



**Australian Government**

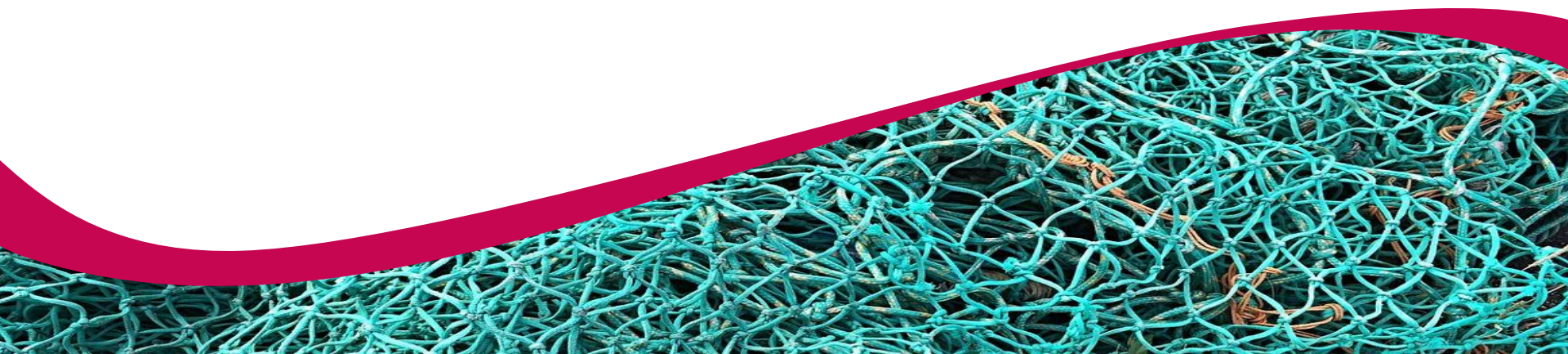
**Australian Fisheries Management Authority**

# **E-monitoring implementation in Australia's tropical tuna fisheries**

IOTC EM Working Group

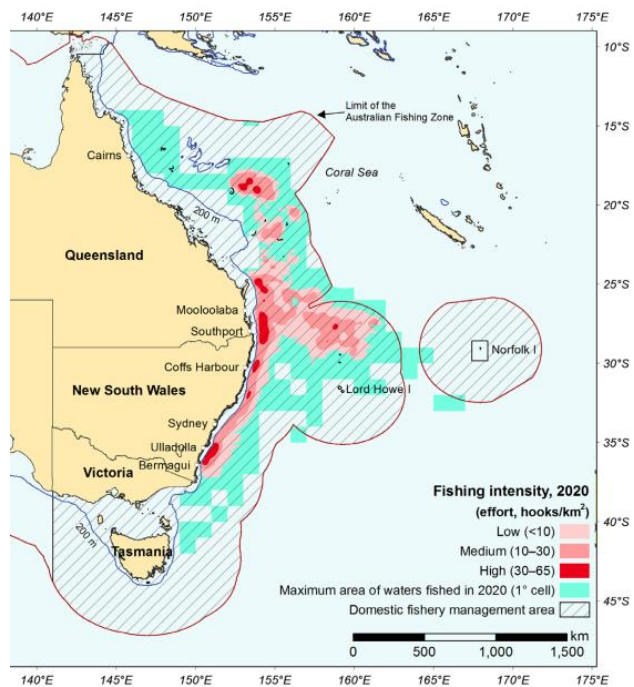
16 November 2021

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# Eastern Tuna and Billfish Fishery



Quota Species	TACCs (tonnes) in 2021
Albacore Tuna	2,500
Bigeye Tuna	1,056
Yellowfin Tuna	2,400
Broadbill Swordfish	1,163
Striped Marlin	351



# Monitoring needs

The major monitoring needs for the tuna and billfish fisheries are to:

- verify total catch and discards for all commercial species and bycatch as reported in logbooks
- verify total fishery interactions with protected species as well as bycatch handling practices and seabird mitigation (tori line deployment)



# Data sources before e-monitoring

- Observers on Japanese boats fishing during the 90s.
- Logbook and human observer program from 2001-2015
- Additional reporting for protected species interactions
- Catch disposal records
- Shore based size monitoring program





# Driver's for considering e-monitoring

- Cost of human observers
- Compliance
- Data quality
- Observer effect
- Workplace Health and Safety concerns



# Process

Proof of concept and commercial trials

Bottom up analysis of:

- What data is collected?
- Why is it necessary?
- Can it be collected by e-monitoring?
- If, no can it be collected another way?

Top down analysis

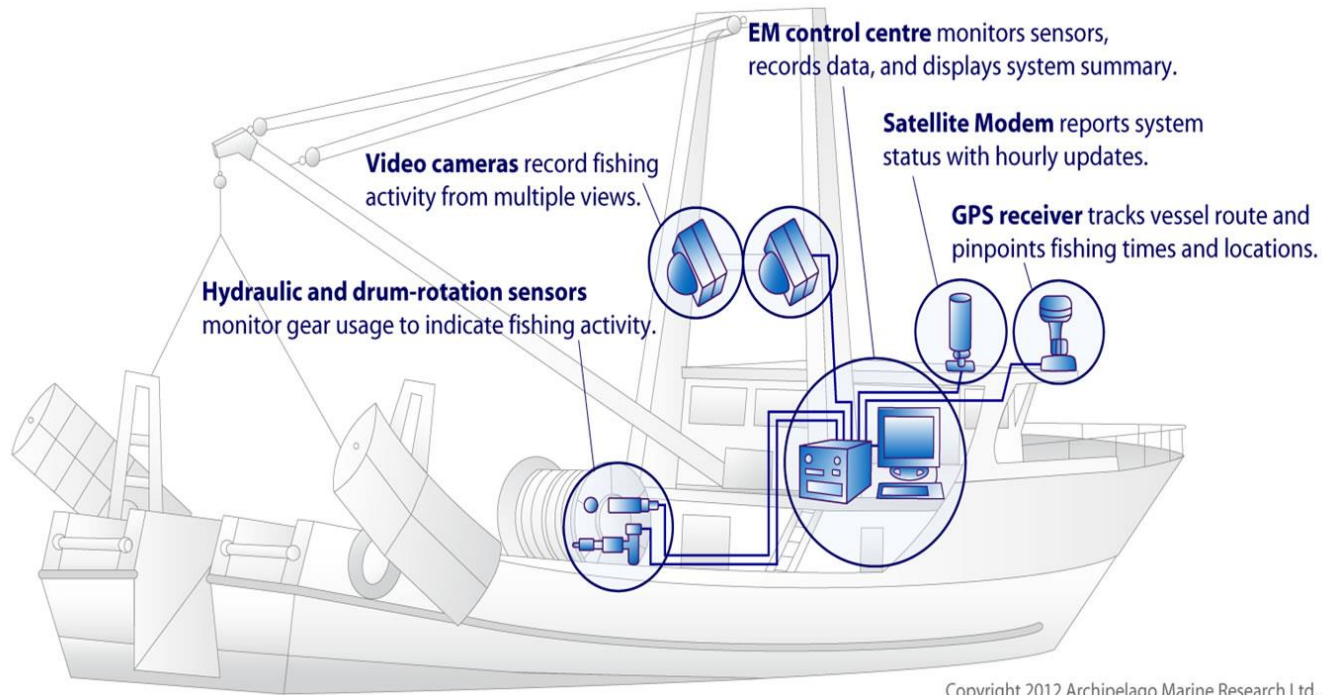
- Decisions that need to be made
- Information requirements for those decisions




# Legal framework for program

- AFMA contract with AAP to supply equipment and operate an e-monitoring program in several Australian fisheries
- First installations in 2015
- AAP responsible for ongoing operation of program including video analysis
- Fishery Direction mandates that EM is installed all pelagic longline boats

# E-monitoring systems







# Fishery specific system requirements

The number of cameras that will be needed on each boat will vary, depending on the configuration of each boat. The required camera views are of:

- the area behind the boat such that the deployment of the tori line might be determined
- the area outboard of the hauling stations
- the processing area.



# Fishery specific objectives

The primary objectives of e-monitoring are to:

- determine catch composition/piece count of fish being caught.
- detect seabird interaction on the haul
- detect the deployment of mitigation devices (tori lines) on the set

For the ETBF, AFMA's objective is to have a minimum of 90 per cent of fishing effort covered by e-monitoring.



# Data handling

- Video footage and sensor data are recorded on removable hard drives, which are replaced and returned to AFMA every month
- AFMA makes forensic copies of data, then provide to AAP for review
- The sensor data recorded on the hard drive allows fishing events to be identified, including the number, time and location of sets allowing the verification of key logbook information without looking at video footage.



## Data handling (cont.)

- AFMA agrees data processing protocols with AAP
- Sensor data is matched with logbook data to determine matching shots
- Video data is analysed to determine catch composition and compliance with mitigation measures
- Key logbook fields, including shot time and location and catch composition including whether it is retained or released and the life status of released animals is recorded and entered into a database
- A unique key is produced in the data base to link the e-monitoring data to the logbook data





# Bycatch mitigation and monitoring

- Pelagic longline vessels will be reviewed for the deployment of seabird mitigation devices at multiple points during gear setting and video clips are taken of deployment.
- Review for protected species interactions
- Video clips are taken of logbook reported interactions and any non-logbook report interactions found during EM review with, Seabirds, Turtles; and Marine mammals



# Data quality

- Camera placements
- Crew cleaning of cameras
- Vessels must notify and fix EM system issues promptly

Status	Description	Action	Fishery
Non-functioning system	Any aspect of the EM system is preventing recording of video or sensor data during fishing activities.	Urgent action required, no fishing allowed. You must cease fishing in the SBT Zone or ASL Zone immediately or receive an exemption from AFMA to keep fishing. You must contact AFMA immediately to report issues and contact AAP to evaluate the issue/s and arrange a resolution.	GHAT ASL Zone, Tuna SBT Zone.
Non-functioning system	Any aspect of the EM system is preventing recording of video or sensor data during fishing activities.	Action required. You may finish your existing trip. You must contact AFMA at the earliest opportunity to report issues and contact AAP to evaluate the issues and arrange a resolution. You may not undertake a subsequent trip without repairing or receiving exemption approval by AFMA.	GHAT, Tuna Longline, SPF.
Fully functioning system	Control centre, cameras and sensors are recording data on HDDs, capturing all catch handling.	None required	GHAT, Tuna Longline, SPF



# Data review

- Importance of skilled technicians, who understand management arrangements and what to look for
- Footage of rare or unusual catch items can be provided to experts for ID
- Video can be reviewed multiple times by different people




# E-monitoring as logbook validation

- Primary goal is verification of fishing logbooks
- Monthly catch comparison reports to industry
- Importance of continuous feedback
- Focus on education, but ability to escalate issues as needed
- Reporting accuracy can be measured at the boat or even skipper level, allowing for targeted education and compliance





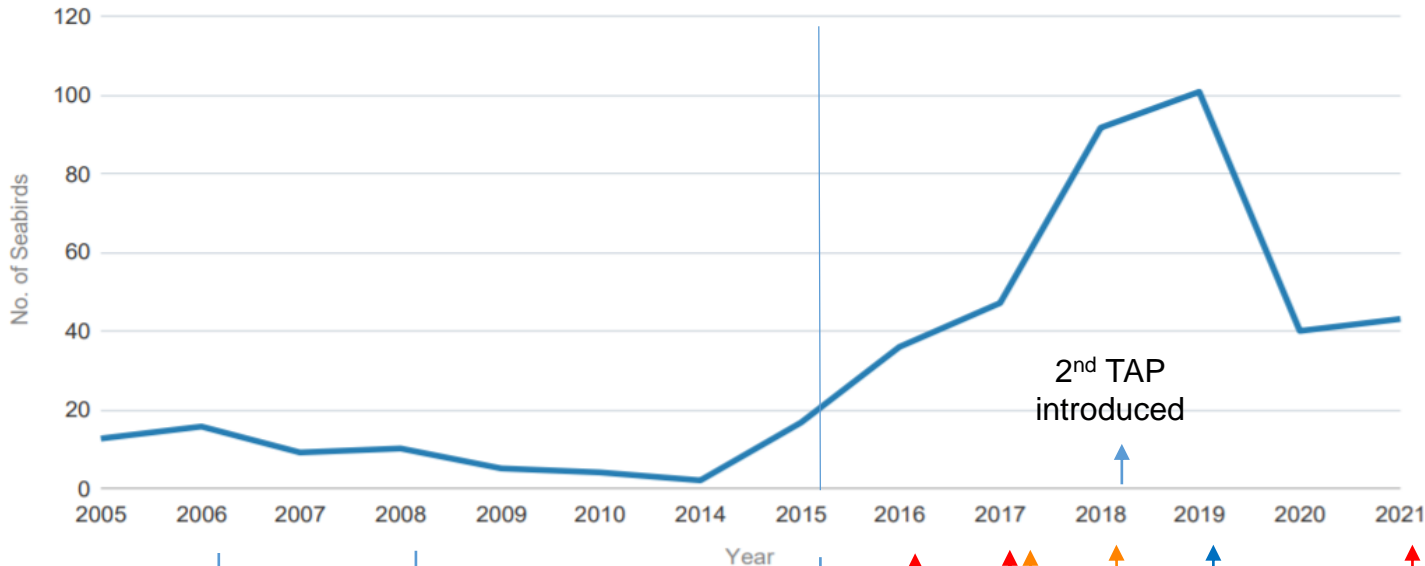
Catch Items	EM Event:			Fishing Log Event:		
	24 Sep 21 @ 10:11 PM			24 Sep 21 @ 10:00 PM		
	Retained	Released	Total	Retained	Released	Total
<b>Quota Species</b>						
Albacore	7	0	7	7	0	7
Bigeye Tuna	7	0	7	7	0	7
Yellowfin Tuna	9	0	9	9	0	9
Swordfish	4	0	4	4	0	4
<b>Nonquota Species</b>						
Blue Shark	0	0	0	0	2	2
Unidentified Sharks	0	0	0	0	1	1
Black Marlin	0	0	0	0	1	1
Lancetfishes	0	1	1	0	3	3
Mahi Mahi	1	2	3	1	0	1



# Impacts of e-monitoring on fisheries management

- Ability to monitor a high level of fishing activity
- Improved logbook reporting
- Assess deployment of mitigation devices and handling practices
- Ability to introduce boat based management responses
- Continuous monitoring during pandemic

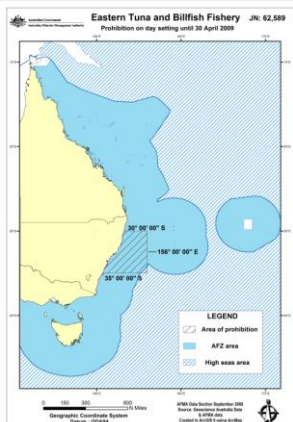
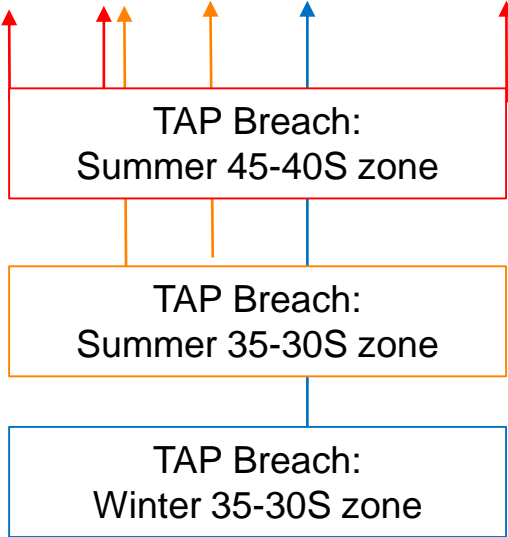
# All seabird interactions in the ETBF



1<sup>st</sup> TAP introduced  
Tori lines introduced

Daylight setting ban

EM introduced





# Management responses

- Utilise data collection to focus on working with boats that are shown to have issues.
- Vessel specific management responses.
- Future management strategy based on:
  - better accuracy of interaction numbers;
  - greater amount of information on interactions;
  - better bird identification; and
  - stronger basis to deal with boats at the individual level (both regulating and helping).







# Cost recovery

Ongoing e-monitoring program costs are cost recovered from industry. This includes:

- Routine servicing of EM systems
- Non-warranty service repairs
- Routine costs for shipping data drives
- Routine data review and processing

In practice, these costs are recovered through levies.



# Benefits

- Reduced costs
- Improved data quality, especially when combined with e-logs
- Ability to monitor more fishing events
- Cost of increasing monitoring level relatively small
- No ‘observer effect’
- Industry assume they are being monitored all the time and do not know which data will be audited



## Benefits (cont.)

- Potential to understand and regulate handling practices
- Auditable - can be viewed by more than one person
- Improved compliance and risk assessments
- Reduced health and safety risks



# Costs – what e-monitoring can't do

- Collect otoliths / genetic samples
- Tag fish
- Weigh fish
- Take length samples (currently)
- See everything a human observer would



# Lessons learned

- Industry acceptance and ownership
- Implementation takes time
- Understand data needs and costs is crucial
- Processes in place to utilize EM data
- Need for good governance and contract management





# Future challenges

- Biological data collection
- Crew based monitoring
- On-board workplace safety monitoring
- Implementation of new fisheries management approaches
- Next generation of program
- Incorporating image recognition/artificial intelligence technologies
- Applying across other Commonwealth fisheries
- Economies of scale regionally



# More information

## AFMAs Electronic Monitoring Program

<https://www.afma.gov.au/monitoring-enforcement/electronic-monitoring-program>

# Thank you!