Electronic Monitoring Guidance from the ICES Working Group on Fisheries Technology Integration



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NOAA



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EM Workshop for the Eastern Pacific Ocean

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International Council for the Exploration of the Sea

Working Group for Technology Integration for Fishery-Dependent Data (TIFD)

Background

- Formed in 2019, co-chair Lisa Borges (Portugal)
- 40+ members from US, Europe, South Africa, Chile, and several other countries
- Government, NGOs, fishing industry, and 6-8 EM service providers

2019 – 2021

- -Develop an inventory of tools being used for reporting and monitoring programs
- -Establish a library of vocabulary and other terms for improve communication
- -Evaluate the risks and benefits of different ETs, how to design monitoring programs
- -Explore different methodologies for integrating data from ETs
- -Examine current approaches to leveraging AI/ML for processing imagery

Mildly successful developing TIFD guidance, largely successful in organizing and planning future work



International Council for the Exploration of the Sea

Working Group for Technology Integration for Fishery-Dependent Data (TIFD)

2022 - 2024

- -Continue to inventory and develop vocabulary of terms
- -Develop discrete recommendations, especially for fishery types (e.g., mid-water trawl)
- -Publish a standardized format for data collected and analysed from EM systems -include a framework of integrating the data into the ICES data system
- -Guidance on drafting RFPs/CFTs for different types of EM programs, publish a template
- -Guidance on using EM for monitoring bycatch of protected, endangered, and threatened species
- -Publish recommendations for interoperability of EM systems and raw data





Standardizing and Managing Vessel Monitoring Plans (VMPs)

Nichole Rossi, Fishery Biologist and Electronic Monitoring Lead NOAA Fisheries, National Marine Fisheries Service Northeast Fisheries Science Center Fisheries Monitoring and Research Division

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Vessel Monitoring Plan (VMP)

- VMPs are unique to a vessel and describe EM system configuration, reporting requirements, and how fishing operations will be conducted.
- VMPs clearly define the roles and responsibilities of all parties, including provisions to which each party must adhere.
- A vessel must adhere to all requirements including catch handling protocols, which describe the processing of targeted species, discards, bycatch, etc.
- Captain and crew must sort catch within the view of the cameras consistent with the VMP.
- Noncompliance (e.g., catch handling inconsistent with the VMP) may affect a vessel's eligibility to participate in the EM program.





Vessel Monitoring Plan Requirements (cont.)

- Vessel are required to submit their draft VMP for agency review (e.g., 30 days before the season).
- Small changes can be made without interuption
- Substantial modifications must be approved prior to fishing (e.g., change in fishing gear).
- A copy VMP must be on board the vessel and accessible at all times.



Vessel Monitoring Plan Requirements (cont.)

At a minimum, the VMP must incorporate these EM Program Standards by reference, and the following sections (below). General vessel information, incl. gear type;

- List of contacts;
- EM system components and specifications;
- Vessel reporting requirements;
- EM system malfunction protocols; and
- Troubleshooting guide.
- Vessel operator responsibilities;
 - System operations and maintenance;
 - Catch handling requirements; and
 - Dockside requirements (if applicable)



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Vessel Diagram of Deck During Fishing Activities

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Gear Specific Required Views

The following information outlines the camera requirements for each electronic monitoring program and gear category. This section is not prescribing the order or number of required cameras, but rather the required views.

Midwater Trawl Camera Requirements				
Cam 1	Primary view of dewatering box and discard control point 1.			
Cam 2	Focused view of pumping operations.			
Cam 3	Stern view focused on net retrieval.			
Cam 4	Alternate view of work deck/discard control point(s).			
Cam 5	Alternate deck view.			
Cam 6	Alternate view of operations during transit/non- fishing activity.			

Purse Seine Camera Requirements			
Cam 1	Primary view of dewatering box and discard control point 1.		
Cam 2	Focused view of pumping operations.; view of triplex (if used)		
Cam 3	Stern view focused on net retrieval and/or skiff location		
Cam 4	Alternate view of work deck/discard control point(s).		
Cam 5	Alternate deck view.		
Cam 6	Alternate view of operations during transit/non-fishing activity.		



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Signature Page

All VMPs must be signed and dated using an electronic signature software that provides some form of audit trail that identifies when a document was sent, opened, signed; as well as, names and email addresses, or unique identifiers of the signatories (e.g., Adobe PDF, DocuSign, DotLoop, etc.). Each time a VMP is modified and sent to the agency for approval, the VMP will require a new signature and date.





Burn-in Trips

As part of the VMP approval process, vessels need to complete a "burn-in trip" to demonstrate the EM system is functioning properly, camera views are sufficient, and to ensure the crew understands catch handling requirements.

Sample Burn-In Trip Evaluation Form

Assessment	_						
System Operations and Functionality	Pass	Fail					
System check completed prior to departure (cameras recording prior to departure)							
System was not manually shut-down prior to the end of the trip							
GPC/Concor Data integet and propady logged							
er stensor bata mate and property togged							
Camera array captures all activity, meets requirements for specific gear category							
Cameras are securely mounted							
Camera views remained operational throughout trip							
There were minimal or no concerns with system impairment							
On Deck Operations and Catch Handling	0	1	Scor	re 3	4	5	
Vessel's overall adherence to their VMP catch handling protocols					-		
Groundfish discards were retained and processed					4		
Crew complied with usage of discard control points (All discarding events took place in camera view at established discard control points)							
Crew did not intentionally or unintentionally obstruct camera views during (Shing operations				\vdash			
Cameras were maintained (cleaned when necessary) throughout the trip							
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Documenting and Managing VMPs - VMAN

- VMAN offers logistical functionality for monitoring draft VMP submissions, active or approved VMPs, and documentation of vessel specific equipment malfunctions and VMP compliance issues.
- VMAN allows users to track, view, comment, and respond to inquiries on active VMPs and new uploads for individual vessels.



EM Vessel Monitoring Plan Document Management Application



VMAN USER GUIDE

U.S. Department of Commerce NOAA Fisheries Service National Marine Fisheries Service Fisheries Monitoring and Research Division Data and Information Systems 166 Water Street Woods Hole, MA 02543



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VMAN Functions

New Vessel Monitoring Plan (VMP) Uploads

Add or Update Document (by vessel or service provider)
Add Images (camera views, vessel diagram, required for approval)
Add Comments (primary notification tool to identify VMP revisions)
Document History (archive for all VMP commentary, communication)

Documents Page

Burn-In Trip (evaluation form, status) VMP Rollover (abbreviated process for approved VMPs with no changes)

Issues Page

Logging and Maintaining Issue Records (issue documentation and archive) Create a New Issue (procedural, crew related, EM equipment) All Issues Dashboard (agency, vessel, EM service provider, EM video reviewer)



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Northeast US – Active VMPs October 2022

ACTIVE VMPs BY PROGRAM

FY2022

2022 IFM HERRING (7)	AMP OPER (24)	MREM GF (5)
ENTERPRISE	ALICIA ANN	BLUE CANYON
OSPREY	ANGELA & ROSE	GUARDIAN
PROVIDIAN	BRITTANY LYNN	LYNN & WILLIAM
RETRIEVER	BUG CATCHA	MORUE
STARLIGHT	CAT EYES	NICOLE LEIGH
SUNLIGHT	ELLA CHRISTINE	
WESTERN SEA	GANNET II	
	KELSI & MORGAN	
	LADY REBECCA	
	LINDA MARIE	
	MARIA G S	
	MARION MAE	
	MISS EMILY	
	MYSTIQUE LADY	
	NORTHERN LIGHTS	
	ΟΓΕΔΝΙ STΔΤΕ	

DOWNLOAD EM ELIGIBILITY TABLE



ToR D: Building a draft EM data model

Helen Holah – Marine Scotland Brant MacAfee – NOAA Fisheries

Data model scope:

manage information derived from EM systems; should not include data derived from other independent systems

- Inclusive of all programmes (globally)
- Uses ICES / FAO vocabularies

Data model objectives:

data model will act as a template for both mature and upcoming EM programs (available to all)

- EM data mapped directly to existing ICES databases by meeting mandatory data fields
- Targeting the Regional Database & Estimation System





ToR D: Building a Logical Data Model





ToR D: Collating Existing Data Specifications



Questionnaire & ACCSP data model circulated to identify data fields commonality across programmes and data field suggestions





ToR D: Steps Taken In October '22

1. Reviewed Data Elements	2. Anticipated future Needs	3. Mapped Data Elements to ICES RDBES schema	4. Proposed adaptations to RDBES to accommodate EM nuances
Discussed regional interpretation of terminology & flagged ambiguous data elements	Removed / minimised niche data elements. Expanded OTHER_ELEMENTS table as a catch all: Pump Operations Shortlisted future areas of data model expansion: Recreational Fisheries PET species bycatch	Identified minimum requirement for RDBES. Utilised ICES RDBES naming conventions and codes	Identified additional fields or codes required to accommodate EM methodologies & uncertainties / biases: Method of Estimation (e.g. visual, scale, AI) Measurement Accuracy (i.e. 1 cm, 5 cm, 10 cm)





• STATUS: First draft of an EM Data Model Entity-Relationship Model & Data Tables with descriptions & indication if mandatory element of RDBES.

 PROCESS STEP: create an ICES GitHub WG repository to house files to support adoption of EM Data Model by EM program users

 NEXT STEP: Intersessional work to establish linkages to other EM Data Model end users in the ICES community and promote uptake of EM data







ICES WGTIFD – 2023 and beyond

2023

- Meetings in Scotland (May) and Portland Maine (Sept/Oct)
- Next steps on building a draft EM data specification and integration framework
- Inventory pelagic hook and line EM use cases, focus on EM for bycatch
- Complete the development of standardized RFP/CFT, centralize RFP announcements

And beyond

-Integrate guidance on VMPs, data storage and transmission into future work

- -Develop interoperability standards for raw EM data, interchange processes
- -Review the technical guidelines and specifications published by EFCA





