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Policy making for sharks and the role and contribution of non-governmental organisations in the fulfilment of international legal obligations

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ABSTRACT

We propose a policy cycle for elasmobranch conservation and management and assessed the role and contribution of non-governmental organisations (NGOs) within this cycle on a case study basis for the Mediterranean region. Following a review of shark-related and relevant legal obligations under international and regional instruments, we classified them into ten focus areas: Capacity building, Conservation measures, Cooperation, Education and Awareness, Monitoring, Policy development and integration, Regulation, Reporting, Research, and Sustainable Management. Based on surveys and a supplementary, web-based research, we found that NGOs contribute substantially to the implementation stage of the proposed policy cycle and fulfil obligations under various legal instruments in relation to data collection, bycatch mitigation, species monitoring, identification of important areas, education and awareness. Furthermore, but to a lesser extent, NGOs are involved in the policy formulation stage as they support the development of new policies within the region. The range and extent of projects and programmes implemented varies among countries, with Spanish organisations currently implementing 25 such initiatives, followed by Bosnia and Herzegovina (14), Greece (14), and France (11), Albania (7), Croatia (6), Cyprus (6), Italy (6), Malta (5), Slovenia (4), Israel (3), Libya (3), Turkey (3), Tunisia (2), and Morocco (1).

1. Introduction

The development of the concept of marine conservation and marine conservation policy was and is a process in which the international community realises the impact of certain activities on the marine environment [1]. Policy is made effective through law and so, environmental regulations within sovereign States should follow set global principles and seek to attain their targets [2]. While goals, targets, and principles may be set and agreed internationally to apply at global or regional levels, the responsibility of translating these into national policies, creating measures and actions, implementing them, as well as monitoring their outcomes, remains principally with national governments and dedicated State-controlled institutions. However, in some cases dominant State-power in conventional regulation may be complemented or even by-passed by supranational and subnational arrangements [3,4]. An example of a supranational arrangement that imposes regulations, such as fisheries quota and conservation measures, on its constituent States is the European Union (EU). Furthermore, there is increasing evidence of private actors taking on public functions in regulation and stewardship of nature [5], especially in countries with limited capacity for statehood and governance [6]. This study makes a case for conservation concerns related to elasmobranchs in the Mediterranean region (in the following collectively referred to as "sharks"), a rather diverse group of animals, that mostly fall within national jurisdiction [7], and what role non-state actors, in this case non-governmental organisations (NGOs), have.

1.1. Policy making for sharks

There are several frameworks to describe how policies, in general, are developed and determined. One which has gained the most attention and application is the policy cycle [8]. To explain and investigate the policy processes related to shark governance, this study follows the basic idea of Kingdon's Multiple Stream Model, with some additional considerations from policy diffusion models (Fig. 1). The Multiple Stream Model is based on the idea that for the policy agenda to include new, pressing issues, three streams must converge to open a 'window of opportunity'. The streams include a 'problem stream', 'policy stream', and 'politics stream' [9]. In this process, the government is central, but multiple actors are involved. The problem stream brings recognized problems in the focus of policy makers, while the policy stream should deliver possible solutions and potential courses of action based on ex-

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Fig. 1. Policy model for shark conservation and sustainable management. Based on Kingdon's Multiple Stream Model (1995) and Berry & Berry's model of policy diffusion.

pert advice. The politics stream determines the underlying national set-up for administration and implementation of policy decisions [10]. The model has proven to be useful through multiple applications within policy analysis, including marine fisheries policies [11]. These applications are not limited to the agenda setting and policy formulation stage but have also been applied to determine implementation factors that support or hamper implementation success [12].

Policy diffusion models, as described by Berry and Berry [13], argue that similar policy innovations are or may be adopted across countries. This recognises that, increasingly, environmental policies are determined globally and "diffuse" (or are meant to diffuse) into national policies [14]; and that several international and regional fora enable and foster cooperation among States and the exchange of information on best available policies and implementation measures. There are several stages within the policy cycle that can be analysed independently or coherently, as they are logically linked and not clearly separated, which are 1) agenda setting; 2) policy formulation and decision-making; 3) implementation; and 4) evaluation (and termination) [8].

1.1.1. Agenda setting

Agenda setting is the process of putting a recognized problem onto a formal policy agenda [8]. In line with Kingdon's Multiple Stream Model, such agenda setting occurs when problems are recognized, solutions are available, and the political set-up would support these through the policy and implementation process [9]. Problems are often the result of crisis or issues salient to the public, whereby public values play an important role [15]. The value of sharks to humans depends on several factors, including how and for what reason sharks are encountered, for example, as attraction for a diver, study object for a researcher, or resource for fishers [16]. While scientific information should provide the foundation for this process, policy makers are not able to know everything about all problems. Although there still is a significant lack of research on many (non-charismatic) shark species [17], especially within developing countries [18], there are general, acknowledged problems that occur on global, regional, and national levels. Such problems include for example:

- Overfishing and impacts from fishing (e.g., bycatch, discards) [19] remain the main threat [20].
- Many shark populations continue to decline [21].
- Illegal, unsustainable, and uncontrolled (fishing) practices pose a threat to sharks [22].
- Human population growth leads to a concomitant demand for shark products locally [23] and internationally [24].
- Shark tourism is a growing industry [25] that requires better regulation [26].
- Climate change is likely to have impacts on sharks, whether it is physiological such as breathing [27] or skin deterioration [28], or the change in area use [29].
- Although there are some success stories of sustainable shark fisheries [30], many fisheries remain unsustainable, especially those that catch sharks and rays [31].
- There are deficiencies in the implementation of working conservation measures [32].

As different species face different levels of risk of extinction, agenda setting must prioritise the most vulnerable and threatened species of sharks [20].

1.1.2. Policy formulation and decision making

Due to the complexity of problems faced by governments, the support and involvement of both social and natural scientists in developing policies is crucial [33]. Depending on its relevance for the economy (trade & consumption) within a country, the fishing sector can influence national policy making that forms part of national development plans [34]. Where, for example, economic gain from the trade of shark fins and meat is negligible and does not play a big part in national food security, conservation may triumph over economic interests, helping to stop global drivers [35]. Historically, while fisheries frameworks aimed for the optimization and maximization of the exploitation of resources [36], there is an increasing incorporation and streamlining of biodiversity objectives into fisheries, which offers hope and a basis for further alignment to produce better solutions [37]. In response to the previous inertia and failure to prevent overfishing, overcapacity, and resultant impacts on the ecosystem by fisheries management bodies, The Sustainable Seafood Movement (TSSM) arose [38]. The TSSM involves fishing projects aimed at sustainability that are led by NGOs and support government objectives and obligations [38]. In this connection commentators such as Abbott have observed that the foundation of such NGOs often results out of frustration with governments' inertia to act and reach globally agreed targets, so they take on the role to inform and "activate" consumers, market actors and the public to demand change [39].

1.1.3. Implementation and evaluation

Policy can be described as a (inter-)nationally set course of action or a course of action reflected through implementation of regulations and measures [40]. Implementation concerns the actions (or inaction) taken to solve a policy problem, a process that most often involves multiple actors [41]. The implementation of environmental and fisheries policies is mainly State responsibility. Although this can be reduced in supranational arrangements. For example, the Common Fisheries Policy (CFP) leaves little room for divergence between EU Member States [42].

To be successful, any approach to management should not only consider the public [43] but must also consider the stakeholders (potentially) affected by the implementation of measures [44]. The more actors affected by a policy have a say in decision-making, the more likely, in the view of Börzel and Risse, they are to accept the policy outcome, even if their interests may not fully be accommodated [6].

The evaluation phase of the policy cycle determines the effectiveness of policies by focusing on the impacts of any implemented measure, but also analyses unintended outcomes of such actions [8]. A change in policy requires evidence to support alternative policies [45], beside political will and public support. The effectiveness of any of the existing implementation measures remains to be assessed [46]. This is due to two considerations. On one hand, shark conservation and management measures are relatively "young", as they only entered the pol-

icy agenda in the past 20–30 years. On the other hand, the biological traits of sharks and rays (slow growth, late maturity, and low fecundity) will demand time for any effects to be seen [47]. Regular and ongoing evaluations of the conservation status of sharks, conducted through the Red List assessments of the International Union for the Conservation of Nature (IUCN), show that many species continue to decline [21,48]. This was demonstrated for example in the 2016 regional re-assessment for the Mediterranean, which showed that half of the rays and more than half of the sharks in this region have an elevated risk of extinction [49].

1.2. NGO roles in the policy cycle

NGOs often target the public to increase the level of awareness and generate support for conservation efforts through campaigns and the involvement of local people [39,50–52]. Without public support, policies will face difficulties in being successful and measures may face opposition [53,54]. But beside fostering public support for conservation, NGOs have an established role in international fora, and drive shark conservation efforts as well as policy agendas, nationally and internationally [55], such as those determining fisheries management [56]. NGOs can also aid the implementation of measures [38,56]. This study assesses the contribution of NGOs to the fulfilment of legal obligations for shark conservation and management at national level focusing on the implementation stage of the policy cycle.

2. Methodology

Based on the introduced policy cycle, the methodological approach aimed to determine the contribution of NGOs to the implementation stage of the cycle, while the legal review determined the agenda set at international and regional level. The overall assessment followed a three-step approach:

Step 1: Compile a list of international and regional obligations and classify them.

Step 2: Analyse survey responses and categorise ongoing initiatives.

Step 3: Conduct web-based research to supplemented information on ongoing initiatives of NGOs' websites. NGO websites were searched for NGOs that fulfilled the below criteria (under 2.2.).

2.1. Legal review

The review of legal frameworks focused on two main legal aspects, the regulation and management of fisheries affecting sharks, and the conservation of species within the marine environment. For the purpose of this study, relevant convention texts, EU instruments, recommendations under relevant Regional Fisheries Management Organisations (RFMOs), as well as existing, shark-specific action plans were reviewed. The systematic review of applicable legislation, guidance and related legal obligations provides a common base from which to determine potential efficacy, when matched against actual implementation and impact of legal measures/norms [57–59]. The following sources formed the basis of the legal review:

- Convention on Biological Diversity (CBD) [60]
- Convention on the Conservation of Migratory Species of Wild Animals (CMS) [61]
- Convention on International Trade in Endangered Species of Wild Fauna and Flora(CITES) [62]
- Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and related Protocols, as well as the Regional Action Plan for Sharks in the Mediterranean [63]
- The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats [64]
- Recommendations of the International Commission for the Conservation of Atlantic Tunas (ICCAT) [65]
- Recommendations of the General Fisheries Commission for the Mediterranean (GFCM) [66]
- EU legislation and the European Action Plan for Sharks [67]

2.1.1. Classification of legal obligations

Legal obligations relevant to sharks were categorised as shown in Table 1. Additionally, for each legal obligation, information on the relevance for sharks was compiled and the binding nature of the measure determined. Subcategories were based on the legal text describing the respective obligation.

2.2. NGO contribution within the policy cycle

The work of NGOs was assessed by the variety of initiatives they implement on a national scale. Initiatives include those that are either directly designed for shark conservation or management; or include sharks as subject of interest within the project (e.g., bycatch mitigation). The selection of NGOs included in this study was based on the fulfilment of at least one of the following criteria:

- Are cooperating partners of the CMS Shark MoU [61].
- Are recognised on the website of the IUCN Shark Specialist Group (SSG) [68].
- Are present at Conference of the Parties meetings of CMS and CITES (this includes admission as observers).
- Are a member of a larger (e.g., regional) shark organisation, coalition, or network, such as the European Elasmobranch Association (EEA) [69].
- Are registered within the respective national registry for NGOs.

Based on these criteria, a list of NGOs operating within the Mediterranean was compiled and contacted to fill in a survey questionnaire. The survey focused on the current work of NGOs (programmes and projects that have been recently completed, are ongoing, and are planned), and the assessment of public and government support at national level. Where no reply was received a web-based search on the NGOs website was conducted to obtain information on ongoing initiatives. The assessment focused on current initiatives, those completed in the past five

Table 1
Categories for the classification of legal obligations.

Category	Definition
Capacity building	Obligations/commitments related to sharing knowledge and building capacity.
Conservation measures	Obligations/commitments concerning the protection and conservation of species and their habitats.
Cooperation	Obligations/commitments that entail establishing working relationships across borders and sectors on different conservation issues.
Education and Awareness	Obligations/commitments related to the increase in public knowledge and educating the public on conservation and management issues.
Monitoring	Obligations/commitments that require States to gather longer term data.
Policy development and integration	Considerations that support the establishment of national strategies to improve conservation and management.
Regulation	Legal obligations that should be transposed into national law to regulate species management and conservation.
Reporting	Obligations/commitments related to sending national data and updates on the implementation of various obligations to central bodies (e.g., Regional Fisheries Management Organisations).
Research	Obligations/commitments related to the collection of data to address specific knowledge gaps.
Sustainable management	Obligations/commitments related to the overall use of marine resources.

years (between 2016 and 2020), as well as those stated as "planned" (to have started in 2021).

2.2.1. Project/programme classification

Initiatives were categorised according to whether they aim to improve fisheries management or conservation management (Table 2). Based on the aim of each initiative, they were classified into nine different groups (Table 2). Each of the programmes and projects was assessed against a set of pre-defined components (Table 2). The categorisation was based on the project description, and the outlined objectives of the projects/programmes, as well as project reports, where applicable. Project components are considered part of the implementation stage, apart from those assigned as "policy development", which are considered to contribute to the policy formulation stage. Additional information from the project description and objectives was collected in relation to the scale of implementation (one or within multiple countries), cooperation (multiple actors involved), and involvement of stakeholders.

Table 2
Classification system for NGO programmes and projects based on the analysis of legal obligations for shark conservation and management at international and regional level.

Category	Definition
Fisheries management	Projects and programmes across the entire chain from fishing to market and trade of fisheries products, aiming to assess fisheries impact and contribute to improved regulation and management of fisheries.
Conservation management	Programmes and projects focusing on conserving elasmobranchs through specific conservation measures including, inter alia, the identification of important areas, distribution of species and education of the public.
Classes	
Impact assessment	Assessment of different impact factors. In relation to conservation management this includes pollution, diseases, and contamination. For fisheries, it includes impact assessments relating to the level of bycatch, habitat degradation by fishing methods, and overall fishing pressure on elasmobranchs.
Bycatch mitigation	Projects aiming to develop, test and assess methods of bycatch mitigation.
Distribution monitoring	Programmes and projects that monitor/research the distribution of elasmobranch species, e.g., social media reports of occurrence, sighting records, field observations, etc.
Education & Awareness	Educational events, programmes, and materials form part of the project that aim to increase awareness and public knowledge.
Recover and release programme	Activities involving the retrieval of specimens and subsequent release, as well as programmes that aim to recover existing stocks through breeding programmes.
Policy proposal	Programmes that result in the development of new policies or aim to contribute/develop to such.
Important areas	Programmes that have the aim to identify/determine areas of specific importance for elasmobranchs such as breeding sites, nursery areas, feeding grounds, etc. and that have the specific aim to designate protected areas.
Population status	Programmes and studies aiming to assess specific elasmobranch populations and determine their status.
Trophic roles	Investigations on the ecological role of elasmobranch species
Components	
Education	Educational events, programmes, and materials form part of the project that aim to increase awareness and public knowledge.
Research	Any form of data collection process that have the specific aim to gather data and generate new knowledge.
Capacity building	Training of stakeholders and the public to increase their skills and specific knowledge in terms of aspects of shark research, conservation, and fisheries management.
Recovery	Activities involving the retrieval and release of specimens.
Policy development	Formulation of new measures, regulations, and actions, e.g., through Action plans. (*This component indicates a contribution to the Policy Formulation stage of the policy cycle.)*

3. Results

The analysis of data obtained from surveys, web-based research and the review of applicable legal instruments revealed a wide range of obligations that are designed, either directly or indirectly to aid shark conservation and management. NGOs contribute to the fulfilment of many of these obligations through the implementation of programmes at national level. This is evident especially in respect of those concerning data collection, bycatch mitigation, species monitoring, identification of important areas, education and awareness.

3.1. Legal obligations (Agenda setting)

The review of legal obligations and voluntary commitments revealed an overlap between internationally and regionally applicable legal frameworks. The applicable instruments and the respective Mediterranean State-Parties are shown in Table 3.

The principal international instrument for the conservation of species diversity is the Convention on Biological Diversity (CBD) [70]. Although the CBD does not directly list sharks, it does concern biological diversity as a whole and has provisions specifically applicable to endangered and threatened species (Table 4), which for the Mediterranean concerns over half of the sharks occurring in this region [49]. At regional level, conservation efforts are integrated under the Barcelona Convention [71], which is implemented through various protocols tackling different environmental issues. The Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol) lists sharks within two Annexes, Annex II for threatened species requiring protection measures, and Annex III for species that should be managed sustainably to avoid further population decline [72]. At European Level, the Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) of 1979 created a framework for species conservation and includes sharks in its Appendices, listing protected species in Appendix II and those requiring management in Appendix III [73].

Two other relevant legal instruments that became important for the conservation and management of sharks, are the 1979 Convention on the Conservation of Migratory Species of Wild Animals (CMS) [74], and the 1973 Convention on the International Trade of Endangered Species (CITES) [75]. In recognition of the importance on international cooperation for species that migrate through several jurisdictions and international waters, the CMS establishes further conservation measures. The CMS introduced the concept of 'Range States', which are those that exercise jurisdiction over parts of the migratory routes of CMS-listed species. Governments reporting under the CMS identify themselves as Range States or non-Range States. The CMS uses Appendix listings for species to assign the level of required action. Appendix I-listed species should receive the highest protection throughout their range, as they are threatened with extinction. Species listed on Appendix II require international cooperation in conservation management to prevent worsening of their conservation status. The listing of sharks under the CMS began in 1999. In 2010, a Memorandum of Understanding for the conservation of sharks was established under the CMS, under which countries can commit to further actions for these particular species group [76].

CITES regulates international trade in endangered species, which are listed within three appendices that require either a full trade ban (Appendix I) for the most endangered species, strong regulatory measures and trade controls (Appendix II), or those for which cooperation among countries is needed to ensure sustainable trade (Appendix III) [77]. At the 10th meeting of the parties, a window of opportunity for shark listings opened through Resolution 9.17, which expressed concern in the unregulated and existentially threatening trade in shark products [78], which has been used to continue shark trade interventions through CITES ever since.

Table 3
Legal commitment of Mediterranean countries to relevant international and regional instruments relevant to shark conservation and management.

Country/ legal instrument	Barcelona Convention	SPA/BD Protocol	Bern convention	CBD	CITES	CMS	CMS MoU	EU	GFCM	ICCAT
Albania	X	X	X	X	X	X			X	X
Algeria	X	X		X	X	X			X	X
Bosnia and Herzegovina	X		X	X	X	X			X	
Croatia	X	X	X	X	X	X		X	X	X
Cyprus	X	X	X	X	X	X		X	X	X
Egypt	X	X		X	X	X	X		X	X
France	X	X	X	X	X	X	X	X	X	X
Greece	X		X	X	X	X		X	X	X
Israel	X			X	X	X			X	
Italy	X	X	X	X	X	X	X	X	X	X
Lebanon	X			X	X	X			X	
Libya	X			X	X	X	X		X	X
Malta	X	X	X	X	X	X		X	X	X
Monaco	X	X	X	X	X	X	X		X	
Montenegro	X	X	X	X	X	X			X	
Morocco	X	X		X	X	X			X	X
Palestine				X						
Slovenia	X	X	X	X	X	X		X	X	X
Spain	X	X	X	X	X	X		X	X	X
Syria	X	X		X	X	X	X		X	X
Tunisia	X	X		X	X	X			X	X
Turkey	X	X	X	X	X				X	X

All these instruments utilise annexes or appendices to list species that are endangered or require urgent management. The species included in these Annexes overlap as might be expected (Table 4).

International fisheries management is principally regulated through Regional Fisheries Management Organisations (RFMOs) in waters outside, and in relation to straddling and migratory stocks inside of national jurisdiction. In the Mediterranean, the two relevant RFMOs are the International Commission for the Conservation of Atlantic Tunas (ICCAT), which regulates Tuna and swordfish fisheries, and the General Fisheries Commission for the Mediterranean (GFCM). The GFCM establishes a fisheries management regime among Mediterranean countries for commercially relevant species through binding recommendations. This also contemplates species affected by these fishers, *ergo ipso*, sharks. After completion of the legal review, an updated recommendation on the management of sharks (GFCM44/2021/16) had just been agreed but could not be evaluated for this study.

The fisheries framework of the EU is based on a Common Fisheries Policy (CFP) [79], with its implementation supported through relevant EU regulations, including Regulation (EU) 2019/1241, which integrates provisions for sharks proposing catch bans. It also prohibits the use of entangling gear for catching certain shark species (Art. 9) [80]. The CFP incorporates the sustainable principles from the 1995 Code of Conduct for Responsible Fisheries [81]. Based on this Code of Conduct an International Action Plan for Sharks (IPOA Sharks) was adopted in 1999 [82], which stipulated subsequent plans, such as the 2003 Regional Action plan for the conservation and management of cartilaginous fishes under the Barcelona Convention [83] (updated in 2020), and the 2009 EU Action Plan for sharks [84].

Table 4 provides a comprehensive overview of the relevant measures to Mediterranean shark conservation. It is interesting as an exercise in interpretation as to the strength of the measures labelled as binding. There are two dimensions to it. First, those measures termed as binding relate to measures with limited 'actual' impact – such as capacity building, designation of area-specific restrictive measures. Thus, for example, language such as '*as far as is appropriate*', or '*where relevant*' provide little by way of legal certainty and allow considerable interpretative space: it is noted in respect of the Aichi Target 11 that 'however, there is still minimal guidance for individual countries to ensure their conservation efforts contribute to the newly revised targets. This lack of clarity effectively leaves each State-Party to interpret what it means within respective political contexts' [85]. It is effectively a government's decision to determine national policies for conservation and fisheries management and the level of involvement of NGOs in developing these policies [56]; although EU Member States (MS) are constrained in the former by the operation of the CFP. Nevertheless, NGOs operate independently from governments in establishing their own programmes relational to international aims and targets for sustainable management and conservation of species [56].

To demonstrate when NGOs became active in the region, a timeline was established between major developments relevant for sharks and the establishment/formation of NGOs (Fig. 2). Although the World Wide Fund for Nature (WWF) was founded in 1961, WWF initiated its Mediterranean programme in 1992 and has recently produced a number of relevant publications on required shark conservation for the region [58], as well as on the trade of shark products [86]. Furthermore, WWF was and is involved in ongoing contributions as evaluated under 3.2. Similarly, the International Union for Conservation of Nature (IUCN), which was established in 1948, created a Mediterranean Office in 2000 and is currently involved in projects relevant for shark conservation (Supplementary Table 1). The first shark-focused group in the Mediterranean was founded in Italy, Gruppo Ricercatori Italiani sugli Squali, razze e chimere (GRIS), in 1995, followed by L'Association Pour l'Etude et la Conservation des Sélaciens (APECS) in France in 1997. Since 2000, there has been a steady increase in shark NGOs and NGOs with shark-specific programmes. To date, the results of this study show 6 NGOs in France, 5 in Spain, 2 in Albania, and 1 each in Malta, Bosnia and Herzegovina, Cyprus, Turkey, Greece, Libya and Israel (Fig. 2).

3.2. NGO contributions

Twenty-one NGOs were contacted that operate in the Mediterranean. Out of these, 15 replied to the survey questionnaire including NGOs from Albania (2), Bosnia and Herzegovina (1), Cyprus (1), France (3), Greece (1), Israel (1), Libya (1), Malta (1), Spain (3), and Turkey (1). The sample size of 15 was too small to establish significant relationships between the responses. However, these responses directly report and reflect on statements made by NGOs. A total number of 73 ongoing initiatives (projects and programmes) in 15 countries was analysed based on survey responses and web-based, supplementary research (Supplementary Table 1). These projects are implemented by 20 different NGOs. Spanish NGOs are currently involved in 25 projects within the Mediterranean, including those conducted around the Balearic Is-

Table 4
Overview of legal obligations and commitments under different legal instruments relevant to Mediterranean countries in relation to shark conservation and management. The table summarises duties subcategorised to specific tasks and indicates whether these are binding to the relevant Parties/Member States. Furthermore, the direct relevance to sharks is evaluated and stated.

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
Capacity building	Technology transfer	Convention on Biological Diversity (CBD)	Art. 16	Yes	All
		UNEP/CMS/Resolution 11.2 (Rev.COP12). Strategic Plan for Migratory Species 2015–2023	Goal 5	Not directly	Migratory species
	Information exchange	Convention on Biological Diversity (CBD)	Art. 12	Yes	All
	Programme development		Art. 17	Yes	All
	Training	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	B.	No	All
			C.5.	No	All
	General Capacity building	Recommendation GFCM/36/2012/3 (amended by GFCM/42/2018/2)	Part III (10)	"as appropriate"	All
		Recommendation GFCM/42/2018/2	Part IV (10)	"as appropriate"	All
		10–08 Recommendation by ICCAT on Hammerhead Sharks (Family Sphyrnidae) caught in Association with Fisheries managed by ICCAT	6	"as appropriate"	Sphyrnidae
Conservation measures	Spatial conservation	Convention on Biological Diversity (CBD)	Art. 8 (a)	"as far as possible and appropriate"	All
		CBD-Strategic Plan for Biodiversity 2011–2020	Target 11	Not directly	All
		Barcelona Convention	Art. 10	Yes	Threatened/endangered species
		Barcelona Convention, SPA/BD Protocol	Art. 3(1, a)	Yes	Threatened/endangered species
		Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Art. III	Yes	Migratory species
		CMS Memorandum of Understanding on the Conservation of Migratory Sharks	Section 4 Conservation Plan (12, c)	No	Migratory species
		Bern Convention	Chapter 2, Art. 4 (3)	Yes	Migratory species in Appendices II and III
		Barcelona Convention, SPA/BD Protocol	Art. 5	No	Threatened/endangered species
		Regulation (EU) No 1380/2013	Art. 8	Yes	All
	Species protection and recovery	Convention on Biological Diversity (CBD)	Art. 9 (c)	"as far as possible and appropriate"	Threatened/endangered species
		Barcelona Convention, SPA/BD Protocol	Art. 3(1, b)	Yes	Threatened/endangered species
			Art. 11 (1)	Yes	All
			Art. 12 (2)	Yes	Threatened/endangered species
	Genetic diversity preservation	CBD-Strategic Plan for Biodiversity 2011–2020	Target 13	Not directly	"Culturally valuable"
		UNEP/CMS/Resolution 11.2 (Rev.COP12). Strategic Plan for Migratory Species 2015–2023	Goal 4	Not directly	Migratory species
	Improve conservation status	UNEP/CMS/Resolution 11.2 (Rev.COP12). Strategic Plan for Migratory Species 2015–2023	Goal 3	Not directly	Migratory species
	Extinction prevention	CBD-Strategic Plan for Biodiversity 2011–2020	Target 12	Not directly	Threatened/endangered species
	Reduce human interactions with species	UNEP/CMS/Concerted Action 12.5 (Rev.COP13). Concerted Action for the Angelshark (*Squatina squatina*)	(iv)	Not directly	Squatina spp.
Cooperation	Cooperation at international level for the conservation and sustainable use of biological diversity	Convention on Biological Diversity (CBD)	Art. 5	"as far as possible and appropriate"	All
		Barcelona Convention, SPA/BD Protocol	Art. 3(2)	Yes	All
	Regional cooperation through RFMOs for shark conservation	Communication from the Commission to the European Parliament and the Council on a European Community Action Plan for the Conservation and Management of Sharks	3.1.	No	Migratory species
	National cooperation for sustainable use	Convention on Biological Diversity (CBD)	Art. 10 (e)	"as far as possible and appropriate"	All
	Cooperation at international level on education and awareness raising		Art. 13 (b)	"as appropriate"	All

(*continued on next page*)

Table 4 (*continued*)

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
	Cooperation at international level on technical and scientific matters		Art. 18 (1)	Yes	All
	Cooperation in research on migratory species	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Art. II (Fundamental Principles)	optional ("should")	Migratory species
	Establish agreements to protect endangered migratory species	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Art. IV	Yes	Migratory species Appendix II
	Regional and international cooperation for the conservation of migratory species	UNEP/CMS/Resolution 11.2 (Rev.COP12). Strategic Plan for Migratory Species 2015–2023	Goal 3	No	Migratory species
	Cooperation with relevant organisations	CMS Memorandum of Understanding on the Conservation of Migratory Sharks	Section 4 Conservation Plan (13, a)	optional ("should")	Migratory species
	Cooperation between Parties for conservation and management	Barcelona Convention, SPA/BD Protocol	Art. 12 (1)	Yes	Annex II and III species
	EU Commission and Member State cooperation in exchange of information with GFCM	Regulation (EU) No 1343/2011	Art. 23	Yes	All
	Cooperation at international level in capacity building and implementation	10–08 Recommendation by ICCAT on Hammerhead sharks (Sphyrnidae) caught in association with Fisheries managed by ICCAT	6	"as appropriate"	Sphyrnidae
Education and Awareness	Promote understanding of the importance of biological diversity and necessary conservation efforts	Convention on Biological Diversity (CBD)	Art. 13. Public Education and Awareness	Yes	All
	Promote understanding of the importance of migratory species and necessary conservation efforts	UNEP/CMS/Resolution 11.2 (Rev.COP12). Strategic Plan for Migratory Species 2015–2023	Goal 1	No	Migratory species
	Increased awareness of public on threats to sharks and foster participation in their conservation	CMS Memorandum of Understanding on the Conservation of Migratory Sharks	Section 4 Conservation Plan (12, d)	optional ("should")	Migratory species
	Development of programmes	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	B. Priorities	No	All
	Foster public support and involve all stakeholders; design material and establish programmes		C.6. Education and public awareness	No	All
	Work with relevant bodies in development of guidelines for shark activities and programmes		C.6. Education and public awareness	No	All
	Promotion of education on conservation of species	Bern Convention	Chapter 1, Art. 3 (3)	Yes	All
Monitoring	Create inventory nationally	Convention on Biological Diversity (CBD)	Art. 7 (a)	"as far as possible and appropriate"	All
		Barcelona Convention, SPA/BD Protocol	Art. 3(3)	Yes	All
			Art. 11 (2)	Yes	Threatened/endangered species
	Monitor potentially harmful activities	Convention on Biological Diversity (CBD)	Art. 7 (c)	"as far as possible and appropriate"	All
	Trade monitoring	Convention of International Trade in Endangered Species (CITES)	Art. IV	Yes	Appendix II
	Species monitoring	Convention on Biological Diversity (CBD)	Art. 7 (b)	"as far as possible and appropriate"	All
		CMS Memorandum of Understanding on the Conservation of Migratory Sharks	Section 4 Conservation Plan (12, a)	optional ("should")	Migratory species
		Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C.4.	No	All

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Table 4 (*continued*)

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
	Species monitoring	Recommendation GFCM/42/2018/2	Part IV (9, c)	Yes	All
	Monitor species and activities with potential impacts as well as their effects	Barcelona Convention, SPA/BD Protocol	Art. 3(5)	Yes	All
			Art. 7 (2b)	Yes	All
	Development of programmes	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	B. Priorities	No	All
	Fisheries and discard/ bycatch monitoring	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C.4.	No	All
		Recommendation GFCM/42/2018/2	Part IV (9, a)	Yes	All
		UNEP/CMS/Resolution 12.22. Bycatch	Participation in Regional Fisheries Management Organizations	Yes	Migratory species
	Discard and release monitoring	10–07 Recommendation by ICCAT on the Conservation of oceanic whitetip shark caught in association with Fisheries in the ICCAT convention area	2	Yes	*Carcharhinus longimanus*[a]
		11–08 Recommendation by ICCAT on the Conservation of silky sharks caught in association with ICCAT Fisheries	3	Yes	*Carcharhinus falciformis*[a]
		15–06 Recommendation by ICCAT on porbeagle caught in association with ICCAT Fisheries	2	Yes	*Lamna nasus*
	Impact assessment	Convention on Biological Diversity (CBD)	Art. 14	"as far as possible and appropriate"	All
Policy development and integration	Cross-sectoral policy plans for conservation and use of biological diversity	Convention on Biological Diversity (CBD)	Art. 6 (b)	"as far as possible and appropriate"	All
		Barcelona Convention, SPA/BD Protocol	Art. 3(4)	Yes	All
	Establish national policies	Bern Convention	Chapter 1, Art.3 (1)	Yes	Threatened/endangered species
	Strategies for species recovery	Convention on Biological Diversity (CBD)	Art. 8 (f)	"as far as possible and appropriate"	Threatened/endangered species
	Establish agreements to protect endangered migratory species	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Art. II (3. c)	Yes	Migratory species Appendix II
	Regional Action Plan development	UNEP/CMS/Concerted Action 12.5 (Rev.COP13). Concerted Action for the Angelshark (*Squatina squatina*)	(vi). (2.3.)	Not directly	*Squatina squatina*
	Bycatch reduction policies	UNEP/CMS/Concerted Action 12.6 (Rev.COP13). Concerted action for the mobulid rays (Mobulidae)	1.	Not directly	Mobulidae
	Management plan	Barcelona Convention, SPA/BD Protocol	Art. 7 (2a)	Yes	All
Regulation	Legal protection	Convention on Biological Diversity (CBD)	Art. 8 (k)	"as far as possible and appropriate"	Threatened/endangered species
		Bern Convention	Chapter 3, Art. 6	Yes	Appendix II
		Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C. Implementation Measures	No	Annex II species
	Adapted national legislation and administration	Bern Convention	Chapter 1, Art. 4 (1)	Yes	Appendices I and II
		Barcelona Convention	Art. 14	Yes	All
	Prevent/minimize/control impact	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Art. III (4, b, c)	Yes	Threatened/endangered species Appendix I
		UNEP/CMS/Concerted Action 12.5 (Rev.COP13). Concerted Action for the Angelshark (*Squatina squatina*)	(iv)	Not directly	*Squatina squatina*
		CBD-Strategic Plan for Biodiversity 2011–2020, including Aichi Biodiversity Targets (In decision X/2, the tenth meeting of the Conference of the Parties)	Target 6	Not directly	All
	Prohibition of killing animals within SPAMIs	Barcelona Convention, SPA/BD Protocol	Art.6 (g)	Yes	Those occurring in SPAMIs

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Table 4 (*continued*)

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
	Regulate activities impacting status of endangered species		Art. 11 (2)	Yes	Threatened/endangered species
	Control taking, trade and disturbance of protected species		Art. 11 (3)	Yes "where appropriate"	Protected species
	Prohibition of habitat destruction of endangered species		Art. 12 (3)	Yes	Annex II species
	Habitat protection and restoration incl. activity regulation	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C.3. Critical habitats and environment	No	All
	Regulated exploitation	Bern Convention	Chapter 3, Art. 7 (2) and (3)	Yes	Appendix III
	Management of recreational fishing	Regulation (EU) 2019/1241	Preamble (6)	"where relevant"	All
	Closed season, exploitation regulated	Bern Convention	Chapter 4, Art. 10	Yes	Appendix III
	Retention ban	Recommendation GFCM/36/2012/3 (amended by GFCM/42/2018/2)	Part II (7)	Yes	Annex II species of the SPA/BD protocol
	Driftnet limitation/ban	Recommendation GFCM/22/1997/1 (and subsequent ban Recommendation GFCM/29/2005/3)	1–2	Yes	Pelagic species
	Driftnet ban	Regulation (EU) 2019/1241	Art. 9 (2)	Yes	Annex III (Sharks: *Hexanchus griseus; Cetorhinus maximus*; Alopiidae; Carcharhinidae; Sphyrnidae; Isuridae; Lamnidae)
	3 nm no trawling zone	Recommendation GFCM/36/2012/3 (amended by GFCM/42/2018/2)	Part II (5), Fisheries management measures	Yes	Coastal species
	Trawling prohibition below 1000 m	Recommendation GFCM/29/2005/1		Yes	Deep-water species
		Regulation (EU) No 1343/2011 as amended by Regulation (EU) 2019/982	Chapter III Fishing gear, Article 16	Yes	Deep-water species
	Gear restriction (entangling gear)	Regulation (EU) 2019/1241	Art. 9 (4): 4	Yes	(e) Sharks belonging to the following species or families *Hexanchus griseus; Cetorhinus maximus*; all species of Alopiidae; Carcharhinidae; Sphyrnidae; Isuridae; Lamnidae.
	Prohibition of impactful actions, prohibition of unselective gear	Bern Convention	Chapter 3, Art. 8	Yes	Appendix III (*Isurus oxyrinchus, Lamna nasus, Prionace glauca, Squatina squatina, Rostroraja alba*)
	Catch utilization	04–10 Recommendation by ICCAT by ICCAT concerning the conservation of sharks caught in association with Fisheries managed by ICCAT	2	Yes	Sharks caught in association with ICCAT fisheries
	Finning prohibition		3	Yes	All (excl. rays/skates)
		Recommendation GFCM/36/2012/3 (amended by GFCM/42/2018/2)	Part II (4), Fisheries management measures	Yes	All (excl. rays/skates)
		Recommendation GFCM/42/2018/2	Part III, Fisheries management measures	Yes	All (excl. rays/skates)
		Regulation (EU) No 605/2013 amending Council Regulation (EC) No 1185/2003	Preamble	Yes	All (excl. rays/skates)
		04–10 Recommendation by ICCAT by ICCAT concerning the conservation of sharks caught in association with Fisheries managed by ICCAT	5	Yes	Sharks caught in association with ICCAT fisheries
	Fishing/retention ban	09–07 Recommendation by ICCAT by ICCAT concerning the conservation of Thresher Sharks caught in Association with Fisheries in the ICCAT Convention Area	1	Yes	*Alopias superciliosus*
			3	Optional ("should")	*Alopias spp.*
		10–07 Recommendation by ICCAT on the Conservation of Oceanic Whitetip Shark caught in Association with Fisheries in the ICCAT Convention Area	1	Yes	*Carcharhinus longimanus*[a]
		10–08 Recommendation by ICCAT on Hammerhead Sharks (Family Sphyrnidae) caught in Association with Fisheries managed by ICCAT	1	Yes	Sphyrnidae

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Table 4 (*continued*)

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
		11–08 Recommendation by ICCAT on the Conservation of Silky Sharks caught in Association with ICCAT Fisheries	1	Yes	*Carcharhinus falciformis*[a]
		Regulation (EU) 2019/1241	Preamble (16)	Optional ("should")	"rare" species
		Regulation (EU) 2019/1241	Annex I: Prohibited species	Yes	*Pristis spp., Manta spp., Mobula spp., Squatina squatina, Carcharodon carcharias, Cetorhinus maximus*
		Council Regulation (EU) 2021/92	Preamble	No	All
			Section 3, ICCAT Convention areas, Article 27 Sharks	Yes	*Alopias superciliosus, Sphyrnidae, Carcharhinus longimanus*[a], *Carcharhinus falciformis*[a]
	Trade prohibition/ regulation	Convention of International Trade in Endangered Species (CITES)	Art. VIII	Yes	Relevant to Appendixes
	Trade prohibition		Art. III	Yes	Appendix I species
	Trade regulation		Art. IV	Yes	Appendix II species
Reporting	Implementation report	Convention of International Trade in Endangered Species (CITES)	Art. VIII	Yes	Relevant to Appendixes
		Regulation (EU) No 605/2013 amending Council Regulation (EC) No 1185/2003	Art. 6	Yes	All
		14–06 Recommendation by ICCAT on Shortfin Mako caught in Association with ICCAT Fisheries	2	Yes	*Isurus oxyrinchus*
		18–06 Recommendation by ICCAT to replace 16–13 on Improvement of Compliance Review of Conservation and Management Measures regarding sharks caught in Association with ICCAT Fisheries	1	Yes	Sharks caught in Association with ICCAT Fisheries
		11–08 Recommendation by ICCAT on the Conservation of Silky Sharks caught in Association with ICCAT Fisheries	7	Yes	*Carcharhinus falciformis*[a]
		11–15 Recommendation by ICCAT on Penalties applicable in case of non-fulfilments of reporting obligations	1	Yes	Sharks caught in Association with ICCAT Fisheries
		10–06 Recommendation by ICCAT on Atlantic Shortfin Mako Sharks caught in Association with ICCAT Fisheries	1	Yes	*Isurus oxyrinchus*
		16–13 Recommendation by ICCAT on Improvement of Compliance Review of Conservation and Management Measures Regarding Sharks caught in Association with ICCAT Fisheries	1	Yes	As relevant under previous Recommendations
	Report on measures and their effectiveness	Convention on Biological Diversity (CBD)	Art. 26	Yes	All
		Barcelona Convention	Art. 26	Yes	All
	Improved catch reporting	14–06 Recommendation by ICCAT on Shortfin Mako caught in Association with ICCAT Fisheries	1	Yes	*Isurus oxyrinchus*
		UNEP/CMS/Resolution 12.22. Bycatch	Bycatch Mitigation Measures and Data Collection	Yes	Migratory species
	Provision of information on bycatch mitigation methods			Yes	Migratory species
	Adjust reports for Chondrichthyes	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C.2. Fisheries management	No	All
	Reporting on exceptions made	Bern Convention	Chapter 3, Art. 9 (2)	Yes	Annex II (*Carcharodon carcharias, Cetorhinus maximus, Mobula mobular, Isurus oxyrinchus, Lamna nasus, Prionace glauca, Squatina squatina, Rostroraja alba)*
	Catch and discard reporting	Recommendation GFCM/36/2012/3 (amended by GFCM/42/2018/2)	Part III (9), Monitoring, data collection and research (a, b)	Yes	Annex II and III species of the SPA/BD Protocol
		Regulation (EU) 2017/1004 (and the respective Implementing Decision (EU) 2019/909)	Art. 5 (2b)	Yes	All
		Recommendation GFCM/42/2018/2	Part IV (9, a, b)	Yes	Annex II and III species of the SPA/BD Protocol

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Table 4 (*continued*)

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
		07–06 Supplemental Recommendation by ICCAT concerning Sharks	1	Yes	All
		09–07 Recommendation by ICCAT on the Conservation of Thresher Sharks caught in Association with Fisheries in the ICCAT Convention Area	4	Yes	Alopias spp.
		10–08 Recommendation by ICCAT on Hammerhead Sharks (Family Sphyrnidae) caught in Association with Fisheries managed by ICCAT	4	Yes	Sphyrnidae
		11–08 Recommendation by ICCAT on the Conservation of Silky Sharks caught in Association with ICCAT Fisheries	3	Yes	*Carcharhinus falciformis*[a]
Research	General information (biology, genetic studies, ecology, taxonomy, etc.)	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	B. Priorities	No	All
	Biology	14–06 Recommendation by ICCAT on Shortfin Mako caught in Association with ICCAT Fisheries	3	Not directly	*Isurus oxyrinchus*
	Migratory populations	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Art. II (Fundamental Principles), 3(a)	Optional ("should")	Migratory species
		CMS Memorandum of Understanding on the Conservation of Migratory Sharks	Section 4 Conservation Plan (12, a)	Optional ("should")	Migratory species
	Development of programmes	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C.4.	No	Migratory species
	Genetic resources research	Convention on Biological Diversity (CBD)	Art. 15	Yes	All
	Biology	14–06 Recommendation by ICCAT on Shortfin Mako caught In Association with ICCAT Fisheries	3	Not directly	*Isurus oxyrinchus*
	Fisheries research	UNEP/CMS/Resolution 12.22. Bycatch	Participation in Regional Fisheries Management Organizations (8 d)	"as appropriate"	Migratory species
		UNEP/CMS/Concerted Action 12.6 (Rev.COP13). Concerted Action for the Mobulid Rays (Mobulidae)	1. Reduce target and incidental catch (1.3.)	Not directly	Mobulidae
		Communication from the Commission to the European Parliament and the Council on a European Community Action Plan for the Conservation and Management of Sharks	3. THE ACTION PLAN 3.1.	No	All
	Increased gear selectivity	04–10 Recommendation by ICCAT Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT	8	"where possible"	Sharks caught in Association with ICCAT Fisheries
	Important areas (e.g., critical habitats, nursery areas)	Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	B. Priorities	No	All
		Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	C.3. Critical habitats and environment	No	All
		04–10 Recommendation by ICCAT concerning the Conservation of Sharks caught in Association with Fisheries Managed by ICCAT	9	"where possible"	Sharks caught in Association with ICCAT Fisheries
		07–06 Supplemental Recommendation by ICCAT concerning Sharks	4	"where possible"	Pelagic sharks
		09–07 Recommendation by ICCAT on the Conservation of Thresher Sharks caught In Association with Fisheries in the ICCAT Convention Area	5	"where possible"	Alopias spp.
		10–08 Recommendation by ICCAT on Hammerhead Sharks (Family Sphyrnidae) Caught in Association with Fisheries Managed by ICCAT	5	"where possible"	Sphyrnidae
	Stock assessment	07–06 Supplemental Recommendation by ICCAT Concerning Sharks	5	Yes	*Lamna nasus*
	Population assessment	15–06 Recommendation by ICCAT on Porbeagle caught in Association with ICCAT Fisheries	4	Not directly	*Lamna nasus*
Sustainable management	Sustainable management	CBD-Strategic Plan for Biodiversity 2011–2020	Target 7	Not directly	All

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Table 4 (*continued*)

Category	Subcategories	Instrument	Paragraph	Binding?	Shark relevance
	Fisheries sustainability	Memorandum of Understanding on the Conservation of Migratory Sharks	Section 4 (12, b)	Optional ("should")	All
	Fisheries management	Communication from the Commission to the European Parliament and the Council on a European Community Action Plan for the Conservation and Management of Sharks	3. THE ACTION PLAN 3.1.	No	All
	Bycatch mitigation/ reduction	UNEP/CMS/Resolution 12.22. Bycatch	Participation in Regional Fisheries Management Organizations	Yes	Migratory species in Appendices I and II
		Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2020)	B. Priorities (13.3)	No	All
			B. Priorities (13.4)	No	All
			C.2.	No	All
		UNEP/CMS/Resolution 12.22. Bycatch		"as appropriate"	Migratory species
		Recommendation GFCM/36/2012/3	Part II (8)	Yes	*Galeorhinus galeus*
		Regulation (EU) No 1380/2013	Art. 14	Yes	All
	Catch limit (sensitive species)	Regulation (EU) 2019/1241	Preamble (9)	Yes	All
		Council Regulation (EU) 2021/92	Preamble (13)	Yes	All
			Preamble (33)	Yes	*Isurus oxyrinchus*
			Art. 8	Yes	All
		Regulation (EU) No 1380/2013	Art. 7	Not directly	All
	Safe limits	UNEP/CMS/Resolution 11.2 (Rev.COP12). Strategic Plan for Migratory Species 2015–2023	Goal 2	Not directly	Migratory species
	Discard elimination	Regulation (EU) No 1380/2013	Art. 2	Yes	All
	Reduce mortality	07–06 Supplemental Recommendation by ICCAT concerning Sharks	2	Yes	*Lamna nasus, Isurus oxyrinchus*
		UNEP/CMS/Concerted Action 12.5 (Rev.COP13). Concerted Action for the Angelshark (*Squatina squatina*)	(iv)	Not directly	*Squatina squatina*
	Prevent adverse impacts	Convention on Biological Diversity	Art. 10 (b)	"as far as possible and appropriate"	All
	Reduce human impact	UNEP/CMS/Concerted Action 12.5 (Rev.COP13). Concerted Action for the Angelshark (*Squatina squatina*)	(iv)	Not directly	*Squatina squatina*
	Live release	04–10 Recommendation by ICCAT concerning the Conservation of Sharks caught in Association with Fisheries managed by ICCAT	6	Yes	Sharks caught in Association with ICCAT Fisheries
		10–08 Recommendation by ICCAT on Hammerhead Sharks (Family Sphyrnidae) caught in Association with Fisheries managed by ICCAT	2	Yes	Sphyrnidae
		11–08 Recommendation by ICCAT on the Conservation of Silky Sharks caught in Association with Fisheries managed by ICCAT	2	Yes	*Carcharhinus falciformis*[a]
		15–06 Recommendation by ICCAT on Porbeagle caught in Association with Fisheries managed by ICCAT	1	Yes	*Lamna nasus*
		Recommendation GFCM/36/2012/3 (amended by GFCM/42/2018/2)	Part II (6)	Yes	Annex II species of the SPA/BD Protocol
		Recommendation GFCM/42/2018/2	Part III	Yes	Annex II species of the SPA/BD Protocol

[a] Relevant to Mediterranean countries for ICCAT fisheries in the Atlantic, but not directly applicable to the Mediterranean Sea as this species is not an established species in the region.

lands. Three countries (Bosnia and Herzegovina, France, Greece) implemented more than ten initiatives within the time frame assessed. NGOs in other countries are involved in fewer projects, with only one project on bycatch mitigation being implemented in Morocco (Fig. 3).

Based on the analysis, NGOs fulfil two roles within the policy cycle. They contribute to the implementation of conservation and fisheries management measures, and, to a lesser extent, the formulation of new policies. The results of the analysis of initiatives show that NGOs contribute to the fulfilment of obligations in relation to capacity building, monitoring, research, education and awareness, policy development, and sustainable fisheries management under the applicable legal frameworks (Table 4). They also initiate and create cooperation between countries through the cross-border implementation of these programmes and projects. A detailed overview of classified initiatives and their composition is shown in Fig. 3.

Out of the total, 49 (67.12 %) initiatives classified for the category of 'Conservation management' and 24 (32.88 %) fell under 'Fisheries management', with Greece and Spain being the two countries with highest percentage of fisheries related projects, namely (43.75 %) and (20 %) respectively. Within these two categories, 'Impact assessments' accounted for most initiatives (15), followed by those concerning the distribution of species (14), and projects focusing on bycatch mitigation (10). A lower number of initiatives target topics of 'Population status' (7), 'Important areas' (5), 'Recover & release programmes' (5), 'Educa-

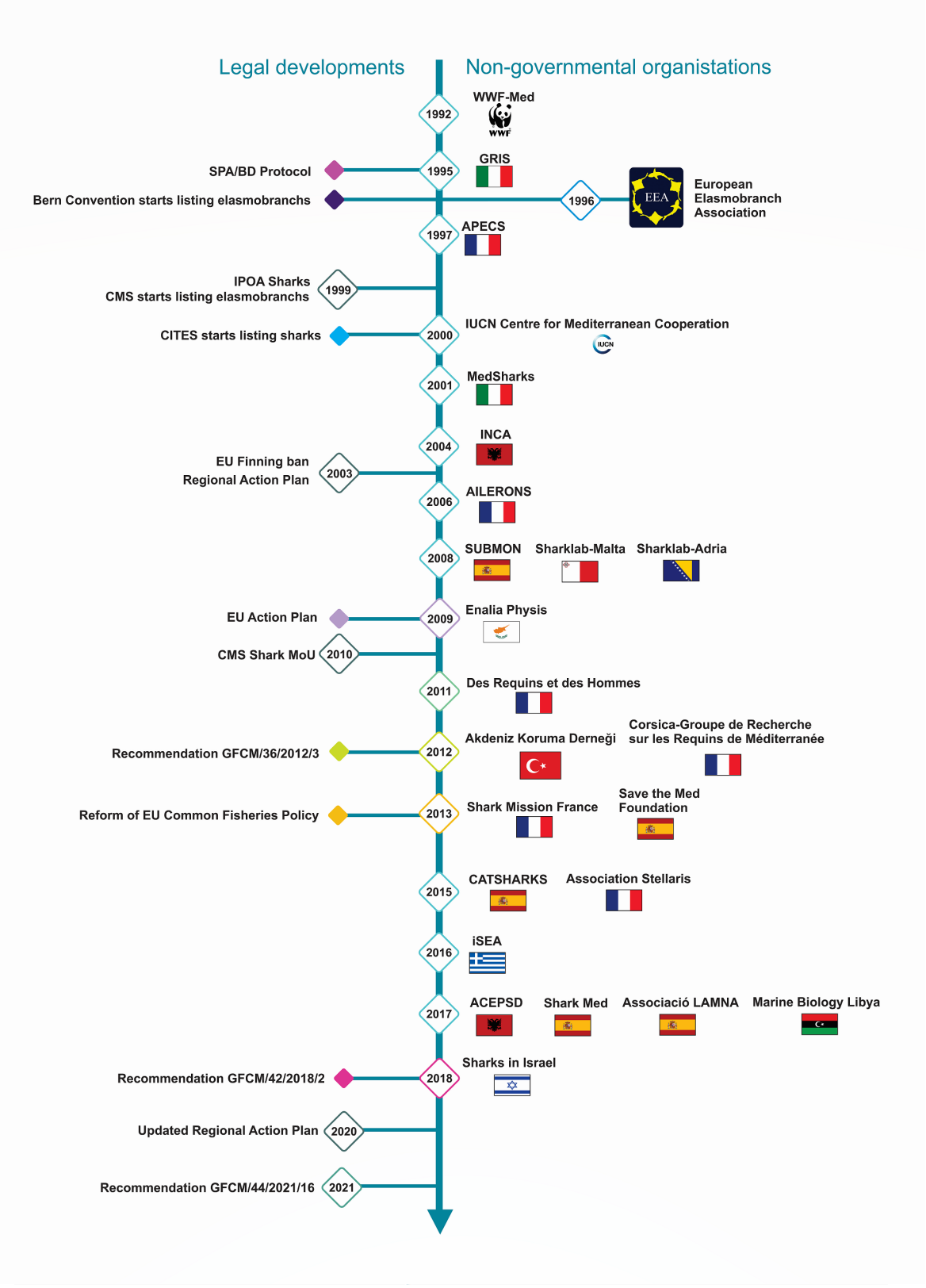

Fig. 2. Timeline showing the foundation of NGOs that are currently operating or have operated in the Mediterranean and legal developments. Remarks: "APECS" operates in the Atlantic part of France, "Des Requins et de hommes" operates globally but currently has no projects in the Mediterranean, and "Association Stellaris" appears to be no longer operational (web-based research).

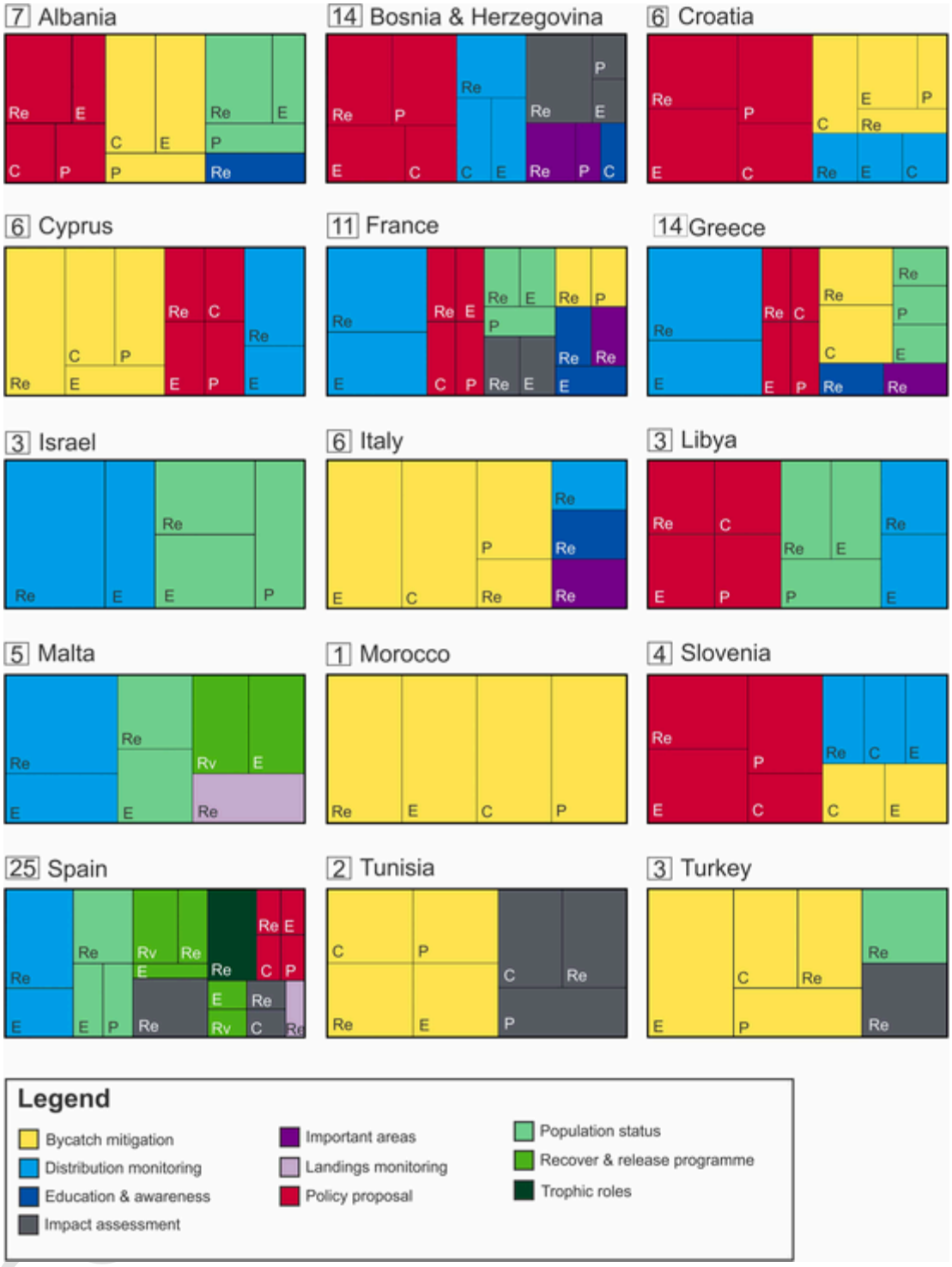

Fig. 3. Tree maps of NGO contributions by country based on the different classes of measures and respective composition of the components. These components are Research (Re), Education (E), Policy development (P), Capacity building (C), and Recovery (Rv). Number boxes for each country indicate the number of initiatives found and assessed in the respective country.

tion & Awareness' (4), and 'Trophic roles' (4). Only two programmes aim to collect landings-data of selected species. Additionally, of all the programmes analysed, seven are specifically designed to develop and create new policies for sharks, thereby supporting the formulation of new policies. This is further supplemented by an additional ten initiatives that integrate a 'Policy development' component. The highest represented component is 'Research', which forms part of 66 out of 73 initiatives, followed by 'Education' (integrated 30 times), 'Capacity building' (17), 'Policy development' (17), and 'Recovery' actions (5). This research conducted by NGOs focuses not only on the impact of different activities and population status of selected species, but also supports the preservation of genetic diversity, e.g., through the collection of tissue samples by the Albanian Center for Environmental Protection and Sustainable Development and the market mislabelling project of Associacio LAMNA (Supplementary Table 1).

Although all projects with a focus on developing new policies involve governments, the survey responses indicate a limited influence for NGOs at national level. The self-evaluation of NGOs' relationship

with the government of the country they operate in and the existence of a direct working relationship is shown in Fig. 4. Despite working relationships with the government, only 6 NGOs feel that their government is supportive of shark conservation (Albania (2), France (1), Israel, Malta, Spain (1)). Conflicting views in relation to government support were noted among NGOs from Albania, France, and Spain. Only one Spanish NGO, located in the Balearic Islands, felt that the government is supportive. It is noteworthy that only three of the NGOs received financial support from the government. A consistent view among NGOs is that there is a need for better policies, with 53.33 % of the opinion that sufficient scientific information for such is available in their country (Albania (1), Bosnia and Herzegovina, France (2), Greece, Malta, Spain (2)).

Despite the wide range of initiatives with components related to awareness raising, education, and capacity building, public support, as evaluated through survey responses, is limited. Seven NGOs replied that they consider the public 'not well informed' (Albania (1), Bosnia, France (1), Greece, Libya, Spain (1), Turkey). This term was defined as "A low percentage (if any) of the local population is aware of shark conservation efforts and issues, including shark products and meat". On the other hand, NGOs from Cyprus, France (2), Israel, Malta, Spain (2) answered that they would evaluate public knowledge as 'moderately informed', which was indicated as follows: "There is a general understanding of marine conservation issues with some knowledge on shark related issues in the public".

Additional efforts, beyond the initiatives assessed, are being implemented at national level. Fourteen NGOs stated that they produce their own awareness material (one NGO withheld a reply to this question). Furthermore, 53.33 % of surveyed NGOs hold regular awareness events and offer some form of training. Volunteer programmes are offered by most NGOs (73 %), contributing to additional capacity building involving national and foreign volunteers.

Further to categorisation, the implementation scale of each of the projects was assessed. Most of the initiatives are implemented at national scale (79.45 %), followed by those that include multiple Mediterranean countries at 'subregional' level (9.59 %), and those that reach across the entire Mediterranean (8.22 %). Only two initiatives involve contributions from outside the Mediterranean at international level. Additional considerations applied to the evaluation of initiatives assessed the integration of stakeholders. Fifty (68.49 %) of the initiatives involve stakeholders.

4. Discussion

The legal review demonstrates that shark related problems have made it to the international agenda, creating obligations in relation to the conservation and management at national level. However, inherent difficulties bedevil the efficacy of the legal regimes that are identified as relevant to shark conservation and management. The relevant instruments listed in Table 4 show that priority is given to the most threatened species, yet other species continue to decline and the listing of these species in appendixes might not be able to keep up with the rate of disappearance. While Table 3 shows significant State-Party commitments in acceding to agreements, their purpose may not always be realised. There might often be discrepancies between statements of intent or aspiration – doubtless well intentioned - and the reality of truly binding, effective, legal measures. The nature of international measures is often rooted in compromise in order to secure agreement amongst states with often divergent priorities and interests, as the ongoing development of the United Nations' ABNJ measure demonstrates [87]. Otherwise, there may be implementation gaps. This is also reflected in provisions of the assessed instruments. Apart from the direct protection of listed species, legally binding provisions mainly concern data collection, education, and reporting.

In legal commentary, this is often explained by virtue of the discrepancy between implementation *in law* and implementation *in fact*. The former, implementation in law, occurs when State-Party to a specific obligation changes its legal architecture or implements a measure purporting to fulfil it. State involvement here may be voluntary, such as accession to a multilateral environmental agreement (MEA), such as the CBD or Barcelona Convention, and any implementing measures may reflect the characteristics of the obligations to which the state may or may not be held to account via treaty mechanisms. They may be compulsory, for example, through obligations created pursuant to membership of a supranational body such as the EU which to take two examples creates obligations in respect of habitat designations or fisheries measures and will take action to enforce them.[1] The latter, implementation in fact, refers to the situation whereby the measure of law is made effective in its enforcement. Within the EU member states, the nature of most fisheries measures as being Regulations (as defined by Article 288 of the Treaty on the Functioning of the European Union) means that theoretically they are part of the law of the Member States without further action. Practical enforcement of that law is a different matter however and may require external pressure to be applied. Achieving an effective enforcement regime depends upon a multiplicity of diverse but interdependent factors, including effective institutional machinery; physical infrastructure/capacity; political will; public prioritisation of the issues; and external factors such as the presence or threat of sanction. In all these circumstances, NGOs offer significant potential as push factors to realise State obligations. Litigation, or the threat of it, by organisations such as Client Earth [88], The Blue Marine Foundation, WWF and the Marine Conservation Society [89] and Oceana in other situations offers scope for concerned practice in the Mediterranean.

The increasing consideration of elasmobranchs at international level in recognition of the urgent conservation needs for this group seems to be driven and accompanied by an increase in the establishment of NGOs focusing on shark conservation. Although this study is limited to the responses from surveys and the limitations of a web-based research, it reflects overall NGO efforts across multiple categories within 15 Mediterranean countries. Although the extent of programmes and projects varies across countries, which can have multiple causes such as the number of active NGOs within a country, available funding, the number of sharks within national waters, etc., the evaluation of activities of NGOs at national level showed that NGOs support the fulfilment of multiple obligations (Table 4, Fig. 3); thereby contributing substantially to the implementation stage of the policy cycle for sharks in the Mediterranean Sea. Naturally, most of these projects and programmes focus on conservation management rather than fisheries management, noting that NGOs in general have an objective to conserve rather than the power to manage [90]. Furthermore, NGOs contribute to the development of new policies, supporting the policy formulation stage of the policy cycle, and foster regional cooperation. A case in point is the development of Action plans for Angelsharks, which was reaffirmed through the 13th Conference of the Parties meeting of the CMS within the Concerted Actions for Angelsharks [91]. The CMS is also one of the legal instruments that incorporates questions concerning the national involvement of NGOs within its reporting template [92]. The CMS reporting requires State-Parties to answer on committees and cooperation with NGOs (among other stakeholders); and focuses on specific aspects such as awareness, capacity building, and cooperation on protected areas. Similarly, the CBD report format incorporates questions on public involvement and cooperating working relationships with NGOs. The international plan of action and regional plan, although listing respective government entities responsible for implementation, also encourage working relationships with NGOs [93].

[1] Court of Justice of the European Union, Case C-304/02 *Commission v France* [2005] ECR I-6263.

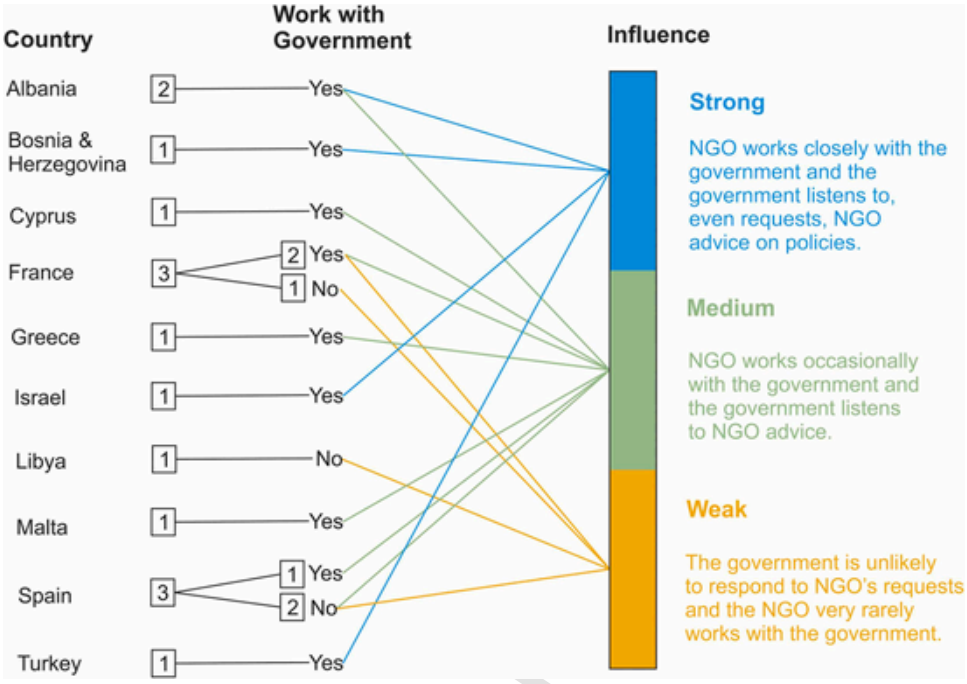

Fig. 4. NGO responses per country showing the number of NGOs in boxes, and their responses to whether they work together with their national government and how the NGO evaluates their influence on policy making at national level.

Policy influencing by NGOs in cooperation with governance certainly does not only happen at national level, but across regional and even international level, showing commitment and cooperation among NGOs and governments that may lead to more effective, better designed policies and implemented measures at national level. The influence of NGOs on policy making has been subject to limited, but increasing research [55,94]. The role and increasing importance of non-state actors as recognized by Challender and MacMillan in issue framing and agenda setting in the case of CITES, also identified a drawback of NGOs claiming unwarranted victories and thereby reducing their eligibility if not guided by the best available science [55]. In the case of shark conservation and policy guidance from NGOs and scientists, which often are part or leading forces within NGO efforts, there is for support sustainable fisheries rather than prohibition of such for conservation purposes if informed by solid scientific research [95].

While it may be argued that international policies direct the national courses of action for the conservation of sharks, as shown in the efforts established and decided by governing bodies, the overall implementation still lags. Following the most recent review of implemented measures for sharks through the Focal Point meeting of the Regional Activity Centre overviewing the implementation of the Barcelona Convention, a lack of effort and major gaps for actions remain [93]. This lack of action might have led to the increasing effort as NGOs, a reaction that previously observed by Abbott noting that NGOs evolve out of frustration of governments' inactions [39]. This is further supported by the low level of government involvement, direct cooperation and financial support NGOs receive from governments, and the overall need for better policies vocalised by NGOs.

NGOs, although not essential in improving fisheries management, can bridge gaps in education, training and knowledge transfers and support sustainable fisheries management and stakeholder interactions [96]. The involvement of stakeholders within these initiatives is an essential approach to generate support for improved management [6]. Furthermore, education and awareness raising are important components in supporting shark conservation [97]. As described by Richards & Heard, NGOs have an repository of "armoury" which they use to create change including education, media, and their active participation in policy making, which was also observed in this study:, with the latter being perceived as the course of action to create long term change [98]. Furthermore, this study confirmed that these organisations form coalitions to increase their reach and impact [98]. NGOs also create a hub for information sharing and distribution [90], which was confirmed by the level of cooperation and data gathering efforts shared among the NGOs evaluated.

It is not surprising that NGOs do not fulfil regulatory obligations, as they have limited power to do so if not granted by the national government [90]. This is not though to deny their potential for positive influence. Traffic, for example, has a close and integrated research and advisory role with the CITES Secretariat, offering advice on species' inclusion within the treaty scheme, monitoring trade data and examples of effective enforcement. Although there are legal limitations to the power and involvement of NGOS, such as in the establishment of laws and enforcement of regulations, there are substantial contributions and influences of these organisations for elasmobranch conservation and management, such as the contemporary trend for litigation-focused environmental NGOs offering alternative means to close accountability gaps for non-compliance. Preserving genetic diversity beyond the focus of economically valuable species but of all biodiversity, is key for future conservation efforts, and should be further carried into the next decades focus [99], a goal which the efforts of the NGOs contribute to. Although there is clear evidence of the contribution of the evaluated NGOs in fulfilling such obligations, the impact of these projects and programmes is less clear due to the reliance on informal rather than formalized processes which can lead to legal uncertainty and reduced impact [90].

5. Conclusion

NGOs support the implementation stage of the policy cycle for sharks, while advocating for the formulation of new policies. Despite supporting the creation and development of better policies in the region, they also implement a wide range of measures that aid the fulfilment of international and regional obligations for shark conservation and management. Further research may be needed to assess the effectiveness of the implemented measures and the role of NGOs as observers for policy effectiveness and "watch dogs" for the implementa-

tion of measures at national scale, aiding the evaluation of national policies. As noted above the contemporary willingness for NGOs to resort to litigation or the threat of it, represent a significant push-factor to encourage more effective implementation and/or enforcement of obligations – particularly, although not limited to, when those obligations are constituent parts of directly applicable measures of European Union law.

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Data statement

The data for this study is part of an ongoing PhD project and may be made available upon reasonable request post PhD completion.

CRediT authorship contribution statement

Lydia Koehler: Conceptualization, Methodology, Data evaluation, Writing - Preparation of Original Draft; Jason Lowther: Supervision, Writing and Composition, Reviewing and Editing.

Data availability

The data that has been used is confidential.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2022.105228.

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