

Cape Parrot and Mistbelt Forest Conservation Action Plan

Editors:

Kate Carstens, Kirsten Wimberger

March 2020



Photo: JC Carstens

Contributing authors:

Kate Carstens¹, Kirsten Wimberger¹, Rowan Martin², Colleen Downs³, Harriet Davies-Mostert⁴, Anna Young⁵, Preshnee Singh³, Clare Padfield¹, Melissa Howes-Whitecross⁶, Shaun Wilkinson⁷, Kerry Morrison⁴

¹Wild Bird Trust's Cape Parrot Project

²World Parrot Trust, UK

³Univeristy of KwaZulu-Natal and The Cape Parrot Working Group

⁴IUCN SSC Conservation Planning Specialist Group

⁵Otterben University, Ohio, USA

⁶BirdLife South Africa

⁷MonteCasino Bird Gardens



Recommended citation:

Carstens, K., Wimberger, K., Martin, R., Downs, C., Davies-Mostert, H., Young, Y., Singh, P., Padfield, C., Howes-Whitecross, M., Wilkinson, S., Morrison, K. 2020. Cape Parrot and Mistbelt Forest Conservation Action Plan. Wild Bird Trust, Johannesburg. 73 pp.

Table of Contents

1	List of acronyms and abbreviations	4
2	Executive summary.....	5
3	Legislation	6
3.1	Summary of conservation status and legislative context.....	6
4	Biological information	6
4.1	Taxonomic description	7
4.2	Distribution, movement patterns, habitat requirements, biology and ecology	8
4.3	Map and geographic area for the plan.....	10
4.4	Species role in the environment	10
4.5	Population status and trends	10
5	<i>Ex situ</i> populations and status	13
6	Trade.....	14
7	Threats.....	15
7.1	Habitat loss and degradation	15
7.2	Illegal trade.....	17
7.3	Psittacine Beak and Feather Disease.....	17
8	Emerging threats	18
8.1	Climate change.....	18
8.2	Polyphagous shot hole borer beetle	18
9	Past conservation measures	19
9.1	Nest boxes.....	19
9.2	Habitat restoration.....	20
9.3	Annual Cape Parrot Census	21
9.4	Community engagement, education and awareness.....	21
9.5	Monitoring disease.....	22
10	Research inventory and summary	22
11	Action Plan Workshop Outputs	24
11.1	Vision.....	24
11.2	Goals.....	24
11.3	Scope	25
11.4	Timescale.....	25
11.5	Key terms	25
11.6	PVA report.....	25
11.7	Coordination	26
11.8	Strategy: Species and Research.....	27
11.9	Strategy: Habitat and landscape	38
11.10	Strategy: Community engagement	44
11.11	Strategy: Law enforcement and policy development	53
12	References	57
	Appendix I Facets of the 2002 Cape Parrot Action Plan	63
	Appendix II List of workshop participants (incl. those who attended via Skype)	70
	Appendix III DRAFT Terms of Reference for the Cape Parrot	72

1 List of acronyms and abbreviations

- **ARC** – Agricultural Research Council
- **APEC** – Avian Preservation and Education Conservancy
- **BMP** - Biodiversity Management Plan, developed through the provisions within the National Environmental Management: Biodiversity Act, 10 of 2004 and aims to provide for the long-term persistence of a species and the platform to which multiple role-players contribute to conservation action.
- **CIB** – Centre for Invasion Biology – Stellenbosch University
- **CITES** – Convention on International Trade in Endangered Species of Wild Fauna and Flora
- **CoP** – Conference of the Parties
- **CPAPCC** – The coordinating body tasked with overseeing the implementation of this Action Plan.
- **CPBBD** – Cape Parrot Big Birding Day
- **CPP** – Cape Parrot Project based in Hogsback, a project of the Wild Bird Trust
- **CPWG** – Cape Parrot Working Group based in KwaZulu-Natal with close ties to UKZN
- **DEDEAT** – Department of Economic Development, Environmental Affairs and Tourism
- **DEFF** – Department of Environment, Forestry and Fisheries
- **EC** – Eastern Cape
- **ECPTA** – Eastern Cape Parks and Tourism Agency
- **EKZNW** – Ezemvelo KwaZulu-Natal Wildlife
- **FABI** – Forestry and Agricultural Biotechnology Institute
- **HBW** – Handbook of the Birds of the World
- **IBA** – Important Bird Area
- **IUCN** – International Union for the Conservation of Nature
- **SSC CPSG** – Species Survival Commission Conservation Planning Specialist Group
- **KBA** – Key Biodiversity Area
- **KZN** – KwaZulu-Natal
- **LEDET** – Limpopo Department: Economic Development, Environment and Tourism
- **m.a.s.l** – meters above sea level
- **NDFs** – Non-Detriment Findings
- **NEMBA** – National Environmental Management: Biodiversity Act
- **PAAZA** – Pan African Association of Zoos and Aquaria
- **PBFD** – Psittacine Beak and Feather Disease
- **PHVA** – Populations and Habitat Viability Assessment
- **pops** – populations
- **PSHB** – Polyphagous shot hole borer *Euwallacea fornicatus*
- **REDD+** – Reducing emissions from deforestation and degradation
- **RSA** – Republic of South Africa
- **SABAP** – Southern African Bird Atlas Project
- **SANBI** – South African National Biodiversity Institute
- **SAPS** – South African Police Service
- **TOPS** – Threatened or Protected Species
- **UCT** – University of Cape Town
- **UKZN** – University of KwaZulu-Natal
- **WESSA** – Wildlife and Environmental Society of South Africa

2 Executive summary

The status of the Cape Parrot *Poicephalus robustus* was re-assessed in 2017 by the International Union for the Conservation of Nature (IUCN) following the recent split from the Brown-necked Parrot *P. fuscicollis* (subspecies *suaehelicus* and *fuscicollis*; Coetzer *et al.* 2015, Collar & Fishpool 2017). The Cape Parrot is endemic to South Africa and is listed globally as Vulnerable given that this newly split species has a small population, which is currently estimated to be stable (BirdLife International 2017). Nationally, it is listed as Endangered given the small population size (<2 500 adults), with a projected decline of at least 20% over the next two generations (Downs 2015).

Main threats to the species include habitat loss and degradation, the associated lack of nesting sites and food, and disease (Downs 2015). Emerging threats include climate change which may cause habitat shifting and alteration (Cooper *et al.* 2017, Lézine *et al.* 2019), and the newly discovered polyphagous shot hole borer beetle (*Euwallacea fornicates*) which is causing the deaths of trees at a growing number of locations within South Africa (van den Berg *et al.* 2019). Given future projected declines in the Cape Parrot population and the identification of novel threats facing the species (Downs 2015), an updated plan building on previous plans and reviews (see Warburton *et al.* 2002, Snyder *et al.* 2004, Martin *et al.* 2014, facets of the 2002 Action Plan see Appendix I) is required to guide future and ongoing conservation efforts.

The aim of the Action Plan workshop, held in September 2019, was to review the current status and threats to Cape Parrots and to develop a Conservation Action Plan for the species, setting reasonable and measurable targets for species recovery with the inclusion of all relevant stakeholders. The benefits of developing a Cape Parrot Action Plan through a multi-stakeholder workshop are (a) that it facilitates the documentation of coordinated conservation actions required to protect the Cape Parrot and its habitat; (b) the process engages with a diversity of stakeholders, providing clarity on their roles and responsibilities, and in so doing, fosters an environment of inclusion and shared responsibility for the conservation of the species; and reinvigorates communities, organisations, institutions, governmental departments, businesses, and individuals to be involved in Cape Parrot conservation.

The Action Plan Workshop involved 48 stakeholders representing 23 organisations, departments and institutions (Appendix II). The outcomes of the Workshop included defining a vision as well as species and habitat goals for at least the next 10 years. With these in mind, and the strategies identified on how to tackle the threats facing the species, we will collectively work towards the vision of:

**A thriving population of Cape Parrots acting as a flagship
for the protection and recovery of indigenous forests in
South Africa, for the shared benefit of people and nature.**

~

3 Legislation

3.1 Summary of conservation status and legislative context

The Cape Parrot is listed as Vulnerable on the IUCN Red List of Threatened Species, on the basis that it meets criterion D1, having a small but stable population globally (BirdLife International 2017). Within South Africa, the Cape Parrot is listed as Endangered in the most recent 2015 Eskom Red Data List (Downs 2015), given the small population size (<2 500 adults), and a projected decline by at least 20% over the next two generations (Downs 2015). For the purposes of Red List assessments generation lengths for all *Poicephalus* species has been estimated at 10 years.

3.1.1 International context: The Convention on International Trade in Endangered Species (CITES).

CITES is an international agreement between governments, aimed to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES lists species under three Appendices depending on the level of protection that the species needs. Appendix I includes species threatened with extinction; trade in specimens of these species is permitted only in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

CITES has listed the Cape Parrot under Appendix II since 1975, which means that the following regulations apply to all international trade between CITES Parties:

- An export permit or re-export certificate issued by the Management Authority of the State of export or re-export is required. An export permit may be issued only if the specimen was legally obtained and if the export will not be detrimental to the survival of the species. A re-export certificate may be issued only if the specimen was imported in accordance with the Convention.
- In the case of a live animal or plant, it must be prepared and shipped to minimize any risk of injury, damage to health or cruel treatment.
- No import permit is needed unless required by national law.

3.1.2 National context: National Environmental Management: Biodiversity Act (NEMBA, 2004)

The purpose of this act is to make regulations specifically relating to listed threatened or protected (TOPs) species in South Africa (Department of Environmental Affairs 2004). The Cape Parrot is listed as a TOPs species, and as such, restricted activities may not be carried out without a permit and can be prohibited. Activities include:

1. Hunt/capture/catch/kill
2. Import into RSA / introduce from the sea
3. Export (re-export) from RSA
4. Possess / exercise physical control
5. Breed / propagate
6. Convey / move/ translocate
7. Sell / trade in / buy / receive / give / donate/ accept as a gift / acquire / dispose of
8. Any other prescribed activity

4 Biological information

There are four parrot species commonly considered to be indigenous to South Africa (Hockey *et al.* 2005). The Brown-headed Parrot (*P. cryptoxanthus*) inhabits open, lowland woodlands in north-eastern South

Africa up to southern Kenya (Hockey *et al.* 2005). The Meyer's Parrot (*P. meyeri*) occurs in several African countries south of the Sahara from northern South Africa to Ethiopia where it occurs in various types of woodland (Hockey *et al.* 2005). The Grey-headed Parrot (*P. f. suahelicus*) occurs primarily in woodland such as mopane (*Colophospermum mopane*) and miombo (*Brachystegia spp.*) woodlands in north-eastern South Africa to Tanzania and Angola (Hockey *et al.* 2005). The Cape Parrot is South Africa's only endemic parrot and occurs typically in the highly fragmented Southern and Northern Mistbelt forests (hereafter Mistbelt forests) in KwaZulu-Natal (KZN), Eastern Cape (EC) and Limpopo provinces (Downs 2005a).

South African forests are ancient and have been fragmented for at least 20 million years (Lawes 1990, Berliner 2005). Indigenous forests cover a relatively small area of South Africa (0.38%: 4 655 km² of 1 220 813 km²; Mucina & Rutherford 2011), consisting of Afrotropical (969 km²), Coastal (633 km²), Lowveld riverine (158 km²), Mangrove (33 km²), Mistbelt (1 714 km²), Sand forest (243 km²), Scarp forest (867 km²) and Swamp forest (38 km²). There are six types of Mistbelt forests in South Africa, a type of moist montane forest, and these forests are all highly threatened (Lawes *et al.* 2004a). The Mistbelt forests in South Africa cover an area of roughly 188 000 ha (Department of Agriculture Forestry and Fisheries 2011), which is 0.15% of the area of the country (122 million ha), but less than 5% of that is currently under strict protection (Berliner 2005). Within these forests, a total of 13% of the 280 known extant fungi, plants, animal species are currently threatened (17 Vulnerable, 15 Endangered and four Critically Endangered; IUCN 2018), of which the Cape Parrot is one.

4.1 Taxonomic description

The Cape Parrot was first documented as a species (*P. robustus*) by J.F. Gmelin in 1788. The Brown-necked Parrot of West Africa was declared a subspecies (*P. r. fuscicollis*) in 1820 by Kulh, and the Grey-headed Parrot of south-eastern Africa was added as a subspecies (*P. r. suahelicus*) in 1898 by Reichenow, thus Cape Parrots (as currently recognised) became known as *P. r. robustus* (Clancey 1997, Wirminghaus *et al.* 2002a, Perrin 2005, Christidis *et al.* 2018). A study of the molecular systematics of Cape Parrots in 2015 concluded that the degree of genetic divergence justified the recognition of Cape Parrots as a distinct species (Coetzer *et al.* 2015). While various bird guides, groups, and researchers have considered the Cape Parrot to be a distinct species over the years, there are four main international lists of all bird species, which vary in their approach to listing Cape Parrots. The *Howard and Moore Complete Checklist of the Birds of the World, version 4.1* still lists all three subspecies (Christidis *et al.* 2018). The other checklists all recognize the Cape Parrot as a distinct species (*P. robustus*), with the Brown-necked Parrot and Grey-headed Parrot retained as a subspecies (*P. f. fuscicollis* and *P. f. suahelicus*, respectively), although their basis for the recognition varies. In July of 2017, a re-assessment of the application of the 'Tobias criteria' (Tobias *et al.* 2010) by Collar and Fishpool (2017) prompted BirdLife International, who act as the IUCN Red List authority for birds, to recognise Cape Parrots as a distinct species. This decision was based on morphological differences, primarily in plumage coloration and beak size of museum specimens and augmented with differences in vocalisations (Collar & Fishpool 2017). This decision is not reflected in the published volume 1 of *HBW and BirdLife International's Illustrated Checklist of the Birds of the World* (del Hoyo & Collar 2014), but has been updated in the most recent online checklist (2018) and on the IUCN Red List (2017). The International Ornithological Congress World Bird List, considers species adhering to the Biological Species Concept, with influence from the Phylogenetic Species Concept (Gill & Donsker 2019). They specifically refer their decision to list Cape Parrots as a separate species to follow *Roberts Birds of southern Africa* (Hockey *et al.* 2005). The eBird/Clements Checklist (Clements *et al.* 2019) does not provide specific information as to why they have decided to list Cape Parrots separately. There has been much discussion, some at the conference of the International Ornithologists Union, as to how to rectify disparate avian taxonomy lists (Gill & Donsker 2019). CITES recognised Cape Parrots as separate species at the Seventeenth Conference of the Parties in 2016 on the basis of the genetic differences described by Coetzer *et al.* (2015). CITES is currently considering adopting a standard taxonomic reference for birds and commissioned an analysis of the effects of adopting the *Howard and Moore Complete*

Checklist of the Birds of the World, version 4.1 and the *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. The resulting 110-page document (Orenstein 2018) features a paragraph on the Cape Parrot. The CITES Animals Committee will prepare recommendations for adopting a standard reference for parrots at the Thirty-first meeting of the Animals Committee in 2020.

4.2 Distribution, movement patterns, habitat requirements, biology and ecology

The Cape Parrot distribution extends from the forests in the Amatole mountains in the EC, through KZN along the escarpment into Limpopo province in South Africa (Downs 2005a, Figure 1). Its primary habitat is the mosaic of Mistbelt forest patches that are dominated by yellowwood (*Podocarpus* or *Afrocarpus*) species (Downs 2005a). They typically prefer forest patches at higher altitudes between 700 and 1 400 m.a.s.l, where they are resident but will also visit the forests along the Wild Coast of the EC. Parrots also historically visited coastal forests in KZN, especially during the summer (Downs et al. 2019). The current Cape Parrot population consists of three genetically distinct subpopulations; the southern group in the Amatole mountains in the EC, the central group from Engcobo and Mthatha in the EC through to the Midlands in KZN and a disjunct northern group mainly in the Magoebaskloof in Limpopo province (Coetzer et al. 2019) (Figure 1).

An analysis by Cooper et al. (2017) comparing observed distributions during the Southern African Bird Atlas Project (SABAP1: 1987-1991) and SABAP 2 (2007-ongoing) found that the reported range had reduced by 58% and it was suggested this was due to a variety of factors including a reduction of indigenous forest in 17% (n = 5) of sites. Further sampling in some under-sampled regions in SABAP2, notably in the EC, will help build a more comprehensive picture of range change. Kalle et al. (2018) found that in general, range occupancy of Cape Parrots changed little over time because extinction was balanced by colonisation, but that there was range expansion and contraction on a regional scale. They applied dynamic occupancy models to 13 years (2002-2014) of citizen science driven presence/absence data on Cape Parrots from Downs et al. (2014). Colonisations increased with warmer temperature, area of human modified habitat (e.g. fruit orchard), presence of nests and yellowwood trees (*Afrocarpus* and *Podocarpus* spp.), all linked to greater resource availability. Extinctions in small forest patches (≤ 227 ha), period of low precipitation (≤ 41 mm annual precipitation), loss of indigenous forest cover and artificial lake/water bodies are attributed to resource constraints and unsuitable climatic conditions. The models showed that Cape Parrots are vulnerable to extreme climatic conditions such as drought which is predicted to increase under climate change. Therefore, management of optimum sized high-quality forest patches is essential for long-term survival of Cape Parrot populations.

The Cape Parrot weighs 300-400 g with its head, neck and body plumage an olive-green colour (Wirminghaus et al. 2002a, Downs 2005a). All adult birds have orange on the shoulder (bend of wing) and ankles (tibia), while females generally have orange on the forehead (Downs 2005a). Males usually lack orange on the forehead, but there are exceptions where a small amount of orange is present (Downs 2005a). Juveniles have orange only on the forehead, and absence of orange on the ankles and wing (Downs 2005a). Their cryptic colouration combined with dense forest habitats often make them difficult to locate once perched but their loud harsh call, particularly whilst in-flight makes them conspicuous. They are most active during the first few hours after dawn and before sunset when they leave and return to their over-night roosts in forest patches, although during misty conditions these periods can be extended (Wirminghaus et al. 2000b).

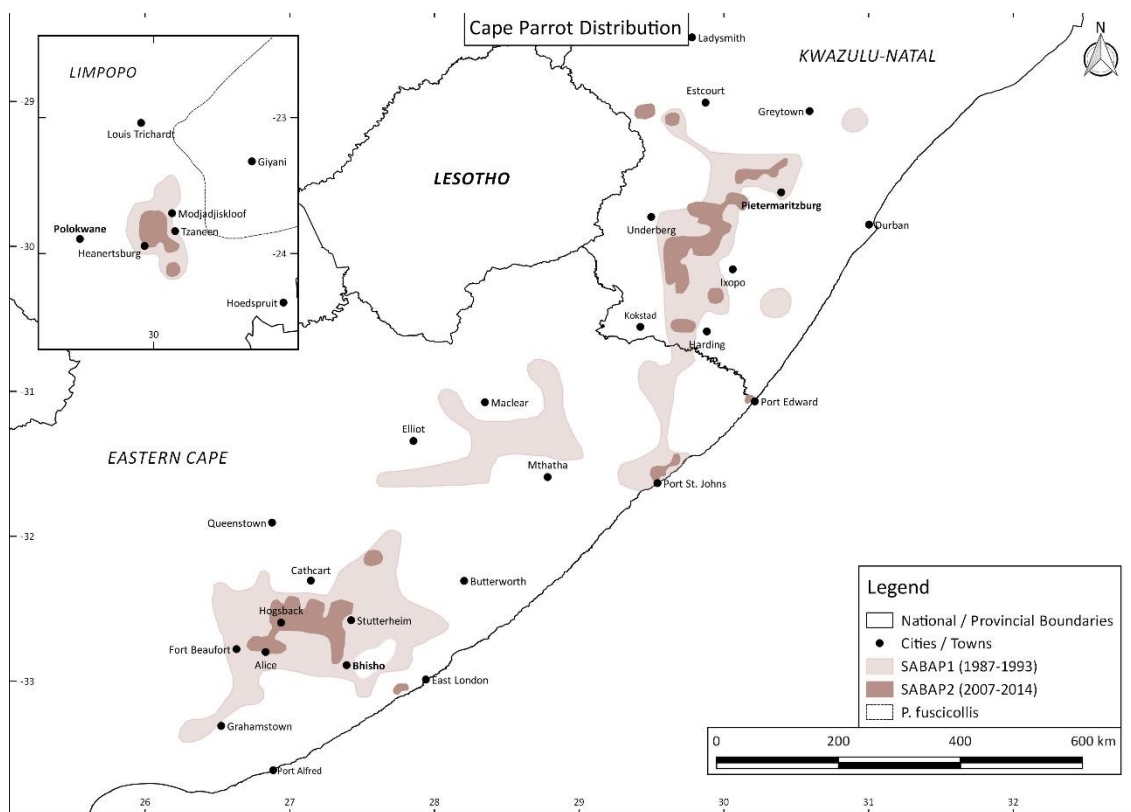


Figure 1. The historical and current distribution of the Cape Parrot (*Poicephalus robustus*). Map based on the distribution map provided for the species in *The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland* (Downs 2015).

The Cape Parrot feeds on the kernels of various indigenous fruits including yellowwoods, White Stinkwood (*Celtis africana*) and Wild Plum (*Harpephyllum caffrum*) (Wirringhaus et al. 2002b). At certain times of the year parrots will also feed on *Protea* spp. flowerheads outside of the forest, and exotic feeding resources such as Black Wattle (*Acacia mearnsii*), Seringa (*Melia azedarach*), Jacaranda (*Jacaranda mimosifolia*), Mexican Bird Cherry (*Prunus salicifolia*) among others (Wirringhaus et al. 2002b). Cape Parrots also forage on certain crop species such as Pecans (Wirringhaus et al. 2002b). Cape Parrots are known as food nomads as they regularly move opportunistically between forest patches when foraging. The absence of parrots in some forest patches during certain periods are likely due to the absence of suitable food, as the fruiting of their preferred trees may be sporadic and absent in some years (Wirringhaus et al. 2001c, Hart et al. 2013).

Cape Parrots typically breed during spring and summer (Wirringhaus et al. 2001a). They nest in existing tree cavities and have been known to make modifications such as widening of the cavity entrance or creating entirely new entrances into the side walls of existing cavities. Cavities are typically in mature or dead emergent or canopy trees in the forest, with nest entrances 6-12 m above the ground (Wirringhaus et al. 2001a). Nests are used in consecutive years (Wirringhaus et al. 2001a) and are lined with wood chips that the pair have gnawed from inside the cavity or entrance (Cape Parrot Project, CPP, unpub. data). They lay 1-5 eggs with incubation by the female which takes approximately 30 days (Wirringhaus et al. 2001a). Hatching is asynchronous. The nestling period lasts for approximately 63 days (Wirringhaus et al. 2001a) with chicks fledging at different times (CPP unpub. data). Chicks remain dependent on the adults for food for a few weeks post-fledging, after which they join large juvenile flocks which roost, gather and travel together to various feeding sites (CPP unpub. data.). Juvenile Cape Parrots are fed almost entirely on *Afrocarpus falcatus* endocarps (Wirringhaus et al. 2001a), and thus it is suspected that breeding seasons are timed to synchronise with peaks in *A. falcatus* fruit availability.

4.3 Map and geographic area for the plan

This Action Plan incorporates all known populations in the Eastern Cape, KZN and Limpopo provinces (Figure 1 above).

4.4 Species role in the environment

Knowledge of a species' role in the environment provides clarity as to how an ecosystem will be affected if it were to die out, which can be particularly important for keystone species that have a larger effect on the environment than is expected based on abundance (Smee 2010). The Cape Parrot is generally not considered a species that has a unique role in the way the ecosystem functions as it is a pre-dispersal seed predator, consuming the endocarp of fruit and discarding large portions of the flesh (Wirringhaus *et al.* 2002b). However, opportunistic observations have seen some individuals carrying exotic pecan nuts in their bills away from the feeding site (CPP unpub. data) as seen in other parrots (Tella *et al.* 2015) suggesting they might also play a role as seed dispersers. Cape Parrot are also likely prey for avian predators. Predation attempts have been observed by large, fast and agile birds of prey such as the Black Sparrowhawk *Accipiter melanoleucus* and Lanner Falcon *Falco biarmicus* (Carstens *et al.* 2017; Wirringhaus *et al.* 2000b). Nest predators include Samango Monkey *Cercopithecus albogularis* and African Harrier-Hawk *Polyboroides typus* (CPP unpub. data).

The Cape Parrot is considered a flagship species of the Mistbelt forests, as it is colourful, charismatic and easily identifiable, and so it is a useful species to promote the conservation of its threatened forest habitat and the other threatened animal and plant species that inhabit it. It is much sought after by birding enthusiasts who travel to reliable places like Hogsback, Magoebaskloof, Creighton and other areas to catch a glimpse of South Africa's only endemic parrot.

4.5 Population status and trends

Cape Parrot numbers had declined since the early 1900s, particularly in the 1950's (Skead 1971), with wild populations estimated to be <1 000 individuals in 1989 (Boshoff 1989). Declines were noted where they were once common (Skead 1971, Wirringhaus *et al.* 1999a). Individuals were taken for the bird trade (23 parrots by 1 trapper in 1962, Skead 1964) or killed as a crop pest (Wirringhaus *et al.* 1999a, Boyes 2010). Population declines were also linked to historical overexploitation of forest products and felling of indigenous timber, which removed parrot nesting and feeding trees (Wirringhaus *et al.* 1999a).

The Cape Parrot Big Birding Day (CPBBD), initiated in 1998, has been held annually since then as part of the conservation effort of the Cape Parrot Working Group. The aim of the CPBBD is to obtain an annual accurate population estimate (Figure 2), as well as to gather data on nesting, threats such as disease, or to document reports of hunting or tree felling in forests where observers are located. These data are stored and included in the annual report of the CPBBD. This is one of the longest citizen science monitoring projects in RSA, having been conducted for 22 years. The first estimates from the CPBBD estimated the parrot population at ~500 individuals (Wirringhaus *et al.* 2000a). This increased to ~1 000 individuals a few years later as the spread of counters expanded and consisted of 300–350 Cape Parrots in the EC, 170–220 in KZN and 50–60 in Limpopo Province (Downs 2005c). Following a continued increase in the number of observers and localities covered during the census, the estimated national population increased to a relatively stable number of ~1 600 individuals (Figure 2, Downs *et al.* 2014), of which 1 250 were adults (Downs 2015). In 2019, as many as 1 804 were counted in the wild - the highest number to date - with 947 individuals in the southern Amathole region, 772 in the central region (369 former Transkei, 413 KZN) and 75 in the northern subpopulation in the Limpopo Province (Downs *et al.* 2019).

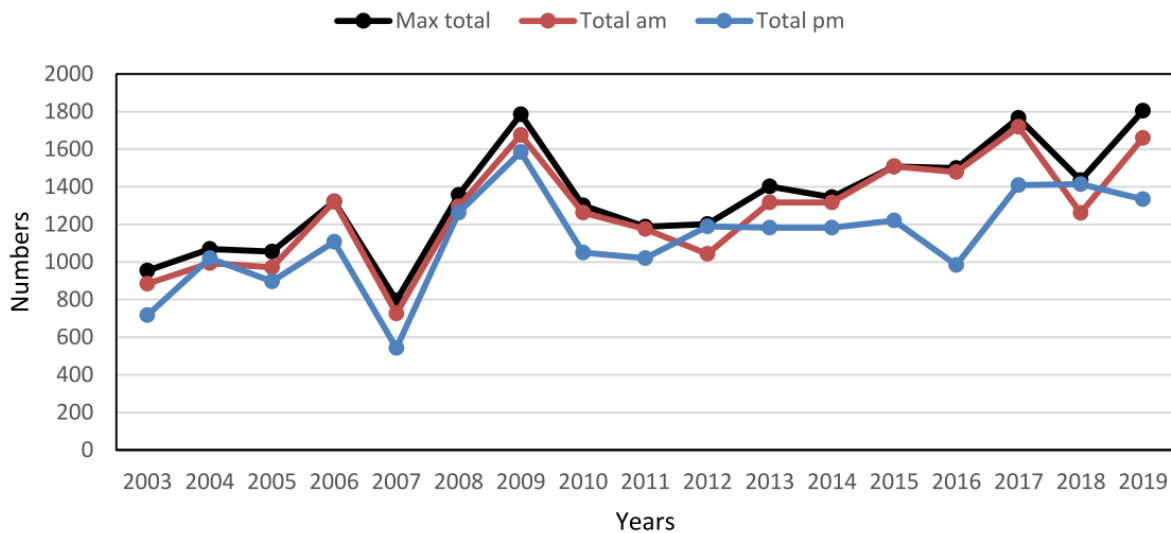


Figure 2. Counts of Cape Parrots during the Cape Parrot Big Birding Day during 2003-2019 (Downs et al. 2019) which is conducted over 2 days (late afternoon-pm- and then following morning-am) usually in May.

Cape Parrot numbers in the Amathole Mountain Range, Eastern Cape province, are monitored monthly, specifically in forest patches and pecan orchards around Hogsback where the CPP is based. The village of Hogsback and the four surrounding forest patches have an average of 83 Cape Parrots that roost there daily, with a maximum of 162 seen in the autumn of 2019, mostly due to the presence of large juvenile flocks (CPP, unpubl. data). The largest gathering in a single day was recorded at the pecan orchard in Alice, where 589 were counted departing Alice in one evening as the parrots were returning to their forest roosting sites >30 km away (Carstens et al. 2018). Forests are also monitored closely by CPP during the breeding season with 10 active nests and 11 potential nests located since 2016 and monitored. In addition, high quality flock photographs are taken to provide accurate estimates of age and sex ratios for that region, as well as the proportion of individuals showing signs of disease and food stress (see section 3.2.8.4). An estimated 75% of birds in the Amathole region are adults, of which ~1/3 are female (CPP unpubl. data).

Monitoring of numbers and behaviours of Cape Parrots frequenting five forest ‘hotspots’ in the Magoebaskloof area of Limpopo province was conducted monthly between 2012 and 2014 revealing seasonal patterns of movements and establishing a baseline against which future population trends can be assessed (Symes et al. unpub. data).

P. robustus as Vulnerable?

by James Westrip (BirdLife International). Posted on BirdLife International’s Forum on June 1, 2017

Following a taxonomic reassessment, the Brown-necked Parrot, *Poicephalus robustus*, is to be split by BirdLife’s Taxonomic Working Group into Cape Parrot, *P. robustus*, and Brown-necked Parrot, *P. fuscicollis*. Brown-necked Parrot comprises two subspecies; *P. f. fuscicollis*, which is found patchily in West Africa, as well as around the lower River Congo and into northern Angola, and *P. f. suahelicus* which has a more easterly distribution from central Angola across to Tanzania and south to northern Botswana, Zimbabwe, Mozambique and the extreme north-east of South Africa (see Collar 2017). Any potential decline in this species is not thought to be at sufficient a rate to approach the threshold for listing under criterion A. The population has not been quantified but it has been described as ‘patchily common’, but

may be 'generally scarce' (Collar 2017). Therefore, the Brown-necked Parrot is unlikely to approach the threshold for Vulnerable under any criterion and would warrant listing as Least Concern.

Cape Parrot, *P. robustus*, is endemic to South Africa, only found in the provinces of KwaZulu-Natal and Eastern Cape with a small outlying population in Limpopo (see Hockey et al. 2005, Collar 2017). The recent Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland assessed this species as Endangered (Downs 2015), however, assessing this species against IUCN criteria suggests that the species should not be given this as a global Red List status.

The population of *P. robustus* is assessed annually by the Cape Parrot Big Birding Day. The pilot for this was held in 1997, and has continued every year since then, with the census taking place on a Saturday afternoon/Sunday morning since 2000 (Downs et al. 2014). Population numbers prior to 2002 were below 500, but since then the numbers have been higher (average $1,366 \pm 245$ individuals between 2008 and 2012, with a high count of 1,786 individuals in 2009) (Downs et al. 2014). However, this is likely to be a consequence of an increase in the coverage of the survey, and in fact the population appears to have been stable over at least the 15 years of surveys incorporated in Downs et al. (2014). The 2016 survey supports this with a maximum number of 1,499 individuals reported (Downs and Singh 2016). In Downs (2015) the population size was listed as 1,100-1,500 mature individuals. However, it is believed that this may actually represent the total number of individuals rather than mature individuals as it was further stated that it was unknown what proportion of these individuals were adults (see Downs 2015). Treating the population estimate of Downs (2015) as an estimate of the total number of individuals would also fit with the estimates presented by Downs et al. (2014) and Downs and Singh (2016). This estimate could be altered to take into account the maximum record of 2009, so that the range is 1,100-1,786 individuals, which would roughly equate to 733-1,190 mature individuals.

As stated above, the population trend at least over the past 20 years appears to be stable, which makes it odd that the species are listed under criterion C1 in Downs (2015). To be listed under criterion C1 there has to be a high level of confidence in trend data, as the rate of decline must be observed, estimated or projected. Such a high level of confidence would require strong data to back up a listing. While Downs (2015) does present an 'estimate' of a potential future continuing decline this figure would far more likely be classed as a 'suspected' decline based on the Trend Justification; especially as the species has remained stable despite the current threats it is facing. Therefore, it would appear inappropriate to use this criterion to assess the species.

Given the current trend the species would not approach the threshold for Vulnerable under criteria A2+4 (decline over the past 3 generations, and a decline over 3 generations incorporating the past and the future), and the range of the species is too large for it to approach the threshold for Vulnerable under criterion B. Given that the current population trend is stable, it is also suggested that the species should not be listed as threatened under criterion C. The species could qualify as Vulnerable under criterion D1 though, as the potential population size range does go below 1,000 mature individuals, though it is at the borderline between Vulnerable and Near Threatened. There is also potential for listing under criterion A3 (decline over future 3 generations). Even though the species is currently stable despite the current threats of habitat loss and trade, there are some threats that are increasing in prevalence, such as disease, that could lead to future declines (see Downs 2015). Downs (2015) does state that the potential decline in the future may be at least 20% over 2 generations [though in the Trend Justification stating 20% over 3 generations], which would roughly equate to a decline of 28.4% over 3 generations (30 years). This would thus approach the threshold for Vulnerable under criterion A3cde, but given that Downs (2015) stated that it could be higher it may meet the threshold for Vulnerable (30% decline). However, there is still much uncertainty regarding this suspected future population decline, and so we request any further information regarding the potential for such a decline in the future noting especially that the population

is currently considered stable despite potential threats. In the absence of this information it is proposed that the Cape Parrot be listed as Vulnerable under criterion D1.

References

Collar, N. 2017. Brown-necked Parrot (*Poicephalus robustus*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. & de Juana, E. (eds.). Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona. (retrieved from <http://www.hbw.com/node/54604> on 16 May 2017).

Downs, C. T. 2015. Cape Parrot *Poicephalus robustus*. Pp. 143-145 in The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Eds. Taylor, M. R.; Peacock, F.; Wanless, R. W.). BirdLife South Africa, Johannesburg, South Africa.

Downs, C. T.; Pfeiffer, M.; Hart, L. A. 2014. Fifteen years of annual Cape Parrot *Poicephalus robustus* censuses: current population trends and conservation contributions. *Ostrich* 85(3): 273-280.

Downs, C. T.; Singh, P. 2016. 19th Annual Parrot Count – Report on the 2016 Cape Parrot Big Birding Day. Hogsback Times (online: <https://hogsbacktimes.files.wordpress.com/2016/08/cpbdd-report-72016.pdf>).

Hockey, P. A. R.; Dean, W. R. J.; Ryan, P. G. (eds). 2005. Roberts – Birds of Southern Africa, VIIIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town.

5 *Ex situ* populations and status

Excerpt from the UKZN CPWG's [website](#)

The Cape Parrot Studbook aims to provide an accurate up-to-date overview of all Cape Parrots kept in captivity, including those in breeding programmes and pets. Ideally the studbook should hold information on every Cape Parrot currently in captivity with details of birds (including those now deceased) that have bred in captivity to show the pedigree and relationships from the original founding birds. The studbook aims to provide important records and insights to assist the conservation of the species both in captivity and the wild. As with most parrot species, Cape Parrots are relatively difficult to observe in the wild, and whilst not mirroring wild populations, avicultural records can provide valuable information. For example, information on age at first breeding, clutch size, and longevity can be useful in determining effective population sizes in the wild.

The studbook can also provide useful information on captive population inbreeding and relatedness which become increasingly important over time and it is useful to be able to look at the population history. Unlike many of the management studbooks which form the basis for genetic and demographic management of populations, Cape Parrots are mainly held in private collections and so are not managed by the studbook keeper. However, the studbook keeper can be called upon to offer advice to breeders wishing to locate birds that are unrelated. It should be noted that all owner details will remain confidential to the studbook keeper unless otherwise requested.

MonteCasino Bird Park is a member of Species 360; an international NGO focussing on wildlife care and conservation which operate on a Zoological Information Management System (ZIMS). It is a web-based open-source record-keeping system used by zoos, aquaria and zoological associations to capture and organize husbandry information, including best-practices and collaboration opportunities among members. These records are accepted by international regulatory bodies such as CITES. Roughly three-quarters of Association of Zoos and Aquariums (AZA) members in North America are members, and the European Association of Zoos and Aquaria (EAZA) requires its members to join. The World Association of

Zoos and Aquaria's (WAZA) Conservation Strategy Guidelines strongly recommend that all zoo and aquaria join and participate in data sharing via ZIMS. There are a number of studbooks on ZIMS, so that simply means when anybody in the world enters a particular species and there is a studbook it will automatically flag on the studbook keepers' side to accept or reject.

Some of the problems encountered with managing the Cape Parrot studbook:

- Internationally the Cape Parrot is still referred to as the Grey-headed Parrot.
- Since the Cape Parrot is still a CITES II listed species, no import permit is needed.
- In South Africa there are no regulations forcing holders to register with the studbook. Since the owner has ownership and has a financial value attached, a number of holders in South Africa do not want to be part of the studbook. There is thus no way of knowing how many Cape Parrots are actually in captivity or what the trade levels are.

6 Trade

Cape Parrots were officially recognised as a distinct species (*P. robustus*) by CITES during CoP17. Prior to this they were considered to be conspecific with Brown-necked and Grey headed Parrot. From 1982 until 2016, CITES considered all three species as one species, listed as "*P. robustus*", when it was placed onto Appendix II. Because of the taxonomy adopted by CITES prior to 2016, these taxa are largely not distinguished in CITES trade to date and some Parties including South Africa are yet to report data for trade in recent years. There is reportedly high demand for the species from aviculturists owing to the bird's rarity, and their current market value is around R100 000 per pair (South African National Biodiversity Institute 2014).

During 2000-2018, exporting countries have reported exports of 6 070 live *P. robustus* (including *Poicephalus fuscicollis* post-2016) while importers have reported imports of 5 367 (data downloaded from <https://trade.cites.org> on 18th August 2019). Of reported exports, 3 417 were bred in captivity, while 2 653 were trapped from the wild. During 2016-2018, 448 *P. robustus* (Cape Parrots) have been reported by exporting countries, noting that a number of countries are yet to submit trade data for 2017, 2018 and 2019. All of these were reported born in captivity (CITES Source Code C or F). Of these, 19 were reportedly exported from EU countries, 20 from Singapore and 408 from South Africa. The majority (280) of South African exports were to Saudi Arabia in 2017 with smaller numbers also going to Mali (60), Bangladesh (40), the Czech Republic (10) and the US (8). In addition, between 2016 and 2018 South Africa has reported issuing permits for the export of 58 *P. fuscicollis*. According to the CITES Trade database there have been 4 seizures of "*P. robustus*" totalling 27 individuals reported to CITES from 1985 until 1999, and none thereafter.

The South African National Biodiversity Institute (SANBI) coordinates the undertaking of Non Detriment Findings (NDFs) for high priority CITES species, which is a science-based risk assessment where the vulnerability of a species is considered in relation to how well it is managed. These species include:

1. Threatened species with small populations traded in very high / high / moderate / low volumes
2. Threatened species traded in very high / high / moderate volumes
3. Near Threatened / Data Deficient / Rare / Declining species traded in very high / high volumes
4. Species not falling into one of the above categories but which are traded in very high volumes

Below is an extract from the summary NDF for the Cape Parrot (South African National Biodiversity Institute 2017): "Any international and local trade in wild specimens poses a high risk to this species. The Scientific Authority is unable to state with any confidence that the trade in *P. robustus* from South Africa

will not have a detrimental impact on the wild population. The Scientific Authority is therefore unable to issue a positive NDF for *P. robustus* at this time and trade must therefore be confined to captive-bred specimens. As chicks of many parrot species look alike, identifying Cape Parrot chicks would be very difficult for law enforcers. As such only captive-bred birds once fledged with juvenile plumage or older can be traded.”

“Since the extent of illegal trading in this species is unknown, it is recommended that measures be taken to ensure that no wild specimens are traded as “captive-bred”; specifically, all specimens for export must be verified as offspring of captive birds through DNA analyses. All shipments of Grey-headed Parrots must also be checked carefully by inspectors to ensure that they do not include any Cape Parrots. The South African National Biodiversity Institute (SANBI) has developed an identification guide for this purpose. The following is recommended to improve the management of captive-bred Cape Parrots:

- captive-bred birds must be recorded in the Pan African Association of Zoos and Aquaria (PAAZA) Stud Book;
- captive-bred birds must be marked with closed rings and/or micro-chipped, and DNA fingerprinted;
- breeders must keep records of breeding and mortality (dates of births and deaths, with blood samples taken from dead birds for DNA fingerprinting);
- all breeders exporting Cape Parrots internationally must be registered with the Management Authority in compliance with the TOPS and CITES regulations.”

“A decision tree or inspection checklist to assist Environmental Management Inspectors with verifying specimens as “captive-bred” in accordance with CITES provisions must be developed by the Scientific Authority within 3 months of publication of this NDF.” (South African National Biodiversity Institute 2017).”

7 Threats

7.1 Habitat loss and degradation

7.1.1 Historical and current logging

Mistbelt forests in South Africa were always patchily distributed, being confined to fire-refuge valleys (Lawes 1990, Lawes *et al.* 2004a). However, the reduction of forest area and increases in forest fragmentation in the recent past have been largely due to human logging of forest hardwoods (Lawes *et al.* 2004a, Adie *et al.* 2013, Grieve & Downs 2015). Most of the logging and forest exploitation occurred prior to the 1940’s and the wood was used for everything from floorboards to furniture (Lawes *et al.* 2004a, Adie *et al.* 2013). During 1880-1940, the forest area in KZN decreased by 80% (Lawes *et al.* 2004b). Targeted tree species that are known Cape Parrot feeding trees include yellowwoods (floorboards, utility furniture, spars, staves, coffins, bridges, railway sleepers), Assegai *Curtisia dentata* (wagon wood, rafters), White Pear *Apodytes dimidiata* (wagon wood), Sneezewood *Ptaeroxylon obliquum* (fence posts) and Ironwood *Olea capensis* (wagon wood, superior furniture, fence posts, railway sleepers). In more recent times (1944-1996), the forest area in KZN decreased by 5.7% (Lawes *et al.* 2004b).

In the EC, most of the damage was during the 1860’s and 1870’s with most timber dragged to northern parts of the country for building purposes. Logging of forest hardwoods, yellowwoods in particular, still continues in the Amathole region. Harvesting off-take there is limited by a quota of 465 m³ of wood per year (Mpisekaya *et al.* 2008). Harvesting criteria include wind-fallen and crownless trees, as well as trees that have lost > 70% of their crowns (Mpisekaya *et al.* 2008). Selective logging of standing dead trees

(snags) continues as these trees are considered redundant to the forest ecosystems (Cawe & McKenzie 1989). Snags, however, are important foraging and nesting sites for a wide range of animals including birds, and Cape Parrots prefer to nest in them (Downs & Symes 2004).

Harvesting of forest products is also ongoing at a subsistence level, such as the removal of sub-canopy trees for poles, and bark for medicinal use (Lawes *et al.* 2004a, Leaver *et al.* 2019). There was a successful prosecution of two brothers from Mooi River who got a local chief to allow them to fell an indigenous forest in the EC in ca 2005 (Downs pers. comm.). Where it is unregulated or for commercial purposes, it can negatively affect forest productivity and ecosystem functioning (Leaver *et al.* 2019). The attrition of forests due to over-exploitation has caused knock-on effects on forest structure and forest community. The disturbance to the cooling and protective layer of the canopy has resulted in the increasing vulnerability of the forest interior to wind damage and of the forest floor to drying out (Downs & Symes 2004).

7.1.2 Exotic, commercial plantations

In addition to logging, non-indigenous tree species pose a threat to Cape Parrot habitat. The areas surrounding indigenous forests have seen a marked increase in non-indigenous tree species, with 60% of buffer zones surrounding the Mistbelt forests identified as transformed (Berliner 2005). Of the 60% that is transformed, 25% are pine plantations (Berliner 2005). Plantations pose a potential long-term threat to forest biodiversity due to the role they have played in increasing forest fragmentation and subsequent isolation of many forest patches in South Africa (Berliner 2005) which in turn has resulted in changes to forest animal community structures (Wethered & Lawes 2003). Increases in plantation extent contributed to local extinctions in six bird species in South Africa's forests: Trumpeter Hornbill *Bycanistes bucinator*, Southern Banded Snake-eagle *Circaetus fasciolatus*, Bush Blackcap *Lioptilus nigricapillus*, Eurasian Golden Oriole *Oriolus oriolus*, Yellow-throated Woodland-warbler *Phylloscopus ruficapilla*, and Orange Ground-thrush *Geokichla gurneyi* (Cooper *et al.* 2017). Although the area covered by plantations has decreased marginally by 1.2% during 1990-2014, this loss of plantation habitat could negatively affect indigenous forests now linked by plantations or those species inhabiting them (Cooper *et al.* 2017). The impact of exotic plantations is not always negative; small forest patches surrounded by commercial plantations can aid colonisation of, and immigration from patches by birds (Wethered & Lawes 2003). However, for larger patches surrounded by plantations, plantations promote the spread of generalist bird species and the loss of forest specialists, resulting in lower forest species richness in those larger forest patches (Wethered & Lawes 2003).

7.1.3 Shortage of nesting sites and food

One of the knock-on effects created by the degradation and loss of forest habitat for Cape Parrots is the resulting shortage of nesting sites and feeding resources. Cape Parrots are secondary cavity nesters, relying on existing cavities, mostly in large, mature trees such as yellowwoods (Wirringhaus *et al.* 2001a) which have been the target during extensive logging operations (Lawes *et al.* 2004a). Although natural nesting sites are assumed to be in short supply, no study has yet quantified how many potential, suitable nesting sites are available within the species' range.

Forest exploitation has resulted in the loss of many small forest patches (Eeley *et al.* 2001). Historically, trees fruiting at different times within and between forest patches meant that there would have been sufficient food year-round provided the Cape Parrots kept moving. Since many of the forest fruiting species exhibit variable fruiting seasons, particularly among patches (Wirringhaus *et al.* 2002b, Hart *et al.* 2013), the loss of forest patches has meant that Cape Parrots are likely under increasing pressure to find food throughout the year to sustain themselves. Consequently, they include many non-indigenous feeding resources as part of their diet due to their reliable fruiting times and relative abundance at certain times of the year (Wirringhaus *et al.* 2002b). Cape Parrots are able to fly great distances from their indigenous forest habitat to seek exotic feeding resources such as Apple, Pear and Pecan orchards, where

they come under threat of persecution as a crop pest, or capture for the illegal pet trade (Wirringhaus *et al.* 2002b). In the EC, the Cape Parrot consumes large amounts of exotic tree species year round, but particularly in autumn/winter when pecan nuts are ripe but whether they are often captured for illegal bird trade (CPP unpubl. data, Carstens *et al.*, see below).

7.2 Illegal trade

Not quantified. Earliest reports by Skead (1971) suggest that the catching, trapping and sale of Cape Parrots was common in the 1960s and presumably earlier, with Cape Parrots trapped in the EC forests such as Pirie and near Mthatha. Birds were caught by using bird calls to lure them in and via ladders which were permanently attached to parrot nesting trees to harvest nestlings (Skead 1971). Over the years reports of illegal trade have been reported to Ezemvelo KZN Wildlife (EKZNW) and the Eastern Cape Tourism and Parks Agency (ECPTA, Downs unpubl. data, CPP unpubl. data). Several overseas agencies have contacted the Cape Parrot Working Group (CPWG) and studbook keeper to verify that Cape Parrots imported into their countries are captive bred. A flyer was produced to assist border control officers with identifying illegal export of Cape Parrots (CPWG Downs unpublished data).

Several incidents involving the capture and illegal selling of Cape Parrots in the town of Alice in the EC have been reported recently to the CPP from residents and business owners there. Cape Parrots flock to Alice in large numbers (>500 individuals seen in one day, Carstens *et al.* 2018) during the Autumn and Winter months when the Pecans are fruiting. Opportunists use this time to capture Cape Parrots and attempt to sell them on to local business owners and possibly elsewhere, but the extent of the capture and onward sale is unknown. CPP is working with Department of Environment Fisheries and Forestry (DEFF) and the South African Police Service (SAPS) and a case has been opened. Posters have been placed at various locations in Alice explaining the illegality of such behaviour. These posters are quickly removed by residents but replaced regularly by CPP. CPP employ guards seasonally in the Pecan Orchard to protect Cape Parrots. Although the orchard is in private property belonging to the University of Fort Hare, regular trespassing occurs by local residents who collect pecans to sell elsewhere. Trespassers are sometimes armed.

7.3 Psittacine Beak and Feather Disease

Psittacine Beak and Feather Disease (Pbfd) is the most prevalent viral disease affecting both wild and captive *Psittacine* populations around the world (Heath *et al.* 2004). It is caused by a *Circovirus*, which is thought to have originated in Australia but is now found world-wide (Heath *et al.* 2004). The virion is extremely stable in the environment where it can persist for decades (Raidal & Cross 1994). Environmental contamination of areas such as water sources and nesting sites, and subsequent ingestion or inhalation of the virus, including through feather dust, is seen as the primary source of infection (Raidal & Cross 1994).

Viral infections occur in three forms: acute, chronic and subclinical. The chronic form is mostly commonly observed in adults and is characterised by abnormal feather growth leading to feather loss, as well as lesions on the bill. Acute infections are most commonly observed in juveniles and affected birds rarely survive longer than a few months (P. Wood 2018 pers. comm). Subclinical forms of the virus have been noted where individuals appear healthy (Regnard *et al.* 2014b). For chronic and acute forms, clinical signs can indicate viral load (Regnard *et al.* 2014b). Infected birds may experience immunosuppression which can lead to secondary infections (Heath *et al.* 2004).

The first suspected cases, based on observations of clinical signs were reported in Creighton, Kwa-Zulu Natal in 1992 (Downs *et al.* 2015). The screening of samples collected in Alice in the Eastern Cape in 2010 confirmed the existence of the Pbfd virus in wild Cape Parrots (Regnard *et al.* 2014a). These results suggested that there was a 92% infection rate but this comes with caveats, such as a possible bias towards capturing diseased individuals and a lack of assessment of the sensitivity and specificity of the assay which

has not yet been assessed (G. Regnard 2018 pers. comm.). Two blood samples collected during 2009-2011 from a site in Limpopo province tested positive for the virus but DNA fragments could not be adequately cloned to facilitate sequencing (G. Regnard 2011 pers. comm). A number of feathers collected from beneath roost trees in 2011 on Amorentia estate (Magoebaskloof, Limpopo) have also tested positive (G. Regnard 2011 pers. comm). It is likely that the strain of the virus in wild Cape Parrots has a single common ancestor throughout the distributional range, while the viral strain in captive Cape Parrots has a different common ancestor from a separate disease introduction event (Regnard *et al.* 2014a). In a review of PBF in Cape Parrots, Downs *et al.* (2015) speculated that increasing changes in the environment, particularly changes in climatic conditions as a consequence of anthropogenic-induced climate change, may be contributing to increased disease prevalence and potentially increased disease-related mortality. Juveniles in particular appear to succumb during times of drought (Downs *et al.* 2015).

Photographs taken by CPP researchers of large flocks in the EC that gather seasonally to consume exotic Pecan nuts have been used to estimate the proportion of individuals that show clinical signs. Preliminary results indicate that in 2018 an estimated 17% of the population showed clinical signs of the disease (CPP unpub. data). It is possible that individuals not showing clinical signs may still be infected (Regnard *et al.* 2014 abs). It is likely that many carry the virus given the virion's stability in the environment, and its ability for rapid vertical transmission (female to offspring) and horizontal transmission (one individual to another, not necessarily related, Heath *et al.* 2004).

8 Emerging threats

8.1 Climate change

Current forecasts under varying climate change scenarios recognise that the biggest threat to forests in South Africa is the impact of climate change on human populations, affecting settlement and consumption patterns which in turn will affect how forest products are used (Berliner 2005). Protection of the Mistbelt forest habitat will require multiple approaches. Conservation area planning would need to include forest reserves in climatically stable areas, or areas spanning altitudinal and latitudinal gradients allowing for migration of the forests (Eeley *et al.* 1999). The protection of large forest areas where this is still possible is needed, along with maintaining or rebuilding connectivity between forest patches (Berliner 2005). Reforestation should be promoted in suitable areas, and the edges of forests protected from damage by fire and colonisation by non-indigenous invasive tree species (Berliner 2005). The importance of promoting functional connectivity of anthropogenically-fragmented forest patches for multiple taxa across the critically endangered forest biome has recently been highlighted (Ehlers Smith *et al.* 2019).

8.2 Polyphagous shot hole borer beetle

A new and growing threat to Mistbelt habitat is the exotic polyphagous shot hole borer (PSHB) *Euwallacea fornicates*. It was first discovered in South Africa in 2017 in the KZN Botanical Gardens in Pietermaritzburg (van den Berg *et al.* 2019). The beetle is 2 mm long (Figure 3), native to south-east Asia and has a symbiotic relationship with a fungus *Fusarium euwallaceae*. When the PSHB infests new trees, the fungus carried on the beetle grows in the tunnels that the beetle creates. The fungus spreads throughout the sapwood and eventually blocks the transportation of nutrients and water up the tree, causing the tree to die.

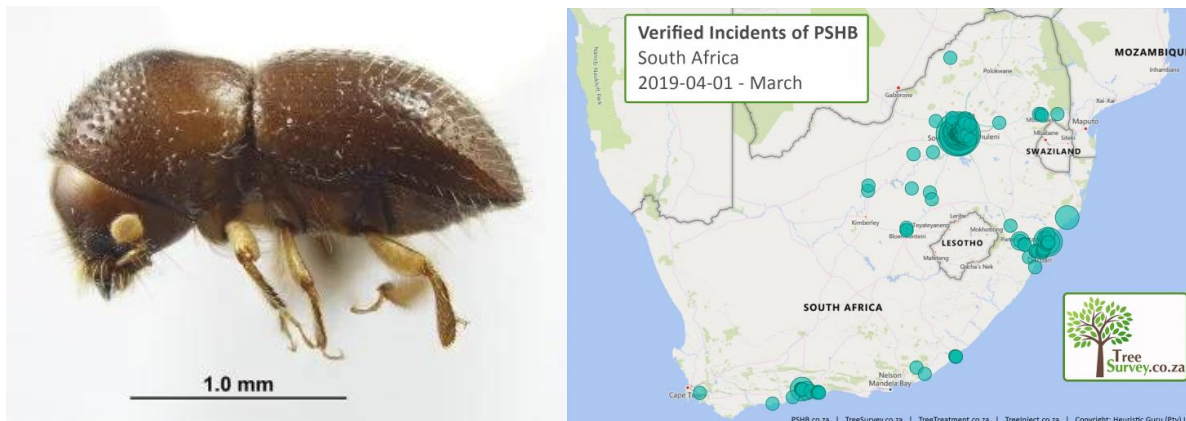


Figure 3. The Polyphagous shot hole borer and its current distribution in South Africa. Images course: treesurvey.co.za

It has spread rapidly and is found in many of the major cities in South Africa including Johannesburg, Pietermaritzburg, Durban, Bloemfontein, Ekurhuleni, as well as George and Knysna (Figure 3). A total of 21 tree species have been identified as being reproductive hosts to the PSHB, and there is evidence of infestation from a further 151 tree species in South Africa (Fryer 2019). Species lists from KZN and Gauteng revealed that 43% of the tree species affected by the PSHB are Cape Parrot feeding tree species, including Real Yellowwood *Podocarpus latifolius*, Cape Chestnut *Calodendron capense* and Wild Plum *Harphephyllum caffrum* (Fryer 2019). Methods of eradication are being developed, and include the use of nanotechnology in the form of an Amphiphilic Nano Oil Delivery System (ANODS) to carry a naturally occurring fungicide through the bark and trunk to target the fungus, causing no harm to the trees themselves (Watson 2019).

9 Past conservation measures

9.1 Nest boxes

Breeding propensity of tree-cavity nesting bird species are often limited by a shortage of natural nesting sites (Newton 1994). Artificial nests can be used to provide alternative nest sites. Cape Parrots nest in natural tree-cavities in high-altitude fragmented Mistbelt forests in South Africa, assumed to be in short supply due to historic and current logging practices (Wirminghaus *et al.* 1999b, 2001a, Downs 2005c). Three projects have tried to increase nest site availability for Cape Parrots.

In 1998, 30 nest boxes were erected in the Hlabeni and Karkloof forests in KZN (Downs 2005b). Nest box design mimicked those successfully used by captive Cape Parrots. Although cleaning fluid was applied externally to the boxes to act as a deterrent against bees, bees still occupied 25% of these nest boxes (Downs 2005b). Cape Parrots only occupied one nest box after 10 years (Downs 2005b). It was suggested that the occupation of this one box out of 30 deployed was due to its proximity to an old natural nest tree that had collapsed a few months earlier, and that the nest box was in a tree with little canopy cover to allow individuals to see their surroundings better (Downs 2005b). In 2006 ten more nest boxes were erected at Ingeli, but none were used by Cape Parrots with most being occupied by bees or stolen by humans (Downs 2019 pers. comm.).

In the EC, during 2011-2012, 179 wooden bird nest boxes (similarly designed to those erected in KZN) and 28 bee boxes (to 'pull' bees) were erected in Hogsback. Analyses of data collected in 2016, showed a total of 43% were used by species other than Cape Parrots, 51% were unused and 6% could not be inspected due to tree instability and inaccessibility (Wimberger *et al.* 2017). Occupancy of boxes by birds was not associated with nest, tree or habitat characteristics. However, there was a strong effect of location on occupancy by bees, with the likelihood of occupancy by bees decreasing for boxes in indigenous Mistbelt

forests. Furthermore, there was a weak effect of tree species on box occupancy, with the likelihood of occupancy decreasing for nest boxes placed in Ironwoods *Olea capensis* and yellowwoods *A. falcatus* and *P. latifolius*. Three bird boxes were inspected by three pairs of Cape Parrots, two boxes in 2016 and one box in 2018, but were never occupied.

In Limpopo, the first nest boxes were erected in 2009, but these fell apart quickly due to use of Cocos Palm *Syagrus romanzoffiana* material (Explore Trees 2019). In 2012, 20 nest boxes (wooden) were erected with cleaning fluid and x-rays used as possible deterrents to bees. However, within 2 years all nest boxes had been occupied by bees. In 2015, an additional 20 nest boxes (wooden and using PVC pipes) were erected with two bee trap boxes below each of them. The trap boxes were treated with a lure to attract the bees and the nest boxes were treated with a mild pyrethrum to repel the bees, as per a “push-pull” system instructed by collaborators ([Avian Preservation and Education Conservancy](#)). The boxes remained bee-free for 2 years, but because of not being able to keep up with the maintenance requirements (e.g. removing bees from occupied bee box and retreating with a lure) bees have begun occupying the nest boxes. Cape Parrots have not yet occupied any nest boxes (Espach 2018 pers. comm.).

9.2 Habitat restoration

Most of the South African forests are degraded through human exploitation of timber starting in the 1700’s and replanting some areas with exotic plant species (McCracken 2004). Forests are still under pressure from legal harvesting and informal harvesting/use (Leaver and Cherry 2020), with animal species and ecosystems affected (Cooper *et al.* 2017, Leaver *et al.* 2019). Analysis of land cover change over the last 20 years from 30 sites throughout South Africa indicated indigenous forest decreased in 17% ($n = 5$) sites (Cooper *et al.* 2017). Consequently, half of South Africa’s forest-dependent bird species showed declining ranges with the loss of these species most prominent in the EC province (Cooper *et al.* 2017).

To reverse the impact that removing large indigenous hardwoods from the forests has had on ecosystems and to increase carbon storage potential to fight global warming, organisations have begun reforestation efforts to facilitate the recovery of a degraded area through activities such as clearing of alien invasive plants and planting of indigenous trees. The most recent report (2017/2018) by the Woodlands and Indigenous Forest Management Unit in the Department of Agriculture, Forestry and Fisheries (DAFF 2018) recorded that 997 ha were planted with indigenous seedlings in KZN (79 ha), EC (872 ha) and Limpopo (46 ha) regions, with a total of 301 ha of state indigenous forests having been rehabilitated.

There have been many tree planting efforts outside of these government areas by concerned and dedicated non-profit organisations. For instance, outside of Cape Parrot distribution, Greenpop and Platbos Conservation Trust have planted over 50 000 trees in Platbos Forest, Western Cape, since 2012 (Greenpop Foundation NPC 2019). Wildlands started their ‘Trepreneur’ program in 2004 in KZN, where community members were encouraged to grow and trade seedlings for items such as bicycles as well as plant indigenous trees at their homes, which includes those near indigenous forests. In 2008, Wildlands planted these trees at a rehabilitation site at Buffelsdraai (780 ha of old sugar cane field) in collaboration with EThekweni municipality. Wildlands’ Indigenous Trees for Life Programme now runs in 24 communities in KZN, Mpumalanga and Gauteng. Both Greenpop and Wildlands have collaborated with the CPP to plant areas around the Amathole region of the EC, South Africa.

Within forest patches used by Cape Parrots, CPP first started planting indigenous trees in degraded areas in 2011, with these sites selected primarily to benefit the Cape Parrots. They grew seedlings from seeds harvested near Hogsback. Seedlings were also produced in micro-nurseries built by the CPP in the communities near Hogsback, and these seedlings were bought from the community for reforestation efforts. The CPP have planted ~40 000 seedlings which have an average survival of 75% after 6 months (CPP unpub. data). In KZN, Karkloof Canopy Tours and Hope of the African Tree Project sell merchandise

to raise funds to plant indigenous trees (especially yellowwoods) for Cape Parrot conservation (Strydom 2019 pers. comm.).

Lastly, the revenue of the Cape Parrot Woolworths bags is currently utilised by BirdLife South Africa's IBA Programme in its KZN project area to assist with stewardship, specifically aimed to secure certain forest patches as privately protected areas in the Mistbelt Forest IBA, where these birds occur. Funds will also be used to assist with habitat management in these forest patches in favour of the species (H. Smit-Robinson pers. comm.).

9.3 Annual Cape Parrot Census

See section 4.5.

9.4 Community engagement, education and awareness

Conservation education aims to positively influence people's beliefs and behaviour towards wildlife and their habitats. Educators are encouraged to increase environmentally responsible behaviour through increasing awareness of the environmental problems or species survival threats; increasing knowledge of how the environment/species function and ways of how to address the threats; encourage audiences to care and feel motivated to participate in environmental improvement and protection; increase skills for audiences to be capable of identifying and contributing to addressing threats; to finally having the audiences actively participating in addressing these threats (UNESCO 1978).

The Cape Parrot Working Group (CPWG) was formed in 2000 at a Cape Parrot Workshop and is based in KZN. They have developed educational materials, posters, DVDs, fact sheets and postcards with information on the Cape Parrot which are distributed at public places including Montecasino and Umgeni Bird Parks (Downs 2019 pers. comm.). An education supplement was also developed and given to various people in the provincial bodies working with schools as well as the Wildlife and Environmental Society of South Africa (WESSA). Presentations are given at schools, garden clubs, conservancies etc., on radio and TV and various popular articles have been written over the years. The CPWG have coordinated an annual CPBBD since 1998 to estimate Cape Parrot numbers across South Africa, as well as to highlight the plight of the Parrot. School children, government officials and interested members of the public are involved. Cape Parrot branded Woolworths shopping bags have helped inform the general public.

The CPP, based in EC, aims to link conservation with economic benefits by uplifting small, rural communities surrounding Cape Parrot forest habitats. To increase on-the-ground forest protection, they encourage local people to become forest custodians through the development of local livelihoods that derive benefit from healthy Afro-montane forest. This includes the development of communal nurseries to germinate seedlings, hiring local people for replanting and invasive plant clearing and providing the necessary training, skills development and environmental education. Furthermore, educational posters and brochures, and marketing materials have been produced and distributed to local schools, accommodation establishments and police stations. CPP staff engage with various local education schools and organisations and have provided recreational educational activities for children and seedlings to plant. Radio, television, print and social media platforms have been used to describe and share CPP's activities tied to habitat restoration and promotion of Cape Parrot conservation.

In Cata village in the EC, Bird Life South Africa assisted the community to establish birding trails in the forest as well as to train bird guides, with the importance of the Cape Parrot emphasised. In addition, BirdLife South Africa assisted to establish a committee which manages ecotourism in the village, which the community still runs.

In the Magoebaskloof area of Limpopo, David Letsoalo of Kurisa Moya Nature Lodge has incorporated Cape Parrots into an education programme focused on local schools called 'Birds in trees'. In partnership with the World Parrot Trust Letsoalo developed educational materials including board games, quizzes,

parrot colouring-in, and stickers. Also in Limpopo, linked to an artificial nest box project (see relevant section), the Avian Preservation and Education Conservancy gave educational talks to the children at a local school on the Cape Parrot, the issues they have with bees occupying the artificial nests and how important both parrots and bees are for the environment.

9.5 Monitoring disease

Refer to section 7.3.

10 Research inventory and summary

Some of the earliest literature on the species stems from research by Skead and Boshoff, who studied Cape Parrots in the former Transkei and Natal (Skead 1971, Boshoff 1989), and in particular their movements and feeding habits (Skead 1964). There are also letters written during 1971-1973 between foresters, nature conservation officials and farmers near King Williams Town reporting large numbers of Cape Parrots feeding on Pecan orchards.

The Cape Parrot has been the focus of one Post-doctoral study, 3 PhDs, 1 MSc and 1 Honours thesis. The PhD research of the late Olaf Wirminghaus formed the backbone of research conducted on this species. During 1999-2002, eight papers by Wirminghaus were published on aspects of the species biology and ecology, including breeding, feeding, abundance, activity, taxonomy and vocalisations (Wirminghaus *et al.* 1999b, 2000a, b, 2001a, b, c, 2002a, b). Two PhDs on Cape Parrots were completed in 2015. One focussed on the development of a potential challenge model and plant-produced vaccine candidate for beak and feather disease virus and described the disease in the wild (Regnard *et al.* 2014a&b, Regnard 2015). The second PhD focussed on the molecular systematics of the Cape Parrot, and provided clarity regarding the genetic composition and gene flow across their distribution (Coetzer *et al.* 2015, 2017, 2019). Currently three UKZN PhD students are studying the avian, mammalian and forest patch characteristics from Mthatha (E. Cape) to Creighton (KZN) and similarly another two UKZN PhD students are studying these in the forest patches from Bulwer to the Karkloof (KZN). As part of this they are also obtaining data on Cape Parrots and factors affecting functional biodiversity of these forest patches. One MSc dissertation focussed on characterising genetic markers for the Cape Parrot (Pillay *et al.* 2010).

More recently, an honours project investigated morphological and colour variation in five species of *Poicephalus* parrots, including Cape Parrots using data collected from museum specimens housed at the Natural History Museum, Tring, UK (Connon 2019). This is part of a larger study by Assoc. Prof. Anna Young at Otterbein University, Ohio USA, investigating morphological and vocal differences between Cape, Grey-headed and Brown-necked parrots (A. Young 2019 pers. comm.). A post-doctoral study (2010-2014) by Dr Steve Boyes focussed on the conservation biology of the Cape Parrot in the Amathole and Transkei regions of the EC. Part of his post-doc involved coordinating several community-based conservation projects aimed at mitigating the impacts of current extinction threats, including a community nest box workshop, indigenous tree nursery and planting scheme, and the management of a Cape Parrot Sanctuary. One aim was to better understand the dynamics that support a recent outbreak of PBFDF in wild Cape Parrots in the EC (see Regnard *et al.* 2014a&b). The CPP continues this work, and data collected are used to determine seasonal variation in diet, movement and breeding in relation to forest food availability.

Other published research includes papers focussing on the species courtship and mating (Carstens 2016), interactions between Cape Parrots and avian predators at a Pecan orchard when large flocks gather (Carstens *et al.* 2017); nest boxes for Cape Parrots in KZN and EC (Downs 2005b, Wimberger *et al.* 2017); a summary of the annual count (Downs *et al.* 2014), range dynamics of the species (Kalle *et al.* 2018) and the gathering of flocks at non-forest feeding sites in KZN (Symes & Downs 2002). Two reviews on the species have been conducted: taxonomy (Perrin 2005) and documented cases of PBFDF of Cape Parrots

(Downs *et al.* 2015). Cape Parrots were included in a wide review of the knowledge gaps and opportunities of the larger parrots of Africa and Madagascar (Martin *et al.* 2014), and the species was described in detail in a chapter in the 2013 book titled *Parrots of Africa, Madagascar and the Mascarene Islands* (Perrin 2013).

Various research on forest habitat with particular reference to Cape Parrot conservation has been conducted and includes (a) a review of historical and recent evidence of Cape Parrots in the Knysna/Tsitsikamma forest (unpub. report by Campbell, 2011), (b) the dynamics of dead trees (snags) in the forest (Downs & Symes 2004, Wilson *et al.* 2017), (c) fruiting phenology (Hart *et al.* 2013), factors affecting forest habitat of the Cape Parrot (Henderson & Downs 2005), and a study assessing range changes in forest-dependent species including the Cape Parrot (Cooper *et al.* 2017).

11 Action Plan Workshop Outputs

11.1 Vision

A thriving population of Cape Parrots acting as a flagship for the protection and recovery of indigenous forests in South Africa, for the shared benefit of people and nature.

11.2 Goals

CAPE PARROT GOALS:

1. Current levels of heterozygosity¹ are maintained within and between the three sub-populations.
2. Sustained growth in effective population size, towards a total wild population of 2 500 individuals², with no reduction in Cape Parrot distribution across the known range.

HABITAT GOALS - encompassing the Forest/Grassland mosaic:

1. Formal protection of at least 10% of currently-utilised Cape Parrot habitat, with a score of at least 50% on The Management Effectiveness Tracking Tool for protected areas ([METT-SA](#)).
2. Habitat degradation, particularly in mature forest, is halted by 2025; and total Cape Parrot niche habitat area is maintained at >100,000 ha³ within the defined scope and timescale.

¹ Coetzer et al. 2019.

² Realistic, achievable number near the predicted maximum population size of 2800 based on: 140 individuals occupying 5000 ha (containing a total of 14 forest patches used by the Cape Parrots at various times of the year) in the Amatholes and 100,000 ha of Cape Parrot niche habitat in SA. Acknowledging that flocks of Cape Parrots rely on a multitude of patches throughout the year: some for breeding, others for feeding only. And that not all patches are considered ideal habitat (e.g. severely degraded patches in some parts of KZN).

³ Munro et al. in prep.

11.3 Scope

The goals below refer to the following Action Plan Scope. In situ: Historic and current Cape Parrot range and future potential habitat, with a focus on the three sub-population areas (southern, central and northern). Ex situ: The global captive population.

11.4 Timescale

Unless otherwise stated, the goals below are for a timescale of ten years, i.e. 2020 - 2030.

11.5 Key terms

Key terms

Cape Parrot Action Plan Coordinating Committee (CPAPCC): A formally delegated group that will form in 2020 to coordinate activities stemming from this Action Plan. A coordinator will be appointed and tasked with seeking collaboration to tackle specific strategic activities. The committee will be defined by a Terms of Reference (Appendix III).

Indicator: A measurable entity related to specific information needed such as the status of a target, change in a threat, or progress towards achieving a goal. A good indicator meets the criteria of being measurable, precise, consistent and sensitive.

Monitoring method: A specific technique used to collect data to measure an indicator. A good method should meet the criteria of accurate, reliable, cost-effective, feasible and appropriate.

Monitoring plan: To evaluate the assumptions in the plan for this strategy and to track progress towards achieving the goals.

Strategy: A set of actions with a common focus that work together to achieve specific goals and objectives by targeting key intervention points, integrating opportunities and limiting constraints. A good strategy is linked, focussed, feasible and appropriate.

Target: An element of biodiversity at a project site, which can be a species, habitat, or ecological system that a project has chosen to focus on.

11.6 PVA report

In prep by H. Davies-Mostert. Will be distributed separately.

11.7 Coordination

The implementation of all strategies from this action plan document will be coordinated and monitored through a Cape Parrot Action Plan Coordinating Committee (CPAPCC), headed by a chair, and following a terms of reference (ToR, Appendix III).

Activities	Responsible organisations	Timeline	Funding administration	Output
1 Establish and manage a coordinating committee to oversee the implementation of the Cape Parrot and Mistbelt Forest Action Plan.	CPP; CPWG; WPT; BirdLife SA; EWT	July 2020 - ongoing	Wild Bird Trust	Formally Constituted Group with letters of appointments for all members. A coordinator appointed who will seek collaborations to tackle specific strategies.
1a Develop a Terms of Reference (TOR) for the co-ordinating committee	World Parrot Trust; Bird Life SA; CPP	March 2020	Wild Bird Trust	Accepted and signed Terms of Reference.
1b First meeting of Group in which a chair will be elected	CPP; CPAPCC coordinator	July 2020	Wild Bird Trust	Minutes of First meeting.

11.8 Strategy: Species and Research

Team members: Cassie Carstens (CPP, cassie@wildbirdtrust.com); Kate Carstens (CPP, kate@wildbirdtrust.com); Colleen Downs (UKZN CPWG, downs@ukzn.ac.za); Hanneline Smit-Robinson (BirdLife South Africa, hanneline.smit-robinson@birdlife.org.za), Elizabeth Watkins (lizwat@vodamail.co.za); Phil Whittington (East London Museum, philw@elmuseum.za.org); Inga Hetzeroth (UCT, inga.hitzeroth@uct.ac.za), Caroline Estafthion (Avian Preservation and Education Conservancy, cefstathion@ufl.edu).

Prioritised strategies for discussion in this working group:

1. Filling in key knowledge gaps
2. Vaccine development
3. Borer detection
4. Captive population management
5. Reassess legal logging quotas
6. Identify and evaluate emerging threats

11.8.1 Filling in key knowledge gaps

Threats addressed by this strategy:

Lack of knowledge about some aspects of the species biology and ecology, as well as habitat, resulting in poorly-informed conservation management decisions.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

An increase in scientific output will translate into informed conservation actions that directly benefit the Cape Parrot population

Activities	Responsible organisations	Timeline	Output
SPECIES			
1. Continued work on differentiation between three sub-populations, including genetics,	CPP; Otterbein; UKZN incl. CPWG.	Ongoing. Genetics to be assessed every 10 years	Peer reviewed journal publications. Otterbein & CPP: One honours dissertation on colour variation

vocalisations, colour variation, diet, habitat use, breeding biology.		for monitoring plan for strategy 11.9.3.	completed (Connon 2019). Data on vocalisations collected and analysed, and includes two closest relatives to <i>P. robustus</i> ; paper in prep.
2. Increase knowledge on diet and prevalence of exotic plant species in diet	CPP; UKZN incl. CPWG	Ongoing	Peer reviewed journal publications.
3. Increase knowledge on breeding biology.			
a) Determine the link between environmental variables (rainfall, tree phenology) and Cape Parrot breeding.	Currently: CPP; Potentially: Amorentia; David Letsoalo; UKZN incl. CPWG; Derek Engelbrecht at Uni. Limpopo.	Ongoing.	Peer reviewed journal publications; Reports to stakeholders.
b) Collect baseline data (e.g. nest characteristics, productivity, recruitment, brood sex ratios, and juvenile survival) from all parts of its range.	Currently: CPP; UKZN incl. CPWG. Potentially: Amorentia; David Letsoalo; Derek Engelbrecht at Uni. Limpopo.	Ongoing.	Peer reviewed journal publications; Reports to stakeholders.
c) Gathering and collating baseline data from captive breeders -timing of breeding; number of eggs laid; brood sex ratio; breeding success; number of chicks hatched; standard physical measurements from chicks.	CPAPCC coordinator working with input from UKZN incl. CPWG; studbook keeper; aviculturists.	End 2021.	Report.
d) Develop Standardised Protocol for data collection from natural nests.	CPP; UKZN incl. CPWG.	End-2020.	Protocol
e) Map location of natural nests (confidentially) and identify forest patches used for nesting.	CPP; UKZN incl. CPWG, David Letsoala.	Ongoing.	Confidential report and long-term database.

f)	Design and test a new artificial nest box prototype.	CPP; APEC.	End 2020.	Nest prototype. Publication linked to breeding study.
g)	Erect nest boxes in areas with low natural nest site availability.	CPP - in Amatholes.	End 2021 - first 30.	Installed boxes. Publication linked to breeding study.
4.	Increase knowledge on population size, distribution, and movement:			
a)	Map population size and distribution, including covering areas missed by SABAP2.	CPBBD coordinator working with input from SABAP, BLSA, CPP, Birding Groups.	2020 and ongoing: CPBBD increase coverage	Annual report; summary publication every 10 years.
b)	Use radio telemetry to track parrot movements on a fine scale (Improve on existing harness and transmitter design).	CPP; UKZN incl. CPWG; WPT; Caroline Estafthion (Kate to ask Puerto Rico and Leah's).	End 2021.	Suitable harness and transmitter and preliminary data on movement collected.
c)	Assess seasonal/yearly use of forest habitat by Cape Parrots.	CPP; UKZN incl. CPWG; David/Limpopo (possibly Dereck Engelbrecht?), Birdlife.	Ongoing.	Peer reviewed publication. Updated map of forest patches used for nesting. CPP – study in the Amatholes underway using Passive Acoustic Monitors.
d)	Determine barriers of dispersal between three sub-populations e.g. “pinch-points”.	UKZN incl. CPWG.	End 2020.	Draft publication ready to be submitted.
5.	Determine level of potential competition between Cape Parrots and Rose-ringed Parakeets <i>Psittacula krameri</i> (nest sites, food resources, disease spread). Understand similarity of nest characteristics to Cape Parrot nests.	UKZN incl. CPWG; Craig Wittington-Jones.	Ongoing.	Competition risk assessment report. Note: Preliminary data available. Funding applied by UKZN through Belgium. UKZN PHD student currently busy with parakeets. There is a book chapter “Introduced and Naturalized Parrots of South Africa: Colonization and the Wildlife Trade” covering some

			of this in a book due to be published in 2020 "Naturalised parrots of the World"(Ed. Stephen Pruett-Jones)
6. Understand impact of Psittacine Beak and Feather Disease (PBFDV) on populations and provide protocol for controlling the spread.			
a) Systematic monitoring throughout ranges to track infection rates and prevalence using flock photographs and/or capture where possible. With emphasis on exploring the prevalence in new areas e.g. Limpopo.	CPP; UKZN incl. CPWG (Sandi Willows-Munro); David Letsoalo; WPT	Ongoing. Report due by end 2025.	Report based on 5-year data.
b) Investigate whether low food availability increases susceptibility to the virus and mortality rates	CPP	End 2021	Report.
c) Dead birds checked for disease in lab.	UCT (Inga Hetzeroth); diagnostic laboratories	Ongoing	
d) Standardised protocol for dealing with PBF positive birds as well as the collection and storage of - and sampling from - dead specimens.	CPAPCC coordinator working with input from CPP, UKZN incl. CPWG, aviculturalists, veterinary specialists.	End 2021	National Protocol for PBF control in RSA.
7. Foster collaboration and relationships between in situ researchers and ex situ breeders to fill Cape Parrot knowledge gaps for both wild and captive birds.	CPAPCC coordinator linking researchers with aviculturists.	As and when.	Knowledge gaps (e.g. in breeding biology, life histories) filled using ex situ populations.
8. Create a decision tree and protocol for wild bird rehabilitation in the event of injury or illness.	CPAPCC coordinator working with input from studbook keeper, CPP and CPWG.	End 2020	Decision tree finalised and agreed by CPAPCC.
HABITAT – ALL REGIONS			

<p>9. Understand the link between human's use of the forest habitat and consequences to the forest ecosystem (who, what, where, when, why).</p> <p>a) KZN</p> <p>b) EC</p> <p>c) Limpopo</p>	<p>UKZN</p> <p>Mike Cherry (Stellenbosch University); Charlie Shackleton – Rhodes University: 1 MSc student and 1 PhD student in progress; DEFF</p> <p>CPAPCC coordinator to approach collaborators for this region.</p>	<p>2022</p> <p>Ongoing</p> <p>2021</p>	<p>Peer reviewed journal publications; Published theses; Reports to stakeholders</p> <p>(a) Currently 3 PhDs in progress</p> <p>(b) PhD student with 3 papers published and 2 in prep., 1 MSc in progress. Published thesis, Peer reviewed journal publications; Reports to stakeholders</p> <p>(c) Willing collaborators identified and projects established</p>
<p>10. Understand and identify all aspects within the forest-grassland mosaic near critical Cape Parrot forest sites that impact water supply to forests, and create a strategy to address threats to water supply to forests where present.</p>	<p>DEFF; Working for Water.</p>	<p>End 2020 .</p>	<p>Summary report with findings and mitigation strategies.</p> <p>DEFF in Amathole mountains working with private landowners to address wetland mismanagement above forest habitat.</p>
<p>11. Investigate the scale and drivers of illegal hunting within the forest-grassland mosaic and the causal effects on forest ecosystem functioning.</p>	<p>DEFF; SAPS; Green Scorpions; Rhodes Uni PhD student tackling this.</p> <p>Possibly include: social science collaborators.</p>	<p>End 2020.</p>	<p>Report with mitigation measures that are implementable by relevant governmental departments, law enforcement and other agencies.</p>
<p>ADMINISTRATIVE</p>			
<p>1. Assess funding options that are available to the different research fields e.g. species specific, habitat specific, disease (below).</p>	<p>CPAPCC coordinator.</p>	<p>Mid 2021.</p>	<p>In-house database of funding sources per field of study.</p>

2. Explore the establishment of a research station and small team in each of the 3 regions to allow continual study of population size, breeding activity, fruiting phenologies, PBFD monitoring etc., possibly based at Coleford in KZN and Amorentia in Limpopo.	CPAPCC coordinator with input from CPP; CPWG; KZN-Wildlife; Amorentia; Ian Rushworth; Wynand Espach.	End 2021.	Feasibility and budget report.
--	--	-----------	--------------------------------

Monitoring plan:

Indicator	Method	Who	When
Number of Research outputs that have been used to inform conservation and policy.	How many papers have informed conservation action and policy.	CPAPCC coordinator	Report back to CPAPCC.
Number of threats have been identified and threat mitigation strategies have been implemented.	Proportion of forests with mitigation measures in place.	DEFF; SAPS.	Report back to CPAPCC when appropriate.

11.8.2 Vaccine development for Psittacine Beak and Feather Disease

Threats addressed by this strategy:

Presence and spread of Pbfd in wild and captive populations

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Developing the vaccine for Pbfd will result in increased juvenile survival (shown by the PVA to be able to dramatically alter long-term sustainability of population), increased resistance to nutritional stress during periods of low fruit availability, and immune stress due to virus outbreaks.
- b) Decrease risk of disease spread from escaped captive birds to wild populations. Eradication of Pbfd through vaccinations.

Activities	Responsible organisations	Timeline	Output
1. Assess feasibility of development of vaccine in South Africa. <u>If deemed feasible</u> , then proceed with activities 2 onwards.	UCT – Inga	Feb 2020	Feasibility report
2. Attract funding for research.	UCT – Inga; WBT	Ongoing	Funding acquired
3. Develop vaccine	UCT – Inga	End 2020	Vaccine
4. Determine dose and vaccination frequency.	UCT – Inga	End 2021	Vaccine use protocol
5. Challenge trial vaccine on model bird species (e.g. Budgerigar <i>Melopsittacus undulatus</i>).	UCT – Inga	End 2021	Trail completed
6. Vaccination programme for captive birds.	UCT – Inga	2022	Vaccinated captive birds
7. Research into methodology (dosage, techniques) for vaccinating wild birds. If deemed feasible then continue to step 8.	UCT – Inga; CPP	2023	Feasibility report, and methodology.
8. Implement vaccine programme for wild birds.	CPAPCC	2024	First wild Cape Parrots vaccinated

Monitoring plan:

Indicator	Method	Who	When
Number of disease cases / occurrences	Disease screening of captive and wild birds	CPAPCC	Every 5 years

11.8.3 Exotic Polyphagous Shot Hole Borer (PSHB) *Euwallacea fornicatus* detection

Threats addressed by this strategy:

Possible spread of shot hole borer into critical Cape Parrot habitat, resulting in further habitat degradation from borer beetle.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Borer beetle not yet present in Cape Parrot habitat
- b) Borer beetle might reach and negatively impact Cape Parrot habitat.
- c) Borer threat can be halted if early detection leads to quick response of accepted solution.

Activities	Responsible organisations	Timeline	Output
1. Investigate early warning systems that can be placed around critical Cape Parrot habitat.	CPAPCC coordinator with input from: CPP, KZN Wildlife, ARC, FABI, SANBI, CIB.	End 2020	Early warning system available and deployable. Database established to record cases where borers are present or absent.
2. Create PSHB protocol in case of occurrence.	CPAPCC coordinator with input from CPAPCC, FABI, CIB, SANBI.	End 2020	Protocol report.
3. Establish partnerships with other stakeholders to detect and then eradicate PSHB if detected, e.g. FABI and SANBI, CIB.	CPAPCC coordinator.	End 2020	Partnerships establishment .

Monitoring plan:

Indicator	Method	Who	When
Number of cases of PSHB detected and addressed.	Based on early warning system developed and protocol developed. If borer is detected – have appropriate bodies been informed? If borer is not detected – keep monitoring.	CPAPCC coordinator working with field researchers.	Annually (or as and when data becomes available).

11.8.4 Captive population management

Threats addressed by this strategy:

- Reduction of the wild population due to individuals being captured for the pet trade.
- Lack of insurance population for reintroduction/reinforcement of wild population.
- Lack of enforcement to have captive breeders reporting information to stud book, resulting in lack of trade information and the possibility for poorly managed captive population with possible inbreeding.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- There still is trade in wild caught adults or nestlings on a scale that is negatively impacting wild populations.
- The increased availability of legally produced captive-bred parrots will offset, rather than stimulate, demand for wild-sourced Cape Parrots.
- That permit conditions of national and provincial bodies can be updated to include additional requirements.
- That the current genetic management of the captive population risks the loss of important genes in the population.

Activities	Responsible organisations	Timeline	Output
1. Update ¹ mandatory permit conditions to include: participation of the studbook, adherence to National Development findings, prohibit hybridization, report medical findings to studbook keeper. Set in legislation to be applicable.	CPAPCC coordinator working with provincial permitting authorities and studbook keeper.	Within 3 years	Updated permitting system set in legislation and enforceable by law. There are permit systems already in place in RSA for other species. Need to investigate and adjust for Cape Parrots.
2. Develop standardised protocol for disease screening and health monitoring of captive population.	Studbook keeper working with aviculturists.	Annually.	Feedback to studbook keeper.
3. Development of a genetic database to reduce inbreeding and risk of hybridization among the captive population.	Studbook keeper and UKZN incl. CPWG, in collaboration with experts in genetic database development.	Database outline created by end 2020 and updated continuously.	Database created that houses links to genetic information. Feedback annually at CPAPCC meetings. Database housed with studbook keeper.
4. Captive population managed with consideration of genetics.	Studbook keeper.	Ongoing.	Guidelines in place and approached under permit conditions if necessary.

¹Use USFWS Captive-Bred Wildlife Registration Permit (<https://www.fws.gov/forms/3-200-41.pdf>) as possible thorough example. Note: Permit system is according to NDF. Seek possible change of CITES classification. Stricter condition needs to be set for permits to keep.

Monitoring plan:

Indicator	Method	Who	When
Health of captive population both in terms of diseases and genetic variability, and completeness of studbook in representing all Cape Parrots in captivity.	Studbook report	Studbook keeper	Annually

11.8.5 Reassess legal logging quotas for the Amathole region

Threats addressed by this strategy:

- a) Lack of nesting sites and feeding resources
- b) Habitat degradation

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) The reassessment will call for a drastic reduction in the amount that can be legally harvested, resulting in a reduction in habitat degradation.
- b) That recommended quota will be implemented and accepted into forestry policy.

Activities	Responsible organisations	Timeline	Output
1. Where legal logging occurs, complete a forest survey to determine the current availability of medium-large forest hardwoods notably Yellowwood spp. Use same criteria as per last harvest quota report to determine new quota.	CPP; Univ. of Stellenbosch.	Mid-2020	Report or research publication with recommendations submitted to DEFF.
2. Follow processes to have guidelines implemented and accepted by government.	CPAPCC coordinator working with CPP and DEFF.	Late 2020	Actionable report accepted by government.

Monitoring plan:

Indicator	Method	Who	When
The number of harvested hardwoods.	Annual report by DEFF.	DEFF and CPP	Annually.
Number of nesting sites.	Nest site surveys.	CPP	Annually ongoing.

11.8.6 Assess risk posed by other emerging threats

Threats addressed by this strategy:

Any new and emerging threats not yet quantified or known.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

That planning will result in action and mitigation of said threat before it has any negative, detrimental effect on the Cape Parrot population.

Activities	Responsible organisations	Timeline	Output
Create an emergency threat group to evaluate and assess threat, and to rally the help and support of those best placed to provide knowledge and input. Possible emerging threats include (a) Borna Virus, (b) Parakeets and Pied crows as nesting and feeding site competitors, respectively.	CPAPCC committee.	Mid 2020	Emerging threat group established with emergency protocol describing the first steps that need to be taken if a new threat emerges: first point of contact, engaging with experts, deliberate within CPAPCC, decide on way forward.

Monitoring plan:

Indicator	Method	Who	When
Emerging threat identified and actions taken to begin planning .	Annual Working Group Meeting	CPAPCC committee.	Ongoing

11.9 Strategy: Habitat and landscape

Team members: Rick Hannan (ricky.hannan@dedea.gov.za), Melissa Howes-Whitecross (Melissa.whitecross@birdlife.org.za), Mr Vuyisa Joyi (VuyisaJ@daff.gov.za), Jessica Leaver (jes.leaver@gmail.com), Nikki Steyn (nikki@wildbirdtrust.com), Yvette Ehlers Smith (EhlersSmithY@ukzn.ac.za), Rob Horsburgh (rhorsburgh@gmail.com).

Prioritised list of strategies included for discussion in this working group:

1. Understand historic, present and future suitable habitats for Cape Parrot: operationalise remote sensing to detect change in habitat; map historical Mistbelt and Afrotropical forest niches to guide rehabilitation locations, facilitate corridor connectivity implementation; collate information on land use to map potential conflict linked to climate change.
2. Prioritisation and risk assessment of Cape Parrot forest patches for protection as well as rehabilitation / corridor.
3. Protect, rehabilitate and restore priority forest sites, forest clusters, zone of influence.

Habitat and landscape protection strategies and activities addressed elsewhere:

1. Researching threats to the forest-grassland mosaic water supply: strategy 11.8.1 activity 10.
2. Investigating the scale and drivers of illegal hunting within the forest-grassland mosaic and the causal effects on forest ecosystem functioning: strategy 11.8.1 activity 11.
3. Reassessing legal logging quotas for the Amathole region: strategy 11.8.5.
4. Capacitate landowners and communities to manage natural forests in a manner compatible with Cape Parrot conservation, using Biodiversity Stewardship¹ as a key mechanism: strategy 11.10.1.
5. Leverage carbon offsetting schemes (including REDD+) to secure funding and other support for protection/restoration of key forest areas: strategy 11.10.3.
6. Education/sensitisation: work with communities using key forest patches to realise behavioural change that stops activities leading to the loss and degradation of forests by building awareness, pride and livelihood focused interventions: strategy 11.10.4.
7. Stakeholder and community engagement: work with stakeholders and communities using key forest patches to realise behavioural change that stops activities leading to the loss and degradation of forests by building awareness, pride and livelihood focused interventions: strategy 11.10.5.

11.9.1 Understanding historic, present and future suitable habitats for Cape Parrots

Threats addressed by this strategy:

Lack of complete and up-to-date distribution and niche habitat maps to advise the process of prioritising forests for protection and restoration.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Knowledge holders want to grant researchers access to information / databases or information is freely available.
- b) Willing participants, site permissions and accessibility and safety.
- c) Students available to do research.

Activities	Responsible organisations	Timeline	Output
1. Identify key contacts and sources of information: DEFF, Green Scorpions, SAPS, LEDET, ECPTA, EKZNW, SANBI, EWT, SABAP/FitzPatrick Institute, SAFRING, Bird Clubs, Museums, Bird guides, Conservation South Africa, Wildlands, researchers and students, ecologists, other NGOs. E.g.: Div De Villiers (div.devilliers@dedia.gov.za), Isaac van de Merwe (izakvdm@daff.gov.za), Mkoseleli Jakavula (MkoseleliJ@daff.gov.za), Derek Berliner (fishpa@mweb.co.za), Coert Geldenhuys (cgelden@mweb.co.za).	CPAPCC coordinator.	May 2020.	List of institutions and contact persons. Relevant researchers, Government personnel.
2. Sightings database: collate relevant sightings data, compile information database and put in place a central digital repository for all sightings data for Cape Parrots and forests.	CPAPCC coordinator or CPWG – intern	May 2020	Database of relevant sightings data.
3. Desk study, collation of data, GIS exercise. Evaluate maps for potential info gaps: 2014 Geoterra Image data layer and SANBI vegmap, remote sensing of habitat change. Past, Present and Future. Map forest patches currently within the formally Protected Area Network (GAP analysis).	UKZN	Sep 2020	GIS Datalayers, GAP analysis outputs and PhD chapter. Currently underway through a forest research PhD student at UKZN.
4. Niche map, corridor map, current distribution map, extent of occurrence.	UKZN	Completed. To be repeated every 5 years (for	Peer reviewed manuscript and GIS data layers for land planners and managers.

		monitoring plan for strategy 11.9.3)	
5. Mapping zone of influence (GIS data layers) outside of parrot niche – human population density, land-use types.	UKZN incl. CPWG.	Dec 2020	GIS map of zone of influence highlighting hotspot areas of potential human-wildlife conflict areas (crop types) and highlight potentially compromised forest patches.
6. With citizen scientists, ground-truthing potential suitable forest sites for Cape Parrots that have not been atlased as part of SABAP2, with sites based on current distribution and niche maps (activity 4 above).	UKZN incl. CPWG; CPP; SABAP; DEFF; CPAPCC (for coordination).	May 2020 – Jan 2021 (to coincide with CPBBD, and allow for follow-up observations)	Populating current extent of occurrence maps – updated data layer.

Monitoring Plan:

Indicator	Method	Who	When
Completeness of information and maps ready for strategy 11.9.2.	Collation of reports and manuscripts.	UKZN incl. CPWG	Mid-2021

11.9.2 Prioritisation and risk assessment of Cape Parrot forest patches for future rehabilitation / corridor protection

Threats addressed by this strategy:

Lack of understanding of the current conditions of priority forest sites.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Prioritising forest patches will guide successful upscaling of the level protection of priority sites.
- b) Assessing forest patches will ultimately lead to the implementation of forest restoration activities.

Notes:

We acknowledge that all forest patches are important but that we will need to prioritise sites that are feasible for the long-term protection of the Cape Parrot and its forest habitat

Activities	Responsible organisations	Timeline	Output
<p>1. Identify priority forest sites for Cape Parrots (desktop):</p> <p>(a) Select criteria for identifying priority forest sites for Cape Parrots. Data to be drawn from Strategy 11.9.1.</p> <p>(b) Using criteria above, identify priority forest sites</p>	<p>UKZN incl. CPWG; DEFF.</p> <p>UKZN incl. CPWG; DEFF.</p>	<p>Mar 2021 - 3 months after completion of strategy 11.9.1.</p> <p>Jun 2021</p>	<p>List of criteria and a prioritisation matrix (decision flow charts).</p> <p>List of priority forest sites based on developed criteria.</p>
<p>2. Determine quality of priority forest patches (desktop and field):</p> <p>(a) Develop forest quality index: what is a healthy vs. degraded vs severely compromised forest.</p> <p>(b) Survey and classify identified priority sites based on developed forest quality index under point 2</p>	<p>UKZN incl. CPWG (forest research students?) + forest ecologist expert panel? (CJ Geldenhuys; D. Berliner; DEFF regional managers).</p> <p>Task team under CPAPCC; UKZN incl. CPWG for KZN (forest research students?); DEFF; Jolene Fisher</p>	<p>Mar 2021 - 3 months after completion of strategy 11.9.1.</p> <p>Apr 2021 - Sep 2021. Thereafter every 5 years for</p>	<p>Methodology to assess and define forest quality based on Cape Parrot ecology e.g. snag availability, food availability, nature and extent of human disturbances at forest-scale and connectivity.</p> <p>Report indicating habitat quality classification of all priority forest sites based on forest quality index. Forest</p>

above to assess general forest health across range	(through EKZNW Ian Rushworth) also mentioned/taken further with habitat group. UKZN Enviro Science (Prof. Onesimo Mutanga). CPP and collaborators for EC; Limpopo partners (Amorentia, Kurisa Moya/David Letsoalo, Craig Symes)	monitoring plan for strategy 11.9.3	habitat quality classification and data from each site added to maps and databases developed in Strategy 11.9.1 (activities 2 and 3).
3. Develop a rehabilitation strategy for priority forest sites identified in activity 2 as being degraded or severely compromised forest (what restoration techniques are we using, where and why?). This will guide strategy 11.9.3's implementation work. [Linked to table below]	CPAPCC coordinator with input from: UKZN incl. CPWG with input from UKZN researchers/students, CPP, DEFF, Greenpop, Wildlands, Coert Geldenhys, Conservation Outcomes.	Mar 2022 - within six months of completion of survey in activity 2 above.	Forest habitat restoration strategy document including maps* and information relevant to forest restoration in South Africa (strategies to implement using decision flow charts). Without reinventing the wheel. Using existing knowledge. *A map with identified areas to guide rehabilitation/restoration/regeneration efforts linked to 11.9.1.

Strategy 11.9.2, activity 3 nested table. Forest site categories based on forest quality index (see activity 2 above), with desired actions per category.

Healthy forest	Degraded forest	Severely compromised forest
Identify future threats (horizon scanning)	Evaluate extent of degradation	Where is it? Locality info: private, communal, forestry
Monitor for changes: on the ground, remote sensing	Identify drivers of degradation	Can it be restored in the long term?
Annual parrot counts if possible	Access issues – land tenure and ownership issues	If yes - refer to strategy 11.9.3
	Implementation of mitigation measures (all forms of restoration, community involvement, implementing legislation)	If no - do not invest any resources into the area
	Annual parrot counts if possible	Annual parrot counts if possible
	Monitor change	

Monitoring plan:

Indicator	Method	Who	When
Percentage of forest patches identified as priority sites ready for (a) approach to upscale level of protection and (b) implementation of restoration activities (strategy 11.9.3)	Rehabilitation strategy document	UKZN incl. CPWG and CPAPCC coordinator	Mar 2022

11.9.3 Protect, rehabilitate, regenerate and restore priority forest sites – sites, forest clusters, zone of influence

Threats addressed by this strategy:

- a) Habitat loss and degradation
- b) Climate change

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Upscaling the level of protection halts forest degradation
- b) Forests will regenerate if the correct rehabilitation/regeneration protocols are developed and followed.
- c) Communities adjacent to rehabilitation sites will work with the team to ensure the success of the project.

Activities	Responsible organisations	Timeline	Output
1. Upscale the level of protection of critical Cape Parrot forest sites, using all available and/or new channels, including but not limited to the designation of new KBAs, IBAs, Biosphere Reserves ¹ , Biodiversity Stewardship initiatives (see 11.10.5).	Coordination through the CPAPCC. ECPTA; DEFF; DEDEAT; EKZN Wildlife; LEDET; Bird Life SA; Conservation Outcomes; local tourism associations, local communities.	2020-2025.	Annual DEFF report.
2. Implement and monitor best ecological practices protocol ² for forest rehabilitation in priority Cape Parrot sites.	DEFF; CPP; Greenpop; Wildlands; WESSA; others working in the field of forest habitat restoration.	To begin in Apr 2022 - ongoing (after completion of strategy document in 11.9.2 activity 3).	(a) Development of a 'Site 0': a test site for comparison and evaluation. (b) Forest rehabilitation reports per site updated annually.

¹Amathole District Municipality working toward creating a Amathole Biosphere Reserve, with predicted completion time in 2021.

²Acknowledging site-specific needs including but not limited to: community engagement, site preparation, development of nurseries, bio-screening plants before planting, planting (where needed), facilitating natural regeneration, alien vegetation management, fire suppression and creation of fire belts.

Monitoring plan:

Indicator	Method	Who	When
Percentage of formally protected, priority Cape Parrot habitat	DEFF annual report	DEFF	Annually
Rate of habitat degradation in priority Cape Parrot habitat	Habitat Quality Index	CPP; UKZN incl. CPWG; Limpopo partners, DEFF; Wildlands	Mid 2022-onwards, every 5 years.
Area of Cape Parrot niche habitat	GIS mapping	UKZN incl. CPWG	Every 5 years.
Connectedness of Cape Parrot sub-populations	Genetic analysis	UKZN incl. CPWG	Every 10 years at least.

11.10 Strategy: Community engagement

Team members: Samke Ngcobo (sam.p.ngcobo@gmail.com); Thobeka Gumede (thobekagumede123@gmail.com); Peter Mather-Pike (peter@calith.co.za); Dean Ricketts (dean.ricketts@deaet.ecape.gov.za); Rowan Martin (rmartin@parrots.org); Wynand Espach (wynand@agricolleges.com); David Letsoalo (info@krm.co.za); Chris Everton (chrise@rancetimber.co.za); Malcolm Gemmel (info@buttonbirding.com).

Prioritised list of strategies included for discussion in this working group:

1. Capacitate landowners and communities to manage natural forests correctly/sustainably using Biodiversity Stewardship as a key mechanism (brought across from law enforcement and policies group)
2. Safeguard Cape Parrots from poaching and persecution at feeding sites in commercial plantations (particularly the pecan orchard in Alice and surrounding farms)
3. Leverage carbon offsetting schemes (including REDD+) to secure funding and other support for protection/restoration of key forest areas
4. Work with communities and stakeholders using key forest patches to realise behavioural change that stops activities leading to the loss and degradation of forests by building awareness, pride and livelihood-focused interventions

11.10.1 Capacitate landowners and communities to manage natural forests in a manner compatible with Cape Parrot conservation, using Biodiversity Stewardship¹ as a key mechanism

¹*Biodiversity stewardship is an approach to entering into agreements with private and communal landowners to protect and manage land in biodiversity priority areas, led by conservation authorities in South Africa. It recognises **landowners as the custodians of biodiversity** on their land. Biodiversity stewardship is based on voluntary commitments from landowners, with a range of different types of Biodiversity Stewardship Agreements available to support conservation and sustainable resource use. Some types of Biodiversity Stewardship Agreements are formally declared as protected areas in terms of the Protected Areas Act, providing long-term security for the sites involved. For more information see here: <https://www.sanbi.org/wp-content/uploads/2019/11/Biodiversity-Stewardship-Factsheet.pdf>*

Threats addressed by this strategy:

Habitat loss/degradation

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) The management of indigenous Forests will benefit Cape Parrots
- b) There is sufficient knowledge available to generate guidelines for the management of forests for Cape Parrots.
- c) Landowners/communities are willing to implement the necessary guidelines and that implementation would not disrupt livelihoods.
- d) Research will validate the guidelines.

Activities	Responsible organisations	Timeline	Output
1a. Synthesize available knowledge on Indigenous Forest Management guidelines (to conserve Cape Parrots).	DEFF; CPAPCC coordinator; Conservation Outcomes.	Jul 2020	Literature reviews presented at Co-ordinating body meeting.
1b. Develop guidelines on Indigenous Forest Management for Cape Parrots.	DEFF; CPAPCC coordinator; Conservation Outcomes.	Dec 2020	Guidelines Document endorsed by Co-ordinating body, Powerpoint presentation.
2. Develop a database of all known stakeholders who manage indigenous forest patches within which Cape Parrots have occurred or do occur.	DEFF; CPAPCC coordinator; Conservation Outcomes.	Dec 2020	Access database.
3. Disseminate guidelines on indigenous forest management to all landowners in the database (all facets of media).	DEFF; CPAPCC coordinator; Conservation Outcomes.	Feb 2021	Social media posts, Email, Google search results, Minutes of workshops.
4. Use the database to prioritise landowners to approach for possible inclusion within the Stewardship programme.	DEFF; CPAPCC coordinator; Conservation Outcomes.	Jul 2021	Stewardship Working Group meeting minutes.
5. Undertake research projects to evaluate implementation of the guidelines	UKZN incl. CPWG .	Dec 2022	Research Output – Theses, Powerpoint presentation/s.

Monitoring plan:

Indicator	Method	Who	When
Rate of habitat degradation	Habitat Quality Index	CPP; UKZN incl. CPWG; Limpopo partners, DEFF; Wildlands	2022-onwards, every 2-3 years

11.10.2 Safeguard Cape Parrots from poaching and persecution at feeding sites in commercial plantations (with focus on Alice and surrounding farms)

Threats addressed by this strategy:

- a) Illegal capture
- b) Possible on-going persecution as crop pest

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Funding is available,
- b) Buy-in of relevant plantation owners,
- c) Guards are an effective deterrent,
- d) Support from law enforcement agencies,
- e) Support from community

Activities	Responsible organisations	Timeline	Output
1. Consultation with Law enforcement (SAPS- cluster commander), DEDEAT, local community leaders. In EC: University of Fort Hare.	EC-CPP	Mar 2020	Employment contracts agreed upon.
2. Employ guards. In EC- through University of Fort Hare (max. 6-month contract).	EC-CPP	Mar 2020	Guards employed. No poaching of Cape Parrots.
3. Investigate legislative or policy with SAPS cluster commander/DEDEAT, which can investigate and prosecute crime (poaching protected species, etc.).	Currently: CPP in EC, Needed: CPWG in KZN, LEDET in Limpopo?	Nov 2020	Persecution of poachers.
4. Safeguarding Cape Parrots in farmlands by engaging with farmer's associations to reduce conflict caused by crop raiding by Cape Parrots.	Currently: CPP in EC	Nov 2020	Cape Parrots conserved in farmlands (non-persecution); commitment and participation by farmers.

Monitoring plan:

Indicator	Method	Who	When
Cape Parrot Population size in Amatholes	Monthly CPP counts, CPBBD annual count	CPP; UKZN incl. CPWG	Ongoing

11.10.3 Leverage carbon offsetting schemes (including REDD+) to secure funding and other support for protection/restoration of key forest areas

Threats addressed by this strategy:

Loss of key forest patches through lack of formal protection and financial means

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) The South African government will pursue REDD+¹ as a financing mechanism to protect forests
- b) The current focal areas for the development of REDD+ have the potential to encompass key forest sites.
- c) The government agencies will be interested in incorporating Cape Parrots into the design of REDD+ strategies.
- d) That REDD+ projects can be designed in such a way to incentivise the protection of habitat features key for Cape Parrots.

¹ REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is a mechanism for carbon trading² which the SA government is currently exploring the possibilities of developing REDD+ projects focused on protecting forests in the Eastern Cape and KwaZulu-Natal. It may be possible to ensure key habitat for Cape Parrots is incorporated into these projects. Importantly this mechanism may provide funding for initiatives to protect the forest which could include a diversity of activities which are identified within other strategies elsewhere in the Action plan. In addition to being a potentially important source of funding it could also bring benefits through ensuring commitments at provincial and national level government to protect forests - which might involve designating protected areas and so could assist in meeting the high-level goals of the Action Plan. The scheme is primarily concerned with carbon storage, but also recognises 'co-benefits' to biodiversity. Supported projects must show that protection is additional (i.e. can't be used to fund existing protected areas). REDD+ is just one of several carbon trading schemes that could be explored. A National REDD manager has been appointed and initial reports prepared and submitted to the Global Climate Fund (GCF)

²Reducing emissions from deforestation and forest degradation (REDD+) is a mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC). It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. Developing countries would receive results-based payments for results-based actions. REDD+ goes beyond simply deforestation and forest degradation and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. (source: <https://www.unredd.net/about/what-is-redd-plus.html>)

Activities	Responsible organisations	Timeline	Output
------------	---------------------------	----------	--------

1. Develop a map and/or table describing key forest sites for Cape Parrots including those currently known to be occupied by Cape Parrots and sites considered potentially suitable (see strategy relating to habitat protection). Link to Strategy 11.8.2.	CPP; UKZN incl. CPWG	April 2020	Map/table of key sites for protection.
2. Liaise/meet with relevant government agencies within the Department of Environment, Forestry and Fisheries to explore how the sites identified in (1) can be integrated into existing strategies for the development of REDD+ in the Amathole, Port St Johns and southern KZN forest regions; in particular identifying how actions needed for the conservation of Cape Parrots can be integrated into the design of REDD+ within the framework of biodiversity co-benefits and what safeguards can be put in place to ensure these co-benefits are met.	CPP; UKZN incl. CPWG; WPT	October 2020.	Minutes of meetings. Key sites for Cape Parrots are integrated into REDD+ projects <u>or</u> additional actions needed ensure that this can be achieved.
3. Depending on the output of activity 2 additional activities might be identified to ensure that any potential for integrating key habitat into REDD+ is realised. These might include lobbying department to ensure progress with submitting REDD+ projects to the Green Climate Fund.	TBA.	TBA.	Key sites for Cape Parrots are integrated into REDD+ projects.
4. Explore potential for leveraging funding and protection of Mistbelt forests through other carbon trading schemes including informal or voluntary offsetting with South Africa based companies, and opportunities arising through the carbon tax and treasury/carbon tax rules.	CPAPCC coordinator; WBT; Tony Knowles	Feb 2021.	List of funding possibilities identifies

Monitoring plan:

Indicator	Method	Who	When
Number of forest patches protected through REDD+	Summary report	CPAPCC coordinator; Tony Knowles; EKNZW	Depends on development of REDD+ in SA

11.10.4 Education / sensitisation:

Threats addressed by this strategy:

- a) Unsustainable use of forest products leading to degradation and destruction of Mistbelt forest habitat,
- b) Illegal trapping of parrots for the pet trade

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) The drivers of current patterns of behaviour that lead to illegal trapping/habitat degradation are understood and can be affected through education/sensitisation activities
- b) Unsustainable use of forest products leading to degradation and destruction of mistbelt forest habitat
- c) Illegal trapping of parrots for the pet trade threatens wild populations
- d) Support is received from communities and industry surrounding Cape Parrot habitat
- e) Education activities result in behaviour change

Activities	Responsible organisations	Timeline	Output
1. Explore potential for artificial nest site sponsorship opportunities.	CPP in EC; CPWG in KZN.	July 2021	Establish artificial nest sites with individual sites sponsored by corporates.
2. Capacitate or empower user groups adjacent to Cape Parrot habitat (industry bodies, schools, youth agencies, Department of education, tourism info centres).	CPP in EC; CPWG in KZN; WESSA	Dec 2021	Communities involved in protecting the habitat and food sources of the Cape Parrot and assisting in programmes creating alternative food sources.
3. Community events in relevant communities, i.e. events, etc. (explore/adapt approaches used in 'pride' campaigns developed by RARE for other situations),	CPP in EC; CPWG in KZN.	Dec 2020	Successful events hosted in all Cape Parrot breeding and feeding areas with community participation and corporate involvement.
4. School programs initiated or developed further (books, games, stories, stickers, freebies).	CPP in EC; CPWG in KZN; Limpopo; WESSA	Dec 2020	Develop and distribute books, games and other materials at a minimum of 5 schools in each of the areas where parrots breed and feed.
5. Investigate mechanisms to roll out educational projects 1-4 above across the species' range.	Cape Parrot coordinating body.	Dec 2020	Coordinators in each province identified and established to take education drive forward.

Monitoring plan:

Indicator	Method	Who	When
Perception change of Cape Parrot and mistbelt forests in terms of the need for their protection.	Community interviews; evaluation reports following education initiatives.	Charlie Shackleton; CPP; UKZN incl. CPWG; Double-up with monitoring teams in KZN e.g. following Ground-Hornbills.	Every 5 years.
Behaviour changes of people surrounding priority forest sites	Community interviews; evaluation reports following education initiatives.	Charlie Shackleton; CPP; UKZN incl. CPWG; Double-up with monitoring teams in KZN e.g. following Ground-Hornbills.	Every 5 years.

11.10.5 Forest management and implementation:

Threats addressed by this strategy:

- a) Unsustainable use of forest products leading to degradation and destruction of Mistbelt forest habitat,
- b) Illegal trapping of parrots for the pet trade
- c) Above a, b caused by lack of buy-in or support from key stakeholders: Governmental departments, farmers, traditional leaders or villagers.

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) The drivers of current patterns of behaviour that lead to illegal trapping/habitat degradation are understood and can be affected through the engagement of stakeholders in forest management
- b) Buy-in and support from Governmental departments, local traditional-leaders, farmers and Tourism Units reduce habitat destruction, Cape Parrot capture
- c) Enough capacity and funding for responsible organisation to conduct the work
- d) Opportunities to develop alternative livelihoods lead to a reduction in those livelihood-related activities that cause forest degradation.
- e) If locals receive any form of social services specific to their needs, and reap those benefits, conservation perception by locals might improve.

Activities	Responsible organisations	Timeline	Output
1. Systematic planning to identify relevant governmental departments	Currently: CPP Possibly: Coordinating body.	Ongoing	More buy-in, awareness and support.
2. Participatory management of industry bodies: a) Farmers.		a) Ongoing	a) More farmer involvement and buy-ins.

<p>b) Forestry (DEFF, Private forestry companies).</p> <p>c) Hospitality/Tourism Units (Visitors Information Centres).</p>	<p>a) CPP with Eastern Cape Agriculture Union and Farmer Associations, South African Pecan Nut Grower Association. Needed: UKZN incl. CPWG in KZN. Limpopo?</p> <p>b) CPP with Amathole Forestry Company Areas. Needed: UKZN incl. CPWG in KZN. Limpopo?</p> <p>c) CPP with Amathole Mountain E-scape Tourism/ Association Hogsback for the Amathole Areas. Cata community Tourism project. Coordinating body throughout range.</p>	<p>b) Ongoing.</p> <p>(c) Achieved in Hogsback in 2019. Ongoing</p>	<p>b) More active involvement.</p> <p>c) More awareness and public donations by using the Visitor Information offices.</p>
<p>3. Include local communities in the developmental planning to implement activity 4:</p> <p>a) Tribal Authorities/Traditional Leaders: Engage tribal authorities.</p> <p>b) Forestry Company existing Liaison Structures.</p> <p>c) Identify and engage Local councillors.</p>	<p>Currently: CPP achieving this with Sompondo and Zingcuka communities. Needed: UKZN incl. CPWG in KZN. Limpopo TBA.</p>	<p>a) Ongoing</p> <p>b) Ongoing</p> <p>c) Ongoing</p>	<p>a) Locals participating in the implementation of strategy 4.</p> <p>b) Local Awareness and support of the project.</p> <p>c) Local municipal support and understanding.</p>
<p>4. Foster positive relationships by strengthening traditional activities/livelihoods¹ of local communities and develop emerging economic activities.</p>	<p>Currently: CPP in EC. Needed: KZN and Limpopo ground work. Linking in existing NGOS: Wildlands; WESSA etc.</p>	<p>From May 2020</p>	<p>Earning trust from local communities and participation for Cape Parrot conservation. Understanding local community needs and cultural norms. Securing funding for incentivising local communities.</p>
<p>5. Promote participation in Cape Parrot conservation by provide incentives for locals.</p>	<p>Currently: CPP in EC. Needed: KZN and Limpopo ground work. Linking in existing NGOS: Wildlands; WESSA etc.</p>	<p>Sep 2020</p>	<p>Participation from local communities in Cape Parrot conservation related activities.</p>

6. Approach traditional royal households for verbal support behind Cape Parrot and Mistbelt Forest conservation.	CPAPCC coordinator	Mid 2021	Letter of support from the traditional royal leaders, e.g. Xhosa king, to use in education campaigns, marketing and funding proposals.
--	--------------------	----------	--

¹*Traditional livelihoods- rather than seeking to replace their livelihoods (alternative activities), seek to provide them with resources close to community needs and cultural norms and to use their traditional lands and indigenous knowledge to manage their natural resources. These activities will diversify the resource base for livelihoods and augmented incomes. Example, village store selling household goods and farming supplies (funded by NGO), support gardening activities (market gardening) by providing households with seeds, fertilizer, farming equipment, etc., partnering with NGOs to fund local and emerging businesses (and supporting women in their activities since they are household keepers).*

Monitoring plan:

Indicator	Method	Who	When
METT-SA scores for priority Cape Parrot habitat	METT-SA methodology	Protected Area Management Authorities	Every 2-3 years.

11.11 Strategy: Law enforcement and policy development

Team members: Brent Coverdale Brent.Coverdale@kznwildlife.com, Steve McKean Steve@conservation-outcomes.org; Humbu Mafumo Hmafumo@environment.gov.za; Ian Taylor- iantay@rancetimber.co.za, Luzuko Dali (Luzuko.Dali@dedea.gov.za), Thabo Gwiji (thabo.gwiji@dedea.gov.za), Nombuyiselo Duma duma@wildbirdtrust.com

Prioritised list of strategies included for discussion in this working group:

1. Create an enabling policy environment to guide and support Cape Parrot conservation.
2. Capacitate¹ and empower law enforcement agencies.

¹It is important that entities are the mandated law enforcement agencies and where the gaps are in capacity, consider a MoU to ensure enforcement with the assistance of other entities such as NGO's. Law enforcement is a state role but it is important to think how capacity-building can be provided. Empower versus Capacitate – the words chosen are very important.

11.11.1 Create an enabling policy environment to guide and support Cape Parrot conservation

Threats addressed by this strategy:

Disjunct between provinces and organisations regarding regulation of land management and wildlife trade relevant to Cape Parrot Conservation

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) Recommendations and changes in legislation will be implemented timeously.
- b) Biodiversity Management Plan will be adequately resourced and implemented, thereby ensuring the survival of the Cape Parrot and its habitat.
- c) The Co-ordinating body will monitor and ensure implementation of the BMP and Action Plan which is supported by all state entities.
- d) Conservation interest will hold the same social value as current social ills and unemployment demands.

Activities	Responsible organisations	Timeline	Output
1. Develop a BMP ¹ (IUCN status, value, stewardship, and action plan activities)	CPAPCC Chair.	Jul 2022	Gazetted BMP
2. Review and assess existing legislation and policy governing Cape Parrots and its habitat to: <ul style="list-style-type: none"> a. Assess the effectiveness of legislation and policy in conserving the Cape Parrot and its habitat. b. Assess the impact (negative and positive) of policy and legislation on conserving the Cape Parrot and its habitat. 	CPAPCC coordinator working with DEFF, ECPTA, EKZNW, LPTA and other relevant provincial bodies. Involve Luzuko Dali and Humbu Mafumo.	Dec 2020	Report with recommendations, if needed.
3. Communicate the outcomes of activity 2 to the respective departments/agencies responsible for conserving Cape Parrots and their habitat.	DEFF.	Mar 2021	Communication letter and report

¹ The BMP aims to provide for the long-term survival of a species in the wild and to provide a platform for an implementing organisation or responsible entity as appointed by the Minister to monitor and report on the progress regarding the implementation of the BMP.

Monitoring plan:

Indicator	Method	Who	When
Number of effective policies guiding and supporting Cape Parrot conservation.	Evaluation questionnaire	DEFF	June 2022

11.11.2 Empower/Capacitate/Assist and empower law enforcement agencies

Threats addressed by this strategy:

Habitat degradation and illegal persecution and capture of Cape Parrots due to lack of Law enforcement (Investigations and Prosecutions).

Key assumptions made in deciding that this strategy will have a positive impact on the target goals:

- a) The penalties after prosecutions will serve as a deterrent.
- b) Effective implementation will result in a detection of loopholes in the law (Is it poor enforcement or is it ineffective legislation?).
- c) That there is a real demand for Cape Parrots being removed from the wild.
- d) Corruption is not an option for the enforcement officers.
- e) Funding is available to facilitate law enforcement when and where needed

Activities	Responsible organisations		Timeline	Funding administration	Output
1. Engage all relevant law enforcement agencies (customs vs SAPS vs governmental departments) to understand reasons for lack of law enforcement of threats to Cape Parrots and Mistbelt forests and their ecological integrity: Presence of livestock in forests, illegal hunting, illegal use of wood forest products, illegal capture and persecution of wild Cape Parrots.	Agency: Customs..... SAPS..... PCA..... Forestry..... Private Security..... Local Government.....	Responsible organisation: DEFF Provincial Conservation Agencies (PCA) DEFF DEFF PCA PCA	Dec 2020	Each responsible organisation	Formal report of agencies targeted highlighting reasons for lack of law enforcement.
2. Compile a list of implementable action/s to address the issues highlighted in Activity 1.	CPAPCC Chair		Mar 2021	DEFF	Formal report with a plan of implementation agreed upon by government.

3. Prioritise Cape Parrots and their habitat within the conservation Biodiversity Enforcement Group/Forum and highlight specific law enforcement issues.	CPAPCC	July 2020	DEFF	Presentation power point document, meeting minutes and registers.
4. Develop a Standard Operating Procedure (SOP) for Cape Parrot Investigations – This will include relevant contact details, Evidence collection (live vs dead bird) (type), etc.	EWT	May 2020	EWT	SOP
5a. Ensure that the <u>Cape Parrot</u> and <u>habitat</u> awareness in regards to law is added into the training of the judiciary.	EWT	July 2020	EWT	Amended training content.
5b. Run a training course to include all sectors of the judiciary to include amended training module (Activity 5a).	EWT	July 2020	EWT	Course attendance register.
6. Develop a monitoring framework to assess effectiveness of training modules.	EWT	July 2020	EWT	Monitoring protocol.

Monitoring plan:

Indicator	Method	Who	When
Effectiveness score for law enforcement in habitat protection, and the prevention of the illegal persecution and capture of Cape Parrots.	Monitoring framework.	EWT; provincial and national Conservation Authorities.	Annually.

12 References

- Adie, H., Kotze, J.D, Lawes, M.J.** 2017. Small fire refugia in the grassy matrix and the persistence of Afrotemperate forest in the Drakensberg mountains. *Scientific Reports* **7**(1): 6549.
- Adie, H., Rushworth, I. & Lawes M.J.** 2013. Pervasive, long-lasting impact of historical logging on composition, diversity and above ground carbon stocks in Afrotemperate forest. *Forest Ecology and Management* **310**: 887-895.
- Berens, D.G., Chama, L., Albrecht, J. & Farwig, N.** 2014. High Conservation Value of Forest Fragments for Plant and Frugivore Communities in a Fragmented Forest Landscape in South Africa. *Biotropica* **46**(3): 350-356.
- Berliner, D.** 2005. Systematic conservation planning for the forest biome of South Africa. Department of Water Affairs and Forestry, Pretoria, South Africa.
- BirdLife International.** 2019. Species factsheet: *Poicephalus robustus*. Downloaded from <http://www.birdlife.org> on 16/09/2019.
- Boshoff, A.** 1989. Uncertain future for southern race of Cape Parrot. *AFA Watchbird*. 16: 22–25.
- Boyes, S.** 2010. Disease decimates Cape Parrots. *Africa - Birds and Birding*. 15(4): 14–15.
- Campbell, A.P.M.** 2011. *Why did the Cape Parrot (Poicephalus robustus) go locally extinct in the Knysna/Tsitsikamma forests and is there a case for reintroductions?* Conservation Matters, unpublished report.
- Carstens, J.C.** 2016. Courtship displays and mating behaviour of the Cape Parrot in the Hogsback area, South Africa. *Biodivers. Obs.* **7**: 1–2.
- Carstens, K.F., Carstens, J.C. & Wimberger, K.** 2017. Interactions between birds of prey and the Cape Parrot in the Eastern Cape. *Biodivers. Obs.* **8**: 1–5.
- Cawe, S.G. & McKenzie, B.** 1989. The afromontane forests of Transkei. IV: Aspects of their exploitation potential. *South African J. Bot.* **55**: 45–55.
- Christidis, L., Dickinson, E.C. & Rensen, J.V.** 2018. The Howard and Moore complete checklist of the birds of the world, version 4.1 (downloadable checklist).
- Clancey, P. A.** 1997. The Cape Parrot: an additional valid species. *Honeyguide* **43**: 61-62.
- Clements, J., Schulenberg, T., Iliff, M., Billerman, S., Fredericks, T., Sullivan, B. & Wood, C.** 2019. The eBird/Clements Checklist of Birds of the World: v2019.
- Coetzer, W.G., Downs, C.T., Perrin, M.R. & Willows-Munro, S.** 2015. Molecular systematics of the Cape Parrot (*Poicephalus robustus*): Implications for taxonomy and conservation. *PLoS One* **10**: 1–19.
- Coetzer, W.G., Downs, C.T., Perrin, M.R. & Willows-Munro, S.** 2017. Testing of microsatellite multiplexes for individual identification of Cape Parrots (*Poicephalus robustus*): paternity testing and monitoring trade. *PeerJ* **5**: 21.
- Coetzer, W.G., Downs, C.T., Perrin, M.R. & Willows-Munro, S.** 2019. Influence of historical and contemporary habitat changes on the population genetics of the endemic South African parrot *Poicephalus robustus*. *Bird Conserv. Int.* 1–24.

- Collar, N.J. & Fishpool, L.D.C.** 2017. Is the Cape Parrot a species or subspecies, and does it matter to CITES? *Bull. African Bird Club* **24**: 156–170.
- Connon, E.** 2019. Morphological and color variation in *Poicephalus* parrots. Otterbein University. Honours thesis.
- Cooper, T.J.G., Wannenburg, A.M. & Cherry, M.I.** 2017. Atlas data indicate forest dependent bird species declines in South Africa. *Bird Conserv. Int.* **27**: 337–354.
- del Hoyo, J. & Collar, N.J.** 2014. *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1: Non-Passerines*. Lynx Edicions, Barcelona.
- Department of Agriculture Forestry and Fisheries.** 2011. *State of the forests report 2007-2009*.
- Department of Agriculture Forestry and Fisheries.** 2018. *Annual Report: 2017-2018*.
- Department of Environmental Affairs.** 2004. National Environmental Management: Biodiversity Act (No. 10 of 2004).
- Downs, C.** 2005a. Cape Parrot (*Poicephalus robustus*). In: *Roberts Birds of Southern Africa* (P. Hockey, W. Dean, & P. Ryan, eds). John Voelcker Bird Book Fund, Cape Town.
- Downs, C.** 2005b. Artificial nest boxes and wild Cape Parrots *Poicephalus robustus*: persistence pays off. *Ostrich* **76**: 222–224.
- Downs, C.T.** 2005c. Abundance of the endangered Cape Parrot, *Poicephalus robustus*, in South Africa: implications for its survival. *African Zool.* **40**: 15–24.
- Downs, C.T.** 2015. Cape Parrot *Poicephalus robustus*. In: *The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland* (M. Taylor, F. Peacock, & R. Wanless, eds), pp. 143–145. BirdLife South Africa, Johannesburg.
- Downs, C.T., Ally, E. & Singh, P.** 2019. *22nd Annual Parrot Count - Report on the 2019 Cape Parrot Big Birding Day*.
- Downs, C.T., Brown, M., Hart, L. & Symes, C.T.** 2015. Review of documented beak and feather disease virus cases in wild Cape Parrots in South Africa during the last 20 years. *J. Ornithol.* **156**: 867–875.
- Downs, C.T., Pfeiffer, M. & Hart, L.A.** 2014. Fifteen years of annual Cape Parrot *Poicephalus robustus* censuses: current population trends and conservation contributions. *Ostrich* **85**: 273–280.
- Downs, C.T. & Symes, C.T.** 2004. Snag dynamics and forest structure in Afromontane forests in KwaZulu-Natal, South Africa: implications for the conservation of cavity-nesting avifauna. *South African J. Bot.* **70**: 265–276.
- Eeley, H.A.C., Lawes, M.J. & Piper, S.E.** 1999. The influence of climate change on the distribution of indigenous forest in KwaZulu-Natal, South Africa. *J. Biogeogr.* **26**: 595–617.
- Eeley, H.A.C., Lawes, M.J. & Reyers, B.** 2001. Priority areas for the conservation of subtropical indigenous forest in southern Africa: a case study from KwaZulu-Natal. *Biodivers. Conserv.* **10**: 1221–1246.
- Ehlers Smith, D.A., Ehlers Smith, Y.C. & Downs C.T.** 2019. Promoting functional connectivity of anthropogenically-fragmented forest patches for multiple taxa across a critically endangered biome. *Landscape and Urban Planning* **190**: 103579.

- Explore Trees.** 2019. Projects: Cape Parrots, bees and champion trees. <http://exploretrees.com/new-index-1#cape-parrot-breeding-box-project>. Accessed on 17/09/2019
- Fryer, H.** 2019. *List of trees impacted by Polyphagous Shot Hole Borer (PHSB) in South Africa*. Available from www.treesurvey.co.za
- Gill, F. & Donsker, D.** 2019. IOC World Bird List (v 9.2). doi: 10.14344/IOC.ML.9.2.
- Greenpop Foundation NPC.** 2019. Reforestation. Available from: <https://greenpop.org/reforestation/>
- Grieve, G.R.H. & Downs C.T.** 2015. A checklist of the plants of the forests and grasslands in the Weza district, southern KwaZulu-Natal and a review of their status in the Red Data List. *Koedoe* 57(1):1-7. DOI: <https://doi.org/10.4102/koedoe.v57i1.1237>.
- Hart, L.A., Grieve, G.R.H. & Downs, C.T.** 2013. Fruiting phenology and implications of fruit availability in the fragmented Ngele Forest Complex, KwaZulu-Natal, South Africa. *South African J. Bot.* **88**: 296–305.
- Heath, L., Martin, D.P., Warburton, L., Perrin, M., Horsfield, W., Kingsley, C., Rybicki, E.P. & Williamson, A.-L.** 2004. Evidence of unique genotypes of Beak and Feather Disease Virus in southern Africa. *J. Virol.* **78**: 9277–9284.
- Henderson, C.L. & Downs, C.T.** 2005. Working with factors affecting the natural forest habitat of the Cape Parrot. In: *Natural Forests and Savanna Woodlands Symposium IV*, pp. 133–140.
- Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G.** 2005. *Roberts Birds of Southern Africa*, 7th ed. John Voelcker Bird Book Fund, Cape Town.
- Kalle, R., Ramesh, T. & Downs, C.T.** 2018. When and where to move: Dynamic occupancy models explain the range dynamics of a food nomadic bird under climate and land cover change. *Glob. Chang. Biol.* **24**: e27–e39.
- Lawes, M. J.** 1990. The Distribution of the Samango Monkey (*Cercopithecus mitis erythrarchus* Peters, 1852 and *Cercopithecus mitis labiatus* I. Geoffroy, 1843) and Forest History in Southern Africa. *J. Biogeog.* **17**(6): 669-680
- Lawes, M.J., Eeley, H., Shackleton, C. & Geach, B.** 2004a. *Indigenous forests and woodlands in South Africa: policy, people and practice*. University of KwaZulu-Natal Press, Pietermaritzburg.
- Lawes, M.J., Macfarlane, D.M. & Eeley, H.A.C.** 2004b. Forest landscape pattern in the KwaZulu-Natal midlands, South Africa: 50 years of change or stasis? *Austral Ecol.* **29**: 613–623.
- Leaver, J., Mulvaney, J., Ehlers Smith, D.A., Ehlers Smith, Y.C. & Cherry, M.I.** 2019. Response of bird functional diversity to forest product harvesting in the Eastern Cape, South Africa. *For. Ecol. Manage.* **445**: 82–95.
- Lézine, A.-M., Izumi, K., Kageyama, M. & Achoundong, G.** 2019. A 90,000-year record of Afromontane forest responses to climate change. *Science.* **363**: 177–181.
- Martin, R.O., Perrin, M.R., Boyes, R.S., Abebe, Y.D., Annorabah, N.D., Asamoah, A., Bizimana, D., Bobo, K.S., Bunbury, N., Brouwer, J., Diop, M.S., Ewnetu, M., Fotso, R.C., Garteh, J., Hall, P., Holbech, L.H., Madindou, I.R., Maisels, F., Mokoko, J., Mulwa, R., Reuleaux, A., Symes, C., Tamungang, S., Taylor, S., Valle, S., Waltert, M. & Wondafrash, M.** 2014. Research and conservation of the larger parrots of Africa and Madagascar: a review of knowledge gaps and opportunities. *Ostrich* **85**: 205–233.

- McCracken, D.P.** 2004. Dependence, destruction and development: a history of indigenous timber use in South Africa. In: *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice* (M. J. Lawes, H. A. C. Eeley, C. M. Shackleton, & B. G. S. Geach, eds), pp. 277–308. University of KwaZulu-Natal Press, Pietermaritzburg.
- Mpisekaya, S.R., Kameni, C., Viljoen, I. & Salukazana, L.** 2008. *Amatole forests yellowwood harvesting levels*. DAFF unpublished report.
- Mucina, L. & Rutherford, M.C.** 2011. *The vegetation of South Africa, Lesotho and Swaziland*, Reprint 20. South African National Biodiversity Institute, Pretoria.
- Newton, I.** 1994. The role of nest sites in limiting the numbers of hole-nesting birds: A review. *Biol. Conserv.* **70**: 265–276.
- Orenstein, R.** 2018. Proposed new CITES standard references for nomenclature of birds (class Aves). In: *Eighteenth meeting of the Conference of the Parties*, p. 110. CITES, Ontario.
- Perrin, M.R.** 2005. A review of the taxonomic status and biology of the Cape Parrot *Poicephalus robustus*, with reference to the Brown-necked Parrot *P. fuscicollis fuscicollis* and the Grey-headed Parrot *P. f. suahelicus*. *Ostrich* **76**: 195–205.
- Perrin, M.R.** 2013. *Parrots of Africa, Madagascar and the Mascarene Islands: biology, ecology and conservation*. Wits University Press, Johannesburg.
- Pillay, K., Dawson, D.A., Horsburgh, G.J., Perrin, M.R., Burke, T. & Taylor, T.D.** 2010. Twenty-two polymorphic microsatellite loci aimed at detecting illegal trade in the Cape Parrot, *Poicephalus robustus* (Psittacidae, AVES). *Mol. Ecol. Resour.* **10**: 142–149.
- Raidal, S.R. & Cross, G.M.** 1994. The haemagglutination spectrum of psittacine beak and feather disease virus. *Avian Pathol.* **23**: 621–630.
- Regnard, G.L.** 2015. Development of a potential challenge model and plant-produced vaccine candidate for beak and feather disease virus. PhD thesis. University of Cape Town.
- Regnard, G.L., Boyes, R.S., Martin, R.O., Hitzeroth, I.I. & Rybicki, E.P.** 2014a. Beak and feather disease viruses circulating in Cape Parrots (*Poicephalus robustus*) in South Africa. *Arch. Virol.* **160**: 47–54.
- Regnard, G.L., Boyes, R.S., Martin, R.O., Hitzeroth, I.I. & Rybicki, E.P.** 2014b. Beak and feather disease virus: correlation between viral load and clinical signs in wild Cape Parrots (*Poicephalus robustus*) in South Africa. *Arch. Virol.* **160**: 339–344.
- Skead, C.J.** 1964. The overland flights and the feeding habits of the Cape Parrot, *Poicephalus robustus* (Gmelin) in the eastern Cape Province. *Ostrich* **35**: 202–223.
- Skead, C.J.** 1971. The Cape Parrot in the Transkei and Natal. *Ostrich* **42**: 165–178.
- Smee, D.** 2010. Species with a Large Impact on Community Structure. *Nature Education Knowledge* **3**(10):40
- Snyder, N., McGowan, P., Gilardi, J. & Grajal, A (eds).** 2000. *Parrots: Status Survey and Conservation Action Plan 2000-2004*. IUCN, Gland, Switzerland and Cambridge, UK. 180 pp.
- South African National Biodiversity Institute.** 2014. *Non-detriment finding for Poicephalus robustus (Cape Parrot)*. Unpublished report.

South African National Biodiversity Institute. 2017. *Summary report: non-detriment findings made by the Scientific Authority.* Available from: <https://www.sanbi.org/wp-content/uploads/2018/04/summary-report-ndfs-april-2017.pdf>

Symes, C.T. & Downs, C.T. 2002. Occurrence of Cape Parrot *Poicephalus robustus* at non-forest feeding sites in South Africa: threats to a declining population. *Bull. African Bird Club* 9: 27–31.

Tella, J. L., Baños, A., Hernández-Brito, D., Rojas, A., Pacífico, E., Díaz, J. A., Carrete, M., Blanco, G., and Hiraldo, F. (2015). Parrots as overlooked seed dispersers. *Frontiers in Ecology and the Environment* 13, 338–339.

Tobias, J., Seddon, N., Spottiswoode, C., Pilgrim, J., Fishpool, L. & Collar, N. 2010. Quantitative criteria for species delimitation. *Ibis*. **152**: 724–746.

UNESCO. 1978. Intergovernmental Conference on Environmental Education: final report. In: *Intergovernmental Conference on Environmental Education, United Nations Educational, Scientific, and Cultural Organisation with United Nations Environment Programme in Tbilisi, USSR, 14 - 26 October 1977*, p. 96. Paris.

van den Berg, N., du Toit, M., Morgan, S.W., Fourie, G. & de Beer, Z.W. 2019. First report of *Fusarium euwallaceae* causing necrotic lesions on *Persea americana* in South Africa. *Plant Dis.* **103**: 1774.

Warburton, L., Mpindi, S., Howells, B., Pienaar, K., Patterson, C., Mattison, H., Whittington-Jones, C., Hughes, S., Fossey, A., O’Grady, J., Koekemoer, J., Downs, C., Perrin, M. & Evans, S.W. 2002. Cape Parrot (*Poicephalus robustus*) Action Plan. BirdLife South Africa, Johannesburg,

Watson, A. 2019. How to stop the voracious beetles killing SA’s trees. The Citizen, 7 August 2019, Johannesburg.

Wethered, R. & Lawes, M.J. 2003. Matrix effects on bird assemblages in fragmented Afromontane forests in South Africa. *Biol. Conserv.* **114**: 327–340.

Wilson, A.L., Bowker, M., Shuttleworth, A. & Downs, C.T. 2017. Characteristics of snags and forest structure in southern mistbelt forests of the Amatole region, South Africa. *Afr. J. Ecol.* **55**: 518–529.

Wimberger, K., Carstens, K.F., Carstens, J.C. & Boyes, R.S. 2017. Nest boxes for Cape Parrots *Poicephalus robustus* in the Hogsback area, Eastern Cape, South Africa. *Ostrich* **89**: 79–85.

Wirminghaus, J., Downs, C.T., Symes, C.T. & Perrin, M.R. 2000a. Abundance of the Cape Parrot in South Africa. *South African J. Wildl. Res.* **30**: 43–52.

Wirminghaus, J.O., Downs, C.T., Perrin, M.R. & Symes, C.T. 2001a. Breeding biology of the Cape Parrot, *Poicephalus robustus*. *Ostrich* **72**: 159–164.

Wirminghaus, J.O., Downs, C.T., Perrin, M.R. & Symes, C.T. 2001b. Abundance and activity patterns of the Cape Parrot (*Poicephalus robustus*) in two afromontane forests in South Africa. *African Zool.* **36**: 71–77.

Wirminghaus, J.O., Downs, C.T., Perrin, M.R. & Symes, C.T. 2002a. Taxonomic relationships of the subspecies of the Cape Parrot *Poicephalus robustus* (Gmelin). *J. Nat. Hist.* **36**: 361–378.

Wirminghaus, J.O., Downs, C.T., Symes, C.T., Dempster, E. & Perrin, M.R. 2000b. Vocalisations and behaviours of the Cape Parrot *Poicephalus robustus* (Psittaciformes: Psittacidae). *Durban Museum Novit.* **25**: 12–17.

Wirringhaus, J.O., Downs, C.T., Symes, C.T. & Perrin, M.R. 1999. Conservation of the Cape Parrot in southern Africa. *South African J. Wildl. Res.* **29**: 118–129.

Wirringhaus, J.O., Downs, C.T., Symes, C.T. & Perrin, M.R. 2001c. Fruiting in two afromontane forests in KwaZulu-Natal, South Africa: the habitat type of the endangered Cape Parrot *Poicephalus robustus*. *South African J. Bot.* **67**: 325–332.

Wirringhaus, J.O., Downs, C.T., Symes, C.T. & Perrin, M.R. 2002b. Diet of the Cape Parrot, *Poicephalus robustus*, in Afromontane forests in KwaZulu-Natal, South Africa. *Ostrich* **73**: 20–25.

Appendix I Facets of the 2002 Cape Parrot Action Plan

Community involvement.					
1) Alternative development opportunities and sustainable participatory forest management committees in place by 2008 in two priority areas in order to enhance the livelihoods of adjacent communities.					
Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Establishment of Community Forest Management Committees at 2 places – (forest management plans for 2 yellowwood rich forests).	EC, KZN, LP	KZN Wildlife, East Cape Nature Conservation, CPWG, NGO, DWAF, Municipalities (Ingwe)	2003 – 2008	Trust and honesty established as the working foundation between all stakeholders. Cape Parrot sites prioritised. Community forest management committees active at two priority sites	ONGOING e.g. 1. Friends of the Amathole Trail and the Amathole Catchment Forum active. Both provide a space to push for the prioritization of Cape Parrot sites. Stakeholders include ECPTA, DEFF, EWT, local communities, local businesses, NPOs. 2. Involvement of DEFF, security companies, EKZNW/ECT and communities in forests around Port St Johns, Mbotyi, Umtata, Kokstad, Ingeli, Creighton, Bulwer, Karkloof, and Magoeboeskloof.
Conduct a skills audit, organise relevant training, for the development of sustainable ecotourism activities. (Environmentally friendly, economically feasible, incorporating the indigenous knowledge of people). Agroforestry.	EC, KZN, LP	KZN Wildlife, East Cape Nature Conservation, CPWG, NGO, DWAF, Municipalities (Ingwe)	Audit: 2004 – 2005 Training: 2004 – 2006.	Report on skills audit available by 2005. Material for training prepared by 2004 and first workshops conducted by 2005.	ONGOING. Various ecotourism and community empowerment activities initiated across the EC, KZN and Limpopo Provinces together with other community upliftment programmes. Several stakeholders involved. Work includes women empowerment initiatives, sewing groups, birdwatching guides, soap making, monastery hike in S. KZN, bee farming etc.
Maximise the value of non-wood products e.g. mushrooms, wild fruits, ferns etc.	EC, KZN, LP	KZN Wildlife, East Cape Nature Conservation, CPWG, NGO, DWAF, Municipalities (Ingwe)	2003 – 2008	Completed assessment of non-wood products that can be harvested sustainably. Appropriate quotas for sustainable harvesting in place. Completed market research into viability of harvest and trade in non-wood products. Marketing strategies have been put in place where appropriate. Greater use of non-wood products by communities, less harvesting of yellowwood	ONGOING. Several publications on the availability of snags in forests. Several studies on human use of forest products finished or in progress e.g. in the Wolf River forest, Amathole region.
Involvement of communities in farm activities e.g. apiculture, basket making, mats, nursery (wood-lot development) etc.	EC, KZN, LP	KZN Wildlife, East Cape Nature Conservation, CPWG, NGO,	2003 – 2006	Cost-benefit analysis of the various farming activities including appropriate market research.	ONGOING. Various ecotourism and community empowerment activities initiated across the EC, KZN and Limpopo Provinces together with other community upliftment programmes. Several stakeholders involved. Work includes women empowerment initiatives, sewing groups, birdwatching

		DWAF, Municipalities (Ingwe)		Possible sources of funding investigated (e.g. DFID and	guides, soap making, monastery hike in S. KZN, bee farming etc. Other examples include micro-nursery established by CPP in one community. Trialled in a second community but it failed. EWT has established trained 7 apiarists in two communities near Hogsback.
Public awareness and training.					
2) Develop and implement an environmental education programme, primarily focussed on the conservation of the Cape Parrot and its habitat, involving the relevant stakeholders, by 2008.					
Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Linking with KwaZulu-Natal Biodiversity Environmental Education Programme in 12 schools, in Cape Parrot areas – with a view to expanding nationally.	KZN, EC & LP = future	KZN Wildlife, KZNCF, OWG, CPWG, BSWG, Sharenet, EC Nat. Cons.	2003 – ongoing Evaluation 2 yearly	Material for education programmes prepared. Twelve schools in priority areas selected. Active education programme underway. List of schools and number of visits made per year	ONGOING. BIRDLIFE SA, EKZNW and WESSA involved with schools. Cape Parrot part of the school curriculum- CPWG consulted. CPWG has posters and a DVD that are supplied to schools. School children and students involved in the annual Cape Parrot Big Birding Day (CPBBD).
Participatory farm workshops in priority problem areas to resolve conflict between Cape Parrots and farmers (re: crop predation).	EC, KZN	CPWG, Nat Cons. Dept (EC & KZN), other NGO's, Farmer Associations, Africa Ext Officers.	Jan 2003 – December 2004	Problem areas identified. Nature and extent of problems in each area determined. Workshops held to identify workable solutions that are locally applicable	ONGOING. Pecan nut farmers across the Cape Parrot range assisting with annual CPBD. Magoeboeskloof area involved with nest boxes. CPWG met with stake holders in Fort Beaufort since CPP partnering with pecan farmers in Fort Beaufort and Adelaide. CPWG regular feedback to various pecan farmers. Concern about some illegal catching of Cape Parrots at farms and towns referred to relevant authorities.
Development of learning support material in relevant languages for use in specified projects.	EC, KZN, LP	CPWG, Nat Cons, Provincial Tourism Association	2003 ongoing.	Appropriate learning support material (resources) available	ONGOING. Posters in Xhosa and English. Signs in Xhosa and English. Woolworths bags distributed across SA. CPWG web page has information. School children regularly contact CPWG for additional information.
Provide training amongst traditional healers in medicinal plant propagation to reduce impacts on Cape Parrot habitat.	KZN (current) EC	Permaculture experts, CPWG, Nat Cons dept, NGO's INR, Agric Dpt	Current 2004 ongoing	List of identified traditional healers amongst Cape Parrot communities. Workshops held with traditional healers to identify needs and priority species. Seedlings and other appropriate stocks obtained. Training workshops conducted. Annual report on monitoring of quantities of resources collected from the wild and those propagated artificially.	ONGOING. Various stakeholders involved with traditional healers. EKZNW interacting with relevant communities in KZN. EThekweni Municipality has nursery.
Compile and distribute a quarterly newsletter to update relevant stakeholders on Cape Parrot activities and issues.	South Africa	CPWG	2003-ongoing quarterly	Editor appointed. Funding for printing and distribution available. First newsletter distributed by 2003. Distributed four times a year	ONGOING. Newsletter comes out twice a year. P Singh currently editor. Sent to all on the database plus the CPBBD report. Back copies available on the CPWG web page.
Consult with rural communities to identify their needs in relation to those of the Cape Parrot and its habitat, toward common resolution. Develop a strategic partnership	EC, KZN	KZN Wildlife, EC Nat Cons., CPWG, NGO's, Business	2003 end 2008	1. List of community needs amongst at least 2 Cape Parrot communities. 2. Community based	ONGOING. Various stakeholders involved including ECPTA, EKZNW, DEFF, Forestry companies, landowners. CPP in Hogsback is working with two communities in the Amathole region. Major needs concern water security and employment so have provided one community with a nursery so

with communities to address their needs as well to benefit Cape Parrot conservation.				projects (documents) drawn up and implementation evident	community members can generate an income by growing seedlings which CPP buys back. Also installed Jojo tanks to provide water security. Have created employment for ~35 villagers who assist us with planting indigenous seedlings. Bulwer community set up tourism centre with SAPPI's assistance- funding ended and project has dwindled. Conservation Outcomes currently working with BirdLife SA in KZN. BirdLife SA bird guides working in areas with Cape Parrots and local lodges or BnB's across Cape Parrot range.
--	--	--	--	--	---

Policy and legislation.

3) By January 2004, a comprehensive national policy on the conservation and sustainable utilisation of the Cape Parrot in captivity and the wild has been distributed. -

Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Draft the national policy in consultation with stakeholders, for the effective conservation of the Cape Parrot in captivity and its habitat taking into account the principle of indigenous knowledge sharing. Explanatory note: The policy must include registration in the studbook, uniform permit conditions, Psittacine Beak and Feather Disease testing, DNA testing, permanent identification methods, safety flights, hybridisation elimination, disease and quarantine control, co-operation between the judiciary and law enforcement officers and increased penalties for illegally dealing in Cape Parrot's.	All 9 provinces	CPWG, Provincial Nature Conservation, ESPU	1) Start Feb 2003 at the CPWG meeting. 2) Draft completed: 30 June 2003, approved by CPWG. 3) Circulated to all provinces & stakeholders, comments returned by: 31 August 2003. 4) Revision completed & final approval by CPWG: 30 October 2003	developed by end June 2003. Draft policy circulated to relevant stakeholders and provincial nature conservation offices by end August 2003. Document revised and approved by the CPWG by end October 2003.	ONGOING. Studbook keeper Shaun Wilkinson from Monte Casino Bird Park. Cape Parrot made ToPs species. NDF workshop led by SANBI. Captive Cape Parrot permitting still varies per province but DNA samples and studbook affiliation encouraged. Most 1st world countries importing F2 birds require studbook support.
Ensure policy is nationally legislated.	All 9 provinces	DEAT (WG 1)	After 30 October 2003 (regular follow-up every 2	Policy is submitted to DEAT WG1. Follow-up is made regularly (record of contact kept).	ONGOING. ToPs legislation. NDF findings after workshop completed. Posters made for ports of entry and exit to SA

			months by CPWG		
Promote compliance and enforcement of the policy	All nine provinces.	CPWG, Provincial Nature Conservation.	Ongoing	Meetings to discuss compliance have been held with all provincial nature conservation bodies. Action is being taken by provincial nature conservation bodies to implement policy. Training provided to relevant permit and law enforcement staff at Provincial conservation staff and govt staff (DEAT) get out to Cape Parrot areas more and establish a definite presence in these areas by end of 2004.	ONGOING. All provincial conservation agencies involved as well as Customs and Excise. Green Scorpions follow up reports of illegal trade.
Monitor compliance with the policy	All nine provinces.		Ongoing	Annual report to CPWG detailing e.g. results of cage inspections and incidence of illegal trade/keeping of this species	ONGOING
Regular review of the policy (every 3 years).	All nine provinces.		Ongoing	Workshops held every 3 years to review policy and modify as appropriate. Amendments to policy to be incorporated into provincial ordinances.	ToPs legislation

Species and habitat.

4) Felling of yellowwood trees by legal commercial loggers reduced by 50% in 5 priority Cape Parrot sites by 2008.					
Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Determine the number of operations nationally.	EC, KZN, LP	Forest Conservation Officers. CPWG	& January 2003 – June 2003	Number of operations determined and where.	ONGOING. Mainly in southern E Cape.
Determine the geographic location of logging operations in relation to Cape Parrot habitat.	EC, KZN, LP	Forest Conservation Officers. CPWG	& January 2003 – June 2003	Logging operations and priority Cape Parrot habitat mapped.	
Prioritise Cape Parrot habitat sites.	EC, KZN, LP	Forest Conservation Officers. CPWG	& July 2003 – December 2003	Suitable Cape Parrot habitat mapped and prioritised.	ONGOING Cape Parrot distribution mapped and forest sites visited. DEFF, forestry companies, conservation bodies and UKZN involved in ongoing research. Illegal logging of forests reported and some court cases have followed.
Determine the criteria used by loggers to select trees (size, age etc.)	EC, KZN, LP	Forest Conservation Officers. CPWG	& January 2003 – March 2003	Review of logging criteria and legislation.	1. In the Amathole region it is tree stage and size.

Determine volumes / quota / history for last 10 years.	EC, KZN, LP	Forest Conservation Officers. CPWG	&	January 2003 – June 2003	Review of available logging records and official quotas.	1. CPP has logging records for the Amathole region area going back several years.
Status of current policies / quotas.	EC, KZN, LP	Forest Conservation Officers. CPWG	&	July 2003 – June 2004	Review of status of current policies/ quotas.	
Submit to quota-planners recommended annual volumes to be felled.	EC, KZN, LP	Forest Conservation Officers. CPWG	&	Dec-03	Sustainable yellowwood logging investigated in terms of Cape Parrot habitat requirements. Revised logging quotas motivated and submitted to DWAF. Document containing annual logging volumes	1. CPP undertaking a project in the near future to determine suitable quotas for the Amathole forests.

(5) Increase food supply of Cape Parrots by planting a minimum of 5 species of food source trees (indigenous/exotic) in a minimum of 5 localities by December 2005.

Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Identify primary Cape Parrot food sources.	EC, KZN, LP	Researchers, field volunteers, forest & conservation officers. Community members.	January 2003 – 30 June 2003	Available literature reviewed. Diet of Cape Parrot flocks in priority areas investigated.	ONGOING. Some publications. Over 35 species of trees used as food sources near Hogsback. 10 new food source species identified. Diet paper in progress.
Identify & prioritise Cape Parrot localities. [Note; This is an essential component of several other project concepts. Liaison needed between various groups to avoid duplication]	EC, KZN, LP	Researchers, field volunteers, Forest Conservation Officers. Community members.	January 2003 – 30 June 2003	Cape Parrot localities identified, prioritised and mapped.	ONGOING. Annual CPPBD and ongoing research has identified important forests and how Cape Parrot are food nomads. Public involved in monitoring occurrence- SABAP2, BirdLasser plus distribution database at UKZN. During drought water sources and food sources outside of forest particularly important. Key forest patches for roosting and nesting identified and mapped near Hogsback. Study being initiated in 2019 to identify other priority sites in the Amathole region.
Identify & select compatible secondary alternative food-source trees	EC,	PMB Botanists, nurseries	January 2003 – 30 June 2003	Alternative food sources reviewed and prioritised.	
Establish participatory Forest Management committees.	EC, KZN, LP	Forest Conservation Officers	July 2003 – December 2005	na	ONGOING. Various established across the range e.g. Friends of The Amathole initiated and ongoing in the Eastern Cape, includes stakeholders from DEFF, local communities, ECPTA, local businesses and NPOs.

Research and monitoring

6) Successfully complete 50% of research projects investigating Cape Parrot movements, social organisation, breeding biology, status as a crop pest, disease, and habitat quality in terms of Cape Parrot requirements.

Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Research into the movements and spatial ecology of the Cape Parrot.	EC, KZN, LP	Mike Perrin & Colleen Downs	2003 - 2005	Students and funding obtained. Annual research reports to the CPWG. Final published report.	ONGOING. Initial radio-tracking failed. Information on some movements obtained from annual CPBBD and observers at other times of the year. Kept in UKZN database. Hogsback- Movement patterns by direct

				Practical application of research findings to improve Cape Parrot conservation.	observations from 2009 to present and ongoing. Telemetry study still in trial phase due to problems encountered with harness designs.
Defining optimal habitat quality (food, nest sites & disturbance) of the Cape Parrot to increase abundance.	EC, KZN, LP	Mike Perrin & Colleen Downs	2005 - 2007	Students and funding obtained. Annual research reports to the CPWG. Final published report. Practical application of research findings to improve Cape Parrot conservation	ONGOING. Several publications. Long term data from public and annual CPBBD held at UKZN. Study characterising roosting, gathering and nesting sites underway in Hogsback currently. Three PhD students working in forests from Umtata to Creighton currently. Ongoing research in Magoeboesklouf.
Determination of the effects of social behaviour on the breeding success and population dynamics of the Cape Parrot in the wild and in captivity.	EC, KZN, LP	Mike Perrin & Colleen Downs	2006 - 2008	Students and funding obtained. Annual research reports to the CPWG. Final published report. Practical application of research findings to improve Cape Parrot conservation.	ONGOING. Several publications. Long term data from public and annual CPBBD held at UKZN. Study characterising roosting, gathering and nesting sites underway in Hogsback currently. Three PhD students working in forests from Umtata to Creighton currently. Ongoing research in Magoeboesklouf.
Estimation of the effect of Psittacine Beak and Feather Disease on survivorship and breeding success in the Cape Parrot.	EC, KZN, LP	Mike Perrin & Colleen Downs	2003 - 2005	Students and funding obtained. Annual research reports to the CPWG. Final published report. Practical application of research findings to improve Cape Parrot conservation	ONGOING. All dead CPs sent for autopsy. Some publications. Long term data base held at UKZN. Information from breeders also collated.
Quantify the impact of the Cape Parrot as a pest of crops and make recommendations to prevent the problem.	EC, KZN, EC	Mike Perrin & Colleen Downs	2004 - 2006	Students and funding obtained. Annual research reports to the CPWG. Final published report. Practical application of research findings to improve Cape Parrot conservation.	ONGOING- see earlier point. CPP partnering with pecan farmers in Fort Beaufort and Adelaide. Articles submitted to Pecan SA newsletters regarding Parrots and Pecans. Direct and frequent contact with the director of Pecan SA
Quantify the impact of Cape Parrot off-take rates for the bird and muthi trade and as food.	EC, KZN, EC	Mike Perrin & Colleen Downs	2003 – 2005	Students and funding obtained. Annual research reports to the CPWG. Final published report. Practical application of research findings to improve Cape Parrot conservation.	Coetzer et al. have PVA manuscript in publication. Trade information collated and kept at UKZN.
Provide alternative, in addition to the current, nest boxes to supplement possible shortage of nest sites by December 2004.	EC, KZN, LP	Mike Perrin & Colleen Downs	2003 - 2005	Students and funding obtained. Annual research reports to the CPWG. Final published report. Practical application of research findings to improve Cape Parrot conservation. Written list of alternate boxes available. Boxes available	1. 200 nest boxes installed in the Hogsback area. None used for nesting by parrots. But occupied by other bird species, small mammals, reptiles, bees and ants. 2. New nest boxes designed by CPP, to be constructed and installed in 2020. ~30? nest boxes installed in Magoebasklouf on Amorentia Estate by ExploreTrees, including trial of push-pull method for encouraging bees to not colonise boxes.
Review the species Status and advocate for acceptance globally.	EC, KZN, LP	Mike Perrin & Colleen Downs	2003 - 2005	Prepare a review document. IUCN accepted red data ranking.	Genetic study completed in 2015 Coetzer et al. Accepted by CITES as a distinct species in 2016 on basis of phylogenetic differentiation. Accepted by BLI/IUCN in 2017 on basis of Tobias et al criteria on basis of morphological and physical differentiation.

Review the Cape Parrots conservation status. Currently it is regarded to be Endangered.	EC, KZN, LP	Mike Perrin & Colleen Downs	2005 - 2008	IUCN accepted red data ranking.	Was categorised as Vulnerable by the IUCN as it has a small but stable population meeting criterion D1. http://datazone.birdlife.org/species/factsheet/cape-parrot-poicephalus-robustus . Taylor et al. 2015 SA Red data Book publication
---	-------------	-----------------------------	-------------	---------------------------------	---

Infrastructure and co-ordination.

7) Enable the Cape Parrot Working Group to develop an infrastructure to realise the objectives of the action plan.					
Project	Provinces	Agencies responsible	Time scale	Indicators	Updates as of 2019
Employ a dedicated paid regional co-ordinator.	na	CPWG	2003 - 2008	Funding available. Dedicated CPWG coordinator employed.	Was dedicated co-ordinator until 2009. Now P Singh assists ad hoc.
Investigate becoming partnered to a national/international conservation group.				Document of organisations with whom options were discussed.	Several organisations approached. Eventually CPWG continued based at UKZN.
Obtain the necessary resources and volunteer network.				Resources available. Well integrated and enthusiastic network of volunteers.	Annual CPPBD relies on area co-ordinators, volunteers across the Cape Parrot range.
Develop and maintain links with supporters.				Regular contact between CPWG coordinator and other members of the CPWG	Newsletter and CPBBD Report

Appendix II List of workshop participants (incl. those who attended via Skype)

Name	Organisation	Location	Email address
Anna Young	Otterbein University, USA	Ohio, USA	ayoung@otterbein.edu
Brent Coverdale	Ezemvelo KZN Wildlife	Pietermaritzburg	brent.coverdale@kznwildlife.com
Caroline Estafthion	Avian Preservation & Education Conservancy	Jacksonville, Florida	cefstathion@ufl.edu
Cassie Carstens	CPP	Hogsback	hogsback@wildbirdtrust.com
Chris Everet	Amathole Forestry Company	Hogsback	chrise@rancetimber.co.za
Clare Padfield	CPP	Hogsback	cppresearch@wildbirdtrust.com
Colleen Downs	UKZN	Pietermaritzburg	Downs@ukzn.ac.za
David Ehlers Smith	UKZN	Pietermaritzburg	daveblpr@hotmail.com
David Letsaolo	Limpopo Birding Routes	Magoebaskloof	info@krm.co.za; dpaletsoalo@gmail.com
Dean Ricketts	DEDEAT	Kokstad	Dean.Rickets@deaet.escape.gov.za
Elizabeth Watkins	Private	East London	lizwat@vodamail.co.za
Gideon van Lil	Amathole Forestry Company	Stutterheim	gideon@rancetimber.co.za
Hanneline Smit-Robinson	BirdLife South Africa	Johannesburg	hanneline.smit-robinson@birdlife.org.za
Harriet Davies-Mostert	IUCN Conservation Breeding Specialist Group and EWT	Johannesburg	harrieted@ewt.org.za
Humbu Mafumo	DEFF	Johannesburg	HMAfumo@environment.gov.za
Ian Rushworth	Ezemvelo KZN Wildlife	Pietermaritzburg	ian.rushworth@kznwildlife.com
Ian Taylor	Amathole Forestry Company	Stutterheim	ian@rancetimber.co.za
Inga Hitzeroth	UCT	Cape Town	inga.hitzeroth@uct.ac.za
Jessica Leaver	CPP	Cape Town	jes.leaver@gmail.com
John Hilton	Wild Bird Trust	Johannesburg	john@wildbirdtrust.com
Joyi Vuyisa	DEFF, Kokstad	Kokstad	vuyisaj@daff.gov.za
Kate Carstens	CPP	Hogsback	kate@wildbirdtrust.com
Kerryn Morrison	IUCN Conservation Breeding Specialist Group	Dullstroom	kerrynm@ewt.org.za
Kirsten Wimberger	CPP	Cape Town	kirsten@wildbirdtrust.com
Luisa Morais	CPP	Cape Town	luisamorais7@gmail.com
Luzuko Dali	DEDEAT	Port Elizabeth	Luzuko.Dali@dedea.gov.za

Malcolm Gemmell	Button Birding	Creighton	info@buttonbirding.com
Malixole Kitsi	DEFF, Kokstad	Keiskammahoek	MalixoleK@daff.gov.za
Melissa Howes-Whitecross	BirdLife South Africa	Johannesburg	melissa.whitecross@birdlife.org.za
Mpho Tijane	DEFF	Johannesburg	mtijane@environment.gov.za
Nikki Steyn	CPP	Hogsback	nikki@wildbirdtrust.com
Nombuyiselo Duma	CPP	Hogsback	duma@wildbirdtrust.com
Peter Mather-Pike	Self-employed/retired	East London	peter@calith.co.za
Phil Whittington	East London Museum	East London	philw@elmuseum.za.org
Preshnee Singh	UKZN	Pietermaritzburg	preshnee.singh@gmail.com
Ricky Hannan	DEDEAT	East London	Ricky.Hannan@dedea.gov.za
Riel Coetzee	University of the Free State	Bloemfontein	coetzerwg@ufs.ac.za
Robert Horsburgh	Avian Preservation & Education Conservancy	Jacksonville, Florida	rhorsburgh6@gmail.com
Rowan Martin	World Parrot Trust	Hayle, England	rmartin@parrots.org
Sally-Ann Fraser	Wild Bird Trust	Johannesburg	sally-ann@wildbirdtrust.com
Samke Ngcobo	UKZN	KwaZulu-Natal	sam.p.ngcobo@gmail.com
Sandi Willows-Munro	UKZN	Pietermaritzburg	Willows-munro@ukzn.ac.za
Steve McKean	Conservation Outcomes NPC	Howick	steve@conservation-outcomes.org
Thabo Gwiji	DEDEAT	East London	thabo.gwiji@dedea.gov.za
Thobeka Gumede	UKZN	KwaZulu-Natal	thobekagumede123@gmail.com
William Horsfield	Captive Breeders	Hillcrest	william@amazona.co.za
Wynand Espach	Amorentia Estate and Nursery (Limpopo)	Tzaneen	wynand@amorentia.co.za
Yvette Ehlers-Smith	UKZN	Pietermaritzburg	yvetteehlers@hotmail.com

Appendix III DRAFT Terms of Reference for the Cape Parrot

Cape Parrot Action Plan Coordination Committee (CPAPCC)

Terms of Reference

The Terms of Reference of Cape Parrot Action Plan Coordination Committee (CPAPCC) are as follows:

1. The purpose of CPAPCC is to coordinate and monitor the implementation of actions outlined in Cape Parrot and Mistbelt Forest Conservation Action Plan 2020.
2. The CPAPCC consists of the following members:
 - a) Chair
 - b) Implementation coordinator
 - c) Regional focal point representative(s): Eastern Cape, KwaZulu-Natal, Limpopo
 - d) Topic focal point representative(s): Species Conservation, Habitat Conservation, Community Engagement Policies and law enforcement, Research
3. CPAPCC Members will commit to meet in person once per year, and in addition via online platforms at least once per year. These meetings will be coordinated by the elected CPAPCC chairperson. Members are responsible for their own travel costs to attend meetings in person unless otherwise indicated by the CPAPCC committee.
4. The activities of the CPAPCC will be supported financially through the Cape Parrot Action Plan Fund derived through donations by organisations and individuals. This will be managed by the CPAPCC coordinator. Funds will be managed within a separate CPAPCC bank account, administered by the WBT bookkeeper, with any changes to be the decision of the CPAPCC.

CPAPCC Chair

5. The Chair of the CPAPCC will be elected by the members of the CPAPCC for a term of two years, at the end of their term the CPAPCC has the opportunity to re-elect the Chairperson for a further two years or nominate a new chairperson for election, and where possible this is to be rotated across affiliated organisations. The Chairperson and/or organisation/department should not serve a continuous term of more than six years.

CPAPCC Implementation coordinator

6. The coordinator shall receive financial compensation commensurate with the role. Financial support for the coordinator will come from a Cape Parrot Action Plan Fund (see point 4). The coordinator will report to the Chair and provide regular updates in the form of monthly reports on activities to the CPAPCC via email. Supervision of the coordinator's day-to-day activities will be the responsibility of the Wild Bird Trust's Project Manager. The coordinator's contract shall fall under the Wild Bird Trust for administrative purposes, but functions and job description of the coordinator will be determined solely by the CPAPCC. Employment will be on a one-year contract, with hiring and contract termination decisions taken by the CPAPCC.

The coordinator shall be responsible for:

- Coordinate the implementation of the Action Plan

- Coordination of CPAPCC meetings and other meetings
- Liaising with all focal point representatives
- Tracking progress and preparation of annual implementation progress report
- Coordinate and develop a biannual Newsletter
- Together with the assigned CPAPCC bookkeeper, managing the budget provided by the Cape Parrot Action Plan Fund responsibly and within budgetary limits

CPAPCC members and focal point representatives

7. All CPAPCC members should sign this ToR which will also serve as LoA (Letter of Agreement) upon acceptance of the voluntary role to serve on the CPAPCC. Participation in meetings or CPAPCC discussions will not be permitted until a signed ToR is received by the CPAPCC implementation coordinator.
8. CPAPCC members and focal point representatives will work with the CPAPCC implementation coordinator, other members and the government and civil society agencies to facilitate the coordinated implementation of the plan.
9. CPAPCC members and focal point representatives will be required to attend at least 50% of meetings within an annual cycle and apologies prior to the meeting must be provided if attendance is not possible.
10. Members of the initial CPAPCC will be determined through their respective involvement during the Cape Parrot Action plan meeting held in Hogsback, Eastern Cape on 26-27 September 2019.
11. Subsequently, new members will be nominated by an existing CPAPCC member and at least 66% of the CPAPCC must agree to this nomination prior to acceptance as a new member on the CPAPCC.
12. Members can serve on the CPAPCC indefinitely, however, all members will be reviewed on an annual basis and can step down from the CPAPCC should they wish to at the end of each calendar year.
13. A member of the CPAPCC acknowledges that their participation is voluntary and all work conducted on behalf of the CPAPCC is done so without any financial or other forms of compensation.
14. A member commits to conduct themselves in a manner that is professional and does not bring the CPAPCC or its partner organisations into disrepute.

Declaration of intent to serve on the CPAPCC committee:

I _____ (*full name*), of
 _____ (*Organisation/Affiliation*) declare my interest to serve as a member of the Cape Parrot Action Plan Coordinating Committee (CPAPCC). I accept the terms stipulated in this Terms of Reference document and will provide appropriate notice of 30 days prior to any resignation from the CPAPCC.

 Signature

 Date

Contact details: Email:

Telephone: