



EXECUTIVE SUMMARY

# WHAT'S IN THE NET?

Using camera technology to monitor, and support mitigation of, wildlife bycatch in fisheries

# WHAT'S IN THE NET?

Sustainable fisheries management is vital for the livelihoods and wellbeing of people all around the world, and for the health and survival of marine ecosystems and species.

Remote Electronic Monitoring with cameras (REM) of fisheries is a powerful tool to underpin sustainable fisheries management. This report explores how REM can be used to address the particular issue of unintentional killing of Endangered, Threatened and Protected (ETP) species in commercial fishing, which we term "ETP bycatch."

It outlines the benefits of REM for bycatch monitoring and mitigation and provides an overview of where REM has been used in relation to ETP bycatch around the world to date. It provides five case studies and identifies best practice elements of implementation, and applies these to two hypothetical fisheries of different scale and scope. Finally, it offers advice on accelerating the adoption of REM and recommendations for the adoption of REM as a key element of sustainable fisheries management.

## The value of REM for ETP bycatch monitoring

ETP bycatch is a significant issue globally. Every year, it is estimated that fisheries bycatch kills: 720,000 Seabirds, 300,000 whales and dolphins, 345,000 seals and sealions, over 250,000 turtles, 120,000 sea snakes (in one fishery alone), 1,135,000 tonnes of sharks and rays, as well as many thousands of tonnes of protected coral.

Effective management and mitigation of ETP bycatch requires first identifying and quantifying the problem through monitoring fisheries. REM is helping to overcome the significant challenges of monitoring ETP bycatch and is providing the data needed to inform effective management and bycatch mitigation. It can also help meet the needs of an increasingly concerned and environmentally aware public and businesses who want food supply chain transparency and assurance.

Independent monitoring of bycatch at sea is often a choice between using human observers or REM with cameras or a blend of both. Significant advantages of REM over traditional human observer programmes include:

- **cost savings** – independent monitoring coverage can be vastly expanded at a fraction of the cost of a human observer programme
- **efficiencies for data and science analysis** - including producing bycatch estimates, and spatially explicit fisheries risk assessments
- **enables innovative bycatch management** - including targeted risk-based prioritisation of management effort, and the potential for tracking fisheries bycatch impact on populations in real-time
- **addresses observer bias** - thereby improving the accuracy of the science used to manage and mitigate bycatch
- **improves the accuracy** of fisher self-reporting and compliance
- **improves staff welfare** – where observers are supported by, or replaced with, REM systems, reducing risk of injury, abuse or fatality witnessed in human observer programmes
- **enables monitoring on smaller vessels with limited space** - REM can be used effectively on small sized vessels, where placing human observers has been challenging or impractical. New REM 'lite' systems are being developed for use on small-scale and artisanal fisheries



The costs of REM are reducing the more the technology is used, and particularly with the advancement of machine learning. Artificially intelligent software is driving cost and time efficiencies in some industries and these could be applied to REM data, particularly in the review of camera footage and the automatic identification of fishing events from sensors. REM computer systems could automatically detect bycatch events, identify bycatch species, and mark sections of the footage that require the attention of human reviewers.

## Best practice elements of REM implementation

In-depth analysis of case studies of REM implementation in a range of fisheries around the world reveals certain steps and processes that significantly improve the chance of REM project success.

These include:

- Feasibility / pilot study conducted that tests specific objectives
- REM in place operationally to address clear objectives
- Roles, responsibilities, and operational requirements, systems and processes are documented (in writing)
- Timeframe for retention of REM information is stated
- Programme review and evaluation undertaken regularly (annually)
- Creating incentives for fishers (e.g. allows vessels with high ETP bycatch to be targeted for management, while vessels performing well continue their normal operations; allows vessels access to markets; could be used to prioritise access to new fisheries/quota; evidence removes inaccurate allegations and builds trust)
- Vessel-specific monitoring data is regularly provided to fishers and there is an identified channel for follow-up when there are differences of opinion about findings
- REM integrated within the broader management framework for management of ETP interactions

While there are clear processes and aspects of REM implementation that encourage success, effective implementation of REM projects and programmes is highly context specific. To illustrate this, best practice is explored in two hypothetical fisheries – an industrial scale trawl fishery with a relatively small number of vessels, and a coastal gillnet fishery with many smaller scale operators. These examples highlight the various stages of successful REM programme rollout.

## Accelerating the adoption of REM

The benefits of REM for monitoring and managing ETP species fisheries interactions are clear. The essential question then becomes – *how do we encourage and accelerate the adoption of REM across fisheries globally?* The report identifies that adoption of REM could be accelerated and incentivised by:

- Developing and enabling incentives including market drivers
- Making REM a regulatory requirement and imbedding it as a mainstream operational monitoring method for ETP interactions
- Establishing best practice funding models and improving cost-efficiency – including through development and adoption of automated video review and machine learning
- Proactively addressing information management and privacy concerns
- Building networks and creating collaborative environments where REM providers and experts, and end users can work together to share learnings, build the profile of REM success stories and share knowledge of what works and how to overcome challenges.





# RECOMMENDATIONS

To ensure that REM is as an integral part of the future of fisheries management, recommendations include:

- Formalising the recognition of REM as a mainstream and effective monitoring method for ETP species monitoring
- Ensuring REM is a standard method of monitoring supported by multilateral international organisations, including RFMOs
- Increasing the rate at which pilot projects transition to operational programmes
- Supply chains should consider REM as a condition of seafood sourcing
- Support and enable REM to be recognised as part of a standard transparency measure recognised by global seafood company and retailer led initiatives
- Highlight to major financial institutions which invest in large scale / high risk fisheries companies, the potential of REM to secure their investment (including brand reputation and market share) and mitigate risk
- Encourage and support the development and implementation of automated video review tools that use machine learning and computer vision, to help reduce costs and increase the efficiency of undertaking video review
- Revise scientific modelling techniques and programmes so that REM derived data can be more effectively used in ETP bycatch risk assessments or other ETP population estimation models
- Enable innovative bycatch management, including targeted risk-based prioritisation of management effort, and the potential for tracking fisheries bycatch impact on populations in real-time.

READ THE FULL REPORT AT  
[HTTPS://WWFEU.AWSASSETS.PANDA.ORG/  
DOWNLOADS/WHATSIINTHENETFINAL.PDF](https://wwfeu.awsassets.panda.org/downloads/whatsinthenetfinal.pdf)

This report was funded through a partnership between WWF and Sky Ocean Rescue



Working to sustain the natural world for the benefit of people and wildlife.

together possible™

[panda.org](http://panda.org)

© 2020 Paper 100% recycled

© 1986 Panda symbol WWF – World Wide Fund for Nature (Formerly World Wildlife Fund)

® “WWF” is a WWF Registered Trademark. WWF, Avenue du Mont-Bland, 1196 Gland, Switzerland. Tel. +41 22 364 9111. Fax. +41 22 364 0332.

For contact details and further information, please visit our international website at [www.panda.org](http://www.panda.org)