

ELECTRONIC MONITORING COST STUDY

Projected Cost of Providing Electronic Monitoring to
100 Vessels in New England's Groundfish Fishery

Presented by:

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Presentation for:

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Purpose of cost study

Estimate cost of expanding existing audit-based EM program to more vessels:

- Assumes 100 vessels (from 30 to 75 feet long) choose to participate
- Considers the costs over three years of counting and measuring regulated groundfish *
- Includes collecting, analyzing and storing EM videos and data from all sector trips
- Does NOT include NOAA administrative costs
- Bases the costs on actual costs incurred during the experimental program
[Used data from over 400 trips that had EM coverage in FY2017 and FY2018]
- Assumes 100% video coverage and 50% video review
- Allows user to make adjustments in key assumptions (e.g., # of participating vessels, cost of video review per haul) to see impact on costs

** The footnote on Page 1 of the cost report associated with this presentation should be updated to read:
“The 13 ACE species being enumerated by video reviewers are: cod, haddock, yellowtail flounder, pollock, American plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, Atlantic wolffish, and ocean pout.”*

Portfolio of vessels assumed to choose to use audit-based EM program

Projected Number of Vessels of Each Length and Gear Configuration to be Using EM					
# of Participating Vessels Configured with...	Less than 30 ft	30 to 50 ft	50 to 75 ft	75 ft and above	All
Gillnet	0 vessel(s)	30 vessel(s)	2 vessel(s)	0 vessel(s)	32 vessel(s)
Jig/Rod-and-Reel	0 vessel(s)	10 vessel(s)	0 vessel(s)	0 vessel(s)	10 vessel(s)
Longline	0 vessel(s)	8 vessel(s)	0 vessel(s)	0 vessel(s)	8 vessel(s)
Trawl	0 vessel(s)	15 vessel(s)	35 vessel(s)	0 vessel(s)	50 vessel(s)
Total Projected Participating Vessels	0 vessel(s)	63 vessel(s)	37 vessel(s)	0 vessel(s)	100 vessel(s)

Upfront cost to equip 80 more vessels

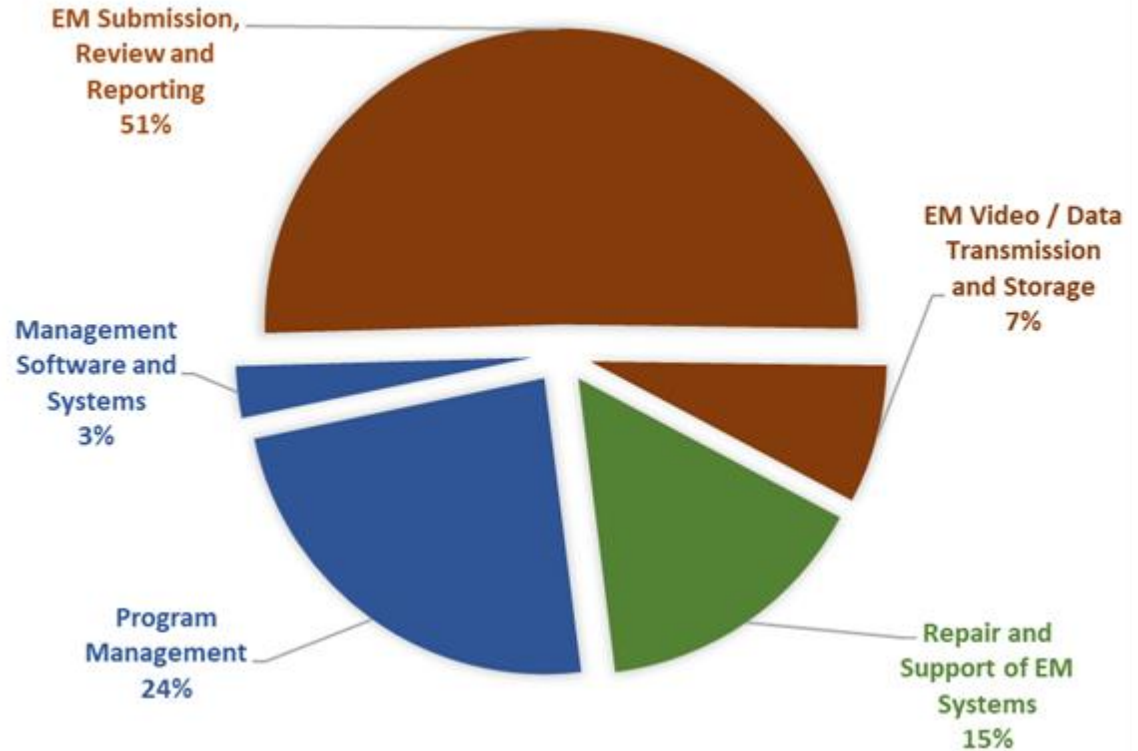
EM Equipment costs, on average, around \$8500 per vessel – or \$680,000 to equip 80 more vessels with required EM equipment

Equipment or Installation Type	Estimated Life	Est. Cost per Vessel
Hardware		
On-Vessel Computer for EM	5 years	\$ 3,500
Removable harddrives	5 years	\$ 200
Monitor and keyboard	5 years	\$ 100
GPS Units	5 years	\$ 150
Cameras	5 years	\$ 1,500
Marine Grade Wire and Cables	5 years	\$ 50
Other misc (e.g., shipping / import fees)	5 years	\$ 200
Installation Costs		
Installation of EM systems on vessels	5 years	\$ 2,500
Remote support for installation	5 years	\$ 200
Year One EM Equipment Costs per Vessel		\$ 8,400
New Participants in EM Program		80 vessels
Year One Aggregated Costs for EM Equipment for All New Participants		\$ 672,000

Distribution of annual costs by budget category

About a quarter of the annual costs (blue pies) represent relatively fixed costs

Most of the costs are for EM video review, submission and reporting. These costs depend on the number of trips taken, the percentage of video reviewed and the efficiency of video review.



Baseline costs of 100% video review per fishing event

Based on actual costs of 100% video review for trips taken in FY2017 and FY2018 for which EM reports were submitted to GARFO

FY2017 and FY2018 (partial)	Trawl	Longline	Gillnet	Jig / Autojig
Average Cost per Fishing Event	\$ 77.09	\$ 81.32	\$ 70.35	\$ 238.57
Median per Fishing Event	\$ 71.21	\$ 79.88	\$ 67.50	\$ 216.45
Standard Deviation	\$ 30.91	\$ 31.52	\$ 28.92	\$ 101.24
+/- with 95% Confidence	\$ 6.15	\$ 14.56	\$ 6.82	\$ 20.15
High of Average Cost per Fishing Event (95% Confidence)	\$ 83.24	\$ 95.88	\$ 77.18	\$ 258.72
Low of Average Cost per Fishing Event (95% Confidence)	\$ 70.94	\$ 66.76	\$ 63.53	\$ 218.42
Estimate Used in March 2019 Cost Model / Projection	\$ 75	\$ 70	\$ 80	\$ 250

NOTE: The estimate used in the March 2019 cost model is different than the average cost per fishing event listed above because of additional / updated data included in the average cost per fishing event. The change in average does not material change the overall costs.

Average baseline costs of 100% EM video review per fishing day

	Jig / Rod & Reel	Gillnet
Ave. Hours of 100% Review per Fishing Event	5.6 hrs	1.8 hrs
Ave Cost per Fishing Event	\$250/day	\$80/set
Ave # of Fishing Events per Day	Same as Day	4 sets/day
Ave Cost of 100% EM Review per Day Trip	\$250/fishing day	\$320/fishing day

	Longline	Trawl
Ave. Hours of 100% Review per Fishing Event	1.6 hrs	1.7 hrs
Ave Cost per Fishing Event	\$70/set	\$75/haul
Ave # of Fishing Events per Day	5 sets/day	4 sets/day
Ave Cost of 100% EM Review per Day Trip	\$350/fishing day	\$300/fishing day

Average cost for EM program per vessel (Year 3)

(Baseline scenario: 100% coverage, 50% video review, No tech improvements)

In the third year of the program, the average cost per vessel for the EM program will be less than \$11,000

A similar amount of coverage by human at-sea monitors would cost more than \$18,000 per vessel*

Electronic Monitoring Budget Category	Average Annual Cost per Vessel in Year Three
Policy, Regulatory and Program Development Costs	\$0/vessel
Program Planning and Development	\$0/vessel
On-Vessel Costs	\$1,620/vessel
Equipment and Software to Record Trips	\$0/vessel
Services, Repair and Support of EM Systems	\$1,620/vessel
Program Admin and Operations Costs	\$9,011/vessel
Program Management	\$2,520/vessel
Management Software and Systems	\$300/vessel
EM Submission, Review and Reporting	\$5,388/vessel
EM Video / Data Transmission and Storage	\$804/vessel
Total for EM Program	\$10,631/vessel

* The estimate for human at-sea monitors is based on a rate paid by one of the sectors for a 12-18 hour day for an equivalent number of fishing days

Total cost for EM program with 100 Vessels for 3 Years

(Baseline scenario: 100% coverage, 50% video review, No tech improvements)

Total projected cost to establish and operate an audit-based EM program (100% video coverage and 50% video review) for 100 vessels for three years is \$4.3 million

Electronic Monitoring Budget Category	Projected Total Expenditures by Fishing Year		
	Year One	Year Two	Year Three
# of Vessels	100 vessels	100 vessels	100 vessels
Policy, Regulatory and Program Development Costs	132,000	61,200	-
Program Planning and Development	132,000	61,200	-
On-Vessel Costs	996,000	216,000	162,000
Equipment and Software to Record Trips	672,000	-	-
Services, Repair and Support of EM Systems	324,000	216,000	162,000
Program Admin and Operations Costs	931,891	898,529	901,148
Program Management	288,000	252,000	252,000
Management Software and Systems	30,000	30,000	30,000
EM Submission, Review and Reporting	538,788	538,788	538,788
EM Video / Data Transmission and Storage	75,103	77,741	80,361
Total for EM Program	2,059,891	1,175,729	1,063,148

Total cost for EM program with 100 Vessels for 3 Years

(Scenario 1: 100% coverage, 35% video review, +25% efficiency from tech)

Total projected cost to establish and operate an audit-based EM program under the above scenario for 100 vessels for three years is \$3.5 million

The average cost per vessel in Year Three would be ~\$8,000

Electronic Monitoring Budget Category	Projected Total Expenditures by Fishing Year		
	Year One	Year Two	Year Three
# of Vessels	100 vessels	100 vessels	100 vessels
Policy, Regulatory and Program Development Costs	132,000	61,200	-
Program Planning and Development	132,000	61,200	-
On-Vessel Costs	996,000	216,000	162,000
Equipment and Software to Record Trips	672,000	-	-
Services, Repair and Support of EM Systems	324,000	216,000	162,000
Program Admin and Operations Costs	675,967	642,605	645,224
Program Management	288,000	252,000	252,000
Management Software and Systems	30,000	30,000	30,000
EM Submission, Review and Reporting	282,863	282,863	282,863
EM Video / Data Transmission and Storage	75,103	77,741	80,361
Total for EM Program	1,803,967	919,805	807,224

NOTE: Exhibit 1 in the document provides an estimate for 35% video review and +20% efficiency increase from tech

Total cost for EM program with 100 Vessels for 3 Years

(Scenario 2: 100% coverage, 20% video review, +50% efficiency from tech)

Total projected cost to establish and operate an audit-based EM program under the above scenario for 100 vessels for three years is \$3.0 million

The average cost per vessel in Year Three would be ~\$6,300

Electronic Monitoring Budget Category	Projected Total Expenditures by Fishing Year		
	Year One	Year Two	Year Three
# of Vessels	100 vessels	100 vessels	100 vessels
Policy, Regulatory and Program Development Costs	132,000	61,200	-
Program Planning and Development	132,000	61,200	-
On-Vessel Costs	996,000	216,000	162,000
Equipment and Software to Record Trips	672,000	-	-
Services, Repair and Support of EM Systems	324,000	216,000	162,000
Program Admin and Operations Costs	500,861	467,499	470,118
Program Management	288,000	252,000	252,000
Management Software and Systems	30,000	30,000	30,000
EM Submission, Review and Reporting	107,758	107,758	107,758
EM Video / Data Transmission and Storage	75,103	77,741	80,361
Total for EM Program	1,628,861	744,699	632,118

Vessel Calculator (Exhibit 2)

Estimated and actual costs will differ based on different vessel characteristics. The “EM Vessel Cost Calculator” allows users to move beyond an “average vessel cost” to one more customized for their particular vessel, gear type and fishing practices.

Sample Vessel One:

Gear: Trawl

Length: 45 feet

Trips per Year: 30 trips

Trip Length: 18-24 hours

Hauls per Trip: 4 hauls per trip

EM Catch Handling Efficiency: Average

Vessel EM Service Requirements: Average

Estimated Annual (Year 3) Cost for User-Specified Vessel	
Policy, Regulatory and Program Dev Costs	\$ -
Program Planning and Development	\$ -
On-Vessel Costs	\$ 1,620
EM Equipment and Software	\$ -
Repair and Support of EM Systems	\$ 1,620
Program Admin and Operations Costs	\$ 7,744
Program Management	\$ 2,520
Management Software and Systems	\$ 300
EM Submission, Review and Reporting	\$ 4,500
EM Video / Data Storage	\$ 424
Total for EM Program	\$ 9,364

100% ASM Coverage v 100% EM Coverage	
# of Fishing Days	30 days
Sample FY2018 ASM Rate for full day (18-24 hr)	\$ 570
Vessel Cost for 100% ASM Coverage	\$ 17,100
Vessel Cost for 100% EM Coverage	\$ 9,364

Sample Vessel Two:

Gear: Gillnet

Length: 40 feet

Trips per Year: 50 trips

Trip Length: 18-24 hours

Sets per Trip: 3 sets per trip

EM Catch Handling Efficiency: Average

Vessel EM Service Requirements: Average

Estimated Annual (Year 3) Cost for User-Specified Vessel	
Policy, Regulatory and Program Dev Costs	\$ -
Program Planning and Development	\$ -
On-Vessel Costs	\$ 1,620
EM Equipment and Software	\$ -
Repair and Support of EM Systems	\$ 1,620
Program Admin and Operations Costs	\$ 9,527
Program Management	\$ 2,520
Management Software and Systems	\$ 300
EM Submission, Review and Reporting	\$ 6,000
EM Video / Data Storage	\$ 707
Total for EM Program	\$ 11,147

100% ASM Coverage v 100% EM Coverage	
# of Fishing Days	50 days
Sample FY2018 ASM Rate for full day (18-24 hr)	\$ 570
Vessel Cost for 100% ASM Coverage	\$ 28,500
Vessel Cost for 100% EM Coverage	\$ 11,147

Catch Handling (Exhibit 3)

Estimated and actual costs will differ based on catch handling processes. Similar vessels had significantly different video review times as a result of different catch handling processes.

Sample Trawl One:

Gear: Trawl
Length: 45 feet
Trips per Year: 30 trips
Trip Length: 18-24 hours
Hauls per Trip: 4 hauls per trip
EM Catch Handling Efficiency: Average
Vessel EM Service Requirements: Average

Estimated Annual (Year 3) Cost for User-Specified Vessel	
Policy, Regulatory and Program Dev Costs	\$ -
Program Planning and Development	\$ -
On-Vessel Costs	\$ 1,620
EM Equipment and Software	\$ -
Repair and Support of EM Systems	\$ 1,620
Program Admin and Operations Costs	\$ 7,744
Program Management	\$ 2,520
Management Software and Systems	\$ 300
EM Submission, Review and Reporting	\$ 4,500
EM Video/ Data Storage	\$ 424
Total for EM Program	\$ 9,364

Sample Trawl Two:

Gear: Trawl
Length: 45 feet
Trips per Year: 30 trips
Trip Length: 18-24 hours
Hauls per Trip: 4 hauls per trip
EM Catch Handling Efficiency: 30% Better
Vessel EM Service Requirements: Average

Estimated Annual (Year 3) Cost for User-Specified Vessel	
Policy, Regulatory and Program Dev Costs	\$ -
Program Planning and Development	\$ -
On-Vessel Costs	\$ 1,620
EM Equipment and Software	\$ -
Repair and Support of EM Systems	\$ 1,620
Program Admin and Operations Costs	\$ 6,394
Program Management	\$ 2,520
Management Software and Systems	\$ 300
EM Submission, Review and Reporting	\$ 3,150
EM Video/ Data Storage	\$ 424
Total for EM Program	\$ 8,014

Key takeaways

- Total program costs for EM equipment and coverage for 100 vessels over 3 years estimated at \$4.3 million for 100% video coverage and 50% video review.
- Costs could be significantly less based on percentage of video reviewed and efficiencies due to incorporation of new technologies in video review
- Per vessel costs depend on number of trips and fishing days, gear types deployed and catch handling processes
- Cost model built for users to test assumptions and impact on projected costs, both for different portfolios of vessels and for individual vessels