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

Thirty-third meeting of the Animals Committee
Geneva (Switzerland), 12 – 19 July 2024

Species conservation and trade

Aquatic species

MARINE ORNAMENTAL FISHES

1. This document has been submitted by the Secretariat in relation to agenda item 44.*

2. The Annex to this information document contains the proceedings of the *Technical International Workshop on Marine Ornamental Fish* that took place from 7 to 10 May 2024 in Brisbane, Australia.

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TECHNICAL INTERNATIONAL WORKSHOP ON MARINE ORNAMENTAL FISHES

Proceedings of the international workshop held from 7 to 10 May 2024 in Brisbane, Australia

Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Technical International Workshop on Marine Ornamental Fishes: Proceedings of the international workshop held from 7 to 10 May 2024 in Brisbane, Australia

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EXECUTIVE SUMMARY

From 7 to 10 May 2024, over 110 experts, policy makers and stakeholders from 28 countries/territories gathered in person (64) at the Brisbane Convention & Exhibition Centre in Brisbane, Australia, and online (50) for an international workshop on marine ornamental fish trade and conservation management. The workshop was convened by the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and was conducted in English, with interpretation in French and Spanish. The four-day meeting was attended in person and/or online by representatives from the Secretariat, 22 Parties (exporting, transit, and consumer countries), the Chair of the CITES Animals Committee, the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the Food and Agriculture Organization of the UN (FAO), the International Union for Conservation of Nature (IUCN), the IUCN Species Survival Commission (SSC) Grouper and Wrasse Specialist Group (GWSP), IUCN SSC Marine Fishes Red List Authority, a range of non-governmental organizations, researchers, and representatives from the marine ornamental fish industry.

The workshop was convened in accordance with Decision 19.237 on *Marine Ornamental Fishes,* adopted at the 19th meeting of the Conference of the Parties (CoP19, Panama City, 2022). It provided participants with an opportunity to discuss the scale and scope of the international trade in marine ornamental fish species, and consider the conservation, trade, management, enforcement and regulatory priorities involved in such trade.

This report contains background information and sets out the objectives of the workshop. It summarizes the workshop discussions and outlines a set of observations and recommendations that were identified by workshop participants.

I. WORKSHOP OVERVIEW

Date and venue

The CITES technical international workshop on marine ornamental fishes was held at the Brisbane Convention & Exhibition Centre in Brisbane, Australia, from 7 to 10 May 2024. It was conducted in English, with simultaneous interpretation provided in French and Spanish.

I.1 Background

At its 18th meeting (CoP18, Geneva, 2019), the CITES Conference of the Parties adopted three Decisions relating to marine ornamental fishes (Decisions 18.296 to 18.298), based on document CoP18 Doc. 94 on *Conservation management and trade in marine ornamental fishes* submitted by the European Union, Switzerland and the Unites States of America. Document CoP18 Doc. 94 described the estimated scale of trade in marine ornamental fish species and the need to better understand the conservation implications of the marine ornamental fish trade. It highlighted that the majority of the >2000 species of marine ornamental fishes are not listed in CITES and that there are substantial data gaps in both trade and conservation status that makes assessing the impact of international trade on these species difficult.

The Secretariat reported on progress with the implementation of these Decisions to the 31st meeting of the Animals Committee (AC31, online 2021) in Document AC31 Doc. 36, noting that external funding had been secured to initiate the implementation of paragraph c) of Decision 18.296 on the preparation of workshop documents. AC31 Doc. 36 also proposed the scope and structure of workshop documents to be produced around four thematic studies: (1) international trade; (2) biology and conservation status; (3) fisheries management; and (4) regulations and enforcement of international trade. The Animals Committee subsequently submitted Document CoP19 Doc. 80 for consideration at the 19th meeting on the Conference of the Parties (CoP19, Panama City, 2022), which adopted a new set of Decisions on *Marine ornamental fishes* as follows:

Directed to the Secretariat

19.247 The Secretariat shall:

a) convene a technical workshop to consider the conservation priorities and management needs related to the trade in non-CITES listed marine ornamental fishes worldwide, with a particular focus on data from importing and exporting countries;

b) invite the Animals Committee, representatives from range States, exporting, and importing countries, fishery stakeholders, industry representatives and relevant intergovernmental and non-governmental organizations to participate in this workshop; and

c) submit findings and recommendations of this workshop to the Animals Committee.

Directed to the Animals Committee

19.238 The Animals Committee shall:

a) agree a terms of reference for the technical workshop; and

b) consider the results of the workshop referred to in Decision 19.237 and make recommendations to the 20th meeting of the Conference of the Parties.

A draft workshop document produced by UNEP-WCMC that considered the four thematic studies detailed in AC31 Doc. 36 was also made available to the Parties at CoP19 in information document CoP19 Inf. 99 and its Annex.

The Secretariat provided an update on progress against Decisions 19.247 and 19.248 to the 32rd meeting of the Animals Committee (AC32, Geneva 2023) in Document AC32 Doc. 40 indicating that external funding had been secured for an in person workshop, and laying out the updated terms of reference and modus operandi for the technical workshop in line with Decision 19.237.

I.2 Workshop objectives

The workshop was convened in fulfilment of paragraph a) of Decision 19.247 on *Marine ornamental fishes* adopted at the 19th meeting of the Conference of the Parties (CoP19, Panama City, 2022), and provided participants with an opportunity to discuss the conservation priorities and management needs relating to marine ornamental fishes, as well as the scale and scope of international trade in these species. Participants also had an opportunity to submit resource materials for consideration during the workshop, and to review the preliminary findings of the background study *International trade in non-CITES listed marine ornamental fish* prepared by UNEP-WCMC. All of the relevant documentation for the workshop was made available at a dedicated webpage on the CITES website (https://cites.org/eng/node/139057)

I.3 Agenda

The workshop agenda is included in Annex A.

I.4 Participants

A list of all workshop participants (both in-person and virtual) and the countries or organizations they represent is included in Annex B.

WORKING STRUCTURE

I.5 Opening session

The workshop opened with a Welcome to Country from Maroochy Barambah, song and lore woman of the Turrbal people, the original inhabitants of Brisbane. She is a graduate of the Victorian College of the Arts and is an internationally renowned opera singer.

This was followed by a welcome address from the CITES Secretary-General Ms. Ivonne Higuero, who expressed her hope that the workshop would foster rich dialogue and collaboration to explore sustainable practices for the international marine ornamental fish trade that balanced conservation with economic viability. Ms. Higuero further stated that the: "Workshop be a catalyst for transformative ideas and concrete actions that benefit both marine biodiversity and the livelihoods of communities worldwide".

Next Rhedyn Ollerenshaw, from the CITES Management Authority for Australia thanked everyone joining in person or online and Switzerland, the UK and the US for supporting the workshop. Additional thanks were given to the CITES Secretariat and UNEP-WCMC for help and support organizing the workshop. The Brisbane Convention Exhibition Centre and OnCall staff and interpreters were also thanked.

Finally, Karen Gaynor of the CITES Secretariat gave an introductory presentation to explain and establish the conduct and objectives of the workshop, in line with Decision 19.247 and the Terms of Reference agreed at AC32 in AC32 Doc. 40. It was also emphasized that the workshop would not: propose species for CITES listing or develop listing proposals; test any species against the CITES listing criteria; or adopt any recommendations; instead, the workshop would focus on developing observations and draft recommendations for consideration by the Animals Committee.

I.6 Presentations of background information

I.6.1 UNEP-WCMC

Kelly Malsch from UNEP-WCMC presented the updated results from the background study on international trade in non-CITES listed marine ornamental fishes (previously published as CoP19 Inf. 99)[1]. This report made use of stakeholder survey responses[2] (gathered from the survey circulated via Notif 2021/030), expert consultation, data from species databases (FishBase, IUCN and ZIMS), official trade databases (LEMIS from the US and TRACES from Europe), published literature and management plans/legislation. The report followed the four thematic studies outlined in AC31 Doc. 36: international trade; biology and conservation status; fisheries management; and regulations and enforcement of international trade.

The presentation focused on summarizing the key results of Thematic studies 1 and 2. Thematic study 1 used the CITES definition of marine ornamental fishes outlined in AC31 Doc. 36 to identify relevant species[3] with evidence of being in international trade and, where possible, summarized levels of trade. Thematic study two presented a potential approach to prioritise species most in need of further assessment into the potential threat from international trade, and provisionally categorized species in international trade as 'low', 'moderate' or 'higher' risk based on their possible likelihood of being threatened by international trade. The prioritisation approach was based on information on species IUCN Red List status, FishBase vulnerability score, expert input and other evidence of species threatened by international trade. UNEP-WCMC noted that levels of trade data were not used for identifying conservation priorities due to the gaps in the available trade data and because trade volumes do not necessarily equate to risk from trade.

Key findings from thematic studies 1 and 2 highlighted in the presentation included:

[1] Updates to CoP19 Inf. 99 included more up to date data from FishBase (including to vulnerability scores and the core taxonomic backbone), the inclusion of IUCN Red List assessments published in version 2023.1, revised data from the TRACES database on EU imports and the removal of any species listed at CoP19 in 2022.
[2] 62 responses received from 66 participants, covering 34 countries in 6 regions.
[3] species of fish (including sharks and rays) native to tropical/subtropical marine coral reefs (based on data in FishBase), which are caught for public or private aquaria (using data from species and trade databases, published literature, stakeholder survey responses and expert consultation)

- 2191 species met the CITES definition of *marine ornamental fishes*, of which 1764 species (81%) had evidence of international trade.
- Based on the prioritisation approach applied, 71 species (4%) were provisionally classified as 'higher risk' and 246 (14%) as 'moderate risk'; the majority of species were identified as 'low risk'.
- There was evidence of ~10% of species in international trade being captive bred for retail, with some heavily traded families such as Chaetodontidae and Labridae appearing to be primarily traded as wild-sourced. However, other commonly traded families such as Pomacentridae appear to have more species frequently captive bred for trade.

UNEP-WCMC also noted the following data gaps in relation to the trade in marine ornamental fishes:

- Global statistics on the overall number of individuals in trade, as well as the species-specific quantities, are lacking - most international trade data are from European and US importers, with little data publicly available from many exporting countries or other import markets.
- Where trade data are available, the source of the traded species (i.e. captive-bred or wild-sourced) is often not reported.
- Whilst most species have IUCN Red List assessments, some have still not been assessed and many that have been assessed are over 10 years old and may be out of date.

I.6.2 International Union for Conservation of Nature (IUCN)

Christi Linardich from the IUCN SSC Marine Fishes Red List Authority presented on their work to assess the conservation risk of marine ornamental fish species in trade that had not previously been assessed for the Red List. Statistics on the IUCN Red List assessments for 2682 marine ornamental fish species identified by IUCN[4] were provided as follows:

- 589 species that had not previously been assessed by the IUCN Red List were assessed in three phases between 2021 and 2024; 449 of these assessments have been published as of version 2023-1 of the Red List, and the remaining 140 species assessments have been submitted for future publication.
- Species of marine ornamental fish were found in 145 families[5], although nearly half of species fell within seven families (Labridae, Pomacentridae, Gobiidae, Apogonidae, Serranidae, Chaetodontidae and Blenniidae).
- 92 species have elevated extinction risk categories (Near Threatened, Vulnerable, Endangered, Critically Endangered) and 141 are Data Deficient.
- 14 of the 92 species with elevated extinction risk had harvesting for the ornamental fish trade as their primary threat. Three of these species were categorised based on restricted range criteria, and 11 under criteria relating to declines of >30%. Other major threats include coral reef degradation and exploitation for human consumption (e.g. groupers).

Several case studies were provided on species of marine ornamental fish that were globally threatened primarily due to the ornamental fish trade, including *Cirrhilabrus naokoae* (Naoko's fair wrasse) and *Elacatinus figaro* (Barber goby).

IUCN noted that:

- The 52 species listed as Data Deficient that are exploited for the marine ornamental fish trade may be potential priority candidates for further research.
- Following this workshop, the IUCN SSC Marine Fishes Red List Authority would (a) review and update their list of species in trade and (b) identify priority species requiring a Red List (re)assessment (including identifying species with assessments over 10 years old).
- Information provided during this workshop (including in workshop documents) may help identify additional sources of population data that would help to quantify species population trends over time.

[4] Identified using US trade data from the Marine Aquarium Biodiversity and Trade Flow database (Rhyne et al. 2015), EU imports (Biondo, 2017) and a Guide to Coral Reef Aquarium Fishes (Michael, 2005).
[5] Following taxonomy presented in Eschmeyer's Catalog of Fishes (Fricke & Eschmeyer, 2024.) as the taxonomic authority followed by IUCN.

I.6.3 Species360

Andrew Rhyne from Roger Williams University presented on the Species Knowledge Index (SKI) developed by Species360 for marine aquarium fish species.

The marine aquarium fish SKI identified 2586 non-CITES listed marine bony fishes with records of international live trade from a variety of databases. Elasmobranchs (sharks and rays) were considered in a separate SKI and so were excluded from this analysis. Whilst the trade in marine ornamental fishes is biodiverse and species rich, it was noted that there appears to be little trade in most species.

Following a flow chart approach, the marine aquarium fish SKI assigned marine bony fish species to sequential priority categories based first on levels of trade (US imports 2004-2011) and then on conservation status considerations.

This was proposed by Species360 as a potential methodology for generating a shortlist of higher priority species for further assessment of risk from trade.

I.6.4 Ornamental Aquatic Trade Association (OATA)/ Ornamental Fish International (OFI)

Matthew Bond presented on a project developed by OATA and OFI, alongside support from various other organisations, which created a framework for identifying species that may warrant further investigation into their populations or management in order to determine whether trade in them is sustainable.

Initially this project created a database of species from academic and industry data, including quantities imported into Europe and the US and metadata on species distribution, threats and reproductive method. This identified 1040 species with evidence of trade.

OATA and OFI presented a proposed prioritisation framework aimed to identify those species most in need of further assessment into the potential threat from international trade. This step-wise approach considered the species IUCN Red List status, additional risk metrics including the FishBase vulnerability index, Product Susceptibility Analysis (PSA) score, endemism and species breeding biology. It was noted that the PSA work could be integrated into this work easily. Further metrics for prioritisation included presence of fishery management measures, availability of captive bred individuals and other evidence of population declines. Inclusion of IUCN Least Concern species and manipulation of the vulnerability scores provided a flexible approach, tailored to resource availability or importance. Depending on the metrics and thresholds used, the framework identified between 62 and 214 species as medium or high priority.

An overview of known fisheries management measures in source countries and territories was also presented, which identified the type of management techniques used. This was presented to highlight that although often referred to as “unregulated”, many fisheries are already under management at a national level.

I.6.5 Gabrielle Baillargeon (University of Leeds)

Gabrielle Baillargeon from the University of Leeds presented a novel method to quantify the vulnerability of marine ornamental fish to harvest using Productivity Susceptibility Analysis (PSA). This method was specifically tailored to marine ornamental fishes, rather than using models and assumptions that were built to assess harvested fish (particularly food fish) more generally such as the vulnerability index used by FishBase. Pre-existing traditional fishery assessments, as well as being focused on food fish species, require more data than are available for most marine ornamental fish species. The PSA framework offers more flexibility around data deficient species and assesses the relationship between a species ability to reproduce (productivity) and their resilience to being fished (susceptibility).

This method scores each species between 1-3 for each factor, with **bold** metrics below double weighted as the most important factors:

Productivity factors:

- **Maximum size**
- Mean trophic level
- Breeding strategy
- **Fecundity**
- Pelagic larval duration
- Susceptibility factors include:

Susceptibility factors:

- **Ecological niche and distribution**
- Cyanide use
- Encounterability depth
- Aquarium suitability
- **Trade volume**
- **Life cycle stage of harvest**[6]

The model produces a global score for each species and uses a semi-supervised machine learning model to classify them as least, moderately or most vulnerable. Species with high productivity and low susceptibility are considered more likely to be resilient to fishing pressure, with most vulnerable species more likely to have low productivity and high susceptibility.

The background document presented at the workshop included PSA values for 258 of the species most imported into the US in 2011 (accounting for approximately 92.5% of US imports from 2011). Of these species, 85% were classified as moderately or least vulnerable according to the PSA methods, whilst ~15% (38 species) were classified as most vulnerable and so were a priority for further research. There was limited overlap when comparing the PSA-based vulnerability classification against the vulnerability classifications from FishBase, with FishBase tending to under-score species in comparison.

It was further discussed how PSA can be adjusted to include factors such as management categories already in place and livelihoods, alongside the time needed to scale up the assessment and add new species. Discussion around the PSA method generally drew a lot of interest and various questions were asked about its ability to be customized.

I.7 Presentations from importing Parties

I.7.1 United States of America, Office of Law Enforcement

Laura DiPrizio from the US Office of Law Enforcement (OLE) provided an overview of the Law Enforcement Management Information System (LEMIS) and the practicalities of monitoring and processing imports in the US.

Physical inspection by Wildlife Inspectors is not possible for all ~171,000 shipments of wildlife products (including live wildlife) imported into the US each year, so shipments are prioritised for inspection. Shipments may be prioritised for inspection if there are potential errors on the shipping documents, shipments contain (or are suspected to contain) protected wildlife or live animals, or the nature of the import. Physical inspection is conducted to confirm shipment contents, humane transport conditions, correct species identification, and that there are no violations of wildlife regulations.

It was noted that LEMIS was produced as a law enforcement management system, rather than as a wildlife trade database. Trade is reported in the LEMIS system with a 'species code' that is associated with a species or a higher-level group. For time efficiency and to facilitate trade, marine ornamental fishes in mixed species shipments can be reported in a single line as MATF (Marine Aquarium Tropical Fish) rather than reporting each species individually, providing all species are individually included on the shipping invoice. It is hoped improvements can be made around data collection to help improve data quality and accessibility.

I.7.2 Fondation Franz Weber (FFW)/University of Aveiro, Portugal

Monica Biondo from Fondation Franz Weber (FFW) presented on the monitoring of marine ornamental fish trade to Europe via the European TRACES (Trade Control and Expert System) database and provided an updated review of European imports 2014-2021.

[6] A low age of harvest was considered to be a unique trait in marine ornamental fisheries compared to food fisheries and may help resilience.

TRACES is an online system for monitoring the import of live animals, products and feed into Europe for the purposes of biosecurity, not as a specific tool for monitoring wildlife trade. Trade may be recorded in TRACES at species or higher taxonomic levels; it was estimated that 70% of marine ornamental fishes imported into Europe under HS code 03011900 (Live ornamental fish [excl. freshwater]) 2014-2021 were reported to the species level.

A summary of the TRACES data reported the import of 26 million specimens into Europe 2014-2021. These data comprised 1452 species (from 120 families) from 61 exporting countries (notably Indonesia, the Philippines and Sri Lanka, which accounted for ~69% of European imports). Almost all imports were in 12 families, including 7.2 million specimens of Pomacentridae.

Two outputs were generated from this project, the Watchlist and Watchlist+. The Watchlist ranks species based on a score generated from the volume of trade, import trends, FishBase vulnerability index and IUCN Red List status. The Watchlist+ builds on the Watchlist to include linear regression for estimating the time-trend in number of specimens traded, which also aims to rank species that may be at risk from overexploitation, although many species could not be included in the Watchlist+ assessment due to limited data.

TRACES data showed a decrease in the number of specimens imported into the EU between 2014 and 2021, corresponding with an increase in value over the same time period from EU import data in UN Comtrade. A link between the decline in volume/ increase in value and rising sea surface temperature (based on NOAA data) was hypothesised. It was noted in discussion that the observed declined in volume and increase in value has been seen elsewhere (e.g. by trade representatives) and was more likely attributed to limited shipping and availability of fish during the COVID-19 pandemic, increased freight rates over the past five years and/or the UK (a key importer) no longer reporting to TRACES.

FFW made several recommendations to improve the quality of available trade data including:

- Requiring TRACES to record (a) all taxa to the species level, (b) the country of origin, rather than the (re)exporter to Europe and (c) the source of specimens (captive or wild-sourced).
- Consider how TRACES or systems such as TRACES could be applied to other parts of the world.
- Establishment of an alert system to determine if a species requires CITES monitoring.
- (Re)evaluation by IUCN of the most commonly traded coral reef fishes.

I.7.3 Singapore

Lee Lester from the National Parks Board joined the workshop online and spoke about the controls and legislation in place in Singapore to manage the import and re-export of marine ornamental fishes.

Of the ornamental fishes passing through Singapore, it was estimated that only 1-5% of these individuals are from marine species, with the majority being freshwater species. Whilst Singapore often imports ornamental fishes for re-export, it was noted that some marine species are also commonly traded for local (domestic) markets, notably butterflyfish, gobies, damselfish and clownfish.

Controls on the import and/or export of marine ornamental fishes into Singapore fall under wider controls relating to the movement of live animals and include: import/export and farm licensing by the Animal and Veterinary Service (AVS), AVS inspection of premises and the annual renewal of import licenses. The import and/or export of marine ornamental fishes are covered by several pieces of legislation in Singapore, including the Animal and Birds Act (sections 8, 10 and 50-52a) and the Endangered Species (Import and Export) Act (sections 4 and 9-14), and there are both financial and imprisonment penalties in place if these are not followed. Health certification is currently not required as part of import documentation.

Singapore detailed a risk-based approach that is used to identify consignments for detailed inspection. This approach considered all information in available documents, the conservation status of reported species, the mode of import and routes into Singapore within a risk matrix. Once cleared, animal enter quarantine and are placed under surveillance for signs of disease.

I.7.4 Israel

Simon Nemtzov from the Israel Nature and Parks Authority joined the workshop online and presented the policies in place in Israel to control and regulate trade.

Israel do not permit the export of any native species, and trade reported as imported from Israel by importing countries should reflect the trade in captive-bred specimens only. The trade in marine ornamental fish species is regulated in Israel with the goal of protecting (a) native coral reef habitat from non-native invasive species, (b) native populations of marine coral reef fishes from illegal take (both domestic and for international trade), (c) the public from potentially dangerous fishes, and (d) global fisheries from overexploitation for the marine ornamental fish market.

The regulation of marine ornamental fish imports into Israel has gone through several iterations:

1. "Whitelisting": only 226 species on a whitelist were permitted for import. These were species that could not (a) be lookalikes for native species, (b) be native to the Red Sea, (c) be considered dangerous fish, or (d) be elasmobranchs, which were considered unsuitable for home aquaria. However, this approach had challenges with accurate species identification, and with exporters including species in shipments that were not the species ordered and so was replaced by alternative approaches.
2. Marine Aquarium Council (MAC) certification: MAC established a system of universal standards and ecolabelling for the entire supply chain (including for collection, exporters, retailers and end buyers such as public aquaria). Israel adopted the MAC standard, which required all exporters and species to be MAC-approved. This remained until 2008 when the MAC ceased functioning.
3. "Blacklisting": the current policy regulating imports of marine ornamental fishes into Israel relies on a short blacklist of higher taxa that are not permitted for import (Elasmobranchii, Trachinidae (genus *Trachinus*), Scorpaenidae, Synanceidae, Tetraodontidae and Plotosidae). Other non-CITES listed marine ornamental fish taxa are permitted for import from wild sources providing the exporters supply evidence similar to non-detriment findings (NDFs) at either species or ecosystem level that there are effective management systems in place.

It was noted by workshop participants that Israel provides a good case study for the evolution of regulation from a whitelisting to blacklisting approach that may benefit others.

I.8 Presentations from exporting Parties

I.8.1 Australia

Adam Briggs from the Australian CITES Scientific Authority in the Department of Climate Change, Energy, the Environment and Water provided a high-level overview of fisheries management and harvest and export data for the five marine ornamental fisheries in Australia.

The fisheries are managed by state or territorial governments and regularly assessed every three years against ecologically sustainable management guidelines. If there are any concerns or areas for improvement, legal conditions are placed on export approvals. These are legally binding and may relate to updating harvest strategies or performing environmental impact assessments. All fisheries ban cyanide, have gear, boat diver restrictions, effort caps and harvest strategies/risk assessments. For the most part, species-specific catch data is required.

The Queensland fishery is the largest fishery with around 800 species harvested, while only a small number of these are taken in significant numbers. It is managed through input controls and has a risk assessment. Approximately 160,000 individuals were harvested in the early 2010's, but this seems to be decreasing.

The Commonwealth coral sea fishery is harvested by two operators catching around 500 species. Take is controlled through input controls. Whilst annual harvest levels fluctuate, they are estimated to be less than 50,000 individuals a year.

The Western Australia fishery targets approximately 250 species. This is managed by input controls and has a risk assessment performed. Numbers of individuals harvested are decreasing; maximum harvest is under 30,000 individuals per year.

The Northern Territory fishery allows harvest of 77 species, although some of these are freshwater species. Harvest is managed through input controls and monitoring of population trends. The take is small here, in some years under 500 fish.

The Cocos Keeling Island has two operators which mainly fish for specific species. Species specific reporting is required and there are limits of harvest. A large part of the fishery is protected by marine parks.

Export data does not typically have species specific information; HS codes are used to monitor exports. Most exports leave from Queensland (where the two largest fisheries are located) and are primarily sent to the US and south-east or east Asia, which may act as transit hubs to Europe.

I.8.2 Philippines

Dennis de Vera from the Bureau of Fisheries and Aquatic Resources gave an overview of the regulation of marine ornamental fish exports from the Philippines.

Six main regulations governing the export of marine ornamental fishes from the Philippines were presented, these covered fishery management, general conservation principles, protected areas and compliance with CITES:

- Republic Act 10654 (An Act to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing)
- Republic Act 9147 (Wildlife Conservation Act)
- Republic Act 11036 (Expanded National Integrated Protection Areas System (E-NIPAS) Act)
- Fisheries Administrative Order 208 (Conservation of Rare, Threatened and Endangered Species)
- Fisheries Administrative Order 233 (Aquatic Wildlife Conservation)
- Fisheries Administrative Order 263 (Fishery Management Areas)

Exporters must be officially accredited and have both export commodity clearance and health certification before they are permitted to export from the Philippines; export shipments are also subject to inspections and various other border controls.

Exports of marine ornamental fishes from the Philippines January 2020 – April 2024 were estimated to weigh ~20.3 million kg and be valued at USD 22.45 million. The main destination country/territories for these exports were the US, mainland China and Hong Kong SAR. Whilst the export data were not available to the species level, it was noted that the top three exported species were: *Chromis viridis* (green chromis), *Amphiprion ocellaris* (common clownfish) and *Nemateleotris magnifica* (firefish goby).

An assessment carried out by the Philippine Aquatic Red List Committee identified twenty priority species for assessment[7], the majority of which (60%) were species of Pomacanthidae.

Finally, some concerns were presented about the marine ornamental fish harvest and trade in the Philippines:

- Difficulties in assessing unsustainable fishing methods due to the geographically fragmented nature of the country.
- Difficulties in enforcing mandates to regulate trade in aquatic species.
- Stakeholder complaints about lengthy process when issuing export documents.
- A need to strengthen data collection and accessibility.

[7] *Ensenium dilemma* (Twocoat Coralblenny), *Chaetodontoplus coerolupunctatus* (Bluespotted angelfish), *Centropyge bispinosa* (Twospined angelfish), *Centropyge bicolor* (Bicolor angelfish), *Centropyge heraldi* (Yellow angelfish), *Pomacanthus imperator* (Emperor angelfish), *Apolemichthys triumaculatus* (Threespot angelfish), *Chrysiptera hemicyanea* (Azure demoiselle), *Amblyglyphidodon ternatensis* (Ternate damsel), *Cirrhilabrus cyanopleura* (Blueside wrasse), *Labroides dimidiatus* (Bluestreak cleaner wrasse), *Chaetodon lunula* (Raccoon butterflyfish), *Diagramma pictum* (Painted sweetlips), *Paracanthurus hepatus* (Palette surgeonfish), *Chaetodon kleinii* (Sunburst butterflyfish), *Chaetodon xanthurus* (Pearlscale butterflyfish), *Pholidichthys leucotaenia* (Convict blenny), *Chrysiptera cyanea* (Sapphire devil), *Amphiprion ocellaris* (Common clownfish), *Amphiprion frenatus* (Tomato clownfish).

I.8.3 Sri Lanka

Vishmila Priyashadi from the University of Ruhuna provided an overview of marine ornamental fish harvest in Sri Lanka.

Sri Lanka began commercially exporting marine ornamental fishes in the 1960's. Due to annual monsoons, it only has active harvesting during certain times of the year. Currently, there are estimated to be ~1200 fishers collecting fish via snorkelling (near shore) and scuba diving (at depth), and 55 exporters. Sri Lanka exports 202 marine ornamental fish species, with gobies (Gobiidae) dominating. Approximately 1% of Sri Lanka's export of marine ornamental fishes are from captive bred sources and are comprised of clownfish (*Amphiprion sebae* and *Amphiprion clarkii*) and seahorse (*Hipppocampus* spp.).

A number of regulations and restrictions were outlined for the management of harvest and export of marine ornamental fishes including:

- A list of prohibited (12) and restricted species (29). Prohibited species cannot be exported, whilst restricted species can be exported under a permit and subject to quota restrictions.
- Rules that govern the number of fishers per boat, fishing boundaries, fishing gears (including number of oxygen cylinders per boat) and areas that can be fished.
- A prohibition on diving at night.
- No new boats being given licenses for capturing marine ornamental fish.
- Five Marine Protected Areas associated with the marine ornamental fish trade, three of which are fully protected.
- Limits can be put on catches of a species to protect an associated species. For example, harvesting of gobies was restricted as it was found *Acorpora* corals were being harvested/damaged when the fish were collected.

As well as monitoring the implementation of regulations, the government is also responsible for providing grants to improve export facilities, training and awareness programmes, subsidies and coral restoration programmes.

It was noted that in Sri Lanka, marine ornamental fishes are "fished to order" rather than being opportunistically caught; this practice is believed to be more sustainable.

I.8.4 Indonesia

Ruby Vidia Kusumah (National Research and Innovation Agency) and Tri Yuliandini Ruswana (Ministry of Marine Affairs and Fisheries) described the strategic approach to sustainable development in Indonesia's marine ornamental fishery, emphasizing the importance of balancing the economy, sustainable use and the protection of natural resources.

Under Government Regulation No. 60-2007, fish species are either classified as 'protected' (CITES-listed or otherwise Nationally Protected) or 'unprotected'. All marine ornamental fish exports require farming, quarantine and/or export licenses, as well as several permits relating to transport, export approval, health certification and cargo clearance; additional licensing is required for protected fish species. These are tracked in an electronic system (https://saji.kkp.go.id/).

A case study on *Pterapogon kauderni* (Banggai cardinalfish) was also presented as an example of species management, with an update on introduced population densities. The Banggai cardinalfish has been introduced to a number of sites outside its natural range in Indonesia through human activity, with varying levels of population density. The species is aquacultured in country for both trade and wild restocking, and a quota system is in place for two companies currently permitted to export this species; these quotas are periodically reviewed. It was highlighted that these community aquaculture programs include women and have multiple benefits for local people. Additionally, habitat restoration has been underway since 2018 using coral frames and restocking microhabitat such as anemones, corals and urchin.

Finally, it was noted that the industry needs to ensure careful harvest practices to maximise fish welfare and survival, as well as consider where other species could be captive bred. The importance of

government oversight and monitoring, as well as continuing to consider the socio-economic situation of those involved in harvesting, was also highlighted.

I.8.5 Kenya

Mohamed Omar from the Wildlife Research and Training Institute presented Kenya's approach to managing coral reefs using area-based management tools through the designation of Marine Protected Areas. Kenya has six Marine Parks and Reserves along a six kilometre expanse of fringing reef that provide varying degrees of harvest regulation; Marine Parks are legally enforced no take zones and Reserves have regulated subsistence use with traditional methods only. Marine Parks were observed to have both higher coral coverage and larger fish populations, since no harvesting of fish is permitted. In general, Marine Protected Areas were considered important breeding grounds for coral reef species, however significant national declines in some of the key harvested families (Scaridae (parrotfish), Balistidae (triggerfish) and Serranidae (basslets/groupers)) have also been recorded, and there are concerns about this altering the ecology of coral reefs.

Kenya's marine ornamental fishery currently targets over 200 species from 35 families, in particular species of Labridae (wrasses), Serranidae (basslets/groupers), Pomacanthidae (angelfish) and Chaetodontidae (butterflyfish). The most abundant marine aquarium species found in Kenya are *Labroides dimidiatus* (blue streak cleaner wrasse), *Pseudanthias squamipinnis* (sea goldie), *Nemateleotris magnifica* (firefish) and *Pseudocheilinus hexataenia* (six-line wrasse). Approximately 145 collectors catch 300,000 fish, which are worth around 700,000 USD annually. There are currently no marine ornamental aquaculture projects in Kenya and two major companies control 65% of the market.

Key actions that would help to enhance the management of coral reef ecosystems in Kenya were noted, including:

- Increased monitoring and standardization of data gathering.
- Enhanced capacity for Non-Detriment Finding (NDF) provision for CITES-listed species.
- Commitment to 30% of marine environment protected by some form of conservation.
- Development of a specific aquarium ornamental fishes management plan.
- A national database to guide decision making.

I.8.6 Brazil

Daniel Eduardo Visciano De Carvalho from IBAMA (Brazilian Institute of Environment and Renewable Natural Resources) presented on some of the challenges of marine ornamental fish management in Brazil and what steps have been taken to overcome them.

Initially positive lists ('whitelists') were used for both the import and export of ornamental fish, however these could not be updated quickly enough to account for market changes and so are not currently being used. Export quotas by trader were also established for marine ornamental fish, however traders would open multiple companies to continue harvest at higher levels. Current regulation of marine ornamental fish trade includes:

- A Negative list ('blacklist') of invasive species to prevent the import of species that may cause ecological harm.
- A Negative list ('blacklist') for species that were either: endangered species for which harvest was prohibited, or species with special conditions for export such as only permitting export of specimens from captive bred sources.
- A requirement for all shipments of ornamental fishes to have specific labelling (whether CITES-listed or not).
- Licensing all fishers and traders.
- Quarantine for both imported and exported fish.

It was noted that some species not yet described (and therefore not yet on a blacklist) are entering into trade, although this was noted to be mainly a consideration for freshwater species.

I.9 Presentations from industry representatives, NGOs and academia

I.9.1 For the Fishes, Hawaii

Inga Gibson from For the Fishes presented on issues faced by the marine ornamental fishery in Hawaii. The cultural importance of coral reef fishes for the people of Hawaii and the need to conserve and protect their fish stocks was highlighted as a key area of consideration.

Due to a failure to provide a legally required Environmental Impact Statement (EIS), and concerns about over-collection and weather events, the marine ornamental fishery in Hawaii has been closed since 2018, however wider concerns were raised over global supply chain welfare and mortalities. These included global compounded losses throughout the supply chain, injury to fish during collection and lifespan in captivity in both private and public aquaria.

Before its closure in 2018, Hawaii was the largest exporter/provided of reef fishes and invertebrates in the US, providing fish to both the US mainland and more globally. Despite being 300 times smaller in area than the Great Barrier Reef in Queensland, Australia, it was noted that coral reefs in West Hawaii provided three times more fish (~372 thousand fish) than were exported from the Great Barrier Reef in 2016. The dominant species harvested from the coastal reefs of Hawaii was *Zebrasoma flavescens* (yellow tang), which was reported to have declined in population by 93% between the 1970s and 2014; this species is now commonly captive bred in the region.

For the Fishes made a number of suggestions for reform needed including:

- Reducing mortality throughout the supply chain.
- Supporting sustainable harvesting practices (including eliminating the use of cyanide).
- Captive breeding and education of consumers through their “Tank Watch” programme could further help to reduce pressure on wild stocks.

I.9.2 Blue Marine Foundation, United Kingdom of Great Britain and Northern Ireland (UK)

Elizabeth Wood from Blue Marine Foundation joined the workshop online and presented on the trade in marine fishes and invertebrates for home and public aquaria in the UK, focusing on the role of the UK in global marine ornamental fish trade and identifying areas for improvement.

Both value and weight of UK imports of marine ornamental fishes (as HS code 030119 – ‘live ornamental fish (excl. freshwater)’) have approximately doubled between 1976-1983 and 2012-2021. The structure of suppliers to the UK has also changed; in 1976-1983 over half of imports into the UK were from Sri Lanka and Singapore, whilst more recent imports (2012-2021) were primarily from Indonesia, the US and the Philippines.

Whilst there was no disaggregation of trade data by source, it was estimated that less than 10% of marine ornamental fishes in trade were captive bred, with the UK primarily importing captive bred specimens from the US (particularly Florida), the Pacific region and Bali. The UK marine aquarium sector does not currently commercially culture marine ornamental fish.

Blue Marine Foundation identified several areas that may benefit from further attention:

- More accurate data on species traded and imported into the UK to help identify potential issues and inform management needs.
- Support to the development of fisheries management plans in supplier countries.
- Concerted efforts to eradicate the use of cyanide.
- Consideration of CITES listing for at risk or vulnerable species.
- Development of captive breeding to support livelihoods in countries of origin.
- Certification to help promote sustainable fisheries and good practice (but noting that this is difficult to achieve in practice).
- Awareness campaigns and advice to buyers, incorporating improved traceability and advice on suitability and survival.

I.9.3 FAO/ Secretariat of the Pacific Community (SPC)

Hannah Gilchrist from the Secretariat of the Pacific Community (SPC) provided an overview of the harvest and trade in marine ornamental fish species from the Pacific region.

It was estimated that the marine aquarium industry (including fish, corals, *Tridacna* clams and live rock) was worth USD 7.4 million / year for the countries of the Pacific region with active aquarium trade[8]. In 2019, there were 34 companies active in the region; however, the COVID-19 pandemic led to many operators closing because export routes were closed.

Based on a 2020 review of the fisheries, management and trade in Aquarium products in the Pacific Islands[9] and subsequent data collected, it was reported that two countries/territories cultured some marine ornamental fishes (New Caledonia and Palau) for export, however most exports are harvested from the wild. Wild harvested trade was reported to all be hand collected from small, discrete areas and to have a relatively short supply chain, with the time from collection to shipping being approximately one week. Management measures in the region include:

- Management plans in place for Papua New Guinea (Marine Aquarium Fisheries Management and Development Plan 2022), Marshall Islands (MAF Regulation 2015), Tonga (2019-2021, under review), Kiribati (draft currently under review, not yet endorsed) and Vanuatu (2008-2013, reviewed, plan submitted for 2017-2022).
- Reporting requirements as part of management plans (SPC hosts a regional database, however few countries/territories in the region consistently contribute data).
- Limits to the number of export licenses.
- One operator per area policy.
- Quota systems.
- Blacklists and whitelists of species for export.

SPC noted that fisheries in the region specifically targeted a mix of species that usually have fast rates of recruitment to allow sustainable collection. Highlighted species included: *Centropyge loriculus* (flame angelfish) from the Northern Pacific, *Acanthurus achilles* (Achilles tang) from French Polynesia, *Neocirrhites armatus* (flame hawkfish) and *Cirrhilabrus scottorum* (Scott's wrasse) from Tonga, and *Paracanthurus hepatus* (blue tang) from the Solomon Islands and Papua New Guinea.

Priority needs for the region identified by SPC include to:

- Finalise draft fisheries management plans and review those that are out-of-date.
- Further assess country-specific marine ornamental fish exports and consult with Pacific stakeholders to identify any species that may be of concern for consideration for CITES listing.
- Improve data system for monitoring aquarium fishery catch and exports, including harmonizing data reporting (e.g. through the regional database hosted by SPC).
- Build regional understand of species in trade and export volumes, including creating up-to-date profiles of the aquarium trade for each country/territory in the Pacific region.

I.9.4 Centre for Environment, Fisheries and Aquaculture Science (CEFAS)

Jo Murray presented work conducted by the UK's Centre for Environment Fisheries and Aquaculture Sciences (CEFAS).

Species-level import data for the UK are currently difficult to access and collate; however, species-level information is declared on individual shipment records. This presentation provided a summary of UK ornamental fish imports based on a subset of shipment records that were digitised from 290

[8] Eleven countries: the Federated States of Micronesia*, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, New Caledonia, Palau, Papua New Guinea (closed since 2022 but looking to reopen), Tonga and the Solomon Islands. * Note that the Federated States of Micronesia was note reported as exporting any marine ornamental fish.
[9] Accessible via https://purl.org/spc/digilib/doc/m8znz

consignments imported in 2018 and 2019; and identified species and quantities of marine ornamental fish imported into the UK during these snapshot time periods.

One week in a 6-month period was assessed in both 2018 and 2019; as only a short period of time was sampled, the total annual trade volume could not be calculated. The most imported families during these time periods were Pomacentridae [30.3% of all individuals imported, notably *Chromis viridis* (blue-green damselfish) and *Amphiprion ocellaris* (common clownfish)], Labridae [10.8% individuals, notably *Labroides dimidiatus* (bluestreak cleaner wrasse)] and Gobiidae [9.7% individuals, notably *Valencienna puellaris* (diamond watchman goby)]. The most common exporters were Indonesia, the Philippines and the Maldives.

In previous analyses of these data, species were only classified as 'captive bred' if they were recorded as such on the packing list; however, few were reported as "cultured" in the documents. When the assessment expanded the scope of 'captive bred' to include species exported from locations other than their native range, the percentage of captive bred individuals increased. It was noted that there is an opportunity to improve labelling to more accurately reflect the availability of captive bred individuals in trade.

II. OBSERVATIONS AND RECOMMENDATIONS

The workshop made the following observations and draft recommendations for consideration by the Animals Committee (see also Annex 4 to AC33 Doc. 44).

I.10 Observations

A. Concerning **the nature and scale of the international trade**, the workshop made the following observations:

- Better data are essential to understand the scale/scope of trade in marine ornamental fish and the impact of the trade on wild populations and ecosystems. Analyses are currently based on data snapshots. Trade analyses would benefit from availability of both export and import data, and species-specific data.
- There are data limitations with current datasets available, including official datasets such as TRACES, LEMIS, HS Codes, FAO capture production and global trade data.
- Some countries, including Kenya, publish export data through annual bulletins.
- Import and export data are often recorded at the species level for reporting for animal health purposes (e.g. biosecurity and quarantine).
- There is a knowledge gap on MOF trade to East Asia due to lack of availability and accessibility to export/import data, including understanding of species in trade, and size and number of specimens.
- There is a need to consider how reporting can align with existing data collection / reporting systems already in place within Parties – to avoid additional burden on Parties. However, it was noted that such reporting is not an obligation for Parties for non-CITES listed species.
- Several approaches for prioritizing species for further research/analysis were put forward at the workshop; additional assessment of these is required. Methods developed for prioritisation should be specific to MOF going forwards. Data systems should be flexible to allow for situations where many species are traded at once (e.g. ~300 species on one shipment).
- Parameterization of PSA with sensitivity analysis can be applied to see different approaches depending on data; does not need to rely on trade data.
- Selection of species for trade is based on a number of factors, including availability of species, consumer demand and economic viability of the supply chain.
- Marine ornamental fishes that are traded illegally (e.g. nationally protected species, misidentification, mislabelling), unreported or unregulated may lead to an underestimation of the volume in international trade.
- Failure to keep up with nomenclature changes and other nomenclatural challenges of fish species creates problems (e.g. GBIF backbone, Catalogue of Fishes, FishBase, IUCN Red List, etc.).

B. Concerning **Information exchange**, the working group made the following observations:

- Data availability and accessibility is highly variable by country and source.
- MOF are reported by weight in higher-level systems (Harmonised System codes, etc) which creates a challenge in comparing trade by individual (which is how they are reporting on packing lists, invoices etc.), particularly as the weight includes water.
- Trade is reported by traders to relevant regulatory entities electronically and/or via packing list, invoices, health certificates. This information, and other industry produced information, could

benefit from being shared to support trade analyses (subject to privacy/commercial sensitivities).

- Parties could consider publishing aggregated data to support understanding of high-level statistics and trends (e.g. 'top 10' approach).

- Good communications between governments (at all relevant levels) and industry (including fishers and trade associations, as appropriate) scientists and other stakeholders, is important for sustainable fisheries management and MOF trade. There may be a benefit from industry communicating trade trends to regulatory authorities, and making that information otherwise available (through publications, website, conferences etc).

- Regional bodies (e.g. SPC in the Pacific) can support collaboration and information exchange.

- There may be a benefit from a suitably qualified international organization providing support for consolidated data and resources on trade using existing products and tools for MOF trade (along the lines that FAO has provided on sharks and rays) [World Fish Centre?].

C. Concerning **best practices,** the working group made the following observations:

- Several possible measures to mitigate the effects of harvest were noted during the workshop including:

    - Use of non-destructive harvest techniques (such as hand nets) and elimination of destructive methods (e,g cyanide).
    - Voluntary control of harvest (e.g. closures during breeding seasons, including self regulation and community based measures).
    - Targeting of life history stages/classes with high natural mortality rates, to minimise effects of harvest.
    - Avoiding harvest of those species with poor chances of surviving in captivity and those species that Parties have determined are vulnerable in their jurisdictions.
    - Fishing to order.
    - Specific national legislation that takes either a species or ecosystem approach.
    - Spatial or temporal restrictions on collection.
    - Spreading collection effort across the reef.
    - Management plans with harvest/quota restrictions; including on use of chemicals.
    - No commercial activities and no-take zones in MPAs.
    - Transparency of operations (visibility in communities) and establishment of reporting systems.
    - Tracking of vessels to understand how effort is distributed (surveillance) e.g. VMS.
    - Other lower tech monitoring efforts (catch, areas of collection, records of divers).
    - [Fisheries observers and active verification on boats in real time].
    - Restricted issuance of licenses to boats/divers.

- There is a need for fisher training programmes on hand collection methods, diving safely etc.

- In some cases, ranching can have less impact than wild harvest and can contribute to the wild population when specimens are reared from the post larvae stage and are used for restocking, however care needs to be taken when releasing back into the wild. It should be recognised that ranching is a small percentage of the overall MOF trade - trade is predominately from wild caught specimens. Ranching is applicable in certain situations but is not an overall solution.

- Sharing of experiences and best practices with other Parties (and outside of government channels through NGOs) should be encouraged.

- Recording the offtake at species level and sharing data beyond the exporter and purchaser (encouraging data sharing).

- Specialist knowledge is needed at border inspection authorities to effectively check shipments on MOF.

- Species ecosystem function should be taken into account in fishery management.

- Supporting captive breeding in range States is preferable to captive breeding in non-range States.

- SPC has published guidelines on best practices including Best practices for the collection, transport, holding and export of fish and corals in the aquarium trade, Saving Nemo – Reducing mortality rates of wild-caught ornamental fish).

D. Concerning **biology, conservation priorities and management needs**, the workshop made the following observations:

- There is a lack of life history information for most MOF species in trade.

- Conservation and management should be context specific, taking into account ecosystems and species.

- Socio-economic factors of all relevant stakeholders should be taken into account when making management decisions.

- NDF guidance and adaptive management practices can also be applied to non-CITES listed species – Parties can be invited to make use of this for MOF and share experiences.

- Recognising the utility of FishBase, there may be scope to improve its vulnerability scores for MOF.

- Self-regulation can work in some situations, e.g small island communities where the local community feels they have ownership and are actively involved. Opportunities for trade can create incentives for local involvement in the conservation of the species. However, it does not work in all situations. Poaching can be a problem in some areas.

- Species for which Red List assessments do not exist or needs updating, particularly where there may be some concern, should be prioritised.

- Marine ornamental fish trade targets a wide range of species and they do not all need to be treated the same way based on biology; specific species need special attention within national regulation.

- Countries can set their own priorities - for example, risk assessments, management measures, trade measures.

- Management needs to be adaptive and responsive (and take into account factors such as natural disasters), informed by science-based monitoring.

- Public aquaria, industry, research organisations and keeper communities can contribute to collation of life-history data (noting that there may be differences between these characteristics for captive and wild individuals).

- MOF and Food Fisheries are both data poor and there are similar challenges - we could consult with food fishery scientists and draw from their expertise.

- Industry indicates that in many cases abundant species are selected for private aquaria trade. They tend to draw on local fisherman/divers to take them to the reefs and provide advice; there are examples in CITES where local divers have been involved in population surveys e.g *Strombus gigas*.

- It should be taken into account that coral reefs are in jeopardy - multiple threats including climate change, destructive fishing practices and other anthropogenic factors aside from trade are relevant when assessing viability to withstand harvest.

- Consideration needs to be given to newly described species that occur in trade - this is usually in small numbers as they are usually not abundant species and this is probably a rare occurrence, but MOF trade can contribute to science (in Australia these species are described by museums).

- In some situations, creation of new offshore (man-made) habitat through construction of breakwaters was found to increase habitat for coral and thus MOF. Some break-out group members did not consider the creation of artificial reefs as habitat restoration.

- There are also efforts to reclaim coral reef and clean-up programmes, with industry involvement. Such programmes aim to release reared specimens to the wild (contributing to conservation). However, it was noted that restocking does have to be done carefully under strict protocols in some countries as these practices can introduce disease, promote genetic mixing etc.

- Understaffing is a challenge at points of import and export.

- Recent research shows that the marine environment houses 78% of animal biomass but receives less than 10% of conservation research effort.

E. Concerning **Livelihoods**, the workshop made the following observations:

- Marine ornamental fisheries can benefit livelihoods / local people. These benefits can extend across communities, including as they relate to employment, economy (including through access rights, licensing fees, income), community cohesion, gender equality, supporting people to remain in their local communities, education, and wellbeing.

- Notably, marine ornamental fish fisheries can provide higher value benefits to people and communities than other extraction systems such as food-fish fisheries.

- There is also the potential for negative impacts on local communities/livelihoods. In particular, unsustainable and unsafe practices can present negative impacts for people.

- There may be different economic benefits to people and communities dependent on their place or role in the supply or value chain.

- While alternative production systems/alternate pathways can (case dependent) present options for more sustainable production/limiting impact on wild populations, they do not always translate to alternative livelihoods for people involved in wild capture fisheries. For example, people who have traditionally harvested wild fish are not always in a position to move to aquaculture practices. There is often also a significant cost to setting up alternate production systems; this may be better invested in maintaining and supporting existing wild harvest systems which have tangible livelihoods benefits.

- Fair and equitable benefit sharing obligations should be taken into consideration.

- Alternate environmental uses such as tourism can be economically important but do not always translate to better outcomes for the environment when compared to sustainable harvest fisheries for MOF. For example, poorly managed tourism can have more impact on reef ecosystems than well-managed MOF harvest.

- Lack of investment in sustainable wild fishing practices could lead to a loss of knowledge and skill in the practice, which may have knock-on effects on sustainability and livelihoods.

- Effective conservation of MOF species can provide long-term livelihood benefits.

F. Concerning **areas for future research**, the workshop made the following observations:

- There would be a benefit to conduct future research on:

    - The best tools to support prioritisation of species (e.g. PSA or other vulnerability analyses, FishBase) to best direct efforts for stock assessments for those species that are highlighted as most potentially vulnerable.

- How to sustainably manage species in data poor MOF fisheries.
- Life history characteristics, including age at maturity, fecundity, pelagic larval duration, generation time of MOF.
- The contribution of *ex situ* husbandry and captive breeding to management and recovery of wild populations (noting that this is highly species and context dependent) including nutritional needs.
- The impact of shifting production systems on livelihoods.
- The best ways government resources can be allocated to fisheries management and harvest practices.
- Supply chains and traceability (technology, tools, production systems, benefit sharing in supply chain, mortality).
- Impact of management actions on populations and livelihoods (e.g. closures and restrictions, restocking, from ranching).
- Monitoring (e.g. remote sensing and GIS).
- Emerging market trends, specifically East Asia.
- Age of extraction for ranching.
- Mortality rates along the supply chain to understand the impacts on harvest levels.
- Cyanide testing and the need for a tool for detection.
- Impact of climate change.
- Test to detect the use and understand the prevalence of destructive chemicals (e.g. cyanide, chlorine) and other chemicals used in harvest.

- Priority should be given to collecting data for known threatened species, data deficient species, species that have not been assessed and those requiring an updated assessment.

G. Concerning **potential options for future monitoring**, the workshop made the following observations:

- CITES listing (Appendix III) could assist in the collection of trade data for species that meet the criteria in Resolution Conf. 9.25. One of the criteria is the species has to be protected by law in the country that proposes the App. III listing.
- Enhanced examination and/or digitisation of packing lists can be used to create a species list for monitoring – currently just snapshots. These tools need to be more widely accessible (perhaps through different government departments).
- It would be beneficial to understand trends or shifts in production systems, perhaps via shifts in descriptors such as source codes (W/R/F/C).
- The market is elastic; this dynamism is linked to various factors including freight costs, market demand, species availability, seasonality etc. It may be useful to monitor to see how those factors affect trade (or trade recovery) and management.

H. The workshop also made the following **miscellaneous observations**:

- MOF fisheries need different management systems than those for food fishes.
- Industry noted a general trend in some regions towards smaller private aquaria over recent years affecting the species ('nano tanks') which is linked to popularity of smaller species.

Technological changes mean smaller tanks are effective. There was also an observation that keeping cultured coral is popular.

- Consumer awareness about sustainability is increasing; consumers may pay a premium for specimens sourced sustainably (but sometimes not provided accurate information at the point of sale in some countries – in others there are requirements on info passed on at sale); information on husbandry of MOF is available online.

- There may be a role for consumer education or empowerment tools, similar to those in use for food fish/seafood.

- Food fish and MOF are harvested at different sizes - MOF generally harvested when small.

- Industry aims and consistently monitors trade to minimize mortality.

- Some species do poorly in smaller tanks or paired with other animals; a higher level of experience for keeping MOF needs to exist for best care of specimens.

- 'Rare in trade' doesn't necessarily mean 'rare in the wild'.

- Trade in sharks and rays as MOF should not be overlooked even when traded in small numbers.

- The following cases were considered at the workshop:
  - Indonesia BCF – community based management
  - Fiji – community based management (https://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/LRF/19/LRF19_03_Teitelbaum.html)
  - Maldives
  - Hawaii
  - Sri Lanka
  - Kenya
  - Australia – Queensland fisheries (harvest strategies, PSA, closed zones, etc.)
- Parties noted similarities in process under Decision 18.256 (Rev. CoP19) on *Songbird trade and conservation management (*Passeriformes *spp.).* There are also possible connections to work under Decision 19.186 on *Identifying information on species at risk of extinction affected by international trade* and ongoing discussions on Ranching and captive breeding, trade in stony corals.

I.11 Recommendations

The marine ornamental fishes workshop recommends that the Animals Committee agrees to:

a) note the outcomes of the international workshop on marine ornamental fishes, including the set of observations and recommendations;

b) note that the workshop has identified a catalogue of over 2,000 species in international trade based on the various background documents prepared for the workshop;

c) note that some background documents have presented different methods, used different datasets and identified species that may warrant further assessment related to the potential impacts of international trade;

d) note that from this catalogue, some species may warrant further research and assessment;

e) consider the catalogue of marine ornamental fish species in international trade identified by the workshop and consider any relevant vulnerability analyses of the species included in this catalogue;

f) encourage Parties, where possible, to record international trade data in marine ornamental fishes at the species level and include the following data:

- Species name: genus + species
- Common name: in any language (local names, English names, etc.)
- Quantity: number of specimens
- Country of origin: country of harvest
- Country of export:
- Country of import:
- Source: CITES source codes (W, R, F or C)
- Import/Export: Is it import, export or re-export?
- Date: date of shipment

g) encourage Parties and stakeholders, where possible, to make marine ornamental fishes international trade data more accessible and consistent, and to share the trade data with researchers to help understand the scope and scale of the trade;

h) invite Parties to consider Appendix III listings for nationally protected species that meet the criteria set out in Resolution Conf. 9.25 (Rev. CoP18) on *Implementation of the Convention for species in Appendix III*. Proponents should consult with other range States and consider application of the proposed listing across the species' range.

i) invite Parties to consider using CITES and International Air Transport Association Guidelines on live animal transport for marine ornamental fishes in trade for transport nationally as well as internationally.

j) encourage Parties to refer to *IUCN Guidelines for Reintroductions and Other Conservation Translocations* when considering releasing specimens of marine ornamental fishes into the wild;

k) encourage Parties to consider entering into a mentoring arrangement with neighbouring Parties to develop best practices for management of and trade in marine ornamental fishes;

l) encourage Parties, where possible, to involve indigenous peoples and local communities and encourage engagement by these communities in the development and implementation of management plans for marine ornamental fishes. In doing so, understand better the potential benefits of sustainable trade to species conservation and hence livelihoods over time.

m) encourage Parties to involve all relevant stakeholders in the development and implementation of conservation and management plans for marine ornamental fishes;

n) encourage Parties to share best practices on documenting international trade in marine ornamental fishes, including data collection, accessibility, evaluation and reporting;

o) encourage Parties to share best practices on population monitoring and evaluation of management effectiveness for species of marine ornamental fishes;

p) encourage Parties when developing management plans for marine ornamental fishes to consider an ecosystem approach, where appropriate, and include conservation elements;

q) recommend that for future IUCN Red List Assessments of marine ornamental fishes, species not yet assessed and those where assessments are older than 10 years are prioritised;

r) invite exporting Parties to consider making use of the methodologies and adaptive management practices outlined in the CITES NDF guidance to ensure that international trade in non-CITES listed marine ornamental fish species is not detrimental to the species in the wild;

s) note the following future research topics on marine ornamental fishes identified at the workshop:

i) The best analytical tools to support prioritisation of species (e.g. Productivity Susceptibility Analysis or other vulnerability analyses, FishBase) to best direct efforts for stock assessments for those species that are highlighted as most potentially vulnerable.
ii) How to sustainably manage species in data poor MOF fisheries.
iii) Life history characteristics, including age at maturity, fecundity, pelagic larval duration, generation time of marine ornamental fishes.

iv) The contribution of *ex situ* husbandry and captive breeding to management and recovery of wild populations (noting that this is highly species and context dependent) including nutritional needs.
v) The impact of shifting production systems on livelihoods.
vi) The best ways government resources can be allocated to fisheries management and harvest practices.
vii) Supply chains and traceability (technology, tools, production systems, benefit sharing in supply chain, mortality).
viii) Impact of management actions on populations and livelihoods (e.g. closures and restrictions, restocking, from ranching).
ix) Monitoring (e.g. remote sensing and Geographic Information System).
x) Emerging market trends, specifically East Asia.
xi) Age of extraction for ranching.
xii) Cyanide testing and the need for a tool for detection.
xiii) Impact of climate change.
xiv) Test to detect the use and understand the prevalence of destructive chemicals (e.g. cyanide, chlorine) and other chemicals used in harvest.

t) encourage Parties to share nationally prohibited species list / domestic legislation on marine ornamental fishes to be included in existing databases such as FAOLEX, ReefLEX, CITES Lex and ECOLEX;

u) encourage Parties to make use of FAO's existing global fishery and aquaculture statistics databases to capture harvest and aquaculture data on marine ornamental fishes; and

v) encourage Parties to use the nomenclature in Eschmeyer's Catalogue of Fishes when recording international trade in non-CITES listed MOF species.

Annex A – Working Programme

DAY 1 Tuesday 7 May 2024

8:00 – 9:00 Registration

9:00 – 12:00 Plenary

Welcome to Country ceremony - Representative of the Turrbal People, Traditional Owners of Brisbane.

1. Welcoming remarks - CITES Secretary-General; Government of Australia

2. Conduct of the workshop – CITES Secretariat

3. Objectives of the workshop – CITES Secretariat

The aim of the workshop is to discuss the results of the updated marine ornamental fishes (MOF) study and other information shared with participants on the dedicated workshop webpage.

4. Presentation of background information, followed by a Q&A session

- UNEP-WCMC – Kelly Malsch (in person)
  - *International trade in non-CITES listed marine ornamental fish (Background paper)*
- IUCN – Christi Linardich (online)
  - *Extinction risk of marine bony fishes in the ornamental trade*
- Species 360 – Andrew Rhyne (in person)
  - *Global Trade in Marine Aquarium Fish*
- OATA/OFI – Matthew Bond (OATA) (in person)
  - *Developing an evidence-led species prioritisation framework*

12:00 – 14:00 Lunch

14:00 – 17:00 Plenary

5. Presentations from importing Parties perspective and academia with Q&A sessions

- Office of Law Enforcement, United States of America – Laura DiPrizio (in person)
  - *LEMIS and Wildlife Inspections in the U.S*
- FFW/University of Aveiro, Portugal - Monica Biondo (in person)
  - *Monitoring the marine ornamental fish trade to Europe with the European TRACES (TRade Control and Expert System). An updated review from 2014-2021: number of specimens, species diversity, import/export countries, value, and alert system.*
- Q&A session
- Singapore – Lester Lee (online)
  - *Marine ornamental fish trade in Singapore*
- Israel – Simon Nemtzov (online)
  - *Changes in the national policy for importing marine ornamental fishes to Israel*
- University of Leeds – Gabrielle Baillargeon (in person)
  - *Evaluating Species at Risk in Data-Limited Fisheries: A Comprehensive Productivity Susceptibility Analysis of the Most Traded Marine Aquarium Fish*
- Q&A session

DAY 2 Wednesday 8 May 2024

9:00 – 12:00 Plenary

6. Presentations from exporting Parties perspective, followed by a Q&A session

- Australia – Adam Briggs/Shane Penny (in person)
  - *Marine ornamental fish trade in Australia*
- Philippines – Johann Friedrich Tejada and Dennis de Vera (in person)
  - *Trade of marine ornamental fish in the Philippines*
- Sri Lanka - Vishmila Priyashadi (in person)

    - *Present status of Marine Ornamental Fish Trade in Sri Lanka and conservation actions*
- Indonesia - Ruby Vidia Kusumah/Tri Yuliandini Ruswana (in person)
    - *Strategic approach to sustainable development in Indonesia's marine ornamental fish industry*
- Q&A session

7. Presentations from industry representatives and academia followed by a Q&A session

- For the Fishes, Hawaii - Inga Gibson (in person), Rene Umberger (online).
    - *Mālama i ke kai a e mālama ke kai iā ʻoe - Marine Aquarium Trade Impacts to Hawaii's Reefs, Fishes, and People*
- Blue Marine Foundation, United Kingdom of Great Britain and Northern Ireland - Dr. Elizabeth Wood (online)
    - *Trade in marine fish and invertebrates for home and public aquaria: UK perspective within a global context*
- FAO/Secretariat of the Pacific Community (SPC) - Hannah Gilchrist/Antoine Teitelbaum (in person)
    - Trade and management of marine aquarium fish in the Pacific

12:00 – 14:00 Lunch

14:00 – 17:00 Plenary

8. Presentations from exporting and importing Parties perspective and followed by moderated discussion and establishment of breakout groups.

- Kenya – Mohamed Omar (online)
    - *No-take or partial protection for coral reef conservation? A study of coral reef conservation in Kenya*
- Brazil – Daniel Eduardo Visciano De Carvalho (in person)
    - Marine ornamental fishes workshop
- CEFAS – Joanna Murray (in person)
    - Marine ornamental fish trade in the U.K.

9. Moderated discussion to agree on topics to be covered in breakout groups - Rhedyn Ollerenshaw, (Australia) and CITES Secretariat.

10. Establishment of breakout groups

DAY 3 Thursday 9 May 2024

9:00 – 12:00 Plenary

11. Breakout groups

12:00 – 14:00 Lunch

14:00 – 17:00 Plenary

11. Breakout groups contd.

DAY 4 Friday 10 May 2024

9:00 – 12:00 Plenary

12. Presentations from breakout groups with draft recommendations

Online participants are also invited to submit proposed draft recommendations in advance. These draft recommendations will be collated with the recommendations coming from the breakout groups. A consolidated set of draft recommendations will be produced at the end of the workshop.

13. Observations and recommendations

12:00 – 14:00 Lunch

14:00 – 17:00 Plenary

14. Final review of outputs

15. Next steps

16. Closure of meeting

Annex B – Participants List

CITES TECHNICAL INTERNATIONAL WORKSHOP ON MARINE ORNAMENTAL FISHES: LIST OF REGISTERED PARTICIPANTS

IN-PERSON ATTENDEES

Institution / Party	NAME
PARTIES	
Australia	Adam BRIGGS
Australia	Cathryn CUMMINS
Australia	Nga HO
Australia	Rhedyn OLLERENSHAW
Australia	Brian PAGE
Australia	Shane PENNY
Australia (Queensland Department of Agriculture and Fisheries)	Jasmine MORTON
Australia (Queensland Department of Agriculture and Fisheries)	Michelle Lee WENNER
Brazil	Daniel Eduardo Visciano DE CARVALHO
Fiji	Sheemal Sheetal NAND
France (French Polynesia)	Alexandra Caroline MINAARII GRAND
India	Sasikumar CHERUKULAPPURATHU
India	Rakesh Kumar JAGENIA
Indonesia	Ruby Vidia KUSUMAH
Indonesia	Tri Yuliandini RUSWANA
Indonesia	Yusra Arsil SUMAR
Kenya	John CHELIMO
Kenya	Samson KAMAU
Kenya	Shadrack NGENE
Papua New Guinea	Nicho GOWEP
Philippines	Dennis F. DE VERA
Philippines	Johann Freidrich C. TEJADA
Switzerland, AC Chair	Mathias LÖRTSCHER
United Republic of Tanzania	Ramla Talb OMAR
United Kingdom of Great Britain and Northern Ireland	Elinor Grace GRANT
United Kingdom of Great Britain and Northern Ireland	Joanna MURRAY
United States of America	Debra Lynn ABERCROMBIE
United States of America	Elizabeth Rose FAIREY
United States of America	Laura Di PRIZIO
United States of America	Angela SOMMA
UN AND ITS SPECIALIZED AGENCIES	
CITES Secretariat	Karen GAYNOR
CITES Secretariat	Hyeon Jeong KIM
United Nations Environment Programme World Conservation Monitoring Centre	Kelly MALSCH

Institution / Party	NAME
United Nations Environment Programme World Conservation Monitoring Centre	Claire MCLARDY
INTERGOVERNMENTAL ORGANIZATIONS	
IUCN SSC Grouper and Wrasse Specialist	Luiz Alves Da Rocha FILHO
Secretariat of the Pacific Community (SPC)	Hannah GILCHRIST
NON-GOVERNMENTAL ORGANIZATIONS, INDUSTRY AND OTHER EXPERTS	
Aquarium Fish Nouvelle-Calédonie	Antoine Jean Marie Patrick TEITELBAUM
Aquatic Nurseries (Private) Limited	Sathyendra WIJAYAPURA
Australia and New Zealand Merlin Entertainments	Laura SIMMONS
Association of Zoos and Aquaria (AZA)	Shelly GROW
Center for Biological Diversity (CBD)	Sarah UHLEMANN
Conservation Analytics	Karen WINFIELD
Fondation Franz Weber	Monica BIONDO
For the Fishes	Inga Lund GIBSON
Indonesia Ornamental Fish Exporters association (INOFE)	Andreas
Indonesia Ornamental Fish Exporters association (INOFE)	Teguh Minarno WIJAYA
Indonesian Coral Shell and Fish Association	Kelvin Brian LEE
Ocean Pets	Peter WRUCK
Ornamental Aquatic Trade Association (OATA)	Matthew BOND
Ornamental Aquatic Trade Association (OATA). Also representing European Pet Organization (EPO).	Dominic WHITMEE
Ornamental Fish International (OFI)	Shane WILLIS
Ornamental Fish International (OFI)	Devi Setya RINI
Pet Advocacy Network	Robert LIKINS
Pet Industry Association of Australia (PIAA)	Anthony Craig RAMSEY
Pro-Vision Reef Inc	Roslyn PATERSON
Quality Marine	Anthony NAHACKY
Quality Marine	G Christopher BUERNER
Roger Williams University	Andrew RHYNE
Steinhardt Aquarium at California Academy of Sciences	Bart SHEPHERD
Tropical Marine Centre (TMC)	Brian SCHAFF
Tropical Marine Centre (TMC)	Derek THOMSON
University of Adelaide	Phill CASSEY
University of Hong Kong	Alice Catherine HUGHES
University of Leeds	Gabrielle BAILLARGEON
University of Ruhuna, Sri Lanka	Maha Sarukkalige Vishmila Harshani PRIYASHADI
Yayasan Alam Indonesia Lestari (the Indonesian Nature Foundation - LINI)	Gayatri REKSODIHARDJO

VIRTUAL ATTENDEES

Institution / Party	FULL NAME
PARTIES	
Brazil	Luana Arruda SEGA
Brazil	Eloiza Pinto VIZUETE
China	Zhu JIANG
China	Ping XIAOGE
Costa Rica	Carlos Alvarado RUIZ
El Salvador	Paola Raquel Santillana SEGOVIA
Israel	Simon NEMTZOV
Israel	Yatir SHAMIR
Kenya	Mohamed OMAR
Malaysia	Yeo Moi EIM
Malaysia	Ernest JINUAT
Malaysia	Valerie Fung SIEW MEI
New Zealand	Bianka ATLAS
New Zealand (AC vice-Chair)	Hugh ROBERTSON
Singapore	Lester LEE
Singapore	Gerald NEO
South Africa	Charlotte Matshidisho MALATJI
Thailand	Pongsatorn ARKARAKITTIKUL
Thailand	Pornpavee MUENROD
Thailand	Wikanda POUNGCHAREAN
Thailand	Nattawalee RUPLEKHA
Thailand	Ekkawit WONGSRISUNG
Tonga	Meletoli FAÁNUNU
United States of America	Laura Faitel CIMO
United States of America	Jennifer IRVING
United States of America	Michelle TURTON
UN AND ITS SPECIALIZED AGENCIES	
United Nations Environmental Programme	Guo ZONGZHE
UN Food and Agriculture Organization	Jeffrey KINCH
UN Food and Agriculture Organization	Kim FRIEDMAN
United Nations Environment Programme World Conservation Monitoring Centre	Matt HILL
United Nations Environment Programme World Conservation Monitoring Centre	Aly PAVITT
INTERGOVERNMENTAL ORGANIZATIONS	
International Union for Conservation of Nature	Oliver J S TALLOWIN
IUCN SSC Grouper and Wrasse Specialist	Colin KUO-CHANG WEN
IUCN SSC Grouper and Wrasse Specialist	Rekha J NAIR
IUCN SSC Marine Fishes Red List Authority	Jemelyn BALDISIMO
IUCN SSC Marine Fishes Red List Authority	Christi LINARDICH
NON-GOVERNMENTAL ORGANIZATIONS, INDUSTRY AND OTHER EXPERTS	
Animal Welfare Institute	DJ SCHUBERT

Institution / Party	FULL NAME
asdfg.IT GmbH	Rariner BURKI
Blue Marine Foundation	Liz WOOD
Chinese Academy of Fishery Sciences	Yingchun XING
Chinese Academy of Fishery Sciences	Zhipeng ZHAO
DICE, University of Kent	Jessica C. SAVAGE
For the Fishes	Rene UMBERGER
Indonesia Ornamental Fish Exporters association (INOFE)	WIWIE
National Animal Interest Alliance (NAIA)	Arthur PAROLA
Ornamental Aquatic Trade Association (OATA)	Emily MAUNDER
Pro-Vision Reef Inc	Heidi MUMME
Segrest Inc	Alan LUKEN
Species360/Universität Oldenburg	Nora RUST
Tahiti Marine Aquaculture	Moerani LEHARTEL
Tropical Marine Centre	Sebastian DUIJVENBODE
Tunghai University	Nathan PRICE