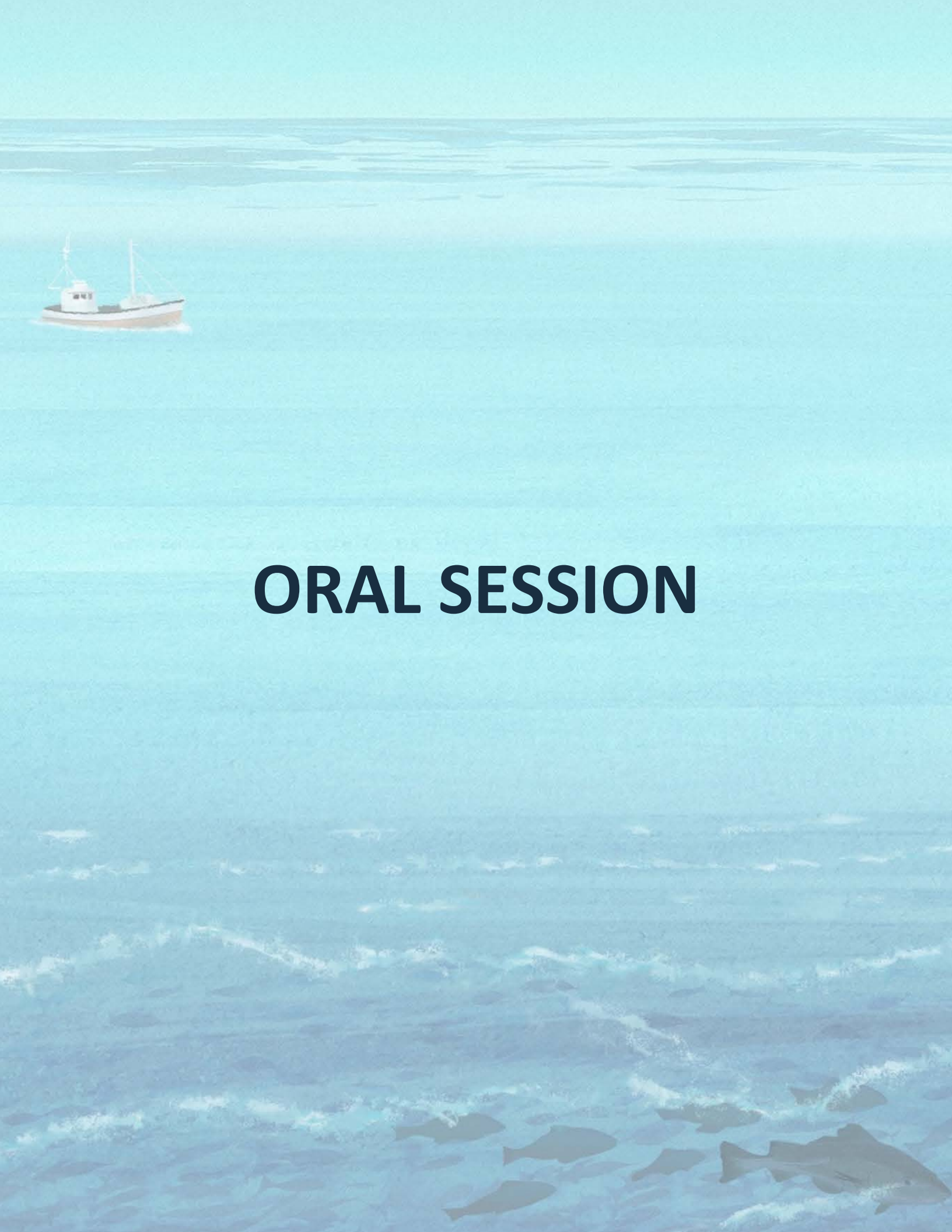
11th International Fisheries Observer and Monitoring Conference
19th – 23rd May 2025

Book of Abstracts

IFOMC 11th International Fisheries Observer and Monitoring Conference

Harpa Reykjavik Iceland 19.-23. May 2025



ORAL SESSION

S-01: Why Observer and Monitor Fisheries? The Importance of at-sea Monitoring

01-01

The FAO Deep-sea Fishery Project: supporting fisheries observers beyond national jurisdictions

Keith Reid, Eszter Hidas

Food and Agriculture Organization (FAO), Rome, Italy

Abstract

The Common Ocean Program Deep-sea Fisheries under the Ecosystem Approach project (DSF Project) has a major focus on observer programmes as a key source of data to improve sustainable management practices for deep-sea fisheries in areas beyond national jurisdiction. As part of meeting their obligations to manage fish stocks most RFMOs have requirements for observers primarily to record catches and collect associated biological data. Observers also have a crucial role in recording accurate information on non-target catches and discards as this is vital in ensuring that fisheries are not significantly impacting on vulnerable species, like deepwater sharks and corals and sponges from vulnerable marine ecosystems.

The DSF project is undertaking a review of the how RFMOs that have responsibility for the management of deep-sea fisheries implement observer programmes, including the different levels of observer coverage required and how observer data and reports are used. We will provide an update on this review and also outline the range of work being undertaken in the DSF Project to support observers, including tablet-based 'smart-id' guides to improve the identification of deepwater sharks. The project has also developed a web-platform to promote discussions and sharing of information, initiatives and lessons learnt related to the sustainable management of deep-sea fisheries and welcomes contributions from all interested parties.

01-02

The impact of observers in increasing compliance in the ICCAT & IOTC transhipment regional observer programmes

Owen Kelley-Patterson, James Moir Clark

MRAG Ltd., London, United Kingdom

Abstract

Introduction and background

MRAG, along with our consortium partner CapFish, manage the ICCAT, IOTC and CCSBT regional observer programmes (ROPs), which involve deploying observers on carrier vessels (CVs) transhipping tuna and tuna-like species from longline vessels in the Indian and Atlantic oceans. The observer's responsibilities include performing inspections on board the vessels that tranship with the carrier vessel to ensure they are in line with the relevant conservation and management measures (CMMs). They check things such as the Vessel Monitoring System (VMS), the Authorisation to Fish (ATF), the logbook and the vessel markings. Observers will issue a potential non-compliance report (PNC) to the respective RFMO secretariat and vessel flag state if any potential infractions are observed.

Methods

We have analysed the observer data collected since 2013 by counting and categorising the PNC reports issued by ROP observers. These data were then normalised against the number of longliners inspected in the given year, to give a figure for the number of PNCs issued per 100 inspections in each PNC category each year between 2013 and 2023.

Results and findings

Having observers oversee at sea transhipments appears to have had an impact on the number of PNCs issued over time and improved compliance. This was most notable within the ICCAT ROP where 63 PNCs were reported per 100 longliners inspected in 2014 and only 8 PNCs were reported in 2022. In IOTC there is a similar trend, with around 44 PNCs reported per 100 inspections in 2014 compared to just 12 in 2022.

Conclusion

Looking at this reduction we can see the fundamental impact that observer programmes can have on increasing vessels' compliance with the CMMs put in place by the RFMO and the subsequent management of the fishery.

01-03

A North Atlantic tale: Valuing and promoting sustainable fisheries through a Regional Fisheries Observer Program

Miguel Machete[1,2], Jorge Gonçalves[3], Pedro Capela[4], Paulo Avila[4], Rogerio Veiros[5], Phillippine Wouters[6], Alexandre Morais[7], Luis Rodrigues[8], Andreia Henriques[9], Luis Costa[7], Gilberto Carreira[10]

[1]IMAR, Horta, Portugal. [2]OKEANOS, Horta, Portugal. [3]Azores Fisheries Federation, Horta, Portugal. [4]Tuna Producers Association, Horta, Portugal. [5]Canning Industry Association, Horta, Portugal. [6]IPNLF, london, United Kingdom. [7]Regional Secretariat for Fisheries of the Azores / Regional Directorate for Fisheries, Horta, Portugal. [8]LOTAÇOR, Ponta Delgada, Portugal. [9]Regional Secretariat for Fisheries of the Azores / Regional Directorate for Fisheries, horta, Portugal. [10]Regional Secretariat for Fisheries of the Azores/ Regional Directorate for Maritime affairs, Horta, Portugal

Abstract

The Azores Fisheries Observer Program (POPA) is a unique initiative, established nearly 30 years ago to address the specific fisheries monitoring needs of this outermost region. Funded by the Regional Government and managed by the Institute of Marine Research (IMAR), the program has primarily focused on the pole-and-line tuna fishery (the most emblematic and significant fishery of the Archipelago), ensuring essential ecological certifications for both the fleet and industry, such as *Dolphin Safe*. In addition, it collects a broad range of equally important multispecific data through on-board observers and, more recently, through regular interviews with captains from the smaller fleet segment (<14 meters in length). POPA now holds the largest database of this kind in the North Atlantic pelagic region, with over 5 million records.

Over the years, the program has built strong, trust-based relationships with various stakeholders in the sector. Through consistent work and reliable data, POPA has created opportunities to give back to the sector by providing valuable information that promotes and enhances the recognition of the tuna fishery, further supporting its sustainability.

In this presentation, we will provide an overview of the actions and initiatives led or supported by the program, which reflect these achievements. These efforts have been carried out in close collaboration with producer associations, the canning industry, fish traders, non-governmental organizations, governmental decision-makers, researchers, and departments of the Azores auction network. Together, these initiatives have reinforced this tuna fishery as an activity that adheres to best practices in fishing methods, target species management, habitat protection, and environmental standards.

01-04

Evolution of fisheries monitoring programs in Chile (Observers and EMS)

Luis Cocas[1], Raul Saa[2]

[1]Subsecretaría de Pesca y Acuicultura, Valparaíso, Chile. [2]Servicio Nacional de Pesca y Acuicultura, Valparaíso, Chile

Abstract

Within the framework of the implementation of a fisheries management strategy with an ecosystem approach and following the recommendations of FAO aimed at guaranteeing ocean´s sustainability and food security, Chile has developed since 2012 a process of diagnosis, reduction and control of discards and incidental bycatch in its national fisheries. This process has involved the joint efforts of the regulatory, research and control agencies along with collaborative work with the fishing industry, leading the country to the gradual solution of the problem.

Considering the challenges of controlling and registering discards and incidental bycatch at sea, Chile incorporated in 2020 the mandatory use of EMS (Image Recording Devices - **DRI** and Electronic Logbook System - **SIBE**) to control compliance, with differentiated application depending on the type of fleet and fishery, together with the maintenance and enhancement of human observation programs onboard for scientific purposes.

The results obtained to date have shown significant reductions in both discards an incidental bycatch, proving that the appropriate implementation of measures and its scientific and compliance monitoring may gradually solve the problem.

In addition, these new technologies to collect, register, manage and analyze fishing data are providing a set of possible solutions to update and modernize the fisheries data systems of the country and to significantly expand the collection and analysis of information, also for research and management, creating an opportunity to coordinate and enhance the work of the fisheries management agencies, around the maximization of the use of the information that can be obtained from these monitoring tools.

Details on the implementation of the monitoring programs, relevant results, lessons learned, challenges and recommendations will be presented to the audience to foster discussion.

01-05

Why management and surveillance - Short overview of fisheries in Iceland from settlement to modern time and the development of the current fisheries management system.

Erna Jónsdóttir

Fiskistofa, Akureyri, Iceland

Abstract

In my presentation I will have a short overview of fisheries in Iceland from settlement to modern time.

Fisheries are integral part of the Icelandic identity and history. Since settlement time fisheries have been vital part of Iceland's food supply. First only for domestic consumption but with more international sailing fisheries was Iceland´s most important product/commodity for international commercial. Fishery products paved the way for import of other products and thus contributed greatly to Iceland's economic and social development.

Fisheries were limited by open rowing boats and hard weather conditions. The need for some kind of fisheries management did not emerge until at the beginning of 20th centuries when motorised vessels were introduced with more capacity. I will try to shed a light on how the fisheries management system developed from free fishing to the highly regulated sector it is today. I will examine the objective and the protective interest of the fisheries management system in its infancy and compare it to the objective and the interest of the current fisheries management system.

01-06

Applying integrated scientific monitoring of sensitive species in Croatian fisheries: First findings of multi-methodological approach

Igor Isajlović[1], Ivana Vukov[2], Ratko Cvitanić[1], Damir Medvešek[1]

[1]Institute of Oceanography and Fisheries, Split, Croatia. [2]Directorate of Fisheries, Ministry of Agriculture, Foresty and Fisheries, Zagreb, Croatia

Abstract

Monitoring sensitive species in marine fisheries requires tailored strategies to gather reliable data and address practical limitations in diverse fishing contexts. From 2022 to 2024, a comprehensive monitoring program was established in Croatia, targeting high-risk fishing gears. This program integrates diverse methodologies aimed at increasing data accuracy, contributing to bycatch mitigation, and enhancing fisheries sustainability.

Key methodologies for data collection included scientific observer sampling on-board fishing vessels, sampling and questionnaires at landing sites for vessels unable to accommodate observers, and self-sampling by fishermen using cameras during hauling operations on a subset of bottom trawlers. Fishery-independent survey data, including MEDITS and MEDIAS, complemented these efforts. Additionally, data from fishing logbooks, reports from ICCAT observers, and national observers deployed on bluefin tuna towing vessels were incorporated. Finally, information from Croatia's national alert system for injured and stranded marine mammals and turtles further enriched the dataset.

This integrated approach enabled the collection of robust, multi-source data on bycatch, species composition, and habitat interactions. For instance, on-board sampling yielded comprehensive species-specific data, while self-sampling overcame logistical difficulties and strengthened fishers' engagement. Fishery-independent surveys and external data sources expanded spatial and temporal coverage, enabling a broader understanding of sensitive species interactions with fisheries.

Findings highlight the effectiveness of combining diverse methodologies in reducing monitoring gaps to efficiently support marine fisheries management. By integrating traditional and innovative techniques, this approach not only enhances compliance with regulatory frameworks but also aims to contribute to the conservation of marine biodiversity. The research emphasizes the importance of adaptable, multidisciplinary monitoring approaches, to balance fisheries operations with the preservation of marine sensitive species.

S-02: Data Management

02-01

Trends in bycatch of fish, marine mammals, sea turtles, and seabirds in U.S. commercial fisheries

Andrea Chan

ECS Federal, Silver Spring, USA

Abstract

Sustainable fisheries management requires that the bycatch of fish and protected species be estimated, tracked, and minimized to the extent practicable. In U.S. commercial fisheries, data on bycatch - or the discarded catch of any living marine resource - is primarily collected by independent fisheries observers on a portion of total fishing trips. NOAA Fisheries is responsible for ensuring adequate data collection for priority bycatch species, and producing bycatch estimates using the best available science. Bycatch of fish (including Endangered Species Act-listed species), sea turtles, seabirds, and marine mammals remains one of the greatest threats to conserving these important species for the benefit of current and future generations. Thus, NOAA Fisheries has prioritized the development of robust observer programs for major U.S. fisheries to support accurate assessments. NOAA Fisheries Office of Science and Technology is in the process of improving the timeliness, consistency, and communication of updated bycatch estimates from all U.S. regions in one centralized database. In addition to providing the raw estimates, we are exploring methods for analyzing trends in bycatch data, when appropriate, while accounting for any changes in bycatch estimation methodology over time. To this end, we analyzed the available data on fish and protected species bycatch in U.S. commercial fisheries over time to designate time series as increasing, stable, or decreasing. We then combined these results with information on bycatch reduction measures, local population abundance, fishing effort, and observer/monitoring coverage levels to identify potential geographic shifts in bycatch hotspots and priorities for scientific research and/or management.

02-02

Regional data governance: from policy to dashboards

Tiffany Vidal

Pacific Community (SPC), Noumea, New-Caledonia

Abstract

Introduction

Effective data management to support the largest tuna fishery in the world, spanning a geographic area covering 20% of the globe, with diverse membership and participation, is not trivial. Data governance, developed in consultation with stakeholders, underpins the ability to collect, safeguard, manage, and disseminate data to support the work of the Western and Central Pacific Fisheries Commission (WCPFC) in a transparent manner. Here, we describe how a regional data integration platform, developed to implement robust data governance practices, has transformed fisheries data management and empowered stakeholders throughout the Pacific.

Methods

TUFMAN2 (T2), one of the flagship platforms of the region, was developed with an aim to link policy frameworks, database systems, and reporting tools. T2 is a SQL Server database with a web-interface allowing for data entry, review, editing, and reporting of member data. The platform is integrated with a suite of e-reporting (ER) applications for the collection of logbook, observer, and port sampling data, and leverages VMS data to identify missing and misreported information. User roles and visibility rules enable efficient sharing of information with multiple members and flag-states, as appropriate, mitigating the need for redundant data entry or management. Integration, flexibility and regional collaboration capture the essence of T2's success.

Results

T2 has dramatically reduced the amount of time members spend entering data. As a result, stakeholders can now spend more time utilising these data to generate insights and improve their fisheries management, both regionally and at a national level.

Conclusion

Stakeholders throughout the Pacific recognized the growing data demands to ensure sustainable management of the vital tuna fisheries in the region. Collectively, with SPC/WCPFC support, an effective and integrated data management platform was built that not only enhanced data quality, timeliness, access and utilization, but also streamlined data governance from policy to dashboards.

02-03

The challenges of past- and future-proofing data management in Fisheries Management software

Stefania Crotti, Felipe Tocornal

Trackwell, Reykjavík, Iceland

Abstract

Since 1996, Trackwell has provided Vessel Monitoring System (VMS) software to several countries and Regional Fisheries Management Organizations (RFMOs) tailoring to both overlapping and unique necessities of each, as well as interfacing with the constant changes that fisheries monitoring has been subjected to in the past 29 years. Keeping the data infrastructure dynamic and adaptable, while sustainable and maintainable, has been a major challenge, especially along the road to upgrade the solution to a Fisheries Management System (FiMS), expanding the domains covered, while still guaranteeing backwards compatibility.

Regulatory changes have put authorities in the need for increased cooperation between countries, RFMOs, and other parties, pressing for the usage of standardized data sharing mechanisms, severe data governance rules, as well as the demand for integration of new and ever-changing datasets. Simultaneously, fisheries monitor systems are expected to be reliable and performant and cannot afford to blindly accommodate changes at the cost of robustness, especially when the system is used for safety-at-sea and to oversee critical missions. The tradeoff between legacy and future solutions calls for an internal standardization of the data feeds and an understanding of what the officers' processes used to be, and where they are headed to.

This lecture will highlight the challenges of how integrating datasets, enabling system customization, and governing data sharing mechanisms have been tackled to create the foundation for a sustainable and effective fisheries management system that has been serving countries and RFMOs, evolving together with local and international regulations, for nearly 30 years.

02-04

Data quality and security management in electronic monitoring programs

Gonzalo Legorburu

DigitalObserver Services, Bilbao, Spain

Abstract

Fisheries data managers face new challenges in handling the growing volume of fishing effort and catch data from Electronic Monitoring (EM) programs. This complex environment demands well-defined stakeholder roles, clear communication procedures, and robust data management strategies. The scope and objectives of EM projects shape the range of stakeholders involved, from vessel operators and fleet managers to fisheries administrations.

Effective data management must ensure both accessibility and security at every stage, including onboard recording and storage, data transmission, and submission to a database for analysis. A tailored data management plan and database design are essential to establish these attributes while maintaining confidentiality and regulatory compliance.

Building on multidisciplinary expertise, this study explores how data management varies across different EM project designs. It tracks the evolution of data handling practices—from early systems that required manually swapping hard drives to modern fully remote solutions—while assessing security measures, confidentiality protocols, and compliance with quality management standards, data protection regulations, and information security certifications. Findings indicate that manual procedures tend to introduce more quality issues, especially when applied to lower-value tasks, where remote data processing methods perform more efficiently. However, for high-value automated tasks, manual verification remains essential to ensure data quality. From a data protection and information security perspective, modern remote data processing enhances security while better aligning with the multi-stakeholder structure of EM programs, compared to early manual systems.

Furthermore, the growing emphasis on interoperability in EM programs requires in-depth analysis to assess its feasibility across diverse project structures. This study identifies key challenges and emerging best practices in EM data management, contributing to the development of standardized methodologies in the field.

02-05

Observer coverage - how much is enough?

Kimberley Mackey

MRAG Ltd., London, United Kingdom

Abstract

Introduction and background.

At the 10th IFOMC meeting, MRAG presented a review of observer coverage levels and asked how coverage levels should be defined. If a fishery says it has 100% coverage what does this mean, 100% of vessels, 100% of effort, 100% of catch? With the increasing use of electronic monitoring (EM) fisheries are increasingly able to say that they have 100% coverage but does this mean that that the vessel is actively monitored throughout all operations or just recorded? MRAG was commissioned by the MSC to conduct a study into levels of fisheries monitoring required and implemented. This study aims to build on the 2018 review to include electronic monitoring and self-reporting.

Methods.

We reviewed a number of different fisheries globally to see how they recorded their catches and fishing operations in general. The majority of these fisheries are MSC certified and were categorized according to location, scale and fishery type. For each fishery the means of monitoring was analysed, whether though self-reporting, observer coverage, electronic monitoring or a combination of all of these.

Results and Findings.

There is no substitution for onboard, independent observation, however this is not always possible due to logistical, physical and financial constraints. This submission will aim to demonstrate how different fisheries are monitored according to their management priorities and what is the optimal level of coverage to ensure the management objectives are met.

Conclusion.

When discussing fisheries monitoring it is important to define what is meant by coverage as this will determine the level of data available and subsequently how effectively the fishery can be managed.

S-03: Observer's Tools of the Trade and Novel Applications of at-sea Monitoring Data

03-01

Streamlining debriefing using onboard electronic reporting and dedicated data review applications

Ryann Turcotte[1], Charles Villafana[2], Jody Van Niekerk[2]
[1]Pacific States Marine Fisheries Commission, Long Beach, USA. [2]NOAA-WCROP, Long Beach, USA

Abstract

Introduction and background:

Recently the United States West Coast Region Observer Program developed an Onboard Record Collection Application (ORCA) which allows observers to enter data on a tablet while at sea. Transitioning to electronic data collection paved the way for the development of a Debriefing Application utilized by observer program staff to review trip data. These applications work together to bring data into the database and deliver a summarized view for debriefers. Implementing the debriefing application has resulted in a more efficient debriefing process, reduced costs, and improved data access and quality.

Methods:

Observers upload data from the tablet to the database when they return from a trip. Once uploaded, data can be accessed in the debriefing app by program staff. This eliminates the need for observers to report to the office allowing them time to rest and readjust to life on land. Additionally, data review begins sooner and can be accessed by program staff from any location. Summaries of trip activities make data review quick and efficient. If errors are found, the observer can re-open the trip in ORCA, make corrections and upload for further review.

Results and findings:

Benefits of implementing the new process include:

- Observers can submit data from home.
- Corrections are made in ORCA and re-uploaded for review in the Debriefing Application.
- Data review can begin as soon as the observer returns.
- Observer ready to redeploy sooner.
- Old process of data review, debriefing and data entry took 2-3 weeks. New process takes an average of 48 hours.
- Debriefing appointment time is focused on observer experience instead of data corrections.
- Data available to users sooner.

Conclusion:

Implementation of the debriefing application coupled with on-board electronic data collection resulted in reduced program costs, improved data quality and streamlined processes for observers and debriefers.

03-02

Optimizing fisheries data collection: the smartfish approach to accuracy, efficiency, and user-friendliness

Laura Lemey, Wim Allegaert, Els Torreele

Flanders Research Institute for Agriculture, Fisheries and Food (ILVO), Ostend, Belgium

Abstract

During our Belgian at sea sampling program and surveys, conducted under the Data Collection Framework, we collect length and weight data from certain fish species aboard commercial fishing vessels. A subset of the samples are brought to our ILVO labs, where we collect additional biological information on individual fish. In the past, these parameters were monitored manually using paper and pencil, then transcribed into Excel with the disadvantages of being time- consuming, prone to errors and less efficient. To address these challenges, we developed the innovative in-house *Smartfish data platform*. The platform stores and organizes data collected during sampling at sea. The data includes biological metrics (length, weight, sex, etc.), but also include stomach sampling, litter and water samples. Two types of software applications were developed, a Windows desktop client for at sea (Smartfish@sea) and a web application for managing the data in the office (Smartfish@office). Smartfish@sea is optimized to run on ruggedized tablets to be used under rough weather conditions. The tablets are connected with our digital measuring board to sample lengths, weights and counts. The measuring board works with a magnetostrictive linear position sensor and is developed in house. Once a trip is completed, the data is synchronized and becomes available in our *Smartfish* database. The data can be further managed in the Smartfish@office web application. In MS Power BI all Smartfish data can be visualized per trip, such as haul locations, length-weight keys per species, etc. These visualizations are also used for initial data quality checks. Additionally, a Smartfish R package was developed that unlocks the data for further in-depth analysis and report creation. To conclude, the Smartfish platform enhances the efficiency, quality and accuracy of data collection, while also providing researchers with easy access to comprehensive datasets, facilitating improved analysis and advancing scientific research.

03-03

Insights from a pilot on electronic monitoring for social responsibility

Sunny Tellwright[1], Meghan Fletcher[2], Gabrielle Lout[3]

[1]Conservation International, Arlington, USA. [2]The Nature Conservancy, Arlington, USA. [3]Ocean Outcomes, Portland, USA

Abstract

The Nature Conservancy, Conservation International, Ocean Outcomes and industry partners collaborated on a first of its kind project to pilot electronic monitoring and Wi-Fi technologies in the fisheries sector to combat both illegal fishing practices and human rights abuses. The project researched the potential applications of EM for monitoring social and labor indicators to explore how these systems might help better protect fishers and support a wider worker-driven social responsibility system? This session will share the key learnings from this pilot, including:

- What labor indicators can be monitored with EM and how
- What are the additional review resources and costs needed to conduct labor reviews in addition to environmental review
- What are the key enabling conditions for EM to be successfully applied to labor monitoring
- Considerations for providing Wi-Fi access to crews

03-04

Seabirds, why we monitor them and how fishery observer programs support their conservation

Kevin Stockmann

Alaskan Observers Inc., San Francisco, USA

Abstract

Fishing interactions with protected species are observed and monitored to ensure that bycatch of protected species remains below a level that the species can withstand. Worldwide, the expansion of commercial fishing has impacted many seabird species. Seabird bycatch, accidental hooking or entanglement in fishing gear, is a threat to seabirds that is monitored and managed, with many contributions from fishery observers. Observer data supports and advances the science of long-term seabird conservation. Observer data plays a fundamental role in quantifying bycatch rates of seabirds and helps managers assess the effectiveness of seabird avoidance strategies. This presentation highlights significant past and ongoing observer contributions to seabird conservation and introduces possibilities for additional observer contributions across programs in the USA and the world.

Observer programs in North America, South America, Africa, Europe and Australia will be surveyed or interviewed. An overview of which seabirds around the planet are most imperiled by commercial fishing will be compiled and presented. A summary of how NOAA West Coast Groundfish observers are trained in seabird identification and data collection will be presented and compared to approaches taken by other observer programs around the world. Recent seabird publications that have relied on observer data will be highlighted and discussed. Seabird monitoring methodologies from observer programs around the world will be presented and compared. Results presented at the IFOMC will include assessment of seabird avoidance methods and how observer data has helped shape seabird avoidance. The idea of a more comprehensive global approach will be presented. A primary justification for observer programs is to monitor incidental takes of marine mammals, sea turtles and seabirds. This presentation will spark conference attendees to think creatively about managing commercial fishing impacts on seabirds worldwide.

03-05

Demonstrating the capabilities of electronic monitoring as a novel at-sea monitoring tool for litter observations from scottish fishing vessels

Lauren Clayton, Helen Holah, Rob Fryer

Marine Directorate of the Scottish Government, Aberdeen, United Kingdom

Abstract

Information is sparse regarding the quantity, types, and sources of domestic litter from at-sea sources such as fishing vessels. Many people live and work at sea, producing waste that can enter the sea directly, suggesting there is an at-sea input of marine litter that is not well understood, monitored, or mitigated despite being illegal. Traditional marine litter monitoring utilises beach cleanup and / or seafloor survey data, which often cannot determine the entry point of litter into the marine environment. This is especially true for domestic litter (e.g. water bottles and packaging) which upon entering the marine environment are indistinguishable from litter from land-based sources. Typically literature regarding litter from the fishing industry focuses on fishing-related materials (e.g. fishing gear and PPE) due to the difficulties of distinguishing some sources of marine litter.

Electronic Monitoring (EM) has potential use beyond fishing activity estimation and catch quantification. This project reviewed historic EM video footage of fish-processing conveyor belts on-board Scottish bottom trawlers from 2016, originally collected to monitor the cod discard ban, for observations of litter items discarded. The aim was to evaluate whether EM systems could be used as a novel monitoring tool, comparable to traditional monitoring techniques, to identify and quantify litter discarded from fishing vessels,.

All reviewed vessels (9) were observed to discard litter at sea. The majority of litter was “Plastic” (>60%) and “Domestic litter” (>50% of 1,200 items), i.e. not fishing related. Additionally, most vessels (7) discarded predominantly “new” generated litter, rather than re-discarding “old” passively captured litter.

This project demonstrates that EM has the potential to monitor at-sea sources of marine litter from fishing vessels. It also highlights that historically some fishing vessels were non-compliant with marine litter regulations. Hence, EM could act as a novel compliance tool to monitor adherence to litter management policies.

03-06

Near-real time monitoring of fishing effort using novel low-cost technology.

Maria-Jose Pria-Ramos

Archipelago, Victoria, Canada

Abstract

Collecting fishing effort data in an efficient and affordable way is important for managing fisheries, especially those with limited resources to implement complex and costly monitoring systems. Archipelago's FishVue LIME and FishVue Fleet deliver innovative, budget-friendly solutions that provide high-resolution fishing effort data, tailored to small-vessel or data-limited fisheries.

The Washington Dungeness Crab fishery offers a practical and impactful case study. Archipelago partnered with the Washington Department of Fish and Wildlife (WDFW) to implement an Electronic Monitoring (EM) program combining FishVue LIME and FishVue Fleet to provide near-real-time fishing effort data. Between 2021 and 2023, pilot projects demonstrated the system’s capability to monitor vessel positional data, collect hydraulic pressure data to detect individual pots hauled. By January 2024, this cost-effective solution evolved into a regulated program and was seamlessly rolled out to over 200 vessels at an average cost of under $50 USD per vessel per month over a five-year program.

FishVue LIME serves as the vessel-based Remote Electronic Monitoring (REM) system, while FishVue Fleet, a web-based software, enables WDFW to calculate pots hauled through algorithmic analysis and generate actionable reports on vessel activity. This integration allows WDFW to monitor and enforce temporary management measures, respond to biotoxin risks, and track fishing activity relative to marine mammal interactions.

This presentation will explore how FishVue LIME and FishVue Fleet offer scalable, affordable solutions for small scale and data-limited fisheries, enabling fisheries management to achieve sustainability and regulatory compliance. By illustrating their successful application in Washington, this session highlights the transformative potential of these tools to modernize fisheries monitoring globally.

03-07

Observers' potential role in monitoring effects of temperature on marine pathogens

Sarah Williamson

Alaska Pacific University, Alaska, USA

Abstract

Forecasting impacts of fluctuating climate shifts on marine ecosystems is imperative for management of ecologically and economically valuable resources. Host-pathogen dynamics are complex systems that are important drivers for a variety of marine processes, such as community structure and biogeochemical cycles. Each pathogen and host have a unique response to temperature changes which can lead to host-pathogen dynamic mismatches and consequent disruption of ecological balance. These mismatches can lead to epizootic events with potential negative repercussions to fish populations. Studies and monitoring programs are needed to quantify the effects of temperature on host-pathogen dynamics, forecast potential epizootic events resulting from climate shifts, and guide resource management.

Fisheries observers are at the forefront of at-sea and shoreside data collection for fisheries management, monitoring protected species, and special scientific research projects. Observers' extensive training on biological sampling provides an opportunity to collect and report critical data on potential pathogen outbreaks. These samples can include blood, skin scrapes, and an assortment of organs/tissues, with sample type and frequency dependence on the pathogen and host in question.

Here, I provide a worked example of pathogen-related data collection using my MS project, Effects of temperature on viral replication, inactivation and the infectivity of viral hemorrhagic septicemia virus in Pacific herring (Clupea pallasii). This project seeks to improve our understanding of how temperature affects the dynamics of host-pathogen interactions using a cold-water adapted virus – viral hemorrhagic septicemia virus (VHSV) – and Pacific herring as a model system. We address the following questions: 1) Does temperature affect in vitro replication and inactivation of, and 2) What is the virulence of temperature-inactivated VHSV to juvenile Pacific herring? Our results suggest that VHSV had faster replication and inactivation at warmer temperatures, and temperature-inactivated virus influenced infectivity depending on inactivation period. In addition to illustrating VHSV's potential adaptability with climate shifts, this study demonstrates the important role of observers in assisting in fisheries health monitoring.

S-04: Monitoring Artisanal and Recreational Fisheries

04-01

Lessons learned from developing and implementing an e-Log app for small-scale fishers in Iceland.

Þorsteinn Ágústsson, Þorvarðu Sigurjónsson

Trackwell, Reykjavík, Iceland

Abstract

This lecture discusses the development and implementation of an electronic logbook (e-Log) application tailored to the needs of small-scale fishers in Iceland. The primary goal was to design a simple and user-friendly tool that enabled fishers to efficiently record essential catch data, including what was caught, where, and how much.

Among the lessons was the importance of involving fishers early in the design process. Their feedback helped make the app more practical and relevant to their daily work. Training and ongoing support were also critical to help fishers feel confident using the technology. This cooperation made it possible for the application to work for all kinds of small-scale fisheries including artisanal and recreational fishers.

For the government, the app provided reliable data for better fisheries management. For fishers, it offered a way to track their fishing history on a website, helping them make smarter decisions.

The project showed that simplicity, user involvement, and support are key to successfully implementing technology in traditional fishing communities. These take-aways can guide future efforts to improve data collection and sustainability in all types of small-scale fisheries around the world.

04-02

Sacrois: A data cross-validation tool to enhance quality and completeness of fishing activity data *(spatio-temporal fishing effort and landings by species)*. Application to the French Atlantic small-scale fleets.

Sébastien Demanèche[1], Eric Bégot[2], Antoine Gouello[3], Armelle Rouyer[1], Laurent Dubroca[4], Jean Baptiste Lecomte[5], Youen Vermard[5], Aurore Chassanite[1], Emilie Le Roy[1], Emilie Leblond[1]

[1]IFREMER (French national institute for ocean science and technologie), Brest, France. [2]NORGAY, Brest, France. [3]PLEGADIS, Saint Loup, France. [4]IFREMER (French national institute for ocean science and technologie), Port en Bessin, France. [5]IFREMER (French national institute for ocean science and technologie), Nantes, France

Abstract

French Atlantic small-scale fleets (vessels under 12m) are a major component of the French Atlantic coast fisheries, representing about 3/4 of all vessels and 1/3 of total landings. High-quality, complete fisheries data are crucial for their effective management at local, national and international levels. This first includes data on fishing activity (spatio-temporal fishing effort and landings by species) which are also essential to consider further data collection of additional information on human, social, economic aspects, and biological variables.

In this summary, the improvements achieved since the development of *Sacrois*, a data cross-validation tool, will be introduced. This methodological innovation aims to enhance quality and completeness of fishing activity data by: 1) cross-validating available reported data leveraging them (log-books, fishing declarative forms, auction sales-notes and geo-localization data) and 2) completing the data, especially on the basis of a scientific census frame survey of professional vessels' annual fishing activity calendars. This overview will highlight functionalities of the algorithm, such as linking input data flows, consolidating/validating and adjusting fishing effort, fishing areas or landings by species in weight and value. The presentation will also focus on the assets derived from the use of the scientific census frame survey, e.g. to assess fishing areas or fishing gears when only sales notes data are available. The main result is a new reference data framework consisting of a set of fishing trips data since 2000, formatted consistently. This framework will be compared with the initial datasets available for these vessels.

Finally, quality indicators computed by *Sacrois* algorithm will be presented: they are particularly useful for assessing the level of data completeness achieved. Further opportunities of such algorithm will be also stated in particular considering the increasing coverage of geo-localization data for these small-scale fleets.

04-03

Electronic monitoring to estimate landed egg-bearing lobster proportions from the solway (scotland).

Lauren Clayton, Helen Holah, Lynda Blackadder, Rachel Kilburn

Marine Directorate of the Scottish Government, Aberdeen, United Kingdom

Abstract

Fisheries stakeholders often have varying viewpoints regarding stock status and characterisation, resulting in different preferences for management measures. In May 2024 the landing of egg-bearing lobsters was prohibited in Scotland as an interim measure to improve management of inshore fisheries. Localised concerns regarding the prohibition were raised by creel/pot fishers in the small area of the Solway Firth on the West coast of Scotland. Solway fishers stated that they catch and land a higher proportion of egg-bearing lobsters compared to Scottish baseline data thus the ban would have a disproportionally greater impact on their income and livelihoods.

UK landings of lobster into Scotland from Solway (stat squares 38E5 and 38E6, 2013-2022) accounted for between 2% and 5% of total lobster landings into Scotland. Due to the low proportion of landings the area is infrequently sampled, and there was insufficient data to respond to the fishers concerns.

A temporary scientific derogation was established in the Solway Firth to collect data on lobsters. Under the derogation fishers are required to take onboard a portable EM system (Tablet with Archipelago FishVue mobile), to estimate the proportions of egg-bearing lobsters retained per trip.

This talk will share preliminary results from analysis of > 30 fishing trips, reporting on the number of lobsters monitored, the proportions and variability of egg-bearing individuals, and describing the challenges of EM monitoring for artisanal fisheries.

This portable, versatile, low cost EM system has been a critical tool in generating data where traditional monitoring programmes have faced challenges, and offers a means to directly input industry observations into the scientific evidence gathering process. Strong industry engagement in this novel science-industry research collaboration positions this trial as an exemplar of EM being utilised to support informed decision-making to implement future inshore management measures with the support of industry.

04-04

Toward fishing sustainability: Electronic Monitoring Pilot Project with the Chilean Seabass Artisanal Fishing Fleet

Natalio Godoy[1], Alvaro Teran[2]

[1]The Nature Conservancy, Santiago, Chile. [2]The Nature Conservancy, Midtown building, Costa Rica

Abstract

The Nature Conservancy (TNC) and partners such as Servicio Nacional de Pesca y Acuicultura (SERNAPESCA), Subsecretaría de Pesca y Acuicultura (SUBPESCA), and the Instituto de Fomento Pesquero (IFOP), and services provider as A.I.S., Inc (AIS) and Integrated Monitoring (IM) have studied the effectiveness of wireless Electronic Monitoring (EM) in the artisanal Chilean Sea Bass fleet. This pilot tested the cost and scalability of an EM system which increased transparency in fishing operations, improved at-sea data collection and moved beyond antiquated EM by using cellular data transmission for wireless data management. The project produced data on fishing effort, protected species, kept, and discarded catch, and gear use from vessels located along 2800km of Chile's coastline. IM installed systems on three vessels, located in north, central, and southern Chile. The IM systems recorded and wirelessly transmitted video of fishing activity from 16 trips, spanning 283 days, including 245 fishing days and 409 hauls. AIS annotated every trip for gear setting, gear recovery (hauling), and issues. The AIS reviewers then reviewed 172 hauls spanning 810 hours of video. The blended average review rate of the hauls for the three vessels was 0.524 review time/haul time. The implications of this, near half review rate, demonstrated the effectiveness of the video, review platform, and reviewer capability. This rate improved over time, and the recommendation for future work includes a burn-in trip for initial camera placement improvement, crew feedback reports to minimize camera view interference, and health checks of the system during fishing events to monitor for system issues. In the future, the scale of the project will impact in the transparency of Chilean and world fisheries.

04-05

Southern California Artisanal: Fisheries, Markets, and Monitoring

Steven Todd

Alaskan Observers Inc., Seattle, USA

Abstract

Catches from artisanal fisheries account for up to 40% of the global annual catch. They provide subsistence, employment, food security, and healthy protein for local and regional communities. The widespread nature of fishing efforts and gear types presents many challenges for management, including identifying fisheries and fishermen, monitoring and catch sampling, and defining and applying regulations.

In the U.S. West Coast Groundfish Observer Program (WCGOP), many observed fisheries in southern California are characterized as artisanal due to the small size of vessels, gear types, and small-scale landings. These fleets are essential to their local communities, supplying locally sourced, fresh, and sustainable catches sold at numerous dockside markets. Direct retail markets have proven to be a key component for economic stability for fishermen. In addition, they provide one of few opportunities to recruit new fishermen into an aging fleet.

The Open Access permit is the most accessible and affordable option for new fishermen in the United States' west coast fisheries. It also serves as the most common pathway into commercial groundfish fisheries and represents the greatest artisanal fishing effort. Typical small-scale fishing vessels range from 7 to 10 meters in length and are often single-crew operations. These smaller vessels present various unique challenges for management and observers. Everything from sampling gear to safety equipment and personal items is customized for each trip. With over 20 years of experience on fishing vessels, I have gained numerous insights, both practical and psychological, for ensuring trip success.

Case studies from interviews with vessel operators will illustrate the mutually beneficial relationships between fishermen and WCGOP and the advantages of dockside markets. Additionally, I will share insights from my experience with trip preparations, sampling strategies, and working effectively and safely on small vessels.

04-06

Collaborative development of electronic monitoring programs for first nations

Fraser Stobie, Jillian DiMaio, Amanda Barney

Teem Fish, Prince Rupert, Canada

Abstract

Indigenous Community Based Fisheries (CBFs) provide opportunities for small-business fishers to participate in commercial industries while maintaining respect for their traditional values and fishing methods. This model is designed to support thriving multi-species, mixed gear, small-boat (<40ft) enterprises, lowering the barriers to industry participation for shareholder Nation citizens .

Teem Fish Monitoring Inc. (Teem Fish) has partnered with First Nations in British Columbia (BC), Canada to test and codevelop 'right-sized' electronic monitoring (EM) pilots in a range of CBFs where other EM options are poorly suited. Our collaborative approach to EM program development is outcome-focused, meaning that we design our solutions around delivering critical information needs that support effective indigenous-led resource management and compliance. Working with First Nations partners, we seek to identify and minimize the barriers to monitoring requirements through EM adoption, acknowledging the context-specific constraints and nuanced needs of individuals. Key challenges encountered include: fragmented and diverse fleets, varied vessel configurations and gear types, low catch revenues that make EM investment unviable, limited capital, and resistance to at-sea observations.

To address these challenges, Teem Fish employed a three-pronged approach: 1) developing deep understandings of the fishery; 2) flexible financing; and 3) providing fit-for-purpose, cost-effective hardware. Equipment lease options along with software discounts reduce upfront costs for pilots, and our portable EM product enables multiple vessels to share a system for lower individual costs. By working with Indigenous fishery managers we aim to avoid 'penalising' small scale fishers, ensuring the cost burden is accommodated fairly. The learnings from these pilot programs further highlights the important benefits of empowering artisanal fleets to proactively consider EM programs and invite regulators into the conversation where Nations can lead by example and develop an appropriate EM solution rather than waiting to react to dictated requirements that may not suit their community.

S-05: Law Enforcement Involvement in Monitoring and (De)briefing and Mentoring of Observers

05-01

The Icelandic „No discarding policy“ and enforcement

Sveinn Andri Brimar Þórðarson

Directorate of Fisheries, Akureyri, Iceland

Abstract

The lecture is intended to shed light on the legal means of the Icelandic Directorate of Fisheries, as a monitoring agency, as a response to violations of the fishing legislation with an emphasis on discarding. Icelandic law stipulates strict penalties against discarding in accordance with the objective clause of the Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, with the main goal of improving treatment of commercial marine stocks and encouraging their sustainable utilisation for the Icelandic nation. This session is intended to introduce the means of enforcement and actions available to the Directorate to ensure compliance with the discarding ban, e.g. with administrative and financial sanctions, police involvement and publications.

05-02

Enhancing observer safety by strengthening response protocols between agencies

Monique Arsenault

Earth Resources Technology in support of NOAA Fisheries, Northeast Fisheries Science Center, Fisheries Monitoring & Research Division, Falmouth, USA

Abstract

This project will investigate the strategies developed in the U.S. Northeast Fisheries Observer Programs to enhance the safety and protection of fisheries observers at-sea, particularly in situations where they may be in imminent danger but face resistance from the captain in notifying authorities. Observers are equipped with inReach communication devices to contact the National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service/Northeast Fisheries Science Center/Fisheries Monitoring and Research Division (FMRD) during at-sea emergencies such as grounding, fire, loss of vessel mechanical power, taking on water, or other concerns about safety. However, there are instances where an observer may notify FMRD of an emergency while the captain refuses to alert authorities, such as the US Coast Guard (USCG), which can lead to strained relations between the observer and the crew.

This project will explore how FMRD has strengthened its collaboration with law enforcement agencies, including the USCG and the NOAA Office of Law Enforcement (OLE), to ensure the safety of observers while fostering positive relationships onboard. A key component of this effort is the development of an Observer Emergency List, which provides clear guidelines on when FMRD staff should step in and alert authorities in the absence of captain cooperation. The project will review two case studies, one before and one after the implementation of this emergency list, to highlight the benefits and need for detailed communication protocols. By refining the emergency list and communication framework alongside USCG liaisons, FMRD has sought to create a safer, supportive work environment for fisheries observers and ensure swift, efficient responses to emergencies at-sea while minimizing the risk of conflict or tension for the observer and crew onboard.

05-03

Greenlandic observer program.

Jannik Holm

Region Nuuk, Nuuk, Greenland

Abstract

Here I'll present the historical timeline of our scheme and the impact of introducing observers in our domestic fishery.

Furthermore, I'll present the cooperation of the observers and the law enforcement agency in Greenland.

05-04

Defining the observer skillset

Sarah Williamson

Saltwater Inc., Anchorage, USA. Alaska Pacific University, Anchorage, USA

Abstract

Introduction:

Observer data forms the foundation for fisheries management globally. In order to collect these critical fisheries data, observers often work in isolated and high-risk environments, employing a broad skill set with unique resilience. Assisting observers in identifying and defining these skills is an essential aspect of career development. This presentation will provide observers and program staff with an understanding of both the range of skills that compose the observer set and the utilization of specific skills for success and advancement within the observer community.

Methods and Findings:

This presentation will assess each aspect of the observer job and describe specific skills necessary for each duty. This will assist observers by providing a defined organizational structure that allows for visualization of both the unique qualities of each skill as well as the dynamic relationship among skills. Program staff will be able to pull key skills from this presentation to include in briefings/debriefings or to include as part of active feedback, thereby aiding observers in both day-to-day performance and in becoming future leaders in the fisheries workforce.

Conclusion:

Validation and tracking of these skills are beneficial as it increases awareness of progress and provides an accurate assessment of one's capabilities. Briefing and debriefing are key components to these two processes, allowing observers to hone their skills, advance their careers, and be better prepared for field deployment.

05-05

Pacific island regional fisheries observer (pirfo) Debriefing and training.

Siosifa Fukofuka

SPC, Noumea, New-Caledonia

Abstract

Pacific island regional fisheries observer (pirfo) Debriefing and training.

Observer debriefing for Pacific Island country observer programmes was first put in place in 2011.

PIRFO Debriefing is to provide principles of debriefing and guide to the processes and rules for debriefing.

Debriefing provides mechanism to provide data quality assurance; flag data that does not meet the specific quality requirements of data users; quickly report, and action if necessary, "critical incidents" that took place on the trip; give Observers timely direct feedback on how they can improve their data; give Observer Coordinators appraisal on their observers' performance; explore, through questioning, if additional information can be gathered about the trip; judge if the quality of the data has suffered through harassment of the observer and report if special consideration is necessary for future placements on the vessel.

Training of pacific Island fisheries observers to become a PIRFO debriefers is in three components, 1 Part A is an Introduction to debriefing training include debriefing policy, the steps required to successfully gain Debriefer certification, preparation for the debriefing process, identifying and prioritising incidents, critical incidents and infringements, communication skills, verification of data, recognising common errors made by observers, completing Debriefer form and Evaluation form, an understanding of how data is used by compliance and scientific personnel, data management and reporting, 2 on the job training – Part B and the final part C is the final workshop, review of part A and B with final assessment.

A placement meeting between observer and vessel take place prior to departure.

Pre debriefing and face to face full debriefing is recommended under PIRFO debriefing policy and guidelines.

Debriefers will carry out E-debriefing once they have completed training and conducted paper debriefings.

S-06: The Future of at-sea Monitoring

06-01

From Catch to DNA: Unlocking the Potential of Molecular Monitoring in Fisheries

Madeline Green, Alexander Coutts

Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Australia

Abstract

Global wild-capture fisheries are a large and diverse sector requiring a range of tools for fisheries-dependant data collection and effective Monitoring, Control and Surveillance (MCS). Molecular monitoring (MM) is a DNA-based approach that provides species-specific catch records and has applications across various fisheries, fleets and vessels including trawlers, and longliners. By enhancing the accuracy of fisheries-dependent data collection, MM offers new opportunities to improve monitoring of landings and by-catch.

This presentation will explore the development and application of MM protocols in a range of fisheries contexts. Case studies include eDNA sampling methods developed for brine tanks, as well as other protocols adapted for inshore trawlers and longliners operating in the high seas. The application of MM has proven effective in identifying key species, such as tuna (*Thunnus spp.),* snapper (*Lutjanidae*), swordfish (*Xiphias gladius*), marlin (*Kajikia audax*), and providing taxonomically resolved catch records with high accuracy and minimal contamination.

While MM is not universally applicable across all fisheries, it is a valuable addition to the MCS toolbox when used appropriately. This presentation will address practical considerations for deploying & standardising MM across different vessel types, interpreting molecular data, and integrating this tool into existing monitoring frameworks. As the demand for more precise and scalable fisheries monitoring grows, molecular monitoring offers a promising pathway to support informed decision-making and sustainable fisheries management.

06-02

Navigating the winds of change: challenges for observers in novel data collection in offshore wind farms

Wouter Suykerbuyk[1], Yoeri van Es[1], Sophie Neitzel[2]

[1]Wageningen Marine Research, Yerseke, Netherlands. [2]Wageningen Marine Research, IJmuiden, Netherlands

Abstract

In recent years, the Netherlands has led the way in utilizing wind energy from the North Sea, showcasing its commitment to sustainable practices. One key development in this effort is implementing "co-use," which allows for the dual use of offshore wind farms for both energy production and other activities like passive fishing and mariculture. Despite the progress made in understanding passive fishing in wind farms, practical experience remains limited. Questions about the legal framework, safety measures, and environmental impact continue to surface. Current research aims to address these gaps by exploring the practical aspects of passive fishing in wind farms, helping to shape policies that balance ecological, economic, and safety concerns. While these co-use initiatives hold great potential, they also present significant challenges for observers tasked with collecting data in these dynamic environments during these explorative, small-scale, novel experiments with often many stakeholders involved. Communication procedures for research in offshore wind farms are often difficult which can be challenging to observers at sea. Stakeholder involvement adds complexity to this process, as different groups—such as fishers, windfarm owners, coastguard and regulatory bodies—may have conflicting interests, procedures or priorities. Safety on board is another critical concern, especially in the challenging conditions of offshore environments, where weather conditions, limited space between turbines and fishery technical aspects can complicate operations. Unexpected events, such as equipment malfunctions or adverse weather conditions, further complicate data collection efforts. To manage these challenges, flexibility and proactive problem-solving by observers involved is essential. This presentation offers valuable insights into how these recent experiences from the field can inform others and improve future studies and monitoring programs in the field of co-use, offshore wind energy and fisheries research.

06-03

Charting New Waters in a Fisheries Observer Program: Tracking Megafauna from Passenger Decks

Miguel Machete[1,2], Susana Simião[3], Gilberto Carreira[3]

[1]IMAR - Institute of Marine Research, Horta, Portugal. [2]OKEANOS - Institute of Marine Research of the Azores University, Horta, Portugal. [3]Regional Secretariat for Fisheries of the Azores/ Regional Directorate for Maritime affairs, Horta, Portugal

Abstract

The Azores Fisheries Observation Program (POPA) was established by regional ordinance in 1999 as the primary tool for monitoring fisheries in the Azores. Managed by the Institute of Marine Research (IMAR) and funded by the Regional Secretariat for the Sea and Fisheries, the program has accumulated over 20 years of extensive experience in hiring, training, and managing observers, as well as correcting, compiling, and digitizing data. This data encompasses not only fisheries but also associated megafauna, marine litter, and other relevant topics, all managed through extensive databases.

In 2023, the Regional Directorate for Maritime Policies (DRPM) sought to create a program for observing megafauna aboard local traffic vessels in the Azores (POMET) as part of the EU LIFE IP Azores Natura Project. This initiative aimed to address the monitoring needs of coastal and marine megafauna species by structuring a low-cost program based on platforms of opportunity. To achieve this, the DRPM launched a public tender seeking an entity with the capacity, experience, and expertise to design a systematic data collection plan for megafauna (cetaceans, seabirds, and sea turtles) through embarked observers, which also required the hiring, training, and management of those personnel.

In this presentation, we will demonstrate how, despite the scope of this project extending beyond fisheries monitoring, POPA/IMAR identified its expertise as well-suited for the task and successfully won the tender by submitting a comprehensive proposal. We will then explore how, in close collaboration with the Regional Directorate and the company operating passenger transport vessels in the region (Atlânticoline)—primarily in the five islands of the central group—POPA adapted its methodologies for training, operations, and management. These adaptations enabled the program to achieve significant coverage, collecting critical scientific data that exceeded DRPM's initial expectations in both quantity and quality.

06-04

Observers, EM, and fishers: a collaborative approach to collecting species-specific manta and devil ray catch data

Jennifer Stahl[1], Melanie Hutchinson[2], Joshua Tucker[1,3], Forest O'Neill[4], Chelsey Young[1], Emily Crigler[1]

[1]NOAA fisheries, Honolulu, USA. [2]IATTC, San Diego, USA. [3]CIMAR, Honolulu, USA. [4]IBSS, Honolulu, USA

Abstract

Conservation efforts for mobulid rays (manta and devil rays) are hindered by a lack of species-specific interaction data in pelagic longline fisheries including catch rates and post-release survival. To address these data gaps, a multi-pronged approach was implemented within the U.S. Hawai'i-based longline fisheries.

Key components of this project include:

- Genetic Sampling: Genetic samples were collected to determine which species are incidentally captured.
- Species Identification Guide: A field guide was developed to enable accurate species identification of mobula rays in the Pacific Ocean by fishers, observers, and researchers.
- Satellite Tagging: Mobulid rays were tagged to assess their post-release survival rates.
- Electronic Monitoring (EM): EM video footage was analyzed to determine its utility for identifying mobulid species, documenting handling and release practices, and collecting data relevant to survival (e.g., at-vessel condition, hook location, amount of fishing gear at release).

Results:

- Genetic sampling and analyses, combined with observations from EM systems, fishers, and observers, have confirmed the presence of five mobulid ray species interacting with the Hawai'i-based longline fisheries.
- To date, 11 individuals representing four of these species have been successfully tagged with satellite tags, demonstrating high post-release survival rates when best handling and release practices are used.
- Insights gained from analyzing EM footage, particularly regarding species identification using the field guide, have been directly transferred to train observers on species-level identification and the collection of more comprehensive interaction data.

Conclusions:

This collaborative project emphasizes the crucial role of partnerships in addressing complex conservation challenges. By effectively combining the expertise of fishers, scientists, and managers, we can significantly enhance our understanding of mobulid ray interactions with fisheries and develop robust conservation strategies for these vulnerable species.

06-05

Can REM replace observers on board fishing Vessels?

Njáll Ragnarsson

Directorate of Fisheries, Vestmannaeyjar, Iceland

Abstract

Introduction

Observer programs are not without their flaws. Observers are costly, their safety can be a concern and consistency, and objectivity can be questioned regardless of prior training and experience. At the same time, Remote Electronic Monitoring (REM) is evolving at a phenomenal pace. So, the question raised is whether REM can replace human observers and if so, to what extent.

Methods

My presentation will be divided into three categories.

Does the role of observers in fisheries and other monitoring programs vary significantly based on the program, country or continent they are working within? Although some RFMO's agree on the importance of observers, not all parties agree on what their role is.

Secondly, I will show real data on what can be called the observer effect. Namely, how behavior can change on board fishing vessels, both catch composition and sizes, when an observer is on board.

Thirdly, I will try to focus on new technologies when it comes to REM, and if those technologies are able to sufficiently do what an observer would otherwise do if he was on board the vessel.

Results, findings and conclusions

Data, collected by the Directorate of Fisheries, indicates that observer presence on board vessels does affect behaviour. Data on catch size indicates significant high grading as well as discards of less valuable species.

REM, even evolving at a significant pace, does have its advantages on monitoring compliance, it still lacks the human touch and, for now, there are tasks carried out by human observers that cannot be fully replaced by REM, i.e. species analysis and providing various information to the crew and compliance authorities.

REM might, for now, work as an assistant to observers and control agencies rather than fully replacing them, depending on what observers are tasked with by the observer program.

06-06

Enhancing Maritime Surveillance: The Role of Drones in Monitoring Illegal Discard at Sea

Sævar Guðmundsson

Fiskistofa, Directorate of Fisheries, Akureyri, Iceland

Abstract

Illegal discard practices at sea pose a significant threat to marine ecosystems and sustainable fisheries management. Traditional surveillance methods often fall short of monitoring and mitigating these activities effectively due to their limited coverage and high operational costs. Drone technology can support maritime surveillance and address the challenges associated with illegal fisheries and discarding them.)

The Icelandic project highlights the key advantages of using drones, including their high-resolution imagery, extended flight durations, and the capability to integrate with existing surveillance systems.

Through case studies and empirical data, the Directorate of Fisheries can demonstrate how drones have successfully identified and documented illegal discard incidents, leading to increased enforcement actions and compliance with Icelandic regulations.

In conclusion, adopting drone technology for maritime surveillance is a significant advancement in combating illegal discard at sea. By providing a comprehensive overview of the use of drones and the data collected, the DOF could inform policymakers, maritime authorities, and stakeholders about the critical role of drones in ensuring the sustainability of marine resources.

S-07: Industry Engagement with at-sea Monitoring

07-01

The Norwegian Reference Fleet – an alternative to Observer programs and EM for monitoring and biological sampling of commercial fisheries.

Tom Williams, Sofie Gundersen, Runar Smestad

Institute of Marine Research, Bergen, Norway

Abstract

The Norwegian Reference Fleet is a group of active fishing vessels, selected as an approximate stratified random sample of vessels from the Norwegian fishing fleet, and tasked with providing information about catches and general fishing activity to the Institute of Marine Research (IMR) (Clegg, Williams 2020). The fleet consists of both offshore and coastal vessels that cover most of Norwegian waters. The Offshore Reference Fleet began in 2000 and was expanded to include coastal vessels in 2005. The four main goals of the Norwegian Reference Fleet are to: 1. Support stock assessments with biological data; 2. Document the fishing effort and catch composition of total catches, including bycatch, discards and catches of non-commercial species, seabirds and sea mammals; 3. Provide a platform for the collection of additional samples from fisheries. 4. Increase collaboration and strengthen dialogue between researchers and the fishing industry. Fisheries data is collected by the crew members themselves, an approach commonly known as self-sampling of catches. Crew members are trained by IMR staff in scientific sampling procedures and the fishing vessels are equipped with instrumentation and software for data collection that was developed by IMR for using both by the Reference Fleet and on the IMRs own research vessels. In this presentation we give an overview of the structure of the Reference Fleet, the equipment used, and a summary of the experiences and lessons learned so far.

References

Clegg T, Williams T (2020) Monitoring bycatches in Norwegian fisheries—species registered by the Norwegian Reference Fleet 2015–2018. Report 2020-8. Institute of Marine Research, Bergen, Norway

07-02

Fishing for science – science for fishing. How *At-Sea Self Sampling Program* helps the at sea sampling program in Ireland.

Macdara Ó Cuaig

Marine Institute, Galway, Ireland

Abstract

When Covid-19 struck many nations suspended their sampling at sea observer programs in the interest of health and safety. In Ireland to mitigate for this suspension the Irish fleet in co-operation with the Marine Institute developed the *At-Sea Self Sampling Program*. With the *At-Sea Self Sampling Program* fishers collect data and samples from a subset of fishing operations in accordance with robust sampling protocol. Skippers and crew are trained in advance and quality control is provided in real time via WhatsApp messaging. Data and samples are collected at fishing trip end for further investigation and analysis. Post Covid-19 the *At-Sea Self Sampling Program* complements the traditional sampling at sea observer program and increases participation in the at sea data collection from the Irish fleet. Data from the deck in Ireland is now collected via the dual stream approach of Self Sampling and Observer at sea sampling. Here we present the mechanics of the *At-Sea Self Sampling Program* and the lesson learned from the process.

07-03

The South African Hake Trawl Fishery's engagement with at-sea monitoring

Willem Louw, Melanie Williamson

CapMarine, Cape Town, South Africa

Abstract

The South African Hake Trawl Fishery participates in at-sea monitoring through the following initiatives.

1) The *self-monitoring program* was initiated to monitor the interactions with Vulnerable Marine Ecosystem (VME) and Endangered, Threatened, or Protected (ETP) species as well as other bycatch Species of Concern. Through extensive collaboration with industry stakeholders, fishers, and regulators, CapMarine developed Move-On Rules for VMEs, trigger thresholds for ETP species, Standard Operating Procedures (SOPs) for data collection, reporting templates, and a comprehensive data management framework. The program is supported by regular on-site training, educational resources such as posters and stickers, awareness videos, and a detailed Safe Handling and Release guidebook.

2) The *annual observer-vessel deployment plan* was designed to increase the observer coverage across all the vessels in the hake trawl fleet. It also improved the logistical coordination among observers, service providers, and crew/vessel managers. This initiative improves the effectiveness of the observer sampling strategies for each vessel type or category while also supporting the proper implementation of self-monitoring SOPs and safe handling and release protocols. Spatial and temporal stratification further improves the representativity of catch and effort data. It also allows for ongoing communication and the interpretation and application of new measures or strategies at the vessel level by CapMarine observers, ensuring alignment with the requirements of Marine Stewardship Council (MSC).

In conclusion, the success of these initiatives highlights the value of collaboration between the regulators, fishing industry and monitoring programs.

07-04

Marching as one: Engaging Industry in the collection of robust data to inform assessment of South Australian Fisheries

Graham Hooper, Chris Presser

South Australian Research and Development Institute, Adelaide, Australia

Abstract

Establishing trust between fishery scientists and commercial fishing sectors is vital in achieving and maintaining sustainable fisheries over a long period of time. In South Australia, collection, and analysis of both fishery independent and dependent data underpin stock assessment of a diverse range of commercial fisheries, including finfish, crustaceans, and molluscs. The South Australian Research and Development Institute (SARDI) plays a key role in developing and undertaking these long-term monitoring programs for the purposes of establishing harvest strategies with predefined biological indicators that are linked to a nationally agreed framework for determining and enabling setting of Total allowable commercial Catches (TACC) at sustainable levels. In some cases, an additional outcome is providing evidence for Marine Stewardship Council certifications. Each season in collaboration with industry, SARDI observers collect robust and reliable data across South Australia's marine and gulf waters. As scientists and independent observers, marching as one involves communication, cooperation, connection, and preparation through engagement of our local seafood and fishing industry, in some cases spanning more than 30 years of collaboration. To achieve effective engagement, we implement a variety of approaches across diverse fishery types which are detailed in the following case studies : i) fishery co-management in the western king prawn fishery, ii) sub-program level planning in the southern rock lobster fishery, iii) individual sampling trips in the blue swimmer crab fishery, iv) working with traditional landowners in the goolwa pipi fishery, v) collaborative fish market/auction sampling in the marine scale fish fishery and vi) undertaking emergency responses in the abalone fishery. Continued industry engagement over long periods facilitates improved data collection techniques, integration of new technologies, management of conflict of interests, integration of women into historically male dominated fisheries, and importantly, maintains observer independence whilst liaising with industry to preserve close working relationships with key stakeholders.

07-05

Reducing Green Sturgeon Bycatch in the California Halibut Trawl Fishery: A collaborative project with observers and the trawl fishing industry

Jason Vestre

Pacific States Marine Fisheries Commission, Morro Bay, USA

Abstract

Green sturgeon (Acipsenser medirostris) is a long-lived, slowly maturing species that is encountered as bycatch on the West Coast of North America in the California halibut trawl fishery. The Southern Distinct Population Segment of Green sturgeon was listed as threatened under the U.S. Endangered Species Act in 2006, prompting efforts to monitor more closely for, and to protect them from, the potentially negative impacts of commercial fishing encounters.

NOAA Scientists, CA Fish and Wildlife, CA halibut trawl fishermen, and the West Coast Groundfish Observer Program (WCGOP) have collaborated to better understand the impacts of green sturgeon bycatch. This was done through multi-year studies focused on genetic analysis, recapture rates, and post-release mortality estimates, as well as an underwater trawl net video study to characterize behavior of green sturgeon in response to trawl net encounters. Observers and fishermen worked side by side, in addition to their normal duties, to complete the onboard components of these studies including bio sample collection, placing pit tags, attaching satellite tags, and camera placement/retrieval on the trawl nets. Current efforts include a detailed trawl fleet gear characterization, gear modification, and further behavioral studies.

In this presentation, I will relay the results of the studies and discuss how the conclusions guide current and future efforts. Additionally, I will highlight the crucial role that observers have played, both as field biologists and as liaisons to industry. Additionally, I will detail how their training, expertise, and program support have effectively engaged the industry in this important work. Current and future collaboration will continue to build on these efforts and bring new insights to move the project closer to its goal.

S-08: Mental Health of Observers and Observer Safety and Readiness

08-01

The vulnerability of observers - An evaluation of observer programs welfare and working conditions

Marcelo Hidalgo[1], Bianca Haas[2], Peter Trott[3]

[1]Seafoodmatter, Utrecht, Netherlands. [2]Australian National Centre for Ocean Resources and Security, University of Wollongong Innovation Campus, North Wollongong, Australia. [3]Fishlistic, Hobart, Australia

Abstract

Human rights issues on fishing vessels are increasingly receiving much-needed global attention. However, most focus is directed towards the fishing crew, often ignoring other important workers on board fishing vessels, namely, observers. Due to their specific role as the “eyes and ears” on the water, observers are not covered by any current binding international regulations concerning working standards on board fishing vessels. This leaves them relatively unprotected, besides flag state control. One way flag states address observer welfare and working conditions is through observer programmes. This presentation aims to share assessment results of whether observer programmes fulfil their responsibilities to protect the health, safety, and welfare of observers and their living conditions while onboard fishing vessels. This analysis was done by developing a specific observer benchmark tool for reviewing observer programmes. The results of this research found that, on average, assessed observer programmes demonstrate good performance. Based on the results, four recommendations are provided, including the need to conduct independent reviews of observer programmes. Generally, more research is needed to get a better understanding of geographical hot-spots and observer experiences. Fisheries observers are key to ensuring sustainable fisheries management, and it is imperative that their right to a safe work environment is assured.

08-02

Taking control of the situation: Incorporating sexual assault/sexual harassment strategic resistance training into fisheries observer training programs

Catherine Benedict

NOAA Fisheries, Northwest Fisheries Science Center, Newport, USA

Abstract

Life at sea has a reputation for danger, be it foul weather, gear malfunctions, or otherwise. As a result, observer safety and preparedness is often considered one of the most important components of any observer training program. While typically focused on drills, maydays, and sea survival training, preparation for sexual assault/sexual harassment (SASH) incidents is often under-emphasized in its importance pertaining to observer safety and preparedness. However, fisheries observers are classified as a group at high-risk for experiencing SASH incidents while onboard fishing vessels.

The West Coast Groundfish Observer Program (WCGOP), under the guidance of the National Oceanic and Atmospheric Administration's Workplace Violence Prevention and Response (WVPR) Program, has introduced a new module for observer training courses called the SASH Strategic Resistance Training. This material, developed by Soteria Solutions, creates an essential toolkit of skills for observers to equip during uncomfortable or dangerous interpersonal situations.

In this talk, we will cover the development of the Strategic Resistance Training module, its basic content topics, and the WCGOP's implementation strategy for conveying this material to trainee observers. Additionally, we will discuss the reported benefits of implementing the new material as well as review anecdotal evidence regarding the impact this training has had on WCGOP observers. We also aim to express the limitations WCGOP staff have encountered while taking on this material in the classroom, and discuss ways to overcome these limitations in the future.

08-03

LGBT+ Observers; Navigating a Difficult Industry

Martin Beach

Frank Orth and Associates, Long Beach, USA. West Coast Region Observer Program (WCROP), San Diego, USA

Abstract

Introduction & Background

Fishing industries tend towards traditionally masculine and conservative cultures. For LGBT+ observers, being placed onto boats can leave them particularly vulnerable to harassment. While observer programs have policies to respond to violent, aggressive, or otherwise threatening incidents, more subtle forms of workplace bias are often unreported and can lead to discomfort and anxiety. I will use accounts from LGBT+ observers to identify the ways that observers are affected by homophobia and transphobia on fishing boats.

Methods

I will be gathering qualitative survey data from observers to determine the extent to which marginalized gender and sexual identity impacts observers out at sea. I aim to determine whether these experiences are prevalent among LGBT+ observers, the nature of the incidents, and how observers alter their behavior in response. I will reach out to observers through online groups and social media platforms asking about their experiences. Along with a description of the experience, I will also collect information such as the observer's program, the number of observers on board with them, how many years they have been in the program, and whether or not they reported the incident.

Results & Findings

The dearth of prior research on this topic makes it difficult to predict what we will learn from observer responses. I hope my findings will help establish a baseline for future understanding of this issue.

Conclusion

Collecting observer accounts is the first step in addressing homophobia and transphobia experienced by observers aboard vessels. By understanding the nature and prevalence of such incidents, programs can work to ensure observers' physical and mental health. In addition, knowing how observers react to such incidents can improve the ability of programs to create safe and effective reporting spaces.

08-04

Coping mechanisms for observers to utilize and reduce the adverse effects isolation has on fisheries observers

Meghan Miller

Southeast Fisheries Observer Program, Galveston, USA

Abstract

Working as a fisheries observer presents many challenges while being offshore. Feelings of isolation and loneliness due to language barriers, a sense of being a burden on deck, lack of common interests with fishing crews, and limited connections to the outside world can have both temporary and lasting mental health impacts on observers. Offshore life can be stressful due to many factors including harsh weather, crew dynamics, operational challenges, and personal pressure to succeed as a fisheries observer. Research on relocation studies have shown that reducing or cutting off social ties significantly increases mental health concerns. For fisheries observers, working offshore often limits social interaction, both physical and technological due to the isolating nature of this career. Coordinators and fisheries programs play a crucial role in addressing these challenges by identifying and implementing strategies to mitigate their impact. Creating self-care strategies prior to deploying observers can help mediate these feelings of seclusion. Engaging and challenging oneself in activities such as mind stimulations, physical activity, utilizing equipment, such as InReach Garmin Devices, can help stay connected to family and friends, and following and maintaining a routine are all self-care strategies that can help reduce mental health concerns while offshore. Methods include distributing a survey throughout each fisheries observer program to previous and present observers. Results indicate which methods are most effective at combating these challenges. In this research, we aim to guide fisheries coordinators different teaching and mentoring strategies for present and future observers to help manage mental health challenges during offshore deployments. Providing guidance, communication, and positive reinforcement can help lessen mental health, alleviate obstacles and foster a more supportive environment for fisheries observers.

08-05

How to advocate for observer interests as an observer? Understanding mental health and other hardships from an observer's perspective

Nicole Santoyo

Alaskan Observers, Inc., Seattle, WA, USA

Abstract

The observers of the North Pacific Observer Program (NPOP) encounter physically and mentally stressful conditions at sea such as cold, injury risk, social isolation, and exhaustion. After a 90-day deployment, when the program surveys observers about health and safety concerns as well as suggestions, ideas may be forgotten and momentum lost. Observers readily provide information about their experiences, but often asynchronously from recognizing a solution they would like implemented, or before realizing the significance of an earlier event.

When opportunities for observer input often arise while we are at sea or off-contract in other locations (and thus, away from administrative offices), how do we best advocate for ourselves? Community building allows observers to network and build solidarity that enhances their impact in scenarios where advocacy is important. Social media and group chats, for example, help keep observers connected and require little energy to maintain, facilitating organization and sharing of ideas.

Currently, observers with my company are undergoing union negotiations to update the current Collective Bargaining Agreement, but ongoing advocacy and community building are continually necessary. To gather information about desired benefits and compensation for our work, as well as mental health hardships underscoring our needs, I conducted a short survey and sought personal correspondence with fellow North Pacific observers.

This presentation will summarize my preliminary use of survey data to understand my coworkers' needs from our employer, especially regarding mental health support. Surveyed observers reported isolation and stressful social situations at sea, and use of land time to attend to their mental health. Contract demands were also summarized to provide example demands for observers to consider when reaching out to our union representative to suggest contract changes. Additionally, I will characterize online observer-to-observer outreach within the NPOP, and the need for support and acknowledgement of observer networking and advocacy.

08-06

The lone ranger – life as an observer in the wild Westfjords

Hakon Dagur Gudjonsson

Fiskistofa, Isafjordur, Iceland

Abstract

It has long been the consensus among observers in the Directorate of Fisheries (DoF) that fisheries surveillance in Iceland is lacking means to serve its purpose properly. One example of that is that in the Westfjords of Iceland there is only one inspector who serves the area on a regular basis. With some of the richest fishing grounds in the world in its backyard, the stakes are high. The Westfjords has 13 ports, hundreds of vessels, thousands of tons and millions of dollars landed yearly.

Armed with a Volkswagen, a drone and good intentions, I do my best to do my job properly, but it isn't always easy. In 2 years of working for Fiskistofa (DoF) I have already encountered numerous challenges in my daily job. From huge accidental releases of salmon to gun wielding fishermen, the job produces new challenges every day. In a small community where everyone knows everyone, it's not always black and white.

In this presentation I hope to give you some insight into my life as an observer in the Westfjords both out at sea and on land. The Westfjords is a region known for two things, fishing and fjords.

08-07|P-52|

Supporting open communication and observer safety

Braven Ledgerwood

AIS, Seattle, USA

Abstract

Knowledge of vessel and crew history is crucial for observers to make informed decisions and to be advocates for themselves, especially in the North Pacific Observer Program (NPOP) Partial Coverage Category where observers are assigned numerous vessels over a single deployment. Thankfully, protocols are in place to support a working knowledge of vessels of concern (VOCs), which affords observers the right to know previous observer's experiences. These protocols rely heavily on open communication between observers, providers, and NOAA Fisheries. Since it is only known what observers report, it is crucial that observers are supported and understand all resources available to them.

Currently, NPOP Partial Coverage Category observers are informed by their providers of VOCs prior to boarding. These concerns range from observer reported issues of ill-compliance to hostile work environments including harassment. With this prior knowledge, observers can prepare accordingly knowing they may need to be more observant to particular fishing practices or crew behavior. Observers are encouraged to document and report any situations to NOAA Enforcement and their providers, whoever they are most comfortable reporting to. With this information potential consequences for violations can be determined and more importantly steps can be taken to mitigate any current risk to observer safety. These situations may include simple double checking of wheel watch or arrangements being made so that an observer may not have to stay onboard a vessel overnight when only one crew member is present.

With observation of vessels under investigation still being required and crews being ever changing, observer reporting is imperative to provide the most current information possible. Knowledge is power, and when observers know reports do not go unheard and that resources are always available for them, an environment of open communication is bolstered.

S-09: Implementing and Managing EM Programs

09-01

Supporting global EM uptake via the Global Electronic Monitoring Accelerator

Alvaro Teran

The Nature Conservancy, San Jose, Costa Rica

Abstract

Over the past decade, The Nature Conservancy (TNC) has supported electronic monitoring (EM) pilot projects in over 18 geographies, advanced innovative technological solutions, contributed to the adoption of the first Regional Fisheries Management Organization (RFMO) EM standards, as well as secured 100% monitoring commitments from seven countries, two global retailers, and the world's largest tuna supplier.

During this time, TNC has developed the expertise, tools, and strategic approaches necessary for creating durable EM programs. However, we recognize that enabling conditions and local situations are different for each country and/or project. That's why we are focused harnessing our lessons learned to support broader knowledge sharing that can improve and streamline global EM uptake EM.

To do this, TNC is launching the Global Electronic Monitoring Accelerator (GEMA), aiming to support fishery managers, industry players and governments with EM program design processes that can best meet science, compliance, and commercial needs. GEMA will equip stakeholders with advisory services, implementation products, and innovative technological solutions. Our goal is to scale EM globally by providing stakeholders with the technical assistance that they need to enable 100% EM coverage across industrial fishing vessels.

During our presentation, we will discuss the main EM implementation challenges that government and industry partners face and we will discuss how the tools and approaches housed under GEMA can best support these stakeholders. Specifically, we will focus on GEMA's four main tools/approaches for advancing EM programs: a) Technical/Operational; b) Financial; c) Scientific; and d) Markets. To help share our vision and story, we will review past case studies, including our work with Chile, to highlight how these tools and approaches can lead to feasible and effective country and industry-wide EM implementation.

09-02

Electronic monitoring success in the indian ocean tuna fishing fleet

Carolina Cavero

Satlink S.L, Madrid, Spain

Abstract

For the implementation of an Electronic Monitoring (EM) program in fisheries, it is necessary to involve from the outset all the multiple stakeholders at various levels, creating a complex environment that requires a well-structured organization, regulatory frameworks, procedures and data management strategies. Each phase of an EM project, from data collection to analysis, requires clear protocols to ensure efficiency, security and compliance.

As an EM leader provider with over a decade of experience on the electronic monitoring sector, Satlink showcases the collaboration for the implementation of an EM government-led program in the Indian Ocean. This initiative commenced at 2018 with NGO funding, government involvement, and collaboration with the technology partner. It began as a pilot project and had since evolved into a fully government-managed program. With ongoing support from the technology partner, it is now embedded within the country's regulatory framework.

Proper implementations require defining the program's coverage level, monitoring objectives, training for government officials, vessel owners, logistics and manufacture capacities, and local presence to ensure the effective adoption and operation of the EM systems.

For data management and confidentiality, it is crucial to establish a robust data management structure at the software level, ensure local data storage, and provide training for government personnel in data management and security to audit the data obtained from the electronic observer, always with the support of the technology company.

Although this program was initially launched with the purse seine fleet, it was later implemented in other fishing methods once the model and management framework were established. Now, advancements in technology and transmission methods are driving a significant transformation in the program.

09-03

Electronic Monitoring in the Chilean Industrial Purse Seine Fleet: Advances and Challenges

Javiera Fuentevilla[1], Raúl Saa[1], Luis Cocas[2]

[1]Servicio Nacional de Pesca y Acuicultura, Valparaíso, Chile. [2]Subsecretaría de Pesca y Acuicultura, Valparaíso, Chile

Abstract

Electronic monitoring through Image Recording Devices (DRI) has been a key tool for enforcing fisheries regulations in Chile's industrial fleet. This study analyzes 92 fishing sets conducted in 2023 by purse seine vessels operating in regions XV, I, and II, with the objective of assessing marine mammal and sea turtle bycatch, as well as compliance with fisheries regulations.

The results indicate that the implementation of DRI has led to improvements in the reporting of bycatch in the Electronic Fishing Logbook (BEP). Specifically, an increase in recorded interactions with South American sea lions (*Otaria flavescens*) and loggerhead turtles (*Caretta caretta*) was observed, along with greater adherence to the bycatch mitigation protocols implemented in 2022. However, the comparison between BEP and DRI records suggests that event reporting remains lower than the actual bycatch observed in the video footage.

Despite these advances, technical challenges were identified, such as camera placement on board, the presence of blind spots, and variable image quality, which may limit the detection of bycatch as well as the proper documentation of other non-target species. Additionally, the need to strengthen human and technological resources was highlighted to expedite video analysis and improve the effectiveness of the current monitoring system.

This study underscores the importance of electronic monitoring in fisheries management and highlights opportunities to optimize its implementation, promoting more efficient enforcement and compliance with environmental regulations in the northern Chilean purse seine fishery.

09-04

Using EM data in stock assessment

Kirsten Håkansson, Marie Storr-Paulsen

DTU Aqua, Lyngby, Denmark

Abstract

The Danish bottom trawl fishery in Kattegat is one of the most important fisheries in the inner Danish waters. These days the fishery mainly targets Norway lobster with by-catches of fish.

Since 2021 the Danish Agricultural and Fisheries Agency has monitored the fishery with EM, including camera. All trips are monitored, a fraction of the trips per vessel are randomly selected for review and others are selected based on a risk assessment. During the review all specimens of Atlantic cod, Haddock, Hake, Saithe and Sole have been annotated with length measurements. Further, it has been noted if the specimens are landed or discarded. The number of reviewed vessels has increased from 11 to 71 since 2021.

In parallel, Denmark has maintained scientific sampling programs covering the same fishery. A) An at-sea observer program collecting data for estimating the amount of discard and below minimum size landings (BMS), and associated biology, and B) an on-shore program collecting biological samples for the landings.

The Danish commercial figures used for input to ICES stock assessment are based on the amounts reported in sale slips and landing declaration or estimated by the means of the scientific sampling programs. Here we explore the feasibility of using the data from the EM program in the stock assessment of Atlantic cod in Kattegat, where the majority of the Danish landings in 2023 and 2024 were taken by the EM fleet. The analysis includes 1) compare and evaluate the data source for discard and below minimum landing size (BMS), 2) compare and evaluate the source for length and age distributions from the two different sources, and 3) We will touch upon the minimum data requirements for utilizing EM data from a control agency in stock assessments

09-05

Stakeholder perceptions of remote electronic monitoring in Norwegian fisheries

Maël Manuel Bueno, Kåre Nolde Nielsen

Norwegian College of Fishery Sciecne, UiT The Arctic University of Norway, Tromsø, Norway

Abstract

Recent advances in sensor technology, robotics, and machine learning are expected to support efforts towards achieving sustainable fisheries. Specifically, Remote Electronic Monitoring (REM) technologies have the potential to considerably enhance the accuracy, cost-efficiency, and coverage of fisheries monitoring, thereby improving simultaneously data collection and analysis, as well as the overall regulatory framework. As a result, REM is making waves in fisheries governance. The Norwegian Fisheries Directorate has notably endorsed this new approach as a key element in combating illegal, unreported, and unregulated fishing. However, the prospect of introducing REM also raises ethical concerns, with fishers being vocal over possible privacy violations, data manipulation, and mission creep. Considering the significance of trust in governance structures and acceptance of regulatory tools for the effectiveness of fisheries management systems, addressing the dilemma between REM as a justifiable versus intrusive sustainability strategy is key. Such dimension has yet to receive adequate research or policy consideration. This paper is part of a PhD project that focuses on the ethical aspects of introducing REM from the perspectives of different stakeholders and with a foundation in ethical and governmentality theories. The paper presents a case study of the forthcoming deployment of REM in Norwegian fisheries. The following research questions are discussed: How do different fisheries stakeholders view this prospect? What are the ethical and governance challenges posed by REM approaches? How can they be alleviated? Data is collected through document analysis and semi-structured interviews with stakeholders involved in small-scale and industrial, pelagic and demersal fisheries in Norway. The collected data is analyzed with NVivo 15, using a combination of deductive and inductive coding strategies. The paper serves as a model for assessing the ethical impacts of sustainability surveillance technologies. It provides a framework that could be adapted to other resource management frameworks where such adoption is anticipated.

S-10: AI applications in Electronic Monitoring

10-01

Advancing Fisheries Monitoring through Open AI Image Libraries: A Collaborative Approach to Groundfish Assessment

Joshua Wiersma, Jeff Douglas

Integrated Monitoring Inc., Boston, USA

Abstract

Integrated Monitoring, in collaboration with NOAA, UMass, and AIS, is leading a transformative effort to develop an open AI image library tailored for groundfish in New England waters. This groundbreaking initiative integrates high-quality imagery from commercial fishing vessels with NOAA's Bigelow research vessel, overcoming significant government confidentiality barriers and enabling innovative data-sharing agreements. By combining diverse datasets, this project delivers a novel foundation for training AI models capable of addressing real-world monitoring challenges.

The open AI library offers unprecedented opportunities for scalability and transferability, with applications extending to other Atlantic groundfish stocks, including fisheries in Iceland, the UK, and the EU. The inclusion of both commercial and research imagery ensures algorithm robustness, enabling accurate species identification, bycatch assessment, and compliance monitoring across varying operational contexts. Integrated Monitoring's collaboration with UMass has further refined AI algorithms, ensuring their applicability across diverse fisheries.

Key advancements include the integration of these algorithms into the Monitor platform, where AI-generated results are displayed alongside human annotations. This feature enables real-time feedback loops that continuously improve AI accuracy and streamline workflows. Integrated Monitoring's cutting-edge onboard systems, powered by edge computing (NUVO-715 with Hailo-8 processor), mark critical events, allowing reviewers to focus on priority data and reducing the overall cost and time of monitoring.

This presentation will highlight the technical and operational breakthroughs achieved through this collaborative effort, the challenges of overcoming regulatory data-sharing barriers, and the transformative potential of combining commercial and research datasets. By creating an open resource for stakeholders, this initiative promotes sustainable fisheries management, reduces monitoring costs, and enhances data transparency across the industry.

10-02

Applying machine learning to automate the analysis of EM video footage to quantify catches in a highly mixed European demersal trawl fishery

Tom Catchpole[1], Becca Lamb[1], Michal Mackiewicz[2], Brian Cowan[3], Hang Zhou[2], Mark Fisher[2], Mads Dueholm[3]

[1]Cefas, Lowestoft, United Kingdom. [2]University of East Anglia, Norwich, United Kingdom. [3]Anchor Lab, Copenhagen, Denmark

Abstract

Remote Electronic Monitoring (REM/EM) refers to a suite of technologies installed on fishing vessels to collect data on fishing activities. These systems typically record vessel position, speed, gear usage, and video footage. Once processed, this data provides insights into location, fish species and quantities caught, and fishing methods used. Traditionally, human analysts interpret this information, but as EM adoption grows, the available human analytical resource will constrain our ability to maximise the use of EM data.

Artificial Intelligence (AI), particularly machine learning, offers a cost-effective solution to automate EM data processing, unlocking its full potential. AI can enhance scientific monitoring of environmental impacts (e.g., on sensitive species), improve compliance and enforcement, and strengthen seafood traceability.

Presented here are the advancements in automating EM video analysis for fish catch and discard quantification in UK mixed demersal trawl fisheries, achieved through two EU-funded projects: **SMARTFISH (H2020)** and **EveryFish (HEU)**. We detail progress in creating training datasets, applying segmentation tools, tracking fish movement, and improving fish detection and classification algorithms.

Key challenges remain, including image quality, high fish densities, occlusion, visually similar species, rare species detection, and ensuring model accuracy and data reliability. Addressing these issues is essential to maximizing AI's role in EM systems.

10-03

The CatchID-Program

Ole Høstmark, Bjarne Schultz, Pia Jonsson

The Norwegian Directorate of Fisheries, Bergen, Norway

Abstract

The CatchID-Program, launched by the Norwegian Directorate of Fisheries in 2021, aims to support the development of new technological solutions, to address the current and future documentation needs for of the fishing industry. The program was initiated as a response to the identified challenges related to the self-reporting of catches by the industry, which allows room to maneuver to circumvent the current regulations and poses difficulties for authorities in combating illegal, unreported and unregulated (IUU) fishing. Additionally, increased expectations from consumers, markets and other counties' authorities necessitate improved documentation of the legality and sustainability of fishing activities.

As a response, the CatchID-Program aims to develop and introduce new technological solutions on board fishing vessels, where the technology represents an independent third party. The approach can be described as a compliance by design architecture, which represent an end-to end process in which information is collected from the source system and distributed to the relevant public agencies. Successful implementation of this program will lead to enhanced confidence in stock management, accurate deduction of quotas, and improved transparency across the value chain. Consequently, it will foster increased trust among industry stakeholders, managers, scientists and the society as a whole.

Four years in, the program is involved in several innovative projects, primarily focusing on the use of AI and computer vision to enhance the documentation of the resources harvested from the ocean, on board the fishing vessels, both nationally and internationally.

10-04

Automatic target tuna catch estimation in tropical purse seiners

Xabier Lekunberri[1,2], Ahmad Kamal[1], Jaime Valls Miro[1,3], Jon Ruiz[1], Iñaki Quincoces[1]

[1]AZTI, Sukarrieta, Spain. [2]University of the Basque Country (UPV/EHU), San Sebastián, Spain.
[3]IKERBASQUE, Basque Foundation for Science, Bilbao, Spain

Abstract

Purse seiners play an essential role in global tuna fishing, as approximately 66% of the world's tropical tuna is fished using this gear. In addition to traditional observers, all tuna Regional Fisheries Management Organizations (RFMOs) have established minimum standards for the use of Electronic Monitoring (EM) in fisheries monitoring. EM was developed as a potential complement to onboard observers, as it improves data collection efficiency and traceability. However, EM still proposes challenges such as the time required to review all the data. In this context, we are developing a pipeline that significantly reduces the workload of EM analysts. This pipeline utilizes video captured by the EM system in two locations, the brailer and the fishing deck, and several computer vision models. This configuration permits the estimation of both the total weight and the species composition of the catches with minimal human interaction. The total weight is estimated using the depth information from the brailer captured by a 3D camera. This depth information is used to calculate the volume of the brailer and its fullness during each fishing operation. The target tuna species composition is estimated using standard 2D footage from the wells deck. Here, the fishes are recorded on a conveyor belt before storing them into wells. In this talk, we will also highlight several key points identified during the development of the pipeline. Some of these issues should be considered while collecting data aboard the ship, such as having appropriate lighting on the fishing deck or dedicated camera hardware. Other points apply to the development of AI models, such as custom datasets or specific model architecture. While the pipeline's initial development was focused on tropical purse seiners, some minor modifications have been successfully tested to use it in other fisheries.

10-05

Optimization of electronic monitoring data analysis through machine learning and artificial intelligence tools

Gonzalo Legorburu, Asier Ruiz

Digital Observer Services, Bilbao, Spain

Abstract

Electronic Monitoring (EM) technology has been widely adopted by industrial fisheries as a practical solution for monitoring fishing activities, with the aim of estimating fishing effort, target catches, and incidental species captures. However, the high recurring costs associated with EM data analysis have often limited its broader implementation. Accurately quantifying sets, catches, and bycatch has long posed a challenge for EM, requiring labor-intensive analysis per unit effort, which significantly increases operational costs.

This study assesses the effectiveness of various Machine Learning (ML) and Artificial Intelligence (AI) tools in reducing EM data analysis time. Utilizing an extensive dataset from 1,464 purse seine tuna fishing trips and 1,215 pelagic longline fishing trips conducted between 2014 and 2023 across multiple EM projects in the Atlantic, Indian, and Pacific Oceans, it's demonstrated a 78% time reduction in tuna purse seine fisheries, from 210 minutes per fishing day in 2015 to 47 minutes in 2023, and a 77% in longline fisheries, going from 243 minutes per fishing day in 2015 to 56 minutes in 2023.

Performance improvements per unit effort are analyzed in relation to the detection of key fishing events, including set deployments, catches, and discards. These advancements greatly enhance the ability of EM systems to identify and classify fishing activities, enabling broader coverage at a lower cost. As a result, cutting-edge EM technologies support the expansion of fisheries observer programs, leading to statistically more robust datasets that contribute to improved fisheries management. Additionally, the recent integration of edge and cloud computing facilitates real-time monitoring solutions, effectively bridging the time gap between at-sea events and final reporting.

Our findings highlight the growing potential of EM for both compliance and scientific applications, providing more representative data and fostering the adoption of management measures that are better aligned with real-world fishing dynamics.

10-06

Essential requirements for adopting AI technological solutions in the western and central Pacific.

Vivian Fernandes[1], Malo Hosken[2], Leontine Baje[2], Timothy Park[2]

[1]Independent Consultant, Sydney, Australia. [2]Pacific Comunity, Noumea, New-Caledonia

Abstract

Trials of electronic monitoring (EM) in Pacific Island countries and territories (PICTs) have progressed at varying levels. Some of these trials have included the development of AI applications driven independently by external service providers. Given the expertise within national fisheries observer programs, the Pacific Island Forum Fisheries Agency (FFA) and the Pacific Community (SPC) were tasked to explore the establishment of a regional library of annotated images to support Pacific-led EM development.

A broad stakeholder consultation identified ten key recommendations, structured into strategic, operational, and tactical priorities. Strategic actions focus on defining objectives, securing funding, and establishing governance frameworks. Operational steps include building partnerships, integrating with existing EM programs, and defining data-sharing protocols. Tactical priorities involve reviewing annotation processes, training observers, piloting initiatives, and establishing regional coordination.

Developing a Pacific-owned image library is feasible and offers significant benefits, member states can now decide on a pathway forward to address these essential requirements.

10-07

Advancing edge AI technology application in electronic monitoring footage review

Vienna Saccomanno[1], Alvaro Teran[1], Meghan Fletcher[1], Ben Gilmer[1], Guzmán López[2], Alicia Schandy[2], Diego Kiedanski[2], Graciana Castro[2], Javier Berneche[2], Joaquín Tomé[2]

[1]The Nature Conservancy, Arlington, USA. [2]Tryolabs, Montevideo, Uruguay

Abstract

Electronic monitoring (EM) systems have significant potential to improve fisheries management and supply chain transparency, but data review costs and logistics have hindered industry-wide adoption of EM. Better technology application and workflows are needed to verify catch and flag risky activity in the EM footage review process to focus the sector's limited monitoring resources. TNC and our partners have been conducting R&D on the feasibility of using edge AI technology to assist in the EM footage review process and flag potentially risky activity on semi-industrial tuna longline vessels in the Eastern Tropical Pacific. The results of our 2023 pilot work suggested that edge processing of fishing activity is possible in at-sea conditions, but that further AI/ML development was needed to make automated catch count and classification between target- and by-catch species more reliable to facilitate near-real time verification. During this session, we will present on the advancements in our second phase of R&D that is focused on developing an open-source AI modeling approach to reliably detect, track, and count catch in longline fishing and then compare AI insights to corresponding e-logbook entries. The current AI modeling approach is based on the YOLO11m architecture and pretrained on Fishnet.ai data, with vessel-specific EM imagery used for additional training data. With a focus on open-source transferability, this session will cover the performance of the AI model stack, the edge system architecture, and the edge-based risk scoring process to facilitate highly prioritized human EM review. We will then review early insights around 1) best practices for incorporating edge AI processing into existing EM systems and how the AI model stack can be accessed, and 2) the implications of edge-assisted EM review to identify IUU fishing activity before products enter global supply chains.

S-11: Standardization of at-sea Monitoring Programs

11-01

Using EM to quantify catch and verify best handling and release practices for endangered, threatened and protected species

Bubba Cook[1], Craig Heberer[2]

[1]Sharks Pacific, San Diego, USA. [2]The Nature Conservancy, Arlington, USA

Abstract

According to the IUCN, more than a third of all global sharks, rays and chimaeras species are 'threatened with risk of extinction' and overfishing constitutes a primary driver. Pelagic longline fishing results in significant bycatch of sharks and rays, but global catch, condition, and fate estimates are highly uncertain due to inaccurate or absent reporting in fishing logbooks and historically low human observer coverage on these "hard to observe" vessels.

With the substantial increase in implementation of EM systems on longline fishing vessels over the past decade, the ability to collect and archive species specific data on sharks and rays for stock assessment purposes, while also verifying compliance with Best Handling and Release Practices (BHRP) promulgated by National Fisheries Authorities and Regional Fisheries Management Organizations, is now more attainable than ever. However, to capture this critically important data, operational procedures onboard the vessels must be implemented to require crew to haul the branch lines closer to the vessel so the EM camera array, or the human observer, can obtain information such as species ID and condition while also minimizing the amount of monofilament line (aka, trailing gear) left on the animal.

A concerted policy and regulatory effort is needed to require hauling the branch line closer to the vessel as a mandatory practice and an integral component of sustainable fishing practices. The EM imagery obtained through this best practice will help develop and train AI algorithms and machine learning models to automate and make the video review and data annotation process more efficient and cost effective.

This presentation will demonstrate what at-sea operational requirements are necessary to ensure data quality and quantity for key bycatch species and to verify compliance with BHRPs and discuss potential incentives to catalyze their adoption and scale up across fishing fleets.

11-02

Technical guidelines for the use of Remote Electronic Monitoring systems (REM) in EU fisheries

Miguel Nuevo, Cristina Morgado

European Fisheries Control Agency, Vigo, Spain

Abstract

The EU Common Fisheries Policy (CFP) introduced the reduction of unwanted catches and the elimination of discards, the landing obligation. To comply with these requirements, Remote Electronic Monitoring (REM) systems was identified as a tool for fisheries monitoring. REM systems provide continuous monitoring and data collection, offering an efficient and cost-effective alternative to traditional control and monitoring tools. Recently, regulation (EU) 2023/2842 (“Control Regulation”) mandates the use of REM systems on high-risk vessels.

EFCA in collaboration with EU Member States and the European Commission developed “Technical guidelines for the use of Remote Electronic Monitoring systems (REM) in EU fisheries”, which provides comprehensive guidelines for the implementation and use of REM systems in EU fisheries. The document outlines the minimum technical requirements and standards for REM systems to assist in the efficient and uniform implementation of the landing obligation, and the implementation of the revised Control Regulation.

Key points covered in the Guidelines include:

• Technical Specifications: Minimum technical requirements for REM systems.

• Implementation and Compliance: Guidelines for the creation of Vessel Monitoring Plans (VMP) tailored to each vessel's characteristics and other aspects of the management of REM programs (Rules of operation, catch handling, logbook recording, etc.).

• System Health and Maintenance: Regular system health checks, data encryption, and secure communication protocols are essential for maintaining the integrity and reliability of REM systems.

• Data issues and AI Integration: Also covered topics related to data handling and the integration of Artificial Intelligence (AI) and Machine Learning as a means to enhance the analysis of REM data, improving quality assurance and efficiency.

The implementation of REM systems supports the enforcement of fisheries regulations, contributing to sustainable fishing practices and the protection of marine resources.

11-03

Harmonization of Pacific Islands' observer programmes

Timothy Park

Pacific Community (SPC), Noumea, New-Caledonia

Abstract

The Western and Central Pacific Ocean (WCPO) tuna fishery is huge, the 2023 tuna catch was 2,630,858 mt, worth $6.1 billion. This represents 79% of the Pacific Ocean tuna catch and 52% of the global tuna catch. The fishery is composed of 281 purse seine, 568 longline, and 21 pole and line vessels: representing 24 flags.

Unlike other oceans, over 80% of the catch occurs in the EEZs of the 14 Pacific Island Countries, and three Territories (PICTs) . Thus, their tuna resource is a significant component of their GDP, and its management is critical to their sustainability as independent nations.

SPC, in collaboration with 2 subregional (FFA, PNA) and one regional (WCPFC) fisheries management organisations, develop regional operational standards and facilitate harmonisation among PICTs' 16 national and 2 subregional observer programmes. Their 800+ observers reported 1382 purse seine, 254 longline and 21 transshipment carrier trips in 2023 .

Harmonization of PICTs observer operations has been critical to ensure the utility of observer data for effective regional management. All WCPO observer data is stored in a single regional integrated database. Harmonization includes standard data collection fields, formats and protocols, training, and regional cooperation allowing national observers to operate in multiple jurisdictions.

The Pacific Islands Regional Fisheries Observer (PIRFO) qualifications are independently recognised as the regional standard for observer training by the Pacific Board for Education Quality. PIRFO is trademarked under the PICTs programmes' ownership, further enhancing alliance among programmes.

Harmonisation among national programmes improves the monitoring efficacy across the region, allowing Pacific Island states meet their national aspirations and managing their regional fisheries resource.

11-04

Standardisation of observer data collection in the WCPFC region

Penihulo Lopati

PNA Office, Brisbane, Australia

Abstract

The Parties to the Nauru Agreement (PNA) Observer Program is one of the largest international observer programs, delivering around 25,000 sea days of observer coverage annually in the Western and Central Pacific Ocean tuna purse seine fishery. The program involves independent monitoring of fishing activity on around 110 vessels operating on shared stocks across around 10% of the earth's surface. The enormous logistical and resourcing challenges of monitoring vessels across such a vast area are at least partially addressed by harmonising systems across the 8 Small Island Developing State (SIDS) members of the PNA. Coordination of the program is managed centrally, with standardised observer training, data collection forms, briefing/debriefing, e-reporting, safety equipment, data handling and payment arrangements for all Party observers involved in the program. The standardised and inter-operable nature of arrangements means that observers can be efficiently deployed as across the region as the distribution of fishing effort shifts, and data is collected in a standardised format, with standardised quality assurance procedures, that can be easily interpreted and used by all Parties. This presentation will explore some of the main practical forms of standardisation across the PNA Parties and the benefits to fishery management.

11-05

Definitions to be considered in the implementation and operation of scientific observer programs: Chilean experience

Erick Gaete

Instituto de Fomento Pesquero (IFOP), Valparaíso, Chile

Abstract

Currently exist a global consensus on the importance of having scientific observation programs for the proper and sustainable management of fisheries and their resources (commercial or non-commercial species), as well as for the protection of the ecosystems where they develop.

In the conception or bases of an observer program, there are different types of principles or initial definitions that condition and govern its subsequent operation, such as, for example, sources of financing (public, private or mixed), role or function of scientific observers (inspectors or observers only), types of contractual relations with observers (indefinite or by season/shipment only employment contracts), operating rules or structures (salaries or rest times, among other things), profiles of desired people (professionals, technicians or without previous experience to train them) or the organizational structure that will support the data collection system, among other aspects. It should also be taken into account that many of these definitions are conceptualized and applied with different approaches in the different countries that have this type of program, many times derived from the history behind each one of them or local restrictions (legal or cultural, for example) and that ultimately condition its operation and future benefits, taking special relevance also when the creation of this type of program is required, either by international treaties or market demands, for example.

The presentation addresses the advantages and disadvantages of the different alternatives or definitions indicated, which are necessary to take into account in the implementation of an observer program in fisheries and their permanence over time, as well as the main support structures that are required for its proper functioning, mainly focused on the experience developed in Chile, as well as with respect to the learning achieved in the different certifications that the Chilean scientific observer program has, both nationally and internationally.

11-06

Observers as facilitators to face fishers doubts and defiance towards the growing number of at-sea observation programs ?

Claire ASSAILLY[1], Fabien NOEL[2], Alex CHAILLOUX[2]

[1]SINAY, Bordeaux, France. [2]SINAY, Brest, France

Abstract

In the southern part of the Bay of Biscay (France), where fishing fleet primarily consists of gillnetters, trawlers and a few longliners, skippers are increasingly asked to engage in at-sea observation programs, no fewer than five in the recent years for some of them. In a context where interactions between fisheries and ETP species are the focus of new numerous programs and face skepticism by concerned professionals, the growing solicitations of fishers complicate both the observers work and the understanding of these programs. However, Sinay, who deploys observers on a large part of the Bay of Biscay programs, has observed that when observers build trust and dialogue over time with professionals, it facilitates their engagement, their understanding and participation.

The installation of cameras on certain vessels has sometimes been facilitated by recurring contact with the shipowners known from observers. Conversely, the contact phase and camera installation have sometimes led to securing an at-sea observation trip and establishing trust. Observers tend to therefore, as being trained to various programs and protocols, be able to directly address the questions of shipowners or captains and/or relay these inquiries to program managers, sometimes leading to protocol adjustments.

Based on this observation, Sinay has deployed an organization aimed at professionalizing observers by gradually diversifying their missions and the programs in which they participate locally, under the support of their coordinator. As they gain experience they often become the lead observer of the area, technical support of colleagues embarking for seasonal programs, facilitating contact search, and organizing embarkations. This person also acts as a key point of contact for local fisheries organizations and program coordinators.

If a process of pooling observation programs has been initiated in France, it is not yet effective, and observers play therfore an important role in communicating programs objectives to fishers.

POSTER SESSION

P-01

An Exploration of Barriers to Reporting Victim Violations for American Fisheries Observers

Alyssa Lambert[1], Sarah Williamson[2,3]

[1]Alaskan Observers Inc., Seattle, USA. [2]Saltwater Inc., Anchorage, USA. [3]Alaska Pacific University, Anchorage, USA

Abstract

Introduction

Being a fisheries observer is a high risk profession that includes long hours,extreme weather, and many unique physical hazards while at-sea. The physically demanding work and isolation associated with this role can take a toll on the mental health of observers. Living and working with people whose interests may conflict with the observer's job duties or personal views can create unhealthy conditions. This strain places the observer in a vulnerable position where they may experience harassment. While observers know that reporting such an occurrence is the recommended action by the agency, there are many complex factors that may prevent the observer from reporting after experiencing such a trauma. This poster aims to identify and quantify some of these harder to perceive barriers to reporting by observers and provide an avenue for them to directly express what would help them.

Methods

A survey has been distributed among fishery observers from multiple regions with voluntary and anonymous participation. Questions fall into three categories: demographic data, multiple choice questions surrounding harassment circumstances, and free response questions regarding what could be improved on to other forms of support that would best assist them through harassment experiences. The statistics generated by this questionnaire will hopefully provide new insights that can be used to inform agencies, providers, and observers about the current challenges observers face.

P-02

Applications of AIML for catch detection in the Australian sub-Antarctic fisheries

Tamre Sarhan[1], Goeff Tuck[2], Richard Little[2], Dadong Wang[3], Saqib Muhammad[3], Rizwan Khoker[3], Xinlong Guan[4], Xin Yuan[3], Jingyu Zhang[4], Candice Untiedt[2], Cara Masere[5]

[1]Australian Fisheries Management Authority, Canberra, Australia. [2]CSIRO, Hobart, Australia. [3]CSIRO, Marsfield, Australia. [4]CSIRO, Eveleigh, Australia. [5]Australian Antarctic Division, Hobart, Australia

Abstract

Fisheries worldwide are increasingly adopting on-vessel cameras, electronic monitoring (EM), for catch recording. AI-driven analysis of EM data offers the potential to improve data quality by providing accurate counts of target and non-target species for species-specific assessments. This presentation will share initial results and discuss challenges from a new project applying AI to EM in Australia's sub-Antarctic fisheries that target Patagonian toothfish (*Dissostichus eleginoides*), including those around Heard Island and McDonald Islands (HIMI), Macquarie Island and the Ross Sea. The HIMI fishery is a Marine Stewardship Council certified longline fishery that also incidentally catches grenadiers (Macrouridae), deepwater skates (*Bathyraja* spp.), and to a lesser degree, morid cods (*Antimora rostrata*). The goal is to test AI's feasibility in delivering accurate counts and measurements of both target and non-target species, with new technologies enabling near real-time catch analysis. Automated species identification using AI could significantly reduce costs for industry and regulatory agencies while enhancing fishery monitoring coverage.

P-03

Automated AI-Based Analysis of Subadult Hake Length Distribution from Landed Box Images for High-Resolution Spatial and Temporal Insights in the Balearic Islands

Ignacio Catalán[1], Amaya Álvarez-Ellacuría[2], Manuel Hidalgo[3], Ismael Rodríguez[2], Hilmar Hinz[1], Miquel Palmer[1]

[1]IMEDEA (CSIC-UIB), Esporles, Spain. [2]FUEIB, Palma, Spain. [3]IEO (CSIC), Palma, Spain

Abstract

Mediterranean fisheries face significant challenges, with hake (Merluccius merluccius) being a key species of ecological and commercial importance. This study applies artificial intelligence to analyze over 18,000 images of landed hake boxes from 2021 to 2023, generating continuous, high-resolution spatial and temporal data on length distributions at the boat and day levels in the Balearic Islands. The automated image analysis captured 65% of the landed biomass in Mallorca, providing representative coverage of the region's diverse fishing grounds. Depth emerged as a major determinant of hake size, with smaller individuals dominating shallow NE and SW areas, aligning with known juvenile abundance zones. Self-Organizing Maps (SOM) and Random Forest analyses identified four distinct length patterns, driven by environmental factors such as latitude, bottom depth, and temperature. The focus on late juveniles offered insights into environmental effects typically associated with earlier life stages. Spatial and temporal variations in catch length were largely boat-specific, reflecting métier-based fishing strategies. This approach complements existing fisheries-dependent and -independent data, offering a cost-effective, scalable, and spatially explicit tool to improve hake management and support sustainable fisheries.

P-04

Optimizing fisheries observer deployment systems and increasing system transferability

Mary Sheehan

TechGlobal in support of NOAA Northeast Fisheries Science Center, Woods Hole, USA

Abstract

Fisheries nationally and internationally utilize different systems to select vessels for observer and monitoring coverage. Although our fisheries behave and are managed differently, there is room to collaborate and utilize parts of current deployment systems to increase efficiencies across programs, safely track observer deployments, and streamline efforts to meet observer coverage requirements. At a regional scale, transitioning multiple observer programs to the same observer deployment system has had significant benefits. In May of 2010, the Northeast Fisheries Science Center implemented the web-based Pre-Trip Notification System (PTNS) to ensure equitable and sufficient coverage across the multispecies groundfish fleet. The PTNS was a replacement for the dockside intercept method used for the groundfish fishery in the past. Since 2010, the PTNS has expanded to include the herring fishery, and for fishing year 2024 we transitioned the scallop fishery from its current Interactive Voice Response System to the PTNS. The implementation of the PTNS has greatly benefited many aspects of our observer programs in the Northeast, namely, automating our trip selection process and reducing human error and bias, mitigating some of the logistical challenges our observer providers face, and increasing vessel equitability and coverage accomplishments.

In this poster, we will (1) discuss what the PTNS is and the logistical challenges associated with observer deployments in the Northeast US, (2) pinpoint the characteristics of fisheries that could benefit from a web-based system utilized by fishermen, managers, and observer providers to effectively deploy observers to meet coverage requirements, and (3) identify how well these types of systems improve target coverage rate completion. Thorough review of existing notification systems can identify similarities and opportunities to build efficiencies in observer deployments both nationally and internationally, especially with larger-scale monitoring efforts on the horizon.

P-05

Assessing the role of electronic monitoring in shark bycatch data collection in Hawai‘i longline fisheries

Chloe Moore[1,2], Andrew Lanza[1,2], Jennifer Stahl[2], Joshua Tucker[1,2], Keith Bigelow[2]

[1]CIMAR, Honolulu, USA. [2]NOAA Fisheries, Honolulu, USA

Abstract

Through collaborative research with fishers in the Hawai‘i longline fisheries, NOAA’s Pacific Island Region (PIR) is conducting electronic monitoring (EM) and machine learning (ML) research to modernize data collection of bycatch species. Research has demonstrated that from EM systems some bycatch can be identified and data on fisher handling, animal condition and attached fishing gear can be collected for cetaceans and sea turtles with high accuracy when animals are brought beside the vessel, with data accuracy diminishing with distance from the vessel. Research is ongoing to determine if similar information can be gathered on sharks, specifically the protected oceanic whitetip shark, after several fisheries management regulations were changed in the PIR. These regulatory changes prohibit wire leaders, require oceanic whitetip and silky sharks to be brought alongside the vessel and recommend all other sharks to be brought into EM camera views for identification, all of which may alter fisher handling techniques and allow for shark bycatch detection using EM. To assess shark interactions, recorded fishing hauls from Hawai‘i’s 20 EM longline vessels with known oceanic whitetip shark catch events, as determined from at-sea observer data, were selected and reviewed to locate any potential shark interactions and to determine fisher handling across all shark species. Secondary reviewers then compared the EM and at-sea observer detections to evaluate the effectiveness of EM in shark bycatch data collection and species-specific shark identification. Further, shark imagery was collected from the reviewed hauls to add to an image library for ML model training to detect shark and other bycatch to enhance EM video review efficiency. This research demonstrates the potential for EM to improve shark bycatch data quality in Hawai‘i and other pelagic longline fisheries, a crucial step in conservation and management of shark populations which is a central priority for regional fisheries management organizations.

P-06

Discard and bycatch assessment at austral demersal freezing trawling fleet in Chile, a contribution of at-sea monitoring

Marcelo San Martín[1,2], Claudio Bernal[1], Juan Carlos Saavedra[1], Cristian Vargas[1], Luis Adasme[1]

[1]Instituto de Fomento Pesquero, Valparaíso, Chile. [2]Universitat de Barcelona, Barcelona, Spain

Abstract

Discard and bycatch are a significant problem for world fisheries. The Chilean fisheries is no exception and during 2012 its fisheries law was modified incorporating special regulations to attend to these issues, including the generation of research and monitoring programs through scientific observers on board. With the aim of showing the evolution of this process in one of most important demersal fisheries in Chile, the assessment of discard and bycatch levels in southern freezing trawling fleet from 2015 to 2023 is presented. The monitoring program considered a cluster sampling design, where observers collected different data as, catches, discards, bycatch, causes of discard and operational data. Discard levels showed variations through the historical series, however, significant decreases were observed with proportions from around 20% to less to 3% of total catches toward the last years. Catches included forty different species, but the target species *Macruronus magellanicus* and *Merluccius australis*, were the principal discarded until 2019, mainly by commercial causes as small size and quality. From 2020, some deep sharks were included within the main species discarded, but lower values. Similar trend was observed in bycatch rates to seabirds and sea lions, the only species affected, achieving one of lowest values in 2023, with 0.003 and 0.008 seabird and sea lions by set, respectively. Results obtained by the monitoring program, have been important input to understand and assess the discard and bycatch in this fishery, helping to Chilean Undersecretary of Fishery establish reduction regulations as discard prohibition, adjustment of the non-target species catch rate, use of bird scaring line and excluder device to sea lions, and mandatory use of electronic monitoring. Whereas the permanent changes of fishing operation and environment, the success of this kind of process must include a constant monitoring and scientific observers are key to detect and report it.

P-07

Compass: a flexible web-based application for fisheries observer data

Amy Westell[1], Russell Blanc[2], Christopher Dixson[2], Darryl Gifford[2], Thomas Liebert[2], Brant McAfee[3], Matthew Turczmanovicz[2]

[1]Lynker in support of NOAA Fisheries, NEFSC, Woods Hole, USA. [2]TechGlobal Inc in support of NOAA Fisheries, Woods Hole, USA. [3]NOAA Fisheries, NEFSC, Woods Hole, USA

Abstract

Fisheries observers around the world cover a wide variety of fisheries, with varying levels of detail and requirements that can rapidly change. Responding to these changing requirements tends to promote the proliferation of requirement-specific systems, which can be difficult to maintain and update. In the Northeast region of the United States, the shift towards electronic data reporting led to an explosion of applications, each meant to handle a small portion of the data processing requirements, leading to a complicated, unwieldy legacy system architecture. Project Compass aims to address this issue by using the Strangler Fig approach coined by Martin Fowler, and will incrementally modernize and replace elements of our legacy observer systems while preserving existing functionality so we can simultaneously continue to collect and process observer data.

Compass is an integrated web-based application designed to consolidate and replace legacy systems currently supporting the Northeast Fisheries Observer Programs. Utilizing modern frameworks such as PHP (CodeIgniter), JavaScript, and the U.S. Web Design System (USWDS), Compass aims to streamline data entry, auditing, and reporting into a single, cohesive system. This effort will sunset outdated, single-purpose applications for data entry, editing, auditing, and reporting and drastically reduce the time between fishing trip and data availability.

The Compass application's unique architecture allows it to present data entry/edit forms that are customized based on data collection program, gear type, and a variety of other attributes. This flexibility combined with the accompanying relational database structure to enforce data integrity and system coherence provides a foundational application that can easily accommodate changes to existing data collections over time, and new monitoring programs in the future with simple configuration changes.

P-08

Machine learning (ML) model innovations for bycatch detection in Hawaii's longline fisheries

Joshua Tucker[1,2], Jennifer Stahl[2], Andrew Lanza[1,2], Chloe Moore[1,2]

[1]Cooperative Institute for Marine and Atmospheric Research (CIMAR), Honolulu, USA. [2]Pacific Islands Fisheries Science Center, NMFS, Honolulu, USA

Abstract

Electronic Monitoring (EM) paired with machine learning (ML) provides a technological solution to monitor fishing vessels globally, expanding coverage to fleets with limited or no monitoring. Incorporating ML detection models into the review process is essential to flag catch events and eliminate unnecessary data collection, potentially filtering out up to 90% of non-informative footage in pelagic longline fisheries allowing human reviewers to focus on the 10% showing catch and incidental catch (bycatch). However, developing ML models to detect bycatch is challenging due to limited imagery, particularly for rare events or confidential data. NOAA's Pacific Islands Fisheries Science Center is developing ML models to detect retained and incidentally caught species in the Hawaii longline fisheries by leveraging EM video footage from 20 volunteer vessels and at-sea observer video collected during interactions with protected species such as cetaceans, sea turtles, and oceanic whitetip sharks. Annotations from this imagery were used to train an object detection model to detect retained fish and bycatch species using YoloV5 base algorithm in a Google Cloud Platform environment, utilizing virtual machines resources. The developed model detects fish on deck, sea turtles, sharks, cetaceans and unidentified catch underwater using 222,564 annotations. Performance metrics indicate good accuracy and precision while raw video footage ("inferenced") run through the algorithm demonstrates the model's potential but highlights the need for enhancements to reduce false positives and missed catch events. Future techniques incorporating methods, such as tracking and unsupervised domain adaptation models, could improve bycatch detection. Applying such innovative ML technologies could allow for cost-effective EM programs, expanding EM-based fisheries monitoring to not only bycatch and protected species in Hawaii's longline fisheries but also to other pelagic fisheries globally.

P-09

Industry survey: preserving and supporting fisheries culture

Lauren Trainor

AIS Inc. in support of NOAA Fisheries, Northeast Fisheries Science Center, Fishery Monitoring & Research Division, Woods Hole, USA

Abstract

This project will explore preserving and supporting fisheries culture in the Northeast U.S. by enhancing industry engagement in our observer programs. Interviews will be conducted with fishermen and fisheries management personnel with questions regarding the future of the fisheries and how managers and fishermen communicate about impacts to the industry. Interviews will be done in person or over the phone, focusing on topics such as proposed changes to fisheries management, areas to improve communication between the fishing industry and management; particularly how policies and regulations are shared with fishermen, and research studies fishermen would like to participate in. Identities will remain anonymous, with nine fishermen from different ports along the Northeast and nine individuals working in fisheries management. Responses and trends will be identified, synthesized, and reported on. Results will summarize the current status of communication between industry and managers, and reveal where participants feel improvements can be made. These interviews aim to capture fishermen's perspectives in an industry where fishing effort may have shifted in certain fisheries over time. Observers face a unique opportunity to act as an “in-between” industry and management while improving communication and identifying avenues for further collaboration. This project has the potential for greater preservation of fisheries culture in the Northeast via recurring fisheries-based surveys to further improve relationships between NOAA and fishermen.

P-10

Trash into treasure: insight into atlantic croaker (Micropogonias undulatus) fishery effort history in gulf of mexico, is it viable to reinstate one?

Vaughn Kohl

A.I.S., Inc., Kemah, USA

Abstract

Atlantic croaker (*M. undulatus)* is a Sciaenid species of fish that is distributed across the Gulf of Mexico (GOM), and all along the eastern coast of the United States. Within the GOM, the species is most abundant in the northern GOM, within state waters, especially Louisiana and Mississippi. Although Atlantic croakers are valued within the recreational sector as live bait, they are primarily only encountered within the commercial sector as discarded by-catch in shrimp trawls. Despite its current status as solely by-catch, this "trash" fish used to be the targeted species of a dedicated fishery within the GOM, with recorded commercial landings dating back to the 1950s. In as little as two decades, however, the fishery began to decline and, ultimately, diminish into obscurity by the 1990s with minimal commercial landings (VanderKooy, 2017). In 2017, the Gulf States Marine Fisheries Commission (GSMFC) published a biological profile of Atlantic croaker in the GOM, largely in response to increased commercial landings of Atlantic croaker. The report compiles data from scientific papers, as well as personal interviews with those closely associated with the industry, and provides useful insight into the historical trends of the value and significance of a croaker commercial fishery in the GOM. Using the report, we can review historical trends of the fishery, which can allow us to better understand the factors that allowed for said fishery to exist, as well as the factors that led to its subsequent decline. Additionally, given that a significant amount of time has passed since its publication, it would be useful to reevaluate the current commercial landing trends of Atlantic croaker in order to assess the viability of an Atlantic croaker commercial fishery in the GOM.

P-11

Enhancing Maritime Domain Awareness: Integrating Pinpoint Earth VMS and PierSight Satellite Technology for Comprehensive IUU Fishing Detection

Dave James, Ali Kennard

Pinpoint Earth Limited, Nelson, New Zealand

Abstract

Introduction:

This abstract highlights a partnership between Pinpoint Earth and PierSight, combining advanced Vessel Monitoring System (VMS) technology with satellite radar surveillance to offer an effective solution for monitoring fishing fleets and detecting Illegal, Unreported, and Unregulated (IUU) fishing.

The integration of Pinpoint Earth's solar-powered Pico and Titan VMS devices with PierSight's Synthetic Aperture Radar (SAR) and AIS satellite service will be accessible through Pinpoint Earth's Nexus software platform, providing a unified interface for data analysis and visualization.

The combined system offers:

1. Comprehensive vessel tracking:
    - Pinpoint VMS devices provide precise, real-time location data for registered local fleets.
    - PierSight's SAR technology detects vessels regardless of their AIS or VMS status, enabling the identification of potential IUU vessels and potential Piracy threats.
2. Advanced IUU behaviour detection:
    - Cross-referencing VMS and satellite data highlights potential illegal interactions between registered and IUU vessels.
    - We intend to leverage AI-powered algorithms to analyse vessel movements and identify suspicious patterns indicative of IUU fishing.
3. All-weather, 24/7 monitoring:
    - SAR technology enables continuous surveillance regardless of weather conditions or time of day.
4. Cost-effective solution:
    - Solar-powered VMS devices reduce operational costs for local fleets.
    - Satellite monitoring minimises the need for expensive patrol vessels and aircraft.
5. Enhanced data integration and analysis:

- Pinpoint Nexus software provides a unified data visualisation, analysis, and reporting platform.
- Machine learning algorithms process vast amounts of data to generate actionable insights

Integration of Pinpoint Earth's Vessel Monitoring System (VMS) technology with PierSight's satellite surveillance capabilities enhances regulatory maritime domain awareness at a reasonable cost; providing comprehensive monitoring of local fishing fleets while also detecting and tracking potential illegal, unreported, and unregulated (IUU) vessels and activities, and ensuring sustainable fisheries management.

Future Directions:

We invite fisheries management organisations to join us in developing a global standard for maritime surveillance and combating IUU fishing.

P-12

Advancing Observer Safety and Data Integrity with Self-Powered, Tamper-Resistant VMS Technology

Dave James, Ali Kennard

Pinpoint Earth Limited, Nelson, New Zealand

Abstract

Introduction:

Fisheries observers face safety challenges in isolated commercial vessels, impacting data integrity. This presentation introduces Pinpoint Earth's Vessel Monitoring System (VMS) technology, designed to tackle these issues with portable, self-powered devices featuring advanced tamper detection.

We will highlight the Pinpoint Pico and Pico Titan VMS devices, showcasing their solar-powered design, dedicated SOS distress button, and pressure-based tamper detection system. These features enhance the safety of observers and ensure data integrity in remote marine environments.

Results:

Pinpoint Earth's VMS technology offers:

1. Portable, self-contained solar-powered units with high-capacity batteries ensure continuous operation independently of the ship's power.
2. A dedicated SOS distress button is used for immediate satellite-based emergency signalling.
3. Advanced tamper detection through internal pressure monitoring:
    - Real-time pressure data transmitted to shoreside regulators and management.
    - Immediate alerts for unauthorised device opening or tampering attempts.
4. Ruggedised, weatherproof construction for harsh marine conditions.
5. Potential for integration with mobile applications via Bluetooth, enabling secure communication and customised reporting.
6. Pinpoint Nexus software advantage:
    - Centralised data management and visualisation platform.
    - Real-time monitoring and analysis of VMS data.
    - Customisable alerts and reporting features.
    - Integration capabilities with other fisheries management tools.

- User-friendly interface for both observers and shoreside personnel.

Conclusion:

We believe our technology can enhance observer safety and data integrity by providing a secure way for observers at sea to raise alarms, acting as a preventative measure against harm. When observers feel safe to perform their work unobstructed, it improves data reliability, ultimately contributing to more effective fisheries management.

Future Directions:

We aim to collaborate with Observer agencies and fisheries management organizations to refine this concept and implement a standardized system that meets the evolving needs of observers and regulatory bodies worldwide.

P-13

The power of communication as a fisheries observer

Danielle Damato

AIS Inc. in support of NOAA Fisheries, Northeast Fisheries Science Center, Fishery Monitoring & Research Division, North Dartmouth, USA

Abstract

Fisheries observers face many obstacles while deployed on a vessel, among them are the constantly changing conditions of weather and sea state, vessel layout and stability, personality types to work with, and modes of fishing. This project will explore observer confidence at sea with tools such as an inReach communication device via a set of interviews with current Northeast observers. The interviews hope to identify whether observers feel more confident at sea knowing they have a connection to land if needed. Through personal interviews of observer experiences at sea, backed by data quality statistics provided by program staff, a discernible pattern between observer communication and performance at sea may be noted. Thriving as a prepared, motivated, and effective observer can prove to be an immense challenge, considering the different industry priorities, the sometimes ostracizing work environment, physical hazards, and ultimate isolation that may accompany the job. Though some factors such as atmospheric conditions are beyond one's control, through proactive planning and the employment of proper tools and communication skills, the enhancement of safety and efficiency become increasingly more controllable in this role. While the sometimes complex task of maintaining a positive attitude and outward motivation to accomplish the duties of an observer can feel daunting, with devices like the inReach some of these concerns can be mitigated. By equipping each observer with appropriate accessibility to technology with an emphasis on skillful practiced communication patterns, the effectiveness of each individual in that role can be expectedly maximized. When faced with less than desirable and unexpected conditions while working on board a vessel, the use of effective communication and communication technology at sea offers an incredible opportunity for critical guidance and can provide considerable changes in perspective in uncertain and withdrawn circumstances.

P-14

The Shark Research Fishery: The Achievement and Value of Observing Sandbar Shark (*Carcharhinus plumbeus*) Longline Fishing in the Southeastern USA

Shane White

A.I.S. Inc., Jacksonville, FL, USA

Abstract

Globally, sharks are a common topic of discourse between members of industry, scientists, and the public due to their ecological and economic significance. Shark roles include top-down ecological regulation, ecotourism, and as a food source.

In the USA, many are considered at-risk of extinction, both by the International Union for Conservation of Nature (IUCN) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Overfishing is the primary driver of shark population declines. Sharks are common bycatch across commercial and recreational fisheries in the southeastern USA, raising concerns about shark regulation and sustainability. This is particularly challenging due to the underreporting of bycatch incidents, as well as many species having high rates of post-release mortality.

In 2006, a NOAA stock assessment classified sandbar sharks (*Carcharhinus plumbeus*) as overfished. To promote sustainably harvesting the limited sandbar shark quota, while enabling the collection of valuable data, the Shark Research Fishery (SRF) was implemented in 2008. This highly regulated and specialized bottom longline fishery requires a NOAA-approved observer on board for every trip conducting SRF sets.

Since its implementation, SRF trips have provided unique and otherwise difficult opportunities to collect data on sandbar sharks, as well as other incidental elasmobranch species of interest, such as the endangered smalltooth sawfish (*Pristis pectinata*) and dusky sharks (*Carcharhinus obscurus*). By targeting sandbars, retained specimens can be dissected for organs that provide insight into shark genetics, reproduction, behavior, and health, particularly when paired with the comprehensive spatial and temporal datasets.

This presentation will discuss the data collected in SRF observing and its importance through direct examples; the overall implications the data from these trips may have on the industry, market, and overall marine health in the western Atlantic and Gulf of Mexico; and where shark observing may be headed in future years.

P-15

Fully Documented Fisheries – Creating an automated discard registration system

Maria Sokolova, Edwin van Helmond

Wageningen Marine Research, IJmuiden, Netherlands

Abstract

Over the last decades Electronic Monitoring (EM) has emerged as a successful and cost efficient technology to improve catch monitoring programmes of fisheries around the world. EM has the potential to provide improved representative coverage of a fishing activities compared to any conventional monitoring method. In addition, EM incentivizes better compliance and initiates discard reduction. The common approach used to analyse the vast amounts of video recordings, often thousands of hour of footage, is an audit-approach: recorded footage is used to verify against a random selection, e.g. 10-20%, of (self-)recorded catch data in logbooks. This requires a contribution and cooperation from the fishers to provide catch data in logbooks. Implications for fishers are minimal, since providing detailed information on landed catch and fishing activity is common practice in most fisheries. However, when other information is required, for instance discard recording by species in a catch quota regime in a mixed fishery, the burden on the fishers increases rapidly. This is the current situation for European bottom trawl fisheries. To comply with regulations under the Common Fisheries Policy of the European Union (EU) sorting, weighing and recording of discards for several species on a haul-by-haul basis is mandatory. The EU landing obligation implies a significant increase in costs for fishers to sort and record quantities of unwanted catch, below minimum conservation reference size, of quota restricted species. In this study we investigate the possibility to use an automated catch recording system involving computer vision technology to record the discards of quota restricted species under the landing obligation. We would like to present our results and share our experiences in developing this innovation in monitoring fisheries.

P-16

Monitoring the Jabuka Pit FRA: Ensuring Sustainability and Stock Recovery

Damir Medvešek, Ratko Cvitanić, Igor Isajlović, Nedo Vrgoč

Institute of Ocanography and fisheries, Split, Croatia

Abstract

The Jabuka Pit, a vital ecological and fisheries hotspot in the Adriatic Sea, plays a fundamental role in sustaining populations of commercially valuable fish and crustaceans. This study highlights the critical need for ongoing fisheries monitoring at sea as a cornerstone for maintaining the benefits of spatial fishery closures and achieving long-term sustainability.

The paper examines the key factors that led to the designation of the Fisheries Restricted Area (FRA) in the Jabuka Pit, emphasizing the pivotal role of scientific monitoring in identifying regions where restrictive fishing measures can drive significant stock recovery. Seasonal monitoring campaigns, conducted following the MEDITS protocol aboard research vessels, provide essential insights into biomass trends, species distribution, and fishing effort dynamics.

The findings reveal a steady increase in biomass for key fish and crustacean species, particularly within the designated No-Take Zone (NTZ). The observed “spillover effect” into surrounding fishing grounds demonstrates the ecological and economic advantages of the closure, underscoring its value as an effective fisheries management strategy.

This study underscores that the success of the Jabuka Pit FRA is closely tied to rigorous, long-term monitoring programs. Consistent data collection and analysis remain crucial for adaptive management, enforcing protective regulations, and safeguarding the ecological balance of this critical marine habitat.

Keywords: Jabuka Pit, Fisheries Monitoring, Fisheries Closure, Biomass Recovery, Sustainable Fisheries Management, No-Take Zone, Spillover Effect, MEDITS

P-17

Can counting partial EM footages help reducing workload in EM review?

Chun Chen, Karolina Molla Gazi, Thomas Smith, Tomasz Zawadowski, Edward Schram, Edwin van Helmond

Wageningen Marine Research, Ijmuiden, Netherlands

Abstract

Electronic Monitoring (EM) is increasingly used to monitor by-catch and discarded species, particularly under the EU Landing Obligation, which mandates compliance with regulations on below minimum landing size (BMS) species. In the Netherlands, a trial has been conducted since 2019 involving EM monitoring on eight demersal beam trawl vessels operating in the North Sea. BMS plaice discarded during fish processing are identified and counted using EM footage of conveyor belts. However, with belt processing times ranging from 5 to 60 minutes per haul, the EM review workload is substantial.

This study investigates the feasibility of reducing the EM workload by reviewing subsets of footage. A total of 75 hauls were randomly selected from 8 trips across the 8 vessels. For each haul, random 1-minute video segments were analyzed. Results reveal that while significant variations exist among vessels and hauls, the BMS plaice counts per minute are relatively uniform within each haul. This uniformity allows the total BMS count for a haul to be reliably estimated using linear regression or a ratio estimator based on processing time. Simulations further indicate that for most vessels, reviewing less than 5 minutes of footage per haul achieves a precision level of a coefficient of variation (CV) of 0.1.

These findings provide a strategic framework for optimizing EM review efforts by allocating less review time to vessels with lower variations and more time to those with higher variations. This approach significantly reduces workload while maintaining precision and compliance monitoring effectiveness.

P-18

Benefits of cultivating multiple support methods in managing fisheries observers and the impacts on individual welfare and data quality

Meghan Miller

Southeast Fisheries Observer Program, Galveston, USA

Abstract

In fisheries observer programs, post-trip debriefings are conducted to ensure the observers are providing prime commercial fisheries data for each region. These debriefings provide opportunities for management staff to concentrate on an observer's strengths and weaknesses in the field, and finding ways to improve on offshore duties. Debriefings are essential in data management and can lead to other support efforts for observers including mentoring and coaching. Mentoring and coaching at sea fisheries observers can have an impact on data quality collection and individual assessment. Supplying a variety of support to newly employed observers can correlate in success of other professions. Creating a foundation of work ethics, morale, and a higher retention of valued observers benefits all observer programs. Research in other industries have shown debriefing enhances the ability of data collectors through goal oriented meetings and focuses on the capability of data collection and protocol techniques, whereas mentoring and coaching employees creates a higher functioning individual. Data from studies about systematic debriefing of qualitative data collection and examination from managerial leadership reviews have provided evidence that applying these techniques have shown to enhance data quality, harbor supervisor and employee relationships, and overall lead to positive outcomes in both support and data standards. Through a survey answered by other National Marine Fisheries region's observer coordinators/debriefers and support staff, we are able to conduce the benefits of how all three support methods can have advantages and which programs have seen the most success in observers' careers.

P-19

Lessons Learned from Solomon Islands EM program to better manage AI.

Derrick Tagosia

Ministry of Fisheries and Marine Resources, Honiara, Solomon Islands

Abstract

Solomon Islands EM program started in 2016, and to this date, a total of Nine (9) Longline Fishing Vessels are currently monitored 24/7, port to port by EM Cameras. There were a lot of lessons learned, some were exciting, others were unexpected, the rest were expected, but could not do anything about them. The Challenges were countless, especially technical and costs. These lessons learned will help us better prepare for AI.

Is Solomon Islands EM program ready for AI? With the current technical and costs challenges faced with our EM program, are we ready for AI? This study will outline the technical challenges that we learned, the ongoing unexpected costs that we continue to encounter, which will then help us whether we ready for AI or not, and/or what must we do to be ready.

Infrastructure wise, we are not ready. With technical challenges, we are not yet ready. With the ongoing costs, we are not ready. What then must we do to be ready for AI? Strengthens our Internet Infrastructures, address these ongoing technical challenges, and ensure that our EM program is cost effective and sustainable, only then that we will be ready for AI.

P-20

Evolving fisheries monitoring: integrating human rights and labor standards into observer programs and electronic monitoring

Bubba Cook

Sharks Pacific, San Diego, USA

Abstract

The increasing demand for robust data and information from fisheries observer programs reflects the growing need for integrated approaches to monitor and manage global fisheries. Observer programs have traditionally focused on collecting biological and operational data for stock assessments and compliance with conservation measures. However, as the scope of fisheries governance broadens to include monitoring human rights and labor standards, these programs must also evolve to meet these new monitoring obligations. This shift is particularly significant as fisheries management aligns with larger-scale monitoring initiatives, addressing cross-cutting issues such as sustainability, ethical practices, and social responsibility.

This presentation will explore the transformative changes occurring in fisheries monitoring programs, with a focus on the Western and Central Pacific Fisheries Commission (WCPFC). As of December 2024, WCPFC has taken pioneering steps to leverage observer programs and, potentially, emerging electronic monitoring (EM) technologies, to assess and report on labor and human rights conditions aboard fishing vessels. These advancements demonstrate the practical integration of social and ethical dimensions into traditional fisheries monitoring, setting a precedent for other Regional Fisheries Management Organisations (RFMOs).

The presentation will provide an overview of the challenges and opportunities associated with expanding observer roles and incorporating EM systems for broader monitoring objectives. It will highlight key technological innovations, data-sharing mechanisms, and policy adjustments necessary to support this transition. The discussion will emphasize how these developments align with global priorities for sustainable fisheries and responsible labor practices, underscoring the importance of collaboration across sectors and jurisdictions.

By examining the progress of programs like the WCPFC and forecasting trends within other RFMOs, this session aims to inspire dialogue on the future of fisheries monitoring, emphasizing the critical role of adaptive methodologies and technologies in meeting evolving demands.

P-21

Monitoring of the catch and bycatch of the small pelagic purse seines in Adriatic Sea

Vanja Cikes Kec, Goran Brzulja, Vedran Vuletin, Filip Rozic, Pave Kuzmanic

Institute of oceanography and fisheries, split, Croatia

Abstract

Small pelagic fish species, the most abundant fish species in Croatian landings, have been investigated since the early 1900s. Biology, ecology and fisheries of the anchovy *Engraulis encrasicolus* and sardine *Sardina pilchardus* are studied at the species and at the gear levels. The main fishing gear targeting small pelagic fish species in the Croatian part of the Adriatic Sea -purse seine net “srdelara”- is surrounding fishing gear (mesh size 14mm) capturing target and bycatch fish that assemble under the artificial light during the night fishing activity.
Within the EU data collection framework, since 2013, the purse seine catch and landings samples are monitored monthly in the most important fishing zones. The catch composition, number of bycatch species, length, and weight distribution were analysed for twelve years. Additionally, analyses of the changes in the sampling scheme in the number of landing and on-board samplings were performed.

Results showed more than 70 different species detected in the bycatch in the selected period, varying in length from 1.5 (little squid) to 108.0 cm (swordfish) and in individual %of total weight from 3% for bogue and 0.2% for sunfish with the rest of species' below 0.1%. The number of species in the bycatch increased from low values at the beginning of the series to the highest numbers in 2016 and after showing a decreasing trend with few high values. Number of the samples varied also during the years with a steady increase of the on-board sampling adding to the rise in the total number of samples targeting more bycatch species. However, no increase in the number of detected species was observed while increasing the number of on-board sampling, hinting at the possibility of switching to the increment of landing sampling as a time and money-saving option.

P-22

Camera monitoring as a tool to map recreational fishery effort in the Borgund fjord, Norway

Sofie Gundersen[1], Otte Bjelland[1], Nils-Roar Hareide[2], Jan Hinriksson[1], Kjell Nedreaas[1], Håkon Otterå[1], Jon Helge Vølstad[1], Keno Ferter[1]

[1]Institute of Marine Research, Bergen, Norway. [2]Runde Forsking, Runde, Norway

Abstract

Norway has the second longest coastline in the world and the highest participation rate in Europe of recreational sea anglers. The recreational fishery that includes substantial participation from foreign tourists is part of the "freedom to roam" legislation, and there is no mandatory registration for recreational anglers, although there is a mandatory registration of tourist fishing companies. The vast coastline, near universal access, high participation rate and no mandatory registration, makes the mapping of recreational fishery in Norway difficult. To map the recreational fishery, the Institute of Marine Research (IMR) has conducted several pilot studies to test different methods the latest one being conducted in the Borgund fjord in 2022 and 2023.

The Borgund fjord is a fjord system located outside the city of Ålesund in western Norway. The fjord system is a spawning area for northeast Arctic cod and has been closed for fishing with conventional gears in the spawning season (1. March – 31. May) since 2009. The fjord, however, is open for fishing with handheld tackle in this period. To estimate the effort and catches by the recreational fishers, IMR conducted a roving creel as well a camera monitoring study of the fjord in 2022-2023. Three cameras were put up at strategic locations, to cover the entire fjord system, and the number of boats was counted by trained technicians at randomly selected days, and at randomly selected times throughout the days. The roving creels were conducted simultaneously to collect data that the camera could not collect, such as the duration of the fishing trips, number of gears and catches. The study showed high effort in the beginning of the period, with the effort decreasing towards the end of the period in both years.

P-23

RED SHRIMP OFF-BOARD EM APROACH IN THE W MEDITERRANEAN

Amaya Alvarez Ellacuria, Ignasi Catalán, Miquel Palmer

IMEDEA, Esporles, Spain

Abstract

The red shrimp (*Aristeus antennatus)* fishery in **Balearic Islands, Western Mediterranean Sea,** represents a significant percentage of the total catch and is the most economically valuable resource for the bottom trawl fleet. Its economic value is directly linked to the size of the specimens, which is why fishermen classify shrimp into different categories to maximize their price.

The trawling vessels of the **Balearic Islands** fleet do not yet have video-based electronic monitoring (EM) systems on board, relying solely on satellite positioning systems to infer when trawling operations take place during navigation. This information can be combined with images of shrimp boxes recorded for each vessel during the auction at the **Mallorca** fish market, where more than 80% of the total catch is sold.

Thanks to artificial intelligence, it is now possible to extract data on the average weight and number of shrimp per landed box. Combining this information with positioning data can improve decision-making and enhance natural resource management by identifying trends in shrimp size over time.

In this study, we present a methodology for an **off-board EM approach** by leveraging all available data from each vessel in the red shrimp trawl fleet. Using deep learning to extract shrimp size and numbers and AIS-derived spatial effort, we provide a comprehensive analysis of this fishery at a low human and economic cost, offering a scalable and easily replicable approach for other fisheries.

P-24

Swedish sea-sampling program

Magnus Andersson, Ronja Risberg, Axel Hjelm

Swedish University of Agricultural Science, Lysekil, Sweden

Abstract

Sweden started with sea-sampling in 1997 and where initially covering demersal trawl fisheries in the Baltic Sea and in Kattegat with the purpose to estimate volumes of discards. The sea-sampling has since developed to encompass more areas and types of fisheries. The purpose has also expanded to e.g. bycatches of sensitive species, primarily in the gillnet fisheries, and species composition in large scale (from a Swedish perspective) pelagic fisheries. Presently we have observers on-board approximately 240 trips yearly.

The coverage of the on-board sampling program is ranging from 1% to 10 % of the total trips conducted in the covered fisheries. To ensure a representative sample of fishing trips, vessels are randomly selected for on-board sampling based on their fishing activity in previous year. Therefore vessels with higher fishing activity have a greater likelihood of being selected for sampling. A vessel that is selected is required to allow observers on-board to maintain its license.

The goal of an observer trip is to estimate the total catch, species composition, including potential presence of sensitive bycatch species, and size distribution within each species. In addition, individual sampling, including extraction of otoliths, is conducted for a selected number of species.

Trips range from 1-20 days where the majority of trips are between 1-2 days long.

There are two observers on each trip, except for smaller vessels fishing with passive gears where space is limited. In Sweden, permanently hired staff carry out the on-board sampling. The same personnel participate in scientific surveys and are involved in other tasks such as biological and statistical analyses and report writing.

The group currently consists of approximately 20 people, of which the majority have fieldwork accounting for around 50% of their employment.

Electronic monitoring is complementing observes schemes to cost effectively increase the coverage in some fisheries.

P-25

E-reg – Electronic Registration – A Swedish application for data collection in fisheries

Anders Svenson, Baldvin Thorvaldsson, Jan-Erik Johansson, Per Johannesson, Lisa Sörman, Malin Werner, Mikael Ovegård

Swedish University of Agricultural Science, Lysekil, Sweden

Abstract

E-reg is an in-house developed software application used at SLU Aqua. The current version is used for data collection on surveys and on-board sampling.

E-reg is used in combination with a rugged tablet (field computer) where equipment such as scales and callipers can be connected for direct data entry. Along with various mounting accessories, it is possible to set up an efficient workstation on most vessels.

The overall goal of the E-reg project is to "implement electronic devices for assisting the biological data collection of fish and shellfish", i.e. finding methods that reduce the need of pen and paper. Collecting data in a digital format makes it possible to meet these demands and increase the data quality by applying real-time computerised quality controls, increase data traceability and eliminate transcription errors.

Development of the application started 2010 and was initially tested and used on smaller surveys. After some refinement and updates, the software was tested on commercial vessel sampling. The device has since been gradually introduced to various commercial fisheries.

The major advantages of using E-reg are that it simplifies the observers' work at sea and reduces the risk of potential errors in data management. All data can be transferred automatically to our database.

There are several built-in quality controls in E-reg, including:

1. Identify "unreasonable" length-weight relationship
2. Visualise the length distribution of the sampled individuals in a subsample
3. The user can add a sampling target and get on screen information when the target is fulfilled
4. All mandatory information is registered
5. Collect geographic information, with built in GNSS, on fishing activity

Future development of E-reg means that more types of commercial sampling will be included, e.g. pelagic fishing, small-scale gillnet sampling and various gear trials.

P-26

Developing electronic monitoring and artificial intelligence for data collection of fisheries landings in Portuguese ports

Rita P Vasconcelos[1], Ana Cláudia Fernandes[1], Vasco Luciano[2], Inês Correia[2], Pedro Afonso[2], Chloé Rouiller[3], César Silva[4], Alexandre Rosa[4], Rodrigues Flávio[4], Susanne E Tanner[2]

[1]IPMA - Instituto Português do Mar e da Atmosfera, Lisbon, Portugal. [2]FCUL - Faculdade de Ciências da Universidade de Lisboa, Lisbon, Portugal. [3]AgrocampusOuest, Rennes, France. [4]Fishmetrics, Lisbon, Portugal

Abstract

Fisheries management is fundamentally based on analyzing data on fishing activity and biological data on species, with the length of individuals being the main biological variable collected. The automation of species identification and individual length measurement allows improving and complementing data collection with traditional in situ manual methods. In a collaboration between IPMA and the Portuguese company Fishmetrics, the automation of species identification and measurement, namely through electronic monitoring and artificial intelligence (AI) are currently being developed. In a first case study, we manually measured a series of species on digital Fishmetrics images to identify the advantages and limitations of the method and setup; and moreover during the COVID-19 pandemic we used the obtained data as replacement / complement to data from traditional in situ sampling. In a second case study, we implemented manual measurements on digital Fishmetrics images of a series of morphometric measurements that can be used as proxies for total length (when not available) in a set of bony fishes and elasmobranchs. In a third case study, we manually measured a set of four bony fishes in a single fishing port and developed (including training, validation and testing) single-species AI models for measurement, and multi-species AI models for species identification and measurement. Further work is being developed, based on images from a series of fishing ports, which includes the testing of the previously developed AI models, and the development of AI models for those species as well as for a series of others.

P-27

Enhancing at sea-monitoring using with AI

Kolbeinn Gunnarsson, Kolbeinn Guðmundsson

Trackwell, Reykjavík, Iceland

Abstract

The collection of fisheries data is continuously evolving, integrating various data sources, such as EM data, landing records, and inspections, that now have become crucial for accuracy and efficiency in the field of fisheries monitoring. Observers onboard fishing vessels ensure data accuracy and compliance while also collecting scientific research data. However, fisheries data comes from multiple independent sources, including landing records, sales records, and inspection reports, making it difficult for FMC officers to fully comprehend what is taking place at sea. So, what are the next steps for enhancing the utility of all this information?

This lecture will explore how AI and machine learning (AI/ML) can consolidate and analyse fisheries data in real-time allowing better decision-making for at-sea monitoring and port inspections. By automating analysis and detecting patterns, AI/ML can enhance compliance monitoring, calculate risk indexes and reduce the need for physical onboard observation, allowing human observers to focus on higher-value tasks.

The lecture will demonstrate how Trackwell foresees integrating multiple datasets, and by using AI/ML technology to provide deeper insights and aid in decision making regarding needs for at-sea observation and inspections.

P-28

Combining onboard observers and Electronic Monitoring to create an AI training database for tuna species identification

Alexandra Maufroy[1], Gérard Llort[2], Tiphaine Bettali[3], Romain Godefroy[2]

[1]Orthongel, Concarneau, France. [2]THALOS, Lorient, France. [3]Bureau Veritas, Rennes, France

Abstract

Identifying species-specific catch quantities onboard tropical tuna purse seiners is a challange. The SIRCEO project explores the integration of electronic monitoring (EM) systems with artificial intelligence (AI) to address this challenge. The success of these models depends on the availability of high-quality training data, which includes diverse and well-annotated images of fish from various fishing contexts.

A core component of this effort is combining the work of onboard observers with EM systems to build a robust training database for AI. Observers provide critical ground truth data, ensuring the accuracy of species annotations and enhancing the quality of the AI model's training dataset. This collaboration bridges the gap between human expertise and automated systems, enabling the development of an AI solution that can improve segmentation and identification of tuna species in real-time.

P-29

Beacon Management for Observer Programs: Reducing Risk and Improving Emergency Readiness

Eric Brasseur

Pacific States Marine Fisheries Commission, Newport, USA. NOAA/NMFS/NWFSC, Seattle, USA

Abstract

This community of professionals has been dedicated to the advancement of collecting information to benefit the management of fisheries around the world. The advancement of technology has expanded the flexibility and availability of EPIRB's as Personal Locator Beacons. Providing observers with a personal emergency rescue beacon is something that every program should make a standard practice to help mitigate the risk inherent to working at sea. When an observer program issues a personal rescue beacon, it takes on a critical responsibility for that individual's safety. Effective beacon registration, management, and assignment significantly influence emergency response efficiency. A well-structured system ensures that accurate information reaches the Coast Guard promptly, reducing response time and minimizing the risk of unnecessary or delayed actions.

It is imperative for Observer Programs to establish clear, easy to follow protocols for identifying the individual behind an activated beacon, their vessel, and available points of contact. Strategies range from a universal registration system with shared emergency contacts to individual beacon assignments with customized contact details. Each approach carries trade-offs in terms of efficiency, reliability, and accessibility.

This presentation will explore best practices and lessons learned based on the United States 406 MHz Beacon Registration system for managing emergency beacons, establishing and using emergency action plans, addressing false activations, threats to observer safety, and vessel emergencies. Attendees will gain insights into building a beacon management system tailored to their program's needs, ensuring a swift and appropriate response to emergencies.

P-30

Impact of Observer Coverage on Reporting of Patagonian Toothfish Bycatch in the Falkland Islands Calamari Trawl Fishery (2012-2021)

Toni Trevizan, Frane Skeljo

Falkland Islands Fisheries Department, Stanley, Falkland Islands (Malvinas)

Abstract

In the Falkland Islands, a Marine Stewardship Council (MSC) certified longline fishery targets the adult component of the population of Patagonian Toothfish (*Dissostichus eleginoides*) in waters between 800 and 2000m. However, notable quantities of juvenile toothfish are taken as bycatch in the shelf-based (<400 m depth) finfish and calamari trawl fisheries. In the calamari fishery it is usually discarded, due to the small size of the specimens. Therefore, juvenile toothfish bycatch in the calamari trawl fishery is a waste of their potential commercial value as well as an impact on the population.

Toothfish bycatch in the calamari trawl fishery and its monitoring and reporting practice went through three distinct phases over the last ten years.

The early period (2012-2015) spanned 8 seasons, characterised by low reported toothfish bycatch weight, infrequent reports of toothfish bycatch, and low observer coverage (<10%). it appears that a daily bycatch was reported only when >50 kg. Throughout this period, toothfish bycatch was reported on 0-10% vessel-days per season.

The transition period (2016-2017) spanned 4 seasons, characterised by high reported toothfish bycatch weight, frequent reports of toothfish bycatch, and low observer coverage (<10%). Throughout this period, toothfish bycatch was reported on 12-38% vessel-days per season.

The recent period (2018-2021) spanned 8 seasons, characterised by low reported toothfish bycatch weight, frequent reports of toothfish bycatch, and high observer coverage (100%). This period saw an almost 10-fold increase in observer coverage due to the introduction of the contract observer programme. Toothfish bycatch was reported on 18-48% vessel-days per season, although total catches decreased to the levels of the early period. Reporting frequency now included even the smallest catches of <1 kg.

P-31

From Fishermen to the Lab: Understanding Broadbill Swordfish (Xiphias gladius) Stomach Samples

Ivanna Diaz

Franks Orth and Associates, Long Beach, USA

Abstract

Introduction
The dietary habits of broadbill swordfish (Xiphias gladius) were studied in 2023–2024 through detailed stomach content analysis, utilizing samples collected by fishery observers aboard commercial fishing vessels, consisting of drift gillnet, buoy gear, and longline. This study focuses on examining stomach contents through sieving and microscopic inspection to identify stomach contents, including small or partially digested prey items that might otherwise go undetected.

Methods
Data derived from these analyses were utilized for individual and integrative statistical methods to explore dietary patterns and ecological interactions. For this presentation, particular attention was given to the stomach contents of a specimen obtained during a buoygear trip in 2024, demonstrating the link between field observation and scientific investigation. Stomach samples were conscientiously analyzed to identify prey items, which included fish species such as sardines (*Sardinops spp.*), anchovies (*Engraulis spp.*), and various cephalopods, including market squid (*Doryteuthis opalescens*) and jumbo squid (*Dosidicus gigas*).

Findings
The diet composition was assessed using statistical frameworks, revealing how prey availability and diversity are primarily influenced by geographic location and environmental conditions, indicated by swordfish size. Preliminary observations specify that larger swordfish tend to consume larger prey, such as jumbo squid (Dosidicus gigas) and large Pacific hake (*Merluccius productus*). The presence of other noticeable species, e.g., market squid (Doryteuthis opalescens), reflects prey variety and predator adaptability. Temporal shifts in prey availability may occur, with prey species becoming more or less prevalent during different oceanic conditions.

Conclusion
The findings contribute to a deeper understanding of swordfish feeding ecology, shedding light on the factors shaping their dietary preferences. Establishing standardized procedures will improve comparisons with future studies, offering further understanding of swordfish-prey relationships. Ultimately, this study contributes to a better understanding of swordfish feeding dynamics and emphasizes the importance of monitoring dietary changes over time to support sustainable fisheries management.

P-32

The development and implementation of an observer training program to support the implementation of the Regional Observer Scheme in the Indian Ocean.

Melanie Williamson[1], Teresa Athayde[2]

[1]CapMarine, Cape Town, South Africa. [2]Independant International Consultant, Frontignan, France

Abstract

The Indian Ocean Tuna Commission (IOTC) established the Regional Observer Scheme (ROS) in 2009 to collect verified scientific data on tuna fisheries. While broad guidelines existed, National Observer Programs (NOPs) lacked standardised procedures, leading to inconsistent data and non-compliance with IOTC requirements.

To address this, the IOTC launched a pilot project to promote ROS by developing uniform standards, improving training, and enhancing data collection methodologies. Between March and June 2018, T. Athayde developed ROS standards and guidelines for accreditation and improved data collection fields. From June 2019 to November 2022, CapMarine (with T. Athayde) implemented a training program to support ROS adoption across the Indian Ocean. This aimed to standardise NOPs through structured training for coordinators and field observers, updated manuals, and electronic reporting tools. The program also reinforced compliance with the mandatory 5% observer coverage outside CPCs' Exclusive Economic Zones.

Challenges included limited CPC commitment, logistical and economic constraints, and the lack of a finalised IOTC e-Collection database. The COVID-19 pandemic further disrupted training schedules and equipment procurement, requiring local sourcing and remote training via email and WhatsApp. National fisheries structures varied, necessitating customised training approaches.

Despite these difficulties, key lessons emerged. Hybrid training (online and practical sessions) improved efficiency, and stakeholder engagement ensured progress. Standardised curricula and data collection forms enhanced effectiveness, and national fisheries agencies played a vital role in observer deployment. CapMarine adapted by using e-learning, adjusting training formats, and offering post-project support. Internet disruptions delayed training, but flexible self-learning options helped. Rising travel costs due to the Ukraine war required strategic adjustments.

Ultimately, the project succeeded through standardisation, adaptation, collaboration, and innovative training solutions.

P-33

Monitoring and bycatch calculations of ETP species in gillnet Fisheries

Lotte Kindt-Larsen, Gildas Glemarec, Mollie Broocks, Anne-Mette Kroner, David Lusseau

Technical University of Denmark (DTU AQUA), Kgs. Lyngby, Denmark

Abstract

Since 2010 Denmark has had a long-term monitoring programme to collect bycatch data on Endangered, Threatened, and Protected (ETP) species in gillnet fisheries. The programme is using electronic monitoring (EM) to collect data on ETP species bycatch and gillnet fishing effort at a fine spatial and temporal scale, including time and position of each net-set and net-haul, together with every associated bycatch event. We used these observations to model ETP species bycatch rates, given the operational and ecological characteristics of each haul observed in the EM programme. Furthermore, data on overall fleet effort were collected to model ETP species bycatch in gillnets and estimate (predict) species-specific bycatch at a regional level. The results demonstrated that fishing characteristics, hereunder, vessel length, mesh-size, net-length, soak-time, depth, time of year, and year are key determinants of ETP species bycatch and that classical approaches that ignore these features – like scaling up observed bycatch rates to fleet level – would produce biased estimates. This emphasizes the need for efficient and informative monitoring methods to understand possible conservation impacts of ETP species bycatch and to implement appropriate mitigation methods.

P-34

Leveraging Synthetic Data for AI-Driven Fisheries Monitoring: Advancing Fish Identification in SynFish

Sander Delacauw[1], Sam Vanhoorne[1], Glenn Aesaert[2], Els Torreele[1]

[1]Flanders Research Institute for Agriculture, Fisheries and Food, Ostend, Belgium. [2]Vintecc, Roeselare, Belgium

Abstract

Synthetic data is emerging as a powerful tool in AI-assisted fisheries monitoring, addressing key challenges such as data scarcity, class imbalance, and the high cost of manual annotation. Unlike real-world datasets, which are often limited by the uneven occurrence of species and environmental variability, synthetic data allows for controlled augmentation of training sets. This enables AI models to better recognise individual fish, differentiate between species, and ignore non-target objects, ultimately improving accuracy and efficiency.

Building on this potential, the SynFish project investigates the application of synthetic data to enhance fish identification technologies. A key focus is generating high-quality training datasets for data-poor species, including ETP (Endangered, Threatened, and Protected) species, which are often underrepresented in traditional datasets. By artificially increasing the presence of these species in training data, AI models can develop better recognition capabilities. Additionally, synthetic data allows for controlled variation at both the species level and in abiotic environmental factors, making models more robust in real-world conditions. The ability to simulate diverse scenarios also supports the development of AI systems that can accurately detect relevant fish while ignoring unwanted objects in more complex catches.

The decision to further explore synthetic data within SynFish is driven by the successful proof of concept (PoC) developed in VISIMII. This PoC demonstrated that synthetic data could be effectively used to train neural networks for fish detection and classification. The promising results highlight the efficiency gains in dataset creation, improved model generalisation, and reduced reliance on labour-intensive manual labelling. Given these advantages, it is expected that future AI training sets will increasingly rely on synthetic data. However, challenges remain, particularly in replicating the organic structure and natural variability of fish in synthetic environments. Addressing these complexities is a critical step toward fully leveraging synthetic data for AI-assisted fisheries monitoring and management.

P-35

Electronic ETP bycatch monitoring in the small-scale Swedish gillnet fisheries

Anna Persson[1], Sofia Nyberg[1], Filip Bohlin[1], Aron Hejdström[2], Andreas Lind[1], Marcus Eriksson[3], Per Johannesson[1], Sara Königson[1], Lachlan Fetterplace[4], Lisa Sörman[1], Kristin Öhman[1], Katja Ringdahl[1]

[1]Swedish University of Agricultural Science, Lysekil, Sweden. [2]Aron Hejdström Produktion, Klintehamn, Sweden. [3]Swedish University of Agricultural Science, Simpevarp, Sweden. [4]Swedish University of Agricultural Science, Öregrund, Sweden

Abstract

Large sampling effort is needed to collect data on bycatches of ETP (endangered, threatened and protected) species as events are rare and the occurrence often patchy. Gillnet fisheries are usually associated with high risk of bycatch. Systematic monitoring of the Swedish gillnet fishery was first implemented in 2017, but sampling effort was limited and only covered a small area of Swedish waters.

On-board camera systems where initially developed as part of a pilot study (2020-2021) to allow for increased sampling coverage in a cost efficient way. Since 2022 monitoring covers all Swedish waters populated by the Baltic and Belt Sea populations of harbour porpoise (*Phocoena phocoena*). The aim is to monitor minimum 5% of the gillnet fishing effort in Kattegat, Öresund and the Baltic proper. This corresponds to ~400 commercial fishing trips yearly.

Monitoring of the Swedish gillnet fishery is challenging. Vessels are small (5-12m), often with limited power supply, geographically dispersed with heterogeneous fishing patterns and activity levels.

We are presently developing an in-house camera system solution to better meet the challenges of the small scale fishing vessels.

The camera systems consists of a main box with two cameras – one outside of the vessel and one inside with a view of the sorting table. The outside camera increases the chance of spotting dropouts and the inside camera aids in identification of e.g bird species.

The systems are small and lightweight and can easily be moved between vessels by personnel from SLU Aqua.

Depending on vessel size, adjustable arms are custom built to improve the view and minimise people being captured on film. The power source is also adaptable: some systems utilise the vessels own power supply and others are built to use external batteries. Systems are adapted for accessing the data remotely to avoid manual download of film.

P-36

The potential impact on marine fish stocks by recreational illegal fishing

Hans Jakob Olesen[1], Christian Skov[2], Casper Gundelund[1]

[1]DTU Aqua, 2800, Kgs. Lyngby, Denmark. [2]DTU Aqua, 8600, Silkeborg, Denmark

Abstract

Commercial fisheries in Europe are typically subject to thorough sampling and monitoring, whereas data on effort and catch in recreational fisheries are often sparse. Over the past few decades, the decline in commercial fishing pressure, partly due to reduced quotas, has led to a growing relative importance and potential impact of recreational fisheries on certain fish stocks. For instance, before the introduction of bag limits, recreational catches of Atlantic cod in the western Baltic Sea represented nearly one-third of the total catch. For other fish stocks, recreational fishers may be the sole or dominant users. This implies, that recreational fishing can have a significant negative impact on the fish stocks if the fishery is of a certain dimension or/and the stocks being caught are in a poor state. The importance of having good data to be able to monitor the impact of recreational fisheries e.g. by inclusion in stock assessment work is now widely acknowledged.

In Denmark it is mandatory to hold a valid fishing license if going fishing in the sea. The list of license holders is used as a sampling frame for a recall survey targeting both passive gear fishers and anglers since 2009 in Denmark. A combination of this recall survey and an on-site survey has been in place since 2016 to ensure a more precise and accurate estimation of the Danish recreational catches of western Baltic cod and allow for inclusion of these data in the stock assessment work. However, there are a few legal exceptions to hold the obligatory fishing license. To be able to include the effort and catches from the recreational fishers not holding a license an omnibus survey was conducted. The survey was designed to allow for a calculation of the impact from both the legal and illegal fishing without license.

P-37

Effects of bag-limits and closures on catches in recreational fisheries

Hans Jakob Olesen[1], Christian Skov[2], Casper Gundelund[1]

[1]DTU Aqua, 2800, Kgs. Lyngby, Denmark. [2]DTU Aqua, 8600, Silkeborg, Denmark

Abstract

The commercial fishing fleets in Europe are generally subject to coordinated sampling and monitoring programs, whereas data on the impact from the small scale and recreational fisheries remain more limited. Over the past few decades, commercial fishing pressure has decreased for many stocks, partly due to reduced quotas, making recreational fishing an increasingly significant factor for some fish stocks. Between 2009 and 2016, before the introduction of bag limits, recreational catches of Atlantic cod in the western Baltic Sea accounted for nearly one-third of the total catch.

However, in response to a sharp decline in the stock, a bag-limit was introduced in 2017 for the recreational western Baltic cod fishery. Since then, bag limits have varied in size, and most recently, the fishery has been completely closed. Over the past 15 years, Denmark has conducted a national off-site recall survey targeting recreational fishing license holders to monitor fishing activity.

This study examines the potential effects of regulatory changes, particularly the impact of bag-limits, on the recreational Atlantic cod (*Gadus morhua*) fishery in the western Baltic Sea.

P-38

Is the angler motivation for catch and release, species or license –type specific?

Casper Gundelund[1], Hans Jakob Olesen[1], Christian Skov[2]

[1]DTU Aqua, 2800, Kgs. Lyngby, Denmark. [2]DTU Aqua, 8600, Silkeborg, Denmark

Abstract

The potential impact of recreational fisheries is becoming increasingly important as society is focusing on ecological sustainability and animal welfare. Catch and release (C&R) is a common thing in many types of recreational fisheries and is important in terms of supporting a sustainable management of fish stocks. For many anglers the opportunity of releasing a nice meal is not up for discussion, whereas others would not dream of killing the catch. In some fisheries, the C&R is thought to be of minor importance where other species are almost exclusively C&R. We study two very common species caught in the recreational fisheries in Denmark; sea trout (*Salmo trutta*) and Atlantic cod (*Gadus morhua*) and investigate different motivations for C&R and if these potential differences are linked to the type of license purchased and angler heterogeneity.

P-39

AI and machine learning in electronic monitoring

Katie Archer, Maria Jose Pria Ramos, Robin Prussin

Archipelago Marine Research, Victoria, BC, Canada

Abstract

As electronic monitoring (EM) programs evolve, emphasis is increasingly placed on reducing program costs, improving data quality, and accelerating data delivery. In response, Archipelago is developing and implementing artificial intelligence (AI) and machine learning (ML) in its long-running Groundfish Hook and Line Catch Monitoring Program (GHLCMP) In British Columbia, Canada. Since the implementation of 100% at-sea monitoring with EM in 2006, this fishery monitoring program has benefited from the active engagement of fishermen, industry representatives, Fisheries and Oceans Canada (DFO), and other stakeholders who have invested in sustainable fishery management. There are 172 active vessels completing over 800 fishing trips and 15,000 fishing events annually in the fishery. The proactiveness within this fishery made it a great candidate for implementing ML and AI. We had early interest from fishers and industry associations willing to partner with Archipelago to provide permissions to analyze EM data and collaborate on ML and AI development projects.

Traditional EM data review is constrained by time and cost affecting accuracy and scalability. Archipelago has responded by developing AI-driven fish detection and implementing it in longline EM review in the GHLCMP. This technology can enable more hours of electronically monitored fishing activity to be reviewed within the same budget and timeframe, reduce program costs while improving data delivery speed, or provide the opportunity to review a greater proportion of fishing activity and collect additional data such as hook or trap counts beyond what was previously reported.

New AI applications are being tested for release later this year, including automated fish fate classification (retained or discarded) and species-specific counting. Future developments will bring AI-assisted EM for size composition sampling at sea. Through these innovations, Archipelago is advancing EM program efficiency, meeting evolving industry needs, and setting a new standard in sustainable fisheries management.

P-40

Flipping the script on fisheries monitoring, a focus on benefit

Fraser Stobie, Jillian DiMaio, Amanda Barney

Teem Fish, Prince Rupert, Canada

Abstract

It is well understood that electronic monitoring (EM) technology is an effective tool for at-sea observation of fisheries, and is a viable option for meeting regulatory compliance. However, generating traction and excitement among industry participants for EM adoption for regulatory compliance purposes remains challenging. At Teem Fish, we are working to "*flip the script*" when it comes to how this technology is viewed by fishers; shifting perspectives away from EM as a requirement, towards EM as a *need*. To achieve this, we are focused on the thoughtful integration of modern technology that provides tangible real-world benefits to fleets and individual operators, beyond monitoring compliance.

By prioritising the needs of the fisher, we aim to deliver pragmatic advancements rather than speculative innovations, leading to faster uptake of EM and greater benefit to 'on the water' operators. Through collaborative approaches to program design and purpose-driven AI integration, we anticipate that intelligent-EM will drive harvest efficiency gains, connect generational and anecdotal knowledge to specific data insights, and bring data sovereignty back into individual owner-operator businesses.

Our approach to harnessing the benefits of EM technology emphasises "*progress over perfection*". To provide pragmatic and timely benefits (instead of additional burdens) to the fishing industry, we advocate for AI advancements in terms of step-change that introduce efficiencies gradually, allowing for more real-world testing and faster realisation of benefits. In our session we will cover lessons learned and highlight practical steps for integrating emerging technologies into EM and at-sea monitoring in the future, and how these will chart pathways toward better models for fisheries management.

P-41

Using the Chi-Squared test to detect possible data errors in codend mesh measurement data sets

Debra Duarte

NOAA, Woods Hole, USA. Liz Ouellette, Woods Hole, USA

Abstract

This study proposes the use of the chi-squared (χ^2) test to identify potential data errors in observer codend mesh measurement data sets. Observer codend mesh data are often subject to manipulation or inaccuracies that may compromise the integrity of fisheries assessments. The chi-squared test, a statistical method commonly used for assessing the goodness-of-fit between observed and expected frequencies, is applied here to compare the distribution of the last digit of a codend mesh measurement against a theoretically expected distribution based on known sampling protocols and expected ranges for the fishery. Deviations from the expected distribution can indicate potential data falsification or measurement errors. The effectiveness of the χ^2 test is evaluated through simulated data sets with introduced intentional errors, demonstrating its utility in detecting inconsistencies that might not be immediately apparent through visual inspection or simple descriptive statistics. The results suggest that the chi-squared test can serve as a robust, objective tool for flagging suspicious data of various types, helping to eliminate performance outliers that call into question the scientific integrity of an observer program, thereby enhancing the credibility of observer-based data in fisheries management.

P-42

Innovating Pelagic Fisheries Monitoring: Wireless AI-Driven Solutions by DPPO and Integrated Monitoring

Joshua Wiersma[1], Mathias Søgaard[2], Lise Laustsen[2]

[1]Integrated Monitoring, Boston, USA. [2]Danish Pelagic Producers Organisation, Copenhagen, Denmark

Abstract

The Danish Pelagic Producers Organisation (DPPO), in collaboration with Integrated Monitoring, has set a new standard for electronic monitoring (EM) in pelagic fisheries by developing a fully wireless, AI-driven program. This innovative system eliminates the need for traditional winch sensors by employing advanced artificial intelligence (AI) models to identify fishing events such as net setting, hauling, and pumping. DPPO staff meticulously reviewed and marked fishing activities, creating a robust dataset. Integrated Monitoring then fine-tuned the AI models using YOLOv8 as the machine vision backbone.

The collaboration extends to the Danish Fisheries Authority (DFA), with whom protocols for data sharing and video review have been developed. These protocols address privacy and confidentiality concerns by adapting Integrated Monitoring's Monitor platform to offer tiered access permissions. Vessel owners can view all video footage, while regulators are restricted to fishing activity events, ensuring transparency while protecting sensitive operational data.

Optimized video transfer using Starlink and 4G networks, coupled with variable frame-rate recording, reduces costs and enhances data efficiency. By automatically prioritizing significant events for high-resolution uploads, the program ensures effective use of limited bandwidth while maintaining high-quality data for analysis.

This groundbreaking wireless EM program not only strengthens compliance with EU landing obligations but also provides an operationally efficient, cost-effective solution for fisheries monitoring. The system's adaptability and scalability offer a viable model for other countries implementing EM in pelagic fisheries. By integrating cutting-edge AI with industry engagement and regulatory collaboration, DPPO and Integrated Monitoring have demonstrated the transformative potential of wireless, AI-enhanced monitoring to meet sustainability, compliance, and operational goals, paving the way for broader adoption of EM globally.

P-43

Half a Century of Hard Work! Observers in the At-Sea Hake Fishery off the U.S. West Coast

Vanessa Tuttle, Jeannine Memoly, Cassandra Donovan

NOAA Fisheries, Seattle, USA

Abstract

140,000 hauls, 1,800 observers, 60,000 sea days, and 50 years. NOAA Fisheries has been deploying observers in the at-sea hake fishery off the U.S. West Coast for half a century. Although much has changed for observers during that time, the core mission remains the same: collecting unbiased fisheries data to inform sustainable management of our prized marine resources. Pacific hake (*Merluccius productus*) is harvested off the Washington and Oregon coasts. Known for their large, dense schools and mild white-fish flavor, the fishery catch has grown significantly from the early years. The fishery evolved from foreign vessels to joint venture fishing to a domesticated fishery. Observers are the common thread through all that change; highly trained scientists who can handle everything life at sea throws at them. This overview illustrates the mountain of data made possible by the hard work of thousands of observers over the last 5 decades.

P-44

MaxN estimation for specific fish populations in unconstrained underwater videos using foundation models

Isaak Kavasidis[1], Amelia Sorrenti[1], Orazio Tomarchio[1], Daniela Giordano[1], Marco Milazzo[2], Gabriele Turco[2], Carlo Cattano[3], Concetto Spampinato[1]

[1]University of Catania, Catania, Italy. [2]University of Palermo, Palermo, Italy. [3]Anton Dohrn Zoology Station, Palermo, Italy

Abstract

Estimating the maximum number of individuals (MaxN) in underwater videos is a fundamental challenge in marine ecology, particularly for fish population assessments and biodiversity monitoring. Traditional methods rely on manual annotation or deep learning models requiring extensive labeled datasets, which are often unavailable or difficult to obtain in marine environments.

In this work, we introduce a novel training-free few-shot classification pipeline for MaxN fish species estimation, eliminating the need for training on extensive datasets while maintaining high accuracy and efficiency.

Our approach leverages a pre-trained foundation model for object detection (SAM2) for extracting and segmenting with high precision fish in unconstrained and populous underwater videos acquired by using a Baited Remote Underwater Video (BRUV) system. The extracted fish are then fed and a foundation model pre-trained on joint image-text pairs for deriving image descriptors to classify user specified fish species based on few known examples gathered automatically from the internet in order to distinguish and count individual fish across frames and derive the MaxN metric.

We validate our pipeline on a real-world underwater video dataset gathered from the Tyrrhenian sea and demonstrate its robustness across diverse marine settings. The results indicate that our approach achieves competitive performance with state-of-the-art deep learning methods, without the burden of extensive training data. This innovation presents a scalable, low-cost alternative for ecological studies and fisheries management, offering a practical solution for automated marine biodiversity assessments.

P-45

Innovative readiness: managing risks and ensuring safety in observing

Rulon Hardy

Fisheries Immersed Sciences Hawaii, Inc., Honolulu, USA. Pacific Islands Regional Observer Program, Honolulu, USA

Abstract

To ensure situational readiness and safety in the dynamic and challenging environments where observers work, it is imperative that they are deployed with the right training, tools, and support to accomplish the goals of their programs while safeguarding mental and physical health in unpredictable conditions.

In this session, we explore the issues that observers encounter by examining the relationship between observers and their program in the Pacific Islands Region. Drawing from the direct experiences of observers, program providers, and fishery service professionals, we highlight the incumbent task of programs in providing innovative solutions to these issues to better understand how programs evolve and adapt to support observers, reduce risks, ensure safety, and instill readiness in the field.

We examine the importance of training and manual protocols, discussing how syllabi are informed, revised, and updated by feedback loops via observer experiences. These data inform program-wide adaptations that lead to updated protocols, implementation of policies, and the adoption of new equipment which serve to mitigate the novel and inherent risks that observers face in their profession.

We discuss the important role that new and existing technologies like satellite texting and Wi-Fi play in maintaining safety by providing in-situ response to emergent situations, extending connectivity to in-season advisors, friends and family, thereby minimizing burnout and other isolation related fatigues.

Inspecting specific cases where new technologies and protocols were implemented in response to challenges and risks that observers reported, we discuss the successes and lessons learned by innovating components of observer programs to adapt to the unique and fluid landscapes where they operate.

With robust and regionally tailored training, protocols, and technology, observer programs can provide specific support and tools to reduce risks, protect health and wellbeing, and enhance the safety of their observers in and out of deployment.

P-46

The importance of observer data collection in the Pacific.

Lauren McGovern

NOAA PIROP, Honolulu, USA

Abstract

The Pacific Islands Regional Observer Program (PIROP) has just celebrated 30 years of monitoring effort in the Pacific. The data collected by observers in Hawai'i and American Samoa has been a vital part of studying highly migratory pelagic species, populations which have been difficult to study in the past. Very little is known of these species so any data which can be obtained can help with studies for years to come. This data has benefitted a variety of shareholders and allowed studies to collect valuable information on these species. Fishery dependent data collected by observers also helps to give a broad picture of trends within the fisheries as a whole.

One of the key roles of an observer is to collect specimens based on protocol and instruction for special projects involving shareholders outside of our offices. Whether it be for protected species, special interest fish, or rare/unusual encounters; these sampling efforts provide data that would be impossible to collect without observers aboard fishing vessels. The hard work of observers has been essential to the progress of marine research.

P-47

Reduce project: Deep Learning Integration for Bycatch Reduction and Data Harmonization

H.Nina del Rio-Ares, Juan Carlos Ovalle, Luis T. Antelo

Institute of Marine Research, IIM-CSIC, Vigo, Spain

Abstract

Bycatch refers to the unintentional capture of non-target species by fisheries. This study, conducted within the framework of the REDUCE project, presents a novel approach to addressing the bycatch of ecologically significant megafauna species of conservation concern, including various species of sea turtles, seabirds, cetaceans, and sharks, interacting with commercial fishing fleets in the East Central Atlantic Ocean (ECAO). We implement an image segmentation model based on *YOLO V8* from *Ultralytics* for real-time, automated detection of bycatch events, using remote electronic monitoring (REM) images provided by collaborators of the REDUCE project. In this first step, the images used to train the model so far are all from two cameras strategically installed on longliners vessels, one located on the deck and another outside, near the longline pulling machine which also capture the water's surface. Capturing these areas is crucial, as many bycatch species never make it onboard. Due to the current limitation in the quantity of available training data, it has been necessary to combine the images from both cameras into a single dataset for model training. This approach allows the generation of a first operational version of the proposed model to address the pursued objective of identifying bycatch while additional data is collected and integrated in the dataset. Preliminary evaluations indicate that the model performs effectively, successfully distinguishing and segmenting bycatch species even under challenging conditions. This study shows the potential of significant advances of AI-based tools integrated in REM systems in improving the monitoring of endangered megafauna bycatch species and supporting their proper management, contributing to the protection of the marine ecosystem while reducing costs.

P-48

The Norwegian catch-sample lottery. A probabilistic survey method for at sea sampling of catches from commercial fisheries.

Tom Williams, Håkon Otterå, Sofie Gundersen

Institute of Marine Research, Bergen, Norway

Abstract

Reliable information on the age- and size-structure of the annual harvest of major commercial fish stocks is crucial input to analytical stock assessments. Such information is usually obtained from landing data (census of biomass) combined with biological sampling of selected landings. A novel new catch sampling method was developed for the major Norwegian pelagic fisheries and gradually implemented from 2018 (Otterå et al 2022). The new sampling regime gradually implemented from 2018 is based on three pillars: probabilistic sampling of hauls, use of electronic logbook, and co-sampling. By a minor modification of the electronic logbook the vessels in the pelagic fishery now report the catch quantity at haul level immediately after each catch operation. This electronic report is automatically submitted to the Institute of Marine Research (IMR), where a random draw by computer in real time determines if a small sample of fish should be taken from that haul by the fishermen and be frozen and transported to IMR for analysis. In 2024 IMR began a pilot project with three Norwegian vessels to test using a modified version of pelagic catch-sample lottery for obtaining biological samples of cod, haddock and saithe from the offshore demersal trawl fishery. Instead of taking a frozen sample of fish, the fishers onboard take otolith samples and length data of the catches requested by the lottery. IMR are also planning to trial a catch-sample lottery in the coastal fisheries for obtaining effort data and length data from data limited stocks such as monkfish.

References

Otterå H., Wathne, J.A., Fuglebakk, E., Slotte, A., Svendsen, B.V., Vølstad, J.H., (2022). A novel probabilistic survey method for at sea sampling in pelagic fisheries – the Norwegian catch sampling lottery. Fisheries Research, Volume 260.

P-49

Bycatch of northern fulmar (Fulmarus glacialis) in Norwegian longline fisheries: Assessing spatiotemporal variations in scale and risk to improve management

Tom Clegg[1], Signe Christensen-Dalsgaard[2], Vegard Sandøy Bråthen[2], Arnaud Tarroux[3], Johannis Danielsen[4], Sébastien Descamps[5], Hálfdán H. Helgason[6], Arne Follestad[2], Gunnar Thor Hallgrimsson[7], Morten Helberg[8], Jón Einar Jónsson[9], Yann Kolbeinsson[10], Hallvard Strøm[5], Paul Thompson[11], Thorkell Lindberg Thorarinsson[10], Tom Williams[1], Kim Magnus Bærum[2]

[1]Institute of Marine Research, Bergen, Norway. [2]Norwegian Institute for Nature Research, Trondheim, Norway. [3]Norwegian Institute for Nature Research, Tromsø, Norway. [4]Faroe Marine Research Institute, Thorshavn, Faroe Islands. [5]Norwegian Polar Institute, Tromsø, Norway. [6]East Iceland Nature Research Center, Egilsstaðir, Iceland. [7]Faculty of Life and Environmental Sciences, University of Iceland, Reykjavík, Iceland. [8]BirdLife Norway, Trondheim, Norway. [9]University of Iceland, Snæfellsnes Research Centre, Stykkishólmur, Iceland. [10]Northeast Iceland Nature Research Centre,, Húsavík, Iceland. [11]University of Aberdeen, School of Biological Sciences, Cromartyt, United Kingdom

Abstract

Seabirds are vulnerable to bycatch in longline fisheries but for most species the impacts are largely unknown. To address this knowledge gap, studies can estimate bycatch directly using observations or calculate the theoretical risk of bycatch using overlap indexes. In a recent study, Clegg et al. 2024 have quantified the scale and risk of bycatch of northern fulmar (Fulmarus glacialis) in the Norwegian offshore longline fishery using a ten-year time series of bycatch observations from a reference fleet programme, and large-scale datasets of fishing activity and northern fulmar distribution. This poster presents the results and conclusions of their work. They estimated an average of 0.01 (95 % CI: 0.008–0.03) northern fulmars bycaught per 1000 hooks, which results in a highly varying estimated annual bycatch of between 51 and 16242 (95 % CI) northern fulmars per year, with the largest hotspot in the Norwegian Sea during June-August. They compared these estimates with overlap indexes calculated for northern fulmars and the same fishing activity. This pinpointed the highest risk of bycatch within the breeding season, where fishing activity increased in the waters around the largest cluster of breeding colonies in the northeast Atlantic. Strong correlations between estimated bycatch and calculated overlap indexes validate overlap indexes as an indirect evaluation of risk and strengthen evidence for management decisions based on the spatial and temporal trends identified in our analyses.

P-50

The view from Dutch Harbor: maintaining fisheries observation technologies on the fishing grounds

Erik Sundholm, Jeremy Olden

Network Innovations Maritime, Seattle, USA

Abstract

We are proposing a poster that offers the perspective of the folks responsible for installing and maintaining the equipment that keeps observers working and fishing vessels compliant. In particular we would be discussing our experiences with observer cameras and recording systems, satellite communication VMS (Vessel Monitoring Systems) and NMFS certified marine scales. The poster would highlight the challenges, most common failure points and lessons learned to keep operations running in compliance. We would be approaching this from the perspective of the people in the middle, with the goal of serving both the observers and the fishermen We will highlight our experiences and observations, the challenges, successes and lessons learned from Dutch Harbor Alaska.

P-51

‘Catching the right boat’ - minimising bias in vessel selection.

Jon Elson[1], Sam Birch[2]

[1]Cefas, Lowestoft, United Kingdom. [2]Cefas, Hayle, United Kingdom

Abstract

The UK has a statutory requirement under retained EU law to monitor discards from commercial fisheries. The Cefas observer programme is the only source of commercial catch information for English fisheries that includes observations, length, and age data for the unwanted part of the catch. The primary aim of the programme is to provide discard information for stock assessments and generate catch advice to inform annual consultations. For observer-collected data to be robust, which is essential to underpin stock advice, the vessel selection method employed must be unbiased.

Cefas observers gain access to the UK fishing fleet on a voluntary basis. Owners and skippers are approached for permission to join their vessel if, and when, it is convenient. Teams of regionally based observers work to quarterly targets and use a newly developed web-based R-shiny application for vessel selection. This app connects to a bespoke PostGres database designed to house a regularly updated list of fishing vessels, from which a stratified random selection is made. The sampling frame is a virtual frame of all fishing trips of vessels in the list, which comprises all English (and Welsh) commercial fishing vessels. The list of active vessels is updated quarterly to capture the polyvalent and seasonal nature of regional fisheries.

The app offers an automated and random vessel selection process which reduces a major source of catch sampling bias and enables programme managers to report refusal rates (skipper and observer) to ICES in a standardised manner. The bespoke design provides further operational benefits by housing a vessel contacts list and logging observers’ communications with vessels, including safety concerns. This technological tool has been significant in improving efficiencies in administration and better managing the vessel selection process, whilst also helping to minimise risk to observers by improving safety mechanisms.

AUTHORS INDEX

IFOMC - Authors Index

IFOMC - Authors Index

IFOMC - Authors Index