



Cost effective monitoring in Australia's tuna longline fisheries

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Monitoring Systems in Tuna Longline Fisheries
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Australian Government

Australian Fisheries Management Authority



Driver's for considering e-monitoring

1. Cost of human observers

- Cost is ~ A\$800,000
- Total cost recovered from industry A\$1.6million
- Observer costs account for ~ 50% of total costs for industry



2. Workplace Health and Safety concerns

3. Compliance

4. Data quality from logbooks

5. Observer effect



Process - proof of concept

System placed on boats for short period

- Conducted in 2006 on 3 different gear types

Confirmed that fishing operations could be

- Detected using sensors
- Monitored by camera's
- Analysed after the event

Data Needs – analysis

Complete review of data collection and needs

Bottom up analysis:

- What data is collected?
- Why is it necessary?
- Can it be collected by e-monitoring?
- Can it be collected another way?

Top down analysis:

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





Commercial trial

Trial on 10 Eastern Tuna and Billfish boats for 10 months

- Variety of designs (forward and aft wheelhouses)
- Variety of hulls (steel, fibreglass)
- Locations (7 Queensland, 3 NSW)
- Fishing styles (shallow set swordfish, tuna and Southern Bluefin Tuna)
- Night and day setting and hauling

Still retained human observer coverage for comparision



Commercial trial - results

62 shots compared between at sea observers and e-monitoring

Over 70% match for identification at the species level

- Improvements in footage quality
- Camera position

Improved logbook reporting



Commercial trial - results

Cost-benefit analysis

- Generally positive
- Approximately AUS \$270,000 saving to industry
- Dependent on maintenance services

Behaviour changes from industry

- Difficult to quantify, but real
- Better compliance



Benefits

Reduced costs

Improved data quality

- Combined with e-logs, near real time high quality data

Ability to monitor more fishing events

- Cost of increasing monitoring level relatively small

No 'observer effect'

- Industry do not know when they are being monitored



Benefits (cont.)

Reduced health and safety risks

- Less staff in dangerous workplaces
- Lower insurance premiums?

Improved compliance and risk assessments

- Can be used as evidence for prosecution, or
- Intelligence to better focus other compliance assets



Benefits (cont.)

Potential to understand and regulate handling practices

- Sea turtle handling guidelines
- Release of live sharks

Auditable

- Can be viewed by more than one person
- Less susceptible to corruption



Costs - what e-monitoring can't do

Collect otoliths / genetic samples

Tag fish

Weigh fish

Take length samples (currently)

Collect human intelligence

See everything a human observer would



Decision to go ahead?

Overall assessment is positive for e-monitoring

Greater focus on making sure logbook data is right

More reliance on using logbook information for
management decisions

Large penalties for industry mis-reporting logbooks



Stakeholder perceptions

Industry

- Supportive only if it delivers cost savings
- Concerned about privacy and public image

Environmental groups

- Initially cautious,
- have seen the benefits in other fisheries

Scientists

- Generally supportive
- Concerned about change in data



Industry perspective

Some industry concern immediately before installs

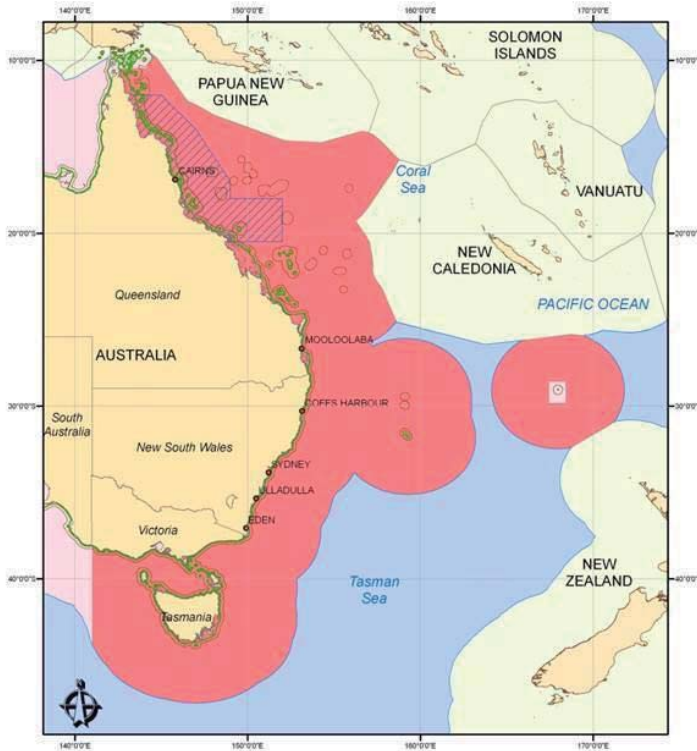
- Privacy concerns
- Reliability and maintenance
- Compliance issues

Several heated port meetings

Few complaints after the installs

Eastern Tuna and Billfish Fishery

Area of the Eastern Tuna and Billfish Fishery



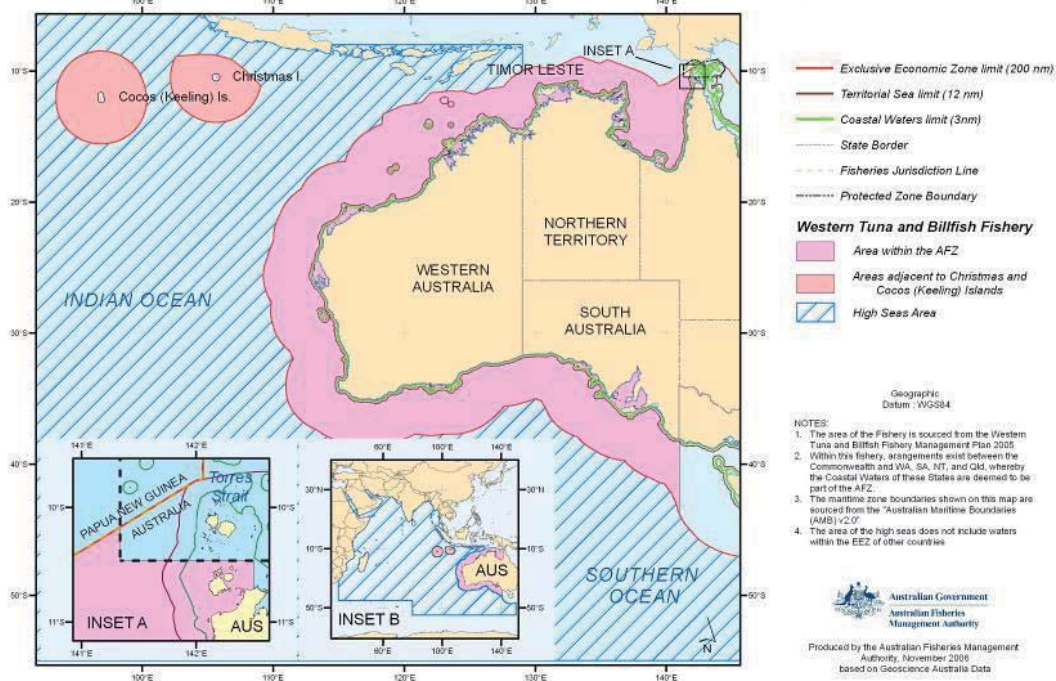
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Western Tuna and Billfish Fishery

Area of the Western Tuna and Billfish Fishery

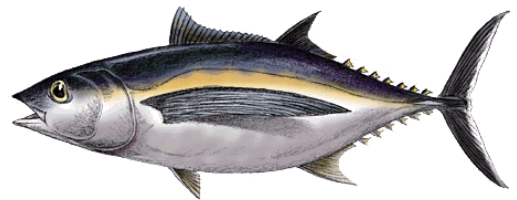
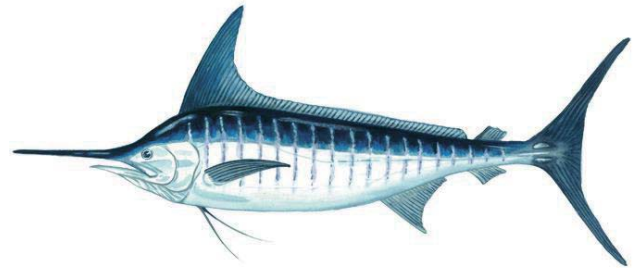
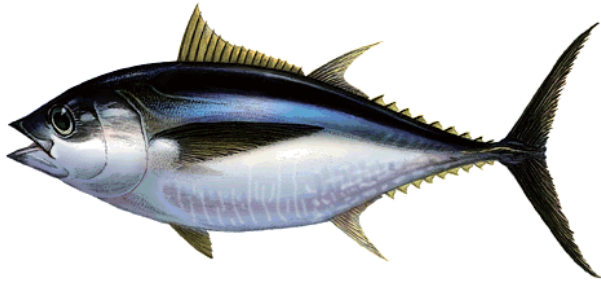
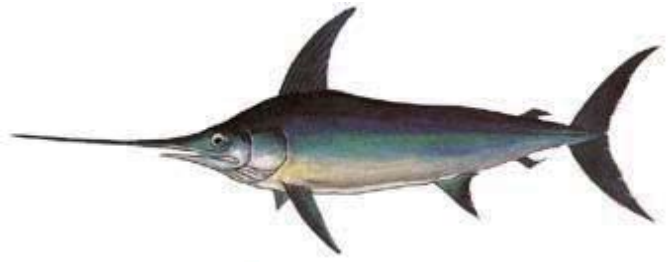
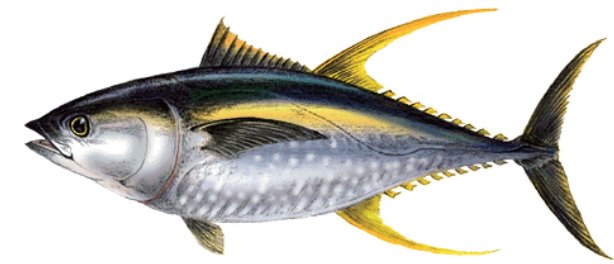
JN: 61,967



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Quota Species



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E-monitoring objectives

Increase accuracy of logbook reporting –
catch and discards

Better monitoring/reporting of protected
species interactions

Cost effective option to collect data



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E-monitoring implementation

Challenging to get agreement/cooperation from industry

Visited ports and held meetings

Explained the benefits:

- Individual accountability
- Improved data
- Reduced costs in fishery

AFMA paid for installation prior to 1 July 2015



E-monitoring installation

E-monitoring required on all full-time ETBF boats since 1 July 2015

36 boats

Boats must have fished for more than 30 days in the previous fishing season to qualify

Archipelago Asia Pacific (AAP) carrying out installs

Sensor data

GPS position, vessel speed and direction,
fishing activity, time and date

- Logged every 2s
- Transmitted every hour

Health statement also confirms system is
operating normally

- Transmitted every hour

Replace VMS in medium term

- Lacks communication ability

Cameras

- Digital full high definition cameras
- 3-5 cameras per boat – most have 4

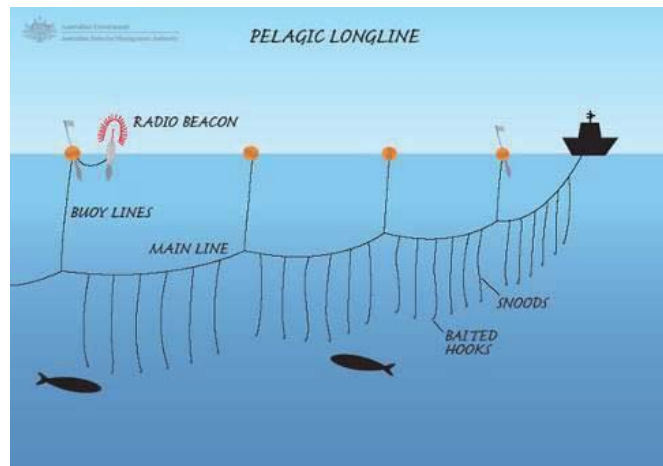


E-monitoring process

Cameras only record fishing activity

Connected to a drum/hydraulic sensor

Cameras triggered when drum rotation or hydraulics turned on



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E-monitoring process

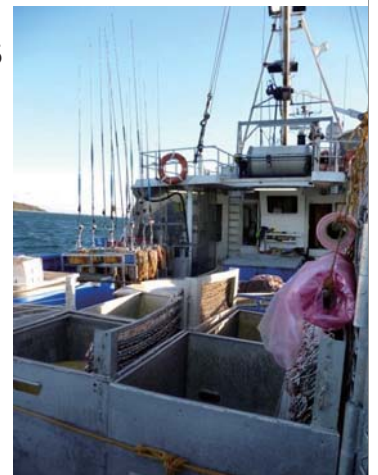
Camera footage is stored on 2tb hard drives

Hard drives returned to AFMA after the first trip of the month.

Drive data is copied and kept for 6 months

Drives then sent to AAP for analysis

Blank drives are returned to boats



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Footage analysis

Minimum 10% of shots audited

Minimum of 1 shot per hard drive per boat

Archipelago Asia Pacific (AAP) carrying out footage analysis

Footage analysis compared to logbook reports



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Logbook reporting

	August 2014	August 2015
No of species reported	36	48
Total catch reported	28,998	29,410
Total discards reported	2,606	5,417

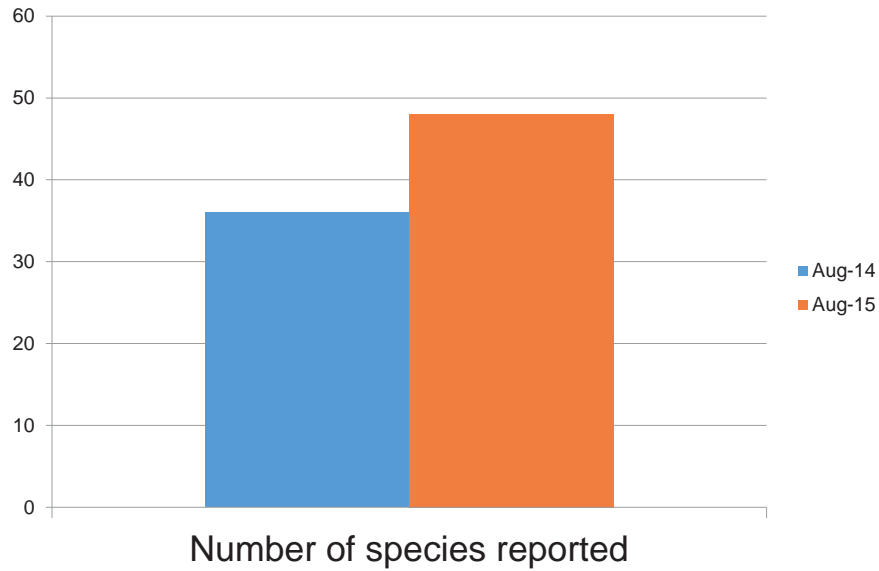
*Does not included changes in effort

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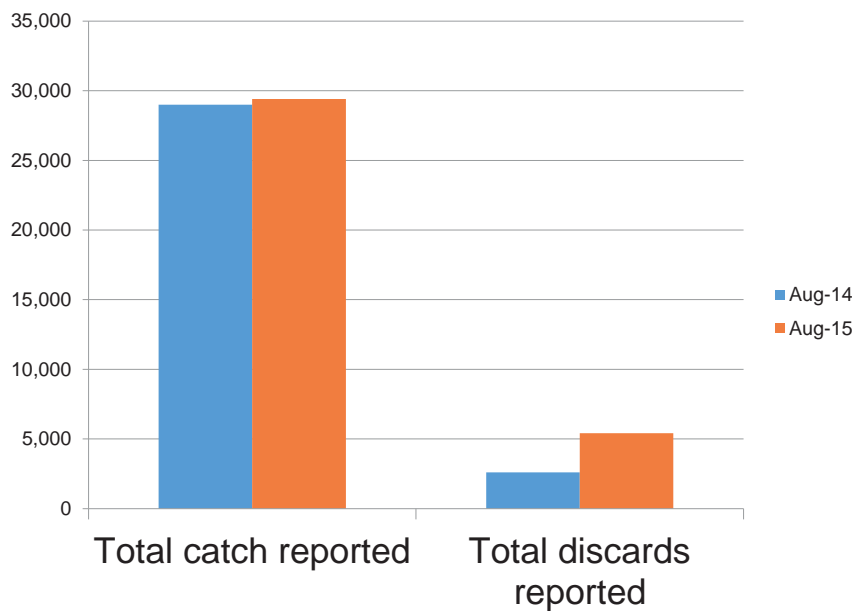
Logbook reporting

Number of species reported has increased



Logbook reporting

Number of discards reported has doubled





Compliance

100% of fishing operations 'monitored'

Automated checking of:

- Fishing start and end times
- Fishing start and end locations
- Fishing in closed areas

Verification of:

- Tori lines
- Discarding of quota species
- Piece counts by species of quota species
- Line weights?

Replaces at sea patrols and flights



Summary

- ✓ Investment required for initial setup
- ✓ Change in how data is used for management
- ✓ Engagement from industry influences cost
- ✓ Better quality logbook data
- ✓ Flexibility for scalability
- ✓ Support with regulation
- ✓ Immediate cost reduction to industry

What Next?

- ✓ Continue to assist fishers in logbook reporting
- ✓ Review data use
- ✓ Investigate additional benefit eg. VMS
- ✓ Increase fisher engagement/ownership
- ✓ Monitor program objectives

Questions?

