

THREATENED FRESHWATER BIODIVERSITY IN MADAGASCAR AND THE INDIAN OCEAN ISLANDS HOTSPOT – PRIORITIES FOR CONSERVATION ACTION

THE ISSUE

The inland waters of Madagascar and the Indian Ocean islands hotspot support a high diversity of threatened aquatic species, a large proportion of which are unique to this hotspot. Many of these species provide direct and indirect benefits to people, such as through fisheries and water purification, supporting local economies and livelihoods. Freshwater habitats and their associated species are, however, being lost and degraded at an alarming rate. Protected areas represent a potentially powerful tool for their conservation, but freshwater biodiversity remains poorly represented within the existing national protected areas networks across the hotspot.

This project has been funded by The Critical Ecosystem Partnership Fund (CEPF), a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank. A fundamental goal is to ensure civil society is engaged in biodiversity conservation.

The information presented in the project report provides the most up-to-date information on the conservation status and distribution of freshwater species and sites for Madagascar and the Indian Ocean islands.

It serves as an information cornerstone to guide conservation policy and development planning to safeguard these unique and overlooked freshwater species.



KEY MESSAGES

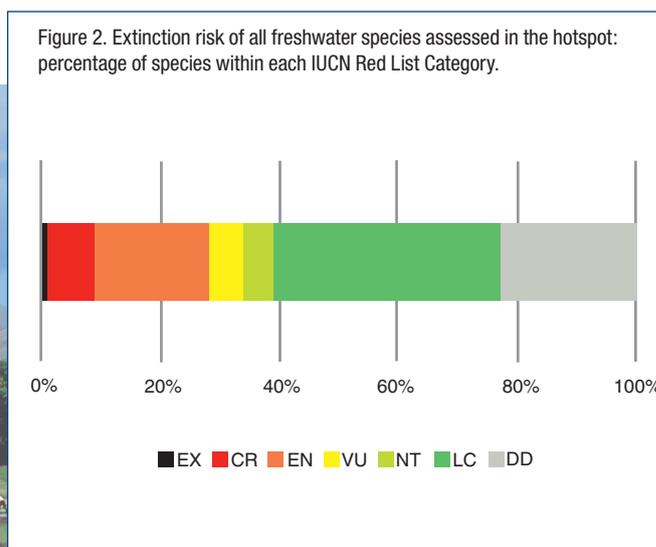
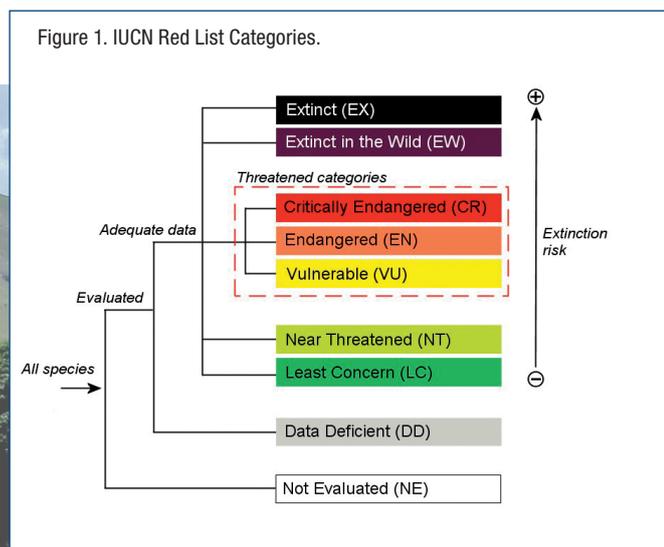
- **Forty-three percent of freshwater species in the hotspot are threatened with extinction.** This level of threat significantly exceeds that recorded for continental Africa. Without immediate action much of this unique biodiversity will be lost and the livelihoods of many people will be impacted.
- **Freshwater biodiversity is significantly underrepresented within protected areas in Madagascar,** where protected areas are primarily delineated for terrestrial species and fail to include targeted management and protection for species living in freshwater habitats. It is therefore recommended that protected areas be designated and managed for conservation and sustainable use of freshwater species.
- **The 23 Freshwater Key Biodiversity Areas (KBAs) identified here represent a network of sites** critical for the persistence of freshwater biodiversity in this hotspot. These sites serve to inform strategies for improved representation of freshwater biodiversity within the National Protected Areas System of Madagascar (SAPM) and other sites for conservation and sustainable use.
- **Management of water resources must account for the requirements of freshwater biodiversity.** Implementation of Integrated River Basin Management and Environmental Flows methodologies are crucial to maintain the quality, quantity and timing of water flows required to sustain healthy freshwater ecosystems.
- **Periodic update and monitoring of this baseline of IUCN species Red List assessments and KBAs** will enable tracking of trends in the status of freshwater species through calculation of a Red List Index for freshwater species. This index will, in turn, inform managers on the effectiveness of their management interventions.
- The new information presented here, combined with **political will and subsequent action** by the governments of the hotspot, can help to ensure the long-term survival of freshwater species and dependent human livelihoods.

PROJECT FINDINGS

Threatened species – priorities for conservation action

Six hundred and fifty-three species of freshwater fishes, molluscs, dragonflies, crabs, crayfishes, shrimps, and aquatic plants were mapped and assessed for their risk of extinction using the IUCN Red List™ Categories and Criteria. This represents **the most comprehensive assessment of freshwater biodiversity** at the species level for the hotspot. Given the wide range of trophic levels and ecological roles encompassed within these taxonomic groups, it is proposed that information on their distributions and conservation status, when combined, will provide a useful indication for the overall status of the associated wetland ecosystems.

Forty-three percent of all species assessed are threatened with extinction – see the full report for more details on this statistic. This level of threat is high in comparison with the 2011 pan-African freshwater biodiversity assessment through which 21% of species were assessed as threatened.



Species information remains very limited for freshwater species in the hotspot such that **23% of the species were assessed as Data Deficient (DD)**, meaning there was insufficient knowledge to assess their extinction risk.

Given the high levels of threat observed across the hotspot it is reasonable to expect that many of these DD species are also threatened. **There is therefore an urgent need for new field research** to better understand these species' distributions, taxonomy and population trends. Without this knowledge it will be difficult to ensure the future survival of these species.

The new information provided here on the status and distributions of freshwater species can be applied to:

- improve representation of freshwater species within protected area networks;
- guide management for freshwater species within existing protected areas;
- highlight sites in need of restoration for the freshwater species present; and
- inform Environmental Impact Assessments.

Main threats to freshwater species

Human activities identified as major threats to freshwater species across the hotspot include:

- i) **habitat loss and degradation** caused by agriculture based on unsustainable practices such as the slash and burn approach, drainage of wetlands, and wetland conversion into rice fields;
- ii) **biological resource** overuse, in particular overfishing;
- iii) **natural systems modifications** caused by dam construction, mining activities, over-abstraction of water resources;

Other major threats that are indirectly caused and exacerbated by human activities include:

- iv) **water pollution** by raw sewage and other organic wastes, and in certain areas industrial waste;
- v) competition from **invasive alien species**; and
- vi) severe droughts, floods and desertification driven by **climate change**.



Freshwater Key Biodiversity Areas (KBAs) – priority sites for conservation action

KBAs are internationally recognised sites of importance for the global persistence of biodiversity. KBAs provide a valuable tool to guide conservation action and to support strategic decisions for identification of sites for protection under international conventions and national policies, and in setting and implementing private sector environmental safeguards.

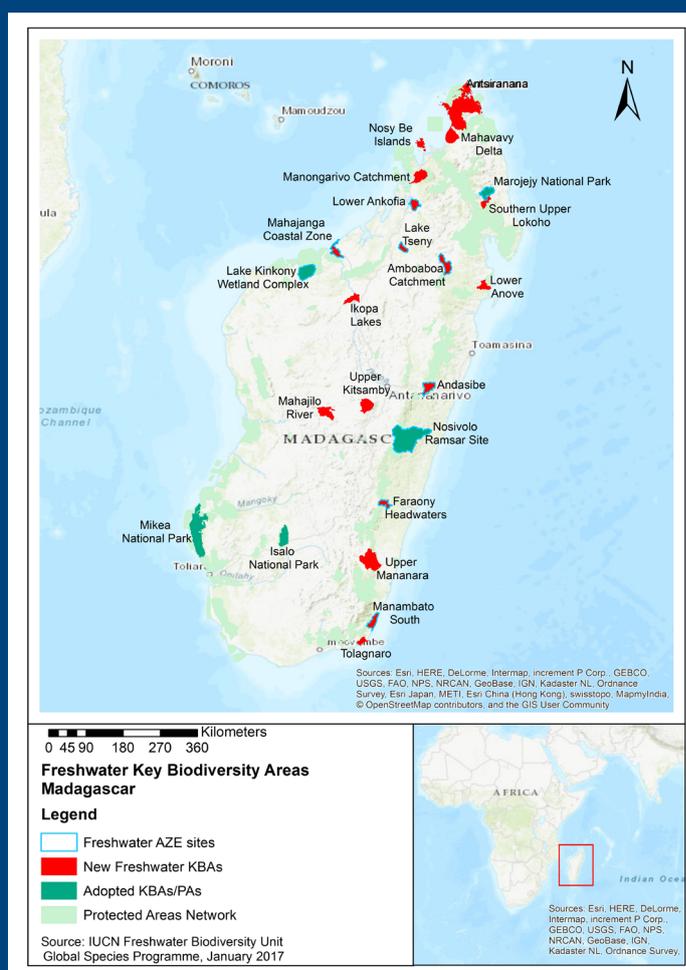
Through this project **23 important river, lake and wetlands systems were identified, mapped and validated as freshwater KBAs in Madagascar.** Ten of these sites also qualify as **Alliance for Zero Extinction (AZE) sites** – sites that each hold close to the entire global populations of Critically Endangered or Endangered species.

These KBAs support 80 globally threatened freshwater species, 62 geographically restricted range freshwater species and 10 freshwater species that aggregate in these sites during one or more key stages of their life cycle. Approximately 62% of the total area of these sites (14,761 km²) was found to lie outside the boundaries of any existing protected area, representing 19 KBAs for 77 trigger species (species that meet the KBA criteria). **These sites represent critical gaps in coverage of freshwater species within the current protected areas network.**

Where freshwater KBAs do fall within the boundaries of existing protected areas, with the notable exception of water birds, the species of concern are rarely the focus of conservation and management actions. **Targeted conservation actions for these neglected freshwater species must be incorporated within the management plans of these existing protected areas.**

Thirty-four potential Site Champions have been identified as individuals and organisations best placed to raise awareness and to help implement the required actions to safeguard these globally important KBAs.

The information presented here represents the start of a process to ensure long-term protection and management of freshwater biodiversity in KBAs. KBA national focal points and a national KBA Coordination Group must now be established to build upon this foundation for site-based protection of freshwater species.



KEY RECOMMENDATIONS FOR INTEGRATING FRESHWATER BIODIVERSITY INTO POLICY-MAKING

A) Multilateral Environmental Agreements (MEAs). The information presented here for freshwater species and KBAs will help Governments of the hotspot meet national commitments to the following MEAs:

- The **Ramsar Convention on Wetlands**, through: i) identification of potential new Ramsar sites; ii) a site gap analysis of the existing Ramsar site network; and, iii) evaluation of existing Ramsar sites that qualify as KBAs and those that do not.
- The **Convention on Biological Diversity's Aichi Targets** (in particular Targets 11 and 12), through: i) expansion of protected areas networks to better represent freshwater ecosystems; and ii) focusing conservation efforts on currently unprotected threatened freshwater species.
- The **UN Sustainable Development Goals**, through providing improved metrics, such as the Red List Index and KBAs for measurement of Sustainable Development targets such as:
 - **Target 6.5** for integrated water resources management at all levels;
 - **Target 6.6** for protecting and restoring water-related ecosystems;
 - **Target 15.1** for the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services; and
 - **Target 15.5** for urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.



B) National cross-sectorial policies. This new information on freshwater species and sites can be integrated within cross-sectorial policies for Madagascar, such as:

- The **Master Plan for Water Management** established by the Ministry of Water, Energy and Hydrocarbons which might require:
 - regulation of water abstraction in areas supporting threatened freshwater species;
 - implementation of environmental flows and integrated river basin management methodologies to maintain or restore freshwater ecosystems;
 - incorporation of freshwater species Red List assessments and KBA site data into the national geo-referenced database on hydrology;
 - management for sustainable use of freshwater species identified as important to local livelihoods.

- The **National Wetlands Strategy** established by the Water and Forests Directorate (DGEF) of the Ministry of Environment, Ecology and Forests (MEEF) and the National Ramsar Committee (CONARAMS), which might consider designation of freshwater KBAs as Ramsar sites where not already covered by the existing Protected Areas Network.
- The **National Wetland Management Guidance** process initiated by the Wildfowl & Wetlands Trust (WWT) in collaboration with MEEF and the Tany Meva Foundation, which might now expand guidance to ensure threatened freshwater biodiversity is integrated into wetland management plans.
- The **National Fisheries Policy** developed by the Ministry of Fisheries Resources (MRHP) which might:
 - develop and implement species action recovery plans for threatened freshwater fishes in Madagascar;
 - impose strict legal bans on any further introductions of freshwater fish species into lakes and river basins where not native;
 - revise the Red List of threatened freshwater fishes regularly, and as new data become available;
 - secure hydrological connectivity of river courses for safeguarding migratory routes of freshwater fishes; and
 - implement regulations and management plans to prevent overfishing.
- The **National Forestry Policy** (POLFOR), developed by MEEF and the **National Rice Policy** developed by Presidential Ministry in charge of Agriculture and Livestock (MPAE), might incorporate the KBA and species Red List data within environmental safeguards to minimise the impacts of irrigation.
- The **Energy Policy 2015–2030**, developed by the Ministry of Water, Energy and Hydrocarbons (MEEH) might integrate the KBA and freshwater species Red List data into the “**HYDRO ATLAS**” to minimise the impacts of hydropower sites on freshwater ecosystems.

Capacity Building. Capacity must be increased to ensure government bodies (national to local) are able to capitalise upon this new information on freshwater biodiversity through training in the application of biodiversity data sets to species and site based management and enforcement activities.

Environmental Safeguards. The list of freshwater KBAs and threatened species provided through this study will inform Performance Standards and Environmental Safeguard policies of donor institutions and the private sector to help avoid or minimise impacts of their operations in and around these critical sites for freshwater biodiversity in Madagascar. Efforts should be taken to ensure that this new information for freshwater biodiversity is fully utilised within these processes.

Harmonisation of Environmental Policies. Environmental policy needs to be better integrated and coordinated across sectorial policies such as energy and agriculture to avoid contradictory regulatory objectives and inconsistent financial initiatives. Without such coordination freshwater species and ecosystems will continue to decline.

MANAGEMENT RECOMMENDATIONS

- **Integrated River Basin Management (IRBM)** is recommended to better coordinate conservation, management and development planning of water, land and related resources across sectors, and to maximise the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems.
- **Environmental flows assessment methodologies** to maintain the quality, quantity and timing of water flows required to sustain freshwater ecosystems and the human livelihoods that depend on them need to be adopted by the managers of dams and irrigation schemes, accompanied by construction of mechanisms to facilitate fish passage.
- **Freshwater habitat reforestation programmes** are needed for many wetland systems, in particular in the upper catchments to reduce downstream impacts of sedimentation.
- Increased efforts are required to trace **invasive alien species** pathways of introduction in freshwater systems, prevent future introductions, and to manage or where feasible eradicate them. Information on the distribution of invasive alien species, their impacts, pathways of invasion and management recommendations can be found in the **Global Invasive Species Database (GISD)** <http://www.iucngisd.org/gisd>.
- **Local stakeholder involvement and participatory approaches** are key to ensure the legitimacy and the long-term sustainability of any conservation actions.

Where can I get more information?

- IUCN Library: Máiz-Tomé, L., Sayer, C. and Darwall, W. (eds) (2018). *The status and distribution of freshwater biodiversity in Madagascar and the Indian Ocean islands hotspot*. Gland, Switzerland: IUCN. viii+128pp.
- Red List of Threatened Species: www.iucnredlist.org
- IUCN Freshwater Biodiversity Unit: www.iucn.org/species/freshwater / Freshwater.Biodiversity@iucn.org
- World Database of Key Biodiversity Areas: <http://www.keybiodiversityareas.org/home>
- Integrated Biodiversity Assessment Tool (IBAT): <https://www.ibatforbusiness.org/>