Extinction risk of marine bony fishes in the ornamental trade

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INTERNATIONAL UNION FOR CONSERVATION OF NATURE

Hello, I am Christi Linardich. I facilitate Red List assessments for the IUCN Marine Biodiversity Unit and Marine Fishes Red List Authority based in the United States. Thank you for this opportunity to speak about our project that estimated extinction risk of marine bony fishes in the ornamental trade.

Overview
- Project background
- Methodology
- Results
- Species-specific highlights
- Future research

My talk will go over the project background, methods, results, some specific species of concern and future research opportunities.

Project to comprehensively assess all marine ornamental fish (MOF) species in international trade

- **Objective**: inform CITES Parties about extinction risk to MOF species in international trade using the IUCN Red List
- **Activities**:
  - Produce a comprehensive list of marine ornamental fish species
  - Produce extinction risk assessments of all Not Evaluated (NE) marine ornamental fish species using the IUCN Red List methodology

The objective of this project that comprehensively assessed marine ornamental fish species was to inform CITES Parties about extinction risk to these species using the IUCN Red List methodology.

To carry this out, we created a list of marine ornamental fish and produced extinction risk assessments of those species that had never been assessed for the Red List.

Methodology

- Species list of 2,682 marine bony fishes in the ornamentals trade
  - Sources:
    - Marine Aquarium Biodiversity and Trade Flow database (Rhyne et al. 2015)
    - Europe ornamentals trade (Biondo 2017)
    - Guide to reef aquarium fishes (Michael 2005)

- Taxonomic authority: Eschmeyer's Catalog of Fishes

- Assessment of 589 species conducted primarily via virtual consultation
  - Phase one completed September 2021: 275 assessments
  - Phase two completed July 2022: 174 assessments
  - Phase three completed March 2024: 140 assessments

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Our list of 2,682 marine bony fishes was created by combining data from the Marine Aquarium Biodiversity and Trade Flow database by Rhyne et al 2015, species in the Europe ornamentals trade according to Biondo 2017 and the guidebook to reef aquarium fishes by Michael 2005.

All taxonomy was adjusted to follow Eschmeyer's Catalog of Fishes, which is the taxonomic authority followed by the Red List for all fish species.

From this list, we identified 589 species that had never been assessed. From late 2019 to early 2024, we compiled data on distribution, population, habitats, use and trade, threats, and conservation measures for each species and then completed their assessments with species experts primarily via virtual consultation.

Results

- 2,682 total species identified in trade
  - 2,093 published on Red List previously
  - 449 of 589 other species now published in version 2023-1 of the IUCN Red List; 140 are submitted

- 145 families with nearly half in seven families:
  - Labridae (wrasses; 364 species)
  - Pomacentridae (damselfishes; 239 species)
  - Gobiidae (gobies; 230 species)
  - Apogonidae (cardinalfishes; 119 species)
  - Serranidae (sea basses; 118 species)
  - Chaetodontidae (butterflyfishes; 118 species)
  - Blenniidae (blennies; 114 species)

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Of the 2,682 total species, 2,093 of them were published on the Red List as part of previous assessment initiatives.

449 of the 589 never assessed species are now published and freely-available on the Red List website and the last 140 are submitted for publication.

Across the 2,000+ species, there are 145 families represented and nearly half are in 7 families, such as the wrasses, damselfishes, gobies, etc.

Results

- Red List category summary
  - 92 species listed in elevated extinction risk categories (Near Threatened, Vulnerable, Endangered or Critically Endangered)
  - 141 species (5%) listed as Data Deficient

- Many species are widely distributed

- Population trend data is often either unavailable or restricted to a small portion of a species' global range.

RED LIST CATEGORY	NUMBER OF SPECIES
Critically Endangered	1
Endangered	9
Vulnerable	53
Near Threatened	29
Least Concern	2,449
Data Deficient	141

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Within these marine ornamental fish, 92 are listed in elevated extinction risk categories, which includes Near Threatened, Vulnerable, Endangered and Critically Endangered.

5% or 141 species are listed as Data Deficient.

One point to make is that many of the species are widely distributed, which precludes them from qualifying for threatened under the restricted range Red List criteria.

Also, population trend data is often unavailable or restricted to a small portion of a species' global range. Such data are needed over more than half of its range to justify a threatened listing under the population decline criteria.

Results

- Major threats to the 92 Near Threatened and threatened species
  - **Coral reef degradation**
    - Example: 5 Vulnerable species are common in the aquarium trade and are dependent on branching corals (*Gobiodon axillaris*, *G. reticulatus*, *Oxymonacanthus longirostris*, *Amblyglyphidodon ternatensis* and *Chrysiptera hemicyanea*)
  - **Exploitation for human consumption**
    - Example: 12 threatened large-bodied species that have high international market value and are heavily exploited by fisheries, including five groupers (*Epinephelus*)
  - **Exploitation for the ornamental trade**
    - See next slide for details

The primary major threats to the species listed as Near Threatened and threatened include the following:

1. Coral reef degradation, such as five species that are common in the aquarium trade and are dependent on branching corals, a habitat that is in severe global decline.

2. Exploitation for human consumption, such as 12 large-bodied species that have high international market value and are heavily exploited by commercial fisheries, including five grouper species.

3. The final threat is exploitation for the ornamental trade

Exploitation for the marine ornamental trade is identified as a primary threat to 14 species listed as Near Threatened or threatened.

This includes 8 seahorses, 3 wrasses, a blenny, goby and cardinalfish.

Three species are listed under restricted range criteria and 11 species are listed under population decline criteria with a global decline approaching or exceeding 30%.

The Barber Goby, which is endemic to Brazil, was assessed as Vulnerable in 2022 based on a suspected greater than 30% global decline.

Threats include poaching for the aquarium trade and reef degradation.

Research needs include population status and conservation actions are needed to enforce the fishing ban.

Results

- **Species highlight**: Wideband Anemonefish (*Amphiprion latezonatus*)
  - Assessed as Data Deficient in 2021
  - Australia endemic
  - Naturally rare and relatively small range
  - Threats:
    - Exploitation for the aquarium trade (high-value species)
  - Research needs:
    - Population status
    - Trade statistics

Credit: Ian Shaw

The Wideband Anemonefish is rare and has a relatively small range in Australia. It was assessed as Data Deficient in 2021 based on the potential major threat from exploitation for the aquarium trade.

Research needs include population status and trade statistics.

Future Research

- 52 species listed as Data Deficient that are exploited for the ornamental trade may be priority candidates for future research

- Following this workshop, we will review and update our list of species in the trade and prioritize species requiring a Red List assessment and reassess assessments over ten years old

- Assess workshop information to identify additional sources of population data that can be used to quantify species population trends over time

Based on these results, there are three points for future research:

1. The 52 species listed as Data Deficient that are exploited for the ornamental trade may be priority candidates for future research

2. The species list that was created for this project could be updated based on the information shared at this workshop and any species not assessed or that has an assessment more than 10 years old could be prioritized.

3. And finally, additional sources of population data that may be identified during this workshop could be used to quantify species population trends over time and consequently inform future Red List assessments.

Thank you and happy to answer any questions

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