

EM Glossary

Last Updated December 12, 2019

Overview

At the [June 2019 Electronic Monitoring Video Data Management Workshop](#) in Seattle, WA, workshop participants identified terms that come up in EM policy discussions that are not always defined in the same way. As a follow-up action, the workshop steering committee compiled this glossary as a resource for consistent EM terminology. This glossary includes terms commonly used when discussing electronic monitoring (EM) in the context of fisheries management, with a bias towards how terms are used in U.S. fisheries management. This glossary is a living document and the next planned update will be after the February 2020 U.S. National Electronic Monitoring Workshop (West Coast).

If a term's definition exists in a U.S. federal regulation or policy directive, we have included text in quotes and a reference to the source. However, this glossary is NOT offering legal advice. If you have questions or need to know if you're in compliance, contact your local fishery management office for the most current rules.

Definitions

Electronic Monitoring (EM): An integrated system of on-board technology that records fishing activity, usually including video cameras as well as GPS or other location tracking technology and sensors that detect specific actions like gear deployment. Van Helmond et al. (2019) describe EM systems as generally consisting of "various activity sensors, GPS, computer hardware and cameras which allow for video monitoring and documentation of catches and detailed fishing effort estimation." NOAA Fisheries defines EM as "the use of technologies – such as video cameras, gear sensors, and reporting systems – to monitor fishing operations, efforts, and/or catch." EM may also be referred to as "REM," for remote electronic monitoring.

References: van Helmond et al. 2019; NMFS ET Policy Directive; CEA & TNC 2018; ISSF Glossary; ICES WGTIFD 2019

EM Program vs. EM System

Within this glossary (and at the June 2019 Data Management Workshop) we use the term "EM Program" to refer to the entire structure for implementing EM in a fishery, including the goals, policies, and supporting technology. We use "EM System" to refer more narrowly to the hardware, software, and data processes.

Audit can refer to:

Logbook Audit or 'Audit-model': using EM data to validate logbooks or other non-EM fishery records, such as for catch, discards, and/or bycatch monitoring.

References: Fujita et al. 2018; CEA & TNC 2018; ICES WGTIFD 2019

Vendor Audit [also Secondary Review or third-party audit]: the process of evaluating a vendor's review of EM video data to ensure video review accuracy and consistency. NOAA Fisheries specifically includes "auditing service provider reviewers" as part of the agency's EM program performance monitoring.

References: NMFS EM Cost Allocation Procedure; CEA & TNC 2018

Costs: The cost of implementing EM varies across vessels, gear types, fisheries and across different stages of the EM data lifecycle (i.e. collection, transmission, analysis, storage). There are one-time costs (like hardware purchases) and ongoing costs (like storage fees) that can accrue to all parties: government, vendors, the fishing industry, and other partners. There can also be non-monetary costs for implementing EM, such as the time required by new catch handling procedures. NOAA Fisheries specifies two categories of EM costs: sampling and administrative.

Costs, Sampling: as defined by NOAA Fisheries, “sampling costs [associated with EM] may include, among others: equipment purchases, leases, and installation; equipment maintenance and upkeep; training for captain and crew; development of vessel monitoring plans; data transmittal; video processing and storage; service provider fees and overhead.”

References: NMFS EM Cost Allocation Procedure

Costs, Administrative: as defined by NOAA Fisheries, “administrative costs [associated with EM] may include, among others: program administration support; certification of EM service providers; EM program performance monitoring; data analysis and storage of federal records.”

References: NMFS EM Cost Allocation Procedure

Data lifecycle: This is a framework for thinking about the different phases data moves through from initial creation to storage and disposal. For EM programs, key stages in the lifecycle include: initial data collection; transmission (from boat to vendor, or from vendor to regulator); analysis or review; and storage and destruction. Different policies and technologies may be needed at each phase. Data lifecycles can be broken down into high degrees of detail, if useful for program design.

References: M. Chisholm “7 phases of a data lifecycle” in Information Management; USGS Data Management guidelines

Data retention: The policies and protocols for maintaining various types of EM data after it has been captured by an EM system (see also **Data storage**) for a certain timeframe. Data retention policies may specify data access rules, such as allowing authorized enforcement staff to view data, as well as security measures and when different data products may be permanently deleted. As of Fall 2019, NOAA Fisheries is drafting a national procedure to establish a minimum retention period for EM data from federally managed fisheries. The NOAA Fisheries West Coast Groundfish Electronic Monitoring Program Rule establishes that “EM service providers will be required to maintain EM data and other vessel owner records for a minimum of three years.”

References: West Coast Groundfish EM Final Rule; CEA & TNC report 2018

Data storage: Where EM data files are held after their initial creation. This includes physical storage of hard drives containing the original data recorded on a vessel as well as the use of local computer servers or cloud-based storage for both raw and post-review data. See **Data retention** for the policies that affect data storage requirements.

Different kinds of EM Data

Raw EM Data: the data collected by the onboard electronic monitoring system, including input from cameras and sensors. Generally, raw data has not been subject to review by human reviewers or AI.

Processed or Reviewed EM Data: the result of analyzing and/or summarizing raw EM data. These can also be called “data products.” “Processed” is a term with [a specific technical meaning when referring to video](#) recording while “processed data” may be used in policy discussions to refer to

video that's been reviewed and the reports from that review. For example, NOAA Fisheries states that "Processing [includes] both manual and automated methods to summarize the collected data."

References: NMFS EM Cost Allocation Procedure

Tabular data: Data that are in a table format, including numbers and text but not images (still or video).

Electronic Reporting (ER): the process of collecting and transmitting fisheries data using digital technology in place of paper forms. NOAA Fisheries specifically defines ER as "the use of technologies – such as smartphones, computers and tablets – to record, transmit, receive, and store fishery data." While the distinction between EM and ER has generally been that EM systems include cameras and ER systems do not, new tools and innovations in monitoring may blur this distinction in the future.

References: NMFS ET Policy Directive; ISSF Glossary; ICES WGTIFD 2019

Vendor [also EM service provider or Contractor]: an entity that provides EM services to fishing vessels. These may include: installing and maintaining hardware and software, overseeing initial data collection and transmission from vessels, analysis and reviews of the data for regulatory agencies, and data storage. Vendors may need to be approved, certified, and audited by a government body to satisfy management compliance; in some cases, vessels may voluntarily opt to carry EM from the vendor of their choice, or companies may require their vessels to carry EM outside of any government requirements. In the West Coast Groundfish EM Rule, NOAA Fisheries defines an EM service provider as "any person, including their employees or agents, that is granted a permit by NMFS to provide EM services for vessels as required under § 660.603 and § 660.604." In some cases, the term "third-party provider" is being used to describe vendors or EM service providers that are outside a regulating government agency and independent from the fishing industry.

References: West Coast Groundfish EM Final Rule

References

California Environmental Associates (CEA) & The Nature Conservancy (TNC). Catalyzing the Growth of Electronic Monitoring in Fisheries. 2018. <https://www.ceiconsulting.com/casestudies/nature-conservancy/>

Chisholm, M. "7 Phases of A Data Life Cycle." Information Management. 9 July 2015. <https://www.information-management.com/news/7-phases-of-a-data-life-cycle>

Fisheries off West Coast States; Pacific Groundfish Fishery; Electronic Monitoring Program. Final Rule June 28, 2019. <https://www.federalregister.gov/documents/2019/06/28/2019-13324/fisheries-off-west-coast-states-pacific-coast-groundfish-fishery-electronic-monitoring-program>

Fujita, R., C. Cusack, R. Karasik, and H. Takade-Heumacher. Designing and Implementing Electronic Monitoring Systems for Fisheries: A Supplement to the Catch Share Design Manual. 2018. Environmental Defense Fund, San Francisco. http://fisherysolutionscenter.edf.org/sites/catchshares.edf.org/files/EM_DesignManual_Final_0.pdf

ICES. 2019. Working Group on Technology Integration for Fishery-Dependent Data (WGTIFD). ICES Scientific Reports. 1: 46. 28 pp. <http://doi.org/10.17895/ices.pub.5543>

International Seafood Sustainability Foundation (ISSF). ISSF Glossary. <https://iss-foundation.org/knowledge-tools/issf-glossary/>

National Marine Fisheries Service (NMFS). *Cost Allocation in Electronic Monitoring Programs for Federally Managed U.S. Fisheries*. NMFS Procedure 04-115-02 effective May 7, 2019.

<https://www.fisheries.noaa.gov/national/laws-and-policies/science-and-technology-policy-directives>

NMFS. *Policy on Electronic Technologies and Fishery-Dependent Data Collection*. NMFS Policy 04-115 effective May 7, 2019. <https://www.fisheries.noaa.gov/national/laws-and-policies/science-and-technology-policy-directives>

USGS. *Data Management*. <https://www.usgs.gov/products/data-and-tools/data-management/>

van Helmond et al. 2019. Electronic monitoring in fisheries: Lessons from global experiences and future opportunities. *Fish and Fisheries* 00: 1-28. <https://doi.org/10.1111/faf.12425>