

MARTIAL EAGLE | *Polemaetus bellicosus*

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Conservation Status:	Endangered
Southern African Range:	Namibia, Botswana, South Africa, Zimbabwe
Area of Occupancy:	243,000 km ²
Population Estimate:	Fewer than 350 pairs
Population Trend:	Declining
Habitat:	Grasslands, Namib, Karoo and wooded savannahs
Threats:	Shooting, drowning, poisons, diminishing food resources

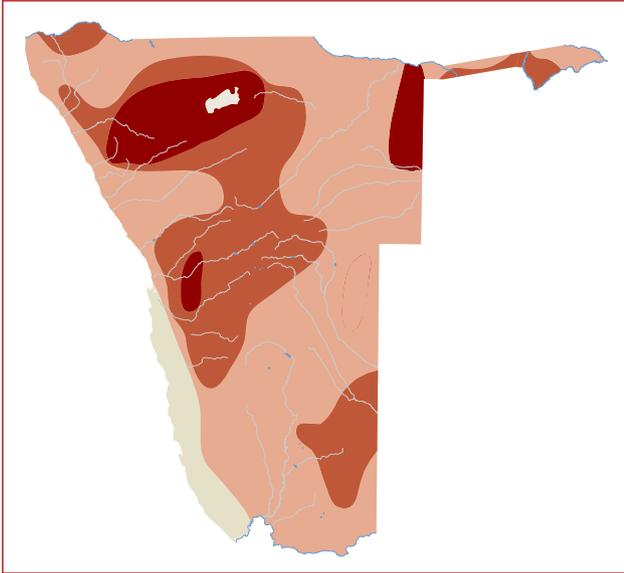


DISTRIBUTION AND ABUNDANCE

The Martial Eagle is a widespread but uncommon Afrotropical species found from the Sahel to the western Cape Province of South Africa (del Hoyo *et al.* 1994). It is locally common only in protected areas where nesting trees occur (Boshoff 1997a), but avoids dense forest habitat (Steyn 1982).

It occurs throughout southern Africa, with greatest concentrations in Kruger National Park, South Africa,

and the Kgalakgadi Transfrontier Park. In Namibia, it is widespread but sparse throughout the country, with gaps only in the Namib sand sea and some farmlands in the south where small-stock farming takes place (Brown 1991). Population concentrations occur in Etosha National Park and communal land to the west, the Tsumkwe District in the east, and central Namibian farmlands (Brown 1991, Boshoff 1997a). The highest density in southern Africa occurs on rich basalt soils in Hwange National Park, Zimbabwe, with nesting pairs 10 km apart. In Kruger National Park and surrounding conservation areas, pairs are spaced 11 km



apart, and in central Namibian farmlands, they are nearly 19 km apart (Tarboton & Allan 1984, Hustler & Howells 1990, Brown 1991, Boshoff 1993). Eagle densities in the Karoo are highest (pairs 7 km apart) where farms are stocked with indigenous ungulates (as opposed to livestock) and where primary productivity is lower (Machange *et al.* 2005).

Two density estimates of breeding pairs are available for Namibia, one inside a conservation area and one outside. There are an estimated 13 pairs in the 22,700 km² Etosha National Park, giving a density of 0.6 pairs per 1,000 km² (TO Osborne *in litt.*). However, this is likely to be an underestimate, because populations there have not been systematically studied, and large areas of Etosha are unsuitable for nesting. In central farmland, three breeding pairs were found in 840 km², giving a breeding density of 3.6 pairs per 1,000 km² (Brown 1991). Based on the size of the South African population, which is estimated at fewer than 600 pairs (Barnes 2000a), the Namibian population, with similar to lower breeding densities, is estimated at fewer than 350 pairs.



ECOLOGY

The Martial Eagle inhabits a wide range of habitats, including open grasslands where large trees occur, the gravel plains of the Namib, scrubby Karoo areas and wooded savannah. In modern times, it has become more common in treeless habitats such as the Nama Karoo, where it nests on pylons (Boshoff 1993, Machange *et al.* 2005). This has yet to be reported in Namibia. It avoids closed-canopy forests, the western edge of the Namib and the Namib sand sea, but penetrates the eastern edge of the Namib Desert along major ephemeral rivers that flow intermittently and support large trees (Boshoff 1997a). It does not generally occur in montane areas (Steyn 1982).

Adults are generally sedentary and are found in the vicinity of their large tree-nests throughout the year (Brown *et al.* 1982, Steyn 1982, Herholdt & Mendelsohn 1995). In Namibia, eggs are laid from April to August (n=40), but with 63% of clutches in May and June. The clutch comprises a single egg (Brown *et al.* 2015). The timing of egg-laying in the Nama Karoo areas of South Africa is similar (Boshoff *et al.* 1990).

Breeding success is difficult to gauge; in the only study in Namibia; Brown (1991) followed three pairs over a six-year period. Pairs laid, on average, every other year (six eggs over 12 pair-years) and fledged five young (0.42 young per pair per year). Only three young reached independence, all from the same pair, giving a success rate at the end of the post-fledgling dependence period of 0.25 young per pair per year. The mortality during the post-fledgling dependence period was 40%.

The diet of the Martial Eagle consists mainly of medium-sized mammals, especially hares and mongooses (63% of 403 prey items investigated) with only 8% consisting of (mostly scavenged) small stock, even in areas dominated by small-stock farming (Boshoff & Palmer 1980). In north-east South Africa, however, birds dominate the diet (45%), especially game birds, with reptiles (38%) and mammals (17%) forming a smaller proportion than in Nama Karoo habitats (Tarboton & Allan 1984, Boshoff *et al.* 1990). Diet is unknown in Namibia, but is probably similar to the mammal-dominated diet of the Nama Karoo study.



THREATS

The Martial Eagle suffers direct persecution through shooting and is also susceptible to drowning in farm reservoirs (Steyn 1982, Brown 1991, Anderson *et al.* 1999). In one study of a small breeding population of Martial Eagles in central Namibia, three breeding pairs were reduced to one breeding pair over a six-year period: three adults and one juvenile were found shot and another juvenile drowned in a farm reservoir. The historic breeding density in this area was five pairs. In 2014, there were no pairs in the study area (CJ Brown pers. obs.). In South Africa, it suffers from poisoning, and it is likely that this also affects the Namibian population to some extent, as evidenced by the poisoning death of Namibia's oldest ringed Martial Eagle (22 years, S Braine unpubl. data) and its probable mate near Ondangwa, in north-central Namibia (G Matongo unpubl. data). A more surprising threat is that of drowning in sheer-walled reservoirs. In southern Africa, Martial Eagles ranked highest of all eagles as victims of drowning; of 65 eagles found dead in reservoirs, 38% were Martial Eagles (Anderson *et al.* 1999). These deaths were especially prevalent in more arid parts of South Africa, where an estimated 8% of the adult population

may succumb to drowning (Anderson *et al.* 1999). This link with aridity suggests that drownings in Namibia may be more common than recorded. Some mortality is associated with collisions with power lines (van Rooyen 1999, Scott & Scott 2011a, 2011b). Between 1996 and 1999, 12 birds were reported killed under power lines in South Africa (van Rooyen 1999). The numbers killed in Namibia are unknown.

A general decline in suitable eagle prey poses a further threat (A Jenkins pers. comm.) that may have a wider impact on Martial Eagle populations than the obvious mortalities revealed in Brown's (1991) farmland studies. This threat may be reflected in the larger than predicted territories of more than 1,000 km² reported by van Zyl (1992) and reports of higher population densities of eagles in areas where natural prey assemblages are intact, such as Hwange and Kruger national parks (Tarboton & Allan 1984, Hustler & Howells 1990). This may also explain the greater eagle densities in game farms in the Nama Karoo, where large ungulates have been re-introduced, compared to densities in small-stock farming areas there (Machange *et al.* 2005). In order to determine whether the higher density areas are indeed, source as opposed to sink populations, an analysis of the adult turnover in each area is required.

Recovery from persecution will be low without immigration for several reasons: apart from a small clutch size and low breeding success, three studies in Namibia and South Africa demonstrated that birds failed to lay eggs in 38% to 66% of prepared nests (Tarboton & Allan 1984, Brown 1991, TO Osborne *in litt.*). This is peculiar to all large species, but the loss of long-lived adults is particularly detrimental to a long-lived species with a low reproductive rate, but the more important reason is the very high mortality of young birds. These birds wander widely and are exposed to many different landowners and custodians. A mortality of 40% between first flight and independence suggests that few birds will survive until adulthood. This impacts not only on populations on freehold and communal land, but also birds in protected areas, albeit over a longer period of time. As birds in protected areas get old and die, there are no young birds to replace them, and populations decline (Brown 1991). It is thus imperative that a landscape approach be adopted to the conservation of large birds of prey, in which all landowners and custodians are stakeholders.



CONSERVATION STATUS

This species is classified as *Endangered*, because populations have declined by as much as 80% in little over five years through direct persecution in central parts of its range (Brown 1991). Given that this occurred in freehold farmlands (Brown 1991) and that at least 50% of Namibia's

Martial Eagles are estimated to occur on freehold farmland (Boshoff 1997a, Mendelsohn *et al.* 2002), it is likely that populations elsewhere have suffered similar declines. This is supported by the lack of recruitment into populations that have lost adults due to poisoning (Brown 1991). The small population, estimated at fewer than 350 pairs (or about 1,000 individuals), also places this species in the *Endangered* category. For these reasons, it should be given *Specially Protected* status in Namibia. It is not considered globally threatened (IUCN 2014), and was listed as *Vulnerable* in South Africa (Barnes 2000a). In the latest South African Red Data List it has been elevated to *Endangered* (Taylor *et al.* in press).



ACTIONS

Educating farmers, especially in the small-stock farming community, about the threatened status of this species is a priority, given the large number of Martial Eagles that die directly at the hands of man. There is little doubt that Martial Eagles do occasionally take domestic stock, but studies have shown that most items are probably scavenged and form a minor proportion of all prey (Boshoff & Palmer 1980). Farming philosophy should be focused on small stock protection and not on predator control. Some adult pairs tend to be much more successful at reproduction than other pairs (Brown 1991), and there is strong fidelity to nest sites (Herholdt & Mendelsohn 1995). Thus, highly successful (source) nests should be identified and directly protected, as they are likely to add significantly to the recruitment of pairs elsewhere, where breeding is less successful (sinks). Covering of farm reservoirs in arid areas will also reduce the number of birds drowning in arid areas of southern Africa (Anderson *et al.* 1999).

Most importantly, additional research on important population processes such as adult survival and turnover, the breeding frequency and success of individually marked birds in protected and unprotected areas, and the movement patterns and survival of young birds should be undertaken. This will determine if protected areas remain sources for Martial Eagles in Namibia, or if these populations are in slow decline because of a lack of new birds joining the breeding population, and will help to differentiate between degraded habitat (and low prey base) or direct mortality through persecution as the reasons for a lack of recruitment and reduced populations in Namibia. This information is important, because a low level of persecution can be sustained by an otherwise healthy population where prey and nest sites are abundant, as is the case for certain heavily persecuted Verreaux's Eagle (Black Eagle) *Aquila verreauxii* populations in the Karoo (R Davies pers. comm.).