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Benchmarking Intergovernmental Organizations' Development of Minimum Standards for Fisheries Electronic Monitoring Systems

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BENCHMARKING INTERGOVERNMENTAL ORGANIZATIONS' DEVELOPMENT OF MINIMUM STANDARDS FOR FISHERIES ELECTRONIC MONITORING SYSTEMS

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Fisheries monitoring programs supply data required for scientific, compliance monitoring and ecological and social sustainability assessments. Fisheries electronic monitoring (EM) systems are increasingly being used to complement and replace conventional human onboard observer programs, and to initiate at-sea monitoring where none previously existed (Gilman et al., 2019; van Helmond et al., 2019). EM systems typically use onboard cameras, global positioning systems, sensors and data loggers to collect information on fishing, transshipment and supply vessel activities. They include office-based staff who analyze imagery (video and/or single frame still photos) and sensor data and input the data into a database. EM systems can be implemented as voluntary programs or as formal programs of national or regional management authorities that have legal and regulatory jurisdiction over the vessels being monitored, where records that result from processing and analyzing EM data are input into a national or regional observer/EM program database.

The US, Australia and Canada have established, fully implemented EM programs. Chile, European Union, New Zealand, Peru, United Kingdom, and some Pacific small island developing states have completed pilots and are considering or planning fully implemented EM programs (van Helmond et al., 2019). While this is tremendous progress, there are an estimated 4.6 million fishing vessels globally – and most of these are in fisheries with no at-sea monitoring (Gilman et al., 2014; FAO, 2020). There is therefore a large monitoring deficit in need of being filled – and a large role for EM in filling this gap.

EM systems can collect most data fields of conventional observer programs (Gilman et al., 2019; Emery et al., 2018). When properly designed, EM systems have several advantages over conventional human observer programs, including overcoming main sources of statistical sampling bias (observer effect, observer displacement effect, coercion and corruption) faced by observer programs (Babcock et al. 2003; Benoit and Allard 2009; Gilman et al., 2020), allowing at-sea monitoring of small-scale fishing and support vessels that present various challenges for placement of human observers, enabling multiple areas of vessels to be monitored simultaneously and near-continuously, and allowing questionable data to be audited and corrected. EM systems, when used on vessels that also have observers, can enable the observers to focus on monitoring tasks, such as biological sampling, that might not be otherwise be feasible (Emery et al., 2018).

This brief report benchmarks the status of the development of minimum standards for fisheries EM systems by intergovernmental organizations and arrangements. Minimum standards for fisheries EM systems are needed to define technical specifications for selecting, installing, operating and maintaining EM equipment (e.g., cameras, sensors and data storage devices) and software; logistical specifications related to how EM data are stored and transferred; minimum requirements for EM analysts and their accreditation; and operational specifications on EM data fields and data collection protocols and on how EM data are reviewed (Restrepo et al., 2018; ACAP. 2021; IATTC, 2020, 2021a; IOTC, 2021a).

The study scope included 15 regional fisheries management organizations and arrangements (RFMO/As) and 4 intergovernmental bodies with remits broader than managing fishery resource, listed in Table 1. RFMO/As are a type of regional fishery body that has a mandate to adopt

measures that are binding on their members. Unlike RFMOs, RFMAs have a form of arrangement through which States adopt binding conservation and management measures that do not provide for the establishment of a Secretariat under a governing body of member States (FAO, 2021). The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), North Atlantic Salmon Conservation Organization (NASCO) and North Pacific Anadromous Fish Commission (NPAFC), which have a wider mandate than the management of fisheries or fishery resources, were also included as these management bodies adopt fisheries conservation and management measures that are binding on their members (Gilman et al., 2014). The study excluded the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (CCBSP) and the International Baltic Sea Fishery Commission (IBFC). There are currently no active CCBSP-managed fisheries and IBSFC was dissolved in 2005 (Gilman et al., 2014). The International Whaling Commission (IWC) was included because aboriginal subsistence whaling is permitted under current IWC regulations, and in the past, there has been special permit whaling operating under the IWC, and while a moratorium on commercial whaling has been in effect since the1985/1986 season, Iceland recently conducted commercial whaling under reservation to the moratorium (IWC, 2019).

Table 1. Status of the development of minimum fisheries EM standards by intergovernmental organizations and arrangements.

Name	Acronym	EM standards: 1 adopted 2 draft 3 planned 4 being discussed 5 not being discussed	Citation
RFMO/As			
Commission for the Conservation of Southern Bluefin Tuna	CCSBT	4	CCSBT, 2022a,b
General Fisheries Commission for the Mediterranean	GFCM	4	GFCM, 2022
Indian Ocean Tuna Commission	IOTC	2	Murua et al., 2020; IOTC, 2021a,b, 2022
Inter-American Tropical Tuna Commission[1]	IATTC	2,3,4	IATTC, 2020; 2021a,b,c; 2022a,b,c
International Commission for the Conservation of Atlantic Tunas	ICCAT	3	ICCAT, 2021, 2022
International Pacific Halibut Commission	IPHC	5	IPHC, 2023
Joint Norwegian-Russian Fisheries Commission	JNRFC	5	--
North East Atlantic Fisheries Commission[2]	NEAFC	4	NEAFC, 2021
Northwest Atlantic Fisheries Organization	NAFO	4	NAFO, 2022a,b
North Pacific Fisheries Commission	NPFC	4	NPFC, 2020, 2021
Pacific Salmon Commission	PSC	5	PSC, 2022
South East Atlantic Fisheries Organisation	SEAFO	5	SEAFO, 2015, 2022a,b
Southern Indian Ocean Fisheries Agreement	SIOFA	4	SIOFA, 2021a,b, 2022a,b
South Pacific Regional Fisheries Management Organisation	SPRFMO	4	SPRFMO, 2022
Western and Central Pacific Fisheries Commission	WCPFC	2	WCPFC, 2022a,b
Remit broader than managing fishery resources			
Commission for the Conservation of Antarctic Marine Living Resources	CCAMLR	4	CCAMLR, 2022
International Whaling Commission	IWC	5	Lent, 2023
North Atlantic Salmon Conservation Organization[3]	NASCO	5	NASCO, 2020, 2022
North Pacific Anadromous Fish Commission	NPAFC	5	NPAFC, 2020, 2021

[1] IATTC has adopted EM definitions (IATTC 2021a), has adopted a detailed workplan for implementation of an eastern Pacific Ocean EM system, convened a series of workshops that discussed and drafted EM system standards on the institutional structure (IATTC, 2021b), the goals and scope of an EM system (IATTC, 2021c), some subcomponents of the EMS management considerations (IATTC, 2022a), technical standards (IATTC, 2022b) and data collection priorities (IATTC, 2022c). Components of EM standards on financial considerations, data collection and reporting, and EM coverage and review rates remain to be developed.

[2] NEAFC has limited observer provisions under Recommendation 19:2014.

[3] A small West Greenland fishery is the only at-sea fisheries for salmon in the North Atlantic conducted by NASCO's Contracting Parties.

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