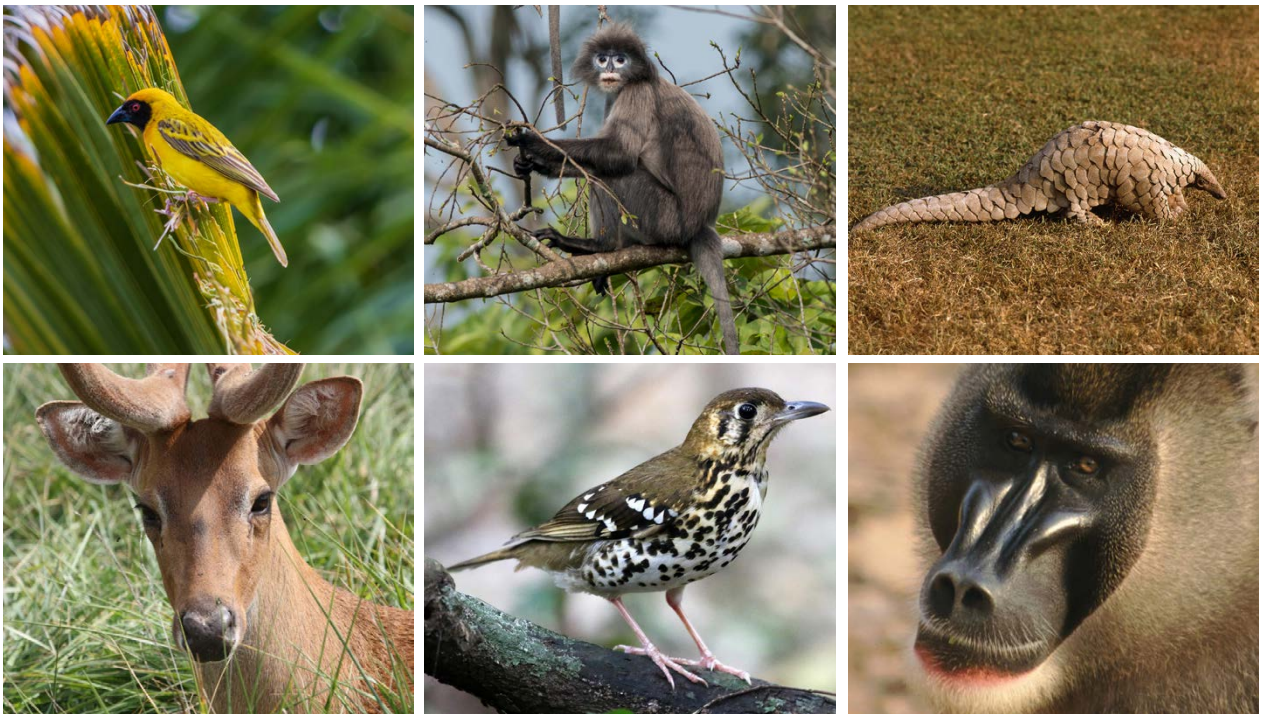
IUCN

Knowledge brief

Summary findings and practical applications of a Species Threat Abatement and Restoration (STAR) assessment in Kenya and Cameroon under The Restoration Initiative



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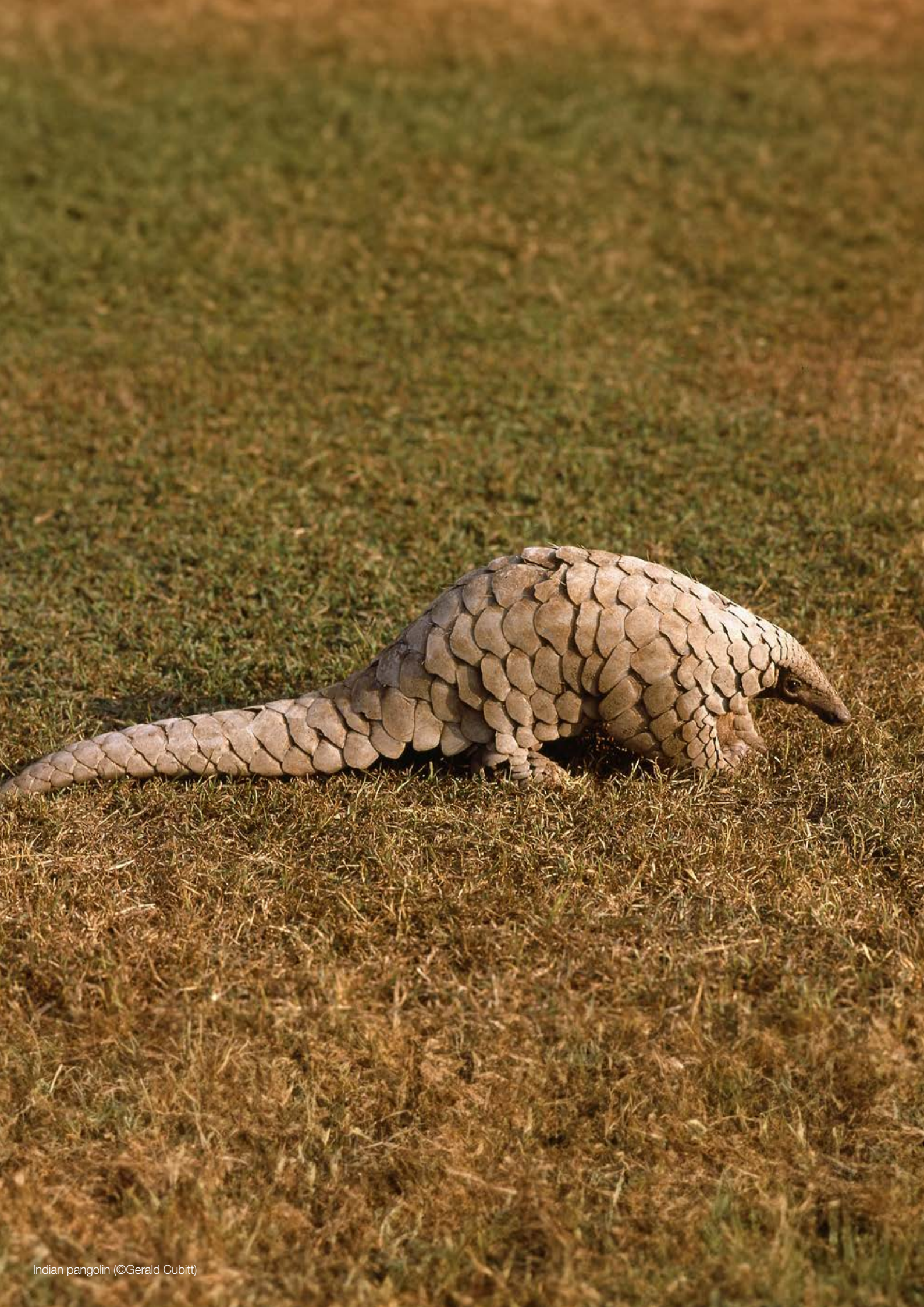

Indian pangolin (©Gerald Cubitt)

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Executive summary

This brief presents the findings from an assessment of the biodiversity conservation potential of The Restoration Initiative (TRI) project sites in Cameroon and Kenya using the Species Threat Abatement and Recovery (STAR) methodology.[1] The STAR method involves combining species-specific information with GIS technology and satellite imagery to develop spatial models estimating species' current area of habitat and lost area of habitat to develop estimated STAR scores. To determine the most effective type of activity for species recovery, the STAR method can provide separate scores for threat abatement and restoration. These estimated STAR scores should be validated by local experts to create calibrated STAR scores. It should be noted that this brief is based on estimated STAR scores that have not been calibrated. Generally, in TRI's project sites in Kenya and Cameroon, the estimated STAR restoration scores are lower, suggesting that restoration activities may be supplementary to threat reduction activities.

In Cameroon, the STAR assessment was carried out in three project sites - Douala-Edea, Mbalmayo, and Waza. The estimated total threat abatement STAR score for all areas in Douala-Edea was 48.4, compared with 2.9 in all areas in the Mbalmayo project site, and 1.2 in all areas in the Waza project site. The STAR scores indicated that the northeast portion of the Douala-Edea landscape has the greatest opportunities for species conservation among the three sites. It also found that 44% of the total STAR score for the Douala-Edea project site is associated with the abatement of threats from agricultural (non-timber) crop expansion and intensification.

In Kenya, TRI supported 2 projects: one in arid and semi-arid lands (ASAL) and the other one in Tana Delta. In Kenya ASAL, the STAR assessment was conducted across two project sites - the Mukagodo forest an the Mount Kulal community forest. The estimated total threat abatement STAR score for all areas in the Mukogodo forest project site was 13.8, and 8.9 for the Mount Kulal project site. The assessment identified the southeastern part of the buffer area of the Mukogodo forest landscape and the Mt. Kulal forest landscapes as particularly important for several threatened species and had the highest potential for species conservation. In the Mukogodo forest project site, the most significant threat abatement measures were reducing livestock farming and ranching.

The Tana Delta project site in Kenya had an estimated total threat abatement STAR score of 1.2. The assessment revealed that the northwest portion of the Tana Delta has the highest concentrations of STAR values, indicating its relative importance within the site for conservation. The project site's STAR score is primarily affected by the abatement of logging and wood harvesting activities.

The brief offers additional recommendations for the practical application and improvement of the STAR metric for future projects. Some key practical applications of the STAR metric include prioritising conservation efforts and enabling a targeted approach to conservation and restoration in areas with significant biodiversity. Additionally, the quantitative STAR scores allow for precise and standardised evaluations and comparisons between project sites. These scores can be used to justify projects to donors and decision-making bodies, communicate important information to policymakers, local communities, investors, and other relevant stakeholders, and support conservation efforts in cross-boundary landscapes. The STAR methodology can also be used to monitor project progress. Future developments in the STAR methodology will allow project teams to select specific indicators to measure progress toward target STAR scores. Key recommendations include the importance of calibration through participative approaches, sharing results with relevant stakeholders, and advocating for adoption by national governments as a consistent metric to assess actions for reducing species extinction risk.

1 Mair, L. et al. (2021). A metric for spatially explicit contributions to science-based species targets. Nature Ecology & Evolution.

Acknowledgments

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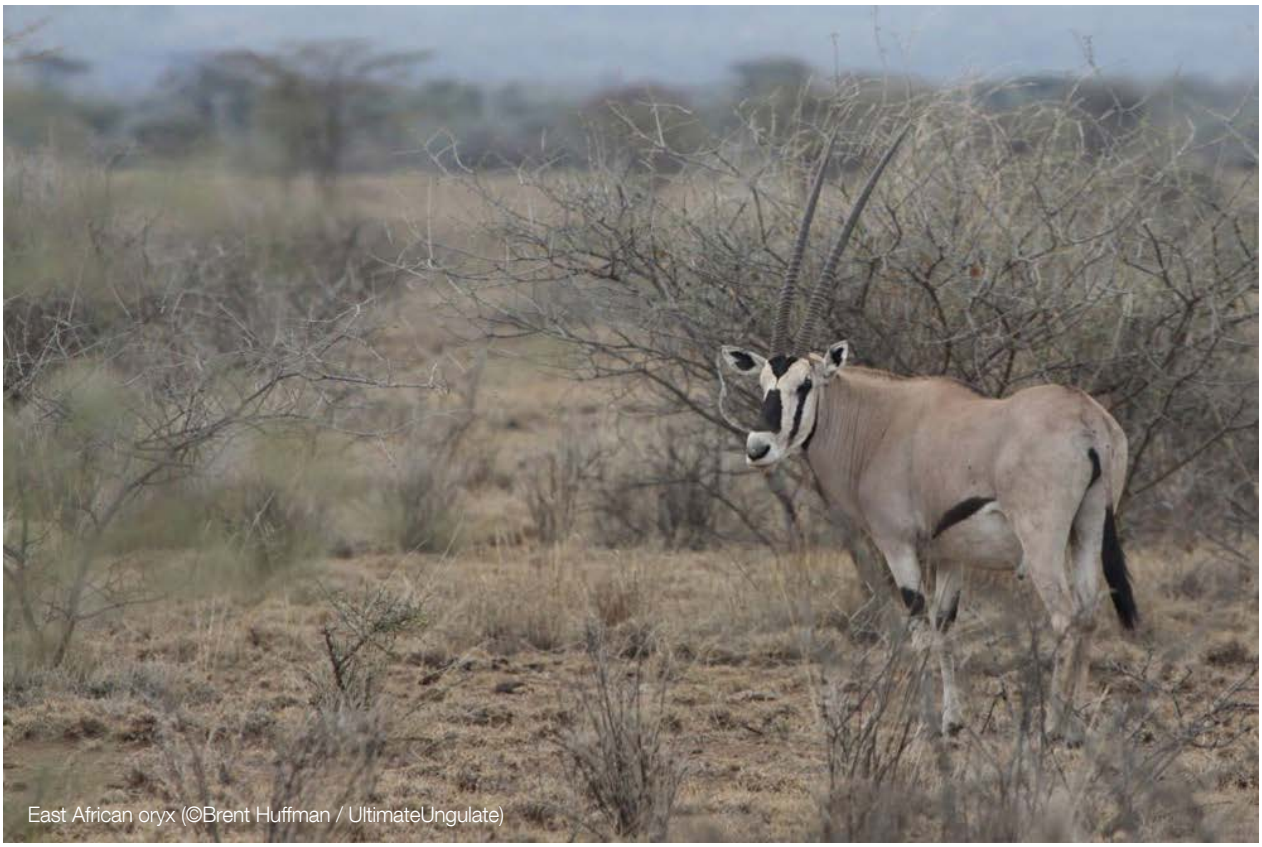
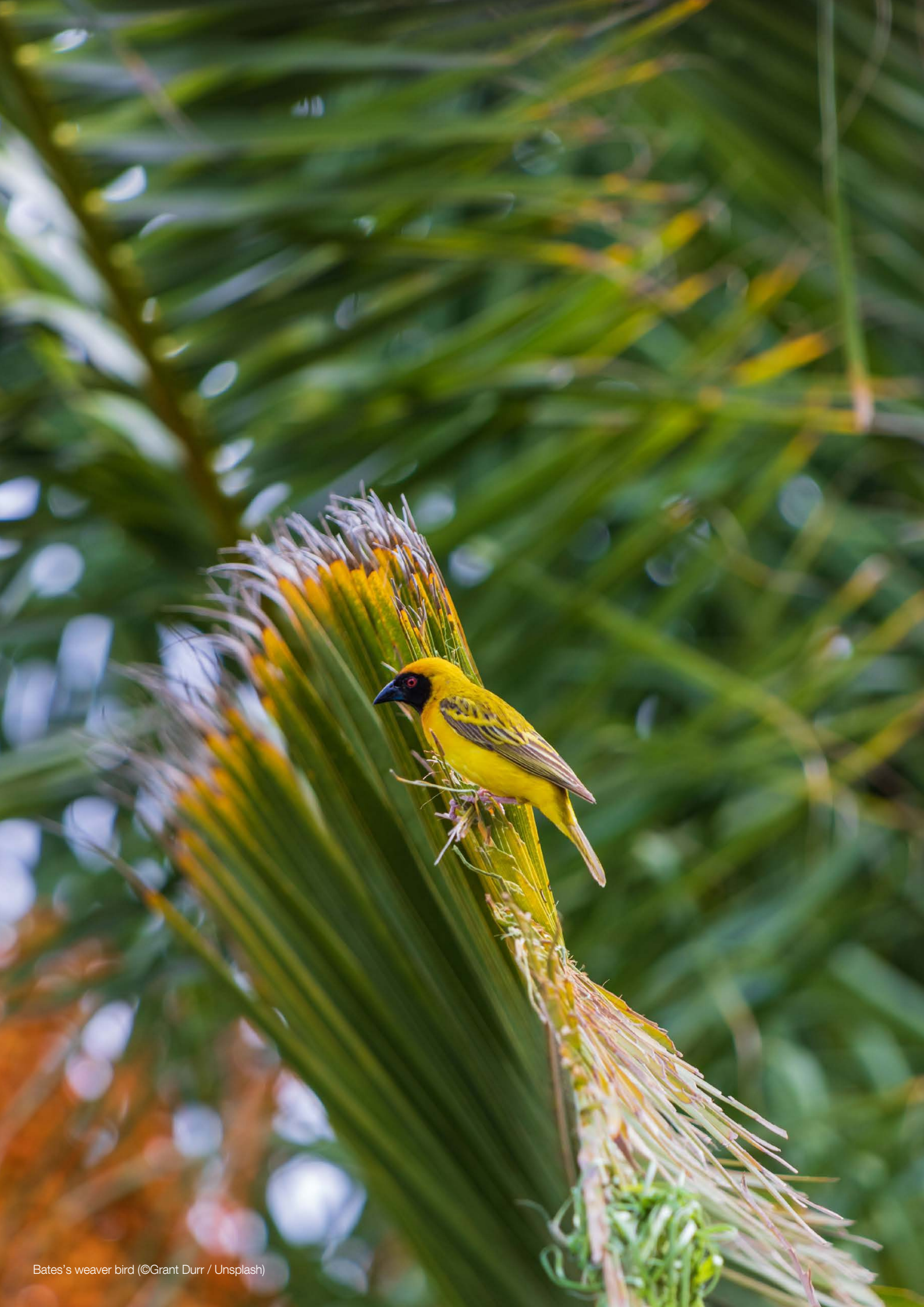


East African oryx (©Brent Huffman / UltimateUngulate)

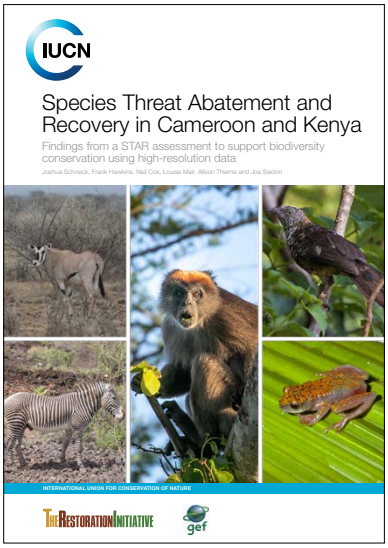


Bates's weaver bird (©Grant Durr / Unsplash)

Background

Determining the appropriate strategy to combat biodiversity loss and mitigate threats to species requires localised, readily available, and accurate information. This includes knowing where threatened species are found, the types of threats facing specific species and their significance, as well as an analysis of the potential outcomes of different actions designed to address threats to species. Competition over land use and funding constraints only adds to the need to find cost-effective and impactful biodiversity conservation and restoration methods. The Species Threat Abatement and Restoration (STAR) metric was developed in response to these needs. The metric uses data from the IUCN Red List of Threatened Species (hereafter IUCN Red List) to estimate the potential and actual impacts of actions and investments in reducing species extinction risk.

The STAR metric has been utilised in some country projects under The Restoration Initiative (TRI).[2] The main objective of TRI is to contribute to restoring ecosystem functioning and improving livelihoods through the restoration of priority degraded and deforested landscapes across 9 countries in Africa and Asia. In Kenya, the objective of TRI is to strengthen integrated natural resource management and restoration of degraded landscapes, specifically in the Mukogodo Forest and Mount Kulal arid and semi-arid landscapes (ASAL) and in Tana River Delta project sites. Likewise, TRI's project in Cameroon, specifically in the Douala-Edea, Mbalmayo, Waza sites, aims to implement and scale forest landscape restoration (FLR) to facilitate biodiversity conservation, sustainable land management, climate resilience and improved community livelihoods.



This brief presents and suggests practical applications resulting from the implementation of the STAR methodology. It draws on the findings from a STAR assessment of the biodiversity conservation and restoration potential in TRI project sites in Kenya arid and semi-arid landscapes (ASAL) and in Tana River Delta project sites and Cameroon that used satellite imagery from 2019, published in 2023. At that time, TRI project sites had already been determined as had the focus on certain threat abatement strategies. As such, the TRI project was already under way, and the STAR scores did not inform the design of the projects. Rather, the STAR assessment's main objective was to better inform conservation and restoration planning and work at project sites, and more generally, to enhance the use of STAR as a tool for restoration and conservation practitioners, communities, investors, and policymakers.

The brief is informed by a comprehensive review of the findings and key informant interviews with project team members under the TRI in Kenya and Cameroon. The interviews provided important insights into how well the STAR scores aligned with the existing focus of the TRI, if the STAR scores informed future decision-making at project sites, as well as the benefits, areas of development, and recommendations for the application of STAR. The brief outlines the STAR methodology and the findings of the assessment in Kenya and Cameroon and then connects findings to provide recommendations for the practical applications and improvements of the STAR metric for future projects.

What is the Species Threat Abatement and Recovery (STAR) metric?

The STAR metric is calculated using the IUCN Red List data.[3] The IUCN Red List provides an indicator of each assessed species' conservation status, ranging from "Least Concern," for species unlikely to become

2 The Restoration Initiative (TRI) unites 10 countries and three Global Environment Facility agencies – IUCN, the Food and Agriculture Organization of the United Nations, and the United Nations Environment Programme – along with governments and strategic partners to overcome existing barriers to restoration and to restore degraded landscapes in support of the Bonn Challenge. therestorationinitiative.org.

3 IUCN. (2024). The IUCN Red List of Threatened Species. Version 2024-1. https://www.iucnredlist.org. Accessed on 30 September, 2024

extinct in the near future, to “Critically Endangered” for species with an extremely high risk of extinction in the wild, to “Extinct,” for species that are no longer in existence. These species have the most urgent need for conservation and restoration measures. The STAR metric presently covers Red List assessed terrestrial amphibians, birds, and mammals, with plans to incorporate additional species, including reptiles and marine and freshwater species.

The STAR method involves combining species-specific information, such as the species range, habitat, and threats, with GIS technology and satellite imagery to develop spatial models estimating species current area of habitat (i.e. the areas that are presently habitable by a particular species) and lost area of habitat (i.e. the areas that were once habitable by a specific species but that are now not suitable for the specifies to inhabit, presumably due to habitat modification and destruction). The estimated STAR score is derived from global data calculated by overlaying these spatial models to assign a numerical value to each unit of the assessed area. The values are based on the conservation status of the species and the proportion of the species’ total habitat that exists within a specific project site or landscape to provide an initial understanding of the species expected to be present and the threats expected to be operating in the area.

Higher STAR values indicate areas where either threat abatement or restoration actions could contribute to the recovery of species, potentially leading to their reclassification to a lower risk category, such as “Least Concern.” To determine the most effective type of activity for species recovery, the STAR method provides separate scores for threat abatement and restoration. These estimated threat abatement and restoration STAR scores should later be validated by local experts and other stakeholders living in the area to create calibrated STAR scores. This process involves confirming the presence of species and the intensity of threats in the assessed area. This calibrated STAR data can be used for setting targets since it more accurately reflects the opportunities for reducing the risk of extinction in the assessed areas. In TRI’s project sites in Kenya and Cameroon, the estimated STAR restoration scores are generally lower, suggesting that restoration activities may be supplementary to threat reduction activities.

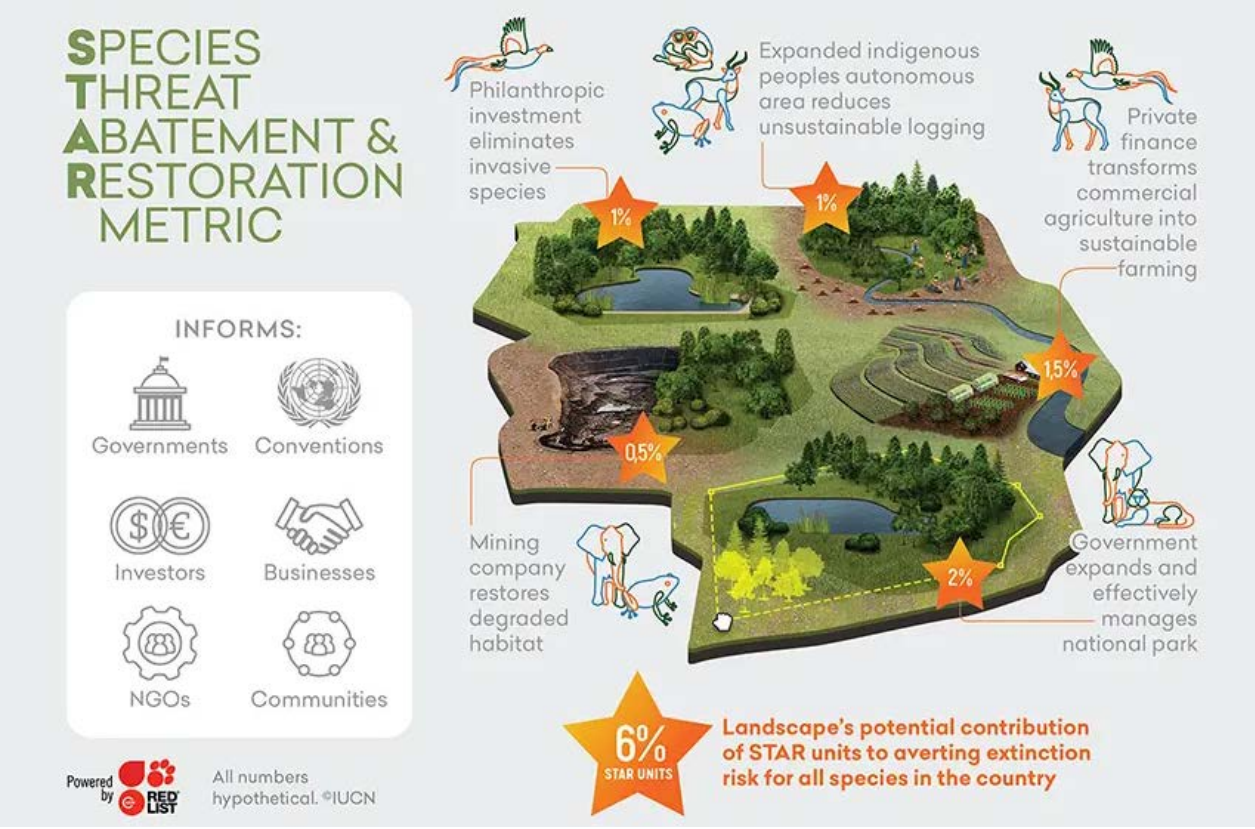
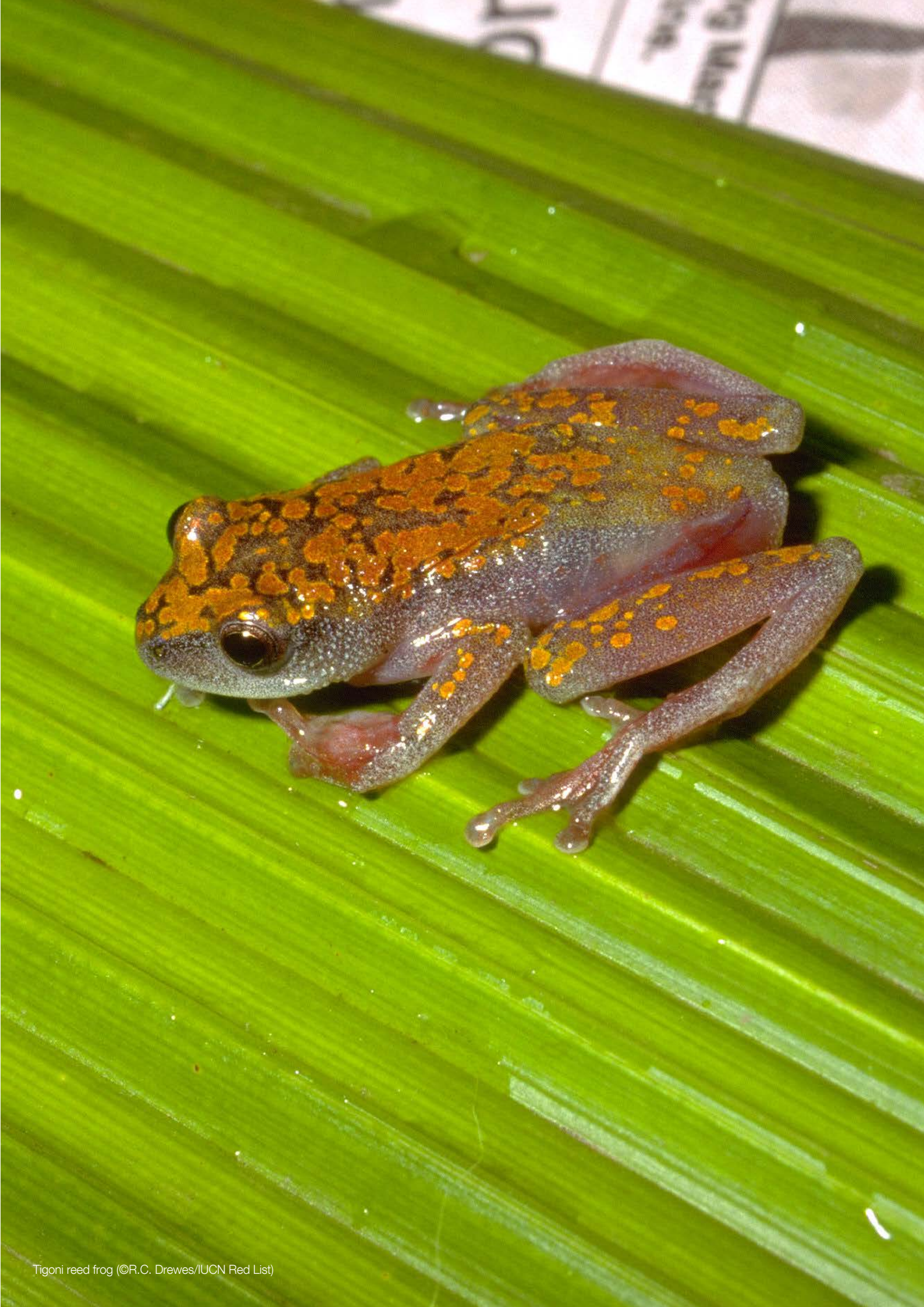


Figure 1: Summary of how Species Threat Abatement and Restoration metric works.

Credit ©IUCN



Tigoni reed frog (©R.C. Drewes/IUCN Red List)

Findings of STAR assessment report

Threats to species were identified at all six project sites in Cameroon and Kenya. It should be noted that the STAR assessments conducted in these countries' project sites were based on a desk review and did not undergo a calibration process to verify STAR scores with local specialists and stakeholders, which would have enabled a more accurate and comprehensive description of the STAR assessment. A full analysis of the STAR assessment with accompanying maps and figures is found in Schneck J., Hawkins F., Cox N., Mair L., Thieme A. and Sexton J. *Species Threat Abatement and Recovery in Cameroon and Kenya: Findings from a STAR assessment to support biodiversity conservation using high-resolution data* report published in 2023.

A Note on STAR Restoration Scores

Schneck J., Hawkins F., Cox N., Mair L., Thieme A. and Sexton J. *Species Threat Abatement and Recovery in Cameroon and Kenya: Findings from a STAR assessment to support biodiversity conservation using high-resolution data* report published in 2023 excludes restoration scores since in most project sites the restoration values calculated in the assessment were significantly lower than the threat abatement scores. This would have presented challenges in developing a consistent scale for maps to show both threat abatement and restoration scores. However, it is important to note that even though restoration values are not considered in the findings of the report and in the summaries below, this does not mean that restoration STAR scores do not provide useful information or, more broadly, restoration activities do not yield positive effects for species recovery.

Restoration Scores

The total estimated STAR scores for restoration reflected below are calculated using the raw data from the STAR assessments using high-resolution satellite imagery from 2019. For each project site, the restoration score for each polygon was added up to calculate the total estimated restoration STAR scores.

Cameroon Project Sites

- Douala-Edea Total Estimated Restoration STAR Score: 24.18
- Mbalmayo Total Estimated Restoration STAR Score: 0.53
- Waza Total Estimated Restoration STAR Score: 0.14

Kenya ASAL Sites

- Mukogodo Forest Total Estimated Restoration STAR Score: 0.68
- Mount Kulal Community Forest Total Estimated Restoration STAR Score: 0.09

Kenya Tana Delta:

- Kenya Tana Delta Total Estimated Restoration STAR Score: 7.7

Cameroon project sites:

The Republic of Cameroon has a diverse ecological landscape. Cameroon's network of biomes, which includes all types of forests, tree systems, savannahs, agricultural mosaics, drylands, etc., are progressively confronted by various forms of degradation. The overall objective of TRI in Cameroon is to support the implementation and scaling up of FLR in the country. The STAR assessment in Cameroon was conducted at three TRI project sites: Douala-Edea, Mbalmayo, and Waza. The estimated total threat abatement STAR score for all areas in Douala Edea was 48.4 compared with 2.9 in all areas in the Mbalmayo project site, and 1.2 in all areas in the Waza project site. Therefore, the STAR scores identified the Douala-Edea landscape, specifically the northeast portion, as potentially having the greatest species conservation opportunities among the three sites. The STAR score is mainly attributed to two threatened species at the Douala-Edea project site – the Dizangue Reed Frog *(Hyperolius bopeleti;* IUCN Red List Classification: Vulnerable) and the Apouh Night Frog *(Astylosternus schioetzi;* IUCN Red List Classification: Endangered) – which accounted for 86% of the total threat abatement STAR score for all the three project sites.

The STAR assessment identified that 44% of the total STAR score for the Douala-Edea project site is associated with abatement of threats from agricultural (non-timber) crop expansion and intensification. Other significant potential contributions to the STAR score reduction include the abatement of residential and commercial development (43%) and logging and wood harvesting (10%). These scores indicate that if these threats were reduced, the STAR score would also fall, suggesting a reduction in the species extinction risk of the site. Reducing agricultural (non-timber) crop expansion and intensification (24%) were also considered as having the most significant contribution to the STAR score at the Mbalmayo project site, followed by invasive species (19%) and natural system modification (18%). In contrast, at the Waza project site, the primary contribution to the STAR score was abatement hunting (24%), followed by livestock farming and ranching (21%), and agricultural (non-timber) crop expansion and intensification (11%).

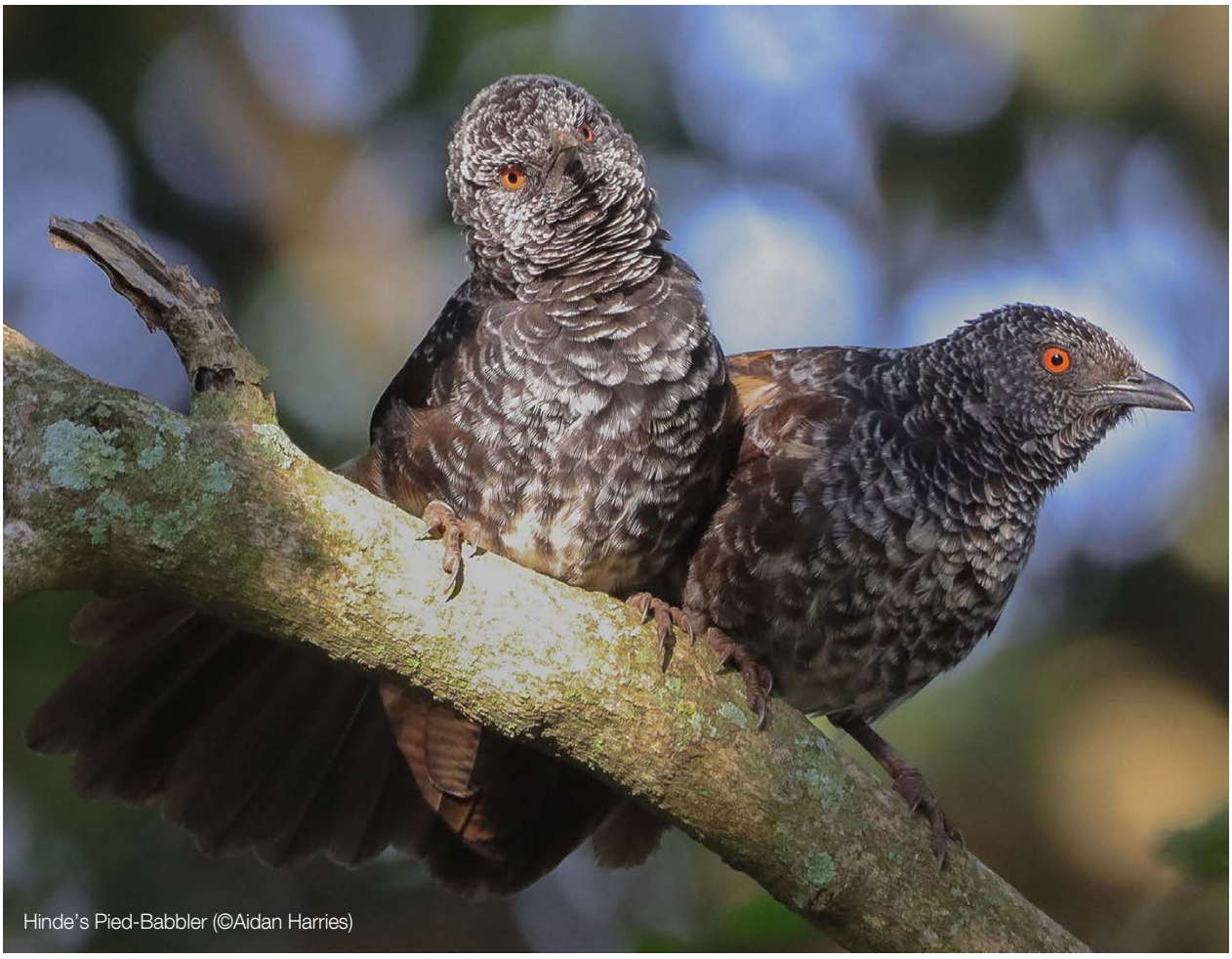
Kenya arid and semi-arid lands (ASAL) TRI project sites:

The TRI in Kenyan arid and semi-arid lands (ASAL) aims to restore deforested and degraded lands through the FLR approach and enhance the socio-economic development of local communities through the development of bio-enterprises of Non-timber Forest Products (NTFPS). The STAR assessment in the Kenya ASAL project sites was conducted in two TRI project sites, Mukogodo forest and the Mount Kulal community forest. The estimated total threat abatement STAR score for all areas in Mukogodo forest project site was 13.8 and 8.9 in the Mount Kulal project site. Fifteen threatened species contributed to 90% of the total threat abatement STAR score. The majority of these species are found in savannah and grasslands (13 of 15) or shrublands (12 of 15), and some in forests (6 of 15).

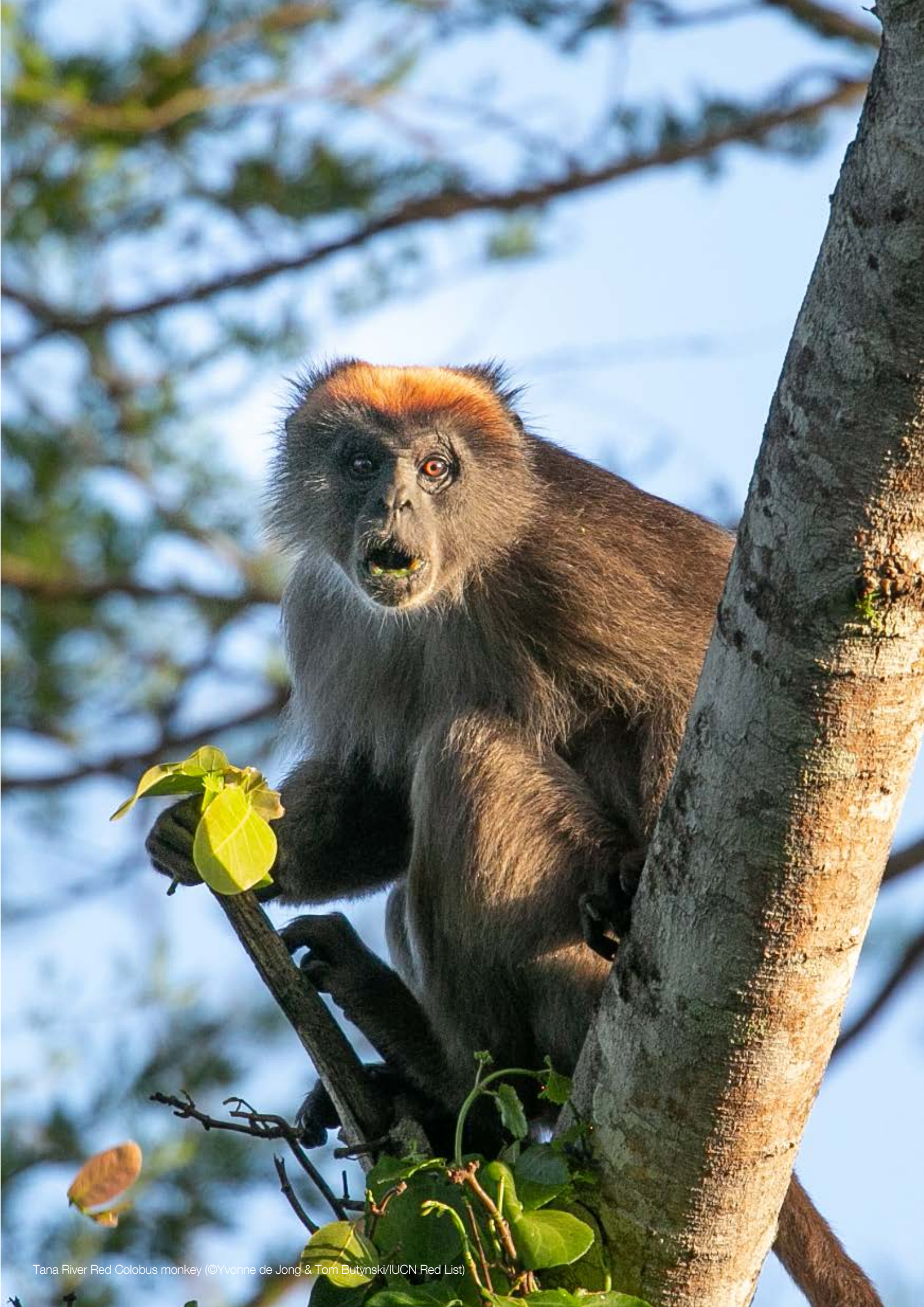
The STAR assessment identified the southeastern part of the buffer area of the Mukogodo forest landscape and the Mt. Kulal forest landscapes (both project and buffer areas), as well as some smaller forest remnants, as particularly important for several threatened species. In the Mukogodo forest project site, the most significant threat abatement measures that would contribute to the STAR score included targeting threats from livestock farming and ranching (18%), natural system modification (16%), hunting (15%), non-timber crops (14%), human disturbance (13%), and other threats. Similarly, at the Mount Kulal project site, significant threat abatement measures that would contribute to the STAR score include targeting threats from livestock farming and ranching (23%), hunting (17%), natural system modification (16%), and human disturbance (13%) and other lesser threats.

Kenya Tana Delta project sites:

The overall objective of the TRI Tana Delta project is to strengthen integrated natural resource management and restore degraded landscapes in the Tana Delta. The STAR assessment in the Tana Delta focused on three key species: the Tana River Red colobus monkey (*Piliocolobus rufomitratus*; IUCN Red List status: Critically Endangered); the Sokoke dog mongoose (*Bdeogale omnivora*; IUCN Red List status: Vulnerable); and the Spotted ground thrush (*Geokichla guttata*; IUCN Red List status: Endangered). The estimated total threat abatement STAR score for all Tana Delta project site areas was 1.2. The assessment showed that the northwest portion of the Tana Delta has the highest concentrations of STAR values, indicating its relative importance within the site for conservation. The project site's STAR score is primarily affected by the abatement of threats targeting logging and wood harvesting activities (22%). Following that in decreasing severity, other threat abatement measures impacting the STAR score include targeting threats from natural system modification (including changes to natural hydrology) (20%), non-timber crop production (16%), invasive species (9%), climate change and severe weather (8%), as well as other lesser threats.



Hinde's Pied-Babbler (©Aidan Harries)



Tana River Red Colobus monkey (©Yvonne de Jong & Tom Butynski/IUCN Red List)

Practical applications of the findings

Prioritise conservation and restoration efforts within and among project sites

The project site maps in Kenya and Cameroon depict the areas with higher STAR values, indicating the relative concentration of species facing extinction risk within project sites.[4] These maps provide valuable insights for prioritising conservation efforts, enabling a targeted approach to areas with greater biodiversity significance. The additive breakdown of STAR scores in each project site by threat provides additional information on which threats contribute most to the extinction risk at each site. This breakdown can further focus conservation efforts and threat-reduction measures to address the specific threats impacting the species within each project site.

In Kenya Tana Delta, for example, the results from STAR showed that the highest concentrations of STAR values are in the Northwest part of the project site, indicating their relative importance for conservation within the site. Initially, TRI in Kenya Tana Delta focused on the Southern portions of the Delta. However, through the STAR results, the project expanded its efforts to include the North. During this process, the project team in Tana Delta partnered with the Kenya Institute of Primate Research (KIPRE) to conduct research on primates in the Delta. STAR enabled the Kenya project to look beyond the original project boundaries, consider expanding the scope, and introduce new interventions.

In addition, the overall STAR scores of a site can be compared with scores of other sites, allowing conservation work to be prioritised among different project sites. Comparing sites enables project managers to identify which would significantly contribute to reducing species extinction. When combined with cost data, such as land value or the cost of threat mitigation actions, this information could be used to allocate scarce financial resources to maximise conservation outcomes cost-effectively.

Organise cross-boundary conservation and restoration projects

Comparisons in project site STAR scores could extend to cross-boundary landscapes. For example, the Waza project site in Cameroon is located close to the borders with Nigeria and Chad; future STAR assessments could extend into the cross-boundary landscapes to create a fuller picture of the threat abatement and restoration opportunities. Cameroon is one of six countries that encompasses the Congo Basin, including Central African Republic, Democratic Republic of the Congo, Republic of the Congo, Equatorial Guinea, and Gabon. The Congo Basin is home to the second largest rainforest in the world and an area of significant importance for biodiversity. Many endangered species inhabit the Congo Basin. The STAR methodology could enable countries in the Congo Basin to work together in a more organised way and produce better results.

Integrate STAR findings into justifications for restoration

STAR provides quantifiable results which enables project teams to compare potential for threat abatement and restoration opportunities with other sites consistently. Previously, project teams in Cameroon, for example, relied on qualitative descriptions, but the STAR assessment assigns a value to these descriptions. This quantification of results allows for more precise and standardised evaluations and comparisons between project sites. Similarly, the Kenya Tana Delta project team had an existing threat analysis underway before the STAR assessment was conducted. The team indicated that the STAR complemented this existing analysis by providing additional quantitative justification to the project activities.

4 Schneck, J., Hawkins, F., Cox, N., Mair, L., Thieme, A. and Sexton, J. (2023). Species Threat Abatement and Recovery in Cameroon and Kenya: Findings from a STAR assessment to support biodiversity conservation using high- resolution data. Gland, Switzerland: IUCN.

Monitor project results and assess specific indicators to measure the impact of interventions

The STAR assessments in Kenya and Cameroon were conducted using satellite imagery from 2019. This data could be used as a starting point to measure the effectiveness of future conservation efforts. This could be done by repeating the assessments using imagery from later years after conservation efforts have begun, or by conducting on-the-ground surveys to gather information about threatened species.

Target STAR represents the desired reduction in threats or restoration of a habitat in a particular area, as contributions towards reducing species extinction risks. project teams can select specific indicators to measure progress towards these targets. Realised STAR can then be used to report progress against targets. This is calculated based on selected indicators to measure threat reduction or restoration progress, and it articulates the contribution of interventions towards reducing species extinction risk.

Selecting the right indicator to monitor progress in reducing threats or restoring habitats can be a challenging task. There is ongoing work to provide guidance on how to choose these indicators. It is essential for the indicator to be closely related to the status of the species at the site. For example, if agriculture is causing habitat loss in a particular area, then the amount of natural habitat converted to agriculture each year could be a suitable indicator for calculating Target and Realised STAR scores. An upcoming publication will further explain how the Target and Realised STAR should be implemented.[5]

Use STAR Findings to identify new threats and economic sectors impacting species negatively

STAR findings of the threat abatement strategies that contributed most significantly to the STAR score generally aligned with the threats and economic sectors identified by the TRI project teams. However, the STAR findings revealed some new threats and prioritised the significance of the abatement of specific threats. In Cameroon, the TRI project initially focused on land restoration and paid less attention to the impact on species. The STAR assessment provided valuable additional information related to the risks to species. At the TRI Cameroon Waza project site, hunting accounted for the highest (24%) of the total STAR score compared to other threats. Interviews with the project team revealed that the STAR assessment affirmed the importance of involving local populations living in and around the restoration areas, recognising that human-wildlife conflict is a significant risk to the species. The STAR assessment results also provided evidence of the economic sectors posing risks to species in the assessed area. Project teams indicate that these results could be used to start discussions with the identified economic operators and collaborate with them to develop strategies that minimise their impact.

Leverage STAR findings to support government restoration action and donor discussions

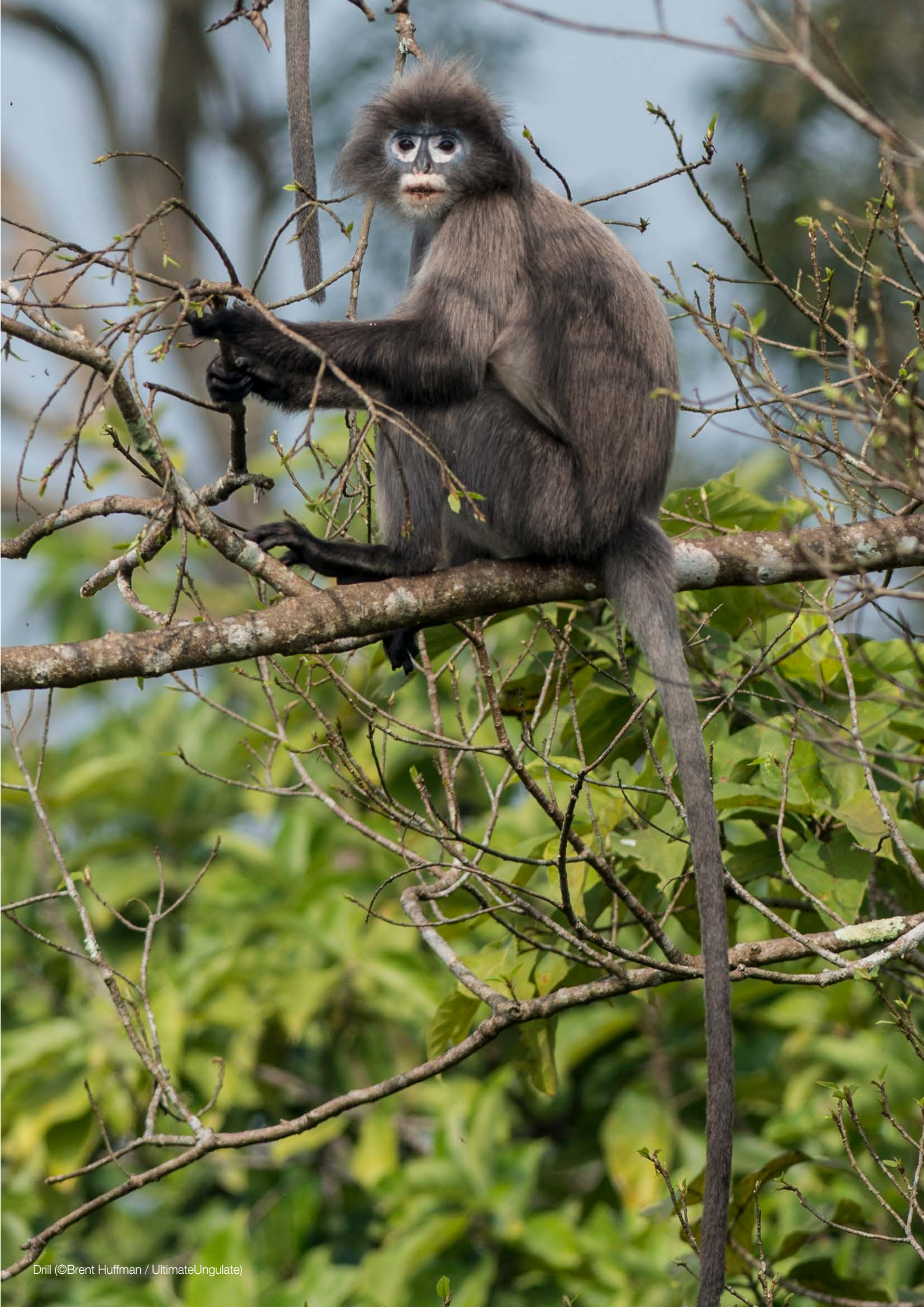
The STAR results on priority threatened species and actions to reduce species extinction risk can be used in communicating the importance of these project sites and conservation measures to policymakers, local communities, investors, and the broader public. For example, the STAR results allowed the Cameroon project team to advise the government more effectively on the most valuable restoration measures to take and where to focus their investments. In the face of limited resources, STAR assessments are a valuable tool for governments to identify priority areas for restoration, like the Douala-Edea landscape, that would offer the greatest opportunity for mitigating threats to biodiversity. STAR can also assist the project team in making informed decisions when approaching multilateral partners and donors for support.

5 For the latest information on STAR, please see: https://iucn.org/resources/conservation-tool/species-threat-abatement-and-restoration-star-metric

Use STAR to target restoration efforts, reduce threats to species and achieve climate and biodiversity commitments

The STAR method is currently being considered for evaluating contributions under the Kunming-Montreal Global Biodiversity Framework. STAR findings for project sites can help guide actions within the country of the project site to support international and national climate and biodiversity commitments. For instance, Cameroon has pledged to restore over 12 million hectares of deforested and degraded land by 2030 as part of the Bonn Challenge initiative. This commitment, the largest in the species-rich Congo Basin, is a significant endeavour. STAR can provide insights in to how to reduce threats to species, determining if and where restoration efforts would be the most effective.

Spotted ground thrush (©Andrew Spencer)



Drill (©Brent Huffman / UltimateUngulate)

Conclusion and recommendations

The results from the STAR assessments are intended to inform the work of existing TRI projects, including sites in Cameroon and Kenya, and also to support the conservation and restoration of threatened species worldwide. The STAR methodology is continuously being refined to create a comparable, scalable, and verifiable measure that can be trusted and utilised by a wide range of stakeholders. The following recommendations indicate some of the ways STAR methodology can be further utilised in the Kenya and Cameroon sites and more generally.

Recommendations

Calibrate STAR assessments through local knowledge

The STAR assessments conducted in Kenya and Cameroon calculated an estimated STAR score. This score is based on global data and provides an initial estimation of species and threats expected to be in the area. Calibration is required to confirm the estimated STAR data through validation from local experts and communities residing in the assessment area.

Calibration is a critical truth-grounding exercise and should take a participatory approach, involving focus groups and interviews with relevant stakeholders such as government officials, researchers, and communities residing in the assessment area. The calibrated STAR integrates the local information from the specific assessment area and confirms species presence and threat presence and intensity. Calibrated STAR should be used for target setting, as it more accurately reflects the opportunities for extinction risk reduction in the assessment area.

In the Tana River Delta project, for example, the estimated STAR score focused on three threatened species: the Tana River Red colobus monkey, the Sokoke dog mongoose, and the Spotted ground thrush. However, the project teams included and emphasised the importance of the risks facing the Tana River Mangabey (*Cercocebus galeritus*). The Kenya project team suggested that the use of data from the IUCN Red List may have limited the estimated STAR score, as additional species information not listed in the Red List informed their project design. Therefore, calibration is critical to identifying insights and relevant information not captured in the estimated STAR score.

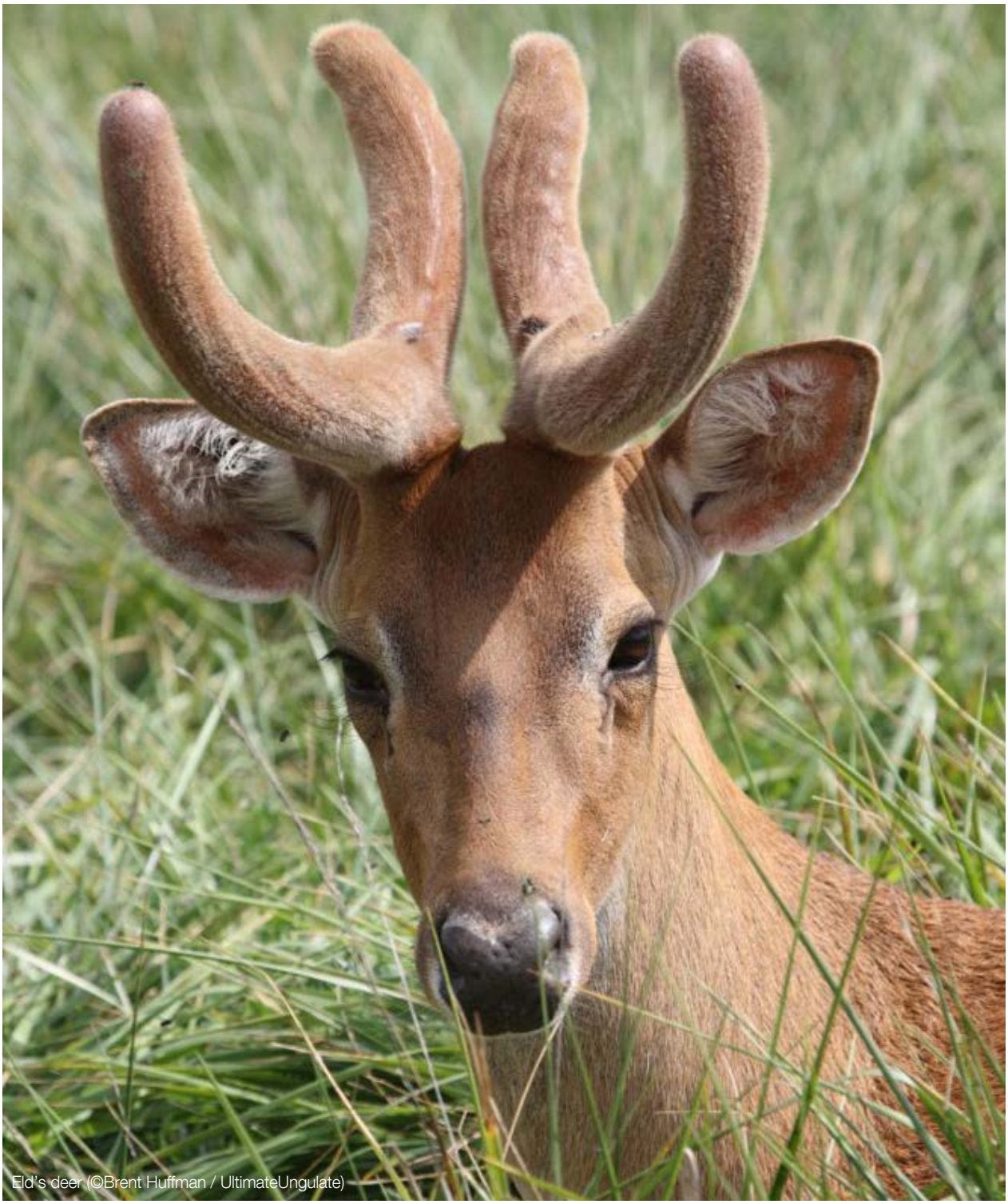
Similarly, the Mukogodo Forest project site further highlighted that estimated STAR scores often do not reflect the reality of certain projects. In Mukogodo Forest, the estimated STAR findings for the Kenya ASAL project sites identified ranching and livestock as significant threats. However, the project teams described that many farms and ranches in this area have been converted into conservancies, transforming the threat of livestock and ranching into a means of supporting conservation and restoration efforts. While the estimated STAR might identify livestock farming as a threat, local expertise integrated into the calibrated STAR shows that livestock farming can be sustainable and contribute to conservation. The STAR score for livestock farming would then be adjusted between estimated and calibrated STAR to reflect this change in threat.

Socialise STAR results across stakeholders

STAR assessment results should be socialised with relevant stakeholders and decision-makers to ensure acceptance. Government officials may be less inclined to accept the data if they do not see their views represented in the research. Conducting stakeholder interviews can help create a sense of ownership over the results and facilitate and mobilise action plans based on those results.

Advocate for STAR assessment to be adopted by national governments as a consistent metric to assess actions for reducing species extinction risk

At present, there is no consistent, recognised methodology for assessing the impacts of actions and investments aimed at reducing species extinction in many of the project countries. Multiple methodologies exist, which hinders effective project coordination. National governments, particularly in countries that include cross-boundary landscapes, such as those in the Congo basin, could benefit from adopting the STAR assessment to enable better coordinated and effective approaches to reducing risks to species across national boundaries.



Eld's deer (©Brent Huffman / UltimateUngulate)

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