

MARINE MEGAFAUNA CONSERVATION ACTION PLANS:

SYSTEMATIC REVIEW AND
RECOMMENDATIONS IN PREPARATION
FOR A GLOBAL CETACEAN ACTION PLAN

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Summary

Cetaceans (dolphins, whales and porpoises) are a group of 94 species distributed throughout the world's oceans, seas, and some rivers and lakes. Threats facing cetaceans are location- and species-specific, and include fisheries bycatch, habitat degradation and ship strikes. Today, 26% of cetacean species are classed as threatened with extinction, meaning conservation intervention is needed. Strategically produced conservation action plans can support the implementation of conservation interventions, resulting in successful conservation outcomes. The last IUCN global action plan to guide cetacean conservation interventions was drafted in 2002, and there is an opportunity and need to develop a new plan. To aid the creation of a new plan, a systematic review of the newest versions of multi-species, multi-country marine megafauna action plans produced up to 28 February 2025 ($n=23$) was conducted. Searching and screening was conducted following the RepOrting standards for Systematic Evidence Syntheses (ROSES) steps for systematic review. A narrative synthesis and critical evaluation was undertaken to distil and select the best approaches and make recommendations. Recommendations include the presentation of a 14-step action plan design process (ranging from securing funding, engaging stakeholders, setting a vision and creating SMART actions, to dissemination and monitoring). Specific recommendations for each step are summarised in a supplementary materials document. Suggested threat and conservation intervention prioritisation metrics (e.g. level of public support, political will, number of affected species) and monitoring metrics (e.g. number of bycatch events, changes in population size) are also presented. The produced recommendations and tools provide a comprehensive approach to cetacean conservation planning. Given the similarities between marine megafauna species' threats and management, findings will also be useful for those creating action plans for other marine megafauna taxa.

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1. Introduction

There are 94 currently recognised species of cetaceans (whales, dolphins and porpoises) worldwide (Committee on Taxonomy, 2025). This diverse group of species inhabits and plays important ecological roles within a range of freshwater, coastal and open ocean ecosystems across the globe. At present, 26% of cetacean species are classed as threatened on the IUCN Red List, and the proportion of species classed as endangered is increasing (Braulik et al., 2023). Threats to cetaceans vary by species and location. However, key threats include fisheries bycatch, habitat degradation (including chemical and noise pollution), prey depletion, marine traffic and climate change (e.g. Read et al., 2006; Jepson and Law, 2016; Erbe et al., 2019). Threat impacts are intensified by cetaceans' life history parameters and relatively low fecundity. Vulnerability to threats is exacerbated for populations with small ranges or populations close to land where there is a higher incidence of anthropogenic threat exposure (Braulik et al., 2023).

Scientists, conservationists and governments, amongst others, have been working to identify, monitor and reduce threats to support cetacean conservation for decades (e.g. Chion et al., 2018; Minton et al., 2022; Liu et al., 2023). However, the multidimensional complexities of threats, including ecological, as well as political, social, and financial facets, make threat reduction challenging. Conservation efforts have yielded progress for some cetaceans like Indus River dolphins (Aisha and Khan, 2021) and Yangtze finless porpoises (Huang et al., 2020). However, many species and populations continue to decline and some are on the brink of extinction or extirpation (e.g. Constantine et al., 2021; Rojas-Bracho et al. 2022; del Monte-Luna et al., 2025). Urgent and more pervasive conservation action is needed to prevent further declines and extinctions (Reeves, 2022).

The International Union for Conservation of Nature (IUCN)'s Conservation Planning Specialist Group (CPSG, 2020) recommends that conservation planning is undertaken for all threatened species. The IUCN's 'Species Strategic Plan 2021 – 2025' set a goal to strengthen such planning from local to global scales. A key element of conservation planning is the production of an action plan, defined as 'a description of a project's goals, objectives, and strategies to abate identified threats and make use of opportunities' (CMP, 2020). Action plans can be effective at achieving conservation outcomes, with the ultimate goal being the improvement of a species' or population's conservation status (Fuller et al., 2003; Reuter et al., 2022; Lees et al., 2021). Improvements can be achieved through a plan's role in raising awareness, mobilising stakeholders, or raising funds (Fuller et al., 2003).

Previous cetacean action plans varied in scope from being population- and threat- specific, to global. The producers of those plans ranged from Non-Governmental Organisations (NGOs) to Inter-Governmental Organisations (IGOs) or Bodies (IGBs). The IUCN Species Survival Commission (SSC) Cetacean Specialist Group (hereafter referred to as the 'Cetacean Specialist Group') has produced three global cetacean action plans, with the most recent meant to cover the period from 2002-2010 (Reeves et al., 2003, [Dolphins, Porpoises and Whales: 2002-2010 Action Plan for the Conservation of Cetaceans](#)). At present, there is no IUCN global plan for cetaceans. Such a plan could highlight and prioritise threats on a global stage, and endorse and support other plans and agreements currently in place (e.g. UNEP/CMS, 2024, [CMS Global Programme of Work: Aquatic Species Conservation Issues](#)). Cetacean Specialist Group members expressed strong support for the drafting of a new global cetacean action plan through a recent member survey. In preparation for the creation of a new global cetacean action plan, conservation planning guidance is needed.

Numerous conservation planning guidance documents are available. For example, the Conservation Membership Partnership produces 'Conservation Standards' twice per decade (e.g. CMP, 2025), the IUCN/SSC Species Conservation Planning Sub-Committee (2017) has produced guidelines for strategic

planning, and the Nature Conservancy released a 'Conservation Action Planning Framework' (TNC, 2007). Further, the International Whaling Commission (IWC) has created a Conservation Management Plan Program handbook, targeted at species- or population-level planning (IWC, 2024). However, at present no thorough but succinct, tailored guidance is available for global marine megafauna conservation planning, which could serve as a reference for the development of a global cetacean plan.

The authors of this document set out to (i) conduct a systematic review of the newest versions of multi-species, multi-country marine megafauna action plans produced up to 28 February 2025; (ii) provide a narrative synthesis and critically evaluate the reviewed plans, and (iii) distil and provide step-by-step recommendations for the development of a new cetacean action plan. As was the case for previous iterations of action plans produced by the Cetacean Specialist Group, this new plan is intended to serve as a guide for all stakeholders involved in cetacean conservation (e.g. NGOs, governments, researchers, potential funders), rather than only as a plan for the Specialist Group's own programme of work.

2. Method

Action plans were searched, screened and synthesised following the RepOrting standards for Systematic Evidence Syntheses (ROSES) steps (Haddaway et al., 2017). These steps are detailed in sections 2.1. and 2.2., and summarised in Figure 1.

2.1. Action plan searching and screening

Action Plans were searched for using the search string '*(action OR manag* OR conserv*) AND (plan OR strategy) AND (dolphin* OR whale* OR cetacea* OR shark* OR ray* OR elasmobranch* OR turtle* OR reptile* OR otter* OR mustelid* OR seal* OR 'sea lion*' OR pinniped* OR dugong* OR sirenia* OR 'polar bear*' OR 'marine mammal*' OR 'aquatic mammal*' OR 'aquatic species' OR 'marine species')*' on the following grey literature sources: Cetacean Specialist Group website library, IUCN/SSC Shark Specialist Group website library, IUCN/SSC Marine Turtle Specialist Group website library, IUCN/SSC Polar Bear Specialist Group website library, IUCN/SSC Pinniped Specialist Group website library, IUCN/SSC Otter Specialist Group website library, IUCN/SSC Conservation Planning Specialist Group Species Plan website libraries, IUCN library, Convention on the Conservation of Migratory Species of Wild Animals (CMS) publications library, CMS Action Plan libraries and the IWC archives. No other IUCN/SSC marine megafauna specialist groups, other than those listed, have dedicated websites. The IUCN library houses IUCN and non-IUCN produced documents, and contained all plans that were listed on the IUCN/SSC marine megafauna species specialist groups' and conservation planning specialist group's websites, indicating a degree of completeness in the searched libraries. Discussions with experts led to the identification of four additional plans. Action plans published up to 28 February 2025 were included.

A total of 51 plans were identified through searching. Plans were screened by their scope, using the information provided in their titles. Action plans were screened for: (i) being the most recent of their kind, if multiple iterations were available; (ii) having a multi-country focus; (iii) having a multi-species focus, and (iv) relating to multiple threats. These criteria were chosen to increase similarity between reviewed plans and a new global cetacean action plan. Where plans met all the screening criteria, they were included in the review ($n=21$). An exception to this screening was previous Cetacean Specialist Group action plans, for which old iterations were also included, bringing the total number of included plans to 23. The searching and screening process is presented in Figure 1.

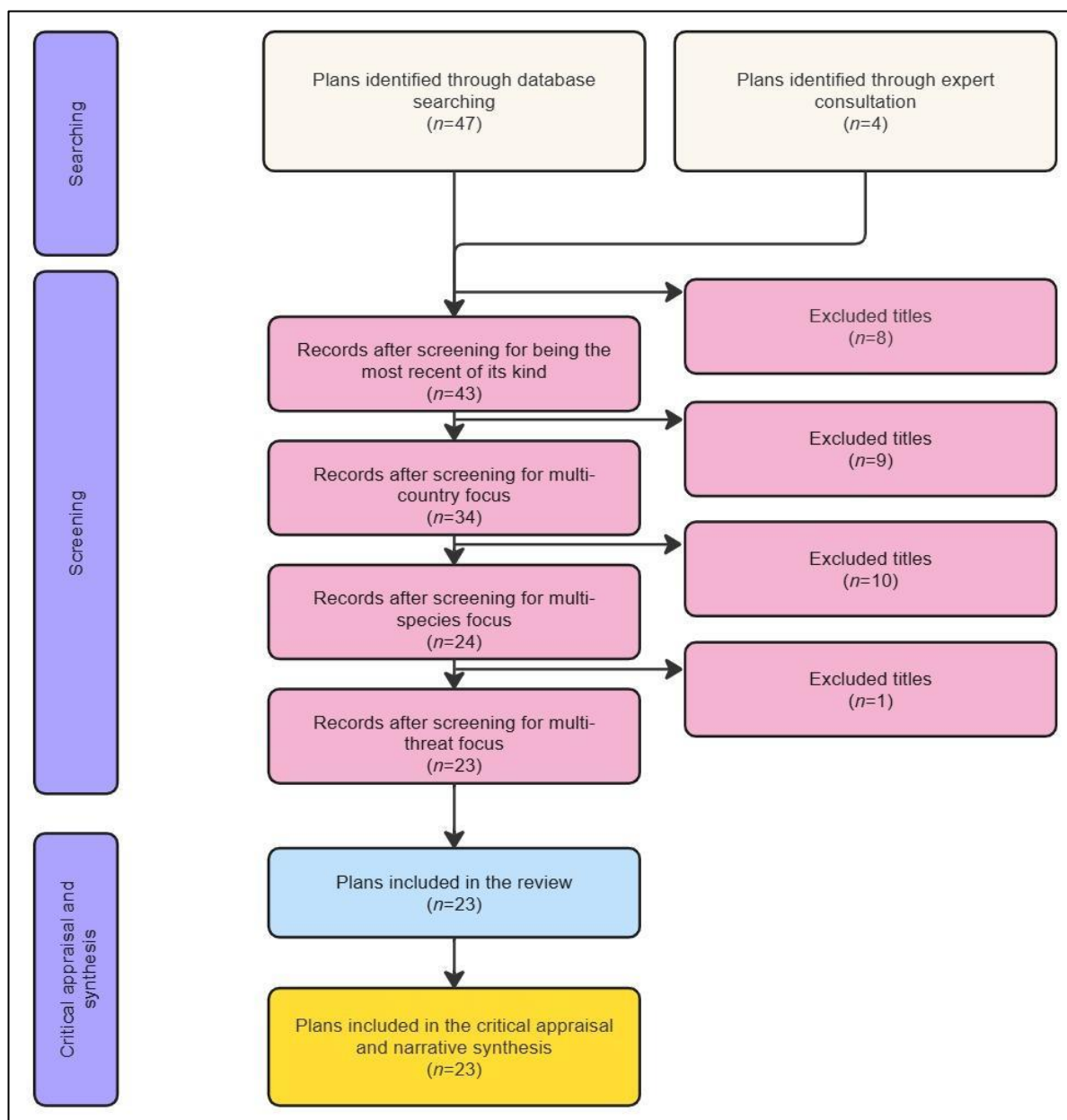


Figure 1. RepOrting standards for Systematic Evidence Syntheses (ROSES) steps followed when literature searching, screening and reviewing marine megafauna action plans (Haddaway et al., 2017).

2.2. Data extraction, processing and synthesis

A list of data to extract from each of the plans was created, covering the action plan design topics of (i) obtaining funding, (ii) assembling a team, (iii) defining a plan scope, (iv) creating a timeline, (v) selecting and engaging stakeholders, (vi) defining success, (vii) ‘understanding the system’ (a term used by the CPSG, 2020, when referring to understanding the ecological, social and political elements of the conservation of a species, including species’ conservation statuses, threats, trends and any current and potential management), (viii) setting objectives, (ix) identifying where intervention can take place, (x) identifying how to intervene, (xi) plan dissemination, (xii) plan monitoring, (xiii) plan drafting and (xiv) plan review and finalisation. These 14 topics, which are summarised in Figure 2, were derived using modified versions of the steps outlined in the conservation planning literature (TNC, 2007; CMP, 2020; IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Byers et al., 2022; Lees, 2023). Data on each of the steps were extracted from each of the plans and entered into a spreadsheet ([Supplementary Material 1](#)). Where possible, informal semi-structured interviews ($n=3$)

were conducted with plan authors to gain further details regarding a plan's development process, scope or scale. Interview responses were also entered into the data extraction spreadsheet, with any responses obtained from interviews marked with an asterisk (*) ([Supplementary Material 1](#)).

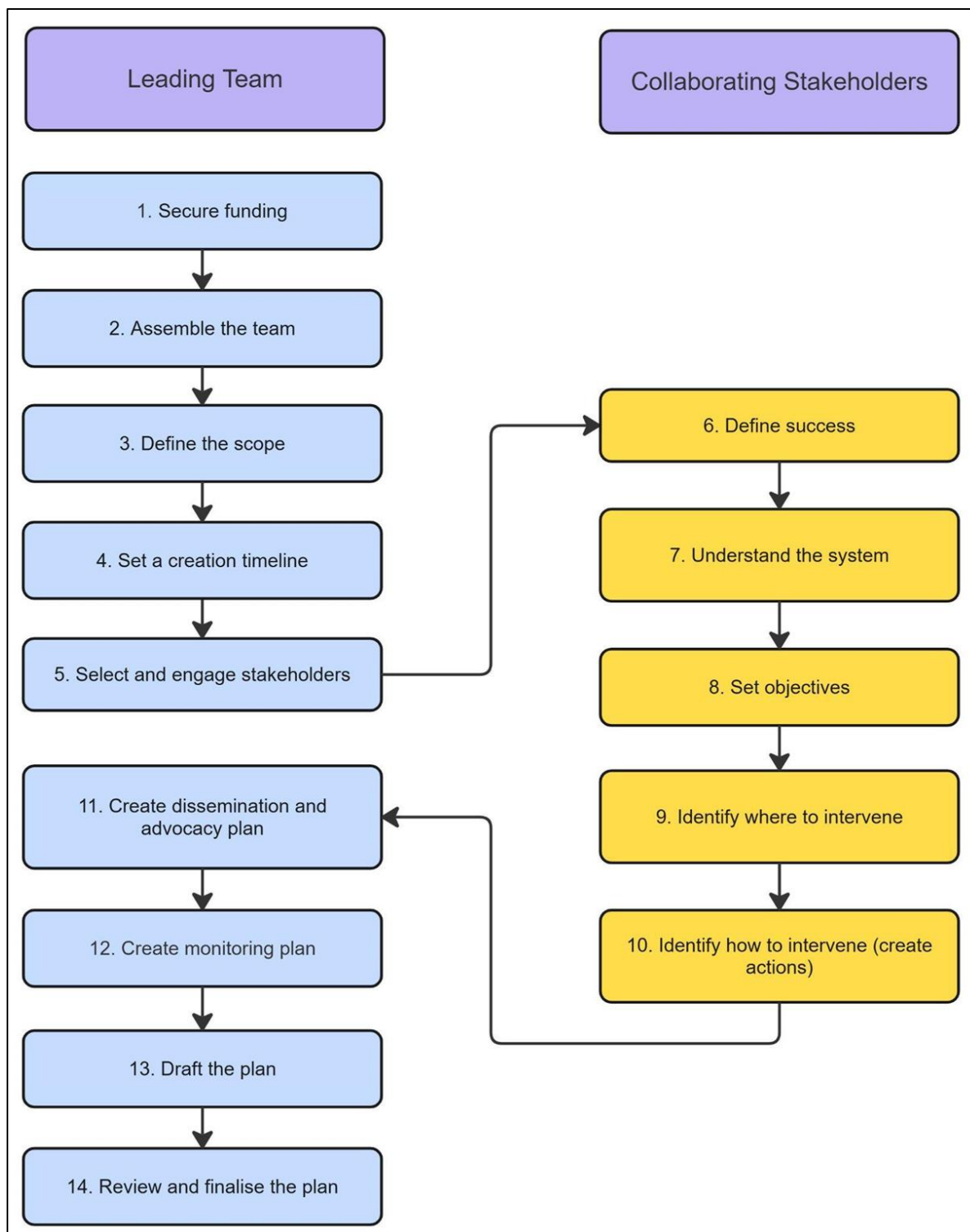


Figure 2. Action plan design steps, derived using modified versions of the steps outlined in the conservation planning literature (TNC, 2007; CMP, 2020; IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Byers et al., 2022; Lees, 2023). The order of steps is flexible, with some steps able to occur in parallel. There may also be some flexibility in whether decisions are made by the leading team or in consultation with collaborating stakeholders.

For analysis, funders were categorised as philanthropic organisations (e.g. foundations, funds, trusts), NGOs/International Non-Governmental Organisations (INGOs), Governments, Zoos and Aquariums, Industry or IGOs/IGBs/Multilateral Environmental Agreements (MEAs). Suggested stakeholders of a future global cetacean action plan were identified from the reviewed plans where there was overlap between a reviewed plan's scope and a new cetacean plan. Plan aesthetics were broadly categorised as 'text-heavy with minimal visuals', 'moderate text with moderate visuals', or 'visual-heavy with limited text'.

Descriptive statistics (percentages, counts) were produced for the extracted data. Further, extracted data were synthesised and discussed with recommendations for a global cetacean action plan distilled.

3. Results and discussion

The reviewed plans were produced over a 40-year period between 1985 and 2024 (Appendix: Table 1). Two plans were produced in the 80s (8.7%), four in the 90s (17.4%), three in the 00s (13.0%), eight in the 10s (34.8%) and six in the 20s (26.1%) (Appendix: Table 1). IUCN/SSC species specialist groups were the lead authors on ten (43.5%) of the plans (Appendix: Table 1).

The 14-steps involved in conservation plan creation derived from modified versions of previously produced guidance (TNC, 2007; CMP, 2020; IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Byers et al., 2022; Lees, 2023) ranged from securing funding to finalising a plan (Figure 2). It is recommended that these steps are used as a guide for future plan development. The order of steps is flexible, with some steps able to occur in parallel. There may also be some flexibility in whether decisions are made by the leading team or in consultation with collaborating stakeholders. The following narrative synthesis and discussion is structured following these steps. Summary recommendations are provided for each step, and are also listed in [Supplementary Material 2](#).

3.1. Secure funding

A total of 58 funders were acknowledged across the reviewed plans. Of all funders, government departments were the most common ($n=24$, 41.4%), funding seven, or 50%, of the reviewed plans where funders were reported. The second most frequent of all funders were philanthropic organisations (e.g. foundations, funds, trusts) ($n=23$, 39.7%), which funded 14, or 100%, of the reviewed plans where funders were detailed (Appendix: Table 1). In terms of individual funders, WWF and the Disney Conservation Fund provided funds for the most plans ($n=5$, 21.7%; $n=4$, 17.4%; respectively) (Appendix: Table 2). DEJA Inc. provided funds for two of the plans in addition to funding other IUCN Action Plans outside the scope of the review (e.g. butterflies plan, IUCN/SSC, 1993; pig, peccaries and hippos plan, IUCN/SSC Pigs and Peccaries Specialist Group and IUCN/SSC Hippo Specialist Group, 1994; fowl conservation plan, McGowen et al., 1995). All funders that funded more than one plan are listed in Appendix: Table 2. This list of funders can be considered by those seeking funds for future action plans. Furthermore, the IUCN/SSC's [Global Species Action Plan](#) (2023) recommends specific funders, namely, the Darwin Initiative, EDGE Protected and Conserved Area Fund, The Rufford Foundation, Whitley Fund for Nature, and the Global Environmental Facility. These funders could also be considered for a new cetacean plan. There are, however, numerous other funders which may be suitable, which were not reported as funders of the reviewed plans.

Of the reviewed plans, none provided details on the cost of plan creation. Providing costs would provide transparency and accountability, allow improved plan evaluation and inform future plan creation planning and fundraising (Bottrill and Pressey, 2012; White et al., 2022). When applying for

funds, the costs involved in implementing all stages of plan creation, as outlined in Figure 2, in addition to plan dissemination and monitoring, should be considered.

Recommendations

- Consider applying for funds from the list of funders presented in Appendix: Table 2.
- Consider applying for funds from concerned government departments (e.g. [Global Species Action Plan](#), IUCN, 2023)
- Consider applying for funds for all stages of plan creation, as detailed in Figure 2, in addition to plan dissemination and monitoring.

3.2. Assemble the team

A person or group of people need to be identified to take the role of leading and coordinating the production process (IUCN/SSC, 2008). The leading team should be involved at all stages of the design process (IUCN/SSC Species Conservation Planning Sub-Committee, 2017) and may or may not also be responsible for plan governance (i.e. dissemination, monitoring) (Figure 2). If an older plan is being adapted to produce an updated plan, Salafsky et al. (2002) recommend that members of the original plan's leading team be involved in the adaptation or updating process. Decisions on the governance level required and appropriate, considering relevant capacity, will need to be made by the leading team, and/or through discussions with stakeholders.

Recommendations

- Decide which person or group of people will be responsible for leading the design process (IUCN/SSC, 2008).
- Define the terms of reference for the team leading the design process, including their role in plan development and eventual monitoring, evaluation, dissemination or eventual adaptation.

3.3. Define the scope

Most reviewed plans ($n=13$, 56.5%) were termed 'action plans' (Appendix: Table 1). However, many plans ($n=8$, 34.8%) were alternatively described as 'conservation strategies' or 'conservation plans' (Appendix: Table 1). Other titles included the terms 'programme' ($n=2$, 8.7%) or 'management plan' ($n=2$, 8.7%) (Appendix: Table 1). According to the IUCN/SSC Species Conservation Planning Sub-Committee (2017), the term 'strategy' often refers to broader 'higher-level' projects, and 'action plans' often refer to smaller-scope projects with actionable activities, however, this distinction was not noted within the reviewed plans. In recent years, the IUCN/SSC Species Conservation Planning Sub-Committee (2017) has made a shift from the term 'action plan' plan to the term 'conservation strategy' or 'conservation plan', both of which have been associated with a more adaptable and holistic approach (i.e. approaching threats from human and ecological angles, encompassing monitoring elements) (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; CMP, 2025).

Of the reviewed action plans, six (26.1%) addressed elasmobranchs, five (21.7%) covered either cetaceans or reptiles, two (8.7%) covered pinnipeds, and one (4.3%) addressed each of mustelids, all aquatic species, all marine mammal species, all marine megafauna species and all species (Appendix: Table 1). Most of the plans ($n=13$, 56.5%) had a global scope (Appendix: Table 1). Almost half of the plans ($n=9$, 60.9%) included details on the time to be covered by the plan (Appendix: Table 1). Providing a time span for a plan can increase accountability. Where a time span was provided, spans ranged from four to ten years (median five years) (Appendix: Table 1). Similarly, the Kunming-

Montreal Global Biodiversity Framework targets were set for eight years (CBD, 2022). If a plan is short, it will become out of date quickly, while long plans can lack a sense of urgency and ambition. When setting a time period to be covered by a plan, it is important to consider: temporal scales of addressing relevant conservation priorities, target species' life history traits, rates of emerging threats, degree of ambitiousness desired, and time taken to produce a plan.

An additional element of the scope is the target audience. Within the reviewed plans, target audiences ranged from government departments, NGO/IGOs, researchers, funders and industry/private sectors to zoos and aquariums. Defining a target audience is important as it influences the communication style and dissemination strategy (see section 13.11. and section 13.13.2.). The workshop guidance document used for the global Sawfish plan suggests identifying the plan's target audience could make up one of the actions, so that dissemination to the target audience can follow (Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#)).

Recommendations

- *Determine what type of planning document would be the most appropriate e.g. (conservation) 'action plan' or 'strategy'.*
- *When determining a timescale, consider temporal scales of addressing relevant conservation priorities, target species' life history traits, rates of emerging threats, degree of ambitiousness desired and time likely required to produce a plan.*
- *Determine the target audience (e.g. governments, researchers, funders, industry, activists/NGOs and IGOs).*

3.4. Set a production timeline

Details on the length of time taken to produce plans could be attained for nine of the reviewed plans (39.1%) (Appendix: Table 1). Where such detail was available, plans took between one and four years to produce (median two years). Reuter et al., (2022) suggest that a plan should be created within one to two years, arguing that plans produced in less time may overlook key steps or ideas, and plans produced in more time lose momentum. Lees (2023) recommends sharing the timeline with stakeholders in advance of their participation. The IUCN/SSC Conservation Planning Specialist Group (2020) recommends that after stakeholder consultations (see section 3.5.2.), a draft action plan is circulated to stakeholders for review (see section 3.14.) as soon as is feasible, to maintain engagement. However, ultimately, the time taken to produce a plan will be determined by the leading team's capacity (e.g. financial, availability, human resources) as well as motivation of the involved parties.

Recommendations

- *When creating a production timeline, consider suggestions by Reuter et al. (2022) that plans should be produced within one to two years, as plans produced in less time may overlook key steps or ideas, and plans produced in more time may lose momentum.*
- *Following stakeholder engagement, circulate draft plans to stakeholders as soon as is feasible, to maintain engagement (CPSG, 2020).*

3.5. Select and engaging the stakeholders

3.5.1. Identify stakeholders

The number of groups or organisations included as stakeholders in a plan's creation ranged from one (e.g. Reijnders et al., 1993, [Seals, Fur Seals, Sea Lions, and Walrus: Status Survey and Conservation Action Plan](#)) to 28 (UNEP/CMS, 2008, [Action Plan for the Conservation of small cetaceans of Western Africa and Macaronesia](#)). NGOs/INGOs were the most common stakeholders ($n=43$, 36.1% of all stakeholders). The UNEP Mediterranean Action Plan and UNEP/CMS were the stakeholders who appeared most frequently in the plans reviewed ($n=4$, 3.4%, each).

Collaboration in producing an action plan has been identified as being essential by the IUCN/SSC (2008). The importance of including diverse stakeholders to achieve successful outcomes, including NGOs/IGOs, IGBs, policy makers, private sector/industry and research institutions, has also been highlighted (e.g. Forgie et al., 2001; Fuller et al., 2003; Reuter et al., 2022; Lees, 2023). The IUCN ran public consultations aimed at relevant stakeholders when creating the Global Standards for Nature-Based Solutions (IUCN, 2020). Outside the field of conservation, citizens have been able to participate in regional or global policy discussions, for example through initiatives such as 'World Wide Views' (Worthington et al., 2013; Blue and Medlock, 2014). On more local scales, action planning that engages local people or communities is common practice (e.g. Sterling et al., 2017) and is essential for conservation efforts (Lees et al., 2021; Dawson et al., 2024). Appendix: Table 3 includes a list of potential stakeholders for a global cetacean action plan. This list encompasses stakeholders of the reviewed plans only, and other relevant stakeholders not identified within the reviewed plans should also be considered.

Recommendations

- *Include a diverse but carefully selected group of stakeholders to collaborate in the creation process (e.g. across Non-Governmental Organisations/International Non-Governmental Organisations, Inter-Governmental Bodies, policy makers, private sector/Industry, research institutions) (Fuller et al., 2003; Reuter et al., 2022; Lees, 2023).*
- *When identifying stakeholders, consider those listed in Appendix: Table 3.*
- *Include as many stakeholders as is practicable.*

3.5.2. Engage stakeholders

Various methods of stakeholder engagement were used to compile the reviewed plans. Methods included consultations, workshops and questionnaires (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#); Bräutigam et al., 2015, [Global Priorities for Conserving Sharks and Rays: A 2015–2025 Strategy](#)). For the global sawfish strategy, a questionnaire was used to collect data for a status review (Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#)). Harrison and Dulvy (2014) further recommend a one-and-a-half to a two-day workshop, and provide a draft agenda that covers the topics of: setting ground rules, species status review, providing an introduction to conservation planning, setting a vision, goals and objectives, creating actions and conclusions. To create the [Western Indian Ocean turtle plan](#), a seven-day strategic planning session was undertaken (IUCN East Africa Regional Office and IUCN/SSC Marine Turtle Specialist Group, 1996). When creating the [Global Species Action Plan](#), the IUCN conducted ten rounds of consultations (IUCN, 2023). When producing the [global otter plan](#), two in-person workshops were conducted (Duplaix and Savage, 2018). For a global plan, workshops could be conducted regionally, as they are for the designation of Important Marine Mammal Areas (IMMAs) (Tetley et al., 2022). Workshops could be conducted online

or in-person. Further, different stakeholders could be involved at different stages of the production process, such as holding smaller in-person workshops at an early stage, then sharing a draft plan for wider (public) comment (e.g. NOAA, 2001, [United States National Plan of Action for the Conservation and Management of Sharks](#); Wallace et al., 2025).

Within the review, three plans (13.4%) involved conservation planning facilitators (i.e. those trained in facilitating planning meetings or workshops), by for example, having members of the leading team undergo facilitator training (e.g. Duplaix and Savage, 2018, [The Global Otter Conservation Strategy](#)) or having facilitators host planning workshops (Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)). The IUCN/SSC Conservation Planning Specialist Group offers [training in facilitation](#) of planning sessions or workshops. Planning guidance highlights the importance of neutral facilitation and of decisions being reached through consensus (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Byers et al., 2022).

Recommendations

- *Decide what stakeholder engagement methods to use (e.g. in-person or online workshops, questionnaires).*
- *Share the plan timeline with stakeholders involved in the creation process (Lees, 2023).*
- *Consider whether it is feasible for members of the leading team to undertake [conservation planning training](#) such as that provided by the IUCN/SSC Conservation Planning Specialist Group.*
- *Decide if it is appropriate or feasible to work with a professional conservation planning facilitator (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)).*
- *Ensure stakeholder facilitation is neutral and decisions are made through consensus (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Byers et al., 2022).*

3.6. Define success

A vision or overarching goal was identified in 17 (74.0%) of the reviewed plans (Appendix: Table 1). A vision should describe the desired state for a species (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; CMP, 2025). A clearly defined vision offers definitions of terms used (e.g. ‘a thriving population’) and incorporates temporal elements (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; CPSG, 2020). For example, the [global shark and ray strategy](#)’s vision is that ‘sharks and rays throughout the world are fulfilling their ecological roles, sustaining well-managed fisheries, and are valued by all for their critical contribution to ecosystem health and human well-being’ (Bräutigam et al., 2015) and the global sawfish strategy’s vision is ‘a world where all sawfishes are restored through understanding, respect, and conservation to robust populations within thriving aquatic ecosystems’ (Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#)).

Further guidance on plan creation suggests goals are produced that act as ‘operational components’ of the vision (IUCN/SSC, 2008; IUCN/SSC Species Conservation Planning Sub-Committee, 2017; CMP, 2020; 2025). The CMP (2025) suggests goals should be Specific, Measurable, Achievable, Results-oriented and Time-limited (SMART). For example, Bräutigam et al.’s (2015) [shark and ray goal](#) is ‘by 2025, the conservation status of the world’s sharks and rays has improved, declines have been halted, extinctions have been prevented, and commitments to their conservation have increased globally’. Presenting a goal in this way makes it measurable. The global sawfish strategy alternatively presents multiple goals of (i) ‘robust sawfish populations where threats are minimised and/or mitigated’, and

(ii) 'effective sawfish conservation and management achieved through capacity building, research, education, and outreach' (Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#)).

Recommendations

- *Define a vision that describes the desired state for a species or group of species (Lees, 2023).*
- *Incorporate temporal elements into the vision (IUCN/SSC Species Conservation Planning Sub-Committee, 2017).*
- *Define any terms used within the vision e.g. 'a thriving population' (CPSG, 2020).*
- *Create goals that are the vision written in more concrete 'operational components' (IUCN/SSC, 2008; IUCN/SSC Species Conservation Planning Sub-Committee, 2017; CMP, 2020; 2025). A vision could be written as one or several goals. These goals should be Specific, Measurable, Achievable, Results-oriented and Time-limited (SMART) (CMP, 2025).*

3.7. Understand the system

More than half of the reviewed plans ($n=15$, 65.2%) included sections on species taxonomy, threats and conservation statuses, prior to presenting actions. Further, eight plans (34.7%) included information on relevant protection agreements and/or legislation (e.g. UNEP, 1985, [Marine Mammals: Global Plan of Action](#); UNEP/MAP-SPA/RAC, 2021, [Action plan for the conservation of Cetaceans in the Mediterranean Sea](#)) (Appendix: Table 1). Such sections indicate some data gathering was conducted to 'understand the system' (as defined in section 2.2) (Appendix: Table 1). This step could further involve gathering up-to-date information on species' distribution, diversity, ecological function, temporal and life stage threats, and conservation interventions (Kovács and Williams, 2012; Lees, 2023) (e.g. Stephenson et al., 2021; Das et al., 2024). Understanding the system is an important step required before setting conservation actions (Kovács and Williams, 2012; Byers et al., 2022).

Lees (2023) recommends that where there may be overlap between the new plan and existing plans, a record of current plans be produced, and a formal process is put in place for integrating plans. In the case of a global cetacean action plan, this would include an inventory and review of existing single or multi species action plans, regional agreements (e.g. Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas; Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area), or conventions relevant to specific threats (e.g. Convention on International Trade in Endangered Species). Formal processes of integration could involve e.g. referencing complementary plans, using existing actions as the rationale for prioritising new actions, or supporting existing resolutions with new actions.

A key element of understanding the system is understanding the threats (Byers et al., 2022). Using a formal process to understand the threats can ensure no species or threat is overlooked and work towards producing an unbiased understanding of threats (Lees, 2023). Within the reviewed literature, one plan (4.3%) identified and assessed threats using a threat analysis (Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)). In a threat analysis, all threats are listed and evaluated based on certain criteria or metrics, for example: the number of species threatened, affected species' conservation statuses, or the degree of existing protections (e.g. Reeves and Leatherwood, 1994, [Dolphins, Porpoises and Whales: 1994-1998 Action Plan for the Conservation of Cetaceans](#); Groves et al., 2002). An expanded list of threat evaluation metrics obtained from the reviewed plans, in addition to suggestions identified in the conservation planning literature, can be found in Table 1. An alternative approach to a threat analysis is a species inventory where each species within the scope is assessed for its threats (Kovács and Williams, 2012). Outside of the reviewed plans, a rigorous approach was taken when identifying global conservation priorities for marine turtles

(Wallace et al., 2011; Wallace et al., 2025). Wallace et al. (2011; 2025) used a “conservation priorities portfolio” system to compare threats facing all marine turtle regional management units.

After threats have been identified, they can be evaluated for inclusion within the plan. The gold standard for assessing when a conservation intervention is merited is the result of a Population Viability Analysis (PVA), with an unfavourable outcome necessitating intervention. However, in many cases, data unavailability may prevent a PVA from being conducted. IUCN Red List statuses could also be used to determine inclusion/exclusion of species for intervention. Other possible metrics for inclusion/exclusion can be found in Table 1. For the [Mediterranean Angel Sharks: Regional Action Plan](#), Gordon et al. (2019) identified 30 threats to Mediterranean Angel Sharks, seven of which were identified as ‘priority threats’, and six of these were addressed within actions. It may be that there are priorities identified which would be better addressed at the local scale or are already addressed at the local scale. In such instances, these threats may only be addressed during the ‘understanding the system’ stage, and may not be considered priorities to include in the final plan (Figure 2).

Recommendations

- Gather up-to-date data on species taxonomy, distribution, diversity, ecological function and threats (Kovács and Williams, 2012; Lees, 2023) (e.g. Stephenson et al., 2021; Das et al., 2024).
- Produce a list of existing (cetacean) plans, protections, agreements, resolutions, etc., and integrate relevant elements from existing plans to the new plan where there is overlap (Lees, 2023) (e.g. use existing measures as guidance for new actions, use existing measures to prioritise threats or interventions).
- Consider following a formal evaluation process to assess threats or species (e.g. threat analysis, species inventory) (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)).
- Decide which threats to address within the plan. This could be done through using various metrics (see Table 1 for examples).

Table 1. Examples of metrics that could be used to evaluate or prioritise threats or species, evaluate or prioritise conservation interventions/individual actions, and/or monitor action progress/success. Some metrics for monitoring success are measured as changes in the metric, rather than the metric itself.

Metric	Metric source	Evaluating or prioritising threats/species	Evaluate or prioritise Conservation interventions/individual actions	Monitoring Success
Severity of threat	Conserving Mobulid Rays: a Conservation Strategy and Action Plan (Ender et al., 2019), Groves et al. (2002)	x		x
Likelihood of threat	A Global Strategy for the Conservation of Marine Turtles (IUCN/SSC Marine Turtle Specialist Group, 1995)	x		x
No. or rate of bycatch events	Conserving Mobulid Rays: a Conservation Strategy and	x		x

	Action Plan (Ender et al., 2019)			
No. of species, subspecies or subpopulations affected	Groves et al. (2002); Lees (2023)	x	x	x
Species'/subspecies'/subpopulations' IUCN Red List Status	Marine Mammals: Global Plan of Action (UNEP, 1985), Dolphins, Porpoises, and Whales: An Action Plan for the Conservation of Biological Diversity: 1988-1992 (Perrin, 1989), Dolphins, Porpoises and Whales: 1994-1998 Action Plan for the Conservation of Cetaceans (Reeves and Leatherwood, 1994), CPSG (2020)	x		x
Species' IUCN Green Status of Threatened Species status	Global Species Action Plan (IUCN, 2023)	x		x
Population viability analysis results e.g. extinction risk under multiple scenarios	Global Species Action Plan (IUCN, 2023)	x	x	x
Species' distribution range/degree of endemism/fragmentation	Global Priorities for Conserving Sharks and Rays: A 2015–2025 Strategy (Bräutigam et al., 2015), Lees (2023)	x		x
Living Planet Index	Global Species Action Plan (IUCN, 2023)	x		x
No. of unique ecosystems types effected/supported (e.g. polar marine, coastal upwelling, deep sea)	Groves et al. (2002)	x	x	x
No. of unique habitat types affected/supported (e.g. seagrass bed, mangrove, cetacean calving grounds, pelagic drift zones)	Groves et al. (2002)	x	x	x
Species Abatement and Recovery (STAR) Metric	Global Species Action Plan (IUCN, 2023)			x

Management Effectiveness Tracking Tool	Global Species Action Plan (IUCN, 2023)			x
No. and/or strength of decisions, resolutions, protections or equivalent in place regarding a threat	Groves et al. (2002), Conserving Mobulid Rays: a Conservation Strategy and Action Plan (Ender et al., 2019)	x	x	x
Political will in place to address threat	Groves et al. (2002)	x	x	
No. or % of members of the public or community groups involved in conservation efforts	Conserving Mobulid Rays: a Conservation Strategy and Action Plan (Ender et al., 2019)			x
Degree of public support	Lees (2023)	x	x	
Likelihood of intervention success/Prior intervention success/Scientific support for intervention	Global Priorities for Conserving Sharks and Rays: A 2015–2025 Strategy (Bräutigam et al., 2015), Lees (2023)		x	
Cost-effectiveness (including whether interventions could be paired with those for species outside the plan's scope) or return on investment	Groves et al. (2002); Lees (2023); Tear et al (2014)		x	

3.8. Set objectives

Objectives can be formed around the threats selected for inclusion within the plan. Similar to a plan's goals (see section 3.6.), the objectives should be SMART (Doran et al., 1981; Green et al., 2019; Groves et al., 2002). Actions can then be built to support each objective. This structure is followed by in the [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#) (UNEP/CMS, 2008), and is commonly supported by the conservation planning guidance (e.g. WWF, 2006; CMP, 2025; IUCN/SSC Species Conservation Planning Sub-Committee, 2017). It may be that there are objectives created which would be better addressed at the local scale, or are already addressed at the local scale. In such instances, it may be that the process for these threats stops at the objective setting stage, with no actions for these objectives presented in the final plan (Figure 2).

Recommendations

- Set SMART objectives for the plan (Doran et al., 1981; Green et al., 2019; IUCN/SSC Species Conservation Planning Sub-Committee, 2017) (e.g. UNEP/CMS, 2008, [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#)).

3.9. Identify where to intervene

To address each objective, decisions need to be made about where in the system interventions could occur. A Theory of Change (ToC) framework is becoming an increasingly common tool to identify intervention points in conservation planning (e.g. Balfour et al., 2019; Rice et al., 2020; Challender et al., 2025), and are recommended in the Conservation Standards (CMP, 2025). Within the review, the [mobulid ray plan](#) (Ender et al., 2019), used a ToC. When producing a ToC, stakeholders map out causal links between the current state for a species and the objective. Once links are identified, assumptions at each link can be identified, as well as locations for possible intervention. Interventions could occur at multiple locations. Further support on producing a ToC can be obtained through online training, such as that of [The Nature Conservancy](#) and [Conservation Training](#). In addition to identifying points of intervention, a ToC can also help to identify methods of intervention and any challenges or opportunities that may be present.

Recommendations

- *Use a 'theory of change' matrix or another method to determine where conservation interventions are most likely to be effective to achieve the objectives (e.g. Ender et al., 2019, [Conserving Mobulid Rays: a Conservation Strategy and Action Plan](#)).*

3.10. Identify how to intervene (action creation)

There are numerous potential solutions to threats. Decisions must be taken by stakeholders on which solution is the best suited for each location- and species-specific threat. Whilst PVAs may be seen as the gold standard for deciding whether intervention is merited (see section 3.7.), and selecting the type and level of intervention, data scarcity may hinder this approach (Ruiz et al., 2021). Further, practical considerations may determine whether an intervention is feasible and/or likely to succeed. As indicated in Table 1, lack of political or public support, bureaucratic 'red tape', cost-effectiveness, and (lack of or limited) available funding or technical expertise are all factors that also need to be taken into consideration (Tear et al., 2014; Groves et al., 2002; Lees, 2023). Once an intervention is identified, actions can be produced. Ensuring all necessary actions are included (see section 3.10.1.) and all actions are considered 'complete' (see section 3.10.2.) is important.

3.10.1. Determine whether all necessary actions are included

Wherever possible, actions should be set forth in a discrete step-by-step fashion (Lees, 2023), as multi-faceted or double-barrelled actions can be difficult to prioritise, implement and monitor. Similarly, all necessary actions needed to meet an objective should be included, with no action included that does not directly relate to an objective (Lees, 2023; IWC, 2024). For example, the [Mediterranean Angel Shark Plan](#) (Gordon et al., 2019) includes consecutive actions for addressing incidental catch, as follows: (i) 'collate data on incidental catch to inform management measures', (ii) 'ascertain the level of bycatch and incidental catch by gear type to inform further necessary action', (iii) 'map hotspots for bycatch of angel sharks (spatially and temporally)', and (iv) 'secure spatial/temporal management and gear restrictions based on collated data'. Similarly, the [conservation and management plan for marine turtles of the Atlantic East of Africa](#) (UNEP/CMS, 2023) includes the consecutive actions of (i) 'develop/modify and use gear, devices, techniques and other measures to minimize incidental capture of marine turtles in fisheries', (ii) 'develop procedures and training programmes to promote implementation of these measures with relevant fishery management organizations', and (iii) 'train

fishermen, the fishing industry, and relevant institutions in techniques to minimize incidental take'. Attaining actions using a ToC (see section 3.9.), may aid identification of required actions.

Numerous sources recommend that actions should be formed to address not only natural capital (e.g. ecological research), but also social (e.g. sustainable livelihoods, community group formation), economic (e.g. alternative livelihood viability, plan financing), human (e.g. awareness raising, capacity building) and institutional capital (e.g. legal protections, policy changes) (Bottrill and Pressey, 2012; Kovács and Williams, 2012; UNEP, 1988; Lees, 2023; IWC, 2024). Within the reviewed literature, 19 (82.6%) of the plans focused their actions on all types of capital, four plans focused on all capital types except financial (17.4%) (Appendix: Table 1). If ecological research is to be included, its link to tangible conservation outcomes is necessary, and could be identified through assessing 'Value of Information' (Canessa et al. 2015). Kovács and Williams (2012) further recommend actions to address 'supporting measures' (e.g. dissemination, implementation, monitoring or financing actions). These important aspects of funding, coordinating, implementing and monitoring plans are included in the UNEP/MAP-SPA/RAC (2019) [Mediterranean sea turtle action plan](#). See sections 3.11. and 3.12. for further detail on dissemination and monitoring.

For regional or global plans, often one or more of the actions required to address a threat may lie at the local level (IUCN/SSC, 2008; Stewart et al., 2018). In such cases, additional context dependent plans may be needed (Hamel and Marsh, 2022). All plans bar one ($n=22$, 95.7%) identified the need for creation of additional plans. In the [Mediterranean Angel Sharks: Regional Action Plan](#), Gordon et al., (2019) referred to a proforma available for the drafting of sub plans. Where species- or location-specific plans have already been created, they could be referenced in the global plan via a hyperlink.

In eleven of the reviewed plans (47.8%), reference was made to challenges associated with the actions (Appendix: Table 1). In the [global sawfish strategy](#), Harrison and Dulvy (2014) include specific reference to challenges and how to overcome them, with an action to 'understand the barriers to successful enforcement and encourage governments to make effective enforcement a high priority'. Where reviews into the effectiveness of action plans have been conducted, key themes as to why plans were not effective included: lack of financial and human resources, lack of plan management capacity, unclear plans with unidentified actors or audiences, loss of enthusiasm, absence of stakeholder collaboration throughout design and implementation, and political red tape (IUCN/SSC, 2008; UNEP, 1988). Whilst implementation barriers will differ between actions and plans, if potential challenges (e.g. loss of enthusiasm, political red tape) are identified, they can be addressed within actions. Lees (2023) recommends that challenges should be identified across socio-economic, political and legal fronts. We also recommend including actions that address challenges where applicable.

Ethical considerations were made within actions of 21 (91.3%) of the plans (Appendix: Table 1). These considerations work to safeguard involved persons and animals associated with actions. Within the review, some ethical actions represented discrete steps towards an objective, for example, 'identify and document best practice for approaching local communities for research and monitoring approval' (SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)). In other instances, ethical considerations were built into actions that had another focus e.g. 'ensure [fishers] ...have access to affordable alternative gears' (Ender et al., 2019, [Conserving Mobulid Rays: a Conservation Strategy and Action Plan](#)). Ethical actions such as this example from the mobulid ray plan may also have more support from fishers and therefore increased likelihood of positive conservation impact. If possible, and where appropriate, ethical considerations for all objectives and actions should be considered. Such consideration can allow for the identification of any unintended negative consequences actions could have (e.g. rush for harvesting, increased fishing fees) (Bottrill and Pressey, 2012).

Recommendations

- *Include all actions required to meet an objective, and none that are unrelated to meeting that objective (IWC, 2024; Lees, 2023).*
- *Ensure actions are step-by-step, not multi-faceted or double-barrelled (Lees, 2023) (e.g. Duplaix and Savage, 2018, [The Global Otter Conservation Strategy](#); UNEP/CMS, 2023)*
- *Where appropriate and feasible, for each objective develop actions across the five types of capital identified by Bottrill and Pressey (2012) (natural, social, human, institutional, economic).*
- *Where appropriate, identify actions to support plan management and governance (e.g. dissemination, monitoring, fund raising) (Kovács and Williams, 2012) (e.g. UNEP/MAP – SPA/RAC, 2019, [Action Plan for the Conservation of Marine Turtles in the Mediterranean](#)).*
- *Assess objectives and actions for any conservation challenges, and address challenges within actions (Lees, 2023) (e.g. Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#))*
- *Take ethical considerations into account for all objectives and actions, and address any identified issues within actions (e.g. Ender et al., 2019, [Conserving Mobulid Rays: a Conservation Strategy and Action Plan](#)).*

3.10.2. Determine whether all actions are complete

Time frames: Creating SMART actions, such as many of those presented in the [Pacific Islands Regional Marine Species Programme 2022–2026](#) (SPREP, 2022) is important for efficient implementation and monitoring (IUCN/SSC, 2008; Green et al., 2019; CMP, 2025). Where possible, the language used within actions should be specific (UNEP, 1988). Whether an action is realistic depends on capacity, which can be improved through the use of ‘supporting measures’ actions, such as those used by the Mediterranean Sea turtle action plan (UNEP/MAP – SPA/RAC, 2019, [Action Plan for the Conservation of Marine Turtles in the Mediterranean](#)). Including time elements for actions, as six (26.1%) of the reviewed plans did, or stating that timelines should be included in sub regional plans (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)), can increase accountability and achievability (IWC, 2024) (Appendix: Table 1). Including details on whether actions have commenced (e.g. UNEP/CMS, 2024, [CMS Global Programme of Work: Aquatic Species Conservation Issues](#)), creates transparency and can aid funders and potential implementers. Time-bound elements of actions can be included within the action as described in the plan, or included independently in a complementary document, similar to actors and budgets (see below).

Implementing actors: Within the review, ten plans (43.5%) identified an actor or type of actor associated with some or all the individual recommended actions. In the [Memorandum of Understanding on the Conservation of Migratory Sharks: Conservation Plan](#), it is stated that actors would be identified by an Advisory Committee (UNEP/CMS, 2012). Including details on implementing actors is recommended by UNEP (1988), Lees (2023) and the IWC (2024) and can aid implementation.

Budgets: Four of the plans (17.4%) provided a budget for all or some of the actions (Appendix: Table 1). Including budgets can be beneficial as financial data can be used to compare cost-effectiveness of potential interventions, monitor plan effectiveness, attract funders and increase transparency (Moore et al., 2004) (Table 1). However, budgeting may be difficult on regional or global scales and may be more effectively calculated on more local scales. For example, Gordon et al., (2019) states that budgets would be provided in sub regional plans of the [Mediterranean Angel Sharks: Regional Action](#)

[Plan](#). Whether funding was already secured was detailed in the UNEP/CMS's (2024) [aquatic species programme of work](#). The UNEP (1985) [marine mammal plan](#) and the IUCN's (2023) [global species plan](#) identified current or potential funders for individual actions. Including budget status and/or funders can guide and support funding applications.

Measures of success: Success metrics are an important part of a plan that facilitates monitoring (Lees, 2023). The [Pacific Islands Regional Marine Species Programme 2022–2026](#) (SPREP, 2022) provides success metrics for all recommended actions. A further four plans (17.4%) include success metrics for some actions (Appendix: Table 1). Indicators for actions should be specific (Stem et al., 2005; Lees, 2023). Metrics could involve changes in e.g. Red List status categories or Living Planet Index. Alternatively, metrics could involve specific measurements such as the 'number of protective policies' or 'number of bycatch events' as used by Ender et al. (2019) in the [mobulid ray strategy](#). When selecting metrics, consider that some 'vanity' or 'illusion' metrics such as 'number of events held' or 'funds raised' may not indicate true success. A number of suggested metrics obtained from the reviewed plans or the wider literature can be found in Table 1.

Recommendations

- *Ensure actions are SMART (IUCN/SSC, 2008; Green et al., 2019; CMP, 2025). If setting timelines is to occur at the subregional level, this should be stated (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)).*
- *Indicate whether each action has commenced.*
- *Identify the actor, or type of actor, responsible for implementation of each action (UNEP, 1988; Lees, 2023; IWC, 2024) (e.g. UNEP/CMS, 2008, [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#)).*
- *If appropriate and feasible, include budget information for each action, as inclusion can increase transparency and aid prioritisation and evaluation, in addition to attract funders (Bottrill and Pressey, 2012; White, 2022; Moore et al., 2004) (e.g. UNEP, 1985, [Marine Mammals: Global Plan of Action](#); Duplaix and Savage, 2018, [The Global Otter Conservation Strategy](#)). If budgets are to be included at the sub-regional level, this should be stated (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)).*
- *Include information as to whether funding has been secured for each action (e.g. UNEP/CMS, 2024, [CMS Global Programme of Work: Aquatic Species Conservation Issues](#)).*
- *Include monitoring metrics for each action e.g. 'number of bycatch events', 'changes in population size' as absence of metrics makes monitoring difficult (Lees, 2023). See Table 1 for examples of monitoring metrics. When selecting metrics, consider that some 'vanity' or 'illusion' metrics such as 'number of events held' or 'funds raised' may not indicate true success.*
- *Where appropriate, incorporate ethical considerations into actions (e.g. Ender et al., 2019, [Conserving Mobulid Rays: a Conservation Strategy and Action Plan](#)).*
- *Use audience-appropriate language for actions.*

3.10.3 Prioritise interventions

Prioritisation is noted as important by the IUCN/SSC Species Conservation Planning Sub-Committee (2017) and the IWC (2024). Actions could be prioritised individually and/or by category (e.g., by threat, species or location). Parameters will need to be identified to rank actions or sub-categories. Table 1 contains a list of metrics that could be used to evaluate actions and rank their priority. Prioritising species more at risk of extinction fits in line with the conservation triage approach (Bottrill et al., 2009).

However, Walls (2018) identified how proactive conservation actions for species not yet on the verge of extinction can be most cost-effective. Brown et al. (2015) argues that prioritising at the action level rather than location- or species-level leads to more effective conservation as actions differ in terms of effectiveness, cost, impact, feasibility etc.

Within the reviewed plans, where action prioritisation was included, priorities were deemed most clear by the authors when each action's priority rating was presented in a table alongside the recommended action, such as in the [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#) (UNEP/CMS, 2008) and the [Action plan for the conservation of Cetaceans in the Mediterranean Sea](#) (UNEP/MAP-SPA/RAC, 2021). Both plans assigned each action a priority level e.g. 'low', 'medium' or 'high'. Where priorities are indicated, definitions of priority levels would also be beneficial.

Recommendations

- *Decide how actions will be prioritised (e.g. by individual actions and/or by categories such as threats, species or location). Identify parameters to rank actions or sub-categories. Table 1 contains a list of metrics that could be used to evaluate actions and rank their priority.*
- *Make priorities clear to the reader by e.g. including priority rankings for each action in a table (e.g. UNEP/CMS, 2008, [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#); UNEP/MAP-SPA/RAC, 2021, [Action plan for the conservation of Cetaceans in the Mediterranean Sea](#)).*

3.11. Create dissemination and advocacy plans

A dissemination strategy was detailed within three (13.0%) of the reviewed plans (Appendix: Table 1). A dissemination strategy is a key step in ensuring a plan is successful. As stated in section 3.10.1, dissemination can be included as actions within a plan. For example, in the [global sawfish strategy](#), there is an action to 'develop and circulate an 8-page document to communicate the actions to a broader audience' and to 'fundraise for the design, printing, and circulation of an 8-page sawfish actions document and translation into appropriate local languages' (Harrison and Dulvy, 2014). Including dissemination within the actions can help ensure implementation is specific and actors, timelines and budgets are assigned, all of which make plans monitorable and more likely to be successful. Further, including dissemination plans within a plan's actions may be beneficial if the leading team or organisation do not have dissemination capacity, as it allows dissemination to be part of the implementation stage of the plan, rather than the assumed responsibility of the plan creators. Nevertheless, plan creators could still be identified as an assigned actor for dissemination actions.

Within the reviewed plans, dissemination strategies included hosting webinars and appealing to governments to adopt the plan (UNEP, 1985, [Marine Mammals: Global Plan of Action](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)). Dissemination could further involve meetings and seminars (online or in person), presentations at conferences (e.g. [Monaco Ocean Week](#), [United Nations Oceans Conference](#), [International Marine Conservation Congress](#)), and announcements within newsletters, mailing lists or on social media. Further, all members of the Cetacean Specialist Group could be ambassadors of the plan, and the plan could be disseminated to all stakeholders involved in the creation of the plan and all groups identified within the plan's actions (e.g. NGOs/INGOs, IGOs/IGBs/MEAs, industries, research institutions, government groups, Zoos and Aquariums, funders). Dissemination could occur at the time the plan is produced/published, and throughout its lifespan. Dissemination occurring during the plan's lifespan could include progress

updates. Hamel and Marsh (2022) recommended that the range states are reminded of a plan's key goals and encouraged to work towards them during a plan's lifespan.

Recommendations

- *Include a dissemination strategy in the plan, including details on who will be responsible for dissemination (e.g. UNEP, 1985, [Marine Mammals: Global Plan of Action](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)). Decide whether this dissemination strategy will be included within specific actions of the plan (e.g. Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)).*
- *Consider the following dissemination routes: meetings and seminars (online or in person) and announcements within newsletters, mailing lists and social media.*
- *Consider disseminating to all stakeholders involved in the design process and all groups identified within the plan's actions or their actors.*
- *Disseminate the plan upon production and throughout the plan's life span, to provide updates and rally implementation (Hamel and Marsh, 2022).*

3.12. Create monitoring plan

Monitoring was addressed within over half of the reviewed plans ($n=12$, 52.7%). Monitoring is considered an important part of an effective plan as it increases accountability and demonstrates impact which is important in securing funding and validating capacity allocation (Hockings et al., 2006; Reuter et al., 2022; Lees, 2023). Stephenson (2019) recommends monitoring is strongest when it is built into early design phases of the plan and is integrated with goals and objectives. Monitoring effectiveness can be improved by identifying who is responsible for monitoring and when monitoring should occur.

Like dissemination, monitoring methods could be included as actions in the plan itself. Including monitoring actions means monitoring plans can also be created to fit the SMART criteria. Varied monitoring methods are available. Within the review, two plans (8.7%) detailed that monitoring would occur at contracting party meetings (UNEP/MAP – SPA/RAC, 2019, [Action Plan for the Conservation of Marine Turtles in the Mediterranean](#); UNEP/MAP-SPA/RAC, 2021, [Action plan for the conservation of Cetaceans in the Mediterranean Sea](#)). The UNEP (1988) recommended creating a monitoring body, as does the IWC (IWC, 2024). One plan (4.3%) included a plan for monitoring and adaptive management in an annex (Common Wadden Sea Secretariat, 2022, [Wadden Sea Seal Management Plan 2023 - 2027](#)). For whichever monitoring methods are selected, assigning a timescale for monitoring improves accountability, aids planning and can be linked more easily to adaptive management. Adaptive management is recommended in numerous planning guidance documents due to its links to effective implementation (e.g. IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Kovács and Williams, 2012; IWC, 2024).

Recommendations

- *Include a monitoring plan (e.g. UNEP/MAP-SPA/RAC, 2021, [Action plan for the conservation of Cetaceans in the Mediterranean Sea](#); Common Wadden Sea Secretariat, 2022, [Wadden Sea Seal Management Plan 2023 - 2027](#)). Decide whether this monitoring plan will be included within specific actions of the plan (e.g. UNEP/MAP – SPA/RAC, 2019, [Action Plan for the Conservation of Marine Turtles in the Mediterranean](#)).*

- *Decide a timescale for monitoring (e.g. UNEP/CMS, 2012, [Memorandum of Understanding on the Conservation of Migratory Sharks: Conservation Plan](#); Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#)).*
- *Decide who will be responsible for monitoring (e.g. UNEP/CMS, 2012, [Memorandum of Understanding on the Conservation of Migratory Sharks: Conservation Plan](#); Harrison and Dulvy, 2014, [Sawfish: a Global Strategy for Conservation](#)).*

3.13. Draft the plan

3.13.1 Plan structure

Plans most commonly started with an introduction ($n=20$, 87.0%), followed by a combination of the topics of species conservation status, taxonomy and threats ($n=15$, 65.2%), and in some cases current conservation initiatives ($n=8$, 34.8%). Including such background elements is important (IWC, 2024) as it provides stakeholders and plan implementers or funders with the rationale for the actions (Lees, 2023). These background sections were most commonly followed by recommended actions ($n=19$, 82.6%). In the reviewed plans, dissemination and monitoring elements were most commonly presented as part of, or alongside, actions ($n=11$, 47.8%; $n=2$, 8.7%; respectively). Additional sections included in some plans were sections dedicated to a plan's vision (e.g. Bräutigam et al., 2015, [Global Priorities for Conserving Sharks and Rays: A 2015–2025 Strategy](#)) or sections on how to engage with the plan (e.g. how to submit data, how to implement or collaborate) (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#)).

In all reviewed plans, the actions were split into themes ($n=23$, 100%). Some plans divided the actions by threat ($n=5$, 21.7%) or by threatened status of species ($n=3$, 13.0%) others by geographic region ($n=3$, 13%). However, most of the plans included themes of some combination of several of the following: research and monitoring, management, capacity building, education and outreach, cooperation/policy, funding ($n=14$; 60.9%) (e.g. Duplaix and Savage, 2018, [The Global Otter Conservation Strategy](#); UNEP/CMS, 2008, [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#); IUCN/SSC Marine Turtle Specialist Group, 1995, [Global Strategy for the Conservation of Marine Turtles](#)). In addition to this list of themes, few plans also included themes of ecotourism and livelihoods, sustainable harvest, and eliminating illegal trade (e.g. SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#); Duplaix and Savage, 2018, [The Global Otter Conservation Strategy](#); UNEP/CMS, 2024, [CMS Global Programme of Work: Aquatic Species Conservation Issues](#)). Two plans (8.7%) had additional themes related to support and implementation of the plan itself, for example 'structure, scope and management of the plan', 'commitment, funding and human resources', 'implementation and coordination' and 'networking and reporting' (Common Wadden Sea Secretariat, 2022, [Wadden Sea Seal Management Plan 2023 - 2027](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)).

Recommendations

- *Determine plan order. We suggest the following order be considered:*
 - > *Introduction*
 - > *Development method*
 - > *Vision and goals*
 - > *Species taxonomy, conservation status and threats*
 - > *Current conservation initiatives*
 - > *Recommended actions (including dissemination and monitoring)*
 - > *How to engage with the plan*

- *Decide how to organise the actions, such as by threat (e.g. Reijnders et al., 1993, [Seals, Fur Seals, Sea Lions, and Walrus: Status Survey and Conservation Action Plan](#)), or by activity type (i.e. research and monitoring, management, capacity building, education and outreach, cooperation/policy, funding) (e.g. Duplaix and Savage, 2018, [The Global Otter Conservation Strategy](#); UNEP/MAP-SPA/RAC, 2021, [Action plan for the conservation of Cetaceans in the Mediterranean Sea](#)).*

3.13.2. Level of detail and communication style

The reviewed plans ranged in length from 8 to 168 pages (median 30 pages), 3,390 to 10,6493 words (median 11,464 words), and contained between 0 and 688 references (median 43 references). Whilst documents that are very long may give weight to the importance of a topic, they can lead to information overload and hinder implementation (Phillips-Wren and Adya, 2020; Arnold et al., 2023). Kovács and Williams (2012) emphasise the importance of being concise. We recommend that the length should be adapted to the target audience, and should attempt to be as concise and direct as possible. Where additional information is relevant to the plan but not all elements essential for implementation (e.g. list of current protections), information could be included in appendices (e.g. UNEP, 1985, [Marine Mammals: Global Plan of Action](#); IUCN East Africa Regional Office and IUCN/SSC Marine Turtle Specialist Group, 1996, [A Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean](#)).

The plan's language, formatting, graphics and level of detail all contribute to how well the document is received by its intended audience, which can influence funding and implementation (Reuter et al., 2022). Of the reviewed plans, eleven (47.8%) were classed as 'visual-heavy with limited text', seven (30.4%) as 'moderate text with moderate visuals', and five (21.7%) as 'text-heavy with minimal visuals' (Appendix: Table 1). Some plans included high-quality infographics (e.g. Ender et al., 2019, [Conserving Mobulid Rays: a Conservation Strategy and Action Plan](#)). The language in plans varied from being 'scientific' to more 'accessible'. Actions were most commonly presented in tables ($n=12$, 52.2%), with some plans numbering actions (Appendix: Table 1) (e.g. Gordon et al., 2019, [Mediterranean Angel Sharks: Regional Action Plan](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)). Using tables can aid clarity and understanding and both tables and numbering can aid efficient implementation and monitoring. Details on action's associated actors, budgets, timelines and monitoring metrics can also be clearly displayed within action tables (e.g. UNEP/CMS, 2008, [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)). Numbered citations of peer-reviewed literature and other references (i.e. Vancouver referencing) was used in three of the plans (13.0%). One plan (4.3%) included numbered references as footnotes on each page, rather than at the end of the document. These referencing strategies can increase readability and may be particularly appropriate for non-specialist audiences. When making decisions regarding the communication style, the plan's target audience should be considered (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; CMP, 2025).

Recommendations

- *Produce a concise plan (Kovács and Williams, 2012) to avoid information overload (Phillips-Wren and Adya, 2020; Arnold et al., 2023).*
- *Include relevant information that is not essential for implementation (e.g. list of current protections) in an appendix (e.g. UNEP, 1985, [Marine Mammals: Global Plan of Action](#); IUCN*

East Africa Regional Office and IUCN/SSC Marine Turtle Specialist Group, 1996, [A Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean](#)).

- Present actions in a table to aid implementation and monitoring (e.g. UNEP/CMS, 2023, [Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa - Revised Conservation and Management](#); IUCN, 2023, [Global Species Action Plan](#); UNEP/CMS, 2024, [CMS Global Programme of Work: Aquatic Species Conservation Issues](#)).
- Consider including details on each action's associated actors, budget, timeline and monitoring metrics within action tables, to aid implementation (e.g. UNEP/CMS, 2008, [Action Plan for the Conservation of Small Cetaceans of Western Africa and Macaronesia](#); SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#)).
- Number all actions to aid implementation and monitoring (e.g. SPREP, 2022, [Pacific Islands Regional Marine Species Programme 2022–2026](#); [Global Species Action Plan](#), IUCN, 2023).
- Consider using numbered references to aid flow and readability (e.g. Ender et al., 2019, [Conserving Mobulid Rays: a Conservation Strategy and Action Plan](#)).
- Make decisions on a plan's aesthetics, length, language, level of detail, referencing style, graphics and formatting with the target audience in mind, as these elements can affect implementation and fund raising (IUCN/SSC Species Conservation Planning Sub-Committee, 2017; Reuter et al., 2022; CMP, 2025).

3.14. Review and finalise plan

Once drafted, a plan can be sent out for review. Review responses can then be incorporated before the plan is finalised. Reviewers could include stakeholders involved in the creation process, wider Cetacean Specialist Group membership or representatives of selected stakeholders (e.g. IWC, CMS). For some action plans, it may be appropriate to send the draft out for wider (public) comment (e.g. NOAA, 2001, [United States National Plan of Action for the Conservation and Management of Sharks](#)). However, in the case of the Cetacean Specialist Group, public comment may not be practical or feasible.

Recommendations:

- *Share a draft of the plan with selected stakeholder groups for review and feedback (CPSG, 2020)*

4. Final thoughts

The current systematic review of 23 multi-species and multi-country marine megafauna action plans led to the distillation of recommendations to support the creation of a global cetacean action plan. We present a flow chart of 14 steps that can be followed when creating a plan, along with recommendations to guide each step of the design and production process (Figure 2, [Supplementary Material 2](#)). We further present a list of metrics that can be used to evaluate and prioritise threats, species and conservation interventions, and monitor plan implementation (Table 1). The guidance and tools presented here represent a comprehensive approach to global conservation planning for cetaceans. This timely guidance should aid effective future conservation planning efforts to reduce species or population declines, and promote recoveries, on local and global scales. Whilst this review is intended to inform the creation of a global cetacean action plan, the review will also be useful for those creating action plans for other marine megafauna taxa.

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Appendix

Table 1. Summary statistics (counts and percentages) for the reviewed marine megafauna action plans. Abbreviations as follows: GO (Government Organisation), Inter-Governmental Body (IGB), Inter-Governmental Organisation (IGO), International Non-Governmental Organisation (INGO), Multilateral Environmental Agreement (MEA), Non-Governmental Organisation (NGO).

		Attribute									
		Metadata									
		<i>Decade produced</i>									
		80s	90s	00s	10s	20s					
<i>n</i>		2	4	3	8	6					
%		8.7	17.4	13	34.8	26.1					
		Securing funding									
		<i>Funder category (non-exclusive)</i>									
		Charity	Government	IGO/IGB/ MEA	Industry	NGO/ INGO	Research Institute	Zoo/ Aquarium			
<i>n</i>		23	24	2	3	16	1	11			
%		28.8	30	2.5	3.8	20	1.3	13.8			
		Scope									
		<i>Focal taxa</i>									
		Elasmobranch	Reptile	Cetacean	Pinniped	Mustelid	Marine Mammal	Marine Megafauna	Aquatic species	All species	
<i>n</i>		6	5	5	2	1	1	1	1	1	
%		26.1	21.7	21.7	8.7	4.3	4.3	4.3	4.3	4.3	
		<i>Geographic focus</i>									
		Global	Regional								
<i>n</i>		13	10								
%		56.5	43.5								
		<i>Time period covered</i>									
		No period defined	4-5 years	6-7 years	8-9 years	10 years					
<i>n</i>		14	6	1	1	1					
%		60.9	26.1	4.3	4.3	4.3					
		<i>Plan title (non-exclusive)</i>									
		Action Plan	Conservat- ion Plan/ strategy	Manage- ment plan							
<i>n</i>		13	8	2							
%		52	32	8							
		Selecting and engaging the stakeholders									
		<i>Collaborating stakeholders across all plans (non-exclusive)</i>									
		NGOs/ INGOs	IGO/IGB/ MEA	GO	Research Institute	Comm- unity					
<i>n</i>		43	28	33	14	1					
%		36.1	23.5	27.7	11.8	0.8					

	Define success				
	Vision stated	No vision stated			
<i>n</i>	17	6			
%	73.9	26.1			
	Understand the system				
	<i>Presented relevant species protections in the plan</i>				
	Yes	No			
<i>n</i>	8	15			
%	34.7	65.3			
	Actions				
	<i>Capital types covered by actions (non-exclusive)</i>				
	Human	Social	Institutional	Financial	Natural
<i>n</i>	19	19	19	4	19
%	23.8	23.8	23.8	5	23.8
	<i>Action actors or type of actors</i>				
	<i>Action timelines</i>				
	Timeline provided for all actions	Timeline provided for some actions	Timeline identified in relative terms	Timeline to be provided later	No timeline detail included
<i>n</i>	3	2	1	1	16
%	13	8.7	4.3	4.3	69.6
	<i>Action budgets</i>				
	Budget provided for all actions	Budget provided for some actions	Budget provided in relative terms	Budget to be provided later	No budget detail included
<i>n</i>	2	1	1	1	18
%	8.7	4.3	4.3	4.3	78.3
	<i>Ethical considerations included in some actions</i>				
	Yes	None included			
<i>n</i>	21	2			
%	91.3	8.7			
	<i>Conservation challenges identified for some actions</i>				
	Yes	None identified			
<i>n</i>	11	12			
%	47.8	52.2			
	<i>Monitoring metrics included for all/some actions</i>				
	Yes	None included			
<i>n</i>	8	15			
%	34.8	65.2			

	Dissemination		
	<i>Dissemination strategy included</i>		
	Yes	No	
<i>n</i>	2	21	
<i>%</i>	8.7	91.3	
	Draft the plan		
	<i>Visual category</i>		
	Visual-heavy with minimal text	Moderate text with modified visuals	Text heavy with limited visuals
<i>n</i>	11	7	5
<i>%</i>	47.8	30.4	21.7
	<i>Action format (non-exclusive)</i>		
	Table	Bullet points	Prose
<i>n</i>	13	7	5
<i>%</i>	52	28	20

Table 2. Funders of the reviewed marine megafauna action plans and the number of plans they funded. For some reviewed plans, multiple funders from the list contributed to funding. Only funders that funded two or more plans were included in this list. Note, numerous other suitable and highly relevant funders outside of those that funded the reviewed plans are available.

Funder	No. of reviewed plans funded
World Wildlife Fund	5
Disney Conservation Fund	4
Peter Scott IUCN/SSC Action Plan Fund (Sultanate of Oman)*	3
Save Our Seas Foundation	3
Chicago Zoological Society	2
DEJA Inc. (now Deja Shoe)	2
Fondation Ensemble*	2
International Fund for Animal Welfare	2
MAVA Foundation	2
Mohammed Bin Zayed Species Conservation Fund	2
National Oceanic and Atmospheric Administration	2
Ocean Park Conservation Foundation Hong Kong	2
Shark Conservation Fund	2
United States Department of State	2
Whale and Dolphin Conservation Society (now Whale and Dolphin Conservation)	2

*Funder no longer active

Table 3. Stakeholders of the reviewed marine megafauna action plans deemed potentially suitable to be considered as stakeholders for a global cetacean action plan. Note, numerous other suitable and highly relevant stakeholders outside of those that acted as stakeholders in the reviewed plans are available.

Potential stakeholders	Organisation type	Source
The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS)	Multilateral Environmental Agreement	Action plan for the conservation of Cetaceans in the Mediterranean Sea (UNEP/MAP-SPA/RAC, 2021)
Convention on the conservation of migratory species of wild animals (CMS)	Multilateral Environmental Agreement	Action Plan for the Conservation of small cetaceans of Western Africa and Macaronesia (UNEP/CMS, 2008), A Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean (IUCN/SSC Marine Turtle Specialist Group and IUCN East Africa Regional Office, 1996), Mediterranean Angel Sharks: Regional Action Plan (Gordon et al., 2019), Global Species Action Plan (IUCN, 2023)
Convention on International Trade in Endangered Species (CITES)	Multilateral Environmental Agreement	Marine Mammals: Global Plan of Action (UNEP, 1985), Global Species Action Plan (IUCN, 2023)
International Whaling Commission (IWC)	Intergovernmental Organisation	Marine Mammals: Global Plan of Action (UNEP, 1985), Global Species Action Plan (IUCN, 2023)
TRAFFIC	International Non-Governmental Organisation	A Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean (IUCN/SSC Marine Turtle Specialist Group and IUCN East Africa Regional Office, 1996), Global Priorities for Conserving Sharks and Rays: A 2015–2025 Strategy (Bräutigam et al., 2015)
United Nations Environment Programme	Intergovernmental Organisation	Marine Mammals: Global Plan of Action (UNEP, 1985), Action Plan for the Conservation of small cetaceans of Western Africa and Macaronesia (UNEP/CMS, 2008), Pacific Islands Regional Marine Species Programme 2022–2026 (SPREP, 2022)
United Nations Food and Agriculture Organization (FAO)	Intergovernmental Organisation	Marine Mammals: Global Plan of Action (UNEP, 1985)
World Wildlife Fund for Nature (WWF)	International Non-Governmental Organisation	Mediterranean Angel Sharks: Regional Action Plan (Gordon et al., 2019), Global Priorities for Conserving Sharks and Rays: A 2015–2025 Strategy (Bräutigam et al., 2015), A Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean (IUCN/SSC Marine Turtle Specialist Group and IUCN East Africa Regional Office, 1996)

Zoological Society of London (ZSL)	International Non-Governmental Organisation	<i>Mediterranean Angel Sharks: Regional Action Plan</i> (Gordon et al., 2019), <i>Eastern Atlantic and Mediterranean Angel Shark Conservation Strategy</i> (Gordon et al., 2017)
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