Climate Change and raptors

Background

Increasingly hot temperatures across the globe and the melting of thousand year-old ice shelves on the Antarctic Peninsula are just some manifestations of a rapidly changing climate on the earth. The ten hottest years on record have been recorded in the last 14 years and the hottest of those was 2005. Why is this? Since the industrial revolution 300 years ago humankind has been generating millions of tons of carbon dioxide, which has simply been accumulating in the atmosphere. While this increased concentration of CO_2 in the atmosphere is only slight, it has caused rapid warming of the climate and will continue to do for at least 100 years even if we stop all carbon emissions tomorrow. Climate change means that natural ecosystems will need to change to adapt to earlier springs, less rain (in southern Africa), more storms, more fires and, for coastal species, higher tides and high seas. For butterflies and amphibians in the northern hemisphere climate change has already shifted their range hundreds of kilometres northwards in the last two decades, and caused extinctions of those species incapable of adapting to the new climatic regime. In southern Africa, rapid, recent and substantial range shifts have been recorded in some bird species, such as crows and Hadeda Ibises, and in some raptors, such as the Black Sparrrowhawk, but whether or not these are due to climate is hotly debated.

Which raptor species are most at risk?

For some birds, shifting ranges have been predicted through modelling of the climate "envelopes" in which they occur, and several classes of birds are predicted to be prone to habitat fragmentation and shrinking ranges.

- Montane species which occur primarily on mountain sides and mountain tops will be forced upslope as temperatures increase. Raptors such as the Bearded Vulture and Cape Vulture are therefore at risk as temperatures increase. We would expect to see reduced breeding and abandonment of the northern-most and north-facing colonies by 2050 when average temperatures are predicted to have increased by about 2°C. The absence of breeding Cape Vulture at colonies in Zimbabwe and Namibia support this.
- Range-limited species which are already restricted to small areas or are endemic to southern Africa, could be pushed further south, compressing their ranges. Such species include Jackal Buzzard and Black Harrier, especially the harriers in their core breeding area on the Cape West Coast. This region will experience some of the highest temperature increases and up to a 20% decrease in rainfall by 2099.
- Wetland species are at risk because of the expected 10% decrease in annual rainfall by the end of this century across southern Africa. Ephemeral wetlands will be flooded less often, and river flow will be reduced. A predicted 72% drop in river flow at Maun by 2099 will mean the Okavango Swamps, an important area for African Marsh Harrier and Western Banded Snake Eagle will be flooded infrequently.
- Grassland species such as migratory kestrels, migratory harriers, Grass Owls, kites and the Secretarybird will face increasing bush encroachment in grassy habitat as increasing CO_2 levels favour the growth of woody plants.
- Migrant species in general may be hardest pressed to cope with changes given that both ends of their range are changing in climate and habitat. Also for the longest distance travelers, such as Amur Falcons, the northern end of their range is changing climatically faster than our southern end, meaning such species have two (different) problems to solve.

What can we do?

Adapting to change for humans as well as for the biodiversity around us is a huge task. Humans need to reduce their carbon footprint (release much less carbon dioxide in their daily lives). We can do this by moving to solar or wind energy, and by reducing our dependence on motor vehicles and associated industries which are major carbon generators. As raptor conservationists, we need to determine how different species are being affected. The research and monitoring that is required includes:

- Monitoring across species' ranges and looking for lower occurrence in northern areas (from new and old atlas data)
- Assessing reduced breeding success or less frequent breeding
- Look for complete range shifts (using historical data)
- Look for body size changes (over 10+ yrs)
- Look for behavioural manifestations of heat stress (panting, head-drooping, shading chicks) in north vs south facing situations
- Look for trends in timing of arrival for migrant species (e.g. migratory kestrels)
- Look at occupancy for cliff-nesting vultures at lowland sites vs high altitude sites and north facing vs south-facing nest ledges

Conservation planners need to predict the future climatic effects on all of our raptors and plan for protected areas in new areas where large numbers of species may find refuge.

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