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SYNTHESIS AND COMPILATION OF SUBMISSIONS ON EXPERIENCES IN MAINSTREAMING BIODIVERSITY IN FISHERIES

Note by the Executive Secretary

1. In decision XIII/3, the Conference of the Parties to the Convention on Biological Diversity outlined a number of specific actions and approaches to be taken by Parties, other Governments and relevant organizations to support mainstreaming biodiversity in fisheries and aquaculture. In the same decision, the Conference of the Parties requested the Executive Secretary to compile experiences in mainstreaming biodiversity in fisheries, including through the ecosystem approach to fisheries, and to make this compilation available prior to the fourteenth meeting of the Conference of the Parties to the Convention.
2. Pursuant to this request, the Executive Secretary issued notification 2017-121, dated 16 November 2017, requesting information on experiences in mainstreaming biodiversity in fisheries, including through the ecosystem approach to fisheries.
3. Submissions were received in response to this notification from Antigua and Barbuda, Argentina, Australia, Canada, Colombia, Costa Rica, Ecuador, Japan, Mexico, Norway, the United States of America, the Food and Agriculture Organization of the UN, the North-East Atlantic Fisheries Commission, the Northwest Atlantic Fisheries Organization, Birdlife International and the Strathclyde Centre for Environmental Law and Governance. The submissions were collated, compiled and synthesized in the attached synthesis and compilation, in collaboration with the Fisheries Experts Group of the IUCN Commission of Ecosystem Management (IUCN/CEM/FEG). They describe various activities undertaken by Governments and relevant organizations related to mainstreaming biodiversity in fisheries.

SYNTHESIS OF SUBMISSIONS ON EXPERIENCES IN MAINSTREAMING BIODIVERSITY IN MARINE FISHERIES¹

Abstract

The submissions received in response to notification 2017-121 have been analysed with a view to identifying the main actions taken to facilitate mainstreaming of biodiversity in fisheries. While the sample size and the reports do not allow for universal conclusions to be drawn, the submissions provide an overview of a very rich range of actions and measures. The progress in implementation is more advanced in some countries, and these experiences may be useful for those Parties still struggling to develop their implementation capacity with regard to mainstreaming biodiversity in fisheries.

1. INTRODUCTION

On 16 November 2017, the CBD Secretariat issued notification 2017-121, which invited Parties, other Governments and relevant organizations to submit information on experiences in mainstreaming biodiversity in fisheries, including through the ecosystem approach to fisheries. Responses were received from: Argentina, Antigua and Barbuda, Australia, Canada, Colombia, Costa Rica, Ecuador, Japan, Mexico, Norway and the United States of America. In addition, responses were also received from the Northwest Atlantic Fisheries Organization (NAFO), the North-East Atlantic Fisheries Commission (NEAFC), Birdlife International and the Strathclyde Centre for Environmental Law and Governance (SCELG).

The following is a brief synthesis of the information contained in the submissions, with a focus on practical actions and their outcomes, when information was provided in the submissions. The sample of Parties and Other Governments (11), regional fisheries management organizations (2) and other institutions (2) that have responded is too small to lead to any universal conclusion. The responses also provide different degrees of detail, and some responses focus only on certain types of fisheries (i.e. inland, marine, fisheries, aquaculture). However, the primary focus of the submissions is on marine fisheries.

In general, the submissions included elements regarding legislation, policies and management plans, specific measures taken (including pilot projects) as well as tools, guidance and other relevant scientific and technical information.

In some cases, the information provided indicates mainly the commitments and initial measures taken to initiate or accelerate the process of mainstreaming. In others the information describes very well-developed legal and policy frames, implementation systems, outcomes and lessons learned that may prove useful for other Parties.

2. ACTION AND OUTCOMES AT NATIONAL LEVEL

2.1 Updating of legal frames

Several (but not all) countries report that their legal frame (e.g. fisheries acts, marine resources act, environment and biodiversity conservation act) have been modified or additional legislation were elaborated in order to better (1) integrate the ecosystem approach and the precautionary

¹ An overview provided by the Fisheries Expert Group of the IUCN Commission on Ecosystem Management (IUCN-CEM-FEG), as commission by the Secretariat of the Convention on Biological Diversity.

approach into fisheries policy, (2) conserve and sustainably utilize resources and (3) conserve marine and coastal water ecosystems, minimizing and mitigating impacts on biodiversity.

These modifications generally aimed to formalize the implementation of the ecosystem approach to fisheries. The more advanced developments reflect a paradigm shift in fisheries management from a focus on target species and stocks of major economic value, to a broader range of stocks (including data-poor stocks), explicitly considering impacts on non-target species, threatened species, habitats and ecosystem structure and function.

In these legislation, or in addition to them, specific trade regulations have been introduced in some countries to control extraction and export of aquatic resources, making the environmental performance of the fishery as a condition to export its products. For example, in Australia, the 1999 Environmental Protection and Biodiversity Conservation (EPBC) Act requires that fisheries ‘take all reasonable steps’ to ensure that EPBC Act listed species—cetaceans, marine, migratory and threatened species (other than conservation-dependent)—are not killed or injured as a result of the fishing; and the fishery does not, or is not likely to, adversely affect the survival or recovery of the species.

2.2 Updating of policies

Updating of policies is often easier and more sustainable in countries where the legal framework has been also updated towards the same intention/objectives, offering a guarantee of lawfulness to the actors.

The effective implementation of the ecosystem approach to fisheries (EAF) requires the redefinition of fisheries management objectives and a re-balancing of goals regarding the bioeconomic and ecological performance of the fisheries, with due regard to target stocks but also to the collateral impact on non-target species (reducing bycatch of mammals, seabirds and turtles) and habitats. The long-term economic and social performance (and equity) remain fundamental conditions to sustainability.

Nonetheless, while all submissions refer to the legal framework underpinning their efforts towards mainstreaming, few of them refer explicitly to an updated policy framework to facilitate it. Exceptions are in Colombia where a national policy for integrated management of biodiversity and ecosystem services was adopted in 2012 and in Australia where the ESD framework has been adopted in the late 1990s and has been supported by ESD Guidelines, and Commonwealth-level policies on harvest strategies and on bycatch impact minimization.

Increasing participative governance and use of local knowledge is seen as important in coastal community fisheries to promote stewardship for sustainable fisheries and conservation.

2.3 Updating of management plans

The submissions indicate that that all respondents, independently of whether they updated formally their legal and policy frames, have established plans to facilitate the implementation of the ecosystem approach to fisheries (EAF), an approach which is clearly referred to as underpinning the actions undertaken by all respondents (national or regional) to promote effective mainstreaming of biodiversity in fisheries.

For example, National Plans of Action (NPOAs) have been adopted and are being implemented, apparently following the framework of the FAO International Plans of Action (IPOA) established at FAO such as:

- NPOA-IUU: to deter and eliminate IUU and that include action to: (i) improve fishers’ education and outreach on ecological matters; (ii) improve surveillance and enforcement, including through the use of Automatic Identification Systems (AIS), on-board video cameras (to check landings and bycatch); and (iii) spot checks on markets and retail outlets.

- NPOA-Sharks for the management and conservation of cartilaginous fish (sharks, rays, and chimeras) particularly threatened species.
- NPOA-Seabirds for the protection of seabirds from threats in in long line fisheries.
- Protection of marine mammal in their interactions with fisheries.
- Protection of sea turtles

These plans have often been jointly elaborated by the authorities in charge of fisheries and of the environment and biodiversity.

Stock rebuilding plans have also become a priority in many advanced countries. These plans tend to cover first the most economically important depleted resources but in a few countries more attention is also being progressively paid to resources of minor importance, using low-cost approaches.

Integrated management plans have been developed, providing a framework for mainstreaming of sustainable use of marine resources and ecosystem services (e.g. in all Norwegian seas), integrating economic and ecological objectives in a single instrument.

Voluntary fishery resources management plans have been developed in Japan by Industry and fishing cooperatives, as a vehicle for shared management and enforcement responsibility.

In Japan, Planning assistance has been provided to developing countries to develop plans of action for sustainable use of fisheries resources and conservation of marine ecosystems

2.4 Measures, instruments and tools

The submissions provide information on a wide range of technical measures that have been taken to effectively implement the ecosystem approach to fisheries, including conventional measures to promote sustainable utilisation and new ecological measures to further integrate ecosystem-wide considerations into fisheries management.

2.4.1 Conventional measures

The FAO Code of Conduct for Responsible Fisheries (CCRF) provides a framework and a range of conventional measures aiming at controlling fishing patterns (i.e. the distribution of fishing pressure on species and sizes). Measures include: (i) Mesh size regulations; (ii) Closed areas, to protect juveniles, including real-time closures; (iii) Closed seasons, to protect spawners; (iv) use of biodegradable materials and retrieval of lost gear to reduce/avoid “ghost fishing” by lost pots or nets;

Overall fishing pressure can be controlled using: (i) Catch limits (to limit the pressure); (ii) Harvest Control Rules (HCRs), to fine tune the pressure using pre-agreed decision rules; (iii) Economic incentives, including exclusive use rights are used to promote longer-term stewardship. Reduction of Illegal Unreported and Unregulated (IUU) Fishing has been a growing concern for the last few decades, including through: (i) Improved enforcement; (ii) Generalization of satellite Vessel Monitoring Systems on commercial-size fleets; (iii) On-board video sets to control catches and bycatch; (iv) Port-States measures to control landings and trade, based on the binding FAO Port-States Measures Agreement (PSMA); (v) Catch certification and traceability); and (vi) improved control of national fleets operating in the high seas.

2.4.2 Ecological measures

These measures reflect concerns that are broader than conventional fisheries management. Some are similar to conventional measures, but their objective is to reduce collateral impact. They tend to be specific to the fisheries and species of concern and include: (i) Marine protected areas; (ii) Areas designated for sustainable fisheries and conservation; (iii) Prohibitions of certain gears (bans) in certain areas to protect endangered species from bycatch, focusing on species most at

risk (e.g. turtles, sharks, birds), or to protect entire vulnerable habitats (e.g. trawls in coral reefs or vulnerable marine ecosystems (VMEs); (iv) use of bycatch excluder devices (e.g. selection grids, circle hooks, birds scarring lines); (v) Catch documentation schemes controlling exports; (vi) Making exports of national fisheries conditional to fleets being certified for ecological performance; (vii) Compulsory reporting of interactions of fisheries with species of concern; (viii) Systematic use of Ecological Risk Assessment (ERA) and management to develop improved management strategies; (ix) Production of Guidelines for EAF implementation; (x) Identification, declaration and protection of critical (vulnerable) ecosystems (e.g. VMEs); (xi) Ban of bottom-contact gears in VMEs; (xii) Provision of prey quotas for top predators; (xiii) Voluntary codes of conduct developed by the fishing industry; (xiv) Systematic use of the Red List as a yardstick for low-cost management of the less economically important species, including through the development of National Red Lists; (xv) special precautionary measures are taken to control fisheries exploration and development in pristine areas; (xvi) Improving information on the use of threatened species (e.g. sea turtles); (xvii) Restoration of critical habitats (seagrass beds; tidal flats, mangroves).

Figure 1 gives an example of “stock table” used to produce a synoptic view of ecological issues affecting fisheries in a country or region

STOCK	Status of knowledge 1-3	Key role 1-2	State of stock 0-6	Fishing mortality 0-5	Red/Black-listed 0-6	Pollution 0-2	Catch value 1-5	Recreational value 1-3	Recreational share 1-4	Shared stock 1-4	Management objective 0-4	Measures implemented 1-3	Priority new measures 1-3	Comment box
Sprat high seas	2	2	1	2	1	1	4	3	4	2	3	1	1	
Sprat coastal	2	2	0	0	2		3	3	4	3	3	3	3	
Blue whiting	1		1	2	1		2	3	4	1	1	1	2	Unsolved multilateral question
Capelin I, II	1	1	1	2	1	1	2	3	4	1	1	1	1	
Capelin IIa, Va, XIV	2	1	0	0	1		3	3	4	1	1	1	1	
Mackerel	2		1	2	1		1	1	4	1	1	1	2	Unsolved multilateral question
Herring IIIa, IVa,b	1	2	1	2	1	1	3	2	4	1	1	1	1	
Herring I, II, IVa	1	1	2	2	1		1	2	4	1	1	1	2	Unsolved multilateral question
Silvery pout	3		3	3	1		4	3	4	2	3	3	1	
Horse mackerel	2		0	4	1		3	3	4	2	3	2	1	
Sandeel	2	1	5	2	1		3	3	4	2	2	1	1	
Greater argenteines	2		3	3	1	0	3	3	4	2	2	1	1	
Norway pout	2	2	1	2	1		3	3	4	2	3	1	1	
Blue ling	3		5	0	4	0	4	3	4	2	3	1	1	
Tusk	2		3	4	1	0	3	2	4	2	2	1	1	
Whiting	2		3	3	1	1	4	2	4	1	1	1	1	
Haddock IV	1		1	2	1	1	3	2	4	1	1	1	1	
Haddock I, II	1		1	2	1	0	1	2	4	1	1	1	1	
Ling	2		3	3	1	0	2	2	4	2	2	1	1	
Pollack	3		5	0	1	0	3	1	2	3	3	3	2	Minimum size
European hake	2		3	3	1	0	3	2	3	3	3	3	2	
Saithe IIIa, IV	1		4	2	1	0	2	1	3	1	1	1	1	
Saithe I, II	1		3	4	1	0	1	1	3	3	1	1	1	
Greater forkbeard	3		3	3	1		4	3	4	2	3	3	1	
Coastal cod I, II	2		5	5	1	2	2	1	2	1	2	1	1	
Coastal cod IIIa, IV	2		6	5	1	2	4	1	1	1	3	1	3	
Cod IIIa, IV	1		2	2	1		3	2	4	1	1	1	3	Revision of the management plan
Cod I, II	1		1	2	1	1	1	2	4	1	1	1	1	

Figure 1: Example of colour-coded “stock table” on state of stocks used to provide a synoptic view of the state of resources at ecosystem level and prioritize management action (In Norway). Stocks are in rows. Issues are in columns. A similar table lists fisheries, their status and issues, regarding *inter alia* discards, incidental mortality on species of concern, impact on seabed, etc. (Gullestad et al., 2017)²

2.4.3 Other supporting measures

These types of measures are aimed at enhancing and facilitating the use of the measures mentioned above. They include: (i) Education of fishers regarding ecological risks related to fisheries; (ii) Awareness-raising with consumers; (iii) Aquaculture development for stock enhancement; (iv) Training courses (such as on disentangling of marine mammals from fishing

² Gullestad, P.; Abotnes, A.M.; Gunnstein, B.; Skern-Mauritzen, M.; Nedreaas, K. & Søvik, G. 2017. Towards ecosystem-based fisheries management in Norway – Practical tools for keeping track of relevant issues and prioritising management efforts. Marine Policy, 77: 104-110

gear); (v) Integrated management of inland fisheries at watershed level; (vi) Allowing public access to information on stock assessment data of all stocks; (vii) Control of invasive species; (viii) Involvement in international cooperation to promote the mainstreaming of biodiversity values at regional or global level; and (ix) increased cooperation between fisheries and conservation agencies.

Projects are being implemented, sometimes with external funding, to develop a more ecological approaches to fisheries, including legal and policy frames, institutional capacity-building, biodiversity impact mitigation reduction, and ecosystem-based, cross-sectoral spatial planning.

Science is an essential aspect of supporting management. Examples given in the submissions include: (i) Use of best available science for stock assessment and policy development; (ii) Research on biodegradable materials; (iii) Research on prediction of climate change impacts on resources and fisheries; (iv) Targeted research on management effectiveness; (v) Systematic research on by-catch and other impacts on various high-risk marine species by high-risk fisheries; (vi) Systematic assessment of biodiversity potentially affected by fisheries, e.g. target, non-target, bycatch and threatened species as well as on the surrounding ecosystem; (vii) generalization of Ecological Risk Assessment, and (viii) National marine science plans.

3. ACTION AND OUTCOMES IN REGIONAL ORGANIZATIONS

At the regional level, submissions were provided by the Northwest Atlantic Fisheries Organization (NAFO) and the North-East Atlantic Fisheries Commission (NEAFC).

Both organizations have modified their Conventions—NEAFC in 2006 (amendments in force in 2013) and NAFO in 2007 (amendments in force in 2017)—to formalize the use of the ecosystem approach to fisheries, extending the scope of the organizations beyond target stocks to also minimise harmful impacts on other parts of the marine ecosystem and to conserve marine biodiversity. NEAFC, which is supported with scientific advice by the International Council for the Exploration of the Sea (ICES), has pioneered the consideration of ecosystem issues in fisheries in the 1990s and developed a specific deep-sea fisheries focus since 1999.

In terms of measures to mainstream biodiversity into fisheries management, both organisations have closed areas containing vulnerable marine ecosystems (VMEs), to protect mainly the very vulnerable cold soft corals and sponge reefs. NAFO has closed 21 areas covering 10% of its regulatory area. It has produced a list of VME indicator species and has mapped the VMES in its regulatory area. NEAFC has closed 7 areas. It has also identified “existing bottom fishing areas” in 2014, severely restricting exploratory fishing outside these boundaries. It has also developed encounter protocols and lists of VMEs indicator species. It has put in place special protections on sharks, rays and chimaeras and, since 2016, has closed certain fisheries and prohibited the bycatch of some species. Practically all VME areas have been closed to fishing.

In terms of management-support science, these organisations have focussed on: (i) improvement of their scientific infrastructure in support of EAF implementation, NAFO established a working group on ecosystem science and management and developed a Roadmap for EAF.

Collaboration with institutions with complementary mandates is also essential. The functional relationship between NEAFC and ICES has been noted above. NEAFC has also strengthened its cooperation with the OSPAR Commission (the regional seas convention for the North-East Atlantic), on areas of mutual interest with regard to management of impacts on the marine environment.

4. CONCLUSIONS

Even though the sample of submissions available cannot be considered as a representative sample, it reveals a very large range of actions, in legal, policy and management frameworks and measures.

The submissions differ in comprehensiveness and detail and this may reflect differences in the degree of advancement in the mainstreaming process and its implementation.

The submissions generally lack information on the results and outcomes of their efforts in mainstreaming. Performance assessment in that respect might not be easy, as the objectives of mainstreaming against which performance could be measured are broad and not easily materialized in indicators.

If the central objective of mainstreaming biodiversity in fisheries is to minimize significant adverse impact of fishing activities on biodiversity, the degree of implementation of Aichi Biodiversity Target 6 could be a useful measure of mainstreaming performance.

Compilation of submissions received in response to notification 2017-121

Submitter	Instruments described in submission	Specific measures/actions described in submission
PARTIES AND OTHER GOVERNMENTS		
Antigua and Barbuda	Fisheries Act (2006, modified 2013): promotes fisheries sustainability, including strategies to reduce IUU fishing	• Conventional measures: (i) Closed seasons for vulnerable, highly valued, and/or ecologically important species; (ii) Protection of juveniles and/or critical life stages for some species; (iii) Prohibiting harvesting of critically endangered, endangered or threatened species; (iv) Prohibiting destructive gear and setting limits on others. • Combatting IUU: (i) Education and outreach to fishers; (ii) Enforcements patrols; (iii) spot checks at local markets and retail outlets; (iv) Surveillance through installation of a coastal radar system and provision of automatic identification systems. • Ecological measures: Declaration and protection of ecosystems under the Fisheries Act. Establishment of MPAs. • Research on biodegradable panels for fish traps.
Argentina	Aquaculture regulation: Law N° 27.231 of 2015	Promotes sustainable socioeconomic development of aquaculture in a science-based ecosystem framework, including for stock enhancement (rebuilding), territorial coordination, collection of statistics, capacity-building, support to distribution and trade (traceability); and food safety control.

	Inland fisheries regulation	• The Commission on inland fisheries and aquaculture (2005) promotes integrated management of fisheries and aquaculture at watershed level (fishery registries; improved control, gear regulations, stock assessment, inter-institutional agreements). • Extraction and export of inland fish resources is regulated through various laws and decrees since 2007, including through caps on exports by species. • Projects and research on: (i) Assessments of stocks of interest for recreational and commercial fisheries of Rio Paraná (EBIPES) (2005-); (ii) Fisheries management and biodiversity conservation in Rio Parana and Rio Paraguay, towards a harmonized ecosystem approach, management capacity-building; reduction of biodiversity impact, cross-sectoral space-based management; (iii) Regional fisheries management plan in the Rio de la Plata Argentinian watershed; (iv) Various projects for the evaluation, conservation and management of river fisheries in the Uruguay, de la Plata and Paraná rivers.
	Marine fisheries regulation: Law N° 24.922 (1997)	• Target and bycatch species-oriented policies have been adopted, regulating fishing areas, gears, minimum landing sizes, closed seasons, Total Allowable Catches (TACs) for the main species. • Bi-national management plans have been established within the framework of the Comisión Técnica mixta del Frente Marítimo including closed seasons, TACs, trip-limits and considerations on environmental impact. • National Plans of Action (NPOA) have been jointly developed between the authorities in charge of fisheries and environment on cartilaginous fish (2015) and to reduce interaction with sea-birds (2016), marine mammals (2016) and turtles, putting observers on board fishing vessels, improving data and mitigation measures on bycatch in several important fisheries. The NPOA-IUU, since 2008, focused on catch traceability, legal certification of fishing activities, on-board video systems to check the fishing activity and catch composition (the data is geo-referenced and transferred by satellite). • Projects to strengthen the management and protection of marine coastal biodiversity in Key Ecological Areas and EAF.
Australia	1991 Fisheries Management Act and 1999 Environment Protection and Biodiversity Conservation Act (EPBC)	• Promote ecologically sustainable development (ESD). Guidelines published for mainstreaming of ESD, consistent with the Precautionary Approach and the Ecosystem Approach. • Independent performance evaluation every 3, 5 or 10 years. 130 fisheries are under EPBC approval process. Approval needed for export. • EPBC requires: all reasonable steps' to ensure that EPBC-listed species (cetaceans, migratory and threatened species –other than conservation dependent species– are not killed, or likely to be adversely affect in their survival or recover, by fishing.
	Commonwealth Fisheries	• Introduces certainty in the fishery management and operations processes • Establishes a science-based strategic approach to fishery management and achievement of biological and

	Harvest Strategy Policy	economic goals
	Commonwealth fisheries bycatch policy	• Aims to avoid/minimize fisheries-related impact on bycatch species through gear selectivity controls, bycatch excluder devices, education programmes, etc. Interactions of fisheries with bycatch species are reported quarterly by AFMA • Application of Ecological Risk Assessment (ERA), focusing on high-risk issues
	National Plans of Action (NPOAs)	• Part of the FAO CCRF implementation and reporting framework • NPOAs on sharks, IUU, seabirds
	Fishing & Aquaculture Research Development & Extension (RR&E) Strategy	• Sets out a RD&E Plan for more focused, efficient and effective fisheries. • The Marine Science Plan 2015-2025 outlines the research, infrastructure and skills needed
	Other mainstreaming instruments	• Regulatory (command & Control): Fishing closures to protect threatened, endangered or protected species; Gear specifications; Size restrictions; Independent monitoring; Bag limits; Limited entry; TACs; fines. • Economic instruments (Charges, fees, statutory fishing rights; Tradable Effort Units (TEU); Transferable gear units; ITQs; Performance bonds • Environmental Impact Assessment (EIA); Environmental Strategic Evaluation (ESE); Territorial planning. • Intervention in international conventions : CITES, CBD, CMS, SIOFA, CCMALR; World Organisation for Animal Health, to avoid/minimize impact, including through trade controls, catch documentation schemes; • Implementation of the FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing (PSMA).
Canada	N/A	• International Governance Strategy Science Program. Targeted research on the effectiveness of management measures in providing conservation & biodiversity benefit. Monitoring, research, and stock assessment to inform management on stock status, TACs, and ecosystem impacts of fisheries on species-at-risk. Information on bycatch of species at risk. Protection of key concentration areas of corals and sponges (VMEs) including in areas beyond national Jurisdiction.
Colombia	Plans for the management of species-at-risk	• National plans of action on: (i) invasive species; (ii) integrated management of biodiversity and ecosystem services; (iii) Marine mammals; (iv) use and conservation of aquatic resources (and committees for their implementation)

	National policies on: (i) Biodiversity (1995); Integrated management of biodiversity and economic services (2012); (iii) Sustainable development of ocean space, and coastal and insular areas (2000)	• Listing of species at risk. Key species of concern (including in CTES, such as: (i) sharks, rays and chimeras; queen conch (<i>Strombus gigas</i>); Parrot fish (<i>Scarus coeruleus</i>, and <i>S. Guacamala</i>). • National Red List of marine fish has been updated and re-assessed. • Workshop on entanglement of marine mammals on the Pacific Coast of Colombia • Participatory workshops on use, and conservation of marine turtles. Improved monitoring • Declaration of protected areas and areas of integrated management for conservation and sustainable use of straddling and highly migratory species (Malpelo) and mangroves (Cabo manglares, Tumaco) • Control of invasive species: <i>Carijoa riisei</i>; <i>Pterois volitans</i>; <i>Penaeus monodon</i>; <i>Kappaphycus alvarezii</i>
Costa Rica	Executive Decree N° 35502-MAG (2009) on AMPRs and shared governance. Executive Decree N° 39.195-MAG.MINAE-MTSS on application of the FAO SSF	• Shared governance systems with the civil society in voluntary Marine Areas for Responsible Fisheries (AMPRs). These areas, requested by the fishery sector, are recognized “of public interest” and may include totally or partially closed areas and seasons. Mangrove reforestation is undertaken (Blue carbon program). Participative program of the use of clams in these mangroves. Development of participative resources assessments using local knowledge (small-scale shrimp fisheries). • Focus on EAF and equitable distribution of benefits • Application of the 2010 FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication with a focus on human rights and vulnerable communities; • New law being prepared to strengthen AMPRs closely linked to SDGs implementation.

	Guidelines	
Ecuador	N/A	• Monitoring, including for both fishery-related and biodiversity aspects, of the green lobster (<i>Panulirus gracilis</i>), Pomada shrimp (<i>Protrachypene precipua</i>), Corvina de Roca (<i>Brotula clarkae</i>), octopus, <i>Pseudocurimata boulengeri</i> (Characiformes: Curimatidae), and fish of province of Los Rios • Proposed fisheries management plan for the exploited populations of spiny lobster, rock corvina and octopus in the Galera San Francisco Marine Reserve
Japan	N/A	• Development and implementation of voluntary resources management plans • Development and improvement of measures to mitigate and reduce bycatch of seabirds and marine turtles, including through awareness raising. • Through FAO Trust Fund projects, support to developing countries in: i) drafting and implementing national PoAs for sustainable fisheries and conservation of marine ecosystems; and ii) capacity-building on catch traceability. • National Red List for marine species published (2017). • Promotion of consumer awareness of eco-labels for products from sustainable fisheries • Accession to FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing in 2017. • Several statutory regulations including an area-based conservation measure to protect and enhance fisheries stocks, based on scientific stock assessments • Effective conservation and restoration of seagrass beds and tidal flats
Mexico	Regulations: NOM-046-SAG/PESC-2017 and NOM-044-SAG/PESC-2017	• Gulf of Mexico: Closure of all fisheries on groupers; Closed areas and seasons on all species of shrimp in marine and estuarine areas; Regulation of tuna fishing in Mazatlan (Sinaloa): an example of highly selective fishing with lowest bycatch and reference on best fishing practices; Seasonal closures on queen conch (Quintana Roo); Seasons and area closures on coffee sea-cucumber (<i>Isostichopus badionatus</i>). Fishery refugia established in Quintana Roo. • Pacific Ocean: Closed seasons introduced in the fisheries for: (i) shrimps, including the Gulf of California); (ii) tuna (<i>T. Albacares</i>; <i>T. obesus</i>; <i>K. Pelamis</i>). Closed season for purse-seining in the IATTC regulatory area; (iii) Abalone, with stock enhancement; Octopus, Baja California; Chocolate clam, Baja California; Catch limits implemented for

	Strategy for the conservation and sustainable use of biodiversity Other regulations are being prepared	croackers (<i>Cynoscion orthonopterus</i>) Gulf of California; Bluefin tuna (<i>T. Orientalis</i>) in the IATTC area; Fishery refugia established in the States of Sonora, Baja California; Temporary prohibition of gillnets and longlines in the Gulf of California; Control of small-scale fisheries in the Gulf of California; Efforts to obtain MSC certification of the Sardine fishery in the Pacific Ocean. • Other regulations, including prohibition of retention of lobster catch on trawlers. • Monitoring projects for <i>Curvina golfini</i>; Fishing operations in the Upper Gulf of California (Pelagic data system).
Norway	New Marine Resources Act (2009) Integrated (cross-sectoral) management plans for all Norwegian sea areas developed (2006-2013).	• Integration of conservation and sustainable use, and involvement of all competent agencies in the planning process. • Confers to the Ministry an obligation to evaluate whether continued fishing at the present scale is justifiable, or whether improved management is required. • Mandatory application of the ecosystem approach for fisheries management, taking into account habitats and biodiversity (Art. 7) • Objectives: increase and optimize long-term economic output; Integrate species interactions, bycatch, habitats impact; Control fishing capacity • Measures include: Stakeholders' participation; Harvest control Rules (HCRs); depleted stocks rebuilding; Improvement of fishing patterns; reduction of discards; Stock and fisheries synoptic tables; efforts on data-poor stocks (using IUCN Red List);
USA	N/A	• Ecological measures: To reduce conflict between double-crested cormorants conservation and aquaculture production. • Research: (i) Predicting climate change impacts on river ecosystems and salmonids across the Pacific Northwest; (ii) Developing fish trophic interaction indicators of climate change for the great lakes; (iii) Linking river management to species conservation; (iv) Connecting food-web dynamics to changes in multispecies assemblages to inform fisheries management; (v) promotion of Ecosystem-Based Fisheries Management (EBFM); (vi) Incorporating climate change considerations into fisheries management.
ORGANIZATIONS		
United Nations Food	Publication of a review of	• The Food and Agriculture Organization of the UN, in order to describe the historical and current consideration of biodiversity across fisheries, collaborated with the International Union for Conservation of Nature - Commission on

and Agriculture Organization (FAO)	Mainstreamin g of Biodiversity in Fisheries	Ecosystem Management - Fisheries Expert Group (IUCN/CEM/FEG) to prepare a journal article on the subject of “Mainstreaming Biodiversity in Fisheries”. This journal article has been published in Marine Policy. The journal article highlights the journey that the fisheries sector has taken in conserving biodiversity, its successes, on-going deficiencies and gaps. The publication also suggests what further work is needed to realize full coherence of legal frameworks, policies and practices across fisheries (and environment) streams. Within the article, real examples are given with suggestions of how to further strengthen cross-sectoral collaboration in mainstreaming. • Reference: Friedman, K., Garcia, S., Rice, J. 2018 Mainstreaming biodiversity in fisheries. Marine Policy. https://doi.org/10.1016/j.marpol.2018.03.001, (https://www.iucn.org/sites/dev/files/content/documents/2018_friedman_et_al_mainstreaming_biodiversity_concerns_in_fisheries_0.pdf).
North-East Atlantic Fisheries Commission (NEAFC)	Convention amended in 2006 to broaden the mandate from target stocks to other parts of the ecosystem and biodiversity; 2008 Recommendation on bottom fishing Agreement with ICES to produce scientific advice (2015)	• Focus on species interactions, habitats and climate change impacts. • Most of NEAFC regulatory area is subject to either a prohibition or severe restrictions on bottom fishing as well as restrictions to fisheries of certain deep-sea stocks and vulnerable species such as sharks. • Increased attention to deep-sea resources in late 1990s and 200s. • Closure of vulnerable marine ecosystems to fishing • Policy on deep-sea exploratory fishing and encounter protocols. Recommendation on protection of VMEs (2014): regulating bottom fisheries in the deep-sea; defining existing fishing areas; closing 13 VMEs; Regulating exploratory bottom fishing and assessment of proposed exploratory fishing; defining bycatch threshold levels; Identifying VME indicator species.
Northwest Atlantic Fisheries Organization (NAFO)	Convention amended (2007)	• To incorporate the ecosystem approach in order to minimize risks of long-term effects of fishing on biodiversity and the ecosystem • Closure of VMEs (21 areas) following FAO Guidelines. • NAFO Scientific Council has implemented measures for mainstreaming biodiversity such as Kernel Density Analysis and an Ecosystem Roadmap.

Birdlife International	N/A	• Work of the Albatross Task Force to reduce seabird bycatch in fisheries.
Strathclyde Centre for Environmental Law and Governance	N/A	• Synthesis on research on mainstreaming biodiversity and ecosystem services into the fisheries sector for sustainable development, based on findings from relevant findings from fisheries-related projects under the Ecosystem Services for Poverty Alleviation (ESPA) programme • Key findings as follows: • Methodologies for identifying “ecosystem management units”, productivity scenarios and sustainable catch levels can be applied also in data-poor contexts • Ecosystems are better managed within appropriate biogeographical scales within which multiple pressures (cumulative impacts) should be assessed • Early integration of livelihoods considerations in conservation measures is key to equitable and effective outcomes • Social safety nets and capacity-building need to complement conservation and management measures • Inclusive Payment for Ecosystem Services schemes, that integrate traditional knowledge, can incentivize conservation and improve livelihoods • Incorporating consideration of ecosystem services and benefit-sharing in integrated impact assessments and planning processes can support sustainable and equitable fisheries management