mercury rising

South Africa's national parks are getting warmer

In a natural world increasingly damaged and fragmented by human activities, protected areas are becoming ever more important for the conservation of threatened bird species. Just one of many vivid illustrations of the significance of protected areas is provided by the abundance of raptors in the Kgalagadi Transfrontier Park (TFP) in the Northern Cape; densities are roughly 10-fold lower in areas surrounding the park, for instance along the Kuruman River between Askham and Vanzylsrus.

Protected areas such as South Africa's network of national parks can buffer birds from the negative effects of many human activities, but there is one anthropogenic impact from which they can offer very little protection: climate change. Indeed, many biologists have predicted wholesale losses of birds and other animals from conservation areas during the 21st century as species' distributions shift towards cooler areas as a consequence of rising temperatures.

A comprehensive analysis of weather data for South Africa's national parks forms the basis of an important and concerning new study published in the *International Journal of Meteorology*. Of the 13 parks with sufficient records over recent decades for meaningful analyses, nine showed statistically significant increases in temperature. Maximum temperatures increased, on average, by 1.20 degrees Celsius over the past 50 years.

However, the extent of warming differed markedly between parks. The most pronounced increases in maximum temperatures occurred in the arid north-western parks, with an increase of 1.95 degrees occurring over the past five decades in the Kgalagadi TFP. One important driver of this warming trend has been an increase in the frequency of very hot days, with the Kgalagadi TFP currently experiencing on average 36 more days per year with maximum temperatures above 35 degrees compared to the situation 50 years ago.

Minimum temperatures have increased at approximately the same rate as maxima, with an average increase across all parks of 1.05 degrees during the period. However, some parks have bucked the trend: Golden Gate Highlands showed no significant changes in any temperature variable, and minimum temperatures in Mountain Zebra decreased by just over one degree over the past 25 years. Overall, however, rising temperatures are the overwhelmingly dominant trend across South Africa's flagship protected area network.

The authors of the study point out that warming in our national parks has occurred at rates considerably higher than those predicted by the models that form the basis for most mainstream climate-change projections. In many instances, the magnitude of warming that has already occurred approaches that often predicted for the year 2035. These climate trends are hence more consistent with worst-case, rather than conservative, global-warming predictions.

The findings provide yet more stark confirmation of the reality of climate change. They serve as a sobering reminder that, even in protected areas, rising temperatures have the potential to affect birds in a myriad of ways that we are only just beginning to understand. And they highlight the need for conservation strategies that explicitly acknowledge that birds will have to cope with very different climates in coming decades.

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Reference

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heavy metal

WHITE-BACKED VULTURE ALBERT FRONEMAN

Vultures and lead poisoning

Africa's vultures are in deep trouble. Recent population declines – attributable primarily to poisonings and the traditional medicine trade – have seen many of the continent's vulture species slip significantly closer to the abyss of extinction. The most recent reassessment of their conservation status paints a bleak picture: four species red-listed as Critically Endangered and a further three as Endangered.

One of the more insidious threats faced by vultures globally is lead poisoning, usually the result of feeding on the carcasses of animals shot with lead bullets. This issue contributed to the near-extinction of the iconic California Condor *Gymnogyps californianus* in North America during the 1980s and remains so serious today that most of the approximately 200 wild-flying condors are captured yearly for the monitoring of lead levels in their blood. Every year, about 20 per cent of the population shows concentrations of lead that are high enough to require chelation therapy. This involves condors being held temporarily in captivity and injected with chemicals that bind to the circulating lead molecules and remove them from the birds' systems.

Very little is known about the severity of the threat posed by lead poisoning to African vultures. To address this potentially critical gap in our knowledge, a team from the Denver Zoological Foundation and Raptors Botswana measured blood lead levels in nearly 500 White-backed Vultures *Gyps africanus* in Botswana between 2012 and 2015. Their findings give cause for concern: the blood lead levels of 136 vultures were significantly elevated above background levels, and those of an additional 11 individuals exceeded the threshold concentration above which California Condors receive chelation therapy.

These findings suggest that lead poisoning warrants much closer attention as a factor potentially contributing to the population decline of Africa's vultures. This issue has also been identified in other threatened species, including Southern Ground-Hornbills *Bucorvus leadbeateri*. The new vulture data from Botswana thus underscore the urgent need to better understand this potentially consequential human impact.

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Reference

Kenny, D. et al. 2015. 'Blood lead levels in White-backed Vultures (*Gyps africanus*) from Botswana, Africa.' *Vulture News* 68: 25–31.