Electronic Monitoring Systems in Fisheries for the Conservation of Sea Turtles

CIT-CC22-2025-Tec.27

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Prepared by the Strategic Alliances Working Group

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SUMMARY

This document, "Electronic Monitoring Systems in Fisheries for the Conservation of Sea Turtles in the IAC Region," prepared by the Strategic Alliances Working Group of the Scientific Committee of the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC), responds to CIT-COP10-2022-R7 Resolution. Its purpose is to provide tools to IAC member countries to contribute to sustainable fisheries management, assisting in the conservation of vulnerable species such as sea turtles. The implementation of EMS allows for continuous data collection on bycatch and fishing effort, strengthening traditional monitoring systems like onboard observer programs by providing essential information for the conservation of vulnerable species.

Moreover, this constant monitoring facilitates the detection of unsustainable practices that could help identify areas for enhanced training in best practices to reduce bycatch and improve the handling of endangered species so they can be returned to the marine environment in good condition. It also ensures transparency in the fisheries supply chain.

To ensure effectiveness, EMS must be supported by a robust legal framework defining technical and operational standards aligned with national and international regulations. The implementation of EMS requires strategic planning, including pilot studies, technology selection, and gradual deployment, accompanied by training for operators and continuous technical support. Ethical data management from EMS is crucial, establishing privacy and confidentiality guidelines to ensure that information is used solely for conservation and fisheries management purposes while safeguarding fishermen's rights.

The financial sustainability of EMS is a priority; funding sources include public funds, collaboration with the private sector, and international support. Additionally, innovation in financing models such as payments for ecosystem services and carbon credits is encouraged.

Although EMS are effective for sea turtle conservation, challenges such as continuous funding, training needs, and data protection also represent opportunities for regional collaboration and the use of advanced technologies.

In summary, EMS are a valuable tool for sea turtle conservation and fisheries sustainability. Their success depends on constant collaboration among all stakeholders, strategic planning, and a continuous improvement approach that maximizes their impact on fisheries management and marine biodiversity protection.

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1. INTRODUCTION

The monitoring and conservation of marine species, particularly sea turtles, have gained critical importance due to the increasing threats these species face. In this context, the implementation of Electronic Monitoring Systems (EMS) in fisheries has emerged as an essential tool for collecting accurate data on bycatch, significantly contributing to sustainable fisheries management and the conservation of vulnerable and endangered species like sea turtles.

Resolution CIT-COP10-2022-R7, “Reduction of the Adverse Impacts of Fisheries on Sea Turtles,” urges IAC member countries to “establish and/or strengthen fisheries monitoring programs to collect information on sea turtle bycatch through, where appropriate, onboard observers and/or electronic monitoring.”

In response to this Resolution, in 2024, the IAC Scientific Committee developed the technical document CIT-CC21-2024-Tec.25, titled "Electronic Monitoring (EM) Systems in Fisheries: Their Importance for Collecting Relevant Information for Sea Turtle Conservation and Lessons Learned from EM Implementation in Chile, the United States, and Peru." This document provides a comprehensive analysis of the outcomes and challenges associated with EMS implementation, offering a valuable resource for IAC countries interested in establishing fisheries monitoring programs and sea turtle bycatch mitigation strategies through EMS.

Despite challenges such as inadequate infrastructure, the need for technical training, and the economic limitations of some IAC countries, the obtained results demonstrate that EMS have significantly improved monitoring capacity and provided crucial data for sea turtle conservation decision-making. The report further emphasizes the need to standardize monitoring protocols and ensure the interoperability of electronic systems at the regional level.

Recognizing that other international entities with which IAc has a Memorandum of Understanding, such as the Agreement on the Conservation of Albatrosses and Petrels (ACAP), the Inter-American Tropical Tuna Commission (IATTC), and the International Commission for the Conservation of Atlantic Tunas (ICCAT), have incorporated discussions and analyses of EMS and provided recommendations on using collected information not only for fisheries management but also for monitoring bycatch of threatened species, including seabirds, marine mammals, and sea turtles. The IAC

Scientific Committee acknowledges the value of these initiatives and, to provide sea turtle-focused information, has considered some of these recommendations and observations.

In this context, and in accordance with Resolution CIT-COP10-2022-R7, the Strategic Alliances Working Group has prepared this guideline document based on the recommendations of report CIT-CC21-2024-Tec.25. This document provides detailed guidance (though not exhaustive, as each country will have its specific legal framework) on the process of establishing and implementing EMS in fisheries, aiming to support both countries that already have EMS and those interested in developing them.

It is important to note that this document is not mandatory but is presented as a guide for IAC member countries wishing to strengthen or implement electronic monitoring systems in their fisheries.

2. OBJECTIVES OF THE IMPLEMENTATION OF ELECTRONIC MONITORING SYSTEMS

2.1 Monitoring and Compliance

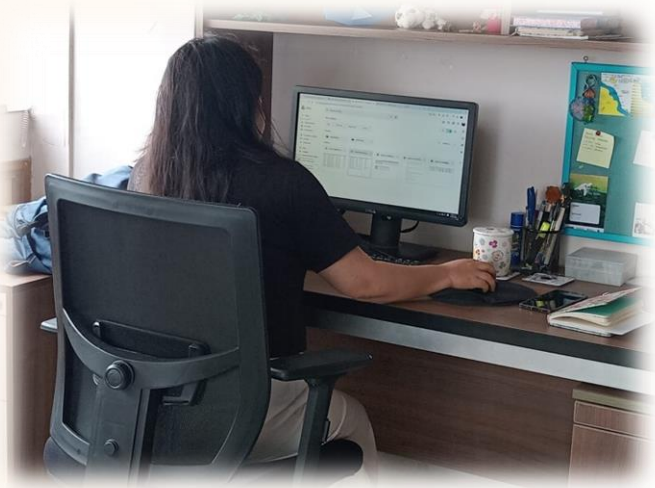
The primary objective of implementing EMS is to ensure that fishing activities are conducted sustainably and in compliance with existing regulations. EMS enable continuous monitoring, facilitating the detection and prevention of unsustainable fishing practices that could endanger biodiversity, particularly sea turtles.

2.2 Scientific Data Collection

EMS provide accurate and continuous data that are fundamental for scientific research. These data allow for a better understanding of the interactions between sea turtles and fishing activities and are essential for developing effective conservation strategies. EMS allow us to:

- Improve compliance: Ensure that fishing operations adhere to established regulations for sea turtle conservation.
- Monitor bycatch: Collect accurate and timely data on sea turtle bycatch and other non-target species such as seabirds.
- Assess fishing effort: Evaluate and quantify fishing effort in critical areas for sea turtle conservation.
- Enhance transparency and traceability: Improve transparency and traceability of fishing operations through continuous data collection.

Annex I includes basic data that could be collected during the processing of images related to sea turtle bycatch.



3. LEGAL FRAMEWORK AND REGULATIONS

The effective implementation of EMS in fisheries requires a solid legal framework that ensures appropriate regulation, compliance with standards, and protection of the rights of all involved parties. This legal framework should be aligned with international best practices and adapted to the specificities of each country.

3.1 Development of the Legal Framework

3.1.1 National Legislation:

Each country should develop and/or update its national legislation to include specific provisions on the implementation and operation of EMS in its fisheries. This legislation should clearly establish the objectives of EMS, the responsibilities of fishing operators, national fisheries authorities, and other involved entities. It should also address the need for permits and specific authorizations for the installation and operation of EMS on fishing vessels.

3.1.2 International Coordination:

Given the transnational nature of many fisheries and the mobility of marine species, it is crucial that national legal frameworks are compatible and coordinated at regional and international levels.

3.1.3 Integration with External Regulations:

The legal framework should be consistent with other international agreements, such as the Convention on Biological Diversity (CBD), the Agreement on Port State Measures (PSMA), and the regulations of RFMOs such as ICCAT and IATTC. This will ensure that electronic monitoring practices in the region align with international standards and contribute to global conservation efforts.

3.2 Technical specifications for SMEs:

The regulations of each country must precisely define the technical specifications that SME must meet in their fleets. This includes:

- Camera and Sensor Quality: Cameras and sensors must be high-resolution and capable of operating in a variety of environmental conditions to ensure accurate and continuous data collection.

- Data Storage and Transmission Capabilities: Systems must have adequate capacities to store large volumes of data and transmit them securely to fisheries authority servers.

- Interoperability: EMS systems must be interoperable, allowing data integration with other monitoring systems, such as global positioning systems (GPS) and automatic identification systems (AIS).

3.2.1 Installation and Maintenance Procedures:

It is essential that regulations establish clear procedures for the installation and maintenance of EMS on fishing vessels. This includes:

- Certification of Installers and Operators: Only certified personnel and companies (companies authorized by the public entity to install and maintain SME systems.

- Periodic Inspections: Fisheries authorities must carry out periodic inspections to ensure that the systems are working correctly and that all required technical specifications are met.

- Preventive Maintenance: Regulations must require operators to carry out regular preventive maintenance to avoid system failures during fishing operations.

3.2.2 Data Collection, Storage and Analysis Protocols:

Protocols should specify how data obtained by EMS should be collected, stored and analyzed:

- Data Collection: Define the types of data that must be collected (e.g., catches of target species, discarded species, fishing effort) and the frequency with which they must be recorded.

- Data Storage: Establish requirements for secure storage of data, including the minimum duration for which data must be retained as a backup and the security measures necessary to protect the information.

- Data Analysis: Regulations should indicate how data should be processed and analyzed, who is responsible for performing this analysis, and how the results will be used to inform fisheries management decisions and/or mitigation of non-target species bycatch.

3.2.3 Compliance and Sanctions:

The regulatory framework should include clear provisions on compliance and penalties associated with non-compliance:

- Mandatory Compliance: Define that the installation and operation of SME is mandatory for all fishing vessels operating in areas with high incidence of sea turtle bycatch.

- Sanctions: Establish a regime of progressive sanctions for operators who do not comply with SME requirements, including fines, license suspension, and possible prohibitions from operating in certain areas.

4. IMPLEMENTATION AND OPERATION OF ELECTRONIC MONITORING SYSTEMS

Successful implementation of an EMS in fisheries requires a systematic and strategic approach. This approach should include careful planning of implementation, provision of appropriate training, establishment of mechanisms for ongoing monitoring, and integration of EMS with other fisheries management tools. Key steps and considerations for EMS implementation and operation are outlined below.

4.1 Strategic Planning

4.1.1 Preliminary Assessment and Pilot Studies:

Prior to full-scale implementation, it is essential to conduct pre-assessments including pilot studies in selected fisheries. These assessments should identify the specific characteristics of each fishery, such as target species, type of fishing gear used, and environmental conditions, to determine the technical needs and capabilities of the EMS. Pilot studies will allow testing the effectiveness of EMSs under real-world conditions, identifying potential technical and operational issues, and adjusting the system as necessary prior to full-scale deployment.

4.1.2 Technology Selection:

Selecting the right technology is crucial to the success of EMS. Authorities must consider a number of factors, including data capture requirements, environmental conditions, and ease of use for fishing operators. The systems selected must be compatible with existing vessels and fishing operations. They must also be adaptable to evolve with technological improvements and changing monitoring needs.

4.1.3 Deployment Planning.

he deployment of SME should be carried out in a phased and strategic manner, prioritizing the areas and fisheries with the highest risk for incidental capture of sea turtles.

- Progressive Deployment: Begin implementation in fisheries where sea turtle bycatch is highest and then expand to other areas. This will allow critical areas to be addressed first and lessons learned to be applied as the program expands.

- Implementation Phases: Break the implementation process into clear phases, with defined goals and timelines for each. For example, the first phase could focus on equipment installation and initial training, while the second phase would focus on ongoing monitoring and evaluation.

4.2 Training and Ongoing Support

4.2.1 Training Programs:

Adequate training of fishing operators and technical staff is essential to ensure the success of EMS. Training programs should be comprehensive and cover both technical and operational aspects.

- Technical Training: Include practical sessions on the installation, operation and maintenance of SME, as well as on the solution of common technical problems.

- Monitoring and Compliance Training: Provide training on the importance of electronic monitoring for sea turtle conservation, applicable regulations, and how data collected is used to improve fisheries management.

4.2.2 Continuous Technical Support:

It is essential that fishing operators have access to ongoing technical support to resolve any issues that arise during the operation of EMS.

- Support Network: Establish a national or regional technical support network to assist vessels with EMS maintenance and troubleshooting. This may include hotlines, in-port maintenance services, and regular system software updates.

- Ongoing Training: Provide ongoing training opportunities to update operators and technicians on new technologies, regulations, and best practices in the use of EMS.

4.3 Monitoring and Evaluation

4.3.1 Continuous Monitoring:

Once implemented, it is crucial to continuously monitor the operation of the SME to ensure that they meet monitoring and conservation objectives.

- Functional Verification: Conduct regular checks to ensure that the EMS are operating correctly, including reviewing the quality of the data collected and detecting possible system failures.

- Compliance Monitoring: Monitoring vessel compliance with regulations using data collected by EMS. Authorities must be empowered to review and analyze the data, identify potential violations, and take corrective action where necessary.

4.3.2 Effectiveness Evaluation:

Regularly evaluate the effectiveness of EMS to ensure that they are contributing to the reduction of incidental capture of sea turtles and compliance with fisheries regulations.

- Results Analysis: Conduct periodic analysis of collected data to assess the impact of EMS on reducing bycatch and improving regulatory compliance.

- Annual Performance Report: Prepare an annual report summarizing key findings from EMS assessments, highlighting both successes and areas requiring improvement. This report should be shared with stakeholders to maintain transparency and facilitate decision-making.

4.3.3 Integration with Other Monitoring Systems:

To maximize the effectiveness of EMS, it is recommended that they be integrated with other fishery monitoring systems, such as global positioning systems (GPS) and onboard observer programs.

- Data Integration: Look for ways to integrate data from SME with data from other sources, allowing for a more complete analysis and better understanding of fishing activities and their impacts on sea turtles.

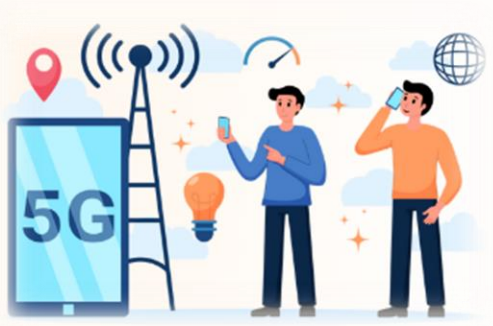
- Inter-institutional Coordination: Promote coordination between different agencies and monitoring programs to ensure a unified and efficient approach to fisheries management.

4.4 Innovation and Continuous Improvement

4.4.1 Adoption of New Technologies:

Technology in the EMS field is constantly evolving. It is important that regulations allow for the adoption or adaptation of new technologies that can improve the effectiveness and efficiency of monitoring.

- Testing New Technologies: Encourage testing and evaluation of new technologies in pilot projects before widespread adoption.



- Systems Update: Establish procedures for the periodic updating of existing SMEs, ensuring that they remain at the technological forefront and continue to meet monitoring objectives.

4.4.2 Policy Evaluation and Review:

SME implementation should be a dynamic process that adapts to changes in fisheries, available technologies and conservation needs.

- Guideline Review: Schedule periodic reviews of SME implementation guidelines to incorporate lessons learned, changes in technology, and new threats or challenges identified in fisheries.

- Stakeholder Engagement: Involve all stakeholders, including fishers, scientists, NGOs, and government agencies, in the process of reviewing and improving SME-related policies and regulations.

4.5 Other Practical Uses of Electronic Monitoring Systems (EMS)

In addition to their application for collecting data on bycatch and fishing effort, Electronic Monitoring Systems (EMS) can also be used on a smaller scale or for complementary purposes to address specific questions that contribute to sea turtle conservation, improved fisheries management, and crew safety. Below are some additional uses of EMS:

4.5.1 Evaluation of Handling and Release Techniques

EMS can be used to develop projects aimed at assessing and improving techniques for handling and releasing sea turtles on board fishing vessels. This information enables the development of specific recommendations tailored to different operational scenarios and environmental conditions. It can also be used to evaluate the effectiveness of training workshops and promote dialogue with fishers, positioning EMS as a collaborative tool in the development and implementation of best practices on board.

4.5.2 Strengthening Crew Safety

An additional advantage of EMS is its use as a tool to improve crew safety during fishing operations, particularly in areas vulnerable to piracy or illegal activities. The images or videos captured by the system can serve as evidence for authorities or legal proceedings in the event of risk incidents or attacks, supporting complaints and providing protection for fishers.

4.5.3 Monitoring Voluntary Compliance with Best Practices

EMS allows for the objective recording of the degree of compliance with voluntary measures implemented by fishers, such as the use of bycatch reduction and exclusion devices or adjustments in fishing practices. This information is valuable for assessing the effectiveness of awareness programs, the commitment of the fishing sector, and for designing incentive strategies that promote broader adoption of best practices.

4.5.4 Recording Interactions with Other Vulnerable Species

Although the focus of this document is on sea turtles, EMS can also capture relevant information on interactions with other protected marine species, such as seabirds, marine mammals, or elasmobranchs. This multi-species monitoring capability strengthens the ecosystem-based approach to fisheries management and enhances the system's contribution to marine biodiversity conservation.

4.5.5 Supporting Certification and Traceability Processes

EMS can provide technical evidence of compliance with regulations and sustainable practices, which is useful in fishery certification processes (such as MSC) or traceability programs. This documentation enhances operational transparency and can facilitate access to markets that value products obtained through responsible and verifiable practices.

5. DATA PROTECTION AND PRIVACY

Data protection and privacy are essential aspects in the implementation of Electronic Monitoring Systems (EMS) in fisheries. Data collection and management must be carried out in a manner that respects the privacy of fishers and vessels, ensuring the security and confidentiality of the information collected. Key guidelines to ensure that data obtained by EMS are managed ethically and comply with international data protection regulations are outlined below.

5.1 Data Protection Regulations

5.1.1 Privacy Policy

It is essential that countries develop and implement clear confidentiality policies to protect information collected by EMS. These policies should ensure that sensitive data, such as the location of fishing operations and personal information of fishers, are handled confidentially and used only for their intended purposes, such as fisheries management and conservation of vulnerable species. Confidentiality policies should precisely define what information is considered sensitive and how it should be protected. They should also specify who has access to this data and under what conditions it can be shared with third parties. In addition, fisheries authorities should implement technical and administrative measures to ensure data confidentiality, such as encryption of information and limited access based on specific roles.

5.1.2 Access to information

Regulations should clearly define who has access to data collected by EMS and under what circumstances. Access should be restricted to fisheries authorities, authorized researchers, and other relevant parties who need this information exclusively for fisheries management and the conservation of vulnerable species.

5.2 Data Management and Storage

5.2.1 Data Storage Security

Data collected by SMEs must be stored securely to protect against unauthorized access, loss or alteration. This includes implementing robust security measures to ensure data integrity and availability.

- Security Measures: Implement advanced security protocols, such as encryption of data in transit and at rest, multi-factor authentication for access to storage systems, and continuous monitoring of data infrastructures to detect potential threats.

- Storage Location: Decide whether data will be stored locally (on vessels) or on remote servers. If cloud servers are used, providers that comply with international security standards and applicable data protection regulations should be selected.

5.2.2 Data Access and Control

Access to data should be strictly controlled to ensure that only authorized persons can access sensitive information. Clear procedures should be established for requesting, approving and recording data access.

- Access Control: Implement a role-based access control system, where only authorized personnel can access certain types of data. This includes defining clear roles and responsibilities for those who have access to the information, from fishing operators to fisheries authorities and scientists.
- Access Logs: Maintain a detailed record of all data access, including who accessed what information and when, to ensure traceability and enable audits in the event of security incidents.

5.2.3 Data Retention and Deletion

Regulations should set out clear periods for data retention, ensuring that information is stored only for as long as necessary to meet the SME's objectives. In addition, secure procedures should be in place for deleting data once it is no longer needed.

- Data Retention Policy: Define the length of time for which data should be retained, based on legal, regulatory and operational requirements. Data that is no longer needed should be securely deleted to prevent unauthorized access.

- Secure Data Deletion: Implement procedures for the secure deletion of data, ensuring that deleted information cannot be recovered. This may include techniques such as cryptographic erasure and physical destruction of storage media.

5.3 Ethical and Responsible Use of Data

5.3.1 Limitation of Data Use:

Data collected by EMS should be used only for the purposes for which they were collected, primarily fisheries management and conservation of vulnerable species. Use of this data for commercial or other unauthorized purposes should be avoided. Regulations should include a clear statement of the purposes for which the data may be used. Any use of data outside these purposes should be strictly prohibited unless there is explicit consent from the affected parties.

5.3.2 Transparency and Informed Consent

It is crucial that fishing operators and other stakeholders are fully informed about how data is collected, stored, and used. Informed consent should be obtained from fishers prior to the implementation of EMS on their vessels.

- Information and Consent: Provide clear and accessible information to fishers on how their data will be handled. Consent must be explicit, documented, and obtained before any monitoring activity begins.

- Rights of Data Subjects: Ensure that fishers and other stakeholders have the right to access, rectify, or delete their personal data, in accordance with applicable data protection laws.

5.3.3 Audits and Supervision

To ensure that data protection policies are implemented effectively, periodic audits must be conducted and independent oversight mechanisms established. Therefore, it is necessary to implement periodic audits of data handling processes to ensure compliance with data protection policies and applicable legislation. Audits must be conducted by certified entities.

6. FINANCING AND SUSTAINABILITY

Funding and long-term sustainability are critical components for successful implementation of Electronic Monitoring Systems (EMS) in fisheries. Financial planning must ensure that the necessary resources are available not only for the initial installation of EMS, but also for their ongoing operation, maintenance, and upgrade. Key aspects to ensure funding and sustainability of EMS are outlined below.

6.1 Sources of Financing

To implement Electronic Monitoring Systems (EMS), countries can consider various sources of funding depending on their capacities and available resources. These sources include:

- Government Funds: Governments can allocate public resources for the installation and operation of EMS, as well as for staff training. Integrating this funding into fisheries conservation and management budgets ensures ongoing support.

- Public-Private Partnership: Private sector participation, especially from the fishing industry, can be a viable option to share costs and promote sector engagement. Companies can contribute through partnerships with the government, collaborations or pay-per-use models of EMS.

- International Support: In the experimental or pilot project stages, multilateral funds could be accessed and donations from international organizations and NGOs can also complement EMS financing, especially in countries with limited resources. Support from entities such as FAO or GEF offers additional financing opportunities for these systems.

This variety of sources provides flexible options that allow each country to tailor the implementation of EMS to its needs and financial capabilities.

6.2 Financial Sustainability Strategies

6.2.1 Equipment Maintenance and Updating

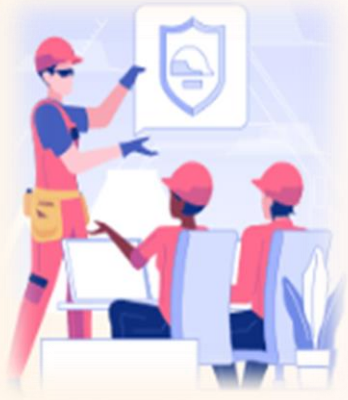
The long-term financial sustainability of EMS requires careful planning to cover the costs of maintaining and upgrading equipment. EMS equipment must be kept in good working order to ensure continuity of monitoring and the quality of data collected. Maintenance includes two factors:

- Reserve Funds: Establish specific reserve funds to cover the costs of maintaining and upgrading equipment. These funds can be financed by government contributions, international donations, or usage fees.

- Maintenance Contracts: Member countries may consider implementing maintenance contracts with technology providers that include regular maintenance services, technical support, and software and hardware upgrades.

6.2.2 Training and Capacity Building

Funding should also ensure ongoing training and capacity building for SME operators, fisheries authorities, and other relevant stakeholders. Therefore, training should be developed:



- Recurrent Training Programs: Establish recurring training programs to ensure that staff are always up to date with the latest monitoring technologies and practices. This may include technical training, updating monitoring protocols, and training on new regulations.

- Educational Partnerships: Develop partnerships with academic institutions and technical training centers to offer courses and certifications related to the use and maintenance of SME. These partnerships can contribute to long-term sustainability by creating a local knowledge base.

6.2.3 Budget Evaluation and Adjustment

Financial sustainability also requires periodic evaluation of budgets to adjust allocated resources according to changing needs. It is therefore important to conduct:

- Annual Financial Reviews: Conduct annual financial reviews to assess the use of funds and the efficiency of SME-related expenditures. This will allow for timely adjustments and ensure that resources are used effectively.

- Results-Based Adjustments: Adjust budgets and funding strategies based on results obtained through electronic monitoring. If areas are identified that require further investment, such as upgrading equipment or expanding monitoring to new areas, resources should be reallocated accordingly.

7. FINAL CONSIDERATIONS

Resolution CIT-COP10-2022-R7 urges member countries to establish and/or strengthen fisheries monitoring through observers or EMS in fisheries that present interactions with sea turtles. The implementation of Electronic Monitoring Systems facilitates obtaining technical information to better understand and mitigate interactions and advance towards effective conservation of sea turtles and sustainable management of fishing activities. Through a comprehensive approach that addresses strategic planning, training, financing, data protection and sustainability, EMS can provide a powerful tool to improve transparency, regulatory compliance, and real-time data collection.

7.1 Importance of EMS for the Conservation of Sea Turtles

EMS have proven to be an innovative and effective tool in the effort to better understand and reduce sea turtle bycatch, one of the main threats facing these endangered species. By allowing for constant monitoring of fishing activities, EMS facilitate the early identification of unsustainable practices and timely intervention to mitigate them. This not only helps preserve sea turtle populations but also contributes to the overall health of marine ecosystems. Furthermore, EMS provide accurate and reliable scientific data that are critical for informed decision-making in fisheries management (ANNEX I). These data can be used to fine-tune regulations, design marine protected areas, and improve conservation strategies at local, national, and international levels.

7.2 Challenges and Opportunities

Although the implementation of EMS presents multiple benefits, it also faces significant challenges that must be addressed to ensure its long-term success. One of the main challenges is sustainable financing. Securing sources of continuous financing for the operation, maintenance, and upgrading of EMS is critical. However, this challenge also offers opportunities for innovation in financing models, including private sector participation, international cooperation, and the exploration of new financing mechanisms such as payments for ecosystem services. Another challenge is the need for training and capacity building. Fisheries operators and authorities must be adequately trained not only in the technical use of EMS, but also in the interpretation of data and its application for fisheries management.

This requires a continued commitment to education and training, as well as the creation of technical support networks at regional and international levels. Data protection and privacy is another crucial aspect. Countries must establish and follow strict data security protocols to protect sensitive information collected by EMS, ensuring that it is used in an ethical and responsible manner.

7.3 Long-Term Sustainability

The sustainability of EMS depends not only on their funding, but also on their integration with other monitoring tools and strategies. Collaboration between member countries, the exchange of best practices, and the constant updating of systems based on technological advances are essential to maintain the relevance and effectiveness of EMS. The approach to sustainability must also include the continuous evaluation of the effectiveness of EMS. This involves not only monitoring the performance of the systems, but also assessing the actual impact on reducing sea turtle bycatch and improving fisheries management. Adjustments and improvements in the implementation of EMS must be based on these evaluations to ensure that the systems evolve according to changing needs and emerging challenges.

7.4 Recommendations for the Future

To maximize the impact of EMS on marine turtle conservation and sustainable fisheries management, the following is recommended:

- Involve all stakeholders, including fishers, scientists, NGOs, and government agencies, in the process of reviewing and improving policies and regulations related to EMS. This is very important, and it is highly desirable that there is support from the (fishing) sector that will have to use the EMS in the negotiation and decision-making processes to establish the EMS.

- Expand the Implementation of EMS: Prioritize the expansion of the use of EMS in the most critical fisheries, where incidental capture of sea turtles is highest.

- Strengthen Regional Collaboration: Promote collaboration among IAC member countries to share knowledge, resources, and best practices in the implementation and operation of EMS.

- Innovate in Financing: Explore and develop new financing models that include private sector participation, the implementation of payments for ecosystem services, and the use of international funds to ensure long-term financial sustainability.

- Updating Technologies and Capabilities: Invest in the continuous updating of SME technologies and in the training of operators and authorities to ensure that systems remain at the cutting edge and that data is used effectively in fisheries management.

- Ensure Data Protection: Establish and maintain high security and privacy standards for the management of data collected by SMEs, ensuring their ethical use and protecting the privacy of fishing operators

Electronic Monitoring Systems (EMS) are a powerful tool for marine turtle conservation and sustainable fisheries management. However, their success requires the formation of a working group involving all stakeholders, as well as carefully planned implementation, sustainable funding, adequate training, and a constant commitment to innovation and continuous improvement. These guidelines are designed to support IAC countries wishing to explore the adoption of EMS in their fisheries by providing general guidelines to guide their decision-making processes. Likewise, for those countries that have already implemented an EMS program, these guidelines can be useful to strengthen their programs and contribute significantly to the protection of marine turtles and a sustainable future for fisheries.

8. ANNEXES

ANNEX 1: Bibliography

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ANNEX I. Basic Data for the Incidental Capture of Sea Turtles

Below is a sheet with the basic data that could be collected during the recording of incidental catches of sea turtles. This information is useful for the analysis and monitoring of these species:

1. General Event Information

- **Event date:**
- **Event time:**
- **Geographic location** (coordinates**):**
- **Fishery involved:**
- **Fishing gear used:** (identifiable in the video, e.g. trawl, longline, etc.)
- **Fishing effort:** (duration of the cast, number of hooks, net size, etc., if in the associated data)

2. Capture Specifications

- **Number of turtles captured:**
- **Condition of turtles at time of capture:**
  - ***Alive***
  - ***Injured***
  - ***Dead***

- **Species identified (if possible):**

  - Green turtle (*Chelonia mydas)*
  - Loggerhead turtle (*Caretta caretta*)
  - Leatherback turtle (*Dermochelys coriacea*)
  - Hawksbill turtle (*Eretmochelys imbricata*)
  - Kemp's ridley turtle (*Lepidochelys kempii*)
  - Olive ridley turtle (*Lepidochelys olivacea*)

3. Description of the Individual

- **Size (shell length in cm):**
  - Straight length
  - Curved length

If not measurable, record apparent size: (assessed visually, e.g. juvenile, sub-adult, adult)

- **Visible markers:**
  - Tags
  - Scars
  - Others

4. Observed Procedures

- **Actions of personnel on board:**
  - Immediate release
  - Handling to reduce damage

- Discarded at sea (indicate whether alive or dead)
- Other action (describe)

Estimated handling time: (from capture to release or disposal, in minutes)

5. Environmental Conditions

- Sea state: (assessed visually, e.g. calm, moderate, rough)
- Other relevant data: (if available in video or system metadata, such as water temperature)
- Depth

6. Additional Observations

- **Comments on the event:** (relevant details observed in the video)
- Video quality:

  - High (sufficient clarity to identify details)
  - Medium (limited identification)
  - Low (difficult identification)

Storage: Associate this tab with the corresponding video file for future reference