HOW NGOS COUNT IN CONSERVATION:

A review of the role of NGOs in biodiversity conservation in South Africa

DECEMBER 2019

HANS HOHEISEN
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Acronyms

CBD	Convention on Biological Diversity
CITES	Convention of International trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
DEA	Department of Environmental Affairs (incorporated into DEFF in 2019)
DEFF	Department of Environment, Forestry and Fisheries
DALRRD	Department of Agriculture, Land Reform and Rural Development
MEA	Multilateral Environmental Agreement
MPA	Marine Protected Area
NBSAP	National Biodiversity Strategy and Action Plan
NBA	National Biodiversity Assessment
NDP	National Development Plan
NGO	Non-governmental organisation
NPAES	National Protected Area Expansion Strategy
NRM	Natural Resource Management
PA	Protected Area
SANParks	South African National Parks

Executive summary

Non-governmental organisations (NGOs) play an important role in conserving South Africa's biological diversity, but their contributions as a sector are not well documented. This review presents a preliminary analysis of the collective contributions of 13 NGOs (all members of the IUCN) to biodiversity conservation in South Africa. Survey questionnaires were used to obtain information on how conservation priorities are set, the types of programmatic work conducted, the indicators used to measure conservation success, levels of income and spending, and employment demographics. The period under review was the 2017/2018 financial year (or 2018 for those NGOs working on a calendar year), although a longer period (2011 – present) was included for work contributing towards the expansion of land under conservation.

The programmatic work was divided into three overlapping categories: 1) habitat conservation; 2) species conservation; and 3) people and conservation. Six participating NGOs focused on one category, four focused on two, while three focused on all three categories. Habitat conservation was a focus for nine NGOs, species conservation was a focus for four, while people and conservation was a focus for 10 NGOs. Conservation strategies were developed by Boards of Trustees and senior managers, but although these roughly aligned with national priorities, this alignment was not generally systematic. Conservation priorities were driven by a combination of factors including project legacy, perceived needs, organisational capacity and expertise, likely impact, and opportunity.

Measuring impact was sometimes difficult for NGOs when long time periods were needed to achieve results, when multi-organisation collaborations complicated attribution of work or when the causal links between interventions and impacts were tenuous. While activity indicators were measured for almost all conservation projects, outcome indicators (how projects affect the conservation problem of interest) were measured for 70% of projects, and impact indicators were measured for only 43% of projects. Results highlights are summarised in Tables 1–4.

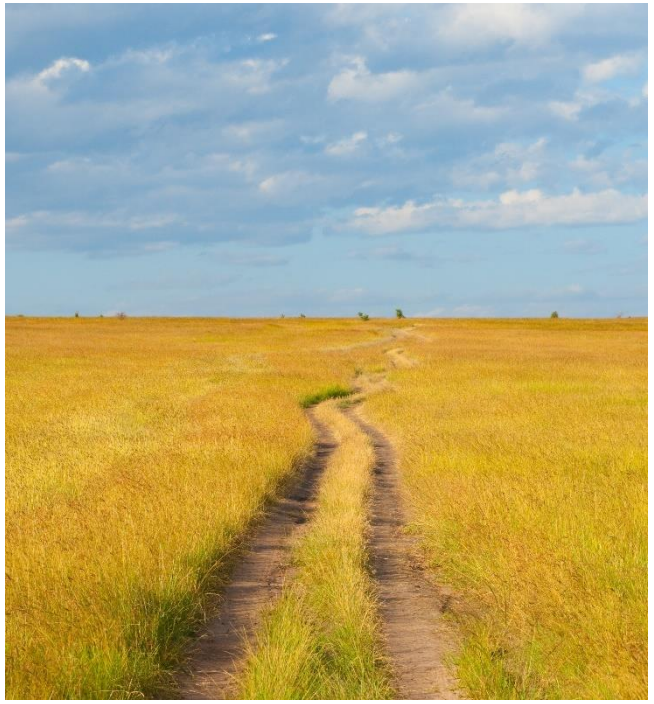

Table 1. Key contributions made by conservation NGOs during the 2017/2018 financial year.

Key conservation contributions	

Habitat conservation	• Five NGOs made key contributions towards the expansion of terrestrial land under conservation, while two played pivotal roles in the expansion of marine protected areas. The total increases in area were:
	  • Terrestrial land acquired or declared Protected Areas with NGO assistance (2017/2018): 22,165 ha (with 642,217 ha under negotiation).
	  • Marine Protected Areas declared with NGO assistance (2019): 4,547,900 ha.

	• Eight NGOs invested in ecological infrastructure, such as through clearing invasive alien plants, rehabilitating wetlands, restoring buffers of natural vegetation in riparian areas and improving rangeland management practices. Results included:
	  • Total area restored: 12,441 ha.
	  • Benefits derived: water retention, erosion control, wetland rehabilitation, riparian restoration, water catchment management, forest restoration and flood attenuation.
	  • Total number people employed during 2018: 1,656.

Species conservation	• Eight NGOs worked on species conservation, either directly with projects that primarily focus on species, or indirectly where the focus is habitat conservation or community upliftment, but where there are knock-on benefits for species conservation.

	• Eight worked on *in situ* species conservation. Highlights included:
	  • Wild Dog (EN): managed metapopulation is stable.
	  • Cheetah (VU): managed metapopulation is increasing.
	  • Wattled Crane (VU): population size and breeding pairs increasing.

	• Two worked on *ex situ* conservation. Highlights included:
	  • Pickersgill's Reed Frog (EN): 600 frogs bred in captivity; 250 released in wild.
	  • Wattled Crane (VU): 2 captively reared cranes successfully released into the wild.
	  • African Penguin (EN): poor current breeding success.

	• Eight worked on illegal wildlife trade. Highlights included:
	  • Zero rhino poaching in the 25 KwaZulu-Natal (KZN) private reserves assisted by NGOs.
	  • 24 community rhinos dehorned (impact hard to measure).
	  • ~1 million people reached through social media demand reduction campaign in Vietnam (impact hard to measure).

Key conservation contributions (continued)	

People and conservation	• Eight NGOs contributed to work on the biodiversity economy. Highlights included:
	  • 13 SMMEs and 15 cooperative businesses in ecotourism supported.
	  • 120 homestead gardens and 12 school gardens planted, with ~80% retention.
	  • ~800,000 visitors to oceanarium exposed to Western Indian Ocean biodiversity.

	• Six NGOs contributed to biodiversity mainstreaming. Highlights included:
	  • Uptake of ecosystem-based adaptation concepts by three municipalities.
	  • 34 companies trained to use a standard of the Global Ecosystem Service Partnership.

	• Six NGOs contributed to public engagement. Highlights included:
	  • 140,000 children engaged in art projects.
	  • 17,000 children received general conservation education.
	  • 130 schools and 90 businesses established recycling collection points.

	• Four NGOs contributed to foundational knowledge. Highlights included:
	  • Kruger Wild Dogs and Cheetah surveys conducted.
	  • 200 citizen scientists reported over 200,000 roadkill data points.
	  • Regional and/or national Red List assessments completed for 10 different taxa.

	• Eight NGOs contributed towards training on conservation. Highlights included:
	  • Total people trained on SAQA accredited courses: 2,911.
	  • Total people trained on non-SAQA accredited courses: 5,205.

Table 2. Key finance results for the 2017/2018 financial year.

Finance highlights	
Income	• The total income for 12 of the participating NGOs during the 2017/2018 financial year was R498.7 million (~USD38 million), with 73.5% (±33) of this being derived from South African funding sources. The main funding categories were donations and bequests (26% ± 37), trusts and foundations (15% ± 16), government (13% ± 21) and corporates (13% ± 26).
Spending	• On average 79% (±14) of NGO income was spent on direct programme costs (i.e. project expenses), including staff salaries, while the remaining 21% went towards support costs (overheads/administration costs). On average, most of the direct programme costs were spent on species conservation (35.9% ± 28.8) and habitat conservation (29.2% ± 32.5).

Table 3. Key employment findings for the 2017/2018 financial year.

Human resources highlights	
Employment	• The total number of permanent employees in the 13 participating NGOs at the end of June 2018 was 962, with an additional 1,656 short-term contract workers.
	• Of the permanent employees, 9% were senior and top management, 16% were professionally qualified middle management, 27% technically skilled junior management, 21% semi-skilled, 16% unskilled and 11% interns.

Table 4. Recommendations arising from the review.

Recommendations	
Recommendations	• **Repeat the review (in streamlined format) on a regular basis**: This will provide NGOs with a consistent way to evaluate their performances over time, monitor the work of other NGOs, provide information on the progress of conservation across South Africa, identify what conservation initiatives work (and what does not work), and keep the government informed. • **Increase NGO participation in future reviews**: The review would greatly benefit from the inclusion of a larger constituency of conservation NGOs, as this would ultimately make it more representative. This could be done through an independently run workshop to allow NGOs to debate the pros and cons of the process and help shape its future design. • **Refine the methodology**: This review was the first review of its kind in South Africa and has provided some valuable initial insights into NGO contributions towards conservation. However, a substantial refinement of the data collection process is needed for future iterations to make the process less onerous. A possible solution to this would be the development of a simplified reporting framework for monitoring key biodiversity indicators. • **Increase the measurement of conservation impact**: Conservation impacts are sometimes challenging to measure, but NGOs need to make a greater effort in this regard. In cases where NGOs do not know exactly what their conservation impact is for a specific project, they should make this a deliverable to be determined. • **Measure cost effectiveness**: Measuring cost effectiveness of projects is not a common practice among NGOs but will likely become increasingly necessary to obtain donor funding in future. Cost effectiveness could be incorporated into a reporting framework but will need an agreed common method for measurement.

1. Introduction

1.1 Background

The Earth's biological diversity is a global asset that is vital to humanity's economic and social development (Secretariat of the Convention on Biological Diversity, 2011). This biodiversity is under increasing threat from habitat loss, climate breakdown, pollution, and wildlife crime, amongst other things (Secretariat of the Convention on Biological Diversity, 2005), all of which are contributing to unprecedented declines in species numbers (Ceballos et al., 2017). The immense scale of human impacts on biodiversity have recently been brought to global attention through the draft Global Assessment on Biodiversity and Ecosystems Services (Balvanera & Pfaff, 2019).

Many multilateral environmental agreements (MEAs) have been developed in response to these challenges through collaborations between governments, with examples including the Convention on Biological Diversity (CBD), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), the Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES), and the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, amongst others. In many cases, it is the responsibility of national governments to implement these MEAs at the national and sub-national level. For example, Article 6 of the CBD states that each contracting party shall develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity, and integrate the conservation and sustainable use of biological diversity into relevant plans, programmes and policies (Secretariat of the Convention on Biological Diversity, 2011).

As a contracting party to the CBD, the South African government has developed a National Biodiversity Strategy and Action Plan (NBSAP) to meet this commitment but has insufficient resources and capacity to fulfil all the requirements of the plan. Non-governmental organisations (NGOs) can help governments meet conservation targets in a number of ways including conserving habitats and species, providing environmental education and skills development, acting as watchdogs for society in terms of environmentally damaging practices, supporting the development and enforcement of effective policy and regulations, enhancing research and encouraging responsible consumption and business practice.

Despite these potentially positive contributions, the roles and collective impacts of conservation NGOs in South Africa are not well documented and their roles as crucial implementers of conservation and environmental policy are not fully recognised. This is partly because the sector, which is comprised of many different NGOs working on their own projects (sometimes in collaboration with other NGOs), does not generally collate its collective work and report its outcomes in a unified and standard manner to support comparability, amongst other functions. While NGOs monitor and assess their own performances, reporting to donors takes priority over contributing to a process of data sharing with other NGOs, and there is little time left for the latter given the high workloads, increasing conservation needs, and the pressures of maintaining good governance.

It is also the case that the work of different conservation NGOs can be quite disparate, making it difficult to decide which areas of conservation to focus on when collating information. Assessments of the work of conservation NGOs tend to be somewhat isolated, either examining individual organisations or their contributions to singular issues (e.g. biodiversity stewardship), but providing limited understanding of how these reflect upon the sector as a whole (Brockington & Scholfield, 2010b). This phenomenon is not isolated to South Africa, with the work of conservation NGOs in other sub-Saharan African countries being characterised by a lack of good data on the nature of their activities (Brockington & Scholfield, 2010b).

This lack of collective assessment has implications for how conservation NGOs are perceived by governments, scientists and the general public, and is important because not all opinions are positive. The academic literature is divided on the benefits of conservation NGOs (Brockington & Scholfield, 2010b), with negative perceptions including suggestions of NGOs growing too powerful, concentrating funds and influence, incompetent handling of expensive

projects, and imposing inequitable conservation arrangements with communities.

Additionally, there is a perceived gap between the funding of conservation NGOs and the funding of conservation action on the ground, with insufficient assessment of the effectiveness of projects (Balmford & Whitten, 2003). Given the scale of the conservation problems faced and the limited resources available to counteract them, it is critical that available resources are used as efficiently as possible, and this requires the evaluation of project successes to identify the most effective approaches (Kapos et al., 2008; Sutherland et al., 2004). Although there has been a shift within the conservation community from reporting about project inputs (such as money and time spent) to tracking and reporting measures of implementation and outputs (such as the activities completed and their quantifiable products), there has been less progress towards assessing and reporting on an intervention's conservation impact (such as changes in the conservation status of target ecosystems, habitats or species) (Kapos et al., 2008). Measuring impact would be the ultimate test of the project effectiveness, but the extent to which NGOs currently do this it is unclear.

1.2 Purpose and scope of review

The main purpose of this review was to present a preliminary analysis of the collective contributions of a subset of NGOs to biodiversity conservation in South Africa. A key sub-objective was to assess how NGOs measure their conservation impact and what indicators they use to do so. Additionally, we aimed to determine how NGOs set conservation priorities, how much funding they receive, what their funding sources are, how funding is spent, and how many people are employed. The review is intended to provide a synthesis of the collective work of participating NGOs and is thus not presented as a comparative study.

Conservation is a broad field because of the many threats to the natural environment, so we focussed on biodiversity conservation. While we recognise the importance of the threats of climate change, depletion of natural resources, pollution and waste, amongst others, we did not try to capture them all in a single review. We note, however, that there is often overlap between work that aims to reduce impacts on biodiversity and work that reduces the impacts of the other threats, and that some of the participating NGOs work in more than one area. Because we set a fairly narrow scope and because we were only able to include a subset of NGOs in the review, we acknowledge that our findings cannot fully capture the work of the entire conservation NGO sector. This is the first such assessment for South African conservation NGOs, so we anticipate a refinement of the process in the future if it is deemed worthwhile to pursue.

In deciding which biodiversity conservation issues to focus on, we used the NBSAP (Government of South Africa, 2015) as a key guideline document. Signatories of the CBD are required to set out a strategy and plan to fulfil the objectives of the Convention, and South Africa's revised NBSAP for the period 2015–2025 identifies the priorities for biodiversity management in South Africa for this period, aligning these with the priorities and targets in the global agenda, as well as national development imperatives. The NBSAP outlines a path to ensure the management of biodiversity assets and ecological infrastructure continue to support South Africa's development path and play an important role in underpinning the economy.

The Department of Environment, Forestry & Fisheries (DEFF), previously the Department of Environmental Affairs, is mandated to ensure the implementation of the NBSAP. DEFF is South Africa's primary environmental custodian and is responsible for protecting the environment and conserving natural resources while balancing this with sustainable development and the equitable distribution of natural resource benefits. It does this through the implementation of national environmental policies that address factors including biodiversity management and conservation, climate change, land degradation, sustainable development and poverty alleviation. The NBSAP makes provision for other agencies to contribute towards its targets, and so is not intended to be entirely reliant on the government for implementation. Based on this, and the fact that DEFF does not have sufficient capacity to fulfil all the requirements of the NBSAP anyway (a factor that is unlikely to change in the future unless greater financial resources are made available), NGOs are able to assist in a number of areas, as described in this review.

We broke down biodiversity conservation work into three main categories, all of which overlap to some extent with each other. These were: 1) habitat

conservation; 2) species conservation; and 3) people and conservation (see Table 5). This report is structured to align the different types of conservation work with these three broad categories but acknowledges that there are areas of overlap. In cases where work overlaps with two or more conservation categories, we have placed it in the category we thought most appropriate.

Many of the strategies of the NBSAP align with goals of other MEAs, including CITES, CMS, the Ramsar Convention and the SADC Protocol on Wildlife Conservation and Law Enforcement in the Southern African Development Community. They also align with the goals of the South African National Development Plan (NDP), which aims to eliminate poverty and reduce inequality by 2030. The section of the NDP that is most relevant to conservation is Chapter 5: Ensuring environmental sustainability and an equitable transition to a low-carbon economy. The vision of Chapter 5 of the NDP is for South Africa to transition to an environmentally sustainable, climate change resilient, low-carbon economy and just society. Table 5 shows how the Strategic Objectives of the NBSAP and the high-level goals of Chapter 5 of the NDP align with our conservation themes.

2. Methods

2.1 Independent oversight

To provide independent oversight and guidance to the review process, methods used, data analysis, and interpretation of outcomes, we established an advisory committee to review the proposal before data collection and to review the final report. The committee assessed the scope of the study, the suitability of selected NGOs, the suitability of the selected indicators of conservation success, and the proposed methods of data collection and analysis, including the questionnaires (see Appendix 1 for TORs). The committee consisted of three recognised conservation biologists, independent of the NGO sector, and with substantial experience in conservation research and practice. Additionally, the NGO review proposal was presented to the South African IUCN National Committee for inputs before the advisory committee workshop, and recommendations made by the national committee were incorporated into the methodology.

2.2 Participating organisations

Defining what constitutes a biodiversity conservation NGO is contested terrain, but the sector is generally viewed as comprising organisations that attempt to conserve wildlife and habitat (Brockington & Scholfield, 2010a). There are many NGOs that work in this space in South Africa, and the numbers are increasing annually due to the burgeoning pressures on the environment. In 2007, a list of conservation NGOs compiled for sub-Saharan Africa included 281 organisations (Brockington & Scholfield, 2010a). There are also many organisations that work around the margins of this definition, including ones that fall more under general environmentalism and others that focus on animal welfare.

It is unclear how many registered conservation NGOs there are in South Africa, but it would be a huge task to quantify the work of all of them in one review, hence we have only included a sample here. Our basis for selection was membership of the International Union for Conservation of Nature (IUCN). The IUCN is a membership union composed of both government and civil society organisations that provides the public sector, private sector and NGOs with the knowledge and tools that enable human progress, economic development and nature conservation to take place in tandem. It is considered the global authority on the status of the natural world and the measures needed to safeguard it. Obtaining IUCN membership requires rigorous compliance with a number of specific requirements (see Appendix 2), and we assumed that NGOs meeting these requirements would share and support the objectives of the IUCN and demonstrate a consistent level of good governance.

At the onset of the review, there were 22 IUCN member conservation NGOs with offices based in South Africa (there are now 23), and 13 of these actively participated in the review. Brief summaries of the work done by these 13 NGOs are provided in Appendix 3. Out of the nine NGOs that did not participate, four could not be contacted, one had not been active for over a year (and it was not clear if or when this NGO would be resuscitated), three declined and one agreed to participate only if all other IUCN NGO members participated. Of the three that declined, a key reason given was a concern that the review might not be widely perceived as being independent, given that it was a review of NGOs conducted by an NGO. They were concerned that if the review was perceived as not fully objective, then it would be difficult for them to justify the time taken by senior NGO staff to provide inputs. To overcome this, we appointed an independent review panel (see section 2.1). Of the 13 that participated, 11 focus primarily on habitat or species conservation (in some cases with an emphasis on people), one is an applied research organisation that works in the areas of environmental and natural resource governance and management, and one is primarily an environmental education organisation. All 13 NGOs conduct work within the biodiversity conservation field, either as a primary or secondary focus, and it is these aspects of their work that we examined. It is important to note that any work of these NGOs that falls entirely outside the focus on biodiversity will not be captured by this review. The alignment of these 13 NGOs with the three main areas of conservation work is shown in Table 6.

Table 5. Alignment of conservation categories and questionnaire themes with the National Biodiversity Strategy and Action Plan (NBSAP) and National Development Plan (NDP).

Focus area	NBSAP*	NDP alignment	NGO review themes
Habitat conservation	• SO1: Management of biodiversity assets and their contribution to the economy, rural development, job creation and social well-being is enhanced. • SO2: Investments in ecological infrastructure enhance resilience and ensure benefits to society.	• Sustaining South Africa's ecosystems and using natural resources efficiently • Building sustainable communities • Responding effectively to climate change mitigation • Responding effectively to climate change adaptation	• Expansion of habitats under conservation • Biodiversity economy • Ecological infrastructure
Species conservation	• SO1: Management of biodiversity assets and their contribution to the economy, rural development, job creation and social well-being is enhanced. • SO6: Effective knowledge foundations, including indigenous knowledge and citizen science, support the management, conservation and sustainable use of biodiversity.	• Sustaining South Africa's ecosystems and using natural resources efficiently • Building sustainable communities	• Conservation of threatened species • *Ex situ* conservation • Wildlife trade • Biodiversity economy • Knowledge accumulation
People and conservation	• SO3: Biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors. • SO4: People are mobilised to adopt practices that sustain the long-term benefits of biodiversity. • SO5: Conservation and management of biodiversity is improved through the development of an equitable and suitably skilled workforce. • SO6: Effective knowledge foundations, including indigenous knowledge and citizen science, support the management, conservation and sustainable use of biodiversity.	• Responding effectively to climate change mitigation • Responding effectively to climate change adaptation • Enhancing governance systems and capacity • Building sustainable communities • Managing a just transition	• Biodiversity economy • Land reform • Biodiversity mainstreaming • Public engagement and education • Knowledge accumulation • Indigenous knowledge • Training • Socio-economic contributions

*SO = Strategic Objective.

2.3 Data sources

We obtained most information using a three-part structured questionnaire (see Appendix 4). Part 1 focussed on finances, and included sources of funding, funding amounts and how funding is used. Part 2 focussed on employment within organisations (including numbers and demographics of employees), and part 3 focussed on programmatic biodiversity conservation work. The questionnaire was drafted by the authors but refined during a 1-day workshop led by the advisory committee. The conservation section consisted of 15 questions based around the NBSAP and, in addition to trying to quantify what the NGOs had achieved, the questionnaire also interrogated the indicators used to measure impact (see section 3.4).

Participating NGOs either completed the questionnaires themselves or provided feedback during interviews. When possible, we supplemented the data obtained from questionnaires with information accessed from the annual reports of organisations. The period under review was the 2017/2018 financial year. For those NGOs that work on a calendar year, we asked for 2018 data. Although the conservation questionnaire asked for answers to go back to 2011 to align with the NBSAP targets, this longer time period proved impractical in most cases due to insufficient institutional memory. To avoid inconsistencies in reporting we do not provide data for periods earlier than 2017/2018, with the exception of the expansion of habitat under conservation.

We did not include any open-source data from the non-participating NGOs, such as can be found in annual reports, because these sources do not generally provide the level of detail we were looking for in our surveys. The use of open source data would thus have resulted in incomplete information for non-participating NGOs and confusion about where the material came from.

In order to maintain confidentiality of data, some of which are sensitive, we present all results as aggregations of data from all participating NGOs. This is intentional because our aim was to provide a synthesis of the collective contributions of NGO work rather than a comparison between them. We do not directly link NGOs to any specific projects listed in the results tables but recognise that in some cases this will be possible for people with personal knowledge of the work of NGOs. We have tried to ensure that this is not possible with sensitive issues like funding and employee information. For more details pertinent to specific projects of NGOs, the reader is directed to NGO annual reports which are available online.

Table 6. Broad conservation categories of participating NGOs. Dark shading represents primary focus areas while pale shading represents categories where conservation work is conducted but is not the main focus.

NGO	Habitat conservation*	Species conservation	People and conservation
African Conservation Trust	SO1, SO2	SO1	SO4, SO6
Conservation South Africa	SO1, SO2		SO3, SO4, SO5, SO6
Delta Environmental Centre			SO5, SO6
Endangered Wildlife Trust	SO1, SO2	SO1, SO6	SO3, SO4, SO5, SO6
Institute of Natural Resources	SO1, SO2		SO3, SO4, SO6
Leadership for Conservation in Africa	SO1		
National Association of Conservancies of South Africa	SO1		
Peace Parks Foundation	SO1, SO2	SO1, SO6	SO3, SO5, SO6
South African Association for Marine Biological Research	SO1, SO2	SO1, SO6	SO3, SO4, SO5, SO6
Southern African Wildlife College	SO1, SO2	SO1, SO6	SO4, SO5, SO6
Wilderness Foundation Africa	SO1, SO2	SO1, SO6	SO3, SO4, SO5, SO6
Wildlife ACT		SO1, SO6	SO4, SO5, SO6
WILDTRUST	SO1, SO2	SO1, SO6	SO3, SO4, SO5, SO6

*SO = Strategic Objective of NBSAP.

2.4 Measuring impact

Measuring the contributions and impacts of conservation NGOs is often not straightforward. The main measurement constraints we encountered were as follows:

- The goals of conservation work can take a long time to accomplish and the effects on target populations or habitats may only become measurable well beyond the time frame of the usual project cycle (Kapos et al., 2008). In contrast, many funding options for conservation projects are only available over short time periods (1–3 years) relative to the time needed to produce tangible outcomes, which means that multiple funding periods may be needed to accomplish the ultimate conservation goals and achieve conservation impact.
- Many large-scale conservation projects require collaborations between NGOs, governments and other entities because few individual organisations have all the necessary skills and resources available to complete projects on their own. This means that the contribution of an organisation may be one small part of a whole project, which complicates attribution of work and makes it difficult to assign results to any specific NGO. Examples of this include measuring the contributions of NGOs to biodiversity stewardship programmes, which generally rely on the inputs of multiple stakeholders (see section 3.5.3) or determining the impact of individual NGOs on rhino poaching when many organisations support the national anti-poaching effort (see section 3.6.3).
- For some conservation interventions, setting indicators for, or measuring conservation impact is challenging because the causal links between interventions and impacts are tenuous and have not been demonstrated. This is common for conservation work aimed at reducing the impacts of illegal wildlife trade on species populations (see section 3.6.3). For example, although dehorning rhinos is widely used as a tool to reduce poaching, there has been no clear demonstration of a causal link between the intervention and desired outcome. As a result, it is hard to assess whether dehorning leads to a reduction in poaching. Another example is demand reduction: although decreasing consumer demand is a plausible mechanism to reduce the number of rhino horns bought on the black market, no causal link between demand reduction campaigns, consumer behavioural changes and reduced poaching has yet been made.
- Some of the work done by conservation NGOs is intangible and does not lend itself to rigorous measurement. Examples include providing support to stakeholders, participation at meetings and workshops, helping guide policy, capacity building, promoting livelihood change, campaigning and networking, amongst other things. While these kinds of contributions can often be quantified (e.g. by counting the number of meetings attended), attributing specific conservation outcomes to them is often not possible. We do not include such contributions in this review unless a tangible outcome can be assigned.
- Measuring the effectiveness of conservation projects is not always built into project budgets because it uses scarce financial resources that are generally prioritised for implementation (Kapos et al., 2008). This problem is exacerbated when there is no clear indicator for measuring impact, when impact is hard to measure, or when the anticipated impact will occur well beyond the end of the project cycle. As a result, monitoring and evaluation of project effectiveness is often given insufficient attention or is left as an afterthought to project planning.

To overcome these common constraints, NGOs often measure and report on the implementation of projects and their outputs (i.e. activities completed and their quantified products) or intermediate conservation outcomes (how a project affects the conservation problem of interest) rather than the long-term conservation impact (i.e. ultimate conservation success – project scale changes in conservation status of target habitats or species) (Kapos et al., 2008). While measuring intermediate outcomes has been shown to be a reliable proxy for conservation impact, measuring implementation of activities is not a good predictor of conservation success (Kapos et al., 2009).

3. Results

3.1 NGO data provision

With a few exceptions, it was not a quick and easy process to obtain the data requested from participating NGOs. This was mainly because the questionnaire was quite onerous and time-consuming to complete, but possibly also because data management was not always efficient.

With regards to the latter issue, we suspect that in some cases the information we requested was not recorded or stored in a format that was easily accessible or extractable. Rather than being stored in central and accessible databases, data are often held peripherally by project managers, sometimes in personal databases and spreadsheets, sometimes in donor reports and sometimes even in people's memories where they effectively remain undocumented. This issue appears to be widespread and not confined to South African NGOs alone, with Kapos et al. (2008) stating that standardised or formalised management of data related to project objectives and outcomes is rare in conservation organizations. Where databases exist, they are often more about operational management than knowledge management and often do not record past projects and effectiveness.

3.2 Conservation categories

As previously mentioned, 11 of the 13 participating NGOs focus primarily on conservation, while one is an applied research organisation with an environmental and natural resource governance and management focus, and one is primarily an environmental education organisation. Both of the latter conduct some work that overlaps with biodiversity conservation. For the remaining 11 with a primary focus on conservation, there are considerable differences in the approaches they take to tackle threats to biodiversity.

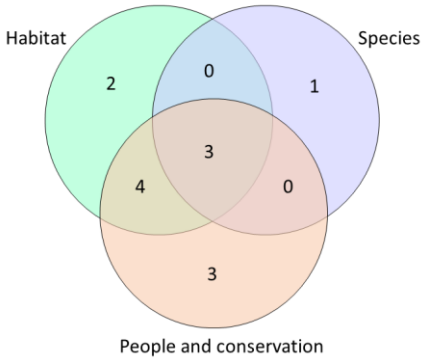

Figure 1. Conservation category focus areas of the 13 participating NGOs.

Six of the NGOs have a primary focus on one broad conservation category, four focus on two categories, while three focus on all three categories. Of these three categories, habitat conservation is a focus for nine NGOs, species conservation is a focus for four (although an additional four have a secondary focus on species), while people and conservation is a focus for 10 NGOs (see Figure 1).

Eleven NGOs contribute towards increasing the land under conservation (although not all these focus on habitat), of which four indicated that, while formal protection was a long-term goal, they were more concerned about changes in attitudes and land use than about the legal process of declaration. For them, the process is more about getting communities and private landowners interested in good stewardship of their land. Before convincing landowners to declare land under a conservation agreement, it is necessary to develop a good working relationship with the owners, maintain a presence and to demonstrate long-term reliability by continuing to work with them to ensure success. Strategies for this kind of work tend to be long-term because the process can take a long time.

Eight NGOs contribute towards species conservation, although only four have a primary focus on this. The conservation of species is generally linked to threats such as habitat loss or over-exploitation and, therefore, this work is often coupled with the other two main categories. Climate change is also a major threat to species, but this is not dealt with directly here. Strategies for conserving species need to be long-term when dealing with ongoing known threats, but also need to be flexible when the threats are emerging or changing, such as is the case with illegal trade in species like rhinos and pangolins.

Five of the NGOs that have a focus on people actively work to uplift disadvantaged communities in conservation sensitive areas through directly supporting the development of the biodiversity economy, ecotourism enterprise development,

conservation agriculture or improving food security. This indirect path to generating positive conservation outcomes creates incentives for rural communities to develop sustainable livelihoods and benefit from conserving habitats and species in the long-term. The NGOs working in this space have long-term legacy footprints with the communities, sometimes lasting for over 20 years, and they try to maintain a constant presence while working with communities to develop greater sustainability. The strategies for these NGOs tend to be long-term and focus on continuing assistance for communities until they become self-sufficient.

The other five NGOs working with people concentrate more on research and training, whereby they develop the knowledge needed to develop effective programmes for sustainable livelihoods or teach people how to do so. Strategies for these NGOs have to be more flexible and responsive to the changing needs of conservation as well as any emerging threats to habitat and species.

3.3 Strategies and priorities

In order to understand why participating NGOs do the work that they do, they were asked how they develop their conservation strategies, whether they align their strategies with national priorities, and how they prioritise projects.

In terms of strategy development, most NGO strategies are developed by Boards of Trustees or Directors and senior executive or management staff. All 13 indicated that they roughly align their strategies with national priorities, but only 3 indicated that national priorities were the primary strategy drivers (see Figure 2). In most cases, therefore, alignment is not particularly systematic.

Priorities are generally driven by a combination of factors including project legacy, perceived needs, organisational capacity and expertise, likely impact, and opportunity. Where work is already being done, especially where this has a long-term legacy, NGOs generally try to keep their work going. There is a practical financial element to this, as it is more costly to start projects in new areas, but there is also the need to maintain support for projects that might fail if such support is withdrawn. This is funding dependent and, therefore, not always possible.

Determining conservation needs starts with the knowledge and experience of staff who are actively involved in conservation work and well placed to see where work is needed. This is complemented by research to identify where new conservation problems are arising, determine ways to resolve the problems, and identify where training is needed. In the latter case, training priorities are also strongly influenced by the needs of state and private agencies. Species monitoring results also play a role and guide priorities.

There was also a widespread view that NGOs inform what they do by what they are able to do and what they believe in, and that priorities are determined by the nexus between funding and capacity. Funding

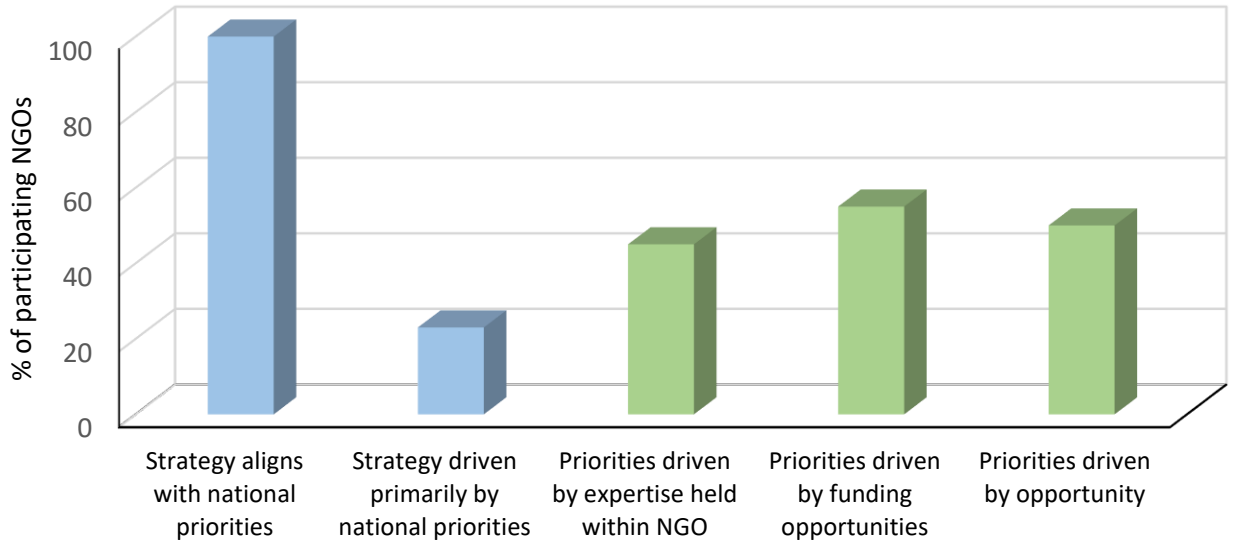

Figure 2. Strategy and priority development among 13 NGOs.

agencies often have their own agendas that do not necessarily align with national priorities, but which may align with those of NGOs, and NGOs sometimes adapt their projects to accommodate the wishes of funders. Opportunity, therefore, can play a role, and when funding opportunities arise outside priority goals, these opportunities may be taken, so long as they do not contravene an NGO's core values. Incomplete alignment with national priorities is, therefore, inevitable and unavoidable due to financial and capacity constraints.

3.4 Indicators, outcomes and impact

To assess how participating NGOs measure impact, we asked what indicators they used for each conservation initiative and assigned these to the following three categories of indicator (following Kapos *et al.* (2008)):

1) Implementation of activities and/or outputs (which are not good predictors of conservation impact and may not measure conservation success (Kapos et al., 2009));
2) Intermediate conservation outcomes (how a project affects the conservation problem of interest – these are reliable proxies for whether a project will deliver real conservation benefits (Kapos et al., 2009)); and
3) Conservation impact (project scale changes in conservation status of target habitats or species – this represents ultimate success).

In some conservation projects these indicator categories do not overlap. For example, with the training of anti-poaching field rangers the activity and output indicators are recorded as the types of training intervention conducted and number of rangers trained, while the intermediate conservation outcome indicator might be measured as whether these trained field rangers are able to effectively protect the conservation areas in which they work. Finally, the conservation impact indicator, which is the ultimate measure of success, might be whether the conservation target of interest is conserved at the project scale as a result of the field ranger actions (e.g. a rhino population is stable or increasing).

In other cases, there is no clear difference between indicator categories (i.e. the successful implementation of an activity may also result in the conservation outcome being accomplished). For example, with the proclamation of protected areas under biodiversity stewardship the activity and output indicators (whether a site is proclaimed) are difficult to separate from the intermediate conservation outcome indicator (whether a site is protected through proclamation).

Among the 13 participating NGOs we found that, while the implementation of activities was measured for 99% of conservation projects, intermediate outcome success was measured for 70% of projects on average (range 29–100%), and conservation impact was measured for only 43% of projects on average (range: 5–100%) (see Figure 3).

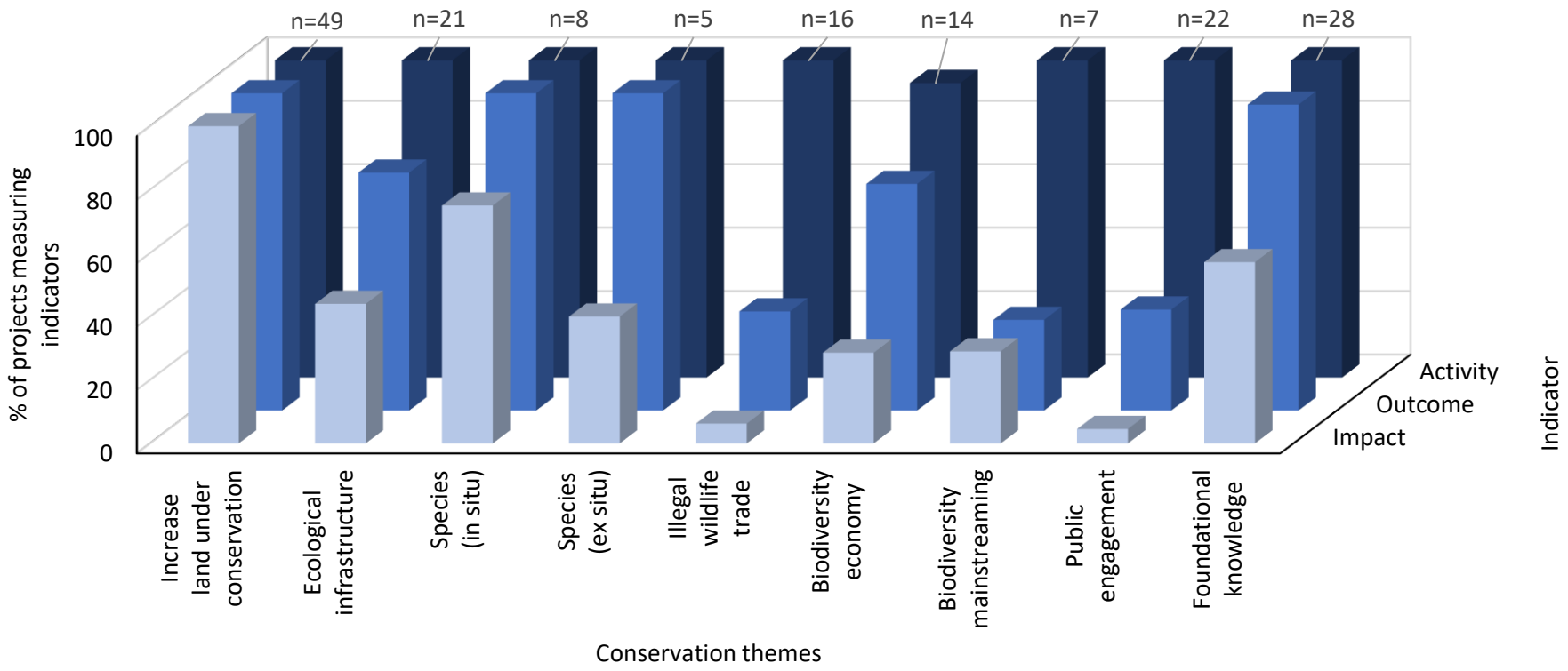

Figure 3. Measuring impact: The percentage of conservation projects measuring three types of indicator: Activity (implementation) indicators, which are not good predictors of conservation impact; Outcome (intermediate) indicators (how a project affects the conservation problem of interest), which are generally reliable proxies for conservation impact; and Impact indicators (project scale changes in conservation status of target habitats or species), which represent ultimate conservation success.

3.5 Habitat

3.5.1 Expansion of habitats under conservation

The Convention on Biological Diversity (CBD) has set a target for countries to conserve 17% of terrestrial and inland water areas, and 10% of coastal and marine areas through 'effectively and equitably managed, ecologically representative and well connected systems of protected areas (PAs) and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes' (Secretariat of the Convention on Biological Diversity, 2014). Like many African countries, South Africa has not yet met these goals (Battistella et al., 2019), with a total current terrestrial area under formal protection of 120,775 km^2, or 9.9% of the country (Department of Environmental Affairs, 2019), and a coastal area representing 5% (until early 2019 this was only 0.4%). Marine Protected Areas (MPAs) currently cover an area of 185,983 km^2, which includes the Prince Edward Island MPA (Department of Environmental Affairs, 2019).

Nested within the general targets of 17% terrestrial and 10% coastal areas are more precise targets set by the National Protected Area Expansion Strategy (NPAES) that consider the proportional representation of ecosystems (Department of Environmental Affairs, 2016b). Protected area targets are action targets that indicate how much of each ecosystem should be included in protected areas, thus guiding protected area expansion to focus on ecosystems that are least protected. Without these specific targets, protected area expansion could just provide more protection for already well-protected ecosystems. These protected area targets align with biodiversity targets set out in the National Biodiversity Assessment (NBA). According to the NPAES, no terrestrial ecosystems (except forests) currently meet the long-term protected area targets, with the most underrepresented being inland aquatic ecosystems, grasslands, Nama and Succulent Karoo ecosystems, and lowland Fynbos (Department of Environmental Affairs, 2016b).

PAs are mainly managed for biodiversity conservation (although they are also driven by heritage conservation) and are protected by law through the National Environmental Management: Protected Areas Act (NEMPAA) (Act 57 of 2003) (Department of Environmental Affairs, 2016b). Expanding the PA network, along with reducing loss and degradation of natural habitat in biodiversity priority areas, are key strategies in the conservation, management and sustainable use of South Africa's biodiversity (South African National Biodiversity Institute, 2017). The creation, expansion and maintenance of PAs has traditionally been the responsibility of the South African government, where the primary implementers of the NPAES are PA agencies and institutions including the Department of Environment, Forestry and Fisheries (DEFF) (previously the Department of Environmental Affairs – DEA), the Department of Agriculture, Land Reform and Rural Development (DALRRD – previously the Department of Agriculture, Forestry and Fisheries – DAFF), South African National Parks (SANParks) and provincial conservation authorities.

The terrestrial PA network can be expanded through three main mechanisms, namely acquisition of land, contract agreements, and declaration of state or public land (Department of Environmental Affairs, 2016b). The first, acquisition of land through purchase, is the more traditional option and involves buying land to add to existing PAs or create new ones. This is the way most PAs were created historically, primarily by the state, but it is an expensive option for both buying and maintaining land. It is also an option open to private entities and NGOs but is uncommon because of the high costs.

The second, contractual agreements (which includes biodiversity stewardship), are mechanisms for provincial conservation authorities to secure land of high biodiversity value for conservation through voluntary agreements with private, communal, or municipal landowners (South African National Biodiversity Institute, 2017). They are made possible through NEMPAA, whereby landowners sign formal contracts and agree to certain restrictions on land use, while retaining ownership of their land. Between 2008 and 2016, 68% of all land declared as PAs within South Africa was achieved through biodiversity stewardship (Wright, 2018).

The process of biodiversity stewardship is led by provincial conservation authorities, but the declaration of new PAs is often the result of collaboration between state implementing agencies and third parties, including NGOs (Department of Environmental Affairs, 2016b; South African National Biodiversity Institute, 2017). Many combinations of partnerships are possible, which makes it hard to

quantify the contributions of participating parties precisely. For a detailed explanation of the mechanisms of biodiversity stewardship, see "The business case for Biodiversity Stewardship" (South African National Biodiversity Institute, 2017).

The third mechanism, declaration of state land, involves reassigning the management of state land to a PA agency, but as very little appropriate land is held by the state, this option has very limited potential. No participating NGOs indicated a role in this process.

We obtained data on the contribution of NGOs to the expansion of habitats under conservation from two sources, namely NGO questionnaires and provincial datasets containing biodiversity stewardship information. In the questionnaires we asked participating NGOs to indicate the types of land expansion they were involved with, the areas under expansion, the stage of the process, whether the locations of the sites were within important conservation areas (as recognised by the NPAES) and the roles they played in the process (see Q2 in Appendix 4).

Provincial datasets on biodiversity stewardship were kindly provided by provincial biodiversity stewardship officers and were used to cross-check information against answers provided by NGOs. Stewardship officers also provided us with information about the contribution of NGOs to the process in their province, including NGOs not included in this review. Provincial datasets included site locations, areas and stage of process.

We cross-checked both these information sources against the South African Protected Areas Database (SAPAD_OR_2019_Q1) (Department of Environmental Affairs, 2019), which includes all formal PAs in South Africa, including contractual agreements and marine areas, declared up to early 2019. This database includes site information, date of declaration and area size, but does not indicate which organisations participated in the declaration process. Because the process of expansion of land under conservation takes a long time, we present two sets of results for the participating NGOs, including expansion during the period since 2011 (which aligns with the timing of the NBSAP) and during 2018 to correspond with the period under review for the other conservation themes.

3.5.2 Land acquisition

There are very few situations where NGOs are entirely responsible for the expansion of habitats under conservation, with examples being limited to land acquisition. Four participating NGOs have been involved in land acquisition, with three directly purchasing land and one facilitating the process on behalf of another NGO. The intentions of buying land were different in all cases and were as follows:

- Purchase for the explicit purpose of biodiversity conservation with the intention of retaining ownership and management. This purchase took place in 2018 and future purchases are planned. The long-term intention is to have the properties declared nature reserves.
- Purchase on behalf of another conservation NGO for the explicit purpose of biodiversity conservation. This mechanism represents two purchases made during 2017, while more are planned. The long-term intention is to have the properties declared nature reserves.
- Purchase for the explicit purpose of biodiversity conservation with the intention to donate the land to the provincial conservation authority, but with the outcome being retaining ownership due to lack of capacity within the province to manage the property. This purchase took place during 2014 and the property has been declared a nature reserve.
- Purchase to increase the core area of a world heritage site and national park with the intent to retain ownership but hand management over to SANParks. This purchase took place before 2011.

Since 2011, the total land acquired in this way was 13,566 ha, while during 2018 it was 1,398 ha (see Table 7).

3.5.3 Biodiversity stewardship

The proclamation process under biodiversity stewardship can take years to complete, so to provide a complete perspective of the contributions made by NGOs we present recent (areas proclaimed during the 2017/2018 financial year) and historical data (areas proclaimed since 2011), as well as areas still under negotiation. Capturing the precise contribution of NGOs to the biodiversity stewardship process is not as straight forward as simply quantifying areas proclaimed and assigning credit to the NGOs involved. As described above, the process is led by provincial conservation authorities, but is often the result of collaboration with third parties, including NGOs (NPAES 2016). Many combinations of partnerships are possible, with different parties making different contributions, and this makes it hard to quantify their contributions precisely. NGO roles in the process may include approaching and negotiating with landowners, provision of expertise in land or species management, conducting site assessments and developing management plans, and supporting various stages of the process financially (SANBI 2017: Business case). These roles have been recognised by the government, who suggest that 'Partnerships between biodiversity stewardship programmes and NGOs should continue to be strengthened, building on the effectiveness of existing partnerships in the landscape' (SANBI 2017).

While we present the contributions of participating NGOs here, we recognise the contributions of NGOs not participating in this review that have played important roles in the biodiversity stewardship process since its inception. Some of these NGOs include Conservation Outcomes, WWF-SA, BirdLife South Africa, the Table Mountain Fund, the Leslie Hill Succulent Karoo Trust, the Overberg Renosterveld Conservation Trust, the Grootbos Foundation, the Southern Africa Tortoise Conservation Trust, and Conservation at Work.

Since 2011, the total terrestrial area declared under NEMPAA was 1,322,815 ha (see Table 8). This excludes MPAs (see below). The area of land declared with the assistance of participating NGOs was 385,645 ha, or 29% of the total. For the period 2018, the total terrestrial area declared under NEMPAA was 289,050 ha, of which 20,767 ha (7%) was declared with the assistance of participating NGOs.

Five NGOs provide post-proclamation support for properties declared as nature reserves or protected environments. Support includes:

- Assessments of management plans and conducting annual reviews for these plans.
- Developing annual plans of operation (APO) with landowners, collaborating with landowners to set annual targets, providing support through accredited staff to provide oversight of alien plant clearing teams funded by landowners, and conducting ecosystem and biodiversity monitoring at the sites.

Table 7. Total area of land brought under conservation by four participating NGOs through land acquisition.

Area (ha) acquired since 2011 (including 2018)	Area (ha) acquired during 2018	Planned area (ha) for acquisition
7,168 Succulent Karoo 1,000 Baviaanskloof 4,000 Grassland 1,398 Soutpansberg	1,398 Soutpansberg	18,576 Succulent Karoo 1,335 Soutpansberg
13,566	**1,398**	**19,911**

- Extension support and facilitation of audits between state conservation organisations and the landowner. It is beneficial to have a few years' handover period between NGO and state to allow for a smooth transition and capacity building where needed.
- Contributing towards management effectiveness, co-management and sharing benefits; ensuring that the benefits to landowners and communities come to fruition.
- Research and monitoring, communication and social impact assessment.

Table 8. Protected area declarations in South Africa since 2011 highlighting the contributions of participating NGOs.

Protected area type	Total area (ha) declared by March 2019[1]	Area (ha) declared since 2011 (including 2018)	Area (ha) declared since 2011 with participating NGO assistance	Area (ha) declared in 2018	Area (ha) declared in 2018 with participating NGO assistance	Area (ha) under negotiation with participating NGO assistance
Terrestrial						
Forest Nature Reserves	173,303	17,844	0	707	0	0
Forest Wilderness Areas	274,489	0	0	0	0	0
Mountain Catchment Areas	624,568	0	0	0	0	0
Protected Environments	772,647	667,466	349,688	135,863	1,044[2]	568,963
Nature Reserves	4,194,251	637,505	35,957	152,480	19,723[2]	53,343
Special Nature Reserves	33,603	0	0	0	0	0
National Parks	3,977,540	0	0	0	0	0
World Heritage Sites	2,027,070	0	0	0	0	0
Total	**12,077,471**	**1,322,815**	**385,645**	**289,050**	**20,767**	**622,306**
Marine						
MPA mainland SA	5,023,272[3]	4,572,675[3]	4,547,900	4,547,900[4]	4,547,900	Unknown
Grand total	**17,100,743**	**5,895,490**	**4,933,545**	**4,836,950**	**4,568,667**	**622,306**

[1]Based on spatial data from DEA (Department of Environmental Affairs, 2019), NGO questionnaires, provincial datasets. [2]Includes 15,281 ha declared in 2019. [3]Includes inshore and offshore MPAs in mainland EEZ, but excludes Prince Edward Island MPA. [4]Declared in 2019.

3.5.4 Marine protected areas

Before 2019, South Africa had 23 inshore MPAs within the Exclusive Economic Zone (EEZ) covering an area of ~475,000 ha. This made up about 0.4% of the available area of the EEZ, which was well below the CBD target of 10%. During early 2019, a further 20 inshore MPAs were declared, adding an extra 4,547,900 ha and bringing the area of EEZ up to a more representative 5% (see Table 8). Two participating NGOs played pivotal roles in this process.

One of these NGOs adopted a role of advocacy and policy development, lobbying the government to raise awareness around MPAs and the need to protect 5% as a starting position. This involved two main areas of work: first, building a case for MPAs with DEFF and providing the department with all the information it needed to make a case for MPAs internally; second, conducting a legal review for MPAs to show what needs to be done for declaration. Now that the government has declared the MPAs, the next step will be to work with SANBI and DEFF to identify the next 5% for conservation. There is also a long-term goal to make sure these MPAs are still functional in 20 years' time.

The role of the second NGO in the development of the new MPAs was to conduct original research to determine where the MPAs should be placed. Now that these MPAs have been declared, the NGO will perform educational duties to make sure that area managers are well informed about the ecology, know which species should be present, how to identify them, etc. This NGO will also play an oversight role by monitoring management activities to ensure that the MPAs are being effectively managed.

3.5.5 Transfrontier conservation areas

South Africa has six Transfrontier Conservation Areas (TFCAs) spanning its borders, with an additional 12 TFCAs being found throughout sub-Saharan Africa (including one in the Western Indian Ocean). There were no additions to the areas of the South African TFCAs during 2018, but their establishment is complex and involves several phases of activity. They are in various stages of development and different phases can take many years to achieve, so there is constant work going on in these TFCAs to keep them functioning effectively. Four NGOs participating here indicated a role in the TFCA management process, with these roles varying from minor to major inputs.

3.5.6 Habitat expansion specific to ecosystems

As described in section 3.5.1, the NPAES sets PA targets that indicate how much of each ecosystem should be included in protected areas, and that without these targets protected area expansion could just provide more protection for already well-protected ecosystems. When asking about contributions to PA expansion work, we also asked participating NGOs to indicate which habitat types occur in the areas where they work and whether the areas fall within the NPAES (see Table 9).

Table 9. Expansion of land under conservation: breakdown by ecosystems. The 20-year NPAES target shortfall represents the amount of land the NPAES plans to protect within specific ecosystems.

Ecosystem	20-year NPAES target shortfall (ha)	NGO contribution since 2011	NGO contribution during 2018	Planned NGO contribution
Terrestrial				
Albany Thicket	197,100	42,900	0	0
Azonal vegetation	273,500	0	0	0
Desert	141,900	0	0	0
Forest	5,000	0	0	474
Fynbos	965,800	0	0	443
Grassland	5,285,200	196,400	6,616	247,751
Indian Ocean Coastal Belt	155,400	0	0	0
Nama-Karoo	3,694,600	120,600	0	0
Savannah	2,924,800	11,603	0	35,364
Succulent Karoo	1,038,000	14,151	14,151	338,758
Marine				
Benthic and coastal	10,496,200	4,547,900	4,547,900	An additional 5%

3.5.7 Ecological infrastructure

Ecological infrastructure refers to naturally functioning ecosystems, such as wetlands, healthy mountain catchments, and rivers that deliver valuable services ('ecosystem services') to people (South African National Biodiversity Institute, 2014). Threats, such as the spread of invasive alien species and land degradation, impact on the ability of ecological infrastructure to provide these essential services. Investing in the maintenance, restoration and protection of ecological infrastructure has been an important area of conservation work within South Africa over the last few years and involves devoting time, effort and finances in order to be successful. This is the focus of Strategic Objective 2 of the NBSAP.

Investing in ecological infrastructure can mean maintaining functioning ecological infrastructure (i.e. land that is already in good condition), as well as restoring degraded land. This can be done through a range of approaches, including:

a. Integrating ecological infrastructure into land-use planning and decision-making.
b. Clearing invasive alien plants from catchments and riparian areas.
c. Rehabilitating wetlands.
d. Maintaining or restoring buffers of natural vegetation in riparian areas.
e. Improving rangeland management practices.
f. Establishing and maintaining protected areas or conservation areas.

Eight participating NGOs invest in ecological infrastructure, with all but one of the above approaches (b–f) being used. The approach of establishing protected areas (f) is covered in section 3.5.3 (biodiversity stewardship). The investments of participating NGOs in ecological infrastructure are outlined in Table A1 in the appendices.

In addition to documenting the investments made by these NGOs, we also asked how they determine what ecological infrastructure to focus on and where to focus. Six NGOs use national priorities as the primary driver behind their choices, with four of these working on securing water resources and wetlands as a priority due to water being South Africa's most critical natural resource (South African National Biodiversity Institute, 2014). Three of these NGOs facilitate the implementation of parts of the government's Natural Resource Management (NRM) programmes.

Two NGOs prioritise areas where they already have a footprint and another identifies areas through the knowledge and experience of staff. Because some projects are easier to fund than others, priorities are often set according to both need and availability of funding. Additionally, one of the NGOs conducts research into the ecological infrastructure of the marine environment to understand how the marine ecosystem functions.

RESULTS SUMMARY

- Number of participating NGOs investing in ecological infrastructure: 8 (3 through NRM).
- Total spend: ~R65 million (much of this from NRM) (+R26 million for waste management).
- Key results:
  - The total area restored through work of participating NGOs during 2017/2018 was 12,441 ha. This included areas in the Nama Karoo, forests, wetlands and riparian habitats.
  - The types of benefits derived from these investments included water retention, erosion control, wetland rehabilitation, riparian restoration, water catchment management, natural spring restoration, forest restoration and flood attenuation.
  - The total number of people employed during 2017/2018 was 1,656.

3.6 Species

3.6.1 *In situ* conservation of threatened species

South Africa is considered a mega-diverse country because of its very high levels of biodiversity and endemism. Much of this diversity is at risk, with 17% of mammals, 15% of birds, 9% of reptiles and 15% of amphibians listed as regionally threatened on the IUCN Red List of Threatened Species. If Near Threatened and Data Deficient species are included, these percentages would be higher. Sound management of this biodiversity is needed to ensure both its preservation and ability to contribute to the economy, rural development, job creation and social well-being. This is a key point of Strategic Objective 1 of the NBSAP.

Although eight out of the 13 participating NGOs worked on species conservation at some level, either directly with projects that primarily focussed on species, or indirectly where the main focus was habitat conservation or community upliftment (but where there were knock-on benefits for species conservation), much of the species work of the participating NGOs is captured in other parts of this report. For example, when habitat loss is a major threat, increasing the area of suitable space available for a species can be the best form of conservation, and this is covered under expansion of habitats. When illegal extraction is a major threat to species, anti-poaching, counter-trafficking, and demand reduction are potential interventions, while overharvesting during legal extraction can be mitigated by incentivising sustainable use. These conservation themes are covered in sections 3.6.3 (Illegal Wildlife Trade) and 3.7.1 (Biodiversity Economy). Research into the basic biology and ecology of a species or monitoring population trends to understand the impacts of threats is often necessary for species conservation work to guide future interventions, and these are covered under section 3.7.4 (Foundational Knowledge). As a result, only one of the participating NGOs did direct species conservation that could not be captured by these other sections. These were direct actions to conserve species not related to habitat conservation or wildlife trade issues.

Table A2 in the appendices provides details on the work done by participating NGOs on direct species conservation that does not fall under any of the abovementioned themes.

RESULTS SUMMARY

- Number of participating NGOs working on *in situ* species conservation: 8 (but note that much of this species conservation work is captured in other sections of the report).
- Total spend: R6 million
- Key results:
  - Species targeted by participating NGOs were the Wild Dog, Cheetah, various vulture species, owl species, crane species, and various threatened fish species (note that there were other species, but these are captured in other sections).
  - NGO roles included: 1) managing threatened carnivore metapopulations (which involved translocations, disease management, resolving human-wildlife-conflict and writing management plans); 2) establishing safe zones for vultures and other birds of prey; and 3) releasing captive reared cranes into the wild.
  - The Wild Dog managed metapopulation remains stable, safe space has grown and genetic diversity is satisfactory.
  - 37 Cheetah relocations were conducted with an overall success rate of 74% (translocations are deemed successful if animals survive for 2 years post release); 58 reserves nationwide actively involved in Cheetah managed metapopulation Cheetah.
  - The number of Wattled Cranes is up by 60% over 26 years, while the number of breeding pairs up by 40%. Additionally, Blue Crane populations are increasing slowly while Grey Crowned Crane habitat is increasing.

3.6.2 *Ex situ* conservation

Ex situ conservation means the conservation of components of biological diversity outside their natural habitats and involves maintenance and breeding of endangered plants and animals under partially or wholly controlled conditions in specific areas such as zoos, gardens and nurseries. *Ex situ* conservation provides a backup strategy and added security for highly threatened species when there is concern that *in situ* methods (i.e. conserving species in their natural surroundings) may not be adequate.

The NBSAP makes provision for *ex situ* conservation and indicates that it is, or will become, necessary for the conservation of certain species to address the impacts of unsustainable use, habitat transformation or climate change. Only two participating NGOs are involved with work on *ex situ* conservation (see Table A3 in the appendices for details).

RESULTS SUMMARY

- Number of contributing NGOs: 2
- Total spend: Not estimated
- Key results:
  - Species that are conserved through the *ex situ* work of participating NGOs are Wattled Cranes, African Penguins, Pickersgill's Reed Frogs, sea-horse species and turtle species.
  - 600 Pickersgill's Reed Frogs were bred in captivity during 2017/2018, with 250 being released into the wild.
  - Two captive reared Wattled Cranes were successfully released into the wild (which represented a 50% success rate from 4 hatched chicks).
  - Breeding of sea-horses is making good progress, although there is a lack of a brood exchange

3.6.3 Illegal wildlife trade

The trade in wildlife and wildlife products, which includes both animals and plants, can be legal or illegal. When conducted sustainably, legal trade can bring considerable socio-economic benefits that incentivise good conservation practices, even for CITES-listed species. To illustrate this, over the ten-year period from 2005–2014, the total financial value of CITES listed exports from the SADC region was estimated to be >USD3.4 billion (Sinovas et al., 2016). When conducted unsustainably, however, legal trade can be a threat to biodiversity conservation because it may have negative effects on species populations over the long-term. Contributions of NGOs to issues surrounding legal wildlife trade are considered under section 3.7.1 (Biodiversity Economy).

Illegal wildlife trade (IWT, or wildlife crime), which is not by definition considered sustainable, poses severe threats to the survival of many South African wildlife species. The main incentive to conduct wildlife crime is profit, with global illegal trade in wildlife products estimated to be USD 70–213 billion in 2014. There is no equivalent estimate for South Africa, but the mega-diverse nature of the country makes it a prime target for wildlife crime. The value of rhino horn trafficking alone can be roughly estimated at ~USD300 million per year, based on 1,000 rhinos being poached. While rhinos have claimed most of the headlines for wildlife crime in South Africa since 2009, there are many other wildlife species that are impacted by illegal trade, and the financial incentives driving the illegal activities create serious threats to these species.

As with other threats to biodiversity, the South African government is mandated to implement strategies to stop IWT but has insufficient capacity to do so alone. Conservation NGOs have played a major role in assisting the government to reduce the impacts of wildlife crimes for many years, and here we assess the contributions of our 13 participating organisations during 2018. We acknowledge that there are many NGOs not included in this assessment that work to support the government in this space, and our review only quantifies the contributions of a few.

Eight of the participating NGOs work to reduce IWT, with contributions varying from supporting on-the-

ground anti-poaching efforts, contributing towards South Africa's anti-trafficking work, commenting on national policy related to wildlife trade, research quantifying IWT in traditional medicine markets, and efforts to reduce demand for rhino horn in consumer countries (see Table A4 in the appendices for details). Rhinos have dominated the discourse around IWT in South Africa since 2009, and this is still reflected in the work of NGOs, with seven of the eight organisations working on rhino related wildlife trade responses. Other species that receive attention are Elephants, Lions, Leopards, pangolins, vultures, cranes, reptiles, amphibians, marine corals, and hard woods. Another important contribution in the fight against IWT is training that increases the capacity of conservation agencies; this work is captured under section 3.7.5 (Training).

Participating NGOs spent a total of ~R30 million during 2018 on implementing projects to reduce the impacts of IWT. The success of this work tends to be measured as activity implementation (e.g. number of rhinos dehorned), which are relatively easy to evaluate, or intermediate outcomes, rather than whether IWT has been genuinely reduced, which is the ultimate goal of the work. This is mainly due to the complexity of the wildlife trade problem rather than any specific flaws in the work conducted by the NGOs. For example, there are many organisations working to reduce IWT (including many not participating in this assessment), making attribution of outcomes challenging and making it difficult to ascribe any improvements to the specific work of a single NGO. Also, there are many factors contributing towards the impacts of IWT and many different interventions being implemented to reduce these impacts (including anti-poaching, anti-trafficking and demand reduction), making it difficult to determine which interventions are most beneficial. Additionally, many interventions require time to take effect, and this results in a lag between the timing of an intervention and the possible outcome.

This highlights a widespread shortcoming of the broader conservation community, which has not historically done a good job of evaluating which conservation interventions work best (Sutherland et al., 2004). The conservation sector in South Africa needs to invest more time in assessing which strategies for countering illegal wildlife trade are most impactful for populations of species under threat (also see the recommendations in section 4). That being said, it is worth remembering the counterfactual argument that without the ongoing interventions, rhino populations would almost certainly be in a much worse state.

RESULTS SUMMARY

- Number of participating NGOs working on IWT: 8
- Types of IWT activity: Anti-poaching; Anti-trafficking; Policy; Traditional medicine; Demand reduction.
- Total spend: ~R30 million
- Species included in the conservation work of participatin NGOs are White Rhino, Black Rhino, African Elephant, African Lion, Leopard, Temminck's Ground Pangolin, *Dalbergia* spp., African vulture species.
- Key results:
  - There was zero rhino poaching in 25 private reserves assisted by participating NGOs in KZN, but rhino poaching continued in Ezemvelo KZN reserves.
  - 13 detection dogs were deployed in reserves, including 2 patrol, 6 tracker, and 5 detection dogs.
  - 24 community rhinos were dehorned through funding provided by NGOs.
  - The feasibility of using Giant Pouched Rats to detect pangolin scales and hardwood was successfully demonstrated with an accuracy of 95%. Rats can be trained more quickly and cheaply than dogs, can be handled by any trained persons (while dogs need a specific handler) and are more cost effective as detection agents. Operational deployment still needs to be tested in ports.
  - State agencies and private landowners have been given access to technologies, operational funding and staffing resources to assist with intelligence led investigations and data analysis with the aim of understanding criminal syndicate working structures.
  - Comments were submitted to DEFF on seven sets of draft legislative amendments. Measuring the uptake of these comments is hard because the government provides limited feedback on how they incorporated comments.

- ~1 million people were reached through social media campaigns regarding the consumptive use of rhino horn in Vietnam. The impact is hard to measure effectively.
- Chinese and Vietnamese agencies were brought out to SA to be introduced to SA agencies and to allow for inter-agency fact-finding and collaboration.

3.7 People and conservation

3.7.1 Biodiversity economy

The South African government is currently implementing a national 'Biodiversity Economy Strategy' (BES) (Department of Environmental Affairs, 2016a), which is an initiative aimed at growing businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to the conservation of biodiversity through their activities. The BES focusses on the commercial wildlife sector and the bioprospecting industries (although no participating NGOs indicated involvement in bioprospecting), but we also include work done towards the oceans economy and sustainable farming in this section where they pertain to biodiversity.

Strategic Objectives 1 and 2 of the NBSAP outline a path to ensure that the management of biodiversity assets and ecological infrastructure continue to support South Africa's development path and play an important role in underpinning the economy (Government of South Africa, 2015). In addition to looking after the network of PAs and sustainably managing species of special concern, the NBSAP also requires expanding, strengthening and transforming the biodiversity economy to optimise economic opportunities in a way that is inclusive of the rural poor and supports local economic development that is sustainable over the long term. This is Outcome 1.3 of the NBSAP (Government of South Africa, 2015).

Six of the participating NGOs have projects that directly or indirectly contributed towards the biodiversity economy (see Table A5 in the appendices for details). Many of these projects also contributed to separate conservation themes such as Biodiversity Stewardship (see section 3.5.3), Biodiversity Mainstreaming (see section 3.7.2), Public Engagement (see section 3.7.3) and Foundational Knowledge (see section 3.7.4) and, where it is the case that the other activity is the primary goal of the project, the amount spent is attributed to that activity.

RESULTS SUMMARY

- Number of participating NGOs working on the biodiversity economy: 6
- Biodiversity economy activities involving participating NGOs were Wildlife and ecotourism, Oceans economy and Sustainable farming.
- Total spend: ~R20 million
- Key results:
  - 13 SMMEs (small, medium and micro-sized enterprises) and 15 cooperative businesses in ecotourism or associated services were supported (e.g. gardens feeding into ecotourism lodges, maintenance support to ecotourism lodges).
  - Increase in wildlife populations on Kgalagadi community ranch; increase in land connectedness; strong village rights to land and resources; effective village-based governance; improved livelihoods, including wildlife benefit; expansion in wildlife economy, including jobs; improved livestock and reduced over-grazing.
  - ~800,000 visitors to oceanarium exposed to Western Indian Ocean biodiversity. Currently no way to tell what the impact of this is, but indicators are being developed.
  - Research contributes towards the oceans economy by providing critical data on sustainability of fisheries stocks.

- 120 homestead gardens and 12 school gardens planted in 2018 with surveys of recipients of homestead garden assistance finding >80% retention rate. School gardens had lower retention at <50%.
- Seven farmers organisations supported with ~600 members using sustainable livestock production. >1600 farmers supported by NGOs earned R32.8 million rand from formal red meat markets from a baseline of zero income from formal markets. This directly supports the 336,000 ha of communal stewardship agreements.
- 240 beehives supported in eight communities in two separate regions.

3.7.2 Biodiversity mainstreaming

Mainstreaming is the process of embedding environmental considerations into policies, planning, strategies, and practices of key public and private actors (e.g. agriculture, mariculture, aquaculture, forestry, mining and energy) that impact or rely on the environment, so that it is conserved and sustainably used both locally and globally. Mainstreaming biodiversity is central to the achievement of South Africa's landscape approach to managing biodiversity and relies on partnerships between different sectors across landscapes. It is a focus of SO3 of the NBSAP.

Six participating NGOs have projects that contributed directly or indirectly towards biodiversity mainstreaming (see Table A6 in the appendices for details). There was considerable overlap between mainstreaming and other conservation themes, and not all of the NGO contributions were captured in this section because they produced indirect benefits arising from work focussing on other conservation themes. One example of such an indirect contribution is waste management, which is not a major theme in this review, but which is captured under Public Engagement (see section 3.7.3). Advocacy, action and innovation work of two NGOs contributed towards the mainstreaming of waste management into state and private business policy. Another example is restoration work captured under investing in Ecological Infrastructure (see section 3.5.7). Private landowners and communities that mainstream this kind of work into their management plans contributed towards ecosystems services benefits.

RESULTS SUMMARY

- Number of participating NGOs working on the biodiversity mainstreaming: 6
- Total spend: R6.5 million
- Key results:
  - Ecosystem based adaptation concepts were taken up by three municipalities.
  - 34 companies were trained to use a comprehensive localised standard of the Global Ecosystem Service Partnership.
  - An Offset Decision Making Framework tool was developed for use by Northern Cape Department of Environment and Nature Conservation and SANParks.

3.7.3 Public engagement and education

Members of the general public are often not aware of the impacts their actions can have on the environment or of the actions they can take to reduce their impacts and conserve biodiversity (Government of South Africa, 2015). Strategic Objective 4 of the NBSAP seeks to enhance people's awareness, understanding and appreciation of the diverse values of biodiversity and to mobilise people to make choices and take actions that enhance biodiversity conservation.

Six of the participating NGOs fulfilled a role of public engagement through raising awareness about the importance of conservation, education in schools, citizen science, informing people about their environmental rights and promoting conservation

friendly lifestyles (see Table A7 in the appendices for details).

RESULTS SUMMARY

- Number of participating NGOs conducting public engagement: 6
- Public engagement activities included engagement with the general public, engagement with schools, awareness about environmental rights, and promotion of conservation friendly lifestyles.
- Total spend: R12.4 million
- Key results:
  - There was ongoing engagement with traditional authorities to facilitate and support a process of conservation on community land, and to promote benefit sharing and green economy.
  - There was ongoing work with commercial farmers to secure safe spaces for threatened species.
  - 4,555 members of the public participated in an annual national awareness day for frog conservation.
  - 500 children attended camps on environmental education.
  - 140,000 children were engaged in art projects.
  - 1,850 children received general conservation education.
  - 15,080 children participated in formal curriculum linked programmes
  - 130 schools and 90 businesses established recycling collection points and 4,000 t of waste were collected

3.7.4 Foundational knowledge, citizen science and monitoring

Research into the basic biology and ecology of species, their distributions and population trends may not directly conserve species or boost numbers but is a critical part of the process of understanding the impacts of threats to conservation and is frequently a necessary part of a species conservation strategy. Four NGOs contributed towards Foundational Knowledge, Citizen Science, Monitoring of species and updating IUCN Red Lists of Threatened Species (see Table A8 in the appendices). The outcomes for this theme generally only have indirect impacts on conservation and we present information on how well data are being collected and how accessible the stored data are. Outcomes are, therefore, less tangible than other sections and do not directly measure conservation impact.

RESULTS SUMMARY

- Number of participating NGOs involved in foundational knowledge generation, citizen science and monitoring: 4
- Total spend: >R6 million (the amount is probably much higher than this, but we were unable to estimate spending on species biology and ecology).
- Species included in the research were Buffalo, Elephant, rhino species, Oribi, African Wild Dog, Cheetah, Leopard, Lion, Riverine Rabbit, Humpback Whale, eagle species, vulture species, crane species, owl species, Southern Ground Hornbill, Sungazer, Albany Adder, amphibians, marine invertebrates, teleosts and elasmobranches.
- In general, non-sensitive data are made available upon request at no cost, although data sharing agreements may be used, and acknowledgement or co-authorship may be requested if used for publications. In some cases, non-sensitive data that has been derived at some cost may only be released upon receipt of legitimate scientific research requests. Sensitive data, such as rhino population and location data, are not available to the general public and will only be released for legitimate scientific purposes or after sufficient time has lapsed to render the data non-sensitive.

Some data are submitted to SANBI and almost all data are digitised.

- The roles of NGOs in foundational knowledge accumulation included conducting primary research, facilitating student research and maintaining databases. For citizen science, NGOs coordinated species surveys, encouraged the public to collect and submit data on a range of species and/or issues, trained stakeholders to collect and submit data, and coordinated the monitoring of various marine harvesting regimes. For monitoring, NGOs either directly monitored or supported the monitoring of a large variety of mammals, bird, amphibians, marine vertebrates and marine invertebrates. For Red List assessments, the roles of NGOs ranged from collecting, collating and/or contributing data to Red List assessments to managing the entire Red List process for certain taxa (e.g. mammals).
- Key results:

  Foundational knowledge research
  - The use of artificial intelligence to monitor the impact of trophy hunting on Buffalo.
  - The efficacy of ear notching as a monitoring tool in Black Rhinos.
  - Distribution and activity patterns of Riverine Rabbits.
  - Migration biology of Humpback Whales.
  - Ecology and conservation of cranes, amphibians and marine invertebrates.
  - Biology of bony & cartilaginous fishes.

  Citizen science
  - Coordination of Wild Dog and Cheetah surveys every 5 years using visitor sightings in Kruger National Park.
  - Collection and submission of roadkill data.
  - Vulture and birds of prey re-sighting data and poisoning incident data.
  - Training members of the public and/or industries to collect and submit various forms of data.
  - Coordinating line fish monitoring catches for sharks and other fish.
  - Coordinating invertebrate catch data collection to monitor shellfish abundance, health and exploitation.

  Monitoring
  - Ground and aerial monitoring of rhinos to create landscape use maps.
  - Annual surveys of Oribi to monitor population trends.
  - Successes of Wild Dog reintroductions, human-wildlife conflict mitigation, and disease management.
  - Success of Cheetah translocations, responses of Cheetahs to reintroduction sites and conflict with humans.
  - Conducting annual KZN Leopard survey to understand population trends, human Leopard conflict and contribute data to hunting quotas, examining connectivity of Leopard populations in northern KZN, Mozambique and Swaziland, monitoring Lions in KZN PAs to understand population dynamics, movement patterns, nesting behaviour.
  - Population dynamics and poisoning events in African vultures and other birds of prey.
  - Movement patterns and breeding behaviour of Southern Ground Hornbills.
  - Sightings, breeding sites and success, roosting site locations and incidents of power line collisions and poisonings in crane species, avian mortalities on a windfarm in the Western Cape to assess impacts of wind as a source of energy.
  - Populations of threatened amphibians, coral reef associated inverts and fishes, exposed reef oyster and mussel populations, linefish & elasmobranchs, shark by-catch and utilisation in the South African commercial long-line fisheries, Status of *Pristus* in KZN, movement behaviour of the giant guitarfish.

  Red List
  - Regional and/or national assessments completed for 10 different taxa.

3.7.5 Training

Strategic Objective 5 of the NBSAP calls for the development of an equitable and suitably skilled workforce to improve conservation and management of biodiversity. A key to achieving this is through training, and NGOs are well placed to either develop and present relevant training interventions or facilitate such training. Not only does a skilled workforce improve the outcomes of conservation work, but it also improves the likelihood of obtaining jobs for the trainees and, therefore, their livelihoods. Eight of the participating NGOs conducted training related to biodiversity conservation (see Table A9 in the appendices).

RESULTS SUMMARY

- Number of participating NGOs involved in training: 8
- Total spend: R85 million
- Total people trained on SAQA accredited courses: 2,911.
- Total people trained on non-SAQA accredited courses: 5,205.

3.8 Finances

3.8.1 Income

Participating NGOs were asked to provide their total income for the 2017/2018 financial year and to provide a breakdown of income into funding source categories. There are many potential funding categories, so we provided a template to work from, including an 'other' option to allow for sources we did not think of. Participants were also asked to indicate whether the funding sources were from within South Africa or if they were international sources. We did not ask for any specific or personal details of funders. In many cases, the income statements of NGOs are available in annual or integrated reports, which are often available on websites, and these were consulted to cross-check details provided in the questionnaires. Although income statements provide total income, most do not provide the level of detail we were seeking and could not substitute for the participation of finance departments of each NGO. Historical income statements were also obtained from annual reports dating back to 2015 to provide insight into changes in overall funding over time.

The total incomes from 10 NGOs were obtained for a 4-year period from 2015–2018 and showed a slight decline over the last two financial years (see Figure 4). One probable reason for this decline has been a weakening economy (nationally and globally), with South Africa's economic growth slowing over the last 10 years (GDP growth has dropped from ~5% in 2007 to ~1.5% in 2018). The weakening economy has likely had a knock-on effect on the ability of NGOs to obtain funds for conservation, which often loses out when state and private finances decline. During the development and data collection portions of the review, one participating NGO highlighted that it currently had to focus on staying afloat financially, and that this pushed the review process down the list of priorities. A second likely reason for the decline in total income is that individual NGOs experience fluctuations in income between years that are not related to the economy (e.g. due to the receipt of unusually large international funds), and when this happens with one or two of the larger NGOs (larger in terms of annual income and spending) this disproportionately swings the total income up or down because these larger NGOs have greater influence on the overall income.

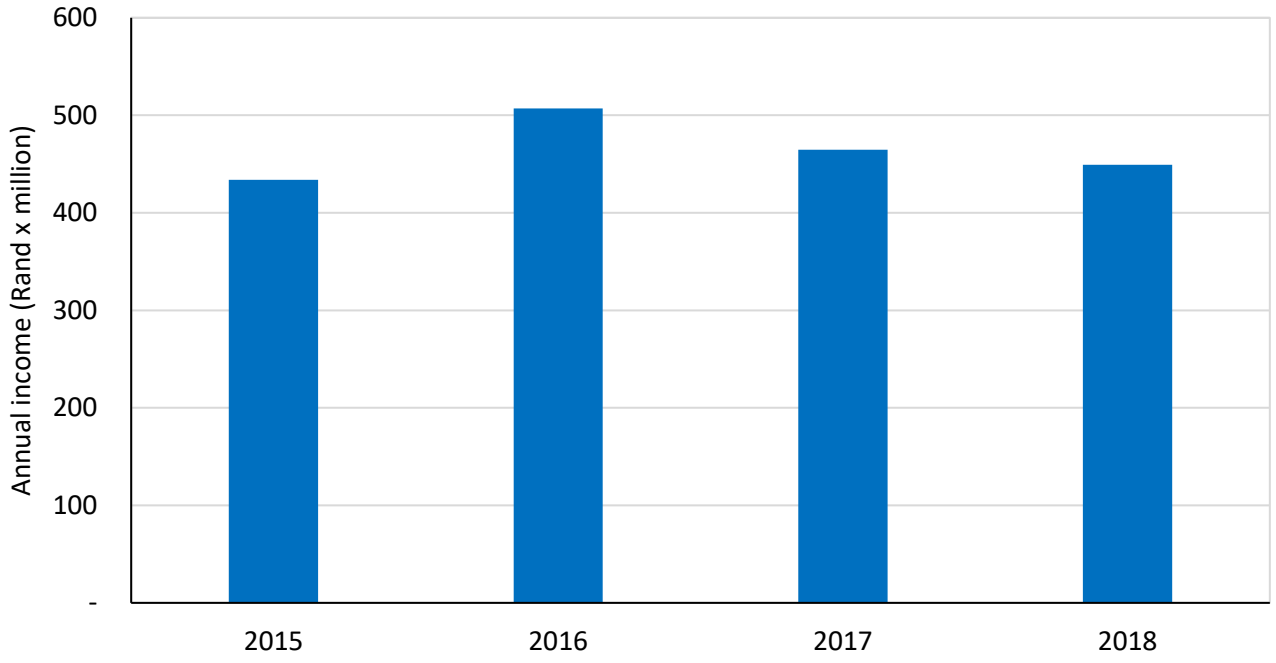

Figure 4. Four consecutive years of total income for 10 of the 13 participating NGOs. Data taken from financial statements in annual reports. NGOs included here were ACT, CSA, EWT, INR, NACSSA, PPF, SAAMBR, SAWC, WFA, and WILDTRUST.

For the financial year 2017/2018 we had data from 12 of the participating NGOs, and these showed a total income of R498.7 million, equivalent to USD38 million at an exchange rate of 13:1. Eleven funding source categories were identified (see Figure 5). During 2017/2018, 73.5% (±33) of funding came from South African sources, while the main funding categories were donations and bequests (26% ± 37), trusts and foundations (15% ± 16), government (13% ± 21), corporates (13% ± 26) and specific NGO-derived income (11% ± 31).

3.8.2 Spending

Participating NGOs were asked to indicate how they spent their money and how it was split between different conservation priorities. On average 79% (±14) of income was spent on direct programme costs (i.e. project expenses), including staff salaries, while the remaining 21% of the funds went towards support costs, also termed overheads or administration costs. On average, most of the direct programme costs were spent on species conservation (35.9% ± 28.8) and habitat conservation (29.2% ± 32.5), followed by community work (11.5% ± 13.2) and training and education (10.5% ± 10.8) (see Figure 6).

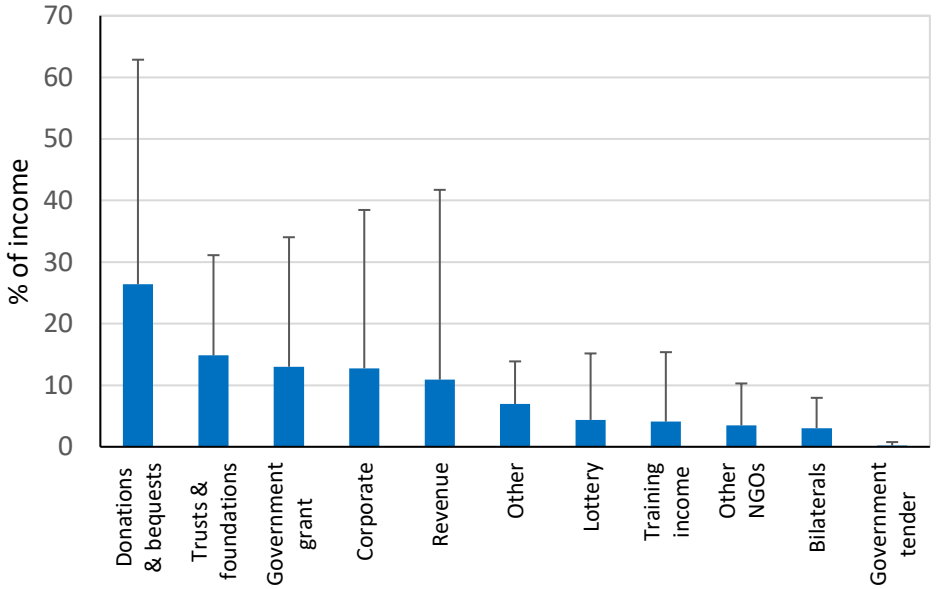

Figure 5. Funding source categories for eight of the 13 participating NGOs during the 2017/2018 financial year. The % income for each category was determined per NGO; means and standard deviations were calculated from these. Data provided by NGO finance departments.

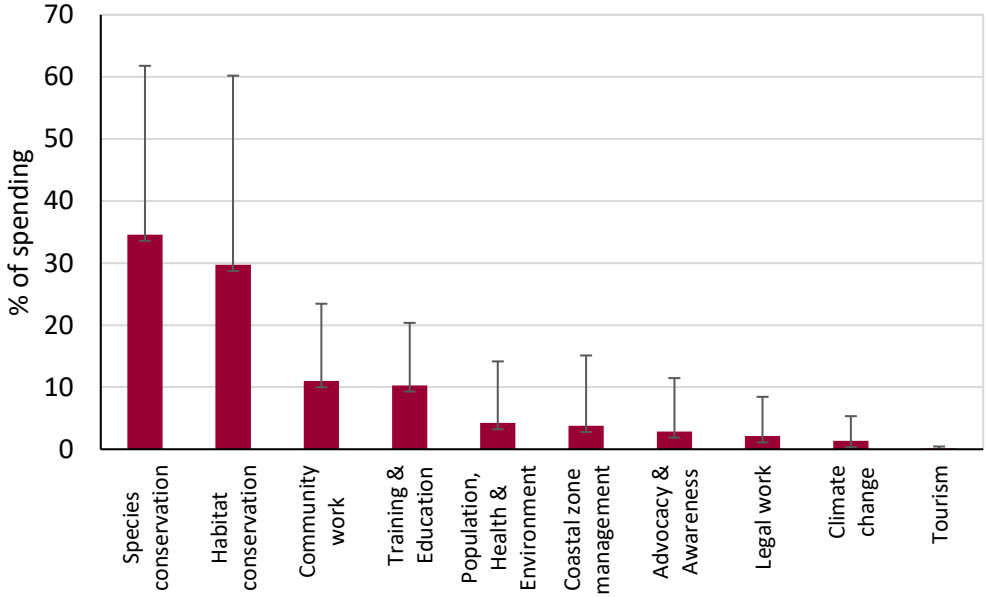

Figure 6. Average % spending on different conservation categories by nine participating NGOs during the 2017/2018 financial year. Data provided by NGO finance departments.

3.9 Human resources – employees

Participating NGOs were asked to provide information on numbers and demographics of employees by completing a standard workforce priority table (as per their most recent employment equity report). Definitions of employment categories were as defined in these employment equity reports.

The total number of permanent employees in the 13 participating NGOs at the end of June 2018 was 962, with an additional 1,656 short-term contract workers, many of whom were paid for by the government but managed by the NGOs. These contract worker numbers are highly variable between years. Of the permanent employees, an average of 9% were senior and top management, 16% were professionally qualified middle management, 27% technically skilled junior management, 21% semi-skilled, 16% unskilled and 11% interns (see Figure 7). The smallest NGO employed just two people while the largest employed 249. One NGO is run by three volunteers with the assistance of a part-time secretary. Out of top management, there were 10 white males, 10 white females, one black male, one black female and one Indian female (see Figure 8).

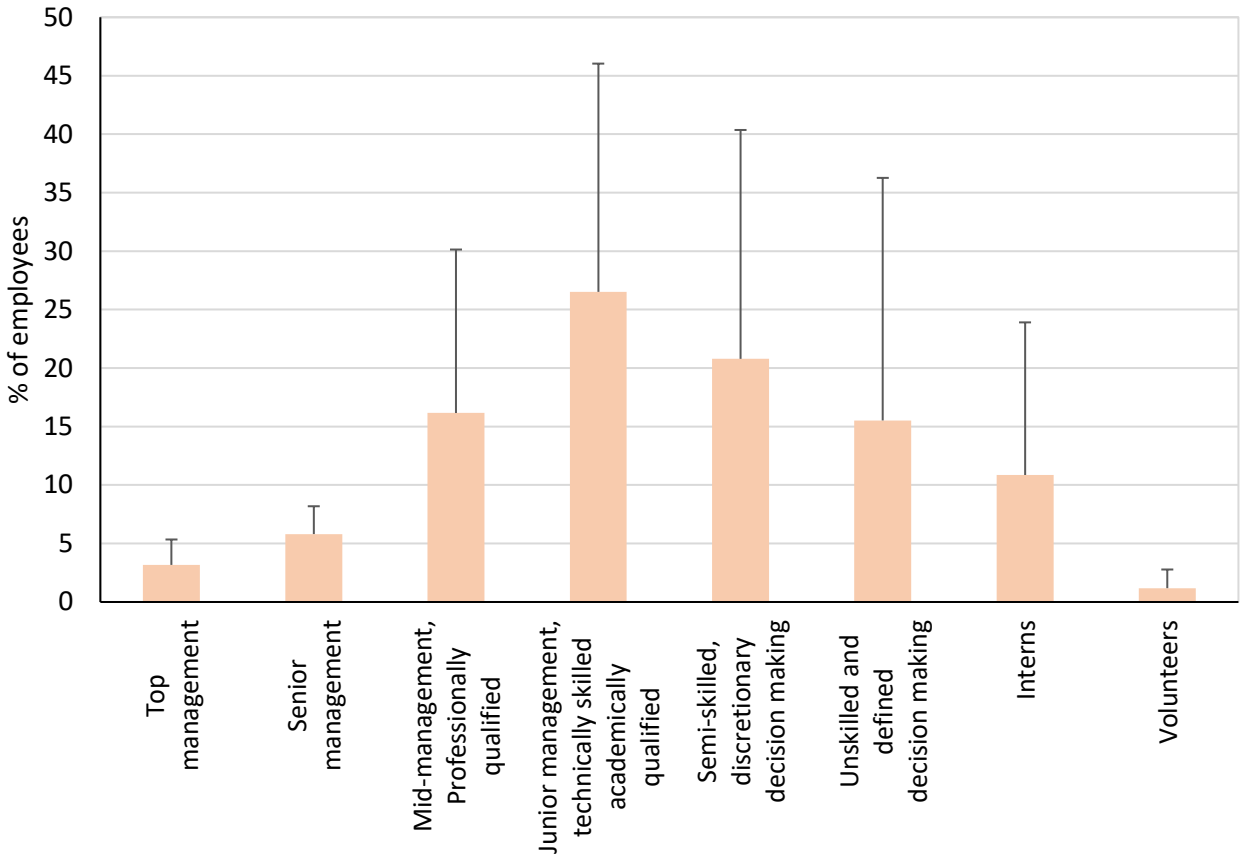

Figure 7. Percentage of NGO employees at different levels of seniority during the 2017/2018 financial year. Data from HR departments of 11 NGOs.

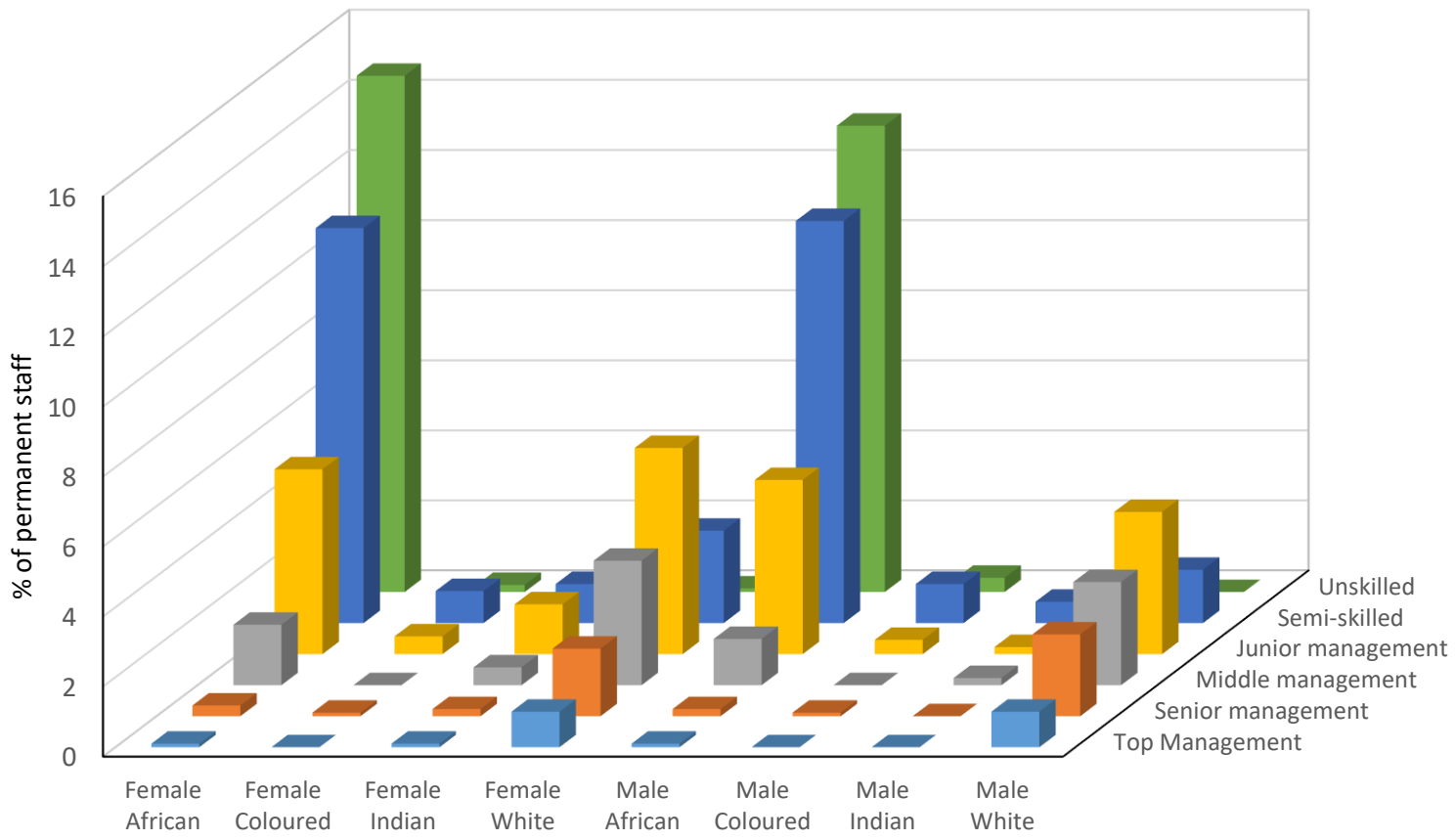

Figure 8. Percentage of NGO employees according to demographics based on data provided by six NGOs during the 2017/2018 financial year.

4. Recommendations

4.1 Repeat the review (in streamlined format) on a regular basis

This is the first review of the conservation contributions made the NGO sector in South Africa. As a result, we focused our attention on a small subset of representative organisations as a means to testing and refining our methodology. The results of this process therefore represent a baseline position against which future assessments can be compared. Repeating the assessment on a regular basis, in a streamlined format, would be useful for the following reasons:

1) It would provide participating NGOs with a consistent mechanism to evaluate and document their own performances over time;
2) It would allow participating NGOs to readily monitor the work of other organisations, which would provide a comparison against their own performance, identify opportunities for collaboration, and reduce the likelihood of duplicating effort;
3) It would provide invaluable information on what works in conservation, an issue that is becoming increasingly important for the allocation of scarce financial and human resources during a time of snowballing threats to biodiversity;
4) It would provide vital information about the progress of conservation across South Africa and highlight areas where more work is needed (or even where work should be abandoned); and
5) It would provide the government with a simple and accessible way to quantify the contributions of NGOs and facilitate their ability to report on South Africa's conservation targets at an international level.

We recommend that future iterations are produced biennially, in order to sufficiently track trends, without been overly burdensome to participant organisations.

4.2 Increase NGO participation

In the future, the review would greatly benefit from the inclusion of a larger constituency of conservation NGOs, as this would ultimately make it more representative. It will, therefore, be necessary to gauge the level of support from the biodiversity NGOs before any future assessments are planned, including those that participated in the current review (as they may be reluctant to do so again due to the effort required) and those that did not. This could be done through an independently run workshop, using an impartial facilitator, to allow NGOs to debate the pros and cons of the process, and help shape its future design (see section 4.3).

Additionally, as there are many non-IUCN-member NGOs in South Africa that do important biodiversity conservation work, it would be worthwhile considering extending the reach of the assessment to include some of these. This would, however, require an objective selection process to ensure that only bona fide organisations are included.

4.3 Refine the methodology

To our knowledge, this review was the first ever project of its kind in South Africa, and it has provided some valuable initial insights into NGO contributions towards conservation. However, in an effort to be as comprehensive as possible, the process of obtaining data tended to be onerous. While we did achieve the main objectives of the review, we recommend a substantial refining of data collection processes in future iterations. As previously described, the main challenge was the length of the questionnaire and the level of detail requested in some of the sections. A possible solution to this would be the development of a simplified reporting framework for monitoring key biodiversity indicators. If NGOs knew what these indicators were at the start of each reporting period, it would theoretically be a relatively simple process to document the results of their work as it is completed. The point of the framework would not be to get NGOs to change the work they do, but to find effective ways to report on common indicators and provide robust information on a regular basis. This could be a partial solution to the challenges of data management (see section 3.1) but would require buy-in from all potential participating organisations at the outset. This could be discussed during the same workshop described above (see section 4.2).

This framework would likely require a shorter questionnaire to encourage participation, although this might result in the loss of important information

needed to assess whether specific national targets are being met. The workshop process could be used to work through these details. One example of where the questionnaire was found to be onerous was in the section on expanding land under conservation, which included a question on whether new conservation land was situated within areas previously recognised as having significant conservation value (such as critical biodiversity areas, which the government needs to know about in order to report against national targets). Some NGOs involved with land expansion did not complete the sections on area within critical biodiversity areas, suggesting that this level of detail was tedious to include. This may reflect an inability in some cases to easily provide the requested information (which in this case is an important component of the national conservation target to be reported on) and suggests that there is a need to manage data more efficiently. Any restructuring of the questionnaire should be done through the workshop and co-created with other participating NGOs.

4.4 Increase the measurement of conservation impact

We found that, while the implementation of activities was almost always measured, intermediate outcome successes were measured just over two-thirds of the time, and conservation impacts were measured less than half the time (see section 3.4). While this reflects the challenges of measuring conservation impact, as described in section 3.4, it also suggests that we need to make a greater effort to find solutions to measure it – this would make us more effective and efficient, improve our successes and help to justify the work we do.

If we do not know exactly what our conservation impact is with a specific project, we should consider making this a deliverable to be determined. This could be factored into the project activities and the total cost of the project during the planning phase. Given the increasing pressures on biodiversity and the decreasing resources available to tackle them, if we are unable to measure and demonstrate impact with projects, we should consider finding alternative solutions.

The workshop recommended above could also be used to drive this process forward. It would be beneficial to all NGOs if we had a greater understanding of how we set targets as a sector and how we monitor and evaluate the effectiveness of our work. Sharing knowledge in this way would make us all more effective in our conservation work and would surely benefit the biodiversity we are trying to conserve. Ideally, we need to identify 10–20 high-level indicators that can be easily measured and tracked across time, and a possible output of the workshop would be a template guide on how to set indicators and how to measure them.

4.5 Measure cost effectiveness

Measuring cost effectiveness of projects is not currently a common practice among conservation NGOs and we did not set out to measure it here. However, as with measuring impact, quantifying cost effectiveness will likely become increasingly necessary to obtain donor funding, and this is something that NGOs will need to consider implementing. This could be incorporated into the reporting framework but will need an agreed common method for measurement. Appendix 6 presents some very basic case studies of cost effectiveness based on results presented here.

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Appendices

Appendix 1: Terms of reference for oversight committee

Background

Although the responsibility of implementing national and international conservation targets generally lies with governments, the South African government does not have sufficient resources or capacity to meet its targets on its own. Non-governmental organisations (NGOs) are thought to play a major role in helping South Africa meet these targets, but their impacts as a collective are not well understood and not fully recognised. While segments of the commercial wildlife sector are able to demonstrate their value to government (such as through jobs created and revenues generated), the NGO sector has not yet measured its collective contributions and, therefore, is not in a position to demonstrate overall value.

While this potentially reduces the influence of NGOs, it also means that the government is not aware of many NGO contributions and is not able to fully report on South Africa's progress towards meeting its conservation targets beyond those for which it is directly responsible. This issue was raised in a recent national stakeholder meeting organised by the Department of Environmental Affairs (DEA) as part of their preparations for the 14th Conference of Parties of the Convention on Biological Diversity to be held in Egypt in November 2018. South Africa will have to report on progress, but currently lacks data and is not aware of many contributions made by non-governmental entities. By quantifying their conservation contributions, the NGO sector will provide the government with some of this critical information and will assist them with their international reporting.

The main goals of this NGO review are to quantify (and qualify where appropriate) the contributions of NGOs to South Africa's biodiversity conservation targets, and to quantify the social and financial contributions through job creation and income generation/spending. While this project is led and funded by the EWT, we emphasise that it is intended to be for the benefit of all bona fide conservation NGOs in South Africa. We anticipate that the results will highlight the benefits of the collective contributions made by NGOs, which will be of use when approaching current and future donors and should provide greater standing with government. The process of collating data on individual contributions to conservation targets will also allow each NGO to measure its own overall impacts, if they are not doing so already.

Purpose of Oversight Committee

Because this review will be conducted by the EWT, which is a member of the NGO sector that will be assessed, there is a risk that the findings will not be perceived to be independent, which will detract from the impact of the work. It is, therefore, necessary to introduce a degree of independence to this process to ensure that the results are considered objective. The purpose of the committee is to provide this independence through oversight of the entire process.

Composition, roles and management of the Oversight Committee

The committee has been established and comprises the following three people:

- Professor Barend Erasmus, Dean, Faculty of Natural and Agricultural Sciences, University of Pretoria, South Africa (previous position at start of review process: Exxaro Chair in Global Change and Sustainability Research, University of the Witwatersrand).
- Professor Emma Archer, Centre for Environmental Studies/Geography, Geoinformatics and Meteorology, University of Pretoria (previous position at start of review process: Chief Researcher, Natural Resources & the Environment, Council for Scientific and Industrial Research (CSIR).
- Dr Luthando Dziba, Managing Executive, Conservation Services, SANParks.

We requested that DEA assign one government official to the committee but have not yet received any formal feedback. The anticipated roles of the committee will be as follows:

- Activity 1: Participate in a one-day workshop before data collection starts (12 July 2018) to review the proposal and assess the following:
    - The scope of the study. The EWT has developed a draft project plan that includes the anticipated scope of the review, and the committee will be requested to review the plan for relevance and feasibility. The plan will be circulated before the workshop. Part of this process will be to determine the extent to which complex socio-economic factors should be considered during the review process because these may be difficult to measure (and might be outside the feasibility of the review).
    - The suitability of selected NGOs. For cost and logistical purposes, the EWT has decided to include all willing IUCN NGO members in the study, but this will be discussed by the committee.
    - The suitability of the selected indicators of conservation success. Using the correct indicators will be critical, as these will affect our ability to quantify success.
    - The proposed methods of data collection and analysis, including an assessment of the questionnaire. A draft questionnaire has been developed by the EWT (and will be circulated before the workshop) but will be amended as necessary by the committee during the workshop.
- Activity 2: Provide *ad hoc* advice on issues arising during the data collection period.
- Activity 3: Review the draft report.

Appendix 2: IUCN membership requirements

The criteria we used to select NGO participation was membership of the IUCN, which requires strict compliance with the following requirements:

General requirements

- Must share and support the objectives of the IUCN.
- Must have as one of its central purposes the achievement of IUCN's objectives and a substantial record of activity in the conservation of nature and natural resources.
- The objectives and track record must embody to a substantial extent:
    - The conservation of the integrity and diversity of nature.
    - The aim to ensure that any use of natural resources is equitable and ecologically sustainable.
    - Dedication to influencing, encouraging and assisting societies to meet the objectives of IUCN.
- Does not pursue objectives or carry out activities that conflict with the objectives of activities of IUCN.

Specific NGO requirements

- Must be a not-for-profit entity which conforms with the law of the State where its seat is located.
- Must have been in existence for at least three years.
- Must have a board that is autonomous and independent.
- Must have a governance structure which is transparent, accountable and representative.
- Must submit a minimum of two letters of endorsement from IUCN members in good standing, IUCN committee or councillors.
- Must submit a copy of Statutes/Bylaws/ Constitution documents and most recent annual audited financial statements together with a reconciliation to the declaration of operating expenditure.

Appendix 3: Participating NGO overviews

The African Conservation Trust (ACT) is an established not-for-profit and public benefit organisation that has been operating in southern Africa since 2000. ACT strives to contribute to a world where urban and rural communities take responsible care of their environment, work consciously to conserve and protect natural resources in sustainable ways, and preserve historical assets and heritage for the benefit of future generations. The core focus areas of ACT are environmental conservation and the socio-economic upliftment of vulnerable communities. Wherever possible, ACT initiatives work in partnership with local communities and other stakeholders to promote long term success. Job creation, poverty alleviation, community sustainability and education are key principles in all our projects. Around conservation, ACT creates significant and sustainable environmental change, specifically focusing on climate change, water conservation, food security, waste recycling, sustainable energy, preservation of endangered indigenous fauna and flora and greening projects that incorporate poverty alleviation and sustainable livelihoods. Around education, ACT increases the capacity and expertise of the southern African environment/conservation community. Around innovation, ACT uses modern technology, specifically GIS capacity to enhance conservation efforts and to pioneer socio-ecological approaches to sustainable protected area management. As a founding member of Project Rhino, ACT focusses on strategic oversight, is responsible for the employment of key operational staff and the secretariat, and the management of the ACT Rhino Fund which had raised over R27million for partner reserves by 2018.

Conservation South Africa (CSA) is a local affiliate of Conservation International, an American NPO (established in 1987) with the goal of protecting nature as a source of food, fresh water, livelihoods and a stable climate. CSA, which has been in existence since 2010, is committed to helping societies adopt a more sustainable approach to development and builds conservation programmes that address development needs and safeguards nature to ensure the well-being of current and future generations. CSA works in landscapes where ecosystem services are critical to support the needs of people and nature and does this through four focal areas: fostering effective governance, promoting sustainable business, building a climate-resilient, green economy and building science and innovation.

Delta Environmental Centre (DEC) is a private, independent non-profit organisation (established in 1975) that aims, through innovative education and training programmes and consultation, to enable people to improve the quality of their environment by promoting the management and sustainable use of all resources, in line with the South African Constitution. DEC has matured into a leading institution in the field of environmental education, training and consultation and is an accredited training provider with the Education, Training and Development Practice – Sector Education and Training Authority (ETDP-SETA), and with the University of the North West (UNW).

The Endangered Wildlife Trust (EWT) is a non-governmental, non-profit, conservation organisation, founded in 1973 and operating throughout southern and East Africa. The EWT conserves threatened species and ecosystems by initiating research and conservation action programmes, implementing projects that mitigate threats facing species diversity, and supporting sustainable natural resource management. The EWT communicates the principles of sustainable living through awareness programmes to the broadest possible constituency for the benefit of the region. The EWT achieves its objectives through the work of specialist, thematic programmes, designed to maximise effectiveness in the field and enhance the development of skills and capacity. These programmes form the backbone of the organisation and are essentially self-managed projects harnessing the talent and enthusiasm of a dynamic network of individuals who specialise in an area of conservation importance and have developed unique expertise in response to the challenges they face. Programmes comprise multiple stakeholders and harness their diverse but relevant expertise to address environmental priorities. Stakeholders include national and provincial government, other NGOs, landowners, local communities, farm workers, conservancies, academic institutions and industry. The EWT also acts as a public watchdog, often taking government and industry to task for decision-making which does not meet sustainability criteria.

The Institute of Natural Resources (INR) is an applied research organisation committed to supporting the resolution of environmental and developmental challenges in southern Africa. INR is an independent,

non-profit, public benefit organisation that has operated successfully for 38 years. The Institute currently comprises 29 dedicated scientists, managers, administrators and support staff, and is served by a Board of six senior professionals with diverse competencies. The main purpose of the INR is to work towards the wise use of natural resources in pursuit of sustainability for the good of the environment and society. This is done through multidisciplinary action research and the dissemination of knowledge and is accomplished by working closely with community partners in creating solutions which are both practical and easily implemented. INR also plays an advisory role to government, communities and the private sector on key initiatives. The Institute's primary focus is sustainable resource management, with our work arranged into a series of inter-linked thematic areas. The INR is not primarily a conservation organisation, but rather is an applied research organisation that works in the areas of environmental and natural resource governance and management. As such they identify key drivers of change in these areas and then partner with other research and practitioner organisations to research and address issues.

Leadership for Conservation in Africa (LCA) was initiated in 2006 by the South African National Parks, Gold field Limited and IUCN and is now active in 16 African countries. The LCA recognises that the local communities bordering on parks and reserves are crucial stakeholders to ensure the long-term protection and survival of such ecosystems, but also that these communities are often very poor. LCA chapters work with local communities to influence socio-economic development within the buffer zones of parks and to find ways to enhance the livelihood strategies of these communities.

The National Association of Conservancies / Stewardship of South Africa (NACSSA) was established in August 2003, although provincial conservancy associations had been around for longer. The purpose of NACSSA is to: 1) promote community-driven conservation nationally by supporting provincial conservancy associations; and 2) network with local and international bodies with similar aims. NACSSA's membership consists of two representatives from provincial conservancy associations plus co-opted members as needed. Through this network NACSSA represents ±750 conservancies in South Africa. In total these conservancies own and manage nearly 6 million hectares of land. A conservancy is a vehicle and platform for community-based conservation. It is a voluntary association of environmentally conscious landowners and land-users who choose to cooperatively manage their natural resources in an environmentally sustainable manner without necessarily changing the land-use of their properties. In order to use the term "conservancy", such a cooperative will need to register and have a bone fide conservancy. Community-based means communities within the conservancies, and surrounding areas, irrespective of racial, religious, gender or cultural association.

Peace Parks Foundation (PPF) was founded on 1 February 1997 by HRH Prince Bernhard of the Netherlands, Nelson Mandela and Dr Anton Rupert to facilitate the establishment of peace parks, or transfrontier conservation areas (TFCAs), in southern Africa. The Peace Parks dream is to re-establish, renew and preserve large functional ecosystems that transcend man-made boundaries – thereby protecting and regenerating natural and cultural heritage vital to enabling and sustaining a harmonious future for man and the natural world. Peace Parks Foundation has been actively involved with the establishment and development of ten of the 18 TFCAs found throughout southern Africa, all of which are in various stages of development. The establishment of each TFCA, or peace park, is complex and far-reaching, and involves several phases of activity, which can take many years to achieve. It is an exemplary process of partnerships between governments and the private sector – an African success story that will ensure peace, prosperity and stability for generations to come.

The South African Association for Marine Biological Research (SAAMBR) was founded in 1951, is a unique Non-Government, Non Profit Company and Public Benefit Organisation. In 2004, SAAMBR became the cornerstone of uShaka Marine World in Durban. For over 60 years SAAMBR has contributed to the conservation of marine and coastal resources in the Western Indian Ocean by operating three integrally linked divisions: Oceanographic Research Institute, uShaka Sea World and uShaka Sea World Education. SAAMBR's Mission is to "contribute to the conservation of marine and coastal resources by:

- Generating scientific information through the Oceanographic Research Institute, a leading marine science research institute in the Western Indian Ocean Region.

- Disseminating information and inspiring care for the oceans through uShaka Sea World, Africa's largest world class, conservation-oriented aquarium.
- Empowering people through uShaka Sea World Education, the leading marine conservation education centre in Africa.

The Southern African Wildlife College (SAWC) is a centre of specialisation in conservation education, training, and skills development, which strives to equip people with the qualifications, practical experience, and thought leadership to manage complex ecosystems, conserve wildlife, and empower local communities.

Wilderness Foundation Africa (WFA) works from its base in South Africa to protect and sustain wildlife and wilderness through integrated conservation and education programmes. Whether it is direct action anti-poaching in the field, large landscape wilderness management, or developing rising young leaders from disadvantaged communities for a career in conservation, the Wilderness Foundation has over 45 years of results. WFA focuses on 3 areas: Species, Spaces and People. Their work is based on the values of: a passion for direct conservation action; respect for all living things; a deep commitment to conservation education; and with operations that demonstrate integrity, transparency, sustainability, and innovation.

Wildlife ACT's Mission is to help save our planet's endangered wildlife and wild places from extinction by running importaki89nt conservation projects in Africa. Wildlife ACT Fund is a non-profit trust on a mission to save our planets' endangered wildlife and wild places from extinction. We believe this is the only chance we have of saving ourselves. Passionate, experienced, on-the ground conservationists doing critical work where it's needed most. Delivering time and expertise, implementing anti-poaching measures, finding and funding equipment, and educating local communities. Wildlife ACT offers the only Fair Trade Tourism certified wildlife volunteer program in Africa and is supported by WWF and contributes to some of the most important and exciting endangered and priority species conservation work being done on the ground, by the professionals.

WILDTRUST, comprising **WILDLANDS, WILDOCEANS and WILDENTERPRISE**, says "We're for The WILD. We work for the WILD places, the open spaces, on land and sea, the green places, oases in our sprawling cities. We work for the safety of threatened species, conserving and restoring the ecosystems in which they can thrive. We work for the upliftment of people and communities, creating WILD livelihoods that provide dignity and a future for families. We're for The WILD. For bringing Humankind and Nature back into harmony, reducing the impacts of humanity, while providing opportunities for people. We grow, we green, we sustain, we restore, we protect – People and Planet. Now. Tomorrow. Forever. We're for The WILD".

Appendix 4: Questionnaires

An assessment of the contribution of NGOs to conservation in South Africa

Background to conservation questions

Although the responsibility for meeting national and international conservation targets rests with the South African government, insufficient resources and capacity restricts their ability to fulfil many of their mandates. Conservation NGOs help the government meet conservation targets in a number of ways, but our roles and impacts as a collective are not fully recognised or documented. The purpose of this NGO review is to collate information on NGO contributions and present an overall assessment of the work we do.

This questionnaire was developed by the EWT and has been reviewed by an independent advisory committee comprising three non-NGO conservationists. This document is one of three requesting information from your NGO, with the other two seeking information on human resources and finance data. The purpose of this specific questionnaire is to collate data (both qualitative and quantitative) on the contributions of NGOs to conservation in South Africa with the intention of presenting a synthesis of the collective impacts of the sector. This is the first sector-wide measurement of conservation contributions, so we anticipate some teething problems and may need to adapt our methods as we proceed. There may be scope to repeat the assessment in the future, probably using a subset of the topics included here, but this will be decided upon after the first assessment is completed and after sector wide consultation.

Ethics declaration

1. The EWT project team will only use the data provided for the NGO review assessment.
2. The EWT project team undertakes to keep all personal and organisational data confidential, and to abide by the Protection of Personal Information Act (POPI) and General Data Protection Regulation (GDPR) of the EU.
3. The EWT project team undertakes to present all data anonymously. Data will be presented at the group level and no individual information will be presented in a manner that allows for direct identification of specific persons and/or organisations.
4. The EWT project team will only share data among team members.
5. The EWT project team will archive the data securely during the preparation of the assessment, after which we will destroy the data in line with the spirit of POPI.

Important notes about the questionnaire

- We are interested in any contributions that NGOs make to conservation, including those that contribute to national targets but also those that may not be on the national radar. As a result, the questionnaire is long in order to capture as many potential contributions as possible, so we suggest that you delegate questions to individuals (or teams) within your NGO who have specific knowledge about the different topics. We leave this to your discretion.
- If your organisation works in areas that are not captured by the questions, please use Q15 at the end to provide the relevant information.
- Depending on the size of your NGO and the scope of work you do, there may be questions that are not relevant for you.
- If there are questions that are difficult to understand or are ambiguous in what they are asking, please let us know.
- Many questions ask you to provide answers for the period 2011 – present. The reason for this is to align the feedback with the CBD targets for 2011–2020. We realise there are two potential complications with this. First, you might be reporting on conservation contributions that do not form part of South Africa's international conservation targets, which means the dates do not need to align with the CBD and may in fact be for a much shorter period. Second, your knowledge and data may not stretch back to 2011. In either case, please answer as best you can for the dates for which you have information, but please clearly indicate the time-periods for which you are reporting.
- If you conduct training relating to any of the topics listed in the questions, please include this information in Q13 near the end of the questionnaire. Training is an important component of the contribution that NGOs make to conservation, but rather than add a training related question for each topic, we have added a standalone question near the end to save space.

Quick guide to conservation questions

Q1: Decision making process

Q2: Expansion of habitats under conservation

Q3: Conservation of threatened species

Q4: *Ex situ* conservation

Q5: Wildlife trade

Q6: Biodiversity economy

Q7: Land reform

Q8: Ecological infrastructure

Q9: Biodiversity mainstreaming

Q10: Public engagement and education

Q11: Knowledge accumulation

Q12: Indigenous knowledge

Q13: Training

Q14: Socio-economic contributions

Q15: Other contributions

Conservation questions

Q1: The decision making process

Q1a) How does your organisation develop its conservation strategies?

Q1b) Do you align your strategies with national priorities, and if so, how?

Q1c) How do you prioritise projects?

Q2: Expansion of habitats under conservation

Q2a) Do you have initiatives/activities that contribute (or contributed) towards the expansion of areas under conservation, such as through contractual agreements with landowners (e.g. Biodiversity Stewardship agreements) or acquisition of land?

Q2b) Please briefly describe the role you play in the process. For example are you involved in landowner engagement and declaration, post-proclamation support, policy development, etc.

Q2c) Do you contribute towards (or did you contribute towards) the expansion of areas under conservation through land acquisition? If yes, please complete the table below for the period 2011 – present. Please include projects still under negotiation, but indicate the stage of development in the last column. Please add rows if necessary.

Description of site	Province	Biome	Total area incorporated	Area (ha) within Critical Biodiversity Areas (CBA 1 or 2)	Area (ha) within the Protected Area Expansion Strategy	Area (ha) within threatened ecosystems	List any key threatened species that are priorities to your organisation	Stage of process (e.g. complete, in development)

Q2d) If you contribute (or contributed) towards Biodiversity Stewardship, please indicate which kinds of contractual agreements you work with and answer the questions in the relevant columns for the period 2011 – present. Please include agreements still under negotiation, but indicate the stage of proclamation in the last column. Please add rows if necessary.

Site	Type of agreement (e.g. Nature Reserve, Protected Environment, Biodiversity Management Agreement)	Type of ownership (e.g. private, communal, commercial)	Province	Biome	Total area (ha) incorporated	Area (ha) within Critical Biodiversity Areas (CBA 1 or 2)	Area (ha) within the Protected Area Expansion Strategy	Area (ha) within threatened ecosystems	List any key threatened species that are priorities to your organisation	Stage of proclamation (e.g. gazetted, under negotiation)

Q2e) Do you do anything else to assist the biodiversity stewardship programme? For example by strengthening the institutional capacity of provincial biodiversity stewardship programmes and the suite of incentives (such as access to technical expertise) to enhance their contribution to protected area and conservation area expansion. This is an opportunity to capture "intangible" contributions.

Q2f) Do you have initiatives/activities that contribute (or contributed) to the expansion or conservation of terrestrial areas that are <u>not</u> captured by questions 2c or 2d, for the period 2011 – present. You could include any of the following: Conservation Servitudes, Mountain Catchment Areas, Specially Protected Forest Areas, World Heritage Sites, Conservancies, Important Birding Areas and any others not listed. If yes, please complete the table below and add rows if necessary. Please avoid double counting of sites captured in earlier questions. <u>Do not</u> include Transfrontier Conservation Areas as these are captured in Q2g below.

Description	Type of conservation area (Conservation servitude, Mountain Catchment Area, etc.)	Province	Biome	Total area incorporated	Area (ha) within Critical Biodiversity Areas (CBA 1 or 2)	Area (ha) within the Protected Area Expansion Strategy	Area (ha) within threatened ecosystems	List any key threatened species that are priorities to your organisation	Stage of process (e.g. complete, in development)

Q2g) Do you have initiatives/activities that contribute (or contributed) to the expansion or conservation of Transfrontier Conservation Areas that share a boundary with South Africa? If yes, please complete the table below for the period 2011 – present and add rows if necessary.

Description	Region (e.g. which countries)	Biome	Total area incorporated/ managed	Area (ha) within Critical Biodiversity Areas (CBA 1 or 2)	Area (ha) within the Protected Area Expansion Strategy	Area (ha) within threatened ecosystems	List any key threatened species that are priorities to your organisation	Stage of process (e.g. complete, in development)

Q2h) Do you have initiatives/activities that contribute to the expansion or conservation of marine protected areas or coastal areas? If yes, please complete the table below for the period 2011 – present and add rows if necessary.

Province	Location	Total area incorporated	Description	Purpose of declaration of MPA	Stage of process (e.g. complete, in development)

Q2i) Do you contribute to the development of financial tools for protected area expansion, such as tax incentives?

Q2j) For sites that have been formally declared please explain your involvement in post-proclamation support and annual review.

Q2k) Please describe the biggest challenges and hurdles in the process of your efforts towards protected area expansion.

Q3) Conservation of threatened species

Q3) Do you have initiatives/activities that contribute (or contributed) towards the conservation of threatened species or species of concern, including terrestrial, freshwater or marine species for the period 2011 – present? Examples could include (amongst other things) management plans, conservation planning, recovery plans, meta-population management, habitat rehabilitation, animal rehabilitation, resolving human-wildlife conflict, or programmes that support sustainable use of threatened species, including medicinal species and horticultural plants etc. If there is any overlap with answers from question 2, please indicate this in the project description. Please add rows if necessary.

Species	Location(s)	Please briefly describe what your initiative does to conserve the target species	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?)	Is there funding available for this work?

Q4) *Ex situ* conservation

Q4) Do you have initiatives/activities that conduct (or conducted) *ex situ* conservation of threatened and useful species, such as to address impacts of habitat transformation and unsustainable use for the period 2011 – present? Please add rows if necessary.

Species	*Ex situ* Location(s)	Please describe what you do	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?)	Is there funding available for this work?

Q5) Wildlife trade

Q5a) Do you have any initiatives/activities that work on (or have worked on) wildlife trade issues, legal or illegal, for the period 2011 – present? Examples could include research to assess the scale of trade in a certain species or to determine trade routes, monitoring trade (such as through permits, seizures and traditional markets), developing or managing projects that work towards reduction of illegal trade or unsustainable legal trade (including anti-poaching initiatives), contributing towards non-detriment findings or CITES related issues, developing or implementing demand reduction programmes, etc. **If your responses include training, please include them in Q13**.

Species/taxon	Please briefly describe what you do	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?)	Please estimate how much you spent on this initiative during the last financial year.

Q6) Biodiversity economy

Q6) Do you have any initiatives/activities that work on (or have worked on) the biodiversity economy for the period 2011 – present? Please add rows as necessary.

Type of economy worked on	Please explain what you do (e.g. do you conduct research, are you working on or supporting any initiatives identified and developed by the Biodiversity Economy Lab?)	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?)	Please estimate how much you spent on this initiative during the last financial year.

Q7) Land reform[1]

Q7) Do you have any initiatives/activities that support (or have supported) the land reform and land restitution initiatives for the period 2011 – present, for example (among others things) through the facilitation of land claim settlements in protected areas and the conservation estate or through support for recipients of land restitution for sustainable land management and biodiversity conservation?

Please briefly describe what you do	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?)	Please estimate how much you spent on this initiative during the last financial year.

Q8) Ecological infrastructure

Q8a) Do you have any projects that support (or have supported) the restoration and maintenance of areas important for ecological infrastructure (other than expanding land under conservation, as described in Q2)? Ecological infrastructure refers to naturally functioning ecosystems, such as wetlands, healthy mountain catchments and rivers that deliver valuable services to people.

Q8b) How do you determine which ecological infrastructure to focus on (e.g. do you use national priorities)?

Q8c) Please describe what you have done for the period 2011 – present. For example, do you invest (directly or indirectly) in (amongst other things) wetland rehabilitation, alien invasive removal or fire management strategies? Do you have projects linked to the governments National Resource Management or Expanded Public Works Programmes? If any of these examples overlap with area expansion covered by Q2, please indicate this in the project description.

Description of project and rationale	Ecosystem service benefit (such as flood mitigation, sense of place and others)	Province	Biome	Total area (ha) restored or maintained	Does this overlap with answers from Q2? If so, how?	Estimated annual value	Number of women employed	Number of men employed

[1] Limited data received on this question, so results not included

Q9) Biodiversity and environmental mainstreaming

Q9) Do you have any initiatives/activities involved in biodiversity or other environmental mainstreaming for the period 2011 – present? Mainstreaming is the process of embedding environmental considerations into policies, planning, strategies and practices of key public and private actors (e.g. agriculture, mariculture, aquaculture, forestry, mining and energy) that impact or rely on the environment, so that it is conserved and sustainably used both locally and globally.

Type of mainstreaming (e.g. biodiversity, water management, waste management, climate change)	Description of initiative	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?)	Approximately how much did you spend on this project during the last financial year?

Q10) Public engagement and education

Q10a) Have you actively contributed towards raising awareness among the general public about the value of biodiversity and educating and mobilising them to adopt biodiversity smart practices during the period 2011 – present?

Q10b) Do you do any work that strengthens environmental knowledge through citizen science programmes that promote learning about conservation? Please add rows if necessary.

Description of project/ programme	Target audience	Please describe your indicators	What is the progress towards the indicators (are they achieved, on track, or is there something blocking progress?) What was the measured outcome?	What was the cost of engagement?

Q10c) Do you do any work that strengthens the integration of conservation content into relevant school curricula? Please add rows if necessary.

Description of curricula/initiatives	Learner type	Number of learners including age	Please describe your indicators	Measured outcome	Cost of training

Q10d) Do you promote conservation-friendly consumer/lifestyle choices, including in retail/tourism and livelihoods? Please add rows if necessary.

Description of project/ programme	How do you do this?	Please describe your indicators	Measured outcome	Total cost

Q10e) Do you provide information to the public on environmental rights and the appropriate tools that protect those rights? Please add rows if necessary.

Description of project/ programme or court case	How do you do this?	Please describe your indicators	Measured outcome	Total cost

Q10f) Do you have a strategy to measure your organisations impact in the social media space, and if so, what is your impact?

Q11) Knowledge accumulation/data collection/scientific data

Q11a) Do you contribute towards foundational knowledge about biodiversity (e.g. through the collection and/or compilation of biodiversity data)?

Q11b) Do you compile species information, such as identification, biology, distribution, status, use or value to people, taxonomy, legislation, and other literature? Please add new rows if necessary.

Taxon group	Description of type of information that has been/ is being compiled	Availability of information	How accessible/ visible is the data?	Is it digitised?	What is the cost to access the data?

Q11c) Do you maintain data sets for indigenous and/or alien invasive species? Please include in your answer which plant or animal groups are included, why you maintain the dataset (i.e. how did you identify priorities), indicate who has access to these datasets and describe the types of data collected. Please add new rows if necessary.

Taxon group (be more specific – to lowest common denominator)	Reason for inclusion (how did you identify priorities)	How do you archive the data?	Who has access to the data?	Description, including data types

Q11d) Do you map or assess the status and trends of ecosystem or vegetation types in terrestrial, freshwater or marine environments? Please add new rows if necessary.

Ecosystem/ vegetation type	Description of data type and mapping activities

Q11e) Do you identify, develop and build further on long-term large-scale monitoring projects and data sets? Please add new rows if necessary.

Monitoring project	Date range	Taxon groups monitored	Description of methods

Q11f) Do you review and expand Red Lists for taxa? Please add new rows if necessary.

Taxon group	Red List date and type (regional, international, national)

Q11g) Do you coordinate, collate or use citizen science data? Please indicate how you check data quality. Please add new rows if necessary.

Project (include what the data are used for)	Taxon groups	Data quality checks

Q12) Indigenous knowledge[2]

Q12) Do you contribute towards projects that maintain knowledge and practices of indigenous and local communities relevant for the conservation and sustainable use of biological diversity?

Q13) Training

Q13) Do you conduct (or have you conducted) training that relates to any of the previous questions? If yes, please complete the table below for the period 2011 – present and add rows if necessary.

Training description (purpose and outcome of training)	Number of training interventions	Number of women trained*				Number of men trained*				SAQA accredited? (Y/N)	Funding source	Total expenditure
		A	C	I	W	A	C	I	W			

* A=African; C=Coloured; I=Indian; W=White

Q14) Socio-economic contributions

We recognise that socio-economic development is a large and complex issue, and we are not attempting to measure NGO contributions in this review. However, we would like to assess whether you measure socio-economic impacts and, if so, what you measure.

Q14a) Do you measure socio-economic impacts?

Q14b) What do you measure? Please describe your methods and indicators.

Q14c) Do you report the outcomes and, if so, where?

[2] Limited data received on this question, so results not included

Q15) Other contributions

Q15) We recognise that there may be other areas in which your NGO contributes to conservation. If that is the case, please describe and quantify where possible any other contributions that you make towards conservation goals. Examples could include climate change, renewable energy, sustainable agriculture and PHE (population, health and environment), amongst other things. Additionally, some work might be considered "intangible" because it cannot be easily quantified – please capture this here.

Description of project	Indicators used	Measured outcomes	Cost of implementation

Questions for finance

Q1) For the last financial year, please indicate your organisation's income in the table below and, where possible, break it down into the categories provided. You do not need to identify the sources. If an income source falls under more than one category, please just select one to avoid duplication.

Income source	National total (ZAR)	International total (ZAR)	Total (ZAR)
Government grants			
Government tenders			
Bilaterals and aid organisations (e.g. USAID, EU and World Bank)	Not applicable		
Trusts and Foundations			
Corporates			
Individual donations from the public			
Memberships			
Retail			
Consultancies			
Training			
Bequest programmes			
Fundraising events			
Lottery			
Other (please specify)			
Other (please specify)			
Other (please specify)			
Grand Total			

Q2a) We define two kinds of costs: 1) direct programme costs; and 2) support costs. The latter may have different names, depending on your NGO terminology, such as support services, overheads, or administration (of which the basic costs include finance, HR, IT and fundraising). Irrespective of the terminology, please to tell us if you use a fixed recovery rate for these support costs for all income received, and if so, what is the percentage? This question is optional.

Q2b) What proportion of your total income goes towards direct programme/project expenses? This question is also optional.

Q3) Out of the money spent on direct programme costs, please provide the approximate percentages spent on the categories listed in the table below?

Categories	**Percentage**
Habitat conservation	
Species conservation	
Community work	
Training & Education	
Population, Health & Environment (PHE)	
Legal work	
Other (please define)	
Other (please define)	

Questions for human resources department

Employment

Q1) Please complete the Workforce Priority table as per your last employment equity report. Please also include interns and volunteers if these categories are not part of your standard reporting format.

Occupational Level	Female				Male				Foreign Nationals		Grand Total
	African	Coloured	Indian	White	African	Coloured	Indian	White	Male	Female	
Top management											
Senior management											
Professionally qualified & experienced specialist & mid-management											
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents											
Semi-skilled and discretionary decision making											
Unskilled and defined decision making											
Interns											
Volunteers											
Total permanent											
Temporary employees											
Grand Total											

Appendix 5: Results

Table A1. Summary of NGO contributions towards ecological infrastructure during 2018.

ECOLOGICAL INFRASTRUCTURE

Defining the problem

Threats to ecological infrastructure, such as the spread of invasive alien species or land degradation, impact on the ability of the environment to provide essential ecosystems goods and services. Investments in the maintenance, restoration and protection of ecological infrastructure enhances the resilience of ecosystems to better withstand pressures from climate change.

Biome and location summary

Biomes: Succulent Karoo, Nama Karoo, Grassland, Savannah, Riparian, Estuarine, Coastal, Marine

Locations: Northern Cape, Eastern Cape, Western Cape, Mpumalanga, KZN, Limpopo

NGO summary details

Number of contributing NGOs: 8 (3 through NRM)
Total spend: ~R65 million (much of this comes from NRM) (+R26 million for waste management)

Total area restored: 12,441 ha

Total number people employed (mostly on short-term contracts): 1,656 (includes 977 through NRM) + 600 for waste management

NGO roles

NRM linked projects

- Implementation of the NRM programmes for rangeland restoration, wetland rehabilitation, invasive alien plant clearing and bush encroachment removal.
- Restoration on 20 forest sites through tree planting.

Non-NRM projects

- Restoration of degraded sites in the Nama Karoo. Different methods of restoration were trialled with ongoing annual photographic surveys measuring vegetation changes.
- Restoration of wetland, grassland and riparian habitat in Limpopo. Annual post-restoration monitoring planned.
- Rehabilitation of grassland habitat in Mpumalanga.
- Floating islands installation in the Knysna estuary to facilitate uptake of nutrients and prevent sedimentation (work now handed over to SANParks).
- Erosion control in the Nama-Karoo, Eastern Cape.

Results

NRM linked

- 1,200 ha of grassland restored in the Eastern Cape and 6,700 ha of savannah restored in Mpumalanga. Benefits derived: water retention, erosion control, wetland rehabilitation, riparian restoration, water catchment management, natural spring restoration.
- 3,400 m^3 of erosion control in the Succulent Karoo of the Northern Cape. Benefits derived: water retention, erosion control, wetland rehab.
- 150 ha of wetland restored. Benefits derived: wetland integrity – priority wetlands for the Endangered *H. pickersgilli.*
- 810 ha alien invasive control along the Amatola/Tyume River. Benefit derived: water retention; also linked to conservation of a threatened (Endangered) fish species, the Border Barb (which has subsequently been found in more sites as a result of the intervention).
- 3,300 ha of forest in KZN restored. Benefits: forest restoration, flood attenuation (crop protection), indigenous fruit trees for food.

ECOLOGICAL INFRASTRUCTURE

- Implementation of alien invasive clearing in the Renosterveld and Fynbos.
- Removal of plastic from rivers and river mouths for recycling: includes recycling collection, processing and dispatch in KZN and establishes networks in township areas to improve waste management and recycling rates.
- Research to understand how the marine ecosystem functions.
- Research and development of a clean wastewater system in the lowveld.

Non-NRM projects

- 266 ha of Nama Karoo restored. Photographic surveys showed vegetation improvements before the current drought started; however, the costs to restore the land (R10,000–20,000/ha) were higher than the costs of buying land. Benefits: flood mitigation, soil protection and restoration of degraded habitat.
- 33 ha of wetland, grassland and riparian habitat restored in Limpopo. Benefits: improved water security.
- Rehabilitation of grassland habitat in Mpumalanga, starting with 12 ha.
- Knysna Estuary floating islands. Benefits derived: Improved estuary health (impacts ecotourism).
- 5 ha of Nama-Karoo improved through erosion control.
- 100 ha of alien invasive cleared from Renosterveld/Fynbos.
- 400 tonnes of plastic removed from rivers and river mouths per month: river basins and mouths cleaned up, less plastic washing out to sea.
- Marine research benefits: understanding climate change mitigation for corals and coral dependent species; biodiversity and resilience of reef organisms to exploitation and climate change; ecosystem services provided by estuaries and coastal lakes; understanding the role of macrobenthos in the estuaries and soft sediment sea floor for ecosystem health and provision of associated services.
- Effective wastewater system developed. Benefits: contribution to food and water security and reduction in water borne related disease using cheap, natural and robust system.

Table A2. Summary of NGO contributions towards general conservation of species.

CONSERVATION OF THREATENED SPECIES

Defining the problem

South Africa is a mega-diverse country because of its very high levels of biodiversity and endemism, but many of our species are at risk (17% of mammals, 15% of birds, 9% of reptiles and 15% of amphibians listed as regionally threatened on the IUCN Red List of Threatened Species). Sound management of this biodiversity is needed to ensure both its preservation and ability to contribute to the economy, rural development, job creation and social well-being.

Species and location summary

Species: Wild Dog, Leopard, Cheetah, vultures, Pel's Fishing Owl, African Grass Owl, Barrydale Redfin fish (CR) (note that many other species are protected by participating NGO work, but some of these are captured in other conservation themes in this review).

Locations: South Africa – national coverage.

NGO summary details

Number of contributing NGOs: 8 (note that much of this work is captured under other themes).

Total spend: R6 million.

NGO roles

- Managing threatened carnivore metapopulation strategies (Wild Dogs and Cheetah), which includes translocations and reintroductions, human-wildlife conflict mitigation, disease management, creating and enforcing policies and protocols, writing management plans and reintroduction feasibility assessments (plus intensive monitoring and research captured in Foundational Knowledge and Monitoring).
- Placing livestock guarding dogs on private properties to protect livestock from Leopard and Cheetah predation.
- Establishing vulture safe zones as part of implementing the CMS Vulture Management Strategy and Action Plan (plus funding and hands-on support for post release monitoring of vultures with satellite telemetry captured under Foundational Knowledge and Monitoring).
- Establishing species and habitat management plans on reserves and private property for threatened birds of prey; resolving human-wildlife conflict with birds of prey (plus monitoring and research to inform conservation planning

Results

- Wild Dog managed metapopulation remains stable, safe space has grown, genetic diversity is satisfactory.
- 37 Cheetah relocations conducted with an overall success rate of 74% (translocations are deemed successful if animals survive for 2 years post release); 58 reserves nationwide actively involved in Cheetah managed metapopulation.
- 17 livestock guarding dogs placed in Waterberg and Soutpansberg; Properties with dogs experience an average reduction in livestock losses of ~90% (some properties experience complete cessation of predation); 80% of dogs become successful guarding dogs. It was noted that the project could have been designed to measure impact more effectively through use of longer lead-in times and the use of control properties without dogs.
- Work on vulture safe space is under development and no land has yet been designated.

CONSERVATION OF THREATENED SPECIES

and habitat rehabilitation captured under Foundational Knowledge and Monitoring). • Assisting with rearing of cranes for release into the wild (plus guiding wetland rehabilitation to include species requirements, research and monitoring of population trends, and protection of habitat – captured under other themes). • Assisting the national power utility (Eskom) with mitigation of electrical infrastructure to prevent collision and electrocution of bird species. • Identifying risks (through research) to species from linear infrastructure (e.g. roads) and implementing measures to reduce the impacts of roadkill. • Collaborating with local municipality to upgrade a weir to improve water flow vital for the survival of a Critically Endangered fish species (Barrydale Redfin).	• Threatened birds of prey management plans still under development, population trends are currently uncertain but are under investigation, engaging with farmers about HWC is in early stages. • Number of Wattled Cranes is up by 60% over 26 years, number of breeding pairs up by 40%; Blue Crane population is increasing slowly; Grey Crowned Crane habitat is increasing. • Number of bird collisions with electrical infrastructure is lower on lines with mitigation devices (this leads to improved line performance as well as better conservation outcomes). Deaths are lower in these areas, but there is no measurement of impact on threatened species because there are many confounding threats and conservation measures being implemented for these species. • Implementation of roadkill risk mitigation is slow due to difficulty in obtaining permission to apply mitigation on national roads. • Water flow through weir is regularly monitored and maintained at a sufficient level to allow Critically Endangered fish species to survive.

Table A3. Summary of NGO contributions towards *ex situ* conservation of species.

EX SITU CONSERVATION

Defining the problem

Certain species are under such a high threat of extinction in the wild that there is concern that *in situ* conservation methods may be insufficient to prevent extinction. Under such circumstances, placing some individuals into maintenance and breeding facilities outside their natural habitats provides a way to increase species numbers through breeding under controlled conditions.

Species and location summary

Species: Pickersgill's Reed Frog (CR), African Penguin (EN), Wattled Crane (CR), sea horses, turtles.

Locations: Johannesburg Zoo, KZN facility.

NGO summary details

Number of contributing NGOs: 2

Total spend: Not estimated (most of the costs are carried by zoos and aquaria – one of which is a participant).

NGO roles

- Facilitating the breeding of Pickersgill's Reed Frogs for release back to wild sites as part of the species Biodiversity Management Plan. Includes collection of specimens and research on the breeding biology and husbandry.
- Breeding an assurance population of African Penguins, rehabilitation of stranded individuals, and awareness raising amongst visitors.
- Collection of abandoned second eggs from wild pairs of Wattled Cranes for captive breeding at zoo. Zoo bred chicks either go to the captive breeding zoo flock or are released back into the wild to supplement the wild population.
- Rehabilitation of stranded individual turtles; awareness and care generation amongst visitors.
- Breeding and husbandry research on sea horses assurance population; awareness and care generation amongst visitors.

Results

- 600 Pickersgill's Reed Frogs bred in captivity; 250 released to the wild. Relocating released individuals is proving very difficult.
- Poor current success for African Penguins.
- Two captively reared Wattled Cranes successfully released into the wild in 2018 (50% success rate from 4 hatched chicks). Zero eggs collected during 2018 due to rearing work.
- Progress of turtle breeding is monitored by scientists.
- Good progress on sea-horse breeding, but there is a lack of a brood exchange. This means decreasing genetic diversity and increasing disease susceptibility.
- Constant visitor research at the aquarium helps refine the use of display animals for conservation education. Constant husbandry research helps improve animal welfare.

Table A4. Summary of NGO contributions towards reducing the impacts of illegal wildlife trade during 2018.

ILLEGAL WILDLIFE TRADE

ANTI-POACHING

Defining the problem

Poaching (the illegal killing or harvesting of wild animals and plants) is key to the IWT process and is normally the first stage in wildlife trafficking. It is frequently unsustainable and, if left unchecked, may lead to declining populations and possibly extinction, particularly in species that have trade value (wild animals and plants may have value as sources of food, as trinkets, as ingredients of traditional medicine, or as pets and ornaments). This section deals with work by NGOs specifically aimed at targeting poachers and reducing poaching on the ground.

Species and location summary

Species: White Rhino; Black Rhino.

Locations: Kruger National Park; Ezemvelo KZN Wildlife reserves (x7); KZN private reserves (x25); Addo Elephant National Park; Great Fish Nature Reserve.

NGO summary details

Number of contributing NGOs: 6

Total spend: R20.8 million

NGO roles

- Management, strategic direction and resource mobilisation for 'Project Rhino', a collaboration of rhino stakeholders in KZN including state, private and community rhino owners, NGOs and anti-poaching specialists, that work together on issues of security, community engagement, policy, lobbying, fundraising and publicity.
- Vehicle deployment for general anti-poaching work on rhino reserves in the Eastern Cape.
- Deployment of detection dogs on multiple rhino reserves.
- Funding dehorning rhinos (veterinarian time, helicopter costs, dehorning) and horn storage for communities.
- Funding GPS collars for rhinos in community reserves.

Results

The ultimate outcome indicator for anti-poaching work is a change in poaching rates, but it is difficult to ascribe any observed changes to specific interventions of NGOs because there are many organisations, including state agencies, making contributions. Although the national poaching rate has declined for rhinos, it is still unsustainably high and needs to be viewed in context with a suspected declining rhino population. A counterfactual view, however, reminds us that without the ongoing interventions, rhino populations would be in a much worse state. With regards to the interventions noted here, the following observations can be made about poaching rates in areas where participating NGOs work:

- There was zero rhino poaching in the 25 private reserves in KZN that were assisted during 2018, while Ezemvelo KZN reserves experienced ongoing high poaching rates.

ILLEGAL WILDLIFE TRADE

- Research, development and support for technology innovations to improve shared awareness for rhino reserves.

- Kruger National Park experienced fewer poaching incidents during 2018 than the previous year, but also received significant anti-poaching interventions by SANParks, DEFF, and other entities. The contributions of the participating NGOs to Kruger are a small part of the total. To complicate matters, Kruger NP may also have a declining rhino population, which makes poaching harder (NB: there may be other contributing factors to this decline other than poaching, including recent drought conditions).

Most measurable indicators for individual NGOs are based more on objectives that aim to improve the chances of reducing poaching (intermediate implementation indicators) rather than measuring the actual changes in poaching rate (the ultimate indicator). Such indicators include:

- 10 vehicles deployed in the Eastern Cape to assist in general anti-poaching operations.
- 13 detection dogs deployed including 2 patrol, 6 tracker (that caught >10 poachers between them), and 5 detection dogs (that perform 50-400 vehicle searches per day at reserve gates).
- 24 community rhinos were dehorned.
- 6 GPS tags were deployed (10 tags currently functioning)

Regarding the technology innovations, these include implementing a LoRa[1] network, linking cameras and rhino sensors to Cmore[2], supporting the use of SMART (Spatial Monitoring and Reporting Tool) through training and deployment, and development of Conservation Apps. These are all works in progress but are improving through regular bidirectional feedback between developers and implementers. The system appears to be disrupting poaching with a decline in poaching rates observed in KZN reserves.

[1]Long range, low power wireless system used to connect Internet of Things technology. This technology enhances communications and the ability to effectively track connected devices. [2]Cmore Is a collaboration ecosystem developed by the Council for Scientific and Industrial Research (CSIR) to function as a situation awareness platform across a wide variety of law enforcement sectors, including those relating to wildlife crimes

ILLEGAL WILDLIFE TRADE

ANTI-TRAFFICKING

Defining the problem

Wildlife trafficking is a criminal activity involving illegal wildlife products that may involve one or more crimes across the entire illegal wildlife value chain and across national boundaries. It includes poaching, smuggling and trade of fauna and flora along the value chain, up to and including the end-user, and takes place in an organised manner, often involving corruption of law enforcement personnel. This section deals with work by NGOs specifically aimed at targeting the stage of trafficking after poaching and before the end-user.

Species and location summary

Species: White Rhino; Black Rhino, African Elephant, Temminck's Ground Pangolin, *Dalbergia* spp.

Locations: Great Limpopo Transfrontier Conservation Area; Ezemvelo KZN Wildlife reserves; KZN private reserves.

NGO summary details

Number NGOs: 3

Total spend: >R2.9 million (this figure is a considerable underestimate).

NGO roles

- Financial support for a study testing the feasibility of using Giant Pouched Rats (*Cricetomys ansorgei*) to detect pangolin scales and hardwood species.
- Deployment of two detection dogs at OR Tambo International Airport to screen cargo.
- Financial and technological support to mandated government agencies conducting anti-trafficking work to disrupt illegal supply chains (including routes between South Africa and Mozambique).
- Provision of housing facilities for reptiles, amphibians and corals confiscated from the illegal trade by conservation authorities to be held as evidence for criminal prosecutions.

Results

The best indicators of anti-trafficking success come from seizure, arrest and prosecution data, but this is sensitive information not generally shared and not directly measured by NGOs. Instead, outcome indicators tend to be measured in terms of the successful completion of set project objectives.

- Whilst rats have not yet been operationally deployed, the feasibility of using rats to detect pangolin scales and hardwood has been successfully demonstrated with an accuracy of 95%. Rats can be trained more quickly and cheaply than dogs, can be handled by any trained persons (while dogs need a specific handler) and are more cost effective as detection agents. Operational deployment still needs to be tested in ports, which is a likely bottleneck to progress.
- Two detection dogs at O.R. Tambo International Airport are screening selected cargo daily, but no wildlife contraband was detected during 2018.

ILLEGAL WILDLIFE TRADE

- Access to technologies, operational funding and staffing resources are provided to state agencies and private landowners to assist with intelligence led investigations and data analysis with the aim of understanding criminal syndicate working structures.
- The number of confiscations of reptiles and amphibians is variable between years (suggesting limited progress), but confiscations of corals have declined recently, tentatively suggesting progress.

POLICY

Defining the problem

DEFF is required to develop, implement, review and update legislative and other tools that ensure the protection of species and ecosystems. These processes generally require public participation and NGOs can play a role in evaluating and commenting on new or amended policy.

Species and location summary

Species: White and Black Rhinos, African Elephant, African Lion, Leopard.

Locations: National coverage.

NGO summary details

Number NGOs: 2

Total spend: Minimal cost – personnel time.

NGO roles

Contribution towards conservation policy development (amendments, draft notices, regulations, quotas) includes:

- Legislative awareness raising and participation in parliamentary dialogues.
- Active involvement in non-detriment findings, biodiversity management plans and species task teams.
- Active engagement with MEAs relating to wildlife trade.
- Involvement in and promotion of public participation processes.

Results

The ultimate measure of success here would be the uptake of comments and recommendations by the government. This is hard to measure, as very little feedback is provided after the participation process is complete, although it may be possible to evaluate uptake when the regulations are eventually published, a process that often takes years. Generally, the only tangible measurement available is the number of submissions made. For 2018, these included submissions on:

- Proposed Amendment of the Alien and Invasive Species List.
- Draft Regulations relating to the Domestic Trade in Rhinoceros Horn.
- Draft Notice Prohibiting the Carrying Out of Certain Restricted Activities Involving Rhinoceros Horn.

ILLEGAL WILDLIFE TRADE

- Proposed amendments to the Norms and Standards for the marking of rhino and rhino horn.
- Comments on South African agenda for CITES COP18.
- Lion bone quota; Leopard hunting quota.

TRADITIONAL MEDICINE MARKETS

Defining the problem

Traditional medicine markets ('muthi' markets) pose a threat to wildlife species when plants and animal are harvested unsustainably. The scale of the threat is unknown for most species and reducing the impact of markets is challenging because of the cultural history surrounding the trade. Few participating NGOs work in this conservation space.

Species and location summary

Species: Temminck's Ground Pangolin, African vultures.

Locations: Limpopo, Mpumalanga, KZN, Gauteng.

NGO summary details

Number NGOs: 2

Total spend: R295,000

NGO roles

- Research to assess the extent of trade in pangolin parts across traditional medicine markets in northern and eastern South Africa.
- Financial support for a PhD student studying the impacts of traditional medicine markets on vulture conservation.
- Informing communities about the risks of using poisoned wildlife products for medicinal purposes, with a focus on vultures.

Results

The ultimate measure of success here would be a reduction in use of threatened species and evidence of sustainable use of all species traded. Welfare considerations are also important. Very limited work is being done by participating NGOs in traditional medicine markets, however, and no measures of changes in use of threatened species are currently being made. Tangible outcome measurements relate to the successful completion of set objectives. All current work of participating NGOs is in early stages of development.

- The Pangolin market trade research is a work in progress with results pending.
- The PhD research on vulture use in markets is also a work in progress.
- ~120 people have been reached regarding the risks of using poisoned animal parts, but the impact of this outreach has not yet been measured.

ILLEGAL WILDLIFE TRADE

DEMAND REDUCTION

Defining the problem

The driver of all illegal wildlife trade is consumer demand, be it food, medicine, ornaments etc. Reducing this demand (i.e. reducing the number of end users) is one way to reduce the size of the illegal trade and, therefore, the scale of illegal offtake. Few of the participating NGOs work on demand reduction and the focus of those that do is on rhino horn, which is predominantly used outside South Africa. This creates specific difficulties around jurisdiction and culture, which means collaboration with organisations in end user countries is necessary.

Species and location summary

Species: White and Black Rhinos

Locations: China, Vietnam, South Africa

NGO summary details

Number NGOs: 2

Total spend: >R4.6 million (this figure is a considerable underestimate)

NGO roles

- Development, implementation and management of a rhino horn demand reduction campaign in Vietnam, primarily through social media, but also seminars.
- Acting as a 'trust broker' to bring together relevant parties from China, Vietnam and South Africa, including law enforcement agencies and tertiary institutions, to evaluate market influences, understand the demand, identify how to change mindsets, and finding solutions that account for local context and conditions.

Results

The ultimate measure of success here would be a reduction in demand for rhino horn in China and Vietnam, which would have a knock-on effect on poaching. This has proven notoriously difficult to measure and some claims of consumer behaviour change made by NGOs working on demand reduction (not including NGOs participating here) have come under scrutiny. Tangible outcome measurements relate to the successful completion of set objectives.

- ~1 million people reached through social media in Vietnam. Impact hard to measure effectively.
- Chinese and Vietnamese agencies brought out to SA to introduce them to SA agencies.
- Donors and implementation partners have been brought together

Table A5. Summary of NGO contributions towards the biodiversity economy during 2018.

BIODIVERSITY ECONOMY		
WILDLIFE & ECOTOURISM		
Defining the problem Biodiversity is recognised as fundamental to economic growth and sustainable development, so creating alternative economic opportunities from biodiversity assets in a way that is not harmful to the environment is a priority for South Africa. Wildlife is one of South Africa's greatest assets and has been recognised by the government as a potentially huge contributor to the biodiversity economy.	**Location summary** Locations: South KZN, Northern Cape, Eastern Cape, Mpumalanga, Kgalagadi	**NGO summary** Number NGOs: 5 Total spend: R3 million
NGO roles • Support ecotourism enterprise development with grants, loans, and technical support in high-biodiversity rangelands. • Provide financial and operational support for the establishment of a community game reserve through stocking with game (buying and donating), conserving and restoring habitat (e.g. removing alien plants), and developing tourism models; brokering deals and negotiating fair benefits for communities. • Development of an ecotourism model that provides ecotourists with opportunities to view satellite tagged Wild Dog packs during the denning season in the Waterberg. All revenues go to landowners to compensate them for losses of wildlife or livestock killed by the Wild Dogs. • Participate in the development of a voluntary market-based certification scheme for the wildlife ranching sector intended to incentivise good		**Results** • 13 SMMEs and 15 cooperative businesses in ecotourism or associated services supported (gardens feeding into ecotourism lodges, maintenance support to ecotourism lodges, etc.) (64 SMMEs and 75 cooperative businesses since 2014). • Financial sustainability of community reserve not yet achieved because all projects are still subsidised. However, things are improving every year (e.g. reserve was a cattle farm, now it is a big five game reserve with some accommodation and providing 80 jobs). • Three landowners received a total of ~R140,000 during the 2.5 month denning season, with the amount varying according to the percentage of time the dogs spend on each property. • Initial feasibility study for certification scheme completed by external (non-NGO) consultant; moderate support for the scheme from wildlife ranchers

BIODIVERSITY ECONOMY

environmental and conservation practice while boosting the wildlife economy. • Support operations of a community ranch in the Kgalagadi area. • Operate the largest oceanarium in Africa, dedicated to introducing people to the biodiversity of the Western Indian Ocean.	demonstrated, although several concerns raised by the sector still need to be overcome. Much work still to be done. • Increase in wildlife populations on Kgalagadi community ranch; increase in land connectedness; strong village rights to land and resources; effective village-based governance; improved livelihoods, including wildlife benefit at HH level; expansion in wildlife economy, including jobs; improved livestock and reduced over-grazing (no agriculture). There is a continued need to expand current initiative to other available land assets. More resources requested from government, but response is very slow. • ~800,000 visitors to oceanarium exposed to Western Indian Ocean biodiversity. Currently no way to tell what the impact of this is, but indicators are being developed.

OCEANS

Defining the problem

South Africa has a large coastal and marine environment that provides economic opportunities through tourism, fisheries, energy extraction and transport, amongst other things. Here we include work done by participating NGOs that involves the coastal and marine environment in conjunction with biodiversity. The oceans economy is a very large sector, and we only cover a small part of it.

Species and location summary

Locations: KZN, Western Indian Ocean

NGO summary

Number NGOs: 2

Total spend: Not estimated

NGO roles

- Research and monitoring of recreational and commercial fisheries, including for shellfish, crustaceans, linefish, pelagic fish, demersal fish and sharks.

Results

- Research contributes towards the oceans economy by providing critical data on sustainability of fisheries stocks.

BIODIVERSITY ECONOMY

- Update the Western Indian Ocean Fish (WIOFish) database every two years (this is a comprehensive database on all fisheries in the Western Indian Ocean).
- Monitoring the marine ornamental fish trade in the SADC region.
- Employing interns and working with permitted whale watching operators in KZN to provide training and temporary employment during the whale season.

- WIOFish database contributes to understanding biological and socio-economic aspects of South Africa's fisheries. All input from national fisheries management institutions in the region up to date, but there is a current lack of support from some WIO countries that threatens the integrity of the database.
- The marine ornamental fish trade appears to be decreasing compared to previous studies, but the export market may be increasing. Important for understanding threats to species. Government record-keeping is poor, so very difficult to estimate.
- Employed 14 local unemployed youth for 'Whale Time' and providing them with a non-accredited learnership as well as tourism course.

SUSTAINABLE FARMING

Defining the problem

Agriculture is a major threat to biodiversity through the destruction of natural habitat when expanding farming activities or through the introduction of toxic chemicals to increase productivity. Sustainable farming using conservation agriculture is an indirect way of preserving biodiversity.

Species and location summary

Locations: KZN, Karoo, Marico, Eastern Cape, North West

NGO summary

Number NGOs: 3

Total spend: R16.6 million

NGO roles

- Provide team to plant homestead gardens; teach communities about conservation agriculture, water-wise agriculture, proper planning and placement of homestead gardens.
- Support development of SMMEs for sustainable livestock production and climate adaptation.

Results

- Planted 120 homestead gardens and 12 school gardens in 2018; survey of recipients of homestead garden assistance found >80% retention rate. School gardens had lower retention at <50%.
- Supported 7 farmers' organisations and ~600 members using sustainable livestock production. Supported >1,600 farmers earn R32.8 million rand from formal red meat markets from a baseline of zero income from formal

BIODIVERSITY ECONOMY	
• Developing a replicable model for better sustainable land management practices in the Karoo through integrating a stronger conservation presence/focus. • Financial and operational support for business development, technical training, market support, provision of equipment and supplies for bee-keeping initiatives. These initiatives provide incentives for improved catchment management.	markets. This directly supports the 336,000 ha of communal stewardship agreements. • Project is in the early phases, finalising training content, will launch training courses early 2019. • 240 beehives in eight communities in two separate regions. Support is ongoing, but will hand over to communities in 2 years.

Table A6. Summary of NGO contributions towards biodiversity mainstreaming.

BIODIVERSITY MAINSTREAMING		
Defining the problem Mainstreaming is the process of embedding environmental considerations into policies, planning, strategies and practices of key public and private actors (e.g. agriculture, mariculture, aquaculture, forestry, mining and energy) that impact on – or depend on – the environment, so that it is conserved and sustainably used both locally and globally. There is considerable overlap between mainstreaming and other conservation themes, so not all of the NGO contributions are captured here.	**Location summary** Locations: Eastern Cape, Northern Cape, Mpumalanga	**NGO summary** Number NGOs: 6 Total spend: R6.5 million (note that some indirect spend is captured elsewhere)
NGO roles • Work on National Adaptation Plan to ensure Ecosystem Based Adaptation (EbA – the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate	**Results** • Good uptake of EbA concepts and spatial priorities at a national and district level (in three municipalities).	

BIODIVERSITY MAINSTREAMING

change) guidelines are integrated into national, district and municipal policies. • Work with Consumer Goods Council of SA Environment and Social Compliance Programme Development on a comprehensive localised standard for the Global Ecosystem Service Partnership (ESP). • Developing a training course for emerging, resettled and commercial farmers on integrating a strong sustainable land management focus into agricultural production. • Biodiversity Disclosure Project developed to assist businesses to track their impacts to biodiversity over time. • Maintenance of the National Biodiversity & Business Network, working with innovative business leaders to identify and manage the business risks and opportunities that result from their interactions with the natural world. • Research contribution to marine fisheries management to guide sustainability. • Development of an 'Offset Decision Making Framework' for the Northern Cape Department of Environment and Nature Conservation (DENC).	• Comprehensive localised standard of the Global ESP on 12 environmental indicators completed, including biodiversity, water, and climate indicators. Two workshops with 34 companies represented attended and trained to use the tool. No follow up enabled due to financial limitations. • Training course on integrating sustainable land management into agricultural production developed; but not yet implemented. • Biodiversity Disclosure Project still growing its network of companies. • National Biodiversity & Business Network provides a platform for businesses to proactively engage with each other and discover solutions that lead to sustainable business growth. • Marine fisheries management research (on linefish, prawn trawl, shellfish collectors, etc.) demonstrates slow but steady progress towards improved coastal management. • Offset Decision Making Framework tool ready for use by DENC and SANParks. Training to be implemented over the next two years.

Table A7. Summary of NGO contributions towards public engagement.

PUBLIC ENGAGEMENT

PUBLIC ENGAGEMENT AND AWARENESS RAISING

Defining the problem

Public awareness, understanding and appreciation of the diverse values of biodiversity are necessary to mobilise people to make choices and take actions that enhance biodiversity conservation.

Species and location summary

Species: Sungazers, frogs

Locations: KZN, Northern Cape, Western Cape, throughout South Africa

NGO summary

Number NGOs: 4

Total spend: R4.6 million

NGO roles

- Engage with traditional authorities to facilitate and support a process of conservation on community land, and to promote benefit sharing and green economy.
- Public talks and landowner workshops to educate farmers and the general public about Wild Dog conservation in the Waterberg.
- Conduct sustainable farming demonstrations for emerging farmers.
- Engage with commercial farmers to explain importance of biodiversity.
- Raise awareness with general public about plastic usage.
- Raise awareness with general public around species conservation.
- Develop champions/ambassadors within communities to promote biodiversity and sustainability, and induce behaviour change that benefits communities and the environment.
- Provide training on the use of conservation tools, e.g. Ecosystem Goods and Services (EGS) toolkit.

Results

Work in early stages

- Obtaining buy-in from traditional authorities is an ongoing, long-term process.
- Work with commercial farmers to secure safe spaces for species is still in its infancy.
- Limited progress with landowners and users of EGS toolkit wrt using the tools independently, but great success in increasing understanding of the impact of management on EGS.

Outcomes achieved

- Measured attendance at workshops, training days, information sessions (specific numbers were not always provided):
  - Three public talks and one landowner workshop leads to increased public engagement with Wild Dog conservation work in the Waterberg. Reporting of Wild Dog sightings by landowners increased by 100% between 2016 and 2018. A landowner survey (69 responses) of attitudes towards Wild Dogs found that 65% were happy to have dogs on their land, 25% were tolerant of dogs as long as they did not stay long, but 10% were intolerant. This survey will be repeated.

PUBLIC ENGAGEMENT

- 8 emerging farmers trained.
- Over 6,000 people represented 30 organisations, schools, individuals and communities participated in national awareness days.
- 20 ambassadors mentored across 18 communities; 2,800 community members reached regarding biodiversity and sustainability.
- 4,555 members of the public participated in an annual national awareness day for frog conservation.

Not measured:

- Awareness raising on general issues such as plastic pollution, recycling efforts and illegal trade.

YOUTH & SCHOOLS

Defining the problem

Raising awareness, understanding and appreciation of the diverse values of biodiversity is particularly important in the youth because their actions will impact biodiversity in the future.

Location summary

Locations: South Africa

NGO summary

Number NGOs: 4

Total spend: R7.6 million

NGO roles

- Promoting learning through Explorer programmes, youth camps/outreach excursions, art competitions, supporting clubs (birding, hiking, biking).
- Encouraging participation at youth summits.
- Supporting learners with disabilities.
- Integrating conservation-based lessons into school curriculums.
- Providing ad hoc talks to school learners.
- Encouraging recycling.

Results

- 500 children attended camps on environmental education.
- 140,000 children engaged in art projects.
- 20 learners with disabilities supported.
- 1,850 children received general conservation education.
- 15,000 children participated in formal curriculum linked programmes on environmental education.
- 25 schools received ad hoc talks on conservation issues.

PUBLIC ENGAGEMENT

- 750 learners learn about birds of prey and wetland conservation.
- 16,000 learners receive lessons on marine biology and conservation.
- 130,000 learners receive guided tour of oceanarium.
- 130 schools and 90 businesses established recycling collection points, 4,000t of waste collected.
- 30 children taken on wilderness hiking trails to learn about wildlife crime.

ENVIRONMENTAL RIGHTS

Defining the problem

Large segments of the public remain unaware of their environmental rights or uncertain of what options they have when their rights have been violated. NGOs are able to play an important role in educating the public about their rights and what options they have to protect themselves.

NGO summary

Number NGOs: 3

Total spend: generally recorded as 'minimal' but includes personnel time and travel costs

NGO roles

- Raise awareness among landowners and other citizens about their environmental rights.
- Provide input into developmental issues (e.g. fracking, mining operations) and work to provide citizens with resources, skills and general strategic direction to fight mining and equip them with best practice guidelines around environmental rights. This is collaborative work involving other organisations.
- Provide input at public meetings and submit comments on applications for exploration/mining.
- Provide online open access to the latest environmental legislation for the KZN coast and mechanisms to report transgressions.

Results

- 5 submissions.
- It is challenging to determine if submitted comments are taken into consideration, so impact is not measured.
- Increasing numbers of landowners are registering as Interested & Affected Parties.
- 16,000 visitors to coastal environmental legislation website.

PUBLIC ENGAGEMENT

PROMOTE CONSERVATION FRIENDLY LIFESTYLES

Defining the problem

There is an increasing awareness nationally and internationally about human overconsumption and the negative impacts this is having on our environment. NGOs can play a leading role in bringing overconsumption to the attention of the public and are often expected to take the lead in finding solutions. There was limited involvement of participating NGOs in promoting conservation friendly lifestyles and no measurement of the conservation impact of the few initiatives implemented.

Location summary

Locations: throughout South Africa

NGO summary

Number NGOs: 3

Total spend: Unknown (but low)

NGO roles

- Maintain an active Facebook page highlighting bad environmental practices.
- Holding litter clean-ups in the Marico (one per year).
- Discourage consumerism though initiatives such as recycling, ecobricks.
- Public awareness campaign to encourage construction of EcoBricks out of plastic bottles filled with soft plastics. These bricks are the used to build benches and garden beds.
- Signage and staff conversations with visitors to oceanarium.

Results

- 1 clean up day conducted in the Marico.
- 5,000 Ecobricks built.
- Two benches and two vegetable gardens built using Ecobricks in previously disadvantaged schools.
- 10,000 hours spent talking with visitors to oceanarium.

Table A8. Foundational Knowledge: NGO contributions to understanding species biology and ecology, population trends and threatened status through research, monitoring and contributing to the IUCN Red List assessments.

FOUNDATIONAL KNOWLEDGE

SPECIES BIOLOGY AND ECOLOGY

Defining the problem

Research into the basic biology and ecology of a species or monitoring population trends to understand the impacts of threats is a critical part of the process of conservation and is frequently necessary as part of a species conservation strategy.

Species and location summary

Species: Buffalo, Elephant, Rhino, Oribi, African Wild Dog, Cheetah, Leopard, Lion, Riverine Rabbit, Humpback Whale, vultures, cranes, Martial Eagle, Pel's Fishing Owl, African Grass Owl, Wahlberg's Eagle, Southern Ground Hornbill, Sungazer, Albany Adder, amphibians, marine invertebrates, teleosts and elasmobranches.

Locations: Limpopo (Kruger National Park, Associated Private Nature Reserves), Free State, Mpumalanga, KZN (East Coast), Eastern Cape, Western Cape, Northern Cape (Karoo, southern Kalahari), Olifants and Blyde Rivers, across South Africa

NGO summary

Number NGOs: 4

Total spend: Not estimated

NGO roles

- Determining whether the impact of trophy hunting can be detected in Buffalo populations in the Greater Kruger area through the use of novel artificial intelligence (AI) methods and aerial photographs.
- Maintaining a database on numbers and population structures of African Elephants across South Africa.
- Testing the efficacy of ear notching as a monitoring tool in rhinos in the Greater Kruger area.
- Research on the distribution and activity patterns of Riverine Rabbits.
- Facilitating student research projects investigating the conservation and biology of migration in a Key1 sub-population of Humpback whales:

Results – data availability and accessibility

- AI use as a method to count and categorise buffalo populations from aerial photographs has been effectively demonstrated. Results presented to relevant partners and available on request at no cost.
- Elephant database results available through the Elephant Specialist Advisory Group Database after signing an MoU. No cost; digitised.
- Individual rhino ear notching found to be ineffective in large open areas; has been dropped by most of the Associated Private Nature Reserves (APNR).
- Riverine Rabbit research ongoing, with new population found outside previously known geographic range. Data are moderately accessible on request from collecting NGO at no cost. Digitised.

FOUNDATIONAL KNOWLEDGE

investigating population dynamics, estimating recovery since whaling stopped, monitoring mixing of subpopulations, identifying where whales go to breed, cataloguing whale fluke images for individual whale identification. • Research to understand landscape use, movement patterns, impact of climate change, impact of power lines, breeding ecology of cranes. • Research on amphibians for general species records and ecological data. • Research on the ecology and conservation of marine invertebrates (includes: macrobenthic communities found in estuary and coastal soft sediments along the east coast of southern Africa; hard and soft corals found in the southern West Indian Ocean; mussels and oysters of the KZN coast; distribution and taxonomy of lobsters of the Western Indian Ocean). • Research on taxonomy, distribution, movement, stock assessment, resource use, culture, etc., of bony & cartilaginous fishes (teleosts & elasmobranchs) of the south east coast of southern Africa and the Western Indian Ocean.	• Student research on Humpback Whales is ongoing; results to be published in peer reviewed journal and shared with DEFF. Data will not be openly accessible but may be requested for research purposes. • Crane research ongoing over multiple years; some data available on the Global Biodiversity Information Facility (GBIF) or on request from collecting NGO at no cost, subject to data sharing agreement and demonstration of legitimate research purpose. • Amphibian data collection ongoing, data available for bona fide research purposes via NGO data request processes at no cost. • Marine invertebrate research and data collection ongoing for multiple years and published in books & journals; reports available in ORI library; Data also available on request to bona fide researchers. • Marine fish research ongoing for multiple years and published in books & journals; reports available in ORI library; Data also available on request to bona fide researchers.

CITIZEN SCIENCE

Defining the problem

Citizen science is the involvement of the public in scientific research, often in collaboration with or under the direction of scientific institutions. Successful citizen science programmes contribute towards the harnessing of knowledge and the deepening of environmental literacy in the public arena, and Strategic Objective 6 of the NBSAP indicates that this is a priority.

Species and location summary

Species: Wild Dogs, Cheetah, Vultures, Martial Eagles, Kloof Frog and other amphibians, sharks and other fish, marine shellfish

Locations: South Africa

NGO summary

Number NGOs: 3

Total spend: >R600,000 (amount uncertain because some costs were not recorded, and some are covered under species or through general costs such as internet usage)

FOUNDATIONAL KNOWLEDGE

NGO roles

- Coordinate Wild Dog and Cheetah surveys using visitor sightings in Kruger National Park.
- Encourage the public to collect and submit data on a range of species and/or issues, including roadkill and other mortalities, bird re-sightings from colour rings, poisoning incidents.
- Coordinate collection and collation of vulture and birds of prey re-sighting data.
- Coordinating line fish monitoring catches for sharks and other fish.
- Coordinating invertebrate catch data collection to monitor shellfish abundance, health and exploitation.

Results

- Kruger Wild Dogs and Cheetah surveys conducted every 5 years.
- 320 re-sightings of vultures were reported by the public.
- 50 farmers engaged in eagle conservation programmes.
- 5 volunteer groups collecting data every month on the Kloof Frog.
- 200 citizen scientists have reported over 200,000 roadkill data points.
- ~120 industry personnel have submitted over 2,000 roadkill data points.
- ~65 industry specific personnel trained to collect roadkill data, ~45 personnel received refresher training, and 14 one-on-one training interventions have been offered since 2016.
- 7 students collecting data for the Southern African Bird Atlas Project, 2 staff members collecting data and 30 species datasets completed.
- Line fish catch monitoring has been ongoing since 1984.
- Shellfish catch monitoring has been ongoing since 1995.

MONITORING

Defining the problem

Monitoring is necessary to understand trends in species populations or habitat condition and is a key step in determining whether conservation interventions are necessary and what kind of interventions are needed. Monitoring is also necessary to evaluate the outcomes of conservation interventions, which is critical to understanding what works in conservation.

Species and location summary

Species: Rhino, African Wild Dog, Cheetah, Leopard, Lion, Oribi, Humpback Whale, vultures, Martial Eagle (and other large eagles), owls (Pel's Fishing and Grass), cranes, frogs (Kloof Frog, Pickersgill's Reed Frog), mussels and oysters, marine linefish,

Locations: Mpumalanga, Limpopo (Kruger National Park and Associated Private Nature Reserves), KZN, Western Cape (Cedarberg, Boland), Free State, Eastern Cape, East & south Coast of southern Africa

NGO summary

Number NGOs: 5

Total spend: R5.1 million minimum

FOUNDATIONAL KNOWLEDGE

NGO roles

- Monitor species through the provision of marking devices (e.g. collars and tags), conducting aerial and/or ground tracking programmes, analysing camera trap data, recording direct observations, conducting frog egg clump counts, acoustic call monitoring, transect counts, annual telephone & electronic media survey of resource users, coalition of citizen science data, recording tag/release data.
- Ground and aerial monitoring of rhinos to create landscape use maps for rhino and link that to possible drivers. Collation of regional data to create a central rhino database of all known animals.
- Supporting the annual survey of Oribi to monitor population trends.
- Monitoring successes of Wild Dog reintroductions, human-wildlife conflict mitigation, and disease management.
- Monitoring success of Cheetah translocations, responses of Cheetahs to reintroduction sites and conflict with humans.
- Conduct annual KZN Leopard survey to understand population trends, human Leopard conflict and contribute data to hunting quotas (in partnership with Ezemvelo and Panthera). Provide manpower.
- Funding and partnership support for Cape Leopard Trust. Activities have included camera trap surveys and household surveys to determine illegal trapping/snaring. Assist on project design and thinking.
- Examining connectivity of Leopard populations in northern KZN, Mozambique and Swaziland.
- Monitoring Lions in KZN PAs to understand population dynamics. Partner with blood Lions aiming to drive down the demand for captive Lion breeding.

Results

- Databases are in place and are being used by at least one stakeholder (i.e. researcher, reserve managers, conservation authorities) to inform management actions and/or hunting quotas.
- The rhino database is being used and managed by a provincial coordinator.
- Oribi surveys ongoing; data available for bona fide research purposes via NGO data request processes at no cost. Digitised.
- Wild Dog monitoring ongoing; some data accessible through data request procedures, some data owned by reserves and kept confidential until reserves allow release. Data may then be used for academic purposes upon request at no cost. Digitised. Wild Dog indicators are good: dog numbers are stable.
- Cheetah monitoring ongoing; some data accessible through data request procedures, some data owned by reserves and kept confidential until reserves allow release. Data may then be used for academic purposes upon request at no cost. Digitised. Cheetah indicators are moderate: below target on snaring and general conservation, below funding target.
- Leopard data are submitted to SANBI and used to guide hunting quotas. Data owned by reserves and kept confidential until reserves allow release. Populations in reserves are declining and the reasons are not understood. Populations on private land are unknown.
- Lions monitoring ongoing. Data owned by reserves and kept confidential until reserves allow release for scientific analysis. PA management use data to decide on conservation actions.
- Vulture data constantly being updated. Available for bona fide research purposes via NGO data request processes at no cost. Peer reviewed scientific papers. Research is in early stages, but starting to provide understanding of vulture movements. Poisoning data is vital for understanding trends and

FOUNDATIONAL KNOWLEDGE

- Monitoring and collating data from movement patterns, nesting behaviour, population dynamics and poisoning events in African vultures.
- Monitoring and collating data from movement patterns, nesting behaviour, population dynamics and mortality rates of threatened birds of prey (Martial Eagle, Pel's Fishing Owl, Grass Owl, Wahlberg's Eagle).
- Monitoring and collating data from movement patterns and breeding behaviour of Southern Ground Hornbills.
- Monitoring sightings, breeding sites and success, roosting site locations and incidents of power line collisions and poisonings in crane species.
- Monitoring and collating avian mortalities on a windfarm in the Western Cape to assess impacts of wind as a source of energy.
- Monitoring populations of threatened amphibians (Pickersgill's Reed Frog and Kloof Frog).
- Monitor habitats through fixed point photography, Stream Assessment Scoring System (SASS), water quality monitoring, photo transects.
- Monitoring coral reef associated inverts and fishes.
- Monitoring exposed reef oyster and mussel populations.
- Monitoring linefish & elasmobranchs.
- Monitoring macrobenthos.
- Monitoring shark by-catch and utilisation in the South African commercial long-line fisheries.
- Sawfish: Status of *Pristus* in KZN.
- Guitarfish: Movement behaviour of the giant guitarfish.
- Garrick: Movement monitoring of *Lichia amia* (Garrick).

patterns in wildlife poisoning incidences for use in planning mitigation Next step is to understand causes.

- Birds of prey monitoring new but data collection is under way. Data are available from MoveBank and tagging database via NGO data access processes at no cost. Papers to be published in scientific journals, popular articles, magazines when sufficient data are collected.
- Southern Ground Hornbill monitoring ongoing. Data accessible from Movebank or collecting NGO on request.
- Crane data collection is ongoing, and data are fully visible on the Global Biodiversity Information Facility (GBIF) and included in the Southern African Bird Atlas Project. Crane trends are good (see Conservation of Species theme).
- Avian mortalities database is ongoing, data are openly accessible on request.
- Frog monitoring (population changes). Data sharing requires data sharing agreements.
- Shark catch rate as a proxy for abundance, High by-catch rate now scientifically documented, needs to be addressed. Data only available to bona fide researchers.
- *Pristus* sp. are functionally extinct along the east coast of South Africa. Data only available to bona fide researchers.
- Guitarfish: Although listed as vulnerable, the population of this species is declining due to fishing pressure, and bag limits should be significantly decreased. Data only available to bona fide researchers.
- Telemetry-based movement monitoring of radio-tagged individuals: Although listed as of least concern, the telemetry data has shown that what was considered multiple discrete populations along the coast is in fact one population that migrates north to south and back again, running the gauntlet of resource-users along the entire east coast. Data only available to bona fide researchers.

FOUNDATIONAL KNOWLEDGE

RED LIST

Defining the problem

The IUCN Red List of Threatened Species is the most comprehensive information source on the conservation status of animal, fungi and plant species. It is a critical indicator of the health of biodiversity and is used to inform biodiversity conservation policy. It provides information about species range, population size, habitat and ecology, use and/or trade, threats, and conservation actions needed. NGOs can contribute to Red List assessments by submitting relevant data to entities conducting assessments or by conducting the assessments themselves.

Species and location summary

Species taxa: mammals, birds, amphibians, Sparidae, Serranidae, Sciaenidae, Lutjanidae, Squatinidae, Various shark & ray families, Estuarine-associated invertebrates

Locations: Region and national

NGO summary

Number NGOs: 3

Total spend: Minimal – personnel time

NGO roles

- Collecting, collating and/or contributing data to Red List assessments.
- Managing entire Red List process for certain taxa (e.g. mammals).

Results

- Regional and/or national assessments completed for 10 different taxa.
- All Red List assessments are freely available online.

Table A9. Biodiversity conservation related training conducted by participating NGOs during 2018.

TRAINING				
Defining the problem Strategic Objective 5 of the NBSAP calls for the development of an equitable and suitably skilled workforce to improve conservation and management of biodiversity. NGOs are well placed to develop and present relevant training interventions to contribute towards this objective.				
Summary information Number NGOs: 8 Total spend: R 85 million Total trained – SAQA accredited: 2,911 Total trained – not SAQA accredited: 5,205				
SAQA ACCREDITED TRAINING				
Training description	**Target audience**	**Length of training***	**# people trained**	**% female**
Agro-ecological farming practices course developed with partner NGO. Target audience: Rural communities and communities in fragile environments	Rural communities and communities in fragile environments	na	1,000	50%
Community skills development: Green Learning (contextually relevant education and skills development initiatives that aim to build capacity for climate resilience and sustainable livelihoods in biodiversity hotspots)	Previously disadvantaged community members	12–43 days	219	na
DEA-NRM: Green Learning	Previously disadvantaged community members	15 days	18	na
Rangeland Restoration: Green Learning	Previously disadvantaged community members	1 days	298	na

*na = information not available

Training description	Target audience	Length of training	# people trained	% female
Community development, health and wellbeing: Green Learning	Previously disadvantaged community members	3 days	141	na
Project skills development. Teaches participants to implement environmental learning programmes. Select, adapt and implement existing environmental learning programmes and use relevant teaching resources to support learning	Unemployed youth	21 days	856	30%
Advanced Certificate in Nature Conservation: Transfrontier Conservation Management	Nature conservation managers of protected areas and their bordering communities	1 year	18	33%
Higher Certificate in Nature Conservation: Implementation and Leadership	Entry level conservation supervisors and leaders	1 year	25	36%
Field Ranger: Protected Areas (armed and unarmed)	Current and potential field rangers	6 weeks	240	27%
Nature Guide: Dangerous game site guide	Potential field guides	39 days	21	29%
New Venture Creation: teaches people about green economy business at a small scale, financial literacy (homestays, trails in reserves, cooking and catering for meetings, growing and selling food)	Previously disadvantaged community members	na	75	87%
NOT SAQA ACCREDITED TRAINING				
Training description	**Target audience**	**Length of training**	**# people trained**	**% female**
Green Learning: Enterprise cooperative development	Previously disadvantaged community members	3 days	152	na

Training description	Target audience	Length of training	# people trained	% female
Wildlife interaction training for Eskom staff who potentially come into contact with wildlife while working in the field	Eskom staff	1 day	180	na
Training road patrol teams to identify roadkill and record data for N3TC, Bakwena and TRAC N4	N3TC, Bakwena and TRAC N4 staff	1 day	90	5%
Poison intervention training	Reserve managers, law enforcement personnel, field rangers	3 days	275	25%
Ecological Niche Modelling (South African and internal EWT participants only)	Conservation scientists		5	40%
uShaka Sea World Education training courses	Teachers, learners, adult tourists		~3,500	na
Coastal zone management for government officials	Government officials		20	na
Fish identification and fisheries compliance for compliance officers	Fisheries compliance officers		6	na
Fisheries statistics and management for fisheries scientists from Western Indian Ocean states	Fisheries scientists		5	na
Siyazenzela training courses: Emotional & Social Wellness; Occupational & Financial Wellness; and Physical & Environmental Wellness	Previously disadvantaged youth between the ages of 18 and 26	4 weeks	172	33%
Permaculture and food security: teach communities the techniques of permaculture and develop their own food gardens – plant propagation, principles of gardening, home gardening	Previously disadvantaged community members	1 day	800	60%
Informal training for Spatial Monitoring and Research Tool (SMART) – most SMART training is done on site (away from the colleges), where it is needed and requested by field partners	Law enforcement personnel, reserve managers, data analysts	variable	na	na

Appendix 6: Cost effectiveness

Duke *et al.* (2013) describe cost effective conservation as the selection of projects that maximise conservation impacts relative to budget constraints. At a basic level, measuring cost effectiveness would require knowing exactly what was spent on a conservation intervention over a known time period and comparing this to a measured outcome or impact. For many conservation interventions this would be very difficult to calculate unless there was a very specific deliverable, a set timeframe, a quantifiable financial outcome, and when the work was conducted by a single organisation (or group of organisations that were well coordinated from the outset). With most conservation interventions, measuring exactly what was spent to obtain a specific impact is complicated when multiple organisations contribute to the work (especially when they do not coordinate inputs), when there are complex factors or interactions that affect conservation status, or when the desired outcome or impact is not clearly defined or quantifiable in financial terms.

To the best of our knowledge, measurements of cost effectiveness are not common in conservation in South Africa (or globally) but will likely become increasingly necessary to obtain donor funding given resource constraints. Although we did not set out to measure cost effectiveness in this review, we have made some very preliminary (and basic) estimates in two case studies (Boxes A1 and A2) – but note that these are in no way comprehensive. In many cases, the basic cost to achieve conservation impact has never been measured, so we have limited baseline information to work with, but if we could start generating such data, we would have comparative information against which to compare future performance.

Box A1. Case studies on the costs of acquiring land and proclaiming protected areas.

In the business case for biodiversity stewardship (South African National Biodiversity Institute, 2017), the cost of proclaiming a PA through biodiversity stewardship was found to be much lower than through the acquisition of new land by the government. We did not request detailed information on the costs of acquiring land or implementing biodiversity stewardship in our questionnaires but have obtained some approximate costs from two projects.

Project 1: Land acquisition in Limpopo Province.

- Total cost to NGO for land purchase: R4.1 million*
- Total area acquired: 1,400 ha
- Cost of land per unit area: R2,930/ha
- This property is currently undergoing assessment for proclamation under biodiversity stewardship, but the costs have not been yet estimated

*Legal fees were provided pro bono

In comparison, the business case for biodiversity stewardship estimated a range of R10,000–20,000/ha for the government to buy land. Note that these estimates were for different provinces and the government costs would have included legal fees and surveyor costs, which were not required for the NGO purchase.

Project 2: Proclamation of Protected Areas through biodiversity stewardship by one provincial nature conservation department with the assistance of a participating NGO.

- Total cost of proclamation (for two properties): R1.917 million (43.5% on salaries)
- There was no need for a land surveyor or a conveyancer in this project
- The following in kind costs were not included in the total: salaries of provincial biodiversity stewardship staff plus their travel costs
- The landowners incurred no costs
- Total area proclaimed: 10,635 ha
- Cost of proclamation per ha: R180/ha
- The original target area was 5,000 ha, so this was exceeded

In comparison, the business case for biodiversity stewardship estimated a range of R47–141/ha for the proclamation. Note that this work was done by a different NGO in different provinces before our study.

We note that this kind of analysis is being conducted by at least one participating NGO involved in biodiversity stewardship, but we did not obtain that information for this review.

In addition, there is work underway to calculate return on investment for biodiversity stewardship, whereby financial benefits (i.e. tax incentives) obtained by landowners for proclaiming land can be incorporated and used to determine cost efficiency.

Box A2. Case study on the costs of managing a metapopulation of Cheetahs.

One of the species targeted by a participating NGO is the Cheetah, a species listed as Vulnerable on the IUCN Red List of Threatened Species. The project involves a large collaboration between the NGO and 58 reserves nationwide with Cheetah populations. Below are the costs incurred to the NGO, which was responsible for the coordination of the translocation costs (veterinary fees were covered by the reserves), collection of genetic material, management plan development (at an average of three plans per year), and much of the liaising with reserves.

- Total annual costs to NGO: R741,000
- Total number of Cheetah relocations: 37 individuals (this converts to 28 successful relocations under the assumption of an overall success rate of 74%, which has been measured by the NGO – a relocation is deemed successful if animals survive for 2 years post release)
- Average cost per Cheetah: R26,500

These costs do not, however, represent the full financial inputs required for Cheetah conservation in South Africa because there are many other factors involved. In addition to low genetic diversity (which is managed by the metapopulation project), other threats to Cheetah include habitat loss, illegal wildlife trade and climate change, amongst other things, and these are all being managed and paid for by various entities, such as the reserves that are part of the metapopulation project. This complexity illustrates the difficulty of measuring cost effectiveness of conservation impact.