Amphibian Biodiversity in South Africa's Mountains : The Long-toed Tree Frog as an indicator of montane ecosystem health

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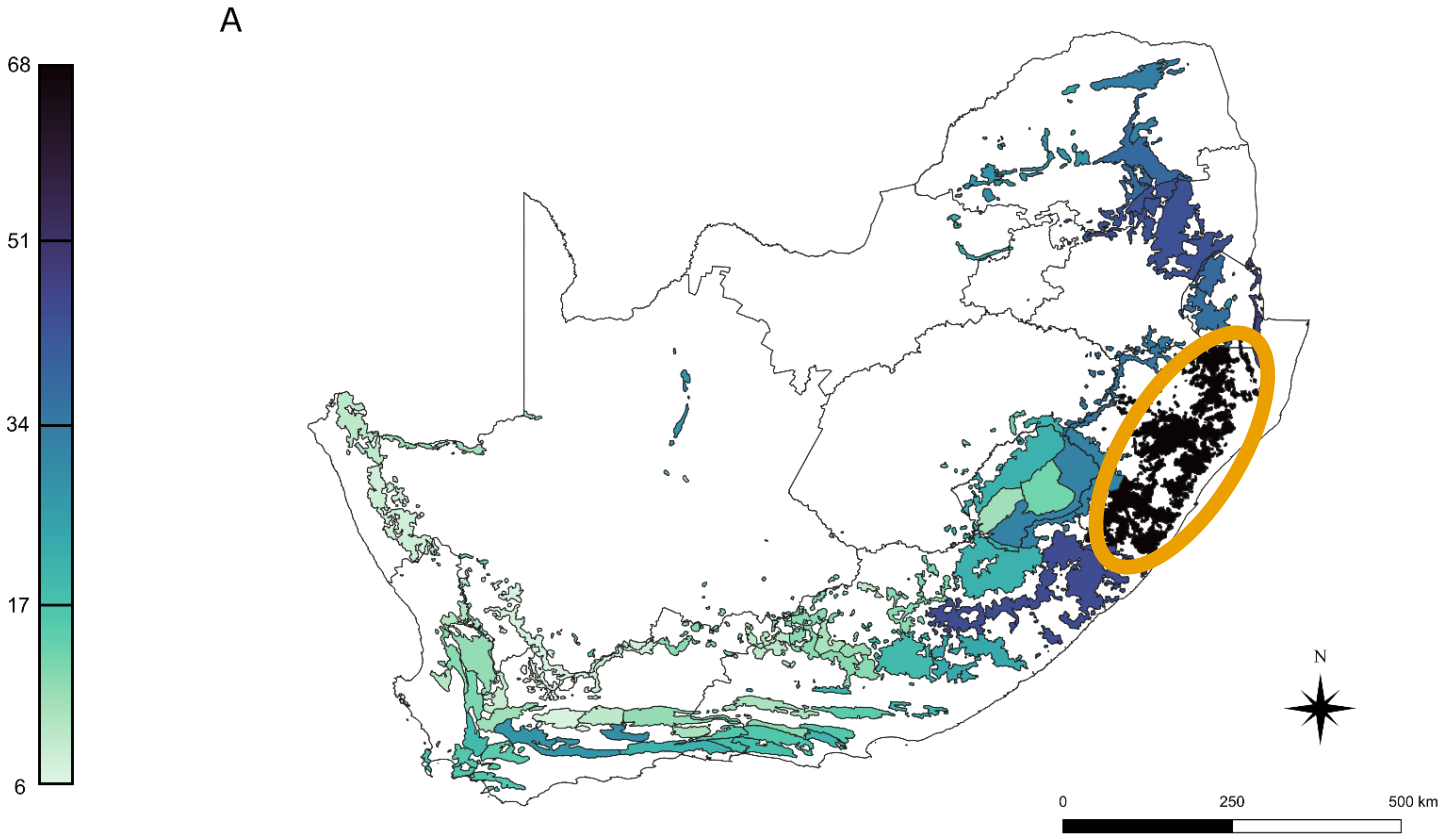
Acknowledgement

Ryan Edwards

Keir Lynch

Montane Amphibian Biodiversity

Montane Amphibian Species Richness



SA is home to 134 described species of frogs

The ranges of **98.51%** of these intersect with the GMBA montane layer

Amphibian species richness across SA's mountains ranges between 6 and 68 species

Many Western Cape species are endemic mountain specialists

Hotspots for Species Richness:

The KZN Midlands (n = 68)

Lebombo Mountains (n = 49), Eswatini Highlands (n = 40), KZN Highlands (n = 38), Soutpansberg (n = 37) and Lesotho Highlands (n = 36)

Unique Adaptations of Montane Amphibians

Adaptations to high UV

Unique Adaptations of Montane Amphibians

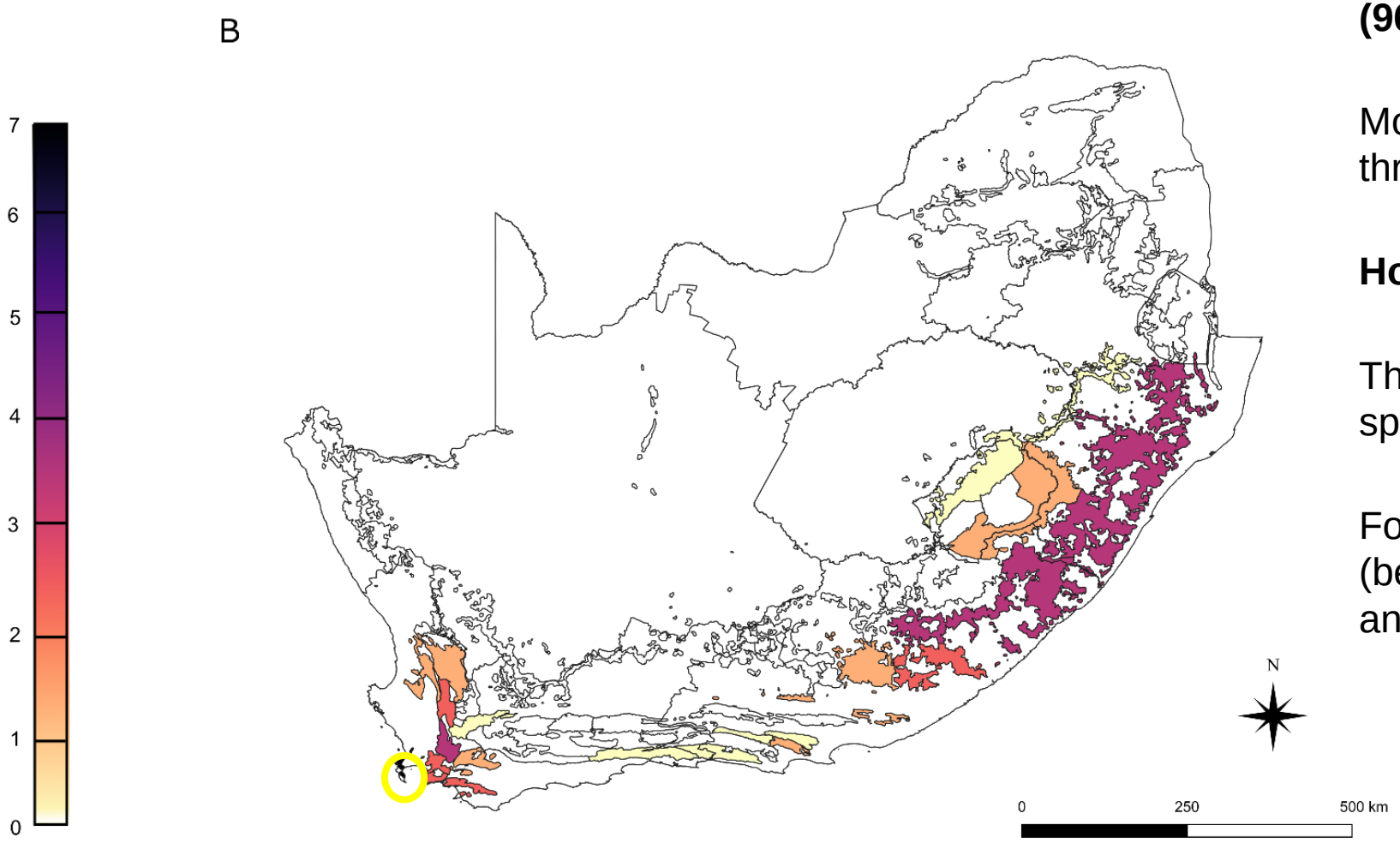
Adaptations to high UV

Resistance to extreme cold, and extreme fluctuations

Extended larval phase

(Fascinating species in Lesotho that need more research and conservation)

Threatened Species & Mountains



Of South Africa's 28 threatened species, 27 **(96.43%)** intersect with mountains

Most mountains range between 0 and 4 threatened species

Hotspots for threatened species

The highest proportion (32%) of threatened species occurs on Table Mountain (n = 7)

Followed by Cape Fold Mountains (between 17 and 14%), Cederberg (13%) and the Amatholes (10%)

Threats to frogs associated with mountains

Alien infestations

Habitat loss and fragmentation

Agricultural expansion

- Wetland Drainage
- Cultivation
- Plantations

Climate change

- Changes in precipitation
- Drying of streams
- Changes to wetland hydrology
- Increased/extreme temperatures

Examples of Threatened Montane Frogs

Rough Moss Frog - CR

Fynbos – Western Cape

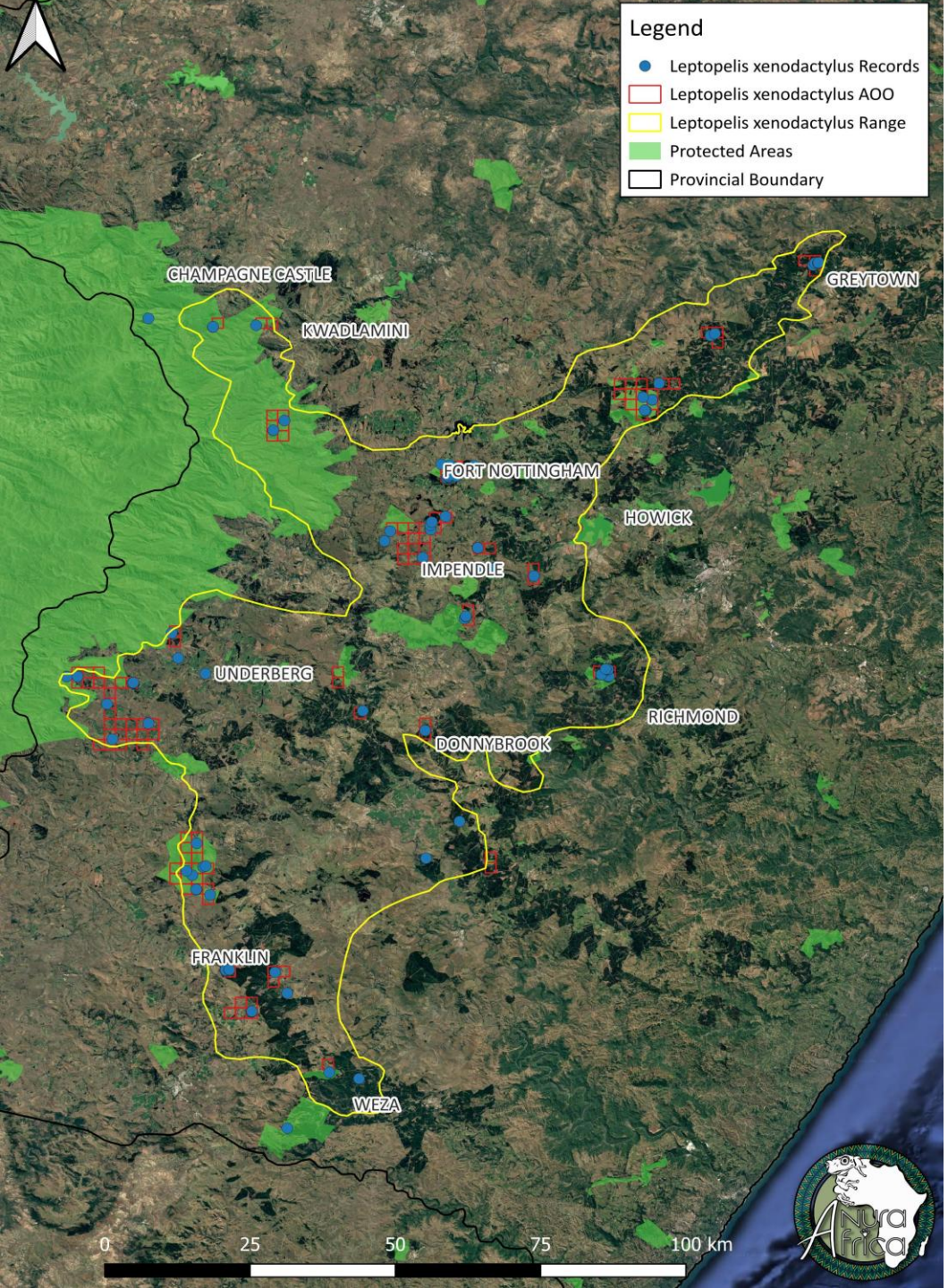
Table Mountain Ghost Frog - EN

Montane Forest – Table Mountain

Amathole Toad - CR

Montane Grassland – Eastern Cape

Our Flagship species : Long-toed Tree Frog *Leptopelis xenodactylus*



Distribution and Threat Status

Distribution

KwaZulu-Natal Midlands and Southern Drakensberg, below the escarpment (between 1000 and 2000 masl)

It occurs across less than 500km2

IUCN Threat Status

Endangered – severely fragmented, declining habitat quality and more than 75% of range outside PAs

Habitat

Temperate Alluvial Wetlands within Mooi River Highland Grassland, with soil hummocks vegetated with graminoids, where it lays its eggs

Ecology

Project objectives

Implement Species and Habitat Monitoring
To build a picture of population dynamics and assess responses to management interventions

Improve Understanding of Habitat Preferences
To support management decisions, wetland rehabilitation and identify sites for protection (key catchment identification)

Improve local capacity and awareness
The Long-Toed Tree Frog exhibits unique biological traits that help it thrive in its specific ecological niche.

Methodology:

Developing a Robust Monitoring Protocol

Species Monitoring

Passive Acoustic Monitoring (PAM)

Seasonal changes, responses to climatic variables

Non-invasive

aSCR Arrays(Acoustic Spatially Explicit Capture Recapture)

Quantitative data to estimate densities of calling males

Machine learning to develop species recognizers

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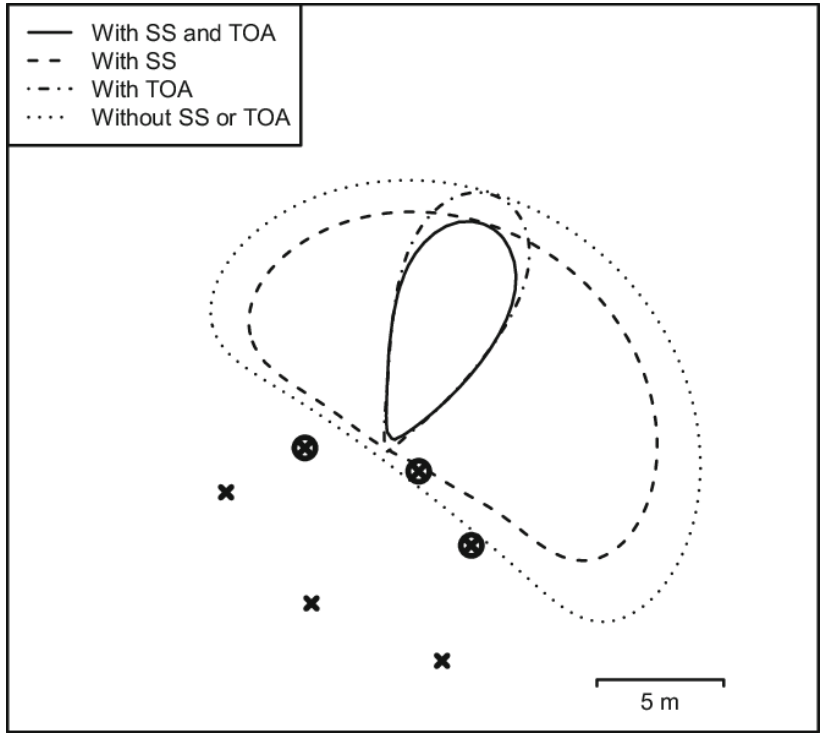
RESEARCH ARTICLE

Methods in Ecology and Evolution

A spatial capture–recapture model to estimate call rate and population density from passive acoustic surveys

Ben C. Stevenson[1] | Paul van Dam-Bates[2] | Callum K. Y. Young[1,3] | John Measey[4]



Habitat Monitoring

Wetland Health Assessments

Veg plots, disturbance units, hydrology and soil analysis

Fixed-Point Photography

Wet/Dry Season and Annual

Generating Drone Orthomosaics

Identification of veg communities and management units

Generating High Resolution Orthomosaics

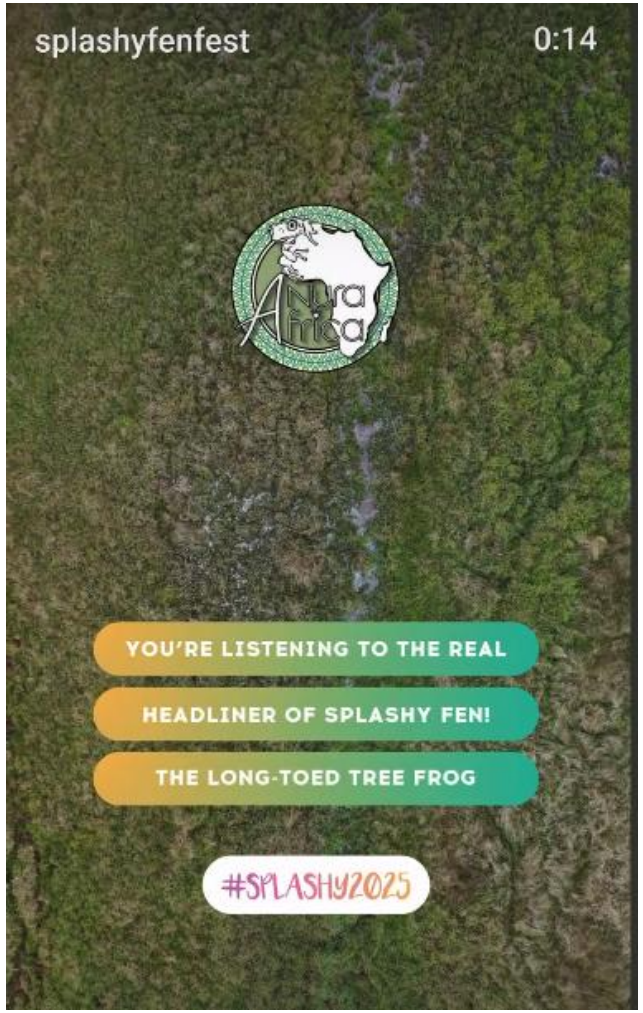
Building Baselines for Conservation Management

Establish baseline population density and understand species responses to climatic and other environmental/management variables

Knowledge on the state and condition of wetlands within project sites to guide rehabilitation needs/management advise

Incorporate wetland rehabilitation recommendations into broader management plans

Engagement



Splashy Fen Music Festival

Arts & Culture

Type locality in Underberg

Landowner engagement

HAPPY WORLD FROG DAY!

Future Directions and Conservation Outcomes

Long-Term Goals for Species Conservation

Habitat Management & Protection

Management Plans

Biodiversity Stewardship

Explore OECMs

Threat Mitigation & Population Recovery

Long-term monitoring

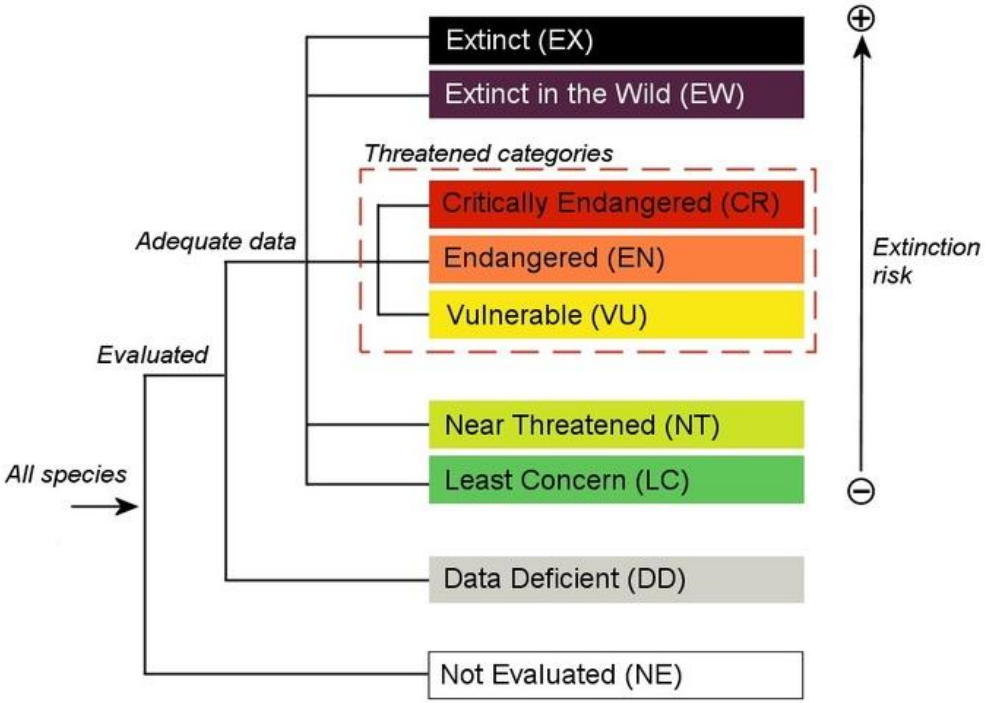
Implementation of management and rehabilitation

Community Engagement & Training

Eco-tourism opportunities

Awareness and skills development

Local conservation icon



Meeting IUCN Criteria and Supporting Red List Assessments

Importance of IUCN Criteria

IUCN criteria provide a scientific framework for assessing species' conservation status and guiding effective strategies.

Red List Assessments

Regular assessments on the Red List ensure endangered species, like the Long-Toed Tree Frog, receive necessary conservation focus.

Fulfilling Conservation Needs for Long-Toed Tree Frog

Building population indices will help improve Red List Assessments

Addressing extinction debt

Thank you

صندوق محمد بن زايد
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