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Keystone protected areas are vitally important for nature conservation and socioeconomic opportunity in Africa.

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Summary

Natural ecosystems provide immense value for biodiversity, communities, and climate mitigation. Recognizing this, all African nations signed the Kunming-Montreal Global Biodiversity Framework in December 2022, which calls for the conservation of 30% of land and oceans for nature by 2030. Also in 2022, at the first African Protected and Conserved Area Congress held in Rwanda, African leaders issued the Kigali Call to Action for People and Nature, which emphasizes the vital role of protected and conserved areas in contributing to economic development, supporting livelihoods and cultures, and safeguarding nature.

While landscape conservation requires a variety of instruments, legally designated and well-managed protected areas can play an important role by providing safe refuges for species that could rewild landscapes beyond their boundaries, as well as safeguarding critical ecosystem services for millions of people. Well-resourced management of protected areas can radiate both conservation and economic benefits out into the broader landscape. As such, protected areas can become "keystones" for wider landscape conservation. Some protected areas are particularly important keystones. In this article, we identify 162 existing protected areas in Africa that have the potential to collectively make a disproportionately large contribution to biodiversity conservation. For example, they make up ~2% of Africa's protected areas yet cover ~34% of protected land and contain 71% of the threatened vertebrate species on the continent. We call these protected areas "Keystone Protected Areas" as they are critical to a wider arch of conservation efforts and can spur action in the landscapes surrounding them. With this approach, we propose a way of thinking about the identification of important areas that are both resilient and play a disproportionate role for biodiversity, and consequently providing ecosystem services.

This paper is the result of a research collaboration between *African Parks Network, Frankfurt Zoological Society and Wildlife Conservation Society*, as well as independent experts Ashley Robson and Peter Lindsey—supported by the Rob Walton Foundation. This report aims to provide a start to a conversation that is designed to be ongoing. Note that this document was not published in academic journals and is not peer reviewed at this point.

> **We propose a way of thinking about identifying important areas that are both resilient and play a disproportionate role for biodiversity, and consequently providing ecosystem services.**

In December 2022, all African countries committed to the Kunming-Montreal Global Biodiversity Framework (GBF) – a historic agreement on immediate actions on safeguarding nature.[1] Target 3 of the GBF, otherwise referred to as '30x30', targets the conservation of at least 30% of terrestrial, inland water, and of coastal and marine areas by 2030, through effectively managed protected areas (PAs) or other effective area-based conservation measures (OECMs).[2]

Achieving 30x30 could have beneficial impacts on millions of people across Africa because sustainably managed PAs are important catalysts for long-term socioeconomic development, reducing poverty and increasing the well-being of rural populations.[3] They deliver multiple ecosystem services, including carbon storage and watershed protection, and in Africa, are a dominant source of foreign exchange, with wildlife tourism generating over US$29 billion annually and employing 3.6 million people.[4] This tourism opportunity can have a multiplier effect on neighbouring landscapes by incentivising local communities to establish wildlife conservancies rather than convert natural habitats to agriculture. The Maasai Mara in Kenya is a good example of this; where the conservancies surrounding the PA add up to its equivalent in size.[5]

However, conserving and managing landscapes across 30% of Africa's terrestrial area alone will be a significant task. Reported PAs currently cover ~17% of the African continent, and as such, the political commitment to 30x30 represents a need for an additional ~4.1 million sq.km. of area to be effectively managed and protected.[6] Conservation at that scale will require the full suite of PAs and other effective area-based conservation measures, recognising indigenous and traditional territories where applicable, and integration into wider landscapes prescribed by Target 3 of the GBF.[7] Conservation of marine environments is equally important to meet GBF targets but is not considered here.

We posit that large, relatively intact, connected, diverse, well-managed PAs can be at the heart of such efforts. Here, we set out to identify these "Keystone Protected Areas" (Keystone PAs). We propose a way of thinking about the identification of important areas that are both resilient and play a disproportionate role for biodiversity, and consequently providing ecosystem services. This approach is just one of many possible methods and generates an initial potential list of Keystone PAs. We also lay out how this identification of Keystone PAs can be further improved in subsequent iterations.

All of Africa's ~7,800 PAs (and many areas outside of PAs) are important for ecological function, but within these, there is a subset that provides disproportionately large benefits for biodiversity and has strong resilience to climatic shocks. The high-quality management of these Keystone PAs should be seen as a catalyst for high-quality management of all PAs and landscapes beyond PAs. Keystone PAs can radiate their impact on PAs and landscapes beyond their boundaries, by being a stronghold for wildlife populations, not only by providing ecosystem services to adjacent landscapes, but also by providing conservation management practices and a conservation talent pipeline for the broader landscape and beyond.

1 UN CBD. 2024. United Nations Convention on Biological Diversity Kunming-Montreal Global Biodiversity Framework
2 Target 3 – Kunming-Montreal Global Biodiversity Framework
3 Ferraro et al. Conditions associated with protected area success in conservation and poverty reduction. *PNAS*.
4 Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology and Evolution*.
5 KWCA 2024. Kenya Wildlife Conservancies Association.
6 UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [On-line], 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net.
7 KM-GBF 2022. https://www.cbd.int/gbf/targets/3

Identifying potential Keystone PAs

To identify potential Keystone PAs, we followed a two-step methodology. First, we conducted a quantitative analysis using a Conservation Value Index (CVI) that integrates several biodiversity parameters (provided below), resulting in a ranked list of PAs based on their conservation value. From this, first we identified statistical outliers – PAs with a CVI score 1.5x above the interquartile range – which could be considered disproportionately important. Second, the list of outliers was validated via qualitative expert assessment to address any anomalies, mainly arising from data deficiencies. Our focus was on nationally designated terrestrial PAs larger than 100 sq. km. (n=2,323), as smaller areas do not play a disproportionate Keystone role and are not as resilient to threats such as climate change.[8,9] Although smaller PAs may not play a Keystone role, they can still be important in other ways, e.g., as stepping stones for landscape connectivity, or for tourism, culture, or the protection of specific species.[10]

The conservation parameters in the quantitative analysis were chosen to capture a holistic view of both the role and condition of a PA:

a. ***Irreplaceability:*** This assesses how crucial a PA is for species survival, indicating the availability of alternative conservation options. Fewer alternatives signify greater irreplaceability.[11]

b. ***Connectivity:*** This gauges the significance of a PA in maintaining network-wide connectivity, evaluating the impact of its potential loss.[12]

c. ***Integrity:*** This reflects the condition of a PA, using human influence as an indicator of human activity-induced degradation. Lower human-driven influence denotes higher integrity.[13]

For the CVI, we calculated the geometric mean of irreplaceability and connectivity for each PA and scaled this by the integrity score (average human influence in the area).

In this first iteration, the analysis did not consider Madagascar or marine habitats. Protected areas in Madagascar have high endemicity and different levels of connectivity, making comparison with mainland Africa challenging. Similarly, marine habitats require different methodology and analysis to identify Keystone areas, with data availability and quality often more challenging. Both Madagascar and Africa's marine habitats are crucially important for biodiversity and livelihoods, and no doubt contain many Keystone PAs, and we look forward to identifying these in subsequent iterations of this research.

8 WDPA 2021. World Database on Protected Areas.
9 Biodiversity data for the marine realm is too limited to do a meaningful broad scale outside in assessment such as this. However, Sala et al. 2021 "Protecting the global ocean for biodiversity, food and climate" prioritised areas for marine protection.
10 Lindenmayer 2018. Small patches make critical contributions to biodiversity conservation. *PNAS*.
11 Methodology from Le Saout, S. et al. 2013. Protected areas and effective biodiversity conservation. Science (1979) 342, 803–805. https://doi.org/10.1126/science.1239268
12 Pathways methodology from McRae, B.H., Kavanagh, D.M., 2011. Linkage Mapper Connectivity Analysis Software. Seattle, WA. Centrality methodology from McRae, B.H., 2012. Centrality Mapper Connectivity Analysis Software. Seattle, WA. and McRae, B.H., Shah, V.B., 2009. Circuitscape users' guide online. Santa Barbara.
13 Integrity calculations based on data from Sanderson et al. 2022. March of the Human Footprint. Available at: https://wcshumanfootprint.org

This analysis is an asset mapping exercise, not a prioritisation, because it informs the potential actions to be taken.[14,15] It simply identifies PAs that are disproportionately important for biodiversity conservation, have high likelihood of resilience in a changing climate, critical for ecosystem service provision and that could act as anchors for larger landscape conservation efforts.

Out of 2,323 PAs with geospatial data available and meeting the size threshold analysed, 229 were statistical outliers with exceptionally high CVI scores. Field experts working across 22 African countries from participating organisations (African Parks, The Wildlife Conservation Society, and the Frankfurt Zoological Society) validated these outliers and the top-ranked ~10% of other sites (n=29) using field experience to improve accuracy in Keystone designation. Expert judgement, necessary for filling gaps in data or correcting anomalies in the CVI, was guided by transparent criteria (see section on interpreting the Keystone list below) and consensus among the group members.

[14] Tallis et al. 2021. Prioritizing actions: spatial action maps for conservation. *ANYAS*.
[15] Game et al. Six common mistakes in conservation priority setting. *Conservation biology*.

Figure 1. Map of Africa's Keystone PAs.

The 162 Keystone Protected Areas

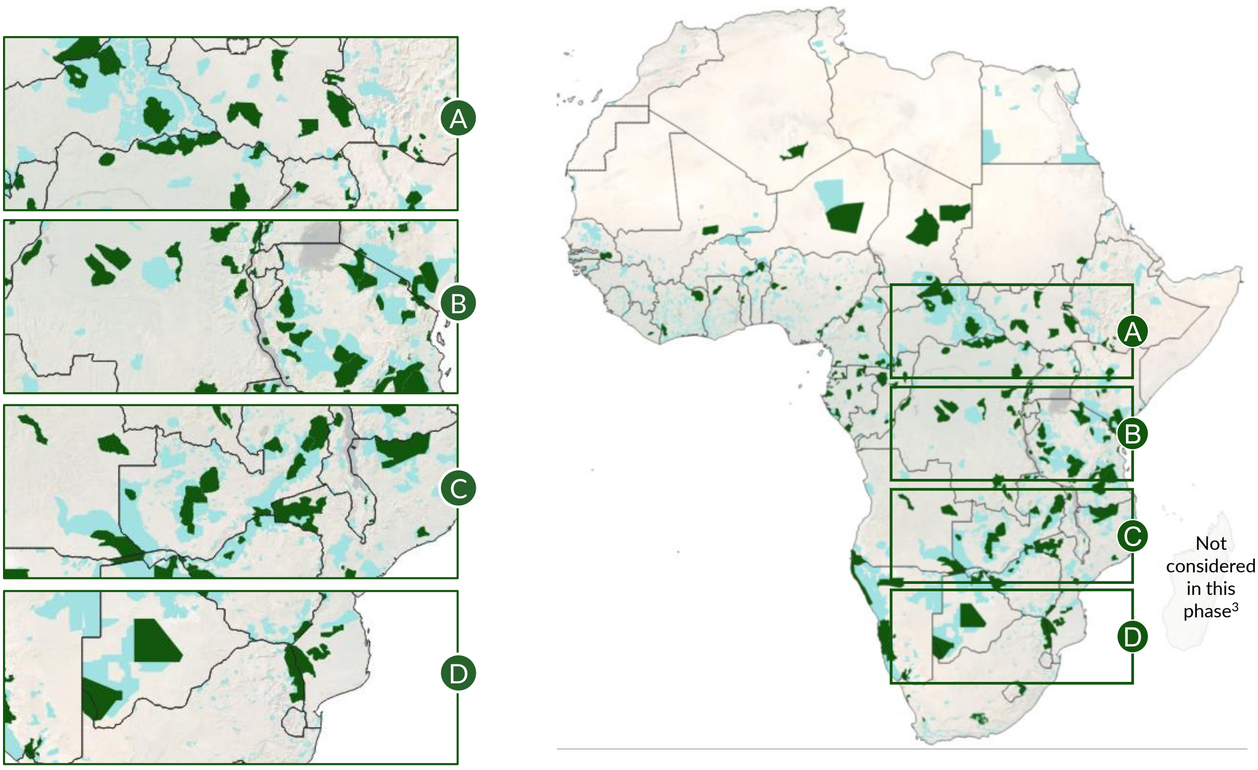
Conservation Value Index (CVI)[1]

PA assessment:

- Keystone PAs
- Other PAs

Keystone PA

Keystone Protected Areas (PAs) are statistical outliers[2] in the CVI score that were then validated by experts



1. The CVI is calculated using the geometric mean of irreplaceability (species ranges within PAs), connectivity maintenance, and habitat integrity.
2. Statistical outliers were identified as PAs scoring higher than the upper quartile by 1.5 x interquartile range.
3. Madagascar will be run separately as a second land mass; these boundaries are not a reflection of the author's endorsement of the presented political boundaries. Boundaries are taken from the World Bank. Dotted boundaries demarcate disputed territories as defined by the World Bank.

Source: Country boundaries taken from World Bank (2025). Available at: https://maps.worldbank.org/; Map relief taken from ESRI (2024). Available at: https://www.arcgis.com/home/item.html?id=9c5370d0b54f4de1b48a3792d7377ff2; Protected areas taken from UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [On-line], 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net. Methodology for irreplaceability taken from Saout, S. et al. 2013. Protected areas and effective biodiversity conservation. Science (1979) 342, 803–805. Available at: https://doi.org/10.1126/science.1239268. Connectivity pathways methodology from McRae, B.H., Kavanagh, D.M., 2011. Linkage Mapper Connectivity Analysis Software. Seattle, WA. Connectivity centrality methodology from McRae, B.H., 2012. Centrality Mapper Connectivity Analysis Software. Seattle, WA. and McRae, B.H., Shah, V.B., 2009. Circuitscape users' guide online. Santa Barbara. Integrity calculations based on data from Sanderson et al. 2022. March of the Human Footprint. Available at: https://wcshumanfootprint.org/

The potential Keystone PA List

The statistical analysis, along with field expert input, identified 162 PAs which play an outsized role in biodiversity conservation and therefore potential Keystone PAs (Figure 1). The list includes many iconic PAs such as *Virunga National Park* in DRC, *Serengeti National Park* in Tanzania, and *South Luangwa National Park* in Zambia. It also includes some less well-known PAs such as *Chinko* in CAR, the *Udzungwa Mountains* in Tanzania, and *Mulanje Mountain Forest Reserve* in Malawi.

When field experts refined the list of 229 PAs, they removed 96 because recent field observations demonstrated that the area is degraded beyond practical or near-term repair, or because there are more appropriate Keystone areas nearby. The experts also added 29 PAs for reasons such as being a source populations for multiple other PAs or being a key habitat for particular species in the region. This resulted in a final list of 162 Keystone PAs.

The average size of a Keystone PA is ~9,100 sq. km., well above the average of the other ~2,000 PAs analysed which is only ~1,300 sq. km. Because of their size, Keystone PAs cover a disproportionate 5% of Africa's terrestrial area and ~34% of Africa's total formally protected land area.

Figure 2. Map of landscapes around Keystone PAs.

Conserving Keystone PAs could have a positive cascading impact on 385 PAs in the landscapes directly around them

Key

- Keystone PA
- Adjacent non-Keystone PA

385

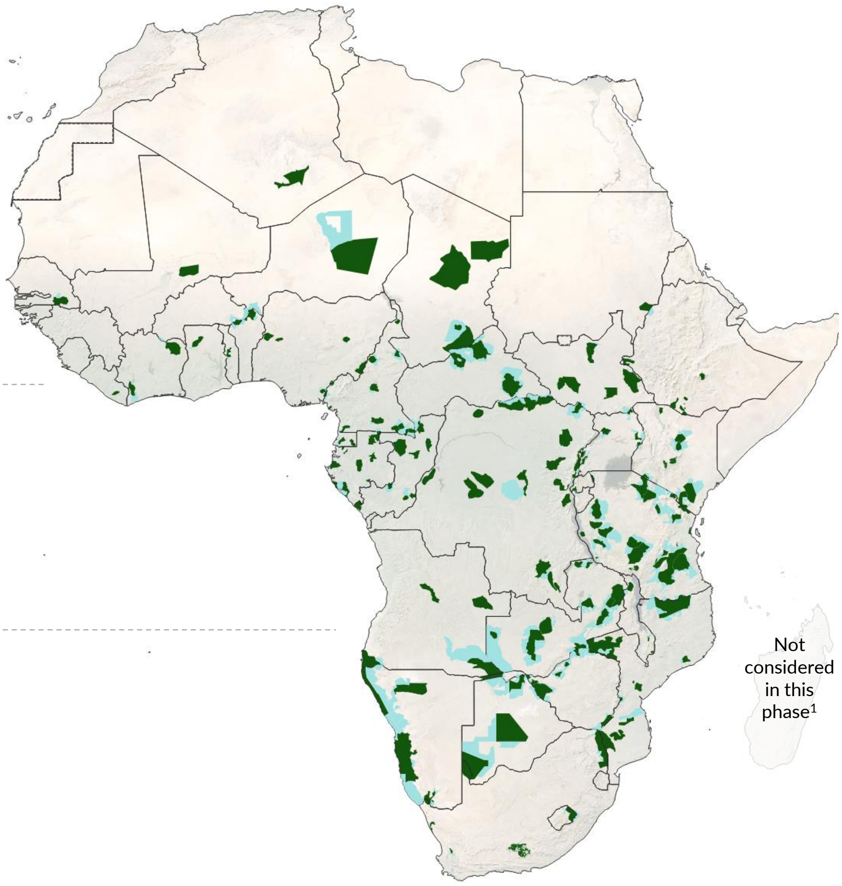
Formally designated PAs are found adjacent to Keystone PAs

2,400 km²

Average size of adjacent non-Keystone PAs

43

Different types of ecosystems present in adjacent non-Keystone PAs



Note: Adjacent PAs are defined as those within 1km of a Keystone PA
1. Madagascar will be run separately as a second land mass; these boundaries are not a reflection of the author's endorsement of the presented political boundaries. Boundaries are taken from the World Bank. Dotted boundaries demarcate disputed territories as defined by the World Bank.

Source: Country boundaries taken from World Bank (2025). Available at: https://maps.worldbank.org/; Map relief taken from ESRI (2024). Available at: https://www.arcgis.com/home/item.html?id=9c5370d0b54f4de1b48a3792d7377ff2; Protected areas taken from UNEP-WCMC and IUCN (2024), Protected Planet: The World Database on Protected Areas (WDPA) [On-line], 2024, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net.

Figure 3. The benefits of Keystone PAs

Keystone protected areas are crucial for biodiversity, ecosystem services, and meeting GBF targets

Keystone PAs comprise only 2% of African PAs, yet the below statistics show they make a disproportionate contribution

Area coverage	**34%** Of protected land in Africa	**5%** Of terrestrial Africa
Species extinction	**71%** Of **currently threatened species**[1] in Africa are within Keystone PAs	**17%** Average threatened species **ranges protected** in Keystones
Ecosystem services	**5.8 billion** **Tonnes of carbon stored**[2], representing 43% of carbon stored in protected land and 8% of total carbon stored in Africa	**47%** Of **water provisioning services** from PAs are provided by Keystones[3]

1. Includes assessment of amphibians, birds, freshwater fish, mammals, reptiles as provided by IUCN IBAT in May 2024; included statuses are Vulnerable, Endangered, Critical Endangered
2. Includes both above and ground carbon
3. Assessed as cumulative populations downstream of the PA of concern. Some PAs may overlap in their impact if they are part of the same watershed

Source: Methodology and analysis from Robson et al. Species ranges and threatened status for birds from BirdLife International (2020). Available at https://datazone.birdlife.org/. Species ranges and threatened status for other animal groups from IUCN (2024). Available at: https://www.iucnredlist.org/. Biomass and soil organic carbon stocks data from Soto-Navarro et al. (2020). Available at: https://doi.org/10.1098/rstb.2019.0128. Water provision (water capture) taken from Döll, Kaspar, and Lehner (2003). Available at: https://doi.org/10.1016/S0022-1694(02)00283-4. Water provision (water delivery) taken from Bondarenko et al. (2020). Available at: doi:10.5258/SOTON/WP00684.

There are 385 other PAs adjacent to the Keystone PAs[16] (Figure 2). If Keystone PAs are managed well enough to catalyse conservation efforts beyond their boundaries, they could create a huge cascading beneficial impact on these adjacent areas.

The Keystone PA list consists of primarily government-managed PAs. However, we find that ~3% (n=5) of the Keystone PAs are community conservancies (or other community-owned management categories). Examples include *Sera Community Nature Reserve* and *Melako Community Conservancy* in Kenya. Lower representation of community areas is in part be due to the analysis being restricted to areas that had some formal designation. This excludes large areas of land with otherwise important conservation value and critical to the landscape.

Outsized benefits created by Keystone PAs

Keystone PAs provide substantial benefits for both threatened biodiversity and human society. Nearly three quarters (71%) of the threatened species in Africa occur in a Keystone PA, and on average have 17% of their range overlapping with it. These places could therefore be important refuges.

Keystone PAs hold 5.8 billion tons of stored above- and below-ground biomass carbon, which is ~43% of carbon in PAs and 8% of the total above- and below-ground biomass carbon stored in Africa. Ensuring this is not released through habitat degradation or unsustainable land use is essential for mitigating climate change. Keystone PAs also provide water provisioning services. Keystone PAs have an outsized importance for this, representing 47% of the water provisioning services for nearby populations across all PAs.

[16] We considered areas adjacent if their boundaries were within 1 km of each other.

Interpreting the Keystone PA List

While prioritization can be valuable to inform policy, operational, and funding decisions, an exercise in shortlisting such as this will be scrutinised and must credibly answer questions such as *why is this PA selected and not that one?* This section details some of the key drivers behind Keystone selection. We also discuss sensitivity analyses that may provide confidence in the results, and the caveats associated with the work, to help readers answer the above question.

> This report aims to provide a start to a conversation that is designed to be ongoing

The Keystone PA list should be viewed as a live list that should be continually or periodically updated, rather than as a static product. Through continual data and methodological advances, and perhaps a broader, more systematic expert outreach, we anticipate that the list will improve and become more robust with time. In addition, the degradation of PAs on the list, or the rehabilitation of other PAs could also result in future changes. This report aims to provide a start to a conversation that is designed to be ongoing.

The methodology used for this report is *just one of many ways to identify PAs* that are disproportionately important. Decisions had to be made around what variables to include or exclude, how those variables were weighted, and the data used to generate them. We acknowledge that a different group of authors might make different choices that change the resulting list.

Also important to note is that land data quality on any continent, including Africa, is far from optimal. This necessitated expert review of the data and the individual outlier PAs which resulted in multiple areas being either excluded or included in the list. While the experts involved all have deep cross-continental knowledge of PAs, their affiliation with NGOs working in a subset of PAs in Africa could have affected objectivity.

In spite of this objectivity risk, we still see field expert validation as an important step of this methodology. Experts agreed with the Keystone status of 58% (n=133) of the PAs initially identified by the methodology as a Keystone, while only 29 out of the remaining PAs analysed (n=2,092) were added into the Keystone list. This provides confidence that the analytical approach taken is providing sensible answers.

When an expert's perspective of a PA differed from the results of the data-driven analyses, we worked with them to understand the basis of their assessment, and found several cross-cutting situations that justified adding or removing a PA from the list:

1. ***Wildlife population health.*** Building understanding on wildlife population health at the ecosystem level is very difficult, with data only available for specific species and/or areas. This means intensive studies are required to determine if an area is too depopulated to efficiently save or is a sink population (so should be removed from the list), or if it is a source population for other areas (so should be added to the list). An example here is *North Luangwa National Park* that was not a statistical outlier but is a source population for many nearby PAs that were statistical outliers.
2. ***Ecological condition.*** Human pressure maps are a good proxy for ecological integrity of habitat, but do not capture small scale shifting agriculture, nomadic pastoralism, etc. that can degrade an ecosystem if not managed in a sustainable way. This means some PAs may be more degraded than the analyses show, meaning they are likely not able to provide full ecosystem functionality, and if beyond reasonable repair should be removed from the list.
3. ***Regionally unique population.*** Some PAs score relatively low on irreplaceability because they contain savannah species assemblages widespread in PAs on the continent. This, however, overlooks cases when these might be the last regional populations and potentially important intra-species genetic variations. For example, the three PAs in the *W-Arly-Pendjari* Complex in Niger, Benin, and Burkina Faso do not score as outliers in the data analysis but contain the last viable West African populations of many species including north-west African cheetah, West African lion, and korrigum.

In addition to expert validation, we carried out sensitivity analyses where we removed each variable in turn from the CVI to see how this influenced a PA's score. Across these analyses we found that 94% (n=215) of the outlier PAs had a median score within the outlier range, suggesting they are not sensitive to individual variables. In other words, if, based on expert input, we removed one of the variable scores, the PA would still remain within (or outside of) the list. We also performed sensitivity analyses with different data inputs to the CVI, for example, we modified the irreplaceability score to weight threatened species more prominently, and in another, we calculated irreplaceability using different species, and explored different human pressure datasets. The majority of outlier PAs remained the same, with slight changes in ordering. One notable sensitivity was calculating irreversibility with and without freshwater fish data included in the metric. Freshwater fish data quality in Africa is much more variable in quality than other categories. PAs with large bodies of freshwater were highly sensitive to this sensitivity. These highly sensitive sites were reviewed by field experts.

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Larger PAs were identified more frequently as an outlier (or Keystone) PAs due to their capacity to host more species and cover larger portions of their ranges, which leads to higher irreplaceability scores. However, small PAs are not automatically ruled out; they can score highly on connectivity if they are key stepping stones connecting larger landscapes, and if they host many endemic or small range species they will score highly for irreplaceability. The *Uluguru Nature Forest Reserve* in Tanzania is a good example of this, it is only 245 sq. km. in area, but hosts ~16 endemic vertebrate species and many more near-endemic species so scores highly in irreplaceability and is a statistical outlier.[17]

> ... recognition of the collective value of multiple PAs underscores the importance of an integrated approach to conservation that considers both individual PAs and the broader landscape connectivity

In regions with a dense mosaic of PAs, such as northern Kenya, southern Tanzania, and the Zambezi Valley, determining Keystone PAs can be challenging due to the interaction between numerous smaller PAs that collectively contribute to the overall conservation value of the landscape, particularly through connectivity. In our analysis, we aim to identify Keystone PAs in these landscapes based on the quantitative metrics, which have been validated by the field experts. However, we also acknowledge that in some landscapes, multiple PAs collectively play unique and important roles, making it difficult to single out just one Keystone PA. This recognition of the collective value of multiple PAs underscores the importance of an integrated approach to conservation that considers both individual PAs and the broader landscape connectivity. More in-depth analysis is needed to fully understand and quantify the contributions of individual PAs within these densely connected landscapes.

Four spatial datasets underpin this analysis; human pressure maps, ecoregions of the world, the World Database on PAs (WDPA), and species range maps from the IUCN Red List. Though they are all best in class at the continental scale they still have significant limitations. For example, many countries have not updated their PA boundaries in the WDPA so some may have changed. To minimise this, we sourced updated boundaries directly from countries or actors working there where we expect possible changes. This means the PA boundary data used here is the most up-to-date continent-wide dataset.

The limitations of IUCN range maps are well discussed.[18] But the challenge most relevant here is that some parts of Africa, Central Africa and desert areas are under-surveyed compared to others.[19] In fact, no dataset is sufficiently comprehensive or standardised across plant, freshwater or marine species range map data to carry out a similar continent-wide exercise that includes them. Plugging data gaps such as these could be considered a conservation research priority – and is a key recommendation from this study. However, because the rates of species declines and habitat loss across Africa are so high, there is an imperative to act even with imperfect data.

17 Burgess et al. 2002. The Uluguru Mountains of eastern Tanzania: the effect of forest loss on biodiversity. *Oryx.*
18 Di Marco et al. 2016. Limitations and trade-offs in the use of species distribution maps for protected area planning. *Journal of Applied Ecology.*
19 Farooq et al. 2020. Mapping Africa's biodiversity: more of the same is just not good enough. *Systematic Biology.*

Operationalising the Keystone PA concept

The Keystone PA concept is that a limited number of exceptionally valuable PAs could form the backbone of continent-wide conservation efforts and catalyse action in the wider landscape. PAs, places that are legally designated and should be managed for long-term nature conservation, have been shown to play an outsized and enabling role in biodiversity conservation.[20] When well-managed, they effectively conserve species and habitats, have lower rates of habitat conversion, and support healthier wildlife populations than similar unprotected areas.[21,22,23,24] Many African species depend almost entirely on PAs for survival.[25,26]

It is important to clarify that all PAs, and many areas beyond them, merit conservation – not just those classified as Keystone PAs. Indeed, restricting conservation efforts to the Keystone PAs would not be sufficient to ensure the preservation of viable populations of many species, or to safeguard ecosystem services to the extent needed by host countries and the world at large.

Moving from a vision to implementation is always the biggest challenge in conservation. Galvanising action is a key motivation for this report; below we describe some of the important considerations to spark action and operationalise the Keystone PA concept.

Ensuring Keystone PAs continue to play their critical ecological role will require multiple actors to rally together – *with African national governments, Indigenous Peoples and local communities in the lead* – supported by the social sector, private sector and international community when needed. African nations have shown conservation leadership by recognizing and gazetting these critical PAs in the first place. The challenge now is making sure the Keystone PAs receive the necessary resources and management to realise their full potential – because they will only continue to play their role in a continental strategy and contribute to GBF Goals if they are effectively conserved. A first step could be for governments to determine whether their Keystone PAs are at risk of degazettement, downgrading, or downsizing. Ensuring effective – and inclusive - management of Keystone PAs would be the next step, as well as ensuring that such effective management can have beneficial impact for conservation in other PAs and landscapes.

Having local community support is crucial for success. While the percentage of Keystone PAs that are community areas is relatively low, these areas often form critical components to the integrated management of the broader landscapes within which many Keystone PAs are found. It is critical that conservation efforts balance biodiversity and natural resource protection with the needs of local communities

[20] Gurney et al. 2023. Area-based conservation: taking stock and looking ahead. *One Earth.*
[21] Pringle, R. 2017. Upgrading protected areas to conserve wild biodiversity. *Nature.*
[22] Gray et al. 2016. Local biodiversity is higher inside than outside terrestrial protected areas worldwide. *Nature Communications.*
[23] Geldmann et al. 2019. A global-level assessment of the effectiveness of protected areas at resisting anthropogenic pressures. *PNAS.*
[24] Barnes et al. 2016. Wildlife population trends in protected areas predicted by national socio-economic metrics and body size. *Nature Communications.*
[25] Shaw et al. 2024. African savanna raptors show evidence of widespread population collapse and a growing dependence on protected areas. *Nature Ecology & Evolution.*
[26] Pacifici et al. 2020. Protected areas are now the last strongholds for many imperiled mammal species. *Conservation Letters.*

and Indigenous Peoples. Community conservation in parts of Africa is growing. For example, in Kenya community conservancies now cover a larger area than the country's National Parks and Reserves combined.[27] Ensuring community initiatives are well supported is crucial for Keystone PAs to act as catalysts for wider landscape conservation efforts. Examples of such catalytic impact can include sharing expertise between Keystone PAs and community conservancies or initiatives, sharing technological capabilities, engaging the communities that live beyond Keystone PA boundaries, and ensuring that wildlife populations can migrate freely from Keystone PAs, where such movement is beneficial. Governments and communities can work together to create regulatory environments that allow conservation as a land use and devolved natural resource ownership and management rights. Such steps have potential to expand the area of land for conservation, by making nature-based land uses viable options for communities. Additional consideration is needed regarding the regulatory environments governing state-owned PAs in which people live, to ensure that resident communities have a key role in governance and management and positioned to be principal beneficiaries of nature-based land uses.

Many PAs in Africa suffer significant budget deficits, and it is unlikely that without a substantial and sustained increase in international funding for conservation that governments or communities alone will be able to effectively manage PAs on the continent.[28] The private and NGO sectors are demonstrating an increasingly important role in supporting conservation efforts in Africa (World Bank 2021).[29] The mechanisms through which this can be achieved are varied, with one example of recent success being found from private and NGO sector collaboration through Collaborative Management Partnerships (CMPs). There is evidence that CMPs can be effective means of harnessing global willingness to pay for conservation in Africa, for attracting investment to under-funded PAs, and in some cases, resulting in pronounced improvements in the conservation status of those areas, and in various socio-economic indicators.[30,31,32]

There is a much greater area of land in Africa that is important for conservation than the area contained within Keystone PAs. Africa still has large extents of ecologically intact land outside its PAs which contain viable wildlife populations and provide critical ecosystem services. This is one of the things that sets the continent apart from others. Therefore, the bigger conservation goal for the continent is to ensure that entire landscapes are sustainably managed for the benefit of all, with Keystone PAs nested within them. Securing Keystone PAs so they realise their full potential should not distract from this broader goal but be seen as an enabling step towards achieving it. Securing the role of Keystone PAs for broader landscapes would have immense beneficial impact on communities, biodiversity and climate.

27 KWCA 2024. Kenya Wildlife Conservancies Association.
28 Lindsey et al. 2018. More than $1 billion needed annually to secure Africa's protected areas with lions. *Proceedings of the National Academy of Sciences.*
29 World Bank 2021. Collaborative management partnership toolkit.
30 Baghai et al. 2018. Models for the collaborative management of Africa's protected areas. *Biological Conservation.*
31 Lindsey et al. 2021. Attracting investment for Africa's protected areas by creating enabling environments for collaborative management partnerships. *Biological Conservation.*
32 Desbureaux et al. 2025. Collaborative management partnerships strongly decreased deforestation in the most at-risk protected areas in Africa since 2000. *Proceedings of the National Academy of Sciences.*

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