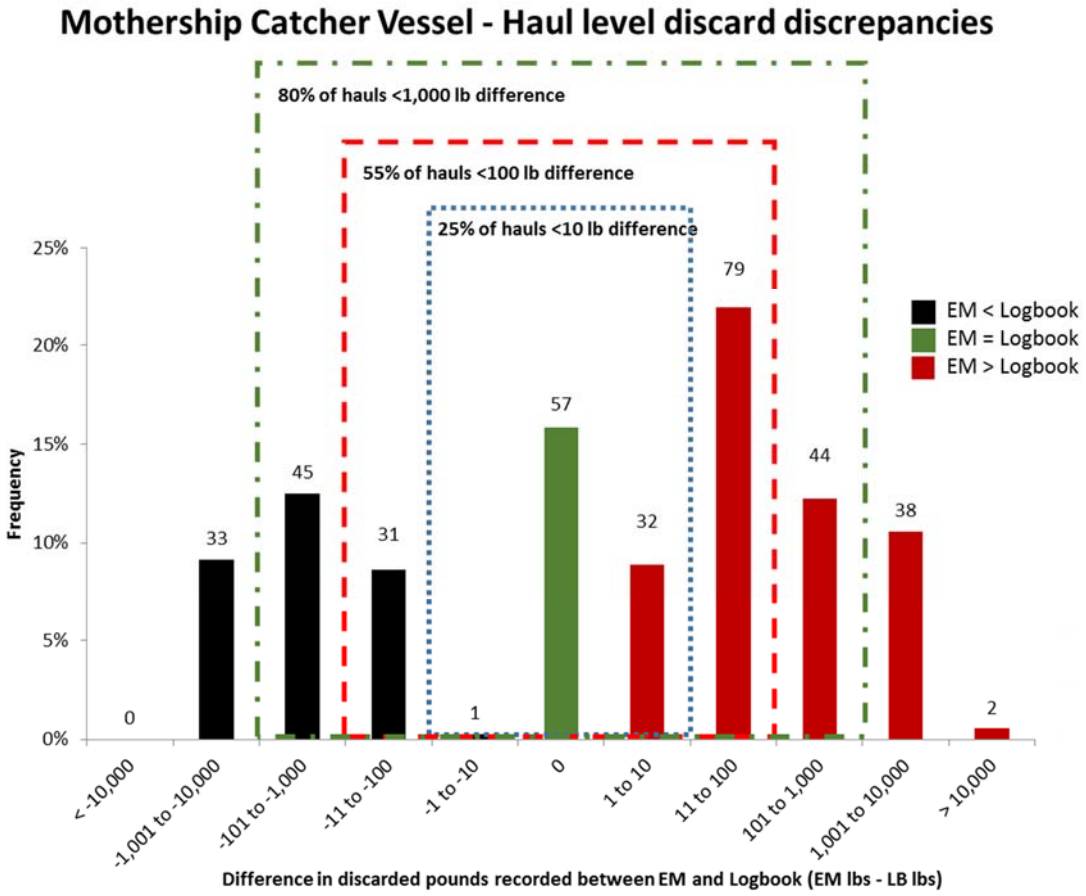

Figure 3. Mothership catcher vessel sector. Histogram of difference in discarded pounds recorded between EM and logbook at the haul level.

There were 2 hauls where differences were larger than 10,000 pounds at the haul level. Both were instances where the vessel logbook had a discard recorded but the magnitude of discard was estimated as much larger by the video reviewer. PSMFC has plans to discuss methods of discard estimation with the fleet once the 2015 fishing season comes to a close (Table 3).

Table 3. Mothership catcher vessel sector. Magnitude of differences that are greater the 10,000 pounds.

Larger than 10,000 lbs difference	
Vessel 1	16,030
Vessel 2	11,800

Estimating the Costs of Video Reviewer by Fleet.

I. Use Total Whiting Fleet Dimensions to Project EM Fleet Dimensions.

Total Whiting Fleet-NMFS Estimates based on Observer Data

Shorebased		Vessels	Total Days	# Trips	Trips per Vessel	Average Trip Length (Days)
	2011	26	3,213	1,427	54.9	2.3
	2012	24	2,504	972	40.5	2.6
	2013	24	2,755	1,232	51.3	2.2
	2014	25	3,201	1,392	55.7	2.3
4 year Average		25	2,918	1,256	50.6	2.3
At-Sea						
	2011	18	619	49	2.7	12.6
	2012	16	517	39	2.4	13.3
	2013	18	604	47	2.6	12.9
	2014	19	698	53	2.8	13.2
4 year Average		18	610	47	2.6	13.0

EFPs suggest 19 shorebased vessels and 12 At sea vessels-most at-sea vessels fish shorebased.

Use 4 year Averages to Project EM Fleet Dimensions

Projected EM Fleets Estimates	Vessels	Average Trips Per Vessel	Average Trip length Days	# of Trips	Total Days
Shorebased	19	51	2.3	961.4	2,234
At-Sea	12	3	13.0	31.7	411

II. Calulate Video Time

Vessel steams to grounds, starts to fish and returns to port.
Video is turned on when fishing begins and left on until vessel returns to port
Assume that steaming to grounds is on average one day for both fleets

	Average Trip Length	Steam Time to Grounds	Estimated Video Trip Length	Video hours
Shorebased	2.3	1	1.3	31.2
At-Sea	13.0	1	12	288

III. Calculate time to review Video based on Sampling Review Rate

	Shorebased	At-Sea
Total Hours	31.2	288

Sampling Rate	100%	100%
Total Hours to Review	31.2	288

IV. Calulate Number of hours of hours fish is being handled --Sort Hours and number of hours of dead time -Non-Sort Hours

Use 2015 average percentages developed by PSMFC.

	Shorebased	Mothership
% of Total Video Time fish handling	11%	7%
% of Video time- dead time/trip	89%	93%
Total Hours to Review	31.2	288
Trip hours--fish handling	3.4	20.2
Trip hours--dead time	27.8	267.8

V. Calculate the number of hours it takes a Video Review to Review

There are different rates of review for fish handling hours and for dead time.

Use 2015 EFP estimates developed by PSMFC from EFPs

	Shorebased	Mothership
review speed for fish handling	0.27	0.30
review speed for dead time	0.06	0.06
Review Hours-Fish Handling	0.9	6.1
Review Hours-Dead Time	1.7	16.7
Total Video Reviewer Hours	**2.6**	**22.9**

VI. Estimate Total Costs of Video Review Costs

PSMFC estimate of video reviewer time per hour		$50
Total Video Reviewer Hours	2.6	22.9
Videro reviewer cost per hour	$50	$50
Average Video Review Cost per Trip	**$132.37**	**$1,143.05**

Estimating the Costs of Video Storage.

To date PSFMC has spent the following amount on video data storage $200,000
Most of this data is whiting data
Arbitrarily assume that Whiting data storage for the year is $175,000

Data Storage costs are scalable to sampling level of review

Sampline level of Review 100%

Overall whiting (at-sea and shorebased) Video Storage Cost 175000

Until NMFS establishes specific confidentiality regulations, assume that video data is same as observer data/or public records.
So video data must be kept for 8 years.
Therefore Video storage costs is a major annual cost

Need to apportion these costs to each sector.
Use total potential review hours to allocate costs per sector

	Shorebased	Mothership	Total
Total Hours to Review per trip	31.2	288	
# of Trips	961.3902564	31.68092105	
Total Hours Review for Sector	29995.376	9124.105263	39119.481
Percent Allocation	77%	23%	100%
Total Cost Video Storage	$175,000	$175,000	
Percent Allocation	77%	23%	
Sector Cost Allocation	$134,183.55	$40,816.45	
Trips per Sector	961.4	31.7	
Average Storage Cost per Trip	$139.57	$1,288.36	

Estimating Field Services Costs

Field Services include services that keep the camera systems running smoothly, sensors working, doing periodic checks, and assuring the camera views are correct.

These estimates are based on June 12, 2014 Archipelago Marine Research Ltd Report on the 2004 to 2010 US Shorebased-Whiting EM Program.
The Report was provided via a letter to Dr. McIsaac.

Table 3-10 of report shows total 2010 Costs of $412,000 and Figure 3-8 shows in-season servicing was 25% of this Cost

This suggests that the annual cost of field servicing was a little over $100,000 in 2010

This is 2015 and we are evaluating EM for shoreside and at-sea fleets.

Therefore the $100,000 estimate is arbitrarily adjusted to $150,000 to account for at-sea fleet and inflation. $150,000

Similar to the Annual Video Storage Costs, need to apportion costs to each fleet.

Field services is strongly related to the number of times a vessel returns or leaves ports

Therefore, use number of estimated trips per sector to apportion costs.

	Number of Trips	Percent of Trips
Shorebased	961	96.81%
At-sea	32	3.19%
Total	993	100.00%

Field Services is strongly related to the number of days operating

	Number of Days	
Shorebased	2,234	84.47%
At-sea	411	15.53%
Total	2645	100.00%

For purposed of Estimation use averages of the percents

	Trips	Days	Average
Shorebased	96.81%	84.47%	91%
At-Sea	3.19%	15.53%	9%

	Shorebased	At-Sea
	$150,000	$150,000
Allocation Percent	91%	9%
Sector Allocation	135,958	14,042
Sector Trips	961.4	31.7
Average Field Service Cost/trip	141.42	443.23

Estimate EM Adminstrative Costs

To administer the program there needs to be

Data Analyst	looks at Logbook data and compares to video
data entry	takes logbook data and enters data into database
Permits administrator	reviews Individual Vessel Monitoring Plans, issues exemptions (permits) from 100% observer rule other duties
Program oversight	

These skills with be associated with positions that will also be working with trawl and fixed gear EM fisheries

Assume that the whiting responsibilities equate to one FTE- 100000

Use number of estimated trips per sector to apportion costs to reflect amount of data entry

Therefore, use number of estimated trips per sector to apportion costs.

	Number of Trips	Percent of Trips
Shorebased	961	96.81%
At-sea	32	3.19%
Total	993	100.00%

However, workload such as issuing exemptions and reviewing IVMPs relate closer to number of vessels

	Number of Vessels	
Shorebased	19	61.29%
At-sea	12	38.71%
Total	31	100.00%

For purpose of Estimation use averages of the percents

	Trips	Vessels	Average
Shorebased	96.81%	61.29%	79%
At-Sea	3.19%	38.71%	21%

	Shorebased	At-Sea
	$100,000	$100,000
Allocation Percent	79%	21%
Sector Allocation	79,050	20,950
Sector Trips	961.4	31.7
Average Admin Cost/trip	82.22	661.28

Hard Drive Submission

Vessels are already supplied with Hard drives
For Shoreside Vessels , one hardrive holds video for 5 trips
For at-sea vessels, one hardrive holds video for 1 trip.
Cost to submit hard drive is $15

	Shorebased	At-sea
Trips per harddrive	5	1
Cost to Submit	15	15
Hard Drive Submission Cost per trip	3	15