CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA

Nineteenth meeting of the Conference of the Parties
Panama City (Panama), 14 – 25 November 2022

IMPLEMENTING CITES APPENDIX II LISTINGS FOR MARINE FISHES: A NOVEL FRAMEWORK AND A CONSTRUCTIVE ANALYSIS

1. This information document is submitted by the United Kingdom of Great Britain and Northern Ireland on behalf of the International Union for Conservation of Nature (IUCN Nigeria)[*] in relation to agenda items 65, 69, and others that bear on implementation of Appendix II listings for marine fishes.

Introduction

2. **Listing a taxon on CITES Appendix II is only the first step towards ensuring the conservation of a species or taxon, including its sustainable use**. For CITES, success should come when any international trade in listed species is sustainable and legal (and conducted humanely in the case of live animals), thus no longer posing a threat to wild populations, throughout the species range (Res. Conf. 18.3). In addition, CITES should ensure that no trade is allowed that does not fully comply with the Convention. In contrast, failure occurs when (i) a species continues to decline due in part or entirely to international trade, legal or illegal, (ii) illegal trade is not controlled or (iii) the species qualifies to be transferred from Appendix II to I.

3. **Although CITES entered into force in 1975,** Parties only agreed to list the first fully marine fish species on Appendix II at CoP12 in 2002, with seahorses and two sharks (Vincent et al, 2013).[†] Humphead wrasse and an additional shark species followed at CoP13 in 2004, and the sawfishes family Pristidae were listed in Appendix I at CoP14 in 2007. It then took until 2013 before CITES decided at CoP16 to regulate trade in marine fishes that were still of substantial commercial fisheries importance, adding five shark species and the manta rays to Appendix II. By 2016, the understanding and commitment of the Parties had progressed, and all four shark and nine devil ray proposals were relatively more easily adopted then and in 2019, when two more sharks and 16 coastal rays were added. Now, at CoP19, Parties have submitted proposals to list additional marine fishes on Appendix II.

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[*] *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

[†] *The history of listing proposals until and including CoP15 – and responses to objections raised about marine fish listings – is analysed in Vincent, A.C.J., Y.J. Sadovy, S.L Fowler and S. Lieberman. 2013. The role of CITES in the conservation of marine fishes subject to international trade. Fish and Fisheries 15: 563–592. https://doi.org/10.1111/faf.12035.*

4. **To support effective implementation of listings of marine species on CITES Appendix II, we wish to draw Parties attention to a recent study**: Vincent, A.C.J., S.J. Foster, S.J. Fowler. S. Lieberman, and Y.J. Sadovy de Mitcheson. 2022. *Implementing CITES Appendix II listings for marine fishes: a novel framework and a constructive analysis*. Fisheries Centre Research Reports 30 (3), 189 pp. This report sets out a framework for evaluating implementation of Appendix II listings and then applies it to seahorses, sharks and humphead wrasse, the first marine fish taxa listed in CITES Appendix II. The findings are meant to encourage and provide guidance for future capacity building and evaluation of CITES mechanisms, as well as identifying areas where greater attention could improve the effectiveness of the listings. The findings do not address specific listing proposals at CoP19, but rather focus on efforts and measures needed to help ensure effective implementation of Appendix II listings (with applicability well beyond marine fishes).

5. **Twenty years after the first marine fish listings on Appendix II, the study sought to support CITES implementation and the conservation of CITES-listed species by: (i) developing a framework for assessing implementation and (ii) using the framework to evaluate implementation for marine fishes.** The analysis focused on three taxa of widely distributed marine fishes that have been listed on CITES Appendix II for the longest time: 42 species of seahorses (*Hippocampus* spp.), the 41 species of elasmobranchs (sharks and rays) listed by 2016 (CITES CoP17) and the humphead wrasse (*Cheilinus undulatus*).

6. **Together, the authors of the study have been leaders in facilitating CITES engagement with marine fishes** – and with these taxa in particular, through their various leadership roles, including in IUCN Specialist Groups – for more than 30 years, bringing both scholarly and practical expertise to their analysis.[‡, §, **, ††, ‡‡]

7. **We invite Parties to take note of the Vincent et al. (2022) report, and consider possible future CITES action** in response to its novel implementation and analyses of marine fish listings on Appendix II. We here provide an executive summary of this report.

8. **The authors developed a framework for analysing CITES implementation of broad relevance to all taxa on Appendix II**. The framework is composed of four levels of response that serve as progress towards full implementation of CITES Appendix II listings (Table 1, Figure 1). The levels represent different ways that CITES Parties might take action on listings along a continuum of implementation, ranging from technical outputs (Level 1) to policy outcomes (Level 2) to field outcomes (Level 3), and eventually to population changes (Level 4), While Levels 1 and 2 are valuable and necessary, work

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occurs removed from the fish. Work at Level 3 is critical to effect a biological change in wild populations (Level 4).

9. **The study revealed that all three focal marine fish taxa had benefited from many technical outputs (Level 1) and progress on policy changes (Level 2) also looked hopeful**, while being far from comprehensive. In general, sharks and humphead wrasse fared much better than seahorses. For all taxa, Parties need to achieve many more practical outcomes (Level 3) at the vessel, dock, Customs shed or market, although there was some encouraging progress for sharks. It remains unclear how CITES listings have helped improve status of fish populations (Level 4), the central tenet of the Convention.

Executive summary

Vincent, A.C.J., S.J. Foster, S.J. Fowler. S. Lieberman, and Y.J. Sadovy de Mitcheson. 2022. *Implementing CITES Appendix II listings for marine fishes: a novel framework and a constructive analysis*. Fisheries Centre Research Reports 30 (3), 189 pp.

A novel framework for analysing implementation

To analyse CITES Parties' progress on implementing the Appendix II listings for fully marine fish species, we developed a framework of broad relevance to all taxa on Appendix II. The framework is composed of four levels of response that serve as progress towards full implementation of CITES Appendix II listings (Table 1, Figure 1). The levels represent different ways that CITES Parties might take action on listings along a continuum of implementation, ranging from technical outputs (Level 1) to policy outcomes (Level 2) to field outcomes (Level 3). Levels differ in their actors, activities, products and tools. While Levels 1 and 2 are valuable and necessary, work occurs removed from the fish. Work at Level 3 is critical to effect a biological change in wild populations (Level 4). Table 2 demonstrates the framework with specifics, showing how five different initiatives evolve across the levels.

For a clear understanding of CITES' effectiveness, we must distinguish among the four Levels in analysing implementation, always seeking to discern population-level changes (Level 4). This is the basic CITES theory of change, that effective implementation of Appendix II will lead to improved conservation of the species.

Level 1: Technical outputs are the products, tools and activities developed by Intergovernmental Organizations (e.g. FAO, regional fishery bodies (RFBs) or IUCN), non-governmental organizations (e.g. NGOs, academic centres), government agencies (subnational, national, or regional), and other catalysts. These might include roles such as developing and disseminating identification (ID) tools, generating frameworks for making non-detriment findings (NDFs) or legal acquisition findings (LAFs), providing guidance and manuals, creating monitoring guidelines, synthesizing data, providing technical advice, hosting capacity building meetings or contributing funding. Alone, these actions do not directly impact wild populations, but well-designed technical outputs serve as vital tools to facilitate effective implementation and management. Without such tools, implementation at Levels 2 and above would be far more difficult, or even impossible in some cases. The value of technical outputs lies in whether and how they are used by Parties or agencies to generate policy outcomes (Level 2) or field outcomes (Level 3).

Level 2: Policy outcomes are changes in policy, rules, regulations, legislation, or management protocols made to generate or drive compliance with and implementation of the CITES Convention. Such policy outcomes commonly emerge from technical outputs in Level 1 and are very important (but not sufficient) to obtain population outcomes; they may also arise directly without the tools in Level 1. Policy outcomes might include a national CITES Scientific Authority making the required NDFs, or legislatures or other elements of government developing a new policy or law pertaining to the species, new framework legislation, new implementing rules and regulations addressing exploitation or trade of the species, formulation of new management protocols, enhancement of enforcement or judiciary regulatory instruments, establishment of new protected areas, or Customs officers' use

of identification guides and other tools. The theory of change is that these actions provide impetus for field outcomes (Level 3) in support of the taxon.

Level 3: Field outcomes are practical changes, activating policy or management protocols in ways that directly and proximately affect pressures on the species. Such outcomes derive from Level 1 and 2 outputs and outcomes, moving decisions from meeting rooms and computers to action on vessels, at docks, traders' facilities, Customs sheds and courts, where the pressures are exerted and the fish are found. They represent translation of regulatory policies or processes (established or new) into front line action, where management of human activity reduces a pressure on a species, mitigates a threat, or creates an opportunity for population recovery. Field outcomes might, for example, include enforcement of a new protected area, implementation of a quota, seizure of an illegal shipment, measurable improvement with compliance and adherence to a management protocol and/or clear enforcement of a rule or management measure (e.g. quotas, time and area closures, gear restrictions), appropriate penalties given for infractions, and active informative monitoring. When field outcomes are well implemented, fish populations should benefit directly, with consequences that are likely to be reflected in biological impacts (Level 4). There are certainly situations where even full efforts at Level 3 may not be enough to offset the range of stresses on wild populations, but strong field outcomes can certainly help diminish pressures on species.

Level 4: Population impacts are biological changes in wild populations and represent direct responses to field outcomes (Level 3). Such changes might be seen in the number of individuals, the size structure of the population, the geographic range of the species, or some other demographic index. This is the level of implementation that is the ultimate goal, though outcomes at Level 3 can sometimes serve as proxy measures of population impacts. It is critical to monitor populations across space and time. Biological impacts are often detected through fisheries landings, with a greater abundance and/or biomass of catch per unit effort (CPUE) as one potential indicator. When population changes are positive, we can infer that the CITES listing is being implemented effectively. When they are negative, either CITES implementation (Levels 3, 2, and even 1) need improvements, or other threats are negating the benefits of CITES implementation and more also needs to be done to mitigate those threats. Furthermore, for migratory species, or those found in multiple countries, effective CITES implementation by one country could be undermined by weak implementation in a neighbouring State.

To meet their obligations to CITES, Parties usually need to implement an Appendix II listing on all four Levels. A Party that (i) produces or accesses Level 1 technical outputs, and (ii) makes governance changes (policy outcomes) in Level 2 policy outcomes but (iii) fails to mobilise practical change (field outcomes) at Level 3 will be most unlikely to (iv) see the required biological changes (population impact) in Level 4. In this theory of change framework, those Parties that implement listings at levels 1, 2, and 3 should be able to detect biological changes (Level 4), as long as they are equipped to measure such change through monitoring. It is, of course, true that some Parties that implement listings at levels 1, 2 and 3 may still struggle to see change at Level 4 because of pressures beyond those posed by over-exploitation and international trade. Again, though, Parties simply must act effectively at Level 3 to have a chance of seeing Level 4 changes. This is true for all CITES Appendix II species.

While it is tremendously important to distinguish clearly where initiatives fall among the Levels of implementation, three considerations must be acknowledged:

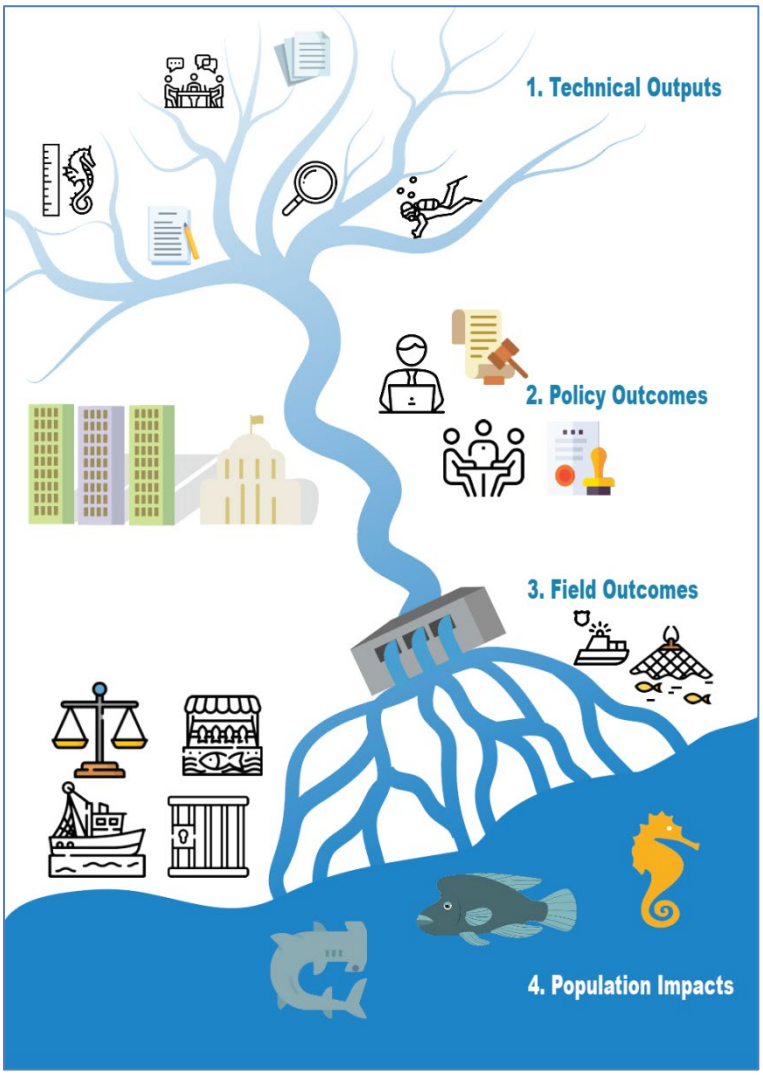
> (1) The four Levels are useful in guiding discussion, and in evaluation and appraisal of CITES implementation, but they may blur into each other at times. The essential element is to ensure direct connection between field outcomes and wild populations;
>
> (2) Policy interventions and management actions that demonstrably reduce mortality, exploitation, and trade (Level 3), are correctly assumed to benefit populations by limiting removals from the wild to sustainable levels; and
>
> (3) There are multiple additional and interacting threats to many species, such that CITES could hypothetically be perfectly implemented but a species might still decline due to pressures other than international trade (e.g. domestic consumption, climate change, invasive alien species, habitat loss or degradation, or disease).

Table 1. Comparing and contrasting criteria, engagement and progress across four levels of implementation

Nature of distinction among levels	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Category of implementation	Technical outputs	Policy outcomes	Field outcomes	Population Impacts
Nature of change	Tools, guidance, and approaches	Governance changes	Practical changes	Biological changes
Connection to the fish	Remote	Distant	Proximate	Intimate
Likely direct effect on the fish	None	None	High	NA - Not applicable
Role of external catalysts	High (action)	Medium (advisory)	Low (facilitation)	NA
Role of government	Variable – could be passive or active	High – must be active	High – must be active	NA
Location of activity	Desk and meetings	Desk, meetings, legislatures	Borders, ports, docks, processing centres, traders' facilities, markets, at sea, courts	Underwater
Seeking to promote	Policy change	Policy and practical changes	Population changes	NA
Main actors	Governments, IGOs (e.g. IUCN SSC, CITES Secretariat, FAO Secretariat, RFBs), NGOs, scientists, civil society	Government (personnel and advisors, decision-makers, legislators, CITES Authorities), industry, FAO Secretariat, RFBs	Government/agency field personnel, Customs agents, border authorities, judiciary, police and law enforcement, fishers, traders.	Fish
Main activities	Product development, workshops, trainings, research, meetings, capacity building, funding	Product application, policy and governance development and adoption	Inspection, enforcement, prosecution, monitoring, enhancing compliance, change in fishing gear or methods, change in trade preferences, allocation of budgets, market measures	Surviving, growing, reproducing, and moving

Main products	ID guides, NDF frameworks and guidance, LAF guidance, monitoring protocols and databases, briefing documents, analyses, CITES Decisions and Resolutions	National level protection, MPA designation, NDFs, LAFs, export restrictions, export suspensions, import restrictions, National Plans of Action, monitoring plans, action by RFBs or industry	Apprehensions, seizures, confiscations, enforced marine protected areas, changes to catch or trade volumes or composition, changes arising from NDFs or LAFs, better data and analyses	More fish, healthier fish populations, greater habitat occupancy
Main tools used	Computers / smartphone, voice, presentation software, white boards, meeting technology, databases	Computers/smartphones (and Apps), voice, presentation software, white boards, meeting technology, data analyses	Applied technology, vehicles and boats, ID guides, genetic tools, logbooks, maps, measuring devices, weigh balances, stock assessments, citizen science, computers / smartphones	Monitoring

Figure 1. A visual representation of a framework for assessing implementation



Implementation of CITES Appendix II listings for marine fishes must have benefits for their populations in the sea. We can present the levels of implementation like the stages of a metaphorical river that must flow to the sea. The shading of blue represents proximity to the fish populations that need support.

At Level 1, the technical outputs (tools and capacity building) are like the many individual rivulets and streams that gather water to feed a river. The waters here can move quite rapidly with little hindrance. They are invaluable but are remote from the sea itself.

At Level 2, the policy outcomes (governance changes) are like a river that is flowing strongly to the sea, passing through urban centres where policy makers and technical experts are deciding how best to act, from meeting rooms and computers. The river gathers water from the rivulets and streams (technical outputs) and flows on downstream, filled with plans, laws, regulation and rules. The waters here are powerful but move more slowly than at the headwaters, in more constrained ways.

By themselves, policy outcomes do not influence marine life.

At Level 3, the field outcomes (practical changes) are like the river delta, estuary or lagoon, where the river meets the sea. This is where the policy and management instruments carried by the river connect proximately to marine life, through the actions of fishers, market traders, and courts. The terrain has flattened and waters may move quite slowly, often changing course, diverging and merging around shifting sandbanks, for example. At Level 3, it is possible to measure change in physical ways: counting fish, sorting catch, or seizing illegal shipments.

At Level 4, population impacts are felt through biological change in the ocean, affected by the flow or water arriving from the river but also subject to other influences.

The dam between Level 2 and Level 3 represents the considerable obstacles that seem to emerge when governments try to ensure that governance decisions flow into practical action. Parties need to focus on invigorating that flow if CITES is to ensure that implementation efforts actually benefit the fish.

Table 2. Examples of how sample activities may be advanced at all Levels.

Activity	Level 1	Level 2	Level 3	Level 4
1. Species identification (ID)	Create and share ID materials	Adopt and disseminate ID materials	Use ID materials to improve identification of species (in trade, markets, shipments, etc.) and seize illegally obtained or traded specimens	Healthier populations
2. Monitoring	Develop monitoring guidelines, databases, and protocols	Require monitoring and use of guidelines and protocols, data sharing	Population and trade monitoring in effect, using the guidelines and protocols, analyses completed	Healthier populations
3. Non-detriment findings (NDFs)	Create NDF framework/guidelines (e.g. minimum sizes, export quotas, spatial restrictions etc.); train in using the framework	Apply NDF framework to make positive or negative NDFs for a species	Ensure positive NDFs are valid and justifiable, improve trade and fisheries management to enable positive NDFs, monitor populations, fisheries and trade, regularly update and share NDFs (adaptive management)	Healthier populations
4. Legal acquisition findings (LAFs)	Create LAF framework/guidelines, train in using the framework	Require use of LAF framework; assemble information on all applicable laws and regulations	Field activity to ensure legality, and that specimens are obtained in accordance with the LAF, rejecting exports of illegally sourced animals	Healthier populations
5. Marine protected areas (MPAs)	MPAs proposed as a management tool for regulating or prohibiting take and trade with guidance as to effective implementation; detailed spatial planning to ensure the right	Policy documentation establishing MPAs and their management requirements	Evidence of effective MPA management (e.g., funding, staffing, capacity building) with evidence of compliance (e.g., community and	Healthier populations

	MPAs are in the right place		stakeholder support) enforcement (e.g., demarcation, patrols, monitoring, apprehensions)	

Taxon-specific evaluation

Our study analysed 20 years of CITES implementation of Appendix II listings for three marine fish taxa – seahorses (42 species at present), sharks and rays (41 species listed to date), and humphead wrasse (one species) – using the framework of four Levels of CITES implementation: technical outputs (tools and capacity building), policy outcomes (governance changes), field outcomes (practical changes) and population impacts (biological changes).

Each of the three marine fish taxa in our analysis has its own history with CITES, together covering a good array of the issues associated with implementing the Convention:

- Seahorses are small and iconic, with many millions traded internationally each year for traditional medicine (dried), curios (dried) and ornamental display (live), and are the first and only fully marine fishes on Appendix II to have been through a Review of Significant Trade (RST) process;
- Sharks and rays are long-lived, slow reproducing fishes that are traded for all manner of uses, usually in parts or derivatives (mostly notably as fins and/or meat), some of which are of high economic value, and are the first and only marine fishes on Appendix II to have involved Regional Fisheries Bodies (RFBs) and required Introduction from the Sea (IFS);
- Humphead wrasse is a giant reef fish when adult but is mostly marketed live (at high prices) at juvenile sizes that can fit onto a serving plate, currently legally traded just between two Parties, and are the first marine fish on Appendix II for which CITES at the global level explicitly responded to illegal trade.

Results from the analysis of implementation

The study revealed progress on implementation of Appendix II listings, potentially of real benefit to the species, although much more needs to be done for Parties to be confident that their trade is not harming wild populations. In general, there were substantive achievements on technical outputs (Level 1) for all three taxa, such that the need for identification guides, frameworks, and protocols is no longer a rate-limiting step (although they can always be improved, of course). Progress on policy changes (Level 2) looked hopeful but was very patchy, encouraging for some species and deficient for others; in general, sharks and humphead wrasse fared much better than seahorses. A few Parties were clearly trying very hard to make evidence-based decisions on what level of trade wild populations of particular species could tolerate, including erring on the side of caution in some cases. In general, however, many more Parties probably need to make NDFs and LAFs – both of which are mandatory under the Convention – for some or all of the taxa. Perceptible implementation of marine fish listings dropped noticeably at the critical level of practical changes (Level 3), when Parties had to translate intention and declaration into front line actions at the vessel, dock, Customs shed or market. Some encouraging progress was evident, particularly for sharks, but there was a real dearth of documented transformative action where the policy and protocol directly reached the fish. Finally, there was scant evidence of how CITES listings have supported the improved status of fish populations (Level 4). The situation seems currently to be most encouraging for some humphead wrasse in limited areas, whereas continued declines have been reported for seahorse populations in key source countries. Due to their life histories, it will inevitably take time before the long-lived sharks show signs of population recovery.

Comparing implementation across focal taxa

The stories of the three focal taxa each involve important aspects of the CITES tools and processes, and convey important lessons for marine fishes and for other taxa.

- Seahorses were the first marine fishes to be taken through RST, which led to trade suspensions/bans for most historically important sources of dried trade (Level 2). However, a lack of enforcement of the suspensions/bans has led to high levels of trafficking for the enormous exports of dried seahorses (Level 3). This contrasted with the transition to captive breeding for the small live seahorse trade (Level 3), with potential relief of trade pressure on some wild populations (Level 4).

- Implementation of the Appendix II listing for sharks has been marked by encouraging levels of information sharing, with many Parties publishing NDFs complete with targets and actions (Level 2). The challenge now is to monitor how many of those well-intended plans continue to be executed on boats and docks (Level 3) and, in due course, to what effect on the wild populations (Level 4).
- For those humphead wrasse that are sold direct from the wild (source code W), implementation has resulted in a model fisheries-based NDF (Level 2) and impressively high levels of involvement from the importing Party, addressing illegal trade (Level 3). In contrast, for those humphead wrasse that are caught from the wild, reared in grow out operations, and sold as ranched animals (source code R), implementation has failed to address many concerns (Level 2 and Level 3).

Taken together, with further examples emerging from our species case studies, these three taxa capture many of the biggest challenges and opportunities about CITES for marine fishes and well beyond.

Seahorses

The CITES Appendix II listing for seahorses may well have had a positive effect on the relatively few populations subject only to trade in live seahorses (which has switched to captive breeding in areas near the markets) but has done little or nothing beneficial for those subject to the enormous and dominant trade in dried seahorses (which persists at high levels, mostly illegally). Regulating trade in dried seahorses is challenging at a global level because the trade totals tens of millions of individuals across more than 30 species, exported and imported by about 80 countries, and most trade is supplied by nonselective or illegal gears. However, each Party that implements the Appendix II listing is only dealing with its own trade in a small number of species, and could do a lot to meet its obligations. A high proportion of the effort and initiative on the seahorse listing has come from Project Seahorse, often acting in its capacity as host of the IUCN SSC Seahorse, Pipefish and Seadragon Specialist Group.

Collaboration with Parties and the Secretariat led to the production of crucial technical outputs (Level 1): identification materials, NDF framework, interim means of making NDFs, monitoring guidelines, field studies and Party engagement in the form of briefings, workshops and discussions. The challenges lay in moving seahorses up Parties' priorities so they would actually make the NDFs, develop and/or follow through with national plans of action, and enact monitoring plans. In the instances where Parties did take policy action (Level 2), they rarely translated those intentions into practical outcomes such as targeted enforcement of any fisheries rules (Level 3) and even more rarely tracked the effect of their interventions. The most common policy action (Level 2) for seahorse trade has been in the form of export suspensions/bans (Level 2), sometimes decided by a Party and sometimes imposed by CITES, rather than engaging in fisheries management for sustainability and legality. Worryingly, Parties have really not enforced the export suspensions (Level 3) and the dried trade that provoked the listings continues at very high levels, mostly through smuggling.

Fishers in key source countries for the dried trade in seahorses have reported continued declines of seahorse catch per unit effort, indicating that trade remains detrimental to wild populations (Level 4). It does seem that wild populations subject only to live trade may have benefited (Level 4) from trade transitions under CITES, as markets shifted towards cultured fish, but the dearth of population monitoring leaves that as a supposition only. Such a transition to captive bred owes a lot to the vigilance of the European Union (EU) and the United States (US) whose careful implementation of the CITES listing prompted industry to make changes in its sourcing. We note, however, that captive breeding does not necessarily benefit populations in the wild, with its impacts being taxon- and context-specific. In the dried trade, the main markets are in Asian countries that could have done more to implement the seahorse listing. Parties will need to tackle the challenge of indiscriminate capture of most seahorses in nonselective fisheries if they are to see population impacts, since the large supply of seahorses may be driving the dried trade and not vice versa.

Sharks

The story of sharks is encouraging, if still very incomplete, when it comes to implementation of the Appendix II listings. Sharks broke new ground for CITES in 1994, as the first taxonomic group for which the CoP adopted a Resolution before any species had been listed in its Appendices (paving the way for CITES later to act on seahorses before listing them). Parallel to CITES Parties' early interest in sharks, and in response to this

Resolution, the United Nations Food and Agriculture Organization (FAO) decided to develop an International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks), stimulating action by national fishery agencies and some RFBs. The CITES-FAO MOU ensures that the two Secretariats continue to work together on marine fish issues, and CITES' second shark Resolution will be 20 years old in 2022.

The first wave of shark species listings (from 2002) came too long after the population collapses of those three species (basking shark, whale shark and white shark) for CITES to be able to do more than to support national and regional protections, by ensuring that the remaining small amount of trade in these very large sharks was legal and facilitating seizures of illegal trade. A pause in Appendix II listings followed; perhaps to determine if the IPOA–Sharks had made more CITES engagement unnecessary, before it became clear that additional species did indeed need CITES support.

The second wave of shark listings in 2013 led to implementation efforts really taking off, with a deluge of interest and substantial funding, including preparation of implementation tools and assistance with capacity-building in fishing countries and major trading hubs. This high level of support prompted a tidal wave of meetings, tools and guidelines (Level 1) that are still being generated today. These have propelled many Parties towards policy outcomes (Level 2), not only at national level, but also through their membership in Regional Fishery Advisory Bodies (RFABs, such as SEAFDEC – the Southeast Asian Fisheries Development Center) and Regional Fisheries Management Organisations (RFMOs – particularly but not exclusively the tuna RFMOs). Many RFMOs have adopted management measures (frequently prohibitions, sometimes quotas and/or mitigation measures) for threatened shark species on CITES. In several cases, they were adopted before the species were included on CITES Appendix II. RFMO management measures, national conservation actions (a rising number of Parties are designating shark sanctuaries), and Convention on Migratory Species (CMS) Appendix I listings for shark species that are also listed in CITES can now be supported through CITES LAFs. Not only are many Parties making NDFs, but they are also sharing them through the CITES Secretariat, thus potentially assisting other Parties in their implementation efforts. The CITES Trade Database has, since 2020, begun recording the use of IFS measures for the newly listed mako sharks, which are among the pelagic sharks taken in areas beyond national jurisdiction.

In assessing transitions from policy change (Level 2) to practical change (Level 3), it is clear that CITES has been a major catalyst for improved fishery data collection and enforcement of compliance with fishery and trade management measures, from the dock to the warehouses and Customs sheds where international shipments leave and enter countries. Where RFMOs had issues prohibitions for some species prior to CITES listings, CITES provided new tools to support these measures. The RFMOs require catch reporting, sometimes observer coverage, and monitor the compliance of fleets in their CPCs[§§]. Awareness and compliance in many industrial pelagic fleets is high, driven by pressure to certify catches and products. Capacity-building and new identification tools for fisheries and Customs officers (Level 1) have begun to yield greater measurable field outcomes (Level 3). These range from prosecutions for fishers and traders in breach of rules on prohibited species at the point of landing to seizures of illegal fins, meat and gill plates at the points of export and import – sometimes at very large scale. Genetic surveys in end markets can monitor compliance with management measures at the source – and are beginning to do so. Fisher and trader awareness, particularly in large scale traditional fleets, however, is still largely low.

The life history characteristics of sharks means it will be many years before we can detect the influence of CITES listings on most shark populations (Level 4). Monitoring efforts will need to be maintained to track changes over the necessary time frame.

Humphead wrasse

Among all Appendix II listings for marine fishes, we would expect the one for humphead wrasse to be well-implemented, and that turns out to be partly (but only partly) correct. These fish – which can exceed 1.5 m in length (huge for a reef fish), are late maturing and change sex – are primarily traded as live food in their juvenile size range, fetching high prices per fish; humphead wrasse is one of the top two most highly valued fish in the luxury seafood market. For the past decade, only one Party (Indonesia) has legally exported HHW to only one

[§§] *Contracting Party or Cooperating non-Contracting Party, Entity or Fishing Entity*

other Party (China and particularly into and via Hong Kong SAR) plus these fish are easy to identify at all their traded sizes, and are transported and sold live, making them more visible.

For the first 14 years after listing, implementation progressed very hopefully. Indonesia made NDFs (Level 2) based on capture of wild humphead wrasse (source code W) using three measures to support wild populations: (i) annual quotas (initially a few thousand later dropping to about 1000 fish or less, with permitted volumes decided through fisheries modelling and trade consultation); (ii) slot size limits for export (from 1-3 kg); and (iii) transport restrictions (air only for source code W fish). In its turn, Hong Kong SAR scrutinized imports and actively fought against illegal trade (Level 3). That said, trade out of Hong Kong SAR (re-exports) and into mainland China, a major trade route for HHW, is poorly documented.

In 2018, along this promising road to implementation, Indonesia decided to also allow exports of ranched humphead wrasse (source code R), exposing an industry that had long been largely invisible and exporting fish illegally. Ranching involves capturing small fish from the wild and growing them out in captivity before the same fish are sold. Indonesia's new NDF for ranched HHW (Level 2) is only based on social and economic considerations and does not take into consideration the biological ability of the population, in the single area where the species is ranched, to sustain high levels of capture of the small fish from the wild. Moreover, ranched fish may be exported by sea in vessels that are difficult to control, especially as those vessels have been exempted from the national export quota of wild fish. In that context, Indonesia's NDF for ranched fish is surprising – using quotas (tens of thousands of fish annually, with no scientific basis), allowing capture of juveniles (well after the peak of natural mortality), and permitting transport means that are notoriously difficult to regulate (seagoing vessels).

Hong Kong SAR is struggling to scrutinize imports of humphead wrasse to the same previous high standards (Level 3) – a major challenge is that ranched and source code W (wild) fish are indistinguishable – and illegal trade (excessive numbers of fish, including many of illegal size) is increasing. The good news is that Indonesia could rather rapidly improve its implementation for humphead wrasse with source code R in three ways: (i) producing a science-based NDF for ranched fish; (ii) restricting exports to air transport or, if that is not possible, closely overseeing vessel exports; and (iii) developing transparency that allows Hong Kong SAR to evaluate imports of ranched fish. Communication between Management Authorities on individual shipments and insistence that vessels use AIS systems at all times would allow better regulation of the dozen vessels involved in moving humphead wrasse from Indonesia to Hong Kong SAR.

Framework for assessing action and implementation

Our framework for evaluating implementation forces a layered analysis of CITES effectiveness that cuts through the noise. With so much happening, it could be easy to confuse activity with achievement and process with progress. We were guided to articulate this framework by the complexity of discussions we had about whether CITES Parties were implementing Appendix II listings for marine fishes well or not. People tended to argue effectiveness based on a tally of what had been done rather than what had been achieved (outputs rather than outcomes or impacts). But we were most directed at discovering whether CITES was working for wild populations of fish. Our analyses led us to discover promising gains at Levels 1 and 2 and a need for more progress at Levels 3 and 4.

Disentangling the different types of contributions allowed us to determine which Levels of implementation happen more than others, and to realise that the most frequently touted activities are commonly not the most important for the species. All four Levels of activity progressing towards implementation offer something of value. It is, however, clear that Levels 1 and 2 are remote from the fish and that Level 3 is where the theoretical becomes the practical, and drivers of population change are found. Initially, soon after listing, almost every activity at any Level makes a contribution. Over time, however, technical outputs (Level 1) accumulate and policy outcomes (Level 2) emerge. It then becomes more evident that field outcomes (Level 3) are comparatively hard to find, sometimes because they are negligible, not documented, or too small in scale but sometimes probably simply because there are no incentives to report them. Over time, too, it becomes evident that population impacts (Level 4) either remain imperceptible or are not being assessed and announced.

Some of the pattern in progressing implementation represents simple inertia: technical outputs can be developed by a few people, with limited resources and little government involvement, often quite quickly; policy outcomes are more complicated and cumbersome, depend on political will, governance structures, and more time; field outcomes involve many people, require actual changes in people's lives, can be costly, and produce uncertain results; and population impacts are often very challenging to discern. In particular, identifying population changes in marine fish species commonly must rely uneasily on fisheries-dependent data, which are affected *inter alia* by regulations and markets, rather than on the necessary fishery-independent monitoring,

Better information is the key to greater confidence about what is happening in the implementation of marine fish listings. It is certainly possible that some Parties are making more progress in generating field outcomes (Level 3) and fostering population change (Level 4) than is yet obvious. Press releases are not issued to commemorate another year's work in an airport or fish market confirming that all shipments were accompanied by the correct CITES permits and that no prohibited, undersized or over-quota species have come ashore – or that the usual variety of infractions of regulations have been identified, addressed through the usual channels, and the appropriate penalties enforced. Similarly, the lack of evidence of biological impacts does not necessarily mean a dearth of benefits to populations. It may mean that any benefits are challenging to measure, there are multiple threats to species that cannot all be addressed by CITES implementation, and long-lived and slow to reproduce species will not show gains in the short term. However, the only way CITES can fully assess implementation in ways that are meaningful to wild populations is for Parties to report on progress with Level 3 and 4 change.

We want to be clear that our framework does not represent four sequential phases of implementation. Sometimes it may make sense to develop NDF frameworks (Level 1), then make NDFs (Level 2), then address a problematic fishery (Level 3). But it may also be possible to aim for a field outcome (Level 3) almost immediately. Say, for example, a Party knows that illegal trade is dependent on illegal fishing. Rather than embarking on developing genetic identification tools (Level 1) or long planning and policy processes (Level 2), the Party could just engage in active enforcement of existing fisheries laws (Level 3). And sometimes, in the spirit of adaptive management, a Party may do best to make an informed judgment on the optimal Level for action and then be prepared to switch Levels as knowledge is gained. To emphasise, the very real and urgent problems for many marine fishes may mean it sometimes make sense to skip straight to practical change, even while monitoring and evaluating the activity. The bigger worry would be if implementation got bogged down in technical outputs (Level 1) and no implementation measures were actually reaching the fish.

Changes needed to enhance implementation

Experience with the first three marine taxa listed on Appendix II indicates that CITES needs to make changes to help further implementation, particularly at Levels 2 and 3 (policy and field outcomes).

- At Level 1, individual Parties and CITES as a whole need to enhance their capacity for marine fishes
- At Level 2, Parties need to meet their obligations as exporting Parties (make NDFs, make LAFs, advance IFS, and monitor exports), meet their obligations as importing Parties (report imports, practice due diligence, and query shipments when appropriate), and advance Review of Significant Trade (RST) processes.
- At Level 3, Parties need their policy outcomes to secure field outcomes in target fisheries, non-selective fisheries, trade, and enforcement – actually putting into action the plans they decreed at Level 2, and documenting their progress to allow evaluation in the spirit of adaptive management.

If we turn to more specific recommendations, effective implementation will depend on national and regional fisheries and ocean agencies working with CITES Authorities to develop and implement adaptive management that fully meets CITES obligations for these species. This includes efforts on at least six axes:

- Make meaningful NDFs that are scientifically sound (including for specimens with source codes R and F) and then use these to establish export quotas or other sound management measures;
- Make LAFs for all species listed on Appendix II, reining in illegal sourcing;
- Engage in active monitoring of actual trade (not just reported/permitted trade);

- Tackle illegal trade that is taking place without permits;
- Address the reality that non-selective fisheries (such as bottom trawls, gill/set nets, seine nets or blast fishing) are a big problem for a great many marine fish species, including many seahorse species and some shark species;
- Monitor and evaluate target species/populations to know how fisheries and trade are responding to CITES requirements, or how to regulate them better.

CITES is well-positioned to enhance support for marine fish species listed on Appendix II. To be effective, implementation needs many tools to help (Level 1) and good policies in place (Level 2). ***Much of that is happening for marine fishes***. The next step is for Parties to implement effective front-line field management (Level 3) in support of CITES listed species through enforcement of rules and regulations, monitoring and evaluation of representative / sentinel populations in the wild, and adaptive management to ensure the long-term recovery and viability of populations. These domains are where increased effort is now critical, recognising that CITES is only asking for what, in fact, all natural resource management should be seeking to achieve: that any use be demonstrably sustainable and legal, not compromise the future of the species, and that socio-economic benefits be directly reliant upon sustainable resource use. In this, CITES-listed species will benefit from any societal change that emphasizes the intrinsic worth of fish as wildlife as well as their value is important economic resources, a change in perspective that is fostered every time CITES decides to embrace another marine fish taxon.

Acknowledgements

The report was funded by the Paul G. Allen Family Foundation with much appreciated support from Rebecca Ng. The authors sincerely thank Regina Bestbier for her tremendous organizational assistance in pulling this report together. We are also grateful to Sydney Ascione for astute support in final revisions and edits and Carissa Chua for assembling the figure on implementation levels. This report is a contribution from Project Seahorse, in collaboration with three other leaders in marine conservation.