

Carpenter, Angus ORCID: <https://orcid.org/0000-0002-0262-9895> (2024)
Malagasy amphibians: competing drivers and their impacts on conservation progress. In: British Herpetological Society & Chilterns Herpetological Group Joint Meeting, 13 October 2024, Amersham, UK. (Unpublished)

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Malagasy amphibians;

...competing drivers & their impacts on
conservation progress?

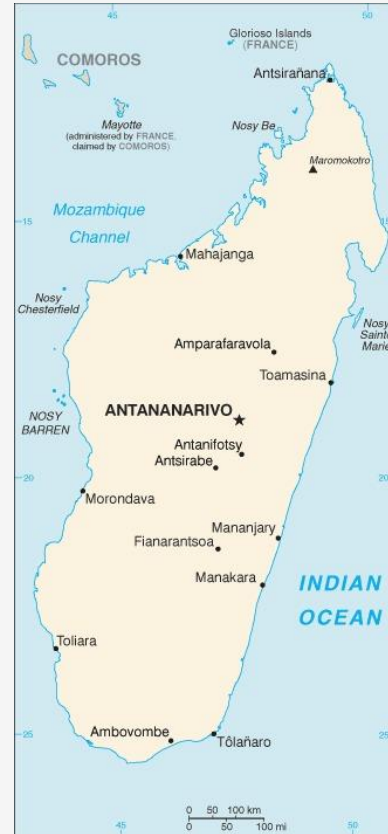
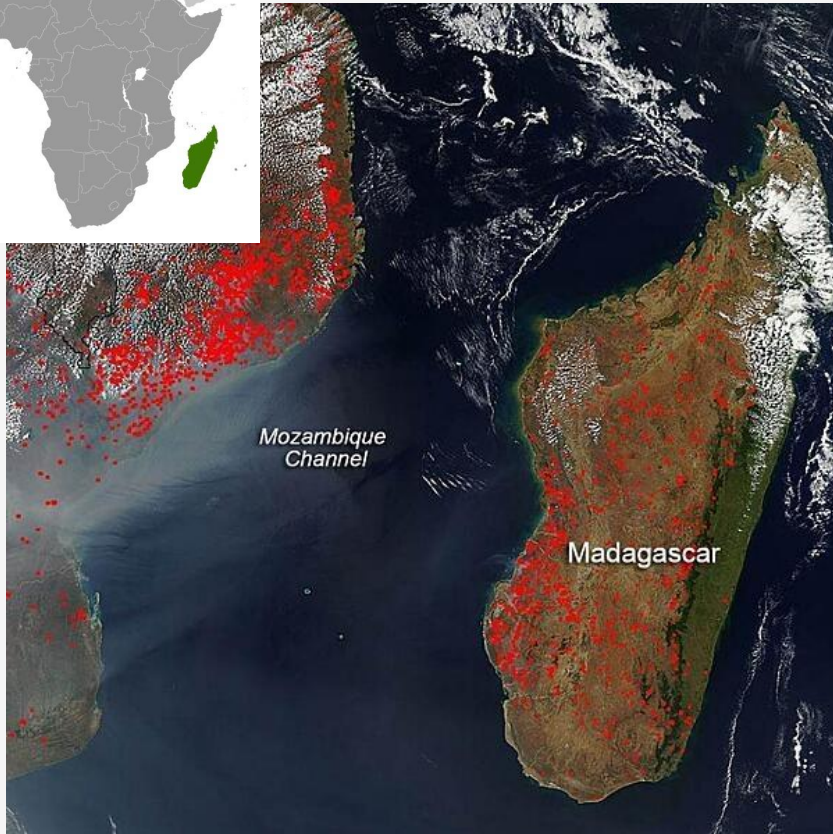
Dr Angus I. Carpenter
(IoSE, Ambleside campus, University of Cumbria)

13/12/2024

this session

- Madagascar; background info & setting the scene.
- history of amphibian IWT (International Wildlife Trade).
- conservation going forward (pressures &/or progress).

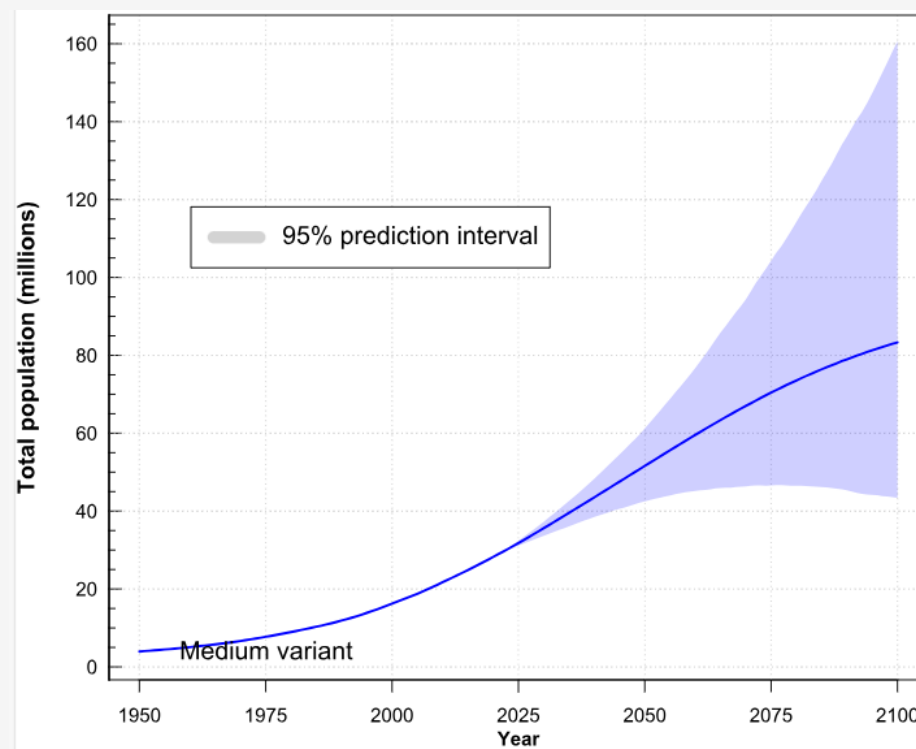
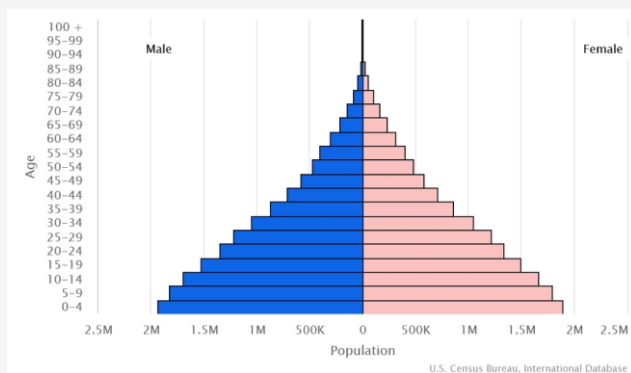
background info & setting the scene



- world's fourth-largest island.
- 6 provinces (faritany); (Antananarivo, Antsiranana, Fianarantsoa, Mahajanga, Toamasina, Toliara).
- Independence in 26th June 1960.
- President Andry Rajoelina.
- Land use (2018); agricultural land 71.1%, forest 21.5%.
- main exports; nickel, clothing, titanium, gold, vanilla, cloves (2021).
- **~71% population below the poverty line**
- **~ 90% of the flora and fauna endemic.**

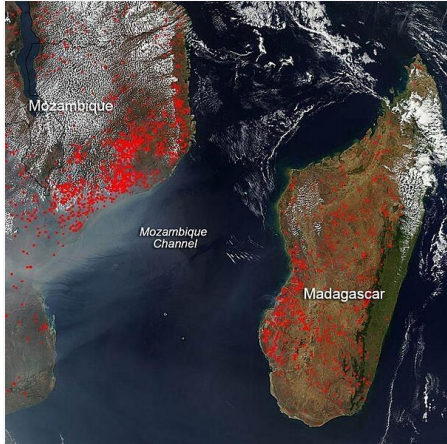
background info & setting the scene

UN 'total population' size for Madagascar;
1950's to 2100.



background info & setting the scene

Drought & Cyclones



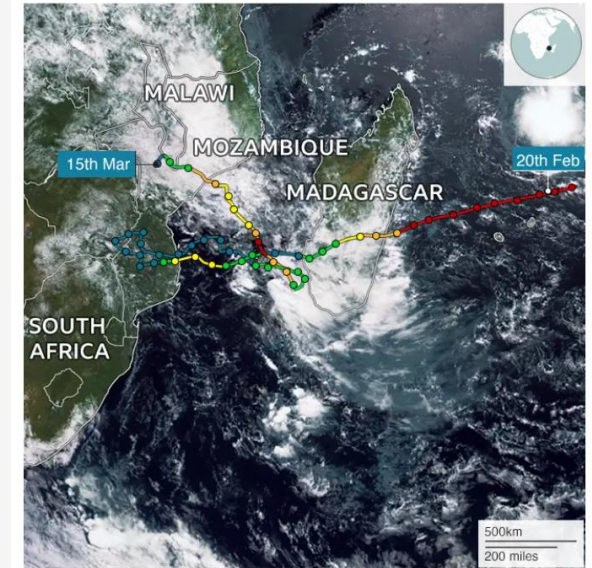
“More than 400 people have been killed and thousands of homes destroyed.” BBC News.



“25 people ...died... 21 are missing, ~40,000 homeless” BBC News

Cyclone Freddy path

- Intense tropical cyclone
- Moderate tropical cyclone
- Tropical cyclone
- Severe tropical storm
- Low pressure area



Source: Zoom Earth



BBC Your account Home News Sport Weather iPlayer

NEWS

Home | Israel-Gaza war | Cost of Living | War in Ukraine | Climate | UK | World | Business | Politics | Culture

World | Africa | Asia | Australia | Europe | Latin America | Middle East | US & Canada

Madagascar on the brink of climate change-induced famine

© 25 August 2021

Climate



WFP/TSIORY ANDRIANTSORANA



Madagascar: UN's WFP warns of a humanitarian crisis due to drought and Covid-19

A third of the population of Madagascar will suffer from food insecurity due to ongoing droughts and a recession.

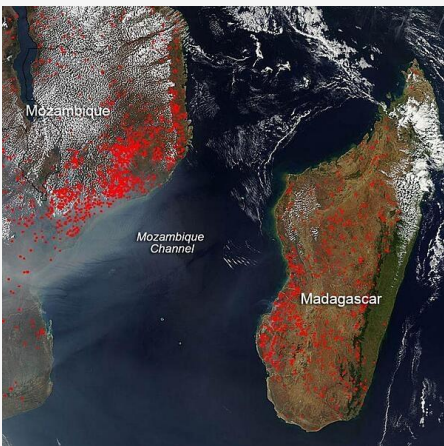
16 January 2021 · News · Africa



Madagascar: 1.5m face hunger because of drought, UN says

The UN says 1.5 million people in southern Madagascar are facing hunger because of a severe drought.

background info & setting the scene



Ways of trading



Madagascar lychee trade mired in corruption ... "Most profits of the lucrative lychee trade between Madagascar and the EU are concentrated in the hands of a few powerful and politically-connected individuals".



The rosewood was being shipped from Madagascar to Hong Kong... Illegal logging in Madagascar's rainforests has worsened since a coup in 2009, conservationists say.

The BBC News logo and a navigation menu. The menu includes "LIVE", "BBC NEWS CHANNEL", and a list of regions: Africa, Americas, Asia-Pacific, Europe, Middle East, South Asia, UK, England, and Northern Ireland.

Last Updated: Friday, 1 August, 2003, 08:06 GMT 09:06 UK

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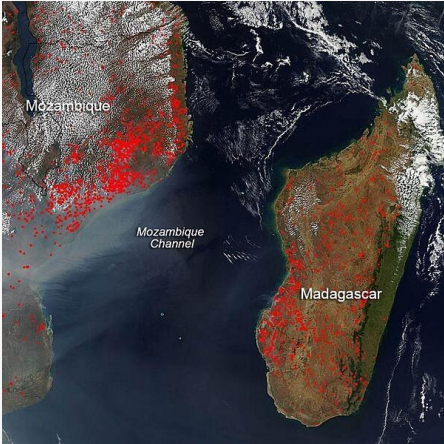
Madagascar's scramble for sapphires

By Richard Hamilton
BBC, Sakaraha, Madagascar

The unregulated free-for-all trade in sapphires is causing growing concern in Madagascar, with allegations of widespread corruption and an increasing use of child labour.



background info & setting the scene



Politics & commitments

Mongabay Series: [Conservation in Madagascar](#)

Madagascar minister calls protected areas a 'failure,' seeks people-centric approach

by Rivonala Razafison and Malavika Vyawahare on 20 August 2020



“The conservation of our biodiversity through Madagascar protected areas’ system for 30 years was a failure...”

We have to change the paradigm and to move toward a system which doesn’t exclude humans and doesn’t put local communities on the side lines; it should be deeply social..”

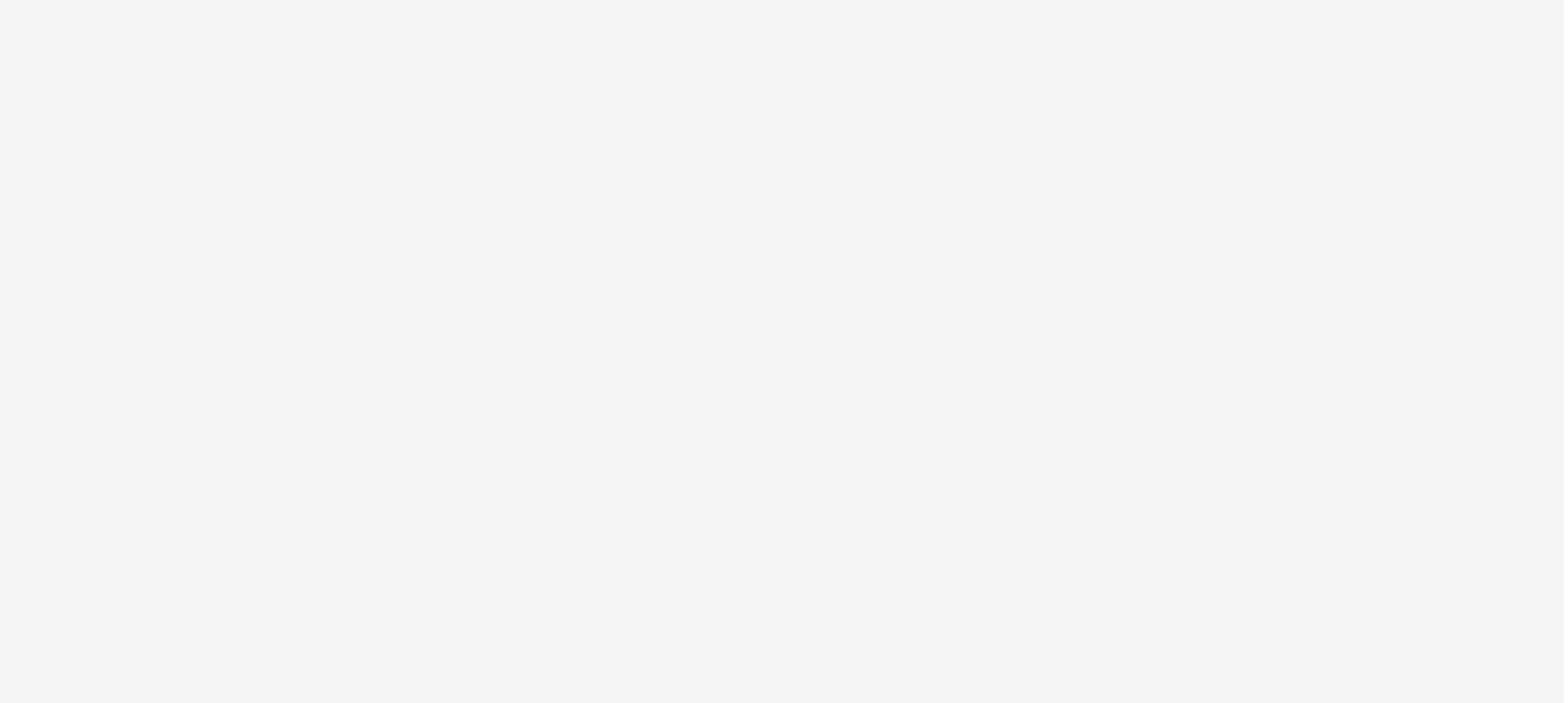
New Program Targets Wildlife Trafficking and Corruption in Madagascar

By ADF — On Nov 3, 2021



Madagascar is among the world’s most corrupt countries;
- Madagascar’s wildlife among the most poached on the planet.
- between 2018 & 2021, >21,000 native tortoises were seized from traffickers.

[New Program Targets Wildlife Trafficking and Corruption in Madagascar - Africa Defense Forum \(adf-magazine.com\)](#)



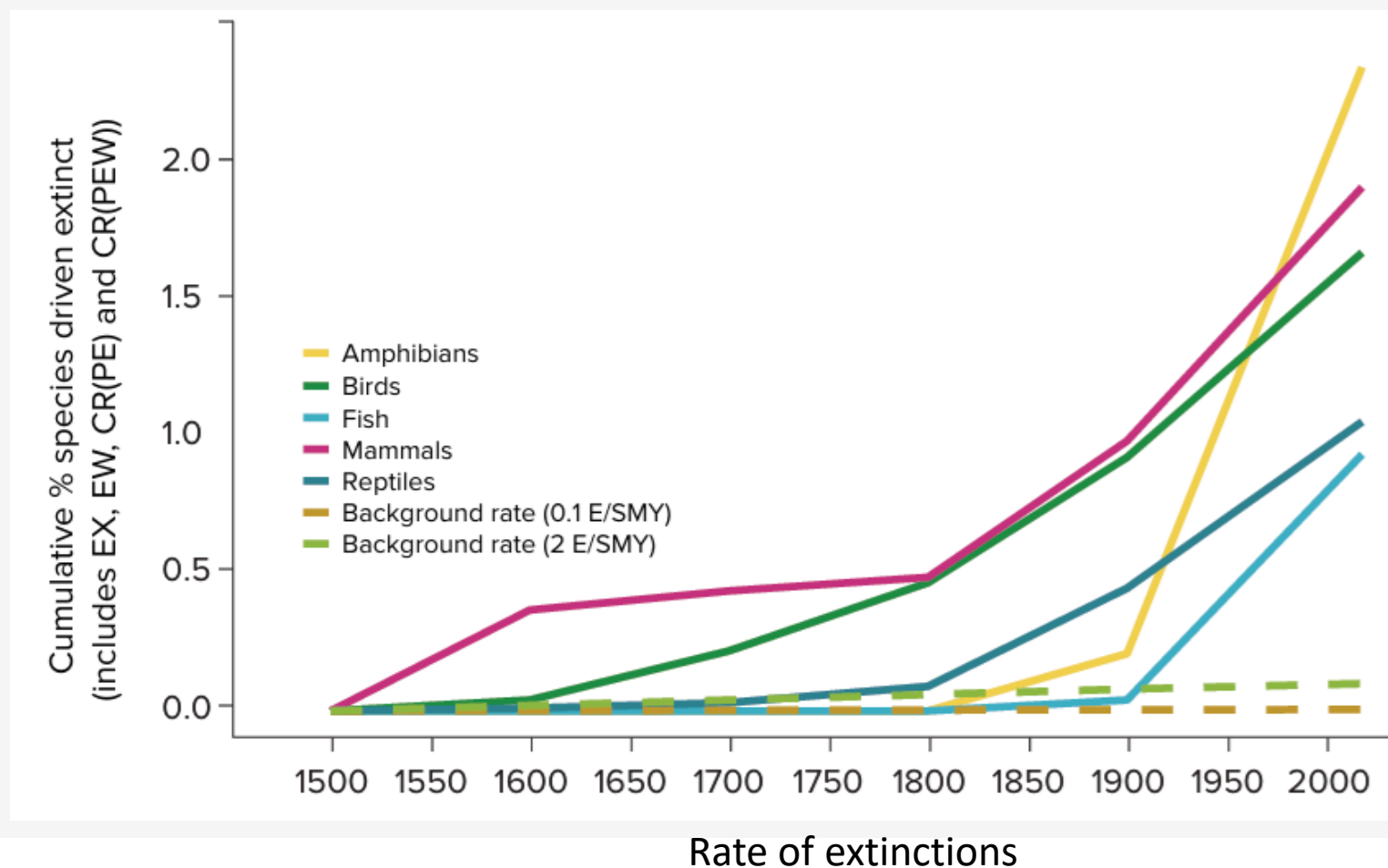
this session

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Malagasy amphibian trade

WWF Living planet report (2024)

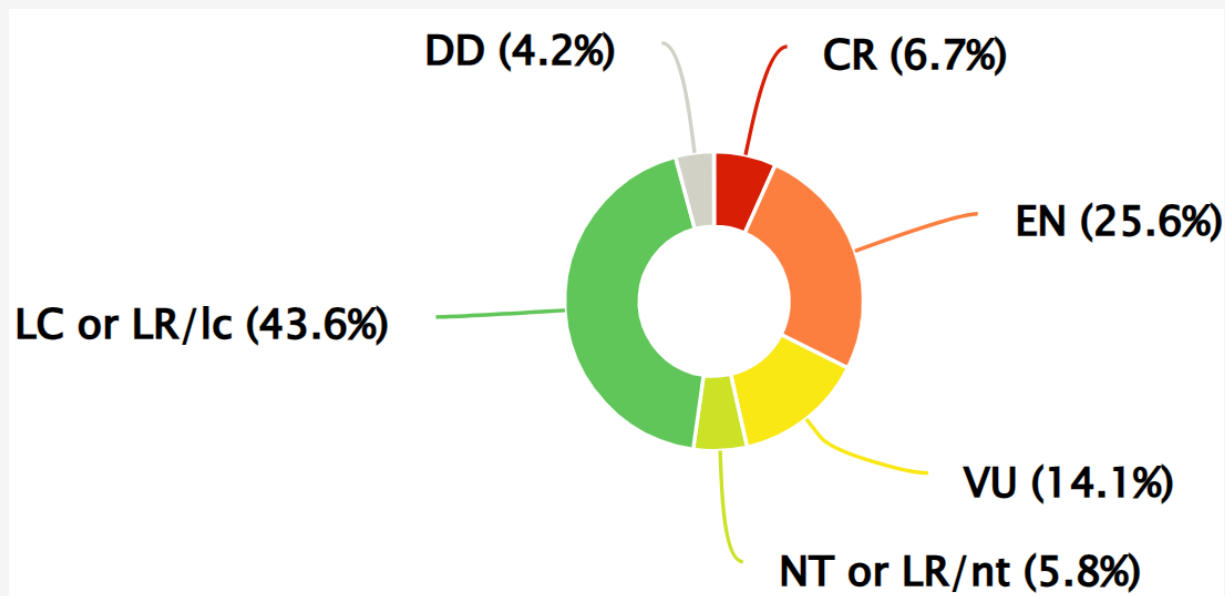
Globally:
the cumulative
number of
species known to
have gone extinct
(WWF 2024)



Malagasy amphibian trade

IUCN Red List

- currently >365 Malagasy amphibian species formally recognised.
- 312 listed on IUCN RedList (searched 22/11/2023).



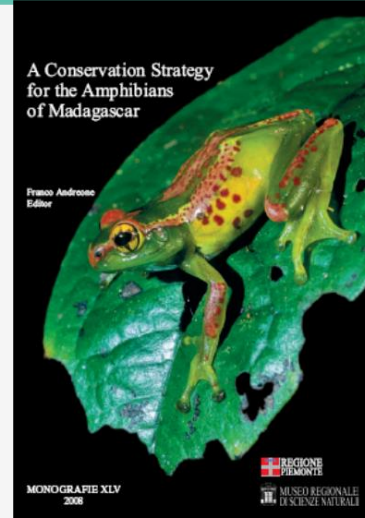
Malagasy amphibian trade

IUCN Red List

| | | | |
|---|--------------|--------|----|
| <i>Gephyromantis tschenki</i> | ↓ Decreasing | Global | LC |
| <i>Gephyromantis tahotra</i> | ↓ Decreasing | Global | VU |
| <i>Guibemantis liber</i> | Unknown | Global | LC |
| <i>Guibemantis pulcher</i> | ↓ Decreasing | Global | LC |
| <i>Boophis quasiboehmei</i> | ↓ Decreasing | Global | NT |
| <i>Boophis andreonei</i> | ↓ Decreasing | Global | VU |
| <hr/> | | | |
| <i>Boophis fayi</i> | ↓ Decreasing | Global | VU |
| <i>Boophis haingana</i> | ↓ Decreasing | Global | EN |
| <i>Boophis baetkei</i> | ↓ Decreasing | Global | CR |
| <i>Boophis schuboeae</i> | ↓ Decreasing | Global | EN |
| <i>Boophis arcanus</i> | ↓ Decreasing | Global | EN |
| <i>Boophis pyrrhus</i> | ↓ Decreasing | Global | LC |
| <i>Mantidactylus zolitschka</i> | ↓ Decreasing | Global | CR |
| <i>Aglyptodactylus madagascariensis</i> | ↓ Decreasing | Global | LC |
| <i>Boophis erythroductylus</i> | ↓ Decreasing | Global | LC |
| <i>Mantidactylus aerumnalis</i> | ↓ Decreasing | Global | LC |
| <i>Boophis madagascariensis</i> | ↓ Decreasing | Global | LC |
| <i>Boophis rappiodes</i> | ↓ Decreasing | Global | LC |
| <i>Mantidactylus grandieri</i> | ↓ Decreasing | Global | LC |
| <i>Boophis williamsi</i> | ↓ Decreasing | Global | CR |
| <i>Mantidactylus mocquardi</i> | Unknown | Global | LC |
| <i>Boophis albilabris</i> | ↓ Decreasing | Global | LC |
| <i>Heterixalus punctatus</i> | — Stable | Global | LC |
| <i>Mantella haraldmeieri</i> | ↓ Decreasing | Global | EN |
| <i>Scaphiophryne boribory</i> | ↓ Decreasing | Global | VU |
| <i>Mantella crocea</i> | ↓ Decreasing | Global | VU |
| <i>Mantella milotympanum</i> | ↓ Decreasing | Global | CR |
| <i>Ptychadena mascareniensis</i> | Unknown | Global | LC |
| <i>Mantella baroni</i> | Unknown | Global | LC |
| <i>Heterixalus betsileo</i> | — Stable | Global | LC |
| <i>Mantella cowanii</i> | Unknown | Global | EN |
| <i>Mantella pulchra</i> | ↓ Decreasing | Global | NT |
| <i>Mantella madagascariensis</i> | ↓ Decreasing | Global | VU |
| <i>Dyscophus antongilii</i> | ↓ Decreasing | Global | LC |
| <i>Plethodontohyla tuberata</i> | ↓ Decreasing | Global | NT |
| <i>Cophyla tsaratananaensis</i> | ↓ Decreasing | Global | EN |
| <i>Cophyla tetra</i> | ↓ Decreasing | Global | EN |
| <i>Mantella expectata</i> | ↓ Decreasing | Global | EN |
| <i>Scaphiophryne gottlebei</i> | ↓ Decreasing | Global | EN |
| <i>Mantella aurantiaca</i> | ↓ Decreasing | Global | EN |
| <i>Guibemantis methueni</i> | ↓ Decreasing | Global | LC |
| <i>Guibemantis timidus</i> | Unknown | Global | LC |
| <i>Spinomantis tavaratra</i> | ↓ Decreasing | Global | VU |
| <i>Spinomantis brunae</i> | ↓ Decreasing | Global | EN |
| <i>Spinomantis fimbriatus</i> | ↓ Decreasing | Global | LC |
| <i>Guibemantis kathrinae</i> | ↓ Decreasing | Global | VU |
| <i>Spinomantis massi</i> | ↓ Decreasing | Global | VU |
| <i>Guibemantis diphonus</i> | ↓ Decreasing | Global | CR |
| <i>Tsingymantis antitra</i> | Unknown | Global | EN |
| <i>Spinomantis nussbaumi</i> | ↓ Decreasing | Global | CR |
| <i>Wakea madinika</i> | Unknown | Global | DD |
| <i>Spinomantis phantasticus</i> | ↓ Decreasing | Global | LC |
| <i>Guibemantis tornieri</i> | ↓ Decreasing | Global | LC |
| <i>Blommersia angolafa</i> | ↓ Decreasing | Global | LC |
| <i>Blommersia kely</i> | Unknown | Global | LC |
| <i>Blommersia galani</i> | — Stable | Global | LC |
| <i>Blommersia variabilis</i> | — Stable | Global | LC |
| <i>Spinomantis elegans</i> | ↓ Decreasing | Global | NT |
| <i>Gephyromantis moseri</i> | ↓ Decreasing | Global | LC |
| <i>Guibemantis punctatus</i> | ↓ Decreasing | Global | CR |
| <i>Gephyromantis ranjomavo</i> | ↓ Decreasing | Global | EN |
| <i>Spinomantis aglavei</i> | ↓ Decreasing | Global | LC |
| <i>Spinomantis guibei</i> | ↓ Decreasing | Global | VU |
| <i>Gephyromantis schilfi</i> | ↓ Decreasing | Global | VU |
| <i>Gephyromantis striatus</i> | ↓ Decreasing | Global | VU |
| <i>Gephyromantis enki</i> | ↓ Decreasing | Global | VU |
| <i>Gephyromantis atsingy</i> | ↓ Decreasing | Global | EN |
| <i>Laliostoma labrosum</i> | — Stable | Global | LC |
| <i>Gephyromantis ambohitra</i> | ↓ Decreasing | Global | VU |
| <i>Guibemantis flavobrunneus</i> | ↓ Decreasing | Global | LC |
| <i>Gephyromantis leucocephalus</i> | — Stable | Global | NT |
| <i>Gephyromantis salegy</i> | ↓ Decreasing | Global | VU |
| <i>Gephyromantis sculpturatus</i> | ↓ Decreasing | Global | LC |
| <i>Gephyromantis zavona</i> | ↓ Decreasing | Global | EN |
| <i>Gephyromantis thelenae</i> | ↓ Decreasing | Global | EN |
| <i>Gephyromantis azzurrae</i> | ↓ Decreasing | Global | EN |
| <i>Gephyromantis mafy</i> | ↓ Decreasing | Global | CR |

Malagasy amphibian trade

amphibian trade



Harold Heatwole · Mark-Oliver Rödel (Editors)

Status and Threats of Afrotropical Amphibians

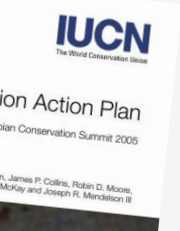
Amphibian Biology, Volume 11, Part 7
Status of Conservation and Decline of Amphibians: Eastern Hemisphere



Edition Chimaira



CHAPTER 4 (Chapter 85 of series).
AMPHIBIAN CONSERVATION IN MADAGASCAR: OLD AND NOVEL THREATS FOR A PECULIAR FAUNA. FRANCO ANDREONE, ANGUS I. CARPENTER, ANGELICA CROTTINI, NEIL D'CRUZE, NICOLAS DUBO, DEVIN EDMONDS, GERARDO GARCIA, JENNIFER LUEDTKE, STEVEN MEGSO, FALITIANA C. E. RABEMANANJARA, CHRISTIAN RANDRIANANTOANDRO, ROMA RANDRIANAVELONA, JANINE ROBENSON, DENIS VALLAN and Gonçalo M. Rosa 147



Amphibian and Reptile Conservation 5(1):3-16.
DOI: 10.1514/journal.arc.0050020 (5604KB PDF)

Malagasy poison frogs in the pet trade: a survey of levels of exploitation of species in the genus *Mantella*

FALITIANA C.E. RABEMANANJARA^{1,2}, NOROMALALA RASOAMAMPIONONA RAMINOSOA², OLGA RAVOAHANGIMALALA RAMILJAONA², FRANCO ANDREONE³, PARFAIT BORA², ANGUS I. CARPENTER⁴, FRANK GLAW⁵, TOKIHERY RAZAFINDRABE², DENIS VALLAN⁶, DAVID R. VIEITES⁷, AND MIGUEL VENCES^{1*}

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Abstract.—Malagasy poison frogs of the genus *Mantella* are small, colorful amphibians that are in high demand for the pet trade. *Mantella aurantiaca* was included in CITES Appendix II in February 1995 and the whole genus included in Appendix II in 2000. CITES Annual report data indicate reported exports of about 230,000 specimens from 1994 to 2003. The reported trade in the most prominent species, *M. aurantiaca*, increased sharply from 1996 to 1998, with more than 30,000 specimens exported in 1998, but dropped after the implementation of an unofficial quota system in Madagascar. Limited information exists on their distribution, habitat preferences and impacts from potential threats, such as harvesting for commerce, and several species are currently listed as Critically Endangered. Based on field surveys of the trade network, the benefits obtained by local collectors were low (equivalent to 0.05–0.20 US\$ per specimen) with usually 100 frogs

A review of the international trade in amphibians: the types, levels and dynamics of trade in CITES-listed species

ANGUS I. CARPENTER, FRANCO ANDREONE
ROBIN D. MOORE and RICHARD A. GRIFFITHS

Abstract Globally, amphibians face many potential threats, including international trade. However, there is a lack of knowledge regarding the types, levels and dynamics of the trade in CITES listed species between 1976 and 2007. Four main trade groups (eggs, skins, meat and individuals) were identified. Trade in amphibian leather focused on *Hoplobatrachus tigerinus* (5573 individuals), whereas trade in eggs focused on *Ambystoma mexicanum* (6,027 eggs). However, for the entire study period there was trade in meat and live animals. The meat trade in live animals was estimated to be worth > USD 11.5 million in only three of the genera involved. Trade dynamics have changed as a result of changes in legislation, such as a ban on *H. tigerinus* exports from Bangladesh for meat. Within the live trade 23 species categorized as either Critically Endangered or Endangered were traded during the study period, and these require greater attention. International trade and potential conservation benefits are affected by countries supplying captive-bred individuals to their domestic markets as well as inter-trade in species listed by CITES, and other species may comprise a significant additional component of international trade. The trade in amphibians is dynamic, and changes in both the types of trade and the species concerned were identified over the study period. Conservation concerns have multiplied from issues concerning population depletions to include indirect impacts associated with disease, predation and competition, which requires a reappraisal of data capture and reporting.

Keywords Amphibians, amphibian conservation, bush meat, CITES, pet trade, wildlife trade

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FRANCO ANDREONE Amphibian Specialist Group/Museo Regionale di Scienze Naturali, Torino, Italy
ROBIN D. MOORE Conservation International, Arlington, VA, USA
RICHARD A. GRIFFITHS Durrell Institute of Conservation and Ecology, School of Anthropology and Conservation, University of Kent, Canterbury, UK

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Anthropology and Conservation, University of Kent, Canterbury, UK
Accepted in November 2012. First published online in June 2014.

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Malagasy amphibian trade

Malagasy wildlife trade (all fauna)

Does not include non-CITES listed species!



Article
Valorisation of Madagascar's Wildlife Trade and Wildlife Tourism: What Are the Conservation Benefits?

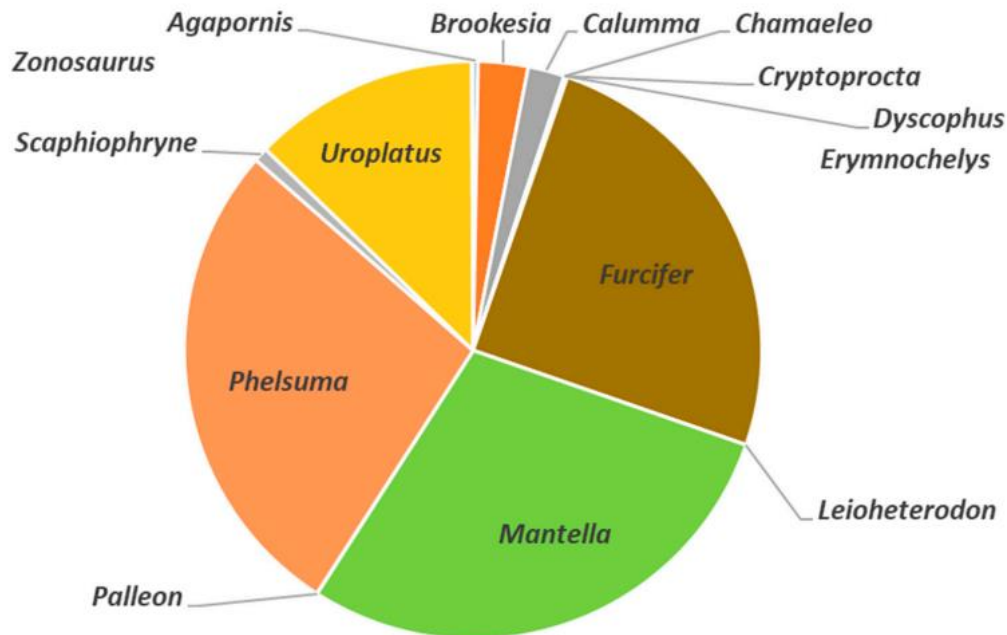
Angus I. Carpenter^{1,*} and Franco Andreone²

¹ Institute of Science and Environment, University of Cumbria, Ambleside Campus, Rydal Road, Ambleside LA22 9BB, UK

² Museo Regionale di Scienze Naturali, Via C. Giolitti, 36, I-10123 Torino, Italy; franco.andreone@...

* Correspondence: a...

Abstract: Wildlife t... aligning, income ge... sets collated from M... to 2018, this study es... Between 2007 and 2... up to a high of USE... to benefit local com... the estimated econo... 72,299.80 for the peri...



top genera traded

| Genus | Species | No. | % |
|------------|----------------------------------|--------|------|
| AMPHIBIANS | | | |
| Mantella | <i>Mantella betsileo</i> | 68,798 | |
| | <i>Mantella baroni</i> | 22,737 | 33.0 |
| | <i>Mantella nigricans</i> | 21,110 | 30.7 |
| | <i>Mantella pulchra</i> | 7306 | 10.6 |
| | | 5969 | 8.7 |
| REPTILES | | | |
| Phelsuma | <i>Phelsuma lineata</i> | 65,329 | |
| | <i>Phelsuma quadriocellata</i> | 17,939 | 27.5 |
| | <i>Phelsuma laticauda</i> | 15,534 | 23.8 |
| | <i>Phelsuma madagascariensis</i> | 14,124 | 21.6 |
| | | 10,563 | 16.2 |
| Uroplatus | <i>Uroplatus sikorae</i> | 30,335 | |
| | <i>Uroplatus fimbriatus</i> | 10,059 | 33.2 |
| | <i>Uroplatus phantasticus</i> | 6170 | 20.3 |
| | <i>Uroplatus ebenau</i> | 5002 | 16.5 |
| | | 4202 | 13.9 |
| Brookesia | <i>Brookesia superciliaris</i> | 6686 | |
| | <i>Brookesia stumpffi</i> | 1927 | 28.8 |
| | <i>Brookesia thieli</i> | 1657 | 24.8 |
| | <i>Brookesia therezieni</i> | 1326 | 19.8 |
| | | 1169 | 17.5 |
| Furcifer | <i>Furcifer pardalis</i> | 6686 | |
| | <i>Furcifer lateralis</i> | 1927 | 28.8 |
| | <i>Furcifer oustaleti</i> | 1657 | 24.8 |
| | <i>Furcifer verrucosus</i> | 1326 | 19.8 |
| | <i>Furcifer</i> | 1169 | 17.5 |

Malagasy amphibian trade

Amphibian species traded



Article
Malagasy Amphibian Wildlife Trade Revisited: Improving Management Knowledge of the Trade

Angus I. Carpenter^{1,*} and Franco Andreone²

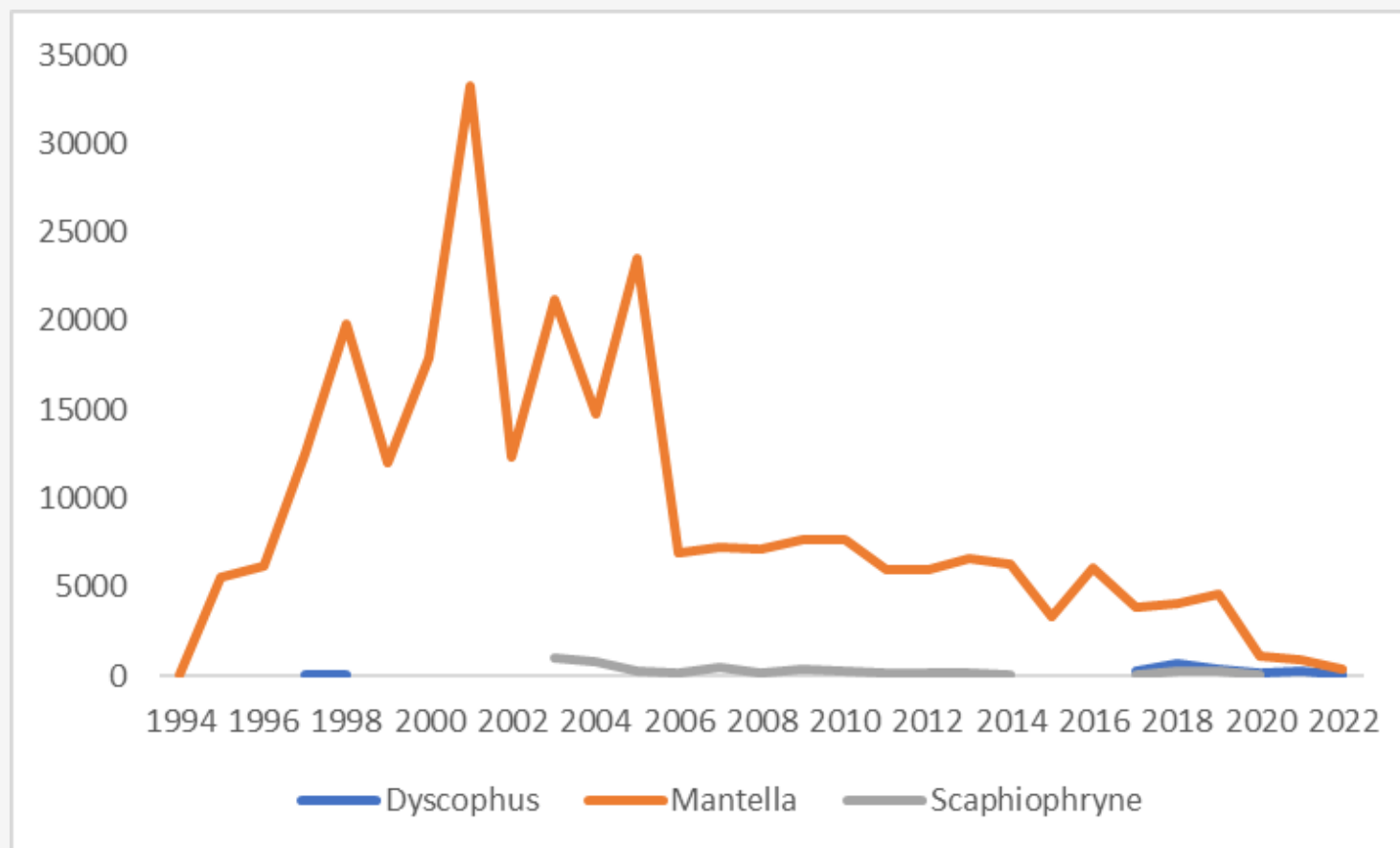
| Amphibian Species | Total Traded | % of Trade |
|----------------------------------|--------------|------------|
| <i>Mantella aurantiaca</i> | 64,745 | 23.89 |
| <i>Mantella betsileo</i> | 38,930 | 14.37 |
| <i>Mantella baroni</i> | 29,805 | 11.00 |
| <i>Mantella madagascariensis</i> | 24,753 | 9.14 |
| <i>Mantella pulchra</i> | 21,147 | 7.80 |
| <i>Mantella spp.</i> | 20,343 | 7.51 |
| <i>Mantella laevigata</i> | 15,068 | 5.56 |
| <i>Mantella viridis</i> | 12,056 | 4.45 |
| <i>Mantella nigricans</i> | 9842 | 3.63 |
| <i>Mantella expectata</i> | 9096 | 3.36 |
| <i>Mantella crocea</i> | 8018 | 2.96 |
| <i>Mantella milotympanum</i> | 6043 | 2.23 |
| <i>Scaphiophryne gottlebei</i> | 4130 | 1.52 |
| <i>Mantella bernhardi</i> | 1883 | 0.69 |
| <i>Mantella cowanii</i> | 1667 | 0.62 |
| <i>Dyscophus guineti</i> | 1021 | 0.38 |
| <i>Mantella haraldmeieri</i> | 940 | 0.35 |
| <i>Dyscophus insularis</i> | 731 | 0.27 |
| <i>Scaphiophryne spinosa</i> | 410 | 0.15 |
| <i>Scaphiophryne marmorata</i> | 195 | 0.07 |
| <i>Dyscophus antongilii</i> | 95 | 0.04 |
| <i>Dyscophus spp.</i> | 45 | 0.02 |

Malagasy amphibian trade

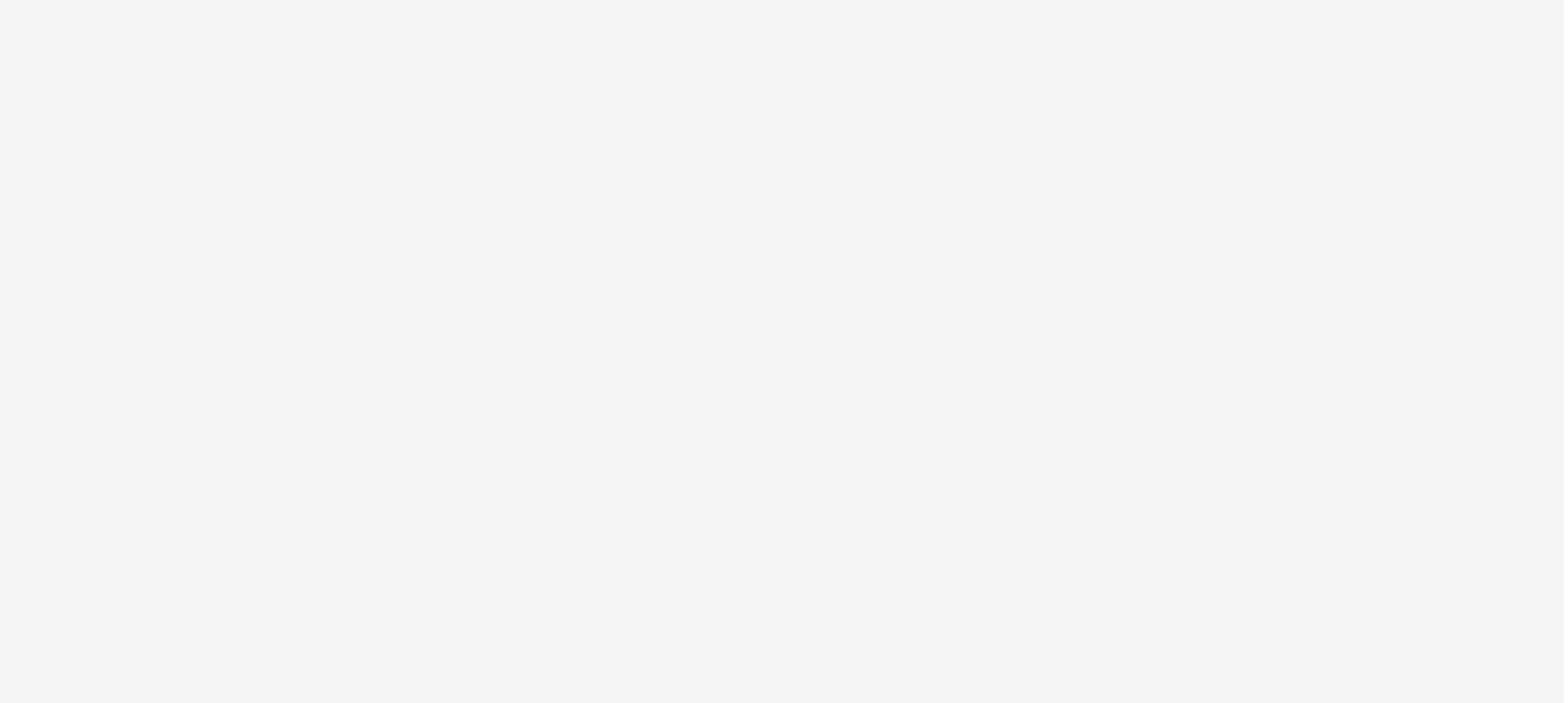
trade patterns

(CITES data @ 23/11/2023)

| | |
|----------------------|--|
| Year Range: | <i>From: 1975 To: 2023</i> |
| Exporting countries: | <i>Madagascar</i> |
| Importing countries: | <i>All Countries</i> |
| Source: | <i>W - Wild,R - Ranched,F - Born in captivity (F1 and subsequent),U - Source unknown</i> |
| Purpose: | <i>T - Commercial</i> |
| Trade Terms: | <i>BOD - bodies,LIV - live,SPE - specimens</i> |
| Species: | <i>Amphibia (Amphibians)</i> |



Does not include non-CITES listed species!



this session

- Madagascar; background info & setting the scene.
- history of amphibian IWT (International Wildlife Trade).
- conservation going forward (pressures &/or progress).

amphibian conservation going forward

setting the scene / tensions

Ways of trading



NEWS
Madagascar presidential aide charged with seeking £235,000 bribe in UK



Madagascar lychee trade mired in corruption ... "Most profits of the lucrative lychee trade between Madagascar and the EU are concentrated in the hands of a few powerful and politically-connected individuals".

NEWS
Rosewood: Kenya seizes illegal Hong Kong-bound cargo



The rosewood was being shipped from Madagascar to Hong Kong... Illegal logging in Madagascar's rainforests has worsened since a coup in 2009, conservationists say.



NEWS

Madagascar's scramble for sapphires



setting the scene / tensions

Politics & commitments



NEWS
Madagascar minister calls protected areas a 'failure', seeks people-centric approach

By Rosalind Wiseman and Malachi Yovanovitch on 23 August 2021



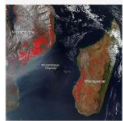
"The conservation of our biodiversity through Madagascar protected areas' system for 30 years was a failure..."

We have to change the paradigm and to move toward a system which doesn't exclude humans and doesn't put local communities on the side lines; it should be deeply social."

<https://www.monagabay.com/2021/08/madagascar-minister-calls-protected-areas-a-failure-seeks-people-centric-approach/>

setting the scene / tensions

Drought & Cyclones



NEWS
Madagascar on the brink of climate change-induced famine



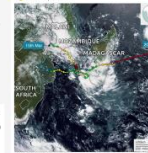
"25 people ...died... 21 are missing" "40,000 homeless" BBC News



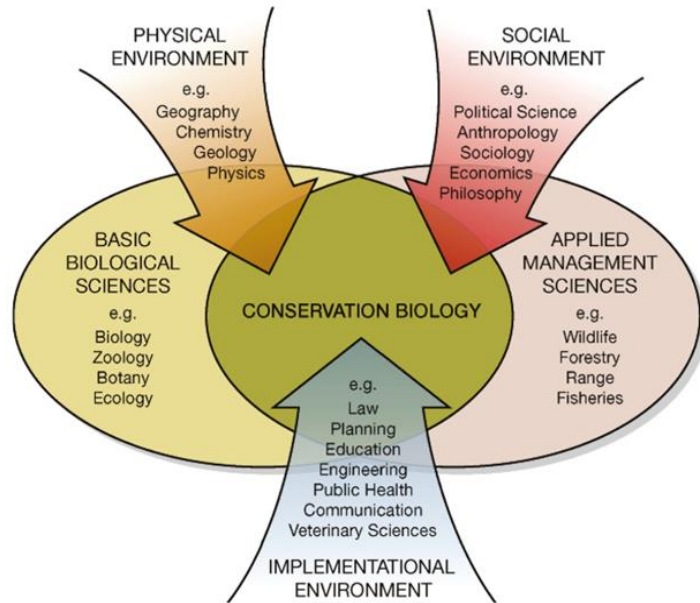
Madagascar: UN's WFP warns of a humanitarian crisis due to drought and Covid-19

"More than 400 people have been killed and thousands of homes destroyed." BBC News.

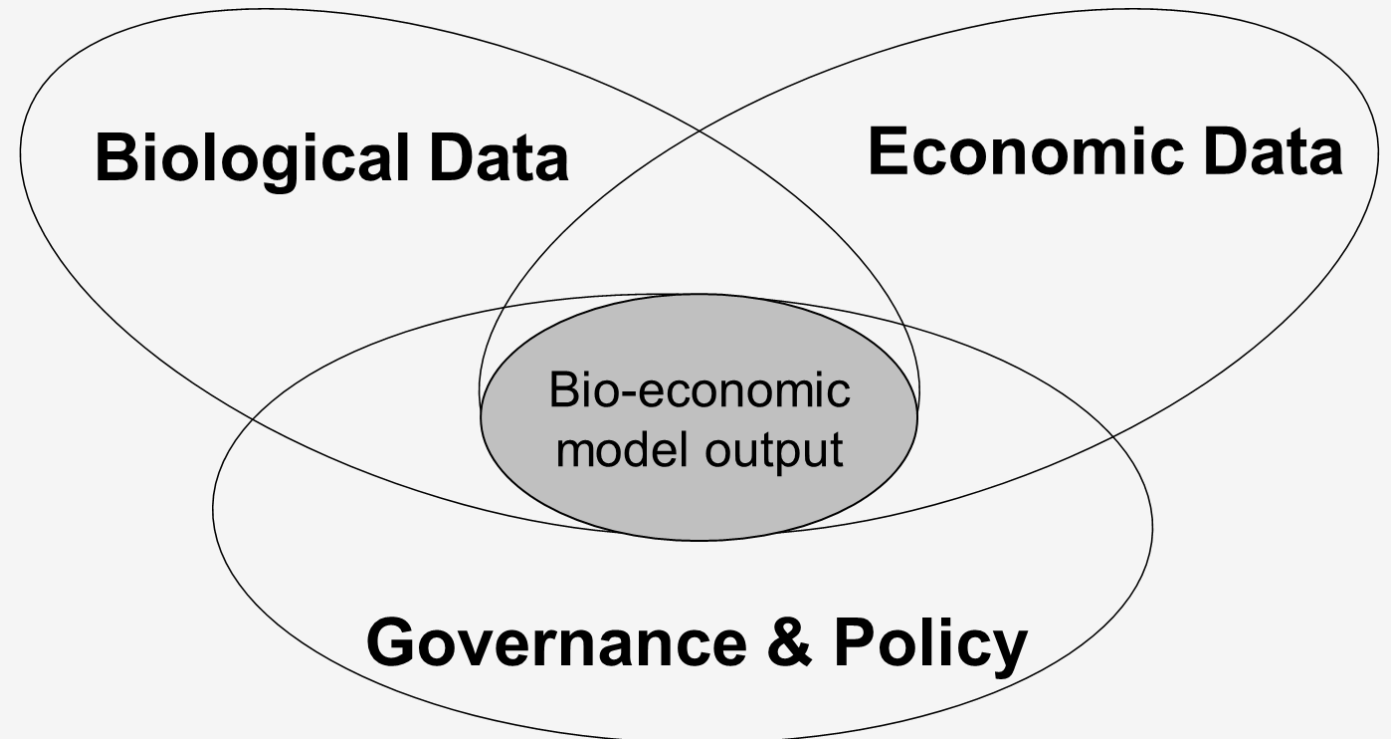
Cyclone Froidy path



amphibian conservation going forward



(extracted from Hunter *et al.*, 2021)



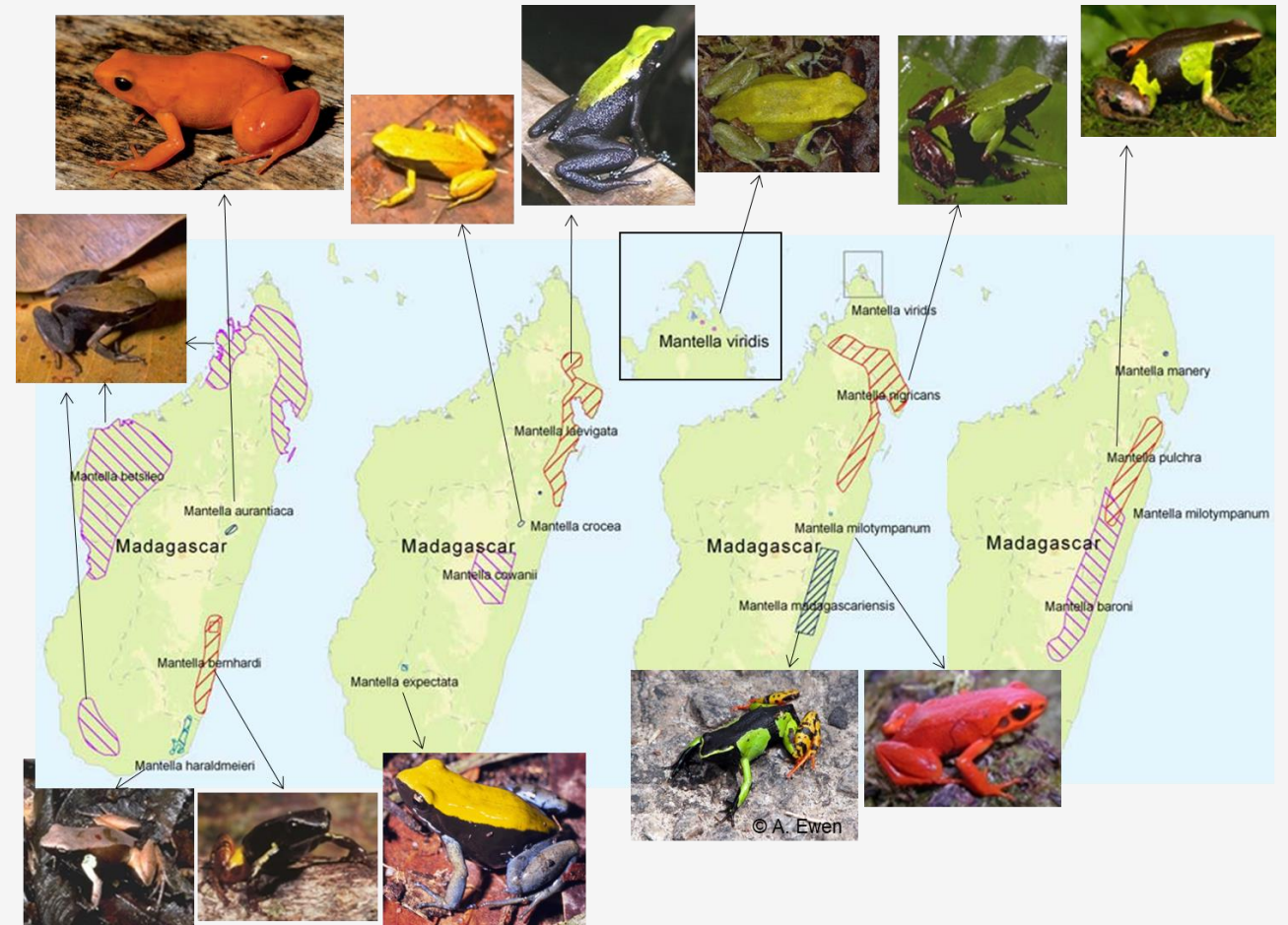
Malagasy amphibian trade

biology / species distributions

Dyscophus antongilii

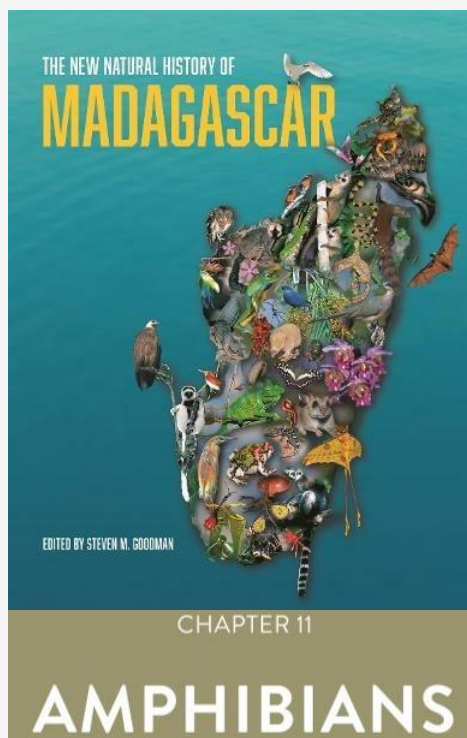


Scaphiophryne gottlebei



Malagasy amphibian trade

biology / breeding ecology



Aquatic eggs

- Eggs deposited in water

Mode 1. Eggs and feeding (exotrophic) tadpoles in lentic water (*Ptychadena*, *Heterixalus*, *Hoplobatrachus*, *Laliostoma*, *Dyscophus*, *Scaphiophryne*, *Paradoxophyla*, *Aglyptodactylus*, and subgenus *Sabona* in *Boophis*).

2. Eggs and feeding (exotrophic) tadpoles in lotic water (other species of *Boophis*).

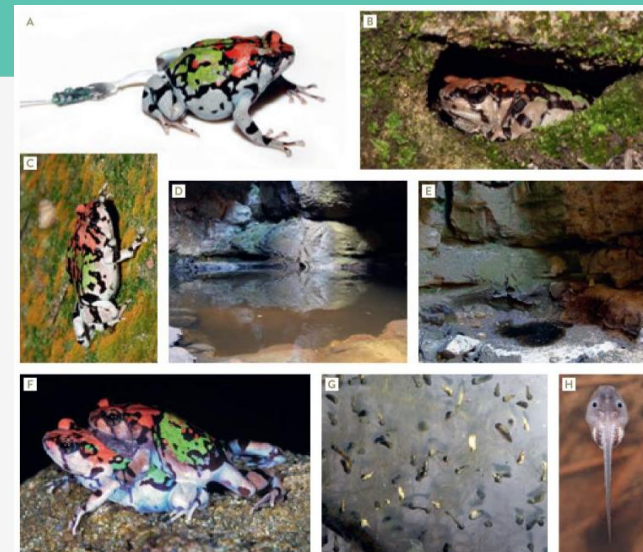
8. Eggs and nonfeeding (endotrophic) tadpoles in water in tree holes or aerial plants (*Anodonthyla*, *Cophyla*, *Platypelis*, several *Plethodontohyla* species including *P. notosticta*, *P. inguinialis*, and *P. mihanika*), or in cavities such as snail shells (some *Stumpffia*).

Eggs terrestrial or arboreal (not in water)

- Eggs on ground, on rocks, or in burrows

17. Eggs and early tadpoles in excavated nest; subsequent to flooding (e.g., after heavy rains), feeding (exotrophic) tadpoles live in ponds or streams (*Mantella* except *M. laevigata* and *M. expectata*, *Mantidactylus* subgenera *Brygomantis*, *Chonomantis*, *Ochthomantis*, and perhaps *Hylobatrachus* and *Mantidactylus*).

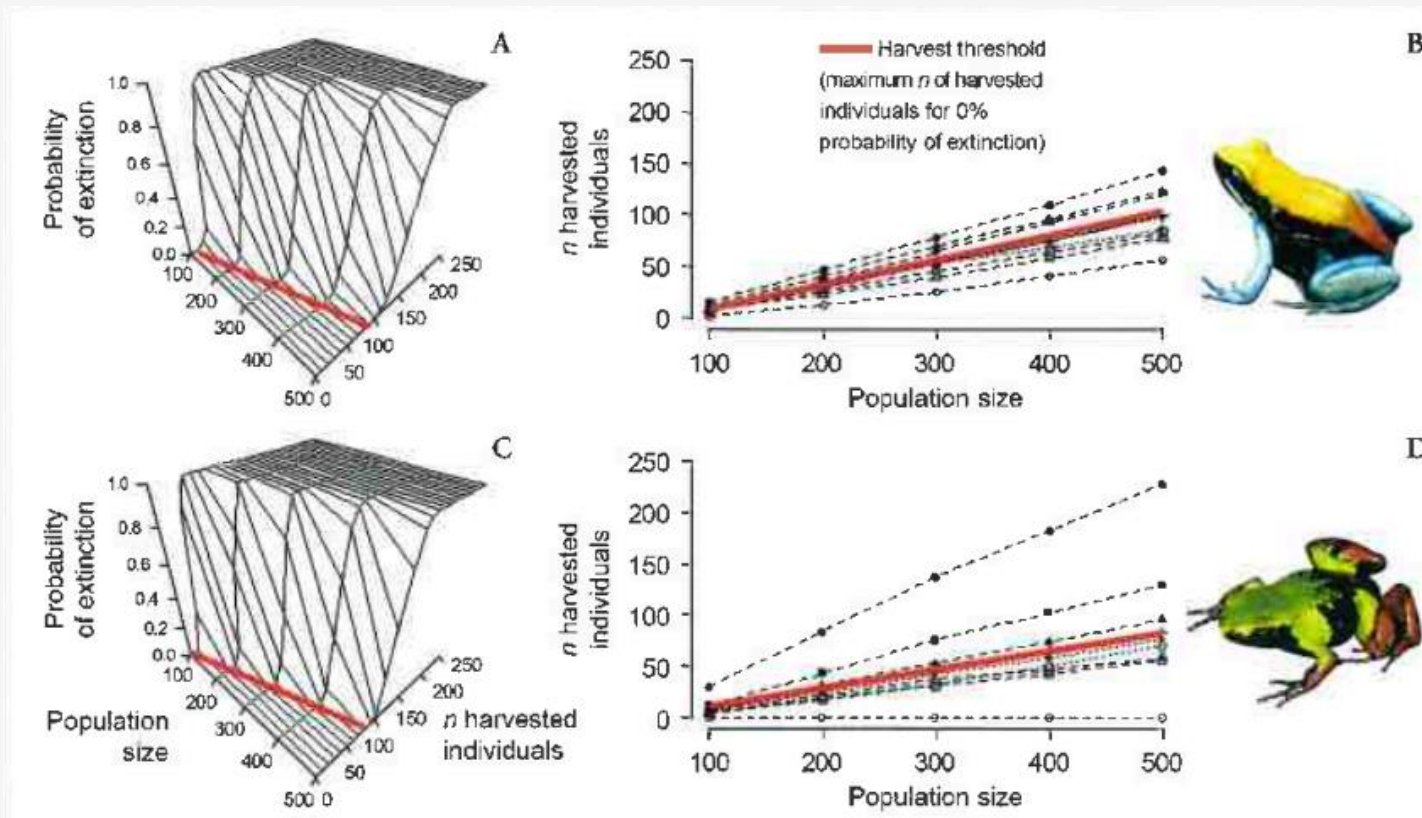
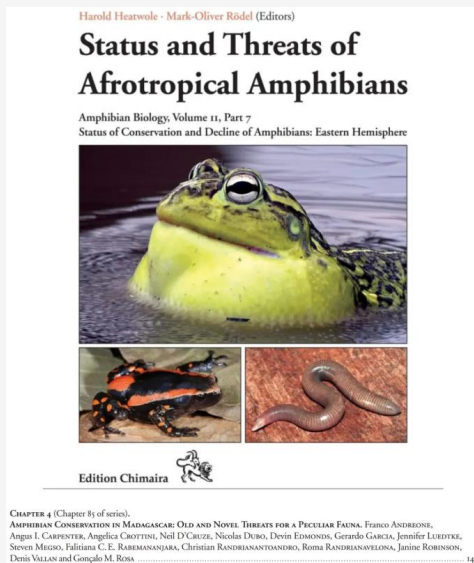
| SPECIES | MEAN CLUTCH SIZE |
|--------------------------------------|------------------|
| <i>Anodonthyla pollicaris</i> | 28.5 |
| <i>Blommersia blommersae</i> | 74.6 |
| <i>Boophis pyrthus</i> | 82.6 |
| <i>Gephyromantis boulengeri</i> | 8.2 |
| <i>Guibemantis aff. albolineatus</i> | 17.3 |
| <i>Mantella aurantiaca</i> | 69.4 |
| <i>Mantidactylus betsileanus</i> | 67.2 |
| <i>Platypelis barbouri</i> | 26.2 |
| <i>Plethodontohyla mihanika</i> | 52.0 |



Natural history and spatial ecology of *Scaphiophryne gottlebei*. Years of research in the canyons of the Isalo Massif have unveiled some secrets of this elusive species. A) Radio-tracking individuals allowed us to better understand movements and dispersal, and B) to discover where these frogs hide and seek refuge. C) This species is highly adapted to live in narrow canyons, as it can climb up vertical walls. D) These are also extremely seasonal breeding habitats, with temporary water basins formed after the first heavy rains that E) dry out afterward. F) Males and females aggregate to breed, and G) and H) the hatching psammonektonic larvae will develop in a race against time to complete their metamorphosis.

Malagasy amphibian trade

draft sustainable harvest levels



amphibian conservation going forward

trade structure & economic data

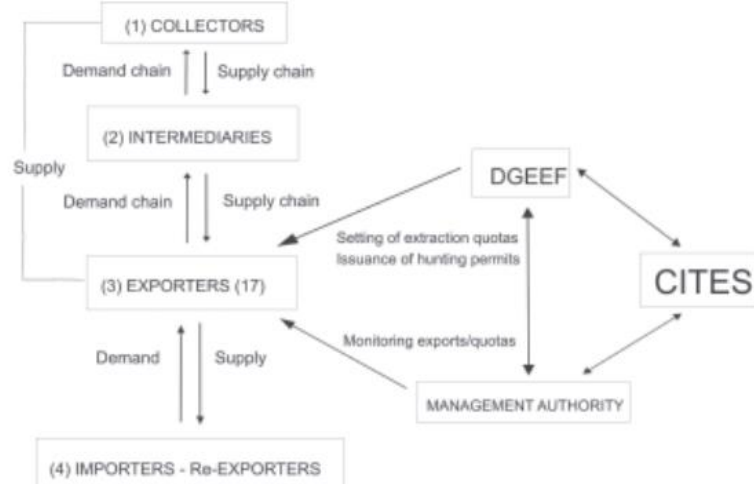
Amphibian and Reptile Conservation 5(1):3-16.
DOI: 10.1514/journal.arc.0050020 (p004RB PDF)

Malagasy poison frogs in the pet trade: a survey of levels of exploitation of species in the genus *Mantella*

FALUTIANA C.E. RABEMANANJARA^{1,2}, NOROMALALA RASOAMAMPIONONA RAMINOSOA²,
OLGA RAVOAHANGIMALALA RAMILJAONA², FRANCO ANDREONE³, PARFAIT BORA²,
ANGUS I. CARPENTER⁴, FRANK GLAW⁵, TOKIHERY RAZAFINDRABE², DENIS VALLAN⁶,
DAVID R. VIEITES⁷, AND MIGUEL VENCES⁸*

¹Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, Mauritskade 61, 1092 AD Amsterdam, The Netherlands; ²franco.andreone@regione.piemonte.it; ³Department de Biologie Animale, Université d'Antananarivo, BP 906, 101 Antananarivo, Madagascar; ⁴Museo Regionale di Scienze Naturali, Via G. Giolitti 36, I-10123 Torino, Italy; ⁵franco.andreone@libero.it; ⁶Centre for Ecology, Evolution and Conservation (CEEC), School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ, UK; ⁷Chameleon project@uea.ac.uk; ⁸Zoologische Staatssammlung, Münchenstr. 21, 81247 München, Germany; frank.glaw@zsm.mwn.de; ⁹Natur-Museum Luzern, Kasernenplatz 6, CH-6003 Luzern, Switzerland; denis.vallan@jhu.edu; ¹⁰Museum of Vertebrate Zoology and Department of Integrative Biology, 3101 Valley Life Sciences Building, University of California, Berkeley, CA 94720-3160, USA; vieites@berkeley.edu

Abstract.—Malagasy poison frogs of the genus *Mantella* are in high demand for the pet trade. *Mantella auranti* demand for the pet trade, *Mantella* in 20 whole genus included in Appendix II in 2003. The whole genus included in Appendix II in 2003. The demand for *Mantella* increased sharply from 1996 to 1998, with 230,000 specimens from 1996 to 1998, with the implementation of an unofficial quota. The implementation of an unofficial quota increased sharply from 1996 to 1998, with 230,000 specimens from 1996 to 1998, with the implementation of an unofficial quota. The implementation of an unofficial quota increased sharply from 1996 to 1998, with 230,000 specimens from 1996 to 1998, with the implementation of an unofficial quota.



Article

Valorisation of Madagascar's Wildlife Trade and Wildlife Tourism: What Are the Conservation Benefits?

Angus I. Carpenter^{1,*} and Franco Andreone²

- ¹ Institute of Science and Environment, University of Cumbria, Ambleside Campus, Rydal Road, Ambleside LA22 9BB, UK
² Museo Regionale di Scienze Naturali, Via G. Giolitti, 36, I-10123 Torino, Italy; franco.andreone@regione.piemonte.it or franco.andreone@gmail.com
 * Correspondence: angus.carpenter@cumbria.ac.uk or carpenter.angus@gmail.com

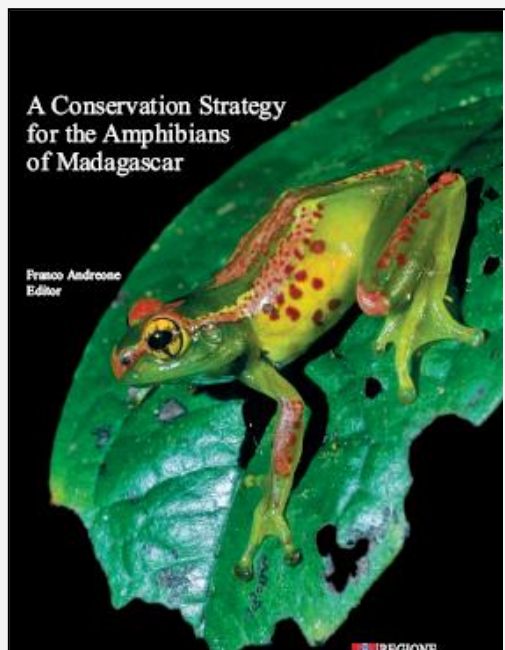
Abstract: Wildlife tourism and wildlife trade may appear juxtaposed, but are two, potentially aligning, income generators that could benefit conservation in developing countries. Utilising data sets collated from Madagascar's Ministère du Tourisme and CITES, respectively, for the period 2007 to 2018, this study estimated levels of income from wildlife tourism and wildlife trade for Madagascar. Between 2007 and 2018, tourism reported yearly incomes ranging from a low of USD 1.4 million up to a high of USD 15.7 million. However, it was unclear what percentage of this figure flowed to benefit local communities. Alternatively, using reported networks for the live wildlife trade, the estimated economic value reaching collectors and/or intermediaries in Madagascar was USD 72,299.80 for the period 2007 to 2018. Both revenue generators operated within different geographical

| Animals | 2007 | Price | Value |
|----------------|---------------|-------|---------|
| Anura | 7772 | | |
| | Dyscophus | 0.25 | 0 |
| | Mantella * | 0.11 | 803.77 |
| | Scaphiophryne | 0.25 | 116.25 |
| Carnivora | | | 0 |
| | Cryptoprocta | | 0 |
| Psittaciformes | | | 0 |
| | Agapornis ^ | 0.3 | 0 |
| Sauria | 12,991 | | 0 |
| | Brookesia | 0.25 | 66.75 |
| | Calumma | 0.25 | 0 |
| | Chamaeleo † | 0.25 | 0 |
| | Furcifer | 0.25 | 1019.75 |
| | Palleon | 0.25 | 0 |
| | Phelsuma | 0.25 | 1068.25 |
| | Uroplatus | 0.25 | 1074.25 |
| | Zonosaurus | 0.25 | 18.75 |
| Serpentes | | | 0 |
| | Leioheterodon | 0.25 | 0 |
| Testudines | 14 | | 0 |
| | Erymnochelys | 0.25 | 3.5 |

| 2018 | Price | Value | Grand Total |
|------|-------|--------|-------------|
| 703 | | | 71,050 |
| 110 | 0.3 | 33 | 342 |
| 593 | 0.13 | 77.09 | 68,798 |
| | 0.3 | 0 | 1910 |
| | | | 4 |
| | | 0 | 4 |
| 100 | | | 650 |
| 100 | 0.36 | 36 | 650 |
| 2592 | | | 167,131 |
| 235 | 0.3 | 70.5 | 6686 |
| 28 | 0.3 | 8.4 | 4871 |
| | 0.3 | 0 | 10 |
| 958 | 0.3 | 287.4 | 59,722 |
| | 0.3 | 0 | 32 |
| 1305 | 0.3 | 391.5 | 65,329 |
| 41 | 0.3 | 12.3 | 30,335 |
| 25 | 0.3 | 7.5 | 146 |
| | | | 21 |
| | | | 21 |
| | | | 105 |
| | 0.3 | 0 | 105 |
| 3395 | | 923.69 | 238,961 |

amphibian conservation going forward

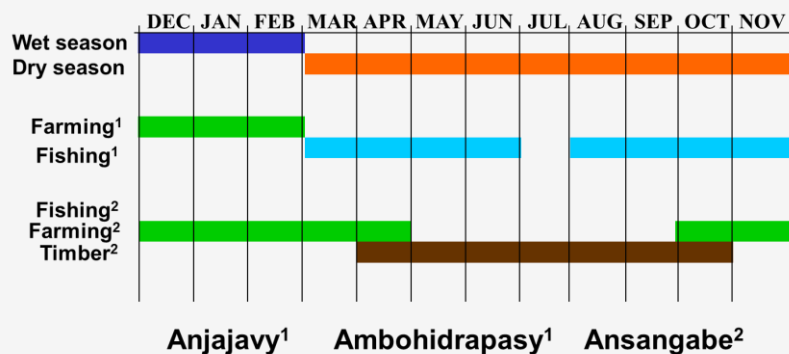
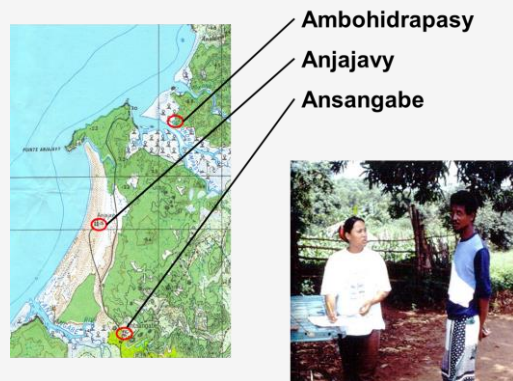
socio-economic profile



A Conservation Strategy for the Amphibians of Madagascar / Monografie del Museo Regionale di Scienze Naturali di Torino, XLV (2008): pp. 357-376

Angus I. CARPENTER¹, Onja ROBSON²

Madagascan amphibians as a wildlife resource and their potential as a conservation tool: species and numbers exported, revenue generation and bio-economic model to explore conservation benefits



| | | | | |
|-----------|---------------|-----------------------------|-----------|-------|
| Timber - | Palisander: | £2 tree ⁻¹ | 20 | £40 |
| | Other timber: | 50p tree ⁻¹ | 40 | £20 |
| | Transport: | 38p shipment ⁻¹ | 6 | £2.28 |
| Farming - | Valley rice: | 28p kg ⁻¹ | 1500 kg | £420 |
| | Hill rice: | 28p kg ⁻¹ | 500 kg | £140 |
| | Maize: | 2p cob ⁻¹ | 800 | £16 |
| | | 35p kg ⁻¹ | 500 kg | £175 |
| | Manioc: | 20p kg ⁻¹ | 500 kg | £100 |
| | Bananas: | 25p tamgozany ⁻¹ | 800 | £200 |
| | Coconuts: | 10p coconut ⁻¹ | 800 | £80 |
| | Honey: | 50p litre ⁻¹ | 50 litre | £25 |
| | | £1.50 rum | 100 litre | £150 |
| | Mangos: | 2p each | 500 | £10 |

Total - £493.28 (\$720.19)

Harvester's revenue = Harvester's costs

➡ Economic costs / harvest No. = price unit⁻¹

↳ \$ 720.19 / 2000 = \$ 00.36 price unit⁻¹

amphibian conservation going forward

institutional governance / demand declines

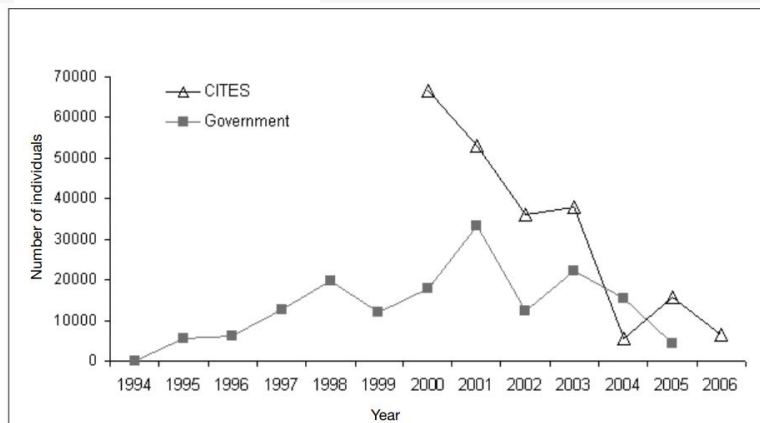
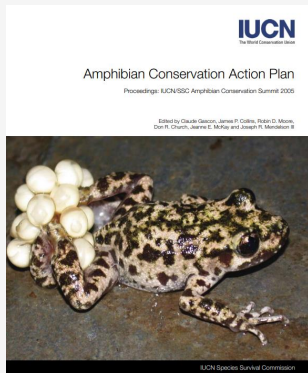


Figure 5.1. Trading trends for the number of individuals of amphibians exported between 1994 and 2006 for both CITES and Malagasy government dataset.



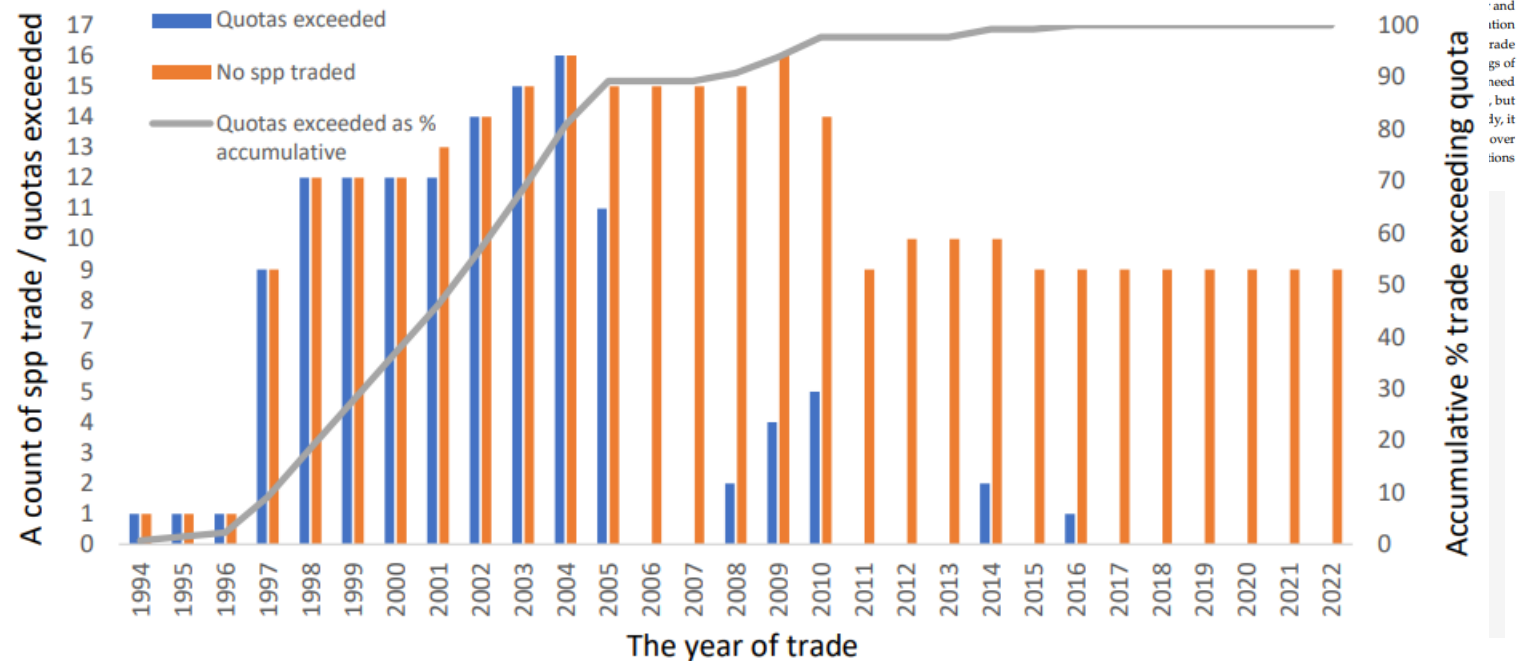
Article Malagasy Amphibian Wildlife Trade Revisited: Improving Management Knowledge of the Trade

Angus I. Carpenter^{1,*} and Franco Andreone²

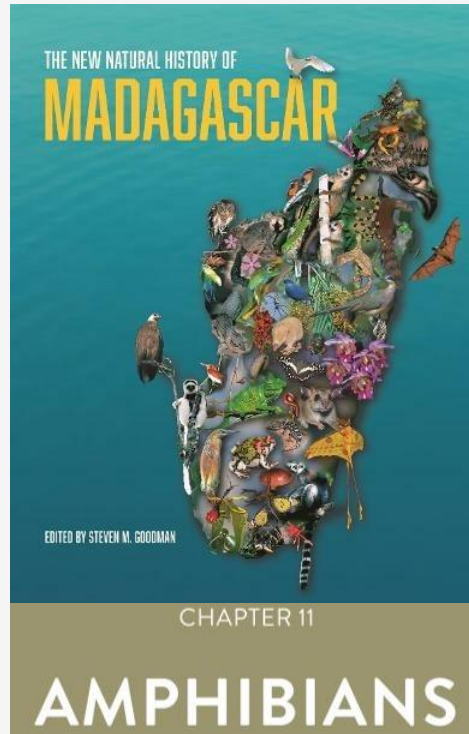
¹ Institute of Science and Environment, University of Cumbria, Ambleside Campus, Rydal Road, Ambleside, Cumbria LA22 9BB, UK

² Museo Regionale di Scienze Naturali, Via G. Giolitti, 36, I-10123 Torino, Italy; franco.andreone@rethione.piemonte.it

* Correspondence: carpenter.angus@gmail.com



amphibian conservation going forward



- currently >365 Malagasy amphibian species formally recognised.
- the number will increase as 100–150 candidate species already identified but not yet assessed and scientifically named.
- predicted that Madagascar will host >500 amphibian species.
- considering scientifically named species only, Madagascar holds ~4.5% of the world's amphibian fauna.

amphibian conservation going forward

drivers of trade

Raptors:

... hobbyists and small falconry groups were found to be the predominant drivers of sales... .

[Panter & White. 2020. Insights from social media into the illegal of wild raptors in Thailand. *Traffic Bulletin*, 32](#)

Reptiles:

The pursuit of novelty ... species include numerous endangered or range-restricted species...
Exploitation can occur immediately after scientific description, leaving new endemic species especially vulnerable.

[Marshall, et al., 2020. Thousands of reptile species threatened by under-regulated global trade. *Nature Communications*, 11, 4738](#)

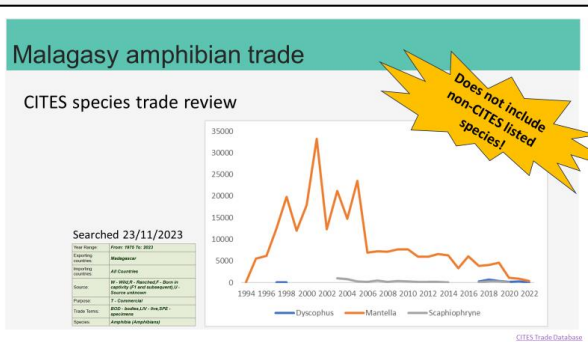
Reptiles & Amphibians:

In the last few decades, exotic pets have become much more common. In the UK in 2008, reptiles and amphibians were more popular than dogs, with over eight million in captivity. But while almost all pet cats and dogs are born and bred in captivity, exotic pets are often taken from the wild, putting species and their habitats at risk.

[Hughes, et al., 2021. Gaps in global wildlife trade monitoring leave amphibians vulnerable. *eLife.*, 10: e70086](#)

amphibian conservation going forward

zoo CB programs



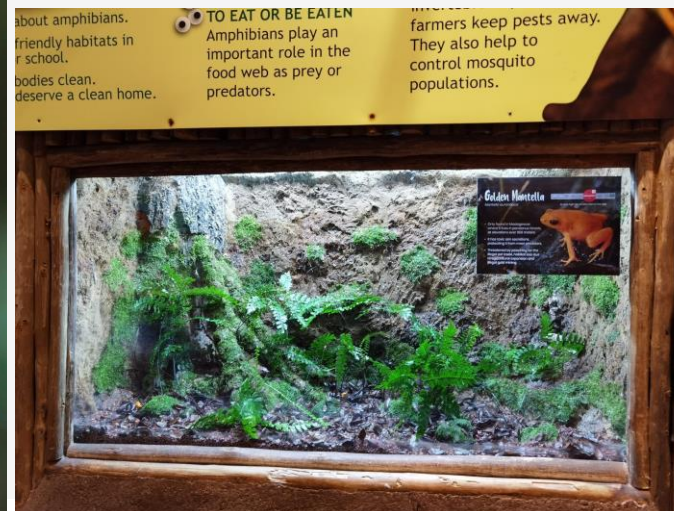
News | 10 Oct, 2023

IUCN Species Survival Commission acknowledges vital contributions of Botanic Gardens, Aquariums, and Zoos to wildlife conservation

The IUCN Species Survival Commission Position Statement on the Role of Botanic Gardens, Aquariums, and Zoos in Species Conservation recognizes the leading role that these organisations already play in the science and practice of conservation, and invites others to reach their full potential, working alongside governments and key partners to collectively achieve IUCN's One Plan Approach.



Home - Animals

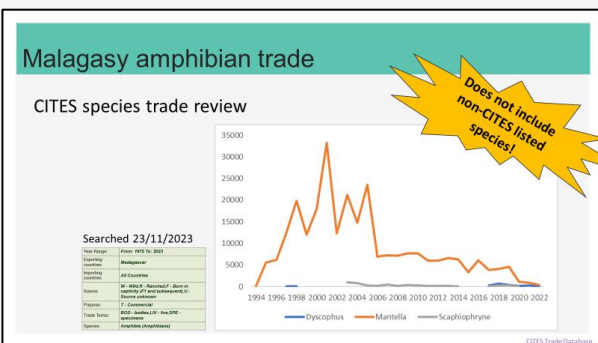


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amphibian conservation going forward

zoo CB programs



News | 10 Oct, 2023

IUCN Species Survival Commission acknowledges vital contributions of Botanic Gardens, Aquariums, and Zoos to wildlife conservation

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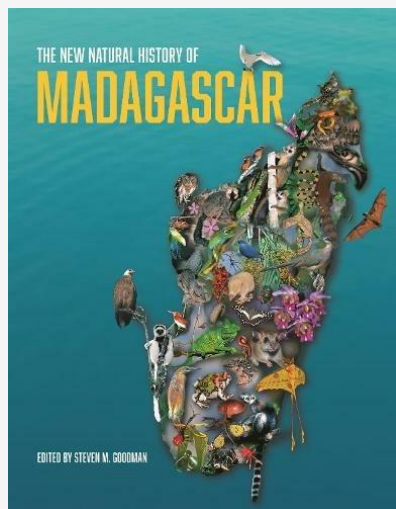
[New Search](#)

Comparative Tabulation Report

| Year | App. | Taxon | Class | Order | Family | Genus | Importer | Exporter | Origin | Importer reported quantity | Exporter reported quantity | Term | Unit | Purpose | Source |
|------|------|--------------------------|----------|------------|--------------|--------------|----------|----------|--------|----------------------------|----------------------------|--------|------|---------|--------|
| 2010 | I | Prolemur simus | Mammalia | Primates | Lemuridae | Prolemur | MG | GB | | 1 | | live | | S | C |
| 2016 | I | Neofelis nebulosa | Mammalia | Carnivora | Felidae | Neofelis | MG | GB | DE | 1 | | 1 live | | B | C |
| 2016 | I | Neofelis nebulosa | Mammalia | Carnivora | Felidae | Neofelis | MG | GB | DE | 1 | | live | | Z | C |
| 2016 | II | Prionailurus rubiginosus | Mammalia | Carnivora | Felidae | Prionailurus | MG | GB | | | | 2 live | | B | C |
| 2016 | II | Prionailurus rubiginosus | Mammalia | Carnivora | Felidae | Prionailurus | MG | GB | | 2 | | live | | Z | C |
| 2017 | I | Osteolaemus tetraspis | Reptilia | Crocodylia | Crocodylidae | Osteolaemus | MG | GB | | | | 4 live | | B | C |

amphibian conservation going forward

CB on Madagascar



MITSinJO CAPTIVE-BREEDING FACILITY



FIGURE 11.8 The main room of the Mitsinjo amphibian captive-breeding facility near Andasibe. Terraria in the photo house *Mantella aurantiaca*. (PHOTO by D. Edmonds.)

TABLE 11.2. Amphibian species maintained at Mitsinjo's amphibian captive-breeding facility since 2011

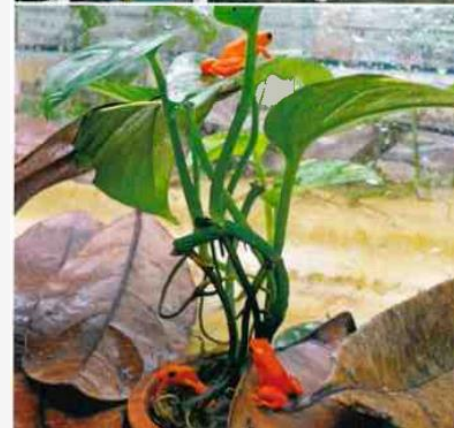
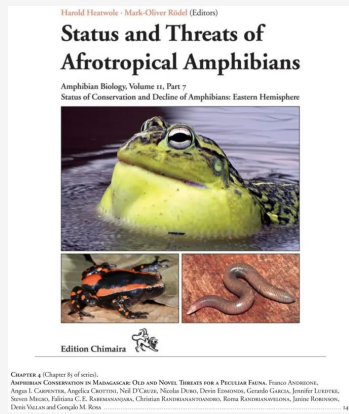
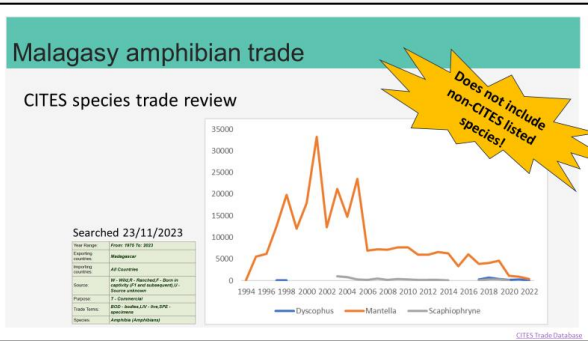
| SPECIES | BRED TO F1 | BRED TO F2 |
|---|------------|------------|
| <i>Anodonthyla pollicaris</i> | X | – |
| <i>Blommersia blommersae</i> | X | – |
| <i>Boophis bottae</i> | X | – |
| <i>B. pyrrhus</i> | X | – |
| <i>Dyscophus guineti</i> | – | – |
| <i>Gephyromantis boulengeri</i> | X | – |
| <i>Guibemantis</i> aff. <i>albolineatus</i> | X | – |
| <i>G. pulcher</i> | – | – |
| <i>Heterixalus betsileo</i> | X | – |
| <i>H. punctatus</i> ¹ | – | – |
| <i>Mantella aurantiaca</i> | X | X |
| <i>Mantidactylus betsileanus</i> | X | X |
| <i>Platypelis barbouri</i> | X | – |
| <i>Plethodontohyla mihanika</i> | X | – |
| <i>Stumpffia</i> sp. ¹ | – | – |

| SPECIES |
|-----------------------------------|
| <i>Anodonthyla emilei</i> |
| <i>A. jeanbai</i> |
| <i>A. theoi</i> |
| <i>Boophis baetkei</i> |
| <i>B. jaegeri</i> |
| <i>B. williamsi</i> |
| <i>Cophyla maharipeo</i> |
| <i>Gephyromantis hintelmannae</i> |
| <i>G. mafy</i> |
| <i>Mantella aurantiaca</i> |
| <i>M. milotympanum</i> |
| <i>Mantidactylus pauliani</i> |
| <i>Platypelis alticola</i> |
| <i>P. mavomavo</i> |
| <i>P. olgae</i> |
| <i>Rhombophryne longicrus</i> |
| <i>Spinomantis brunae</i> |
| <i>Stumpffia hara</i> |
| <i>S. staffordi</i> |

TABLE 11.4. Species recommended for ex situ rescue by the Conservation Needs Assessment

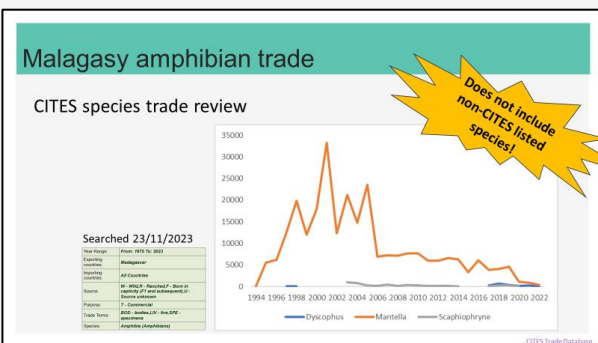
amphibian conservation going forward

CB in hobbyist community



amphibian conservation going forward

Malagasy amphibians for sale



£10 GBP

Carterton, England
Aug 3, 2023

Tadpoles available -> *Heterixalus alboguttatus* (Malagasy starry night reed frog) £15ea or 10 for £120

-> *Mantella betsileo* £12.50ea or 5 for £50

Also have *Mantella betsileo* mets emerging from a different bloodline.

Mets are £20ea, or buy 2 mets and 2 tads (so mixed bloodlines) for £50.

Collection or can post tadpoles.

Also happy to consider trades for (tads etc. of): Lemur leaf frog, *Theloderma corticale*, *Theloderma pictum*, *Theloderma auratum*, *Mantella* sp. (inc. *aurantiaca*), *Dendrobates tinctorius* nominat, glass frogs. And, maybe more... So drop any offers over.

Reply Quote Like

Save Share

BackwaterReptiles.com

Painted Mantella for Sale
Buy a Painted Mantella (*Mantella madagascariensis*)

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Painted Mantella

Mantella madagascariensis/baroni

We have some Painted Mantellas for sale at incredible pricing. These exquisite frogs hail from the island of Madagascar, and are also referred to as "Malagasy" Painted Mantellas. When you buy a frog from us, you automatically receive our 100% live arrival guarantee.

Choose: Med-Large - \$79.99

Options: No Pref

SwellReptiles

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Home > Livestock > Amphibians > Frogs > Tomato frog, *Dyscophus antongilii*

Tomato frog, *Dyscophus antongilii*

Tomato frogs are docile, vibrant coloured and easy to take care of



At a glance...

- Tomato frogs are vibrant coloured.
- Easy to care for making them begin
- Docile pets that don't need a huge



Product

Choose an Option...

from £35.00

amphibian conservation going forward

window of opportunity



The disconnect of 'spp : habitat : local people' being replaced by ex-situ supply to trade removes NTFP value of native forests to local communities.
Resulting in more deforestation??



