SPECIES REVIEW:

BLUE CRANE (*Anthropoides paradiseus*)

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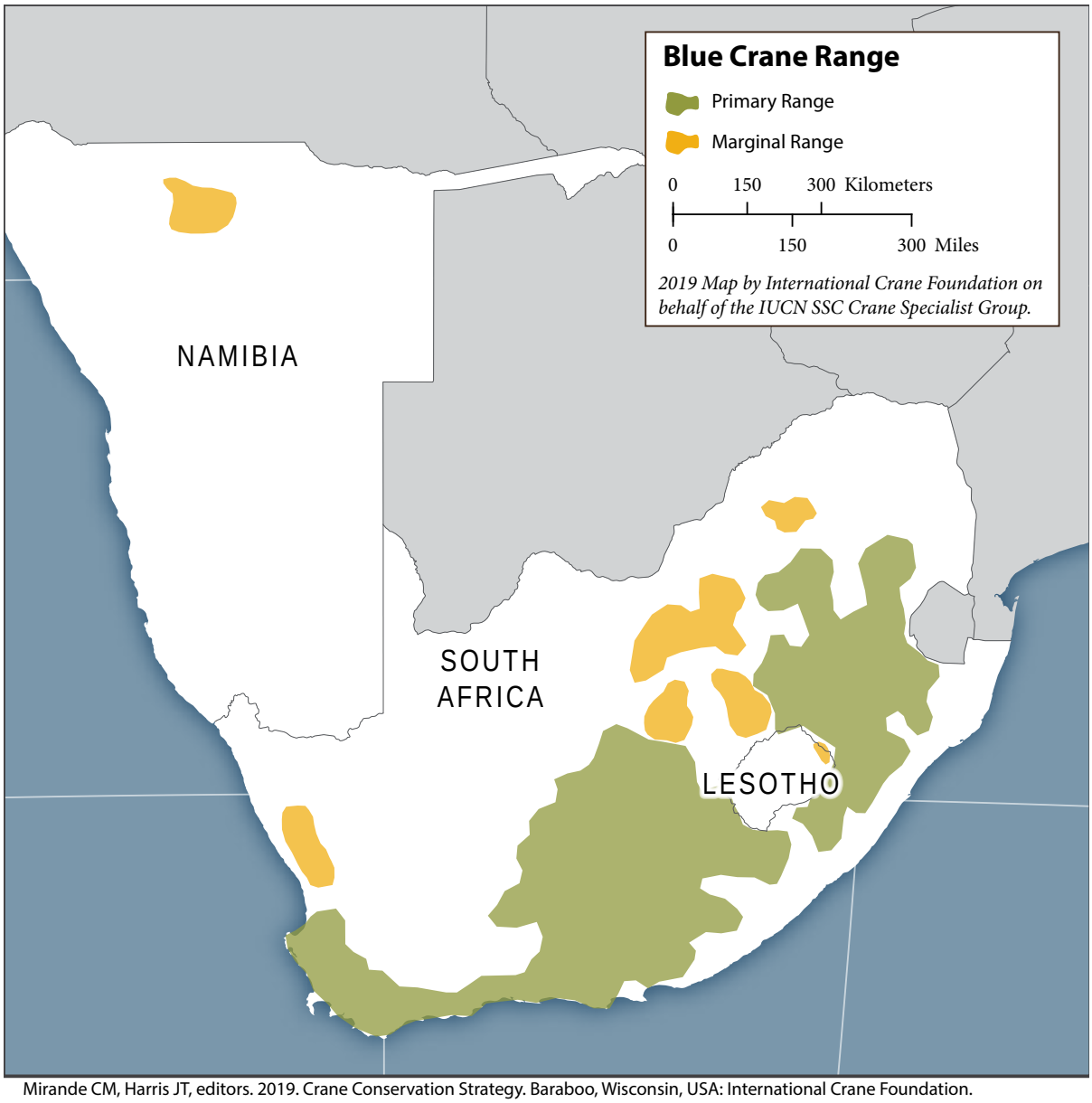
Blue Crane in South Africa (Photographer Jon Smallie, Endangered Wildlife Trust)

Red List Category: Vulnerable
Population Size: 25,000–30,000
Population Trend: Increasing in South Africa, declining in Namibia
Distribution: South Africa and Namibia



Mirande CM, Harris JT, editors. 2019. Crane Conservation Strategy. Baraboo, Wisconsin, USA: International Crane Foundation.

DISTRIBUTION AND STATUS OF KEY SITES

Distribution

The Blue Crane is a near endemic to South Africa, where over 99% of the global population is estimated to occur (McCann et al. 2007). It is the world's most range-restricted crane species and the national bird of South Africa. In South Africa, there are three core population areas. The majority of the global population is found in the agricultural landscape of the Fynbos biome in the Overberg and Swartland regions of the Western Cape Province, with a slow expansion northwards into Namaqualand (Simmons 2011). A widespread population in the Karoo (Northern Cape, southern Free State, and Eastern Cape Provinces) is expanding into the more arid parts of the Karoo and into the Succulent Karoo biome. A third area is in the eastern grasslands (spanning the KwaZulu-Natal, Mpumulanga, and the northeastern Free State Provinces) (Shaw 2003, Allan 2005, McCann et al. 2007, Simmons 2011, Hofmeyer 2012). According to the National Crane Census held in 2002, 47% of the population of Blue Cranes resided in the cereal crop and dryland pasture mosaic of the Western Cape Province, 29% in the natural grassy Karoo, and 23% in the eastern grasslands of South Africa (McCann 2002). However, the Coordinated Avifaunal Road Counts conducted by the University of Cape Town suggest that the population in the Western Cape increased by between 200 and 300% from 1987 to 2010 (Hofmeyer 2012), most likely significantly increasing the percentage of the global population currently found in the area.

A fourth small core population of Blue Cranes occurs in Namibia (Simmons et al. 2006). This isolated population breeds in and around the Etosha National Park and moves northwards, outside the Park, during the winter months (Simmons et al. 2006, Scott et al. 2011, Scott et al. 2015). Numbers have declined from 80 in 1988 (Brown 1992, Simmons et al. 1996) to only 23 in 2013 (Scott and Scott 2013b).

Occasional sightings of Blue Cranes have also been recorded in the southeastern areas of Botswana, Swaziland, and Lesotho (Allan 2005).

Status of Key Sites

Western Cape

The Overberg and Swartland regions of the Western Cape Province have largely been transformed into an agricultural landscape—predominantly a rotational system of small grain (predominantly wheat [*Triticum aestivum*] but also barley [*Hordeum vulgare*] and oats [*Avena sativa*]) and dryland pastures for small stock (mostly sheep [*Ovis aries*]). In certain areas of the Overberg, ostrich (*Struthio camelus*) farming is also practiced. This agricultural landscape, which is currently highly suitable for Blue Cranes, is under increasing potential for change. It is agricultural land and not formally protected for conservation. The Western Cape Province is considered one of the regions in South Africa to be most at risk from climate-induced warming and changes in precipitation (Midgley et al. 2005). Furthermore, history has shown that the response to economic pressure is quick and that existing land use can change dramatically, especially in the light of climate change (Morrison et al. 2012).

Karoo

The majority of the Blue Cranes in the Karoo occur on privately owned land, with a few individuals occurring in protected areas. Sheep farming on natural vegetation is predominant in the Karoo and, therefore, some areas are being considered for proclamation under the Biodiversity Stewardship Programme. This legislated process under South African law (National Environment Management: Protected Areas Act, Act 57 of 2003) enables private landowners to voluntarily enter into legally binding agreements with government to secure and manage the land for biodiversity. Lands proclaimed under this system at the level of Protected Environment or Nature Reserve are included in

the protected area network of the country. However, more than 155,000 km^2 of the Karoo is currently under consideration for hydraulic "fracking" for gas extraction (Twine et al. 2012). Depending on the extent of the fracking operation, suitable habitat could be lost and disturbance levels at each of the drill sites could render the area unsuitable to cranes. However, the greatest concern is the impact that fracking could have on underground water supplies, the primary water source for all farmers, livestock, and biodiversity in this very arid region.

Grasslands

The most threatened biome in South Africa is the grassland biome, with large parts converted to mining, forestry, and maize (corn, *Zea mays*). It is estimated that 58% of this biome has been transformed (Low and Rebelo 1996), and current transformation rates are alarming. The South African National Biodiversity Assessment 2011 (DEA-SANBI 2012) predicted that by 2050, no natural habitat would be left outside of protected areas in KwaZulu-Natal based on the current rate of transformation. The Mpumalanga grasslands are also under significant threat, but from mining. Already, around 75% of the Mpumalanga grasslands are already being mined or are under mining application, largely in the form of open-cast coal mining (Mervyn Lötter, personal comm.).

Namibian Population

This small, isolated population occupies grassland habitats associated with wetlands, breeding within the Etosha National Park (ENP) during the summer and moving northwards to the Omadhiya Lakes, including Lake Oponono, for the winter months, with isolated records in the Zambezi (formerly Caprivi) Region (September 2007; Scott and Scott 2007) and Kavango Region (October 2012; Scott and Scott 2013b) of Namibia. Further potential movements to other, unknown locations are possible (Scott and Scott 2013a, Scott et al. 2011, Scott et al. 2015). Due to the semi-aridity of the core distribution area for Blue Cranes in Namibia, wetlands appear to play a critical role for the species' survival (Simmons et al. 2006, Simmons 2015).

ECOLOGY

Blue Cranes are found across a diversity of ecosystems, including the open and wet highland grasslands of South Africa, the arid ecotone between the grasslands and Nama Karoo biomes, the relatively dry agricultural landscape of the Western Cape Province, and the semi-arid grasslands in and around the Etosha National Park in Namibia (Shaw 2003, Allan 2005, Simmons et al 2006). Blue Cranes have adapted to transformed habitats and are making extensive use of agricultural lands across their range. This is particularly evident in the Western Cape Province, where they are found year-round in the wheat land/pasture mosaic, and less so across the remainder of their range, where they are found on agricultural lands during certain periods of the year, particularly the winter months when foraging (Hofmeyer 2012). Together with the Demoiselle Crane, these two species are the least dependent on wetland habitats of all the cranes.

Blue Cranes nest in secluded areas on bare ground, in short dryland vegetation, and occasionally in wetlands with short vegetation. In the Overberg of the Western Cape, Blue Cranes are found nesting more often in pastures than in cereal crops, where nest survival is also higher. Most nests, though, are in close proximity to natural Fynbos vegetation, which is a source of cover for chicks prior to fledging (Bidwell 2004). In the Nama Karoo, cranes select nesting sites in vegetation of a low height but with good cover for hiding chicks (Gibbons 2007). Across the grasslands, Blue Cranes nest in short grassland or wetland vegetation (McCann and Wilkins 1995, Morrison 1998). Across all of these areas, though, Blue Cranes select nesting sites in close proximity to water and avoid roads and areas of high disturbance (McCann and Wilkins 1995, Morrison 1998, Bidwell 2004, Gibbons 2007). Most of the water points across the drier parts of their range in South Africa take the form of artificial

water points, which are also facilitating range expansion into areas previously unsuitable for cranes (Hofmeyer 2012).

Within the Etosha National Park in Namibia, the cranes breed in grasslands in or near wetland areas on the southern and eastern edges of the Etosha Pan (Simmons et al. 2006). Such wetlands are important for roosting and predator evasion, including for young chicks, and for surviving high temperatures in these semi-arid habitats.

NUMBERS AND TRENDS

The Blue Crane is currently listed globally as Vulnerable on the IUCN Red Data List as a result of the rapid decline it experienced over a two-decade period in the late 1900s (IUCN 2019). Although historically estimated at approximately 100,000 individuals (Allan 2005), the South African National Crane Censuses, conducted over a 10-year period between 1996 and 2005, estimated the population at around 25,000 (McCann et al. 2007). Cranes in the four core regions have had mixed fortunes since then, with the Southern African Bird Atlas Project 2 data showing that the decline in the traditional grassland stronghold has continued (SABAP2 2013), in particular in Mpumalanga and the Free State Provinces. However, the national aerial surveys conducted by the Endangered Wildlife Trust and Ezemvelo KwaZulu-Natal Wildlife indicate that the population in the Drakensberg regions of the KwaZulu-Natal grasslands increased by more than 35% in the decade prior to 2013 (Smith and Craigie 2013). While the central Karoo population has probably remained stable in this largely untransformed landscape, the Western Cape population has continued to expand and increase as Blue Cranes have adapted to the wheat land/pasture land-use system (Shaw 2003, Allan 2005, McCann et al. 2007). Although we do not have current population estimates, the probable stability across the grassland and Nama Karoo populations, and the significant increases that have since been recorded in the Western Cape Province, suggest that the South African population is increasing (Hofmeyer 2012). As a result, the Blue Crane has been down-listed to Near Threatened in South Africa (Taylor et al. 2015). However, modeling has suggested that any increase in adult mortality or decline in breeding productivity could result in a sudden and significant decline in the Western Cape Population (Pettifor et al. 2009). Considering the various threats to the species, both current and in the near future (outlined below), this scenario is a strong possibility and should be monitored carefully.

Sadly, the Namibian population continues to decline and may be facing extinction. Numbers have declined from 138 in the 1970s (Berry 1984; R. Miller, personal comm.) to 80 in 1988 (Brown 1992, Simmons et al. 1996), 60 in 1994 (Simmons et al. 1996) and 2006 (Scott et al. 2015), with further declines to 35 in 2011 (Scott et al. 2011), and only 23 in 2013 (Scott and Scott 2013b). As a result of this decline, the Blue Crane is classed as Critically Endangered in Namibia (Simmons 2015).

THREATS

Current Threats

- Blue Cranes are highly susceptible to collisions with overhead power lines (Jenkins et al. 2010), particularly young inexperienced birds and adults on days with poor visibility (McCann and Wilkins 1995, Smallie 2002). Up to 12% of the Western Cape population is lost to power line collisions annually (Shaw et. al. 2010), and collisions remain the key threat to Blue Cranes in the Karoo where recorded collision rates are higher than those from the Overberg (Shaw 2013);

- The illegal removal of crane chicks from the wild for the captive trade markets, both for domestic purposes and internationally, is a threat in South Africa. In many instances, legally kept cranes are used to legalize wild-caught chicks under the pretense that they are the legal pair's chicks;

- Mining for energy resources poses a serious threat to the habitat that Blue Cranes are found in:
  - o Over 75% of Mpumalanga's grasslands in South Africa are either under mining or prospecting application, the majority of which are for open-cast coal mines that will permanently destroy the habitat (Meryn Lötter, personal comm.);
  - o Around 40% of the Karoo in South Africa is under consideration for gas exploration (Twine et al. 2012). Depending on the extent and distribution of the drilling operations, land will be transformed and water resources will be contaminated. In this arid environment, all biodiversity and people depend on groundwater; and
  - o Gas exploration is being considered in part of southern KwaZulu-Natal in the grasslands of South Africa as well;
- At the current rate of transformation of grassland to agriculture in KwaZulu-Natal, the South African National Biodiversity Assessment in 2011 suggested that there will be no natural habitat left outside of protected areas by 2050 (DEA-SANBI 2012);
- Very recently, changes in the climatic conditions and an increase in drought situations have seen a reduction in the tolerance of farmers to cranes on their wheat fields, pastures, and recently lupine (*Lupinus*) fields (where they are perceived to cause damage) in the Western Cape Province, resulting in isolated poisoning events (Jessica Shaw, personal comm.). This could potentially increase over time. Potential changes in the timing and amount of rainfall as a result of climate change may also alter breeding and survival rates of Blue Cranes (Altwegg and Anderson 2009);
- Blue Cranes, because of their tendency to feed from feed troughs, can and have been blamed for recent outbreaks of avian influenza on ostrich farms in the Overberg region, resulting in sporadic retaliation (Jessica Shaw, personal comm.);
- High levels of disturbance around nesting sites reduce breeding productivity;
- Poisoning has decreased dramatically over the last two decades. However, incidents of poisoning are still occurring, primarily to secure cranes as food. At present though, this threat is minimal for the species;
- In Namibia, illegal and unsustainable hunting for both meat and traditional medicinal uses is considered a major threat when the birds leave the confines of the Etosha National Park during the winter months (Ntinda et al. 2012). The targeting of Blue Cranes for such purposes can be viewed as an added stress which marginal populations probably cannot sustain, and at the present rate this practice is expected to contribute to the disappearance of the cranes in Namibia;
- Blue Cranes in the semi-arid habitats of Namibia are dependent upon water bodies for survival, roosting, and the rearing of their chicks; any changes in the water regime, including borehole drilling to the north of the Etosha National Park, will eventually reduce the permanence and reliability of such sources and threaten their survival, particularly during times of severe drought when competition for water increases (Simmons and Brown 2015); and
- Isolated and small populations can be prone to inbreeding effects if genetic heterogeneity has been lost (Westemeier et al. 1998). The small breeding population in Namibia could rapidly be pushed to extinction in view of its declining numbers and apparent genetic isolation, especially when coupled with hunting pressure and catastrophic events such as severe drought under global climate change (Simmons 2015).

Potential Future Threats

- A large proportion of the proposed and successful applications for wind farms is currently in the Western Cape and Karoo regions, where over 80% of the world's population of Blue Cranes occurs. At present, the impact of the turbines and the wind farms themselves are poorly understood (Jenkins 2011);

- In the Western Cape Province (their stronghold), Blue Cranes are dependent on the current agricultural landscape of winter wheat and pastures. Any changes in agricultural land use caused by climate change, land redistribution, or another economic driver could have an impact. Research has suggested that the current growth in the crane population is as a result of the usually high breeding productivity resulting from this productive landscape (Hofmeyer 2012). As a result, the estimated mortality rate of 12% (Shaw et. al. 2010) from power line collisions is not having an effect on the population. However, should the habitat change to something less suitable and breeding productivity be reduced, a sudden and rapid decline in the population could occur; and

- In Etosha National Park and in the drier areas of Namibia, the effect of climate change could impact breeding Blue Cranes. Under normal conditions, animals move away from the water holes and seepages following the start of the rains, allowing the Blue Cranes the opportunity to nest close to the waters. However, if the rains are late, or the rains stop, animals quickly move back to the water holes, and herders also move their livestock back, increasing the risk of trampling eggs and chicks.

CONSERVATION AND RESEARCH EFFORTS UNDERWAY

Conservation

- Within the Western Cape Province, the Overberg Crane Group works in collaboration with CapeNature (the provincial conservation authority) and landowners to increase awareness and to mitigate threats that arise;

- The International Crane Foundation / Endangered Wildlife Trust Partnership, together with the relevant government authorities in each province and other NGOs, are working with landowners and communities in the grassland biome of South Africa. These efforts include increasing awareness, promoting the involvement of communities in the sustainable use and management of their farms, and securing land for biodiversity and cranes. Using the Biodiversity Stewardship Programme, a legislated process in South Africa whereby landowners voluntarily enter into legally binding agreements with government to secure and sustainably manage their land, we aim to maintain a viable population of Blue Cranes in the grasslands;

- The Endangered Wildlife Trust's Wildlife and Energy Programme has a longstanding strategic partnership with Eskom, South Africa's only power utility company, to mitigate the impacts of power lines on large birds. This partnership includes both a reactive approach to improving the visibility of power lines that are or pose a risk, and proactively improving our understanding of the factors that contribute to collisions. In collaboration with the Percy FitzPatrick Institute at the University of Cape Town, Eskom-EWT currently has a large-scale marking experiment in place in the Karoo to test the effectiveness of different line markers for Blue Cranes and other large terrestrial birds, and they are collecting long-term collision mortality data in the Karoo and Overberg (Shaw et al. 2011, Shaw 2013);

- The International Crane Foundation / Endangered Wildlife Trust Partnership has an African Crane Trade Project aimed at reducing the impact that the wild-caught trade is having on wild populations. This project is addressing and developing mitigation actions at both supply and demand sides as well as along market chains. In particular, efforts are underway to include in legislation the need for

parentage testing for all cranes in trade. This requirement will reduce the illegal permitting of wild caught chicks as a front as chicks from legal cranes; and

- The Namibia Crane Working Group is active in understanding, studying, and conserving the Blue Cranes of Namibia by facilitating surveys, ringing and tracking, education, and protection in line with the Namibia Crane Action Plan (Simmons et al. 2006; Scott et al. 2009, 2011, 2015).

Research

- The International Crane Foundation / Endangered Wildlife Trust Partnership is conducting a study that will outline the use that Blue Cranes make of the agricultural landscape in the Western Cape, both temporally and spatially for foraging, nesting, and roosting. This research will provide baseline information required for objective input into applications for power line and wind farm development and will also provide a basis against which projected landscape changes as a result of climatic or economic conditions can be tested;
- The characteristics and distribution of roosting sites across their range need to be established—vital information for development and power line applications;
- An improved understanding of the molting characteristics and behavior of Blue Cranes during this time is required to fully understand the threats posed to them when flightless. As a key part of their life history, this information is essential when considering conservation action; and
- Future studies in Namibia will continue to monitor the Blue Crane population, ring birds, and study their movements, habitat use and diet, and to confirm whether this population is indeed genetically isolated from that in South Africa (Scott et al. 2015). Further research is needed to verify why the Namibian population is in decline; in particular, the use of satellite transmitters will provide key information on yet-unknown potential wintering destinations, where unnatural mortalities are suspected to be taking place (see Ntinda et al. 2012).

CHANGES SINCE 1996

The distribution of the Blue Crane and its core populations have changed since 1996. Originally with a stronghold in the grasslands, the Overberg and Swartland of the Western Cape now hold the vast majority of the global Blue Crane population. This area is a fraction of the size of the former stronghold range in the grasslands (Hofmeyer 2012). Over the past two decades, the global population has stabilized and, although still declining in certain areas of its range and stable in others, the increasing population in the Western Cape has likely resulted in the population increasing at present. However, this situation is precarious. An increase in adult mortality or reduction in breeding productivity could potentially cause a rapid reduction in the population.

The reasons for the decline prior to 1996, which included predominantly poisoning and habitat loss as a result of afforestation across the grasslands, are no longer significant threats. Poisoning at the time was largely in response to crop damage and the deliberate poisoning of cranes, or as a result of the misuse of agrochemicals. Although poisoning still occurs, it is currently relatively insignificant, resulting from rural communities accessing poisoned grain to obtain animals for food. Current threats are now primarily power line collisions, loss of habitat to agriculture and mining operations, and trade. There are also a number of future activities that could pose significant threats to the species, including wind farms, fracking, land redistribution, and climate change.

The small population in Namibia is declining and appears to be facing extinction in this country (Scott et al. 2015).

PRIORITY RESEARCH AND CONSERVATION ACTIONS

- The development of a Biodiversity Management Plan for Species – Cranes, a legislated process under South Africa law, will provide a detailed plan for the conservation of the Blue Crane in South Africa;
- The primary concern now is the energy sector, through mining, power lines, and wind farms. Addressing these issues is sensitive as energy development is required for development of the country. Research is therefore required to better understand the potential and actual threats to the species and effective mitigation measures, so that conservation action can be determined and implemented;
- Improve our understanding of how Blue Cranes use the agricultural landscape in the Western Cape Province, both for objective input into wind farm developments and for understanding the potential effects of the agricultural landscape changing through climatic and economic drivers such as land redistribution. This research will form a strong basis for future conservation action;
- Securing suitable grassland habitat under the Biodiversity Stewardship Programme is imperative to securing Blue Cranes in the grasslands;
- Further study the impacts and risk factors involved in power line collisions, and use the results of this research to make hazardous power lines more visible with appropriate devices (Barnes 2000, Shaw et al. 2010);
- Increase enforcement, rationalization of the provincial legislation, and improve implementation of legislation related to illegal trade;
- Sustainably manage captive flocks to reduce the wild-caught demand and discourage the taking of fledglings from the wild; and
- Continue to identify/verify localities where illegal hunting of Blue Cranes is believed to be taking place in Namibia, using means such as satellite tracking and interviews/questionnaires, and promote targeted, effective conservation awareness and law enforcement measures among the relevant communities.

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