Electronic Monitoring as a Compliance Tool in the U.S. West Coast Groundfish Catch Share Fishery: Review of 2015 EFPs

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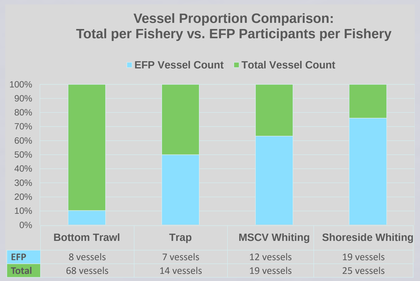
Objective

Implementation of Electronic Monitoring (EM) as a Compliance Monitoring tool on participating EFP vessels to achieve effective individual accountability of catch and bycatch in the Pacific Trawl Rationalization Program, with anticipated EM regulation in the Whiting and Fixed Gear fleets in 2017.

Vessel Participation

Beginning in May 2015, EM was implemented on 37 vessels as a compliance monitoring tool in lieu of at-sea human compliance monitors.



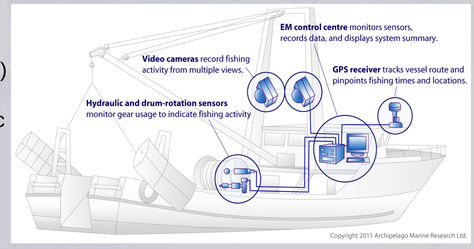
Moving parts of an EM Program

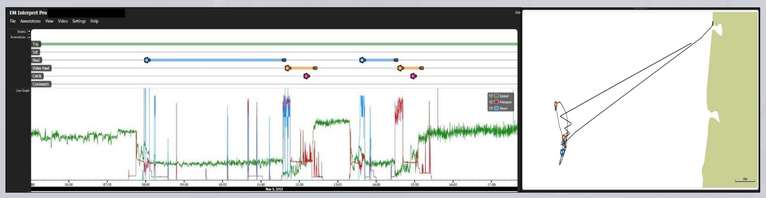
- Vessels and Willing Participants
- Camera Systems
- Field Services
  - Install Systems
  - Fix camera systems
- Software to Expedite Review Time
- Review Sensor and Video Data
- Database to Support Infrastructure and Analysis of Data

EM Camera Systems

Camera systems consist of:

- Video cameras
- Sensors for:
  - Location and speed (GPS)
  - Fishing activity indication (drum rotation or hydraulic pressure)
- Control box that controls the system and stores the data.





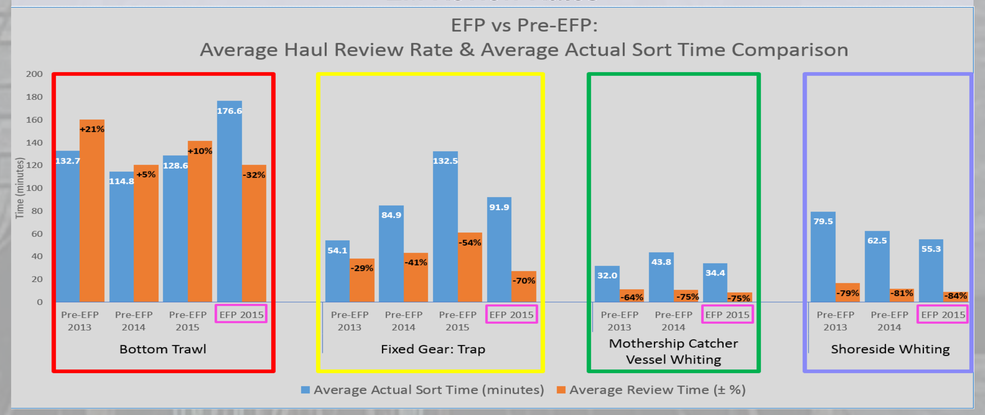
2015 EFP Costs of EM Review

Costs are based on EFP vessels using the Archipelago Marine Research System

Hake Fishery: Maximized retention
Fixed Gear: Maximized retention
Bottom Trawl: 7 Maximized retention vessels, 1 Optimized retention vessel

Fishery	Bottom Trawl	Trap	MS Catcher Vessel	Shoreside Hake
Average Sea Days per Trip	3.58	4.02	12.00	2.84
Average Hauls per Trip	5.69	12.25	18.12	2.63
Average Sort Minutes per Haul	176.57	91.99	34.37	55.31
Average Review Minutes per Haul	120.41	27.28	8.59	8.87
Average Review Minutes per Sort Minute	0.68	0.30	0.25	0.16
100% review (Review Hours per Trip)	11.67	5.82	2.84	0.64
Cost per trip for review time only (100%)	$ 583.69	$ 290.88	$ 142.17	$ 31.91
Cost per sea day for review time only (100%)	$ 163.18	$ 72.40	$ 11.85	$ 11.23

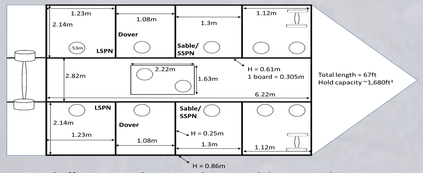
EM Review Rates

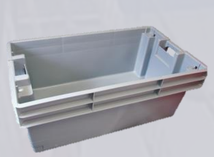


EM Weight Estimation

Method 1: Volumetric Density

- Measurements of boats and containers on boats for volume calculations





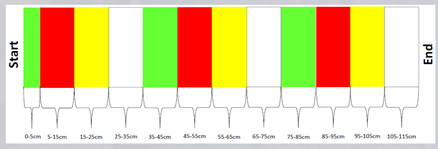
- Estimate % fullness of container with species or species grouping identified
- Calculate weight:

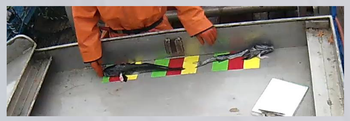
$$Volume\ of\ fish\ (m^3) = \left(Length\ (m) * Width\ (m) * Depth\ (m)\right) * \%\ Full$$

$$Weight\ of\ fish\ (kg) = Volume\ of\ fish\ (m^3) * Density\left(\frac{kg}{m^3}\right)$$

Method 2: Length-Weight Relationships

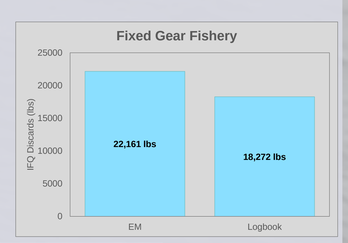
- Estimate length of individual discarded fish using a measuring strip (with fisher cooperation)

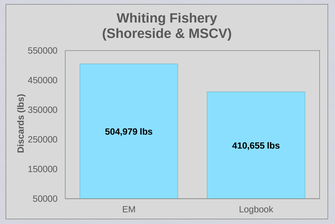




- Insert length into established length-weight equation $W = aL^b$ to calculate weight

2015 EFP Discards by Fishery: Logbook vs. EM Data





2015 EFP Bottom Trawl and Fixed Gear Discarded Species Weight Adjustments

Bottom Trawl Discards	Logbook Reported Discards (lbs.)	EM Estimated Discards (lbs.)	Difference [EM - Logbook]
Arrowtooth Flounder	63	148	85
Chilipepper Rockfish	-	26	26
Dover Sole	9	38	29
English Sole	420	840	420
Longspine Thornyhead	12	40	28
Minor Shelf Rockfish	6	13	7
Other Flatfish	-	71	71
Pacific Hake	167	328	161
Petrale Sole	-	23	23
Sablefish	5	218	213

Fixed Gear Discards	Logbook Reported Discards (lbs.)	EM Estimated Discards (lbs.)	Difference [EM - Logbook]
Arrowtooth Flounder	54	129	75
Dover Sole	2	10	8
Lingcod	160	290	130
Minor Slope Rockfish	12	24	12
Pacific Hake	3	11	8
Pacific Halibut	958	1603	645
Sablefish	4016	7715	3699
Shortspine Thornyhead	39	64	25

Project Update

- **FIS Grant Project 2016-2017**: Development and testing of discard methods and equipment for accurate accountability in the West Coast IFQ fishery for bottom trawl vessels equipped with EM
- **NCSP Grant Project 2016-2017**: Pacific Groundfish Total Catch Accounting using Electronic Monitoring on Fixed Gear Vessels

Acknowledgements
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