LAND INVASIONS

Are indigenous expansionists cause for concern?

WARWICK TARBOTON

As extinctions occur at a rate unprecedented in recent history, the eyes of the world's conservationists are firmly focused on the planet's diminishing biodiversity. In the case of birds, the path to extinction is most often paved by fragmentation, degradation and subsequent loss of habitat. Whilst these concerns are of paramount global importance, what is sometimes forgotten is that the loss of any habitat has, as a necessary corollary, its replacement with another. In some cases, these changes are extreme – such as the transformation of wetlands to residential areas, or grasslands to conifer plantations. In others, such as the replacement of Zanzibar forests with clove plantations, structural changes are less dramatic.

In this article, **Phil Hockey** considers how changing landscapes may have resulted in range expansions of indigenous birds, and whether such range shifts are cause for concern. ▷

Previous page *Black Sparrowhawk has used the proliferation of exotic plantations, such as eucalypts, to its advantage as nesting sites.*

Below *The ability of Sacred Ibis to live in close proximity to man aided its colonisation of arid areas.*

WARWICK TARBOTON (2)

Birds respond more to the physical structure of the environment than they do to its botanical make-up. Obviously, there are exceptions to this generalisation, such as nectar-feeding birds that depend on one or a small suite of flowering plant species. But at the other extreme, man-altered habitats create environments that can be exploited by opportunists. Red-winged Starlings and Speckled (Rock) Pigeons, for example, find the ledges of high-rise buildings perfectly adequate substitutes for their natural nesting sites on cliffs.

Not only 'generalists' have made such adaptations. The Chestnut-banded Plover is an extreme specialist, dependent almost entirely on hypersaline pans. Commercial saltworks have provided an excellent alternative habitat and, as a result, the plover's range and numbers have increased. Other wetland specialists have been similarly opportunistic. Near Phalaborwa, adjacent to the Kruger National Park, Cape Teals, flamingos and many waders have colonised shallow, phosphate-rich pans on the tops of large mine dumps. Another habitat specialist, Sclater's Lark, is dependent on water. The construction of small farm dams in the western Karoo has increased the species' potential breeding range (as it has done for other water-dependent species, such as sandgrouse).

It is not difficult to imagine how the landscape-level changes to the environment that result from agriculture and other human activities can cause large-scale changes to the distributions of native birds. For species that respond positively to such changes, there could be far-reaching ramifications as they come into contact with 'new neighbours'. Southern Africa provides an excellent canvas to examine such changes, firstly because it is a region of dramatic natural gradients, and secondly because it has experienced substantial changes at the hand of man. The gradients in question are primarily longitudinal rather than latitudinal: the east experiences higher rainfall than the west, supports more structurally complex vegetation, and has a richer bird diversity. The west, by contrast, is dry, dominated by short, scrubby vegetation, and supports relatively few bird species. Because species richness is greatest in the east, it could be mathematically predicted that westward range expansions (from areas of high to low diversity) will be more frequent than vice versa.

Man-made changes to local environments have either increased the structural complexity of the habitat (such as the replacement of highland grasslands with commercial forestry), or decreased it (such as the replacement of fynbos with cereal crops, or lowland forest with sugar-cane). Similarly, the plethora of farm dams built for either stock-watering or irrigation has dramatically changed the distribution of surface water, especially in the arid west.

Some predictions of how landscape-level changes could result in range expansion

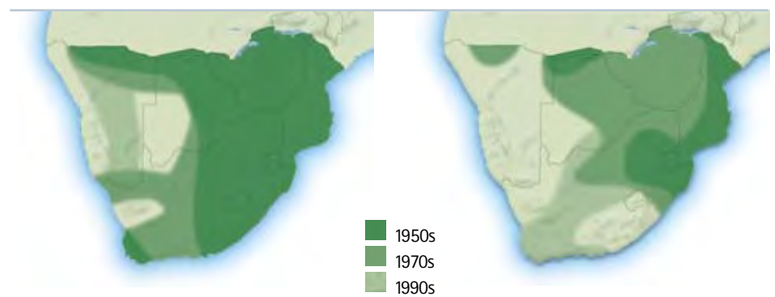
- Proliferation of farm dams favours waterbirds
- Increasing tree cover (plantations, suburban gardens) favours woodland- and forest-adapted species
- Buildings and other structures favour species that breed on 'hard' surfaces, such as cliffs or caves
- Electricity pylons provide nest sites for tree-nesting species in otherwise treeless landscapes
- Increasing spread of humans favours man's commensals.

Effects of the changes

Proliferation of surface water

Globally, wetlands are one of the planet's most threatened habitats, yet, in southern Africa, thousands of small wetlands have been created in the arid regions for irrigation and stock-watering. The effect of this has been to create a more uniform distribution of wetlands across the region. Wetland birds have most definitely responded to this change: of 92 species thought to have increased in numbers or range in the Western Cape during the 20th century, 30 (32 per cent) are associated with freshwater wetlands. In contrast, of 30 species whose range/numbers have decreased, only seven are wetland species (all requiring large, vegetated wetlands or pristine rivers).

The past 50 years have seen a number of colonisations of the Western Cape by wetland species from the east or north, including Blacksmith Plover and White-faced Duck. One of the most dramatic expansions has been that of the Glossy Ibis. Between the 1950s and 1970s, this species more than doubled its regional range, expanding westwards as far as the Free State and central Botswana. Not long afterwards, it made its way across the Karoo to colonise the Western Cape, where it is now common, probably numbering in the thousands. Hadeda and ▷



Sacred Ibis Glossy Ibis

CHRIS VAN ROOYEN

Sacred ibises are also recent colonists of the west. The former is thought to have used irrigated lands as stepping stones through the dry country, while the latter probably exploited a combination of man-made wetlands and other human artefacts, such as refuse dumps.

Afforestation and gardens

The regional demand for timber, and especially pulp, has led to afforestation in habitats ranging from the lowlands of KwaZulu-Natal to highveld grasslands and fynbos. Pines and eucalypts are the dominant trees of plantations and, whilst such stands are generally sterile habitats for birds, a handful of species, especially raptors, have used them to great advantage as nesting sites. Two such opportunists are the Black and Rufous-chested sparrowhawks. As recently as the mid-1970s, Black Sparrowhawks were unknown in Cape Town; today, they are not only common, but increasing.

Gardens too have paved the way for colonists. In Zimbabwe, Harare has become a green 'island' and new species have arrived in response. Purple-crested Turacos have been resident for more than 30 years. More recently, both Variable Sunbirds and Thick-billed Weavers have moved in from the Eastern Districts.

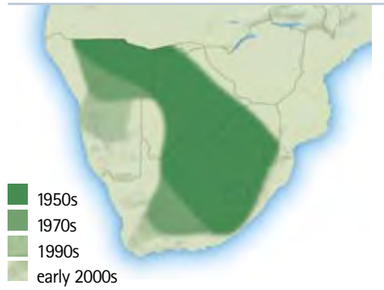
In Gauteng, there has been a similar response by the Grey Go-away-bird. Forty years ago, its range stopped well north of Pretoria; today, it is one of the first birds a visitor to Johannesburg is likely to encounter. At present, African Olive-(Rameron) Pigeon appears to be undergoing a similar invasion of highveld suburbia.

In the Western Cape, the African Goshawk was almost unknown 30 years ago. Today, it is probably the most common raptor in Cape Town, breeding and hunting in suburban gardens. Similarly, until the 1950s, Burchell's Coucal was barely known in Cape Town; today it is a common garden bird of the greener suburbs. At least one fynbos endemic – the Cape Bulbul – has also adapted well to garden life and has used gardens as stepping stones to colonise Namaqualand. Even in the Karoo, gardens have affected bird distributions. Rufous-chested Sparrowhawks have moved into eucalypt and poplar groves around farmsteads, and the spread of the African Harrier-Hawk has been little short of meteoric.

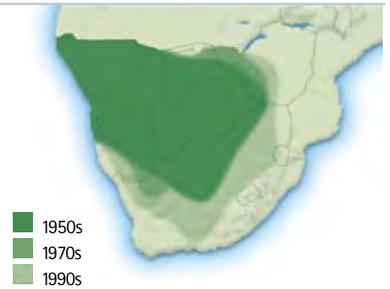
Man-made structures and man's commensals

Worldwide, birds use man-made structures as substitutes for natural nesting and roosting habitats: falcons, owls, storks, starlings and swifts are but a few of the birds that breed on buildings. In the case of the Purple Martin *Progne subis* of America, it is suspected that almost the entire world population breeds in nest boxes. In southern Africa, road bridges and culverts have facilitated the spread of at least one species, the South African Cliff-Swallow. Anyone who has passed under Karoo bridges in summer might wonder where these birds bred historically, and whether indeed they continue to breed in natural habitats. By the mid-1990s, the cliff-swallows had arrived within a few hundred kilometres of Cape Town; five years later, this distance had been reduced to a mere 50 kilometres. In Zambia, construction of roads and culverts has produced a similar response by Red-breasted Swallows.

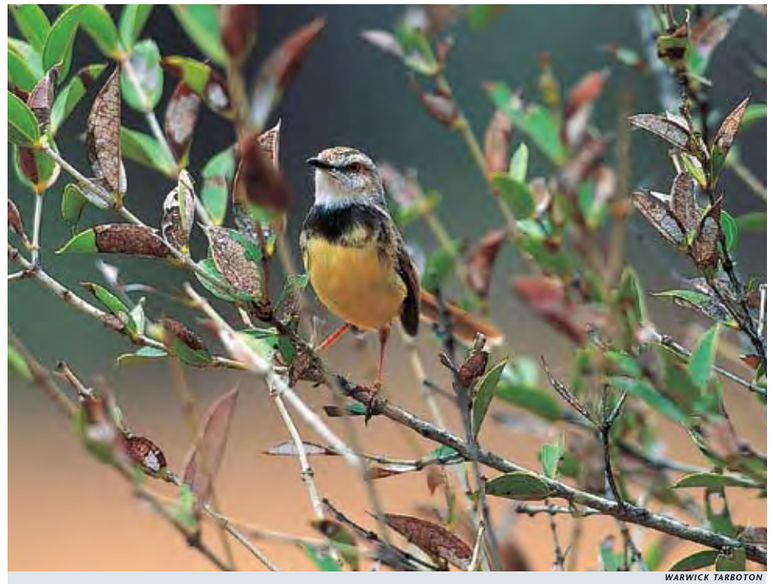
Electricity pylons have also affected distributions. Used as nest sites, they attract crows to otherwise treeless landscapes. ▷



South African Cliff-Swallow



Black-chested Prinia



WARWICK TARBOTON

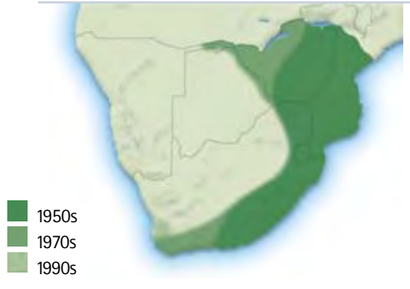
Black-chested Prinia – is its range expansion indicative of climate change?

Climate change – the curved ball

In north-western Europe, several birds have expanded their breeding ranges northward. This is thought to be a consequence of global warming – the same phenomenon that may be responsible for the northward retreat of breeding Ruffs to the fringes of the Arctic Ocean. In southern Africa, in contrast to most range expansions which have been westwards, some dry-country species have expanded their ranges to the south and east. The reasons for these changes are not immediately obvious, but they do suggest that the border of the 'arid zone' itself may be moving. That changes are happening in the arid zone is supported by broad-scale increases in the mortality rate of kokerboom *Aloe dichotoma* trees. Mortality rates of these trees have increased in the hottest parts of their range, but populations in the cooler south are increasing. Both Pririt Batis and Black-chested Prinia increased their ranges more rapidly between the 1970s and the 1990s than between the 1950s and the 1970s, suggesting that the rate of aridification might be accelerating: this accelerating rate of change is also supported by meteorological data.

In southern Africa, climate change is predicted to have dramatic impacts on vegetation within the next 50 years. It is highly that many range shifts will occur among birds; some of these are likely to become apparent within the next decade.

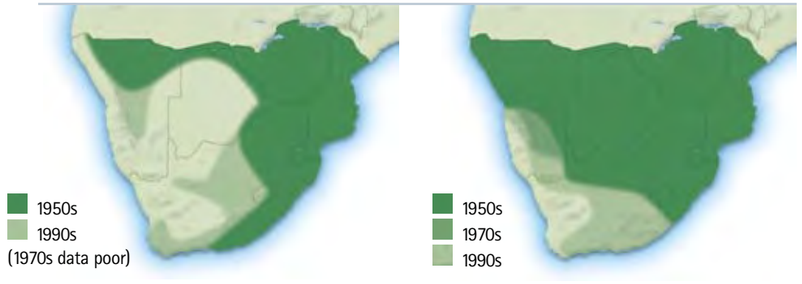
Three expansionist top predators – African Goshawk (above), Black Sparrowhawk and African Harrier-Hawk – have all colonised areas where no equivalent predator existed before.



African Goshawk

Black Sparrowhawk

African Harrier-Hawk



Lesser Honeyguide

Southern Grey-headed Sparrow

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The African Olive-Pigeon is currently undergoing a range expansion in Gauteng, where the greening of the suburbs has provided it with ideal habitat.

These nests in turn are taken over by other new colonists, including Lanner Falcons, and Greater and Rock kestrels.

Some species are highly successful at living with man, certain sparrows, starlings and mynas being cases in point. Indeed, the record for the fastest ever spread of a bird species in southern Africa is held by the alien House Sparrow. In the 1950s, it was confined to a fairly small area in the south-east of South Africa; by the 1990s, it had colonised the entire region bar a small portion of north-western Botswana. The indigenous Southern Grey-headed Sparrow has also spread. This range expansion started in a small way in the 1960s and 1970s, but has subsequently progressed rapidly. This species is one of the hosts of Lesser Honeyguide and may partly, but by no means wholly, explain the westward expansion of the latter's range.

Expansionists – bonuses or liabilities?

Several range-expanding species are large birds at the tops of food chains, the most obvious being raptors. Almost 20 years ago, it was noted that bird communities in the vicinity of Karoo farmsteads supporting Rufous-chested Sparrowhawks were depauperate compared to those around farmsteads without hawks. Whether the small birds had been scared away or eaten was never established, but it is certain that these birds were suddenly faced with a predator that hunted in a manner they had never previously experienced. It was suggested at the time (*Bokmakierie*, 38(1):3–4) that it might be considered a conservation coup if Rufous-chested Sparrowhawk could be removed from the list of birds occurring in the Karoo National Park.

Impacts of most other 'range-expanders' have never been studied. In Cape Town, both African Goshawks and Black Sparrowhawks undoubtedly eat many birds, mostly caught in and around suburban gardens. Both species may be indigenous to southern Africa, but are they indigenous to the Cape Town area? Some believe that the recent appearance of Black Sparrowhawk represents a re-colonisation of the Cape Peninsula following a past extinction. These birds may be performing an ecological role in controlling populations of other species (such as doves, Feral Pigeons and European Starlings) whose numbers have been artificially inflated by man's urban activities. A flipside of this, however, is that the range and numbers of Lemon (Cinnamon) Dove on the Cape Peninsula have decreased since the hawks' arrival, with the remaining populations being confined to areas of dense cover.

ALBERT FRONEMAN

The expansion of the Southern Grey-headed Sparrow's range seems to be fairly closely tracked by that of its parasite, the Lesser Honeyguide.

On the coast, Sacred Ibises have become regular predators at seabird colonies, eating eggs and chicks of African Penguins, Swift Terns and cormorants. Coupled with greatly increased numbers of predatory Kelp Gulls, which themselves have benefited from supplementary food provided by man, this begs the question of whether these expansionists do, or soon will, pose a significant threat to breeding seabirds.

A conservation mindset exists that 'indigenous is good and alien is bad'. Wars are justifiably waged on alien House Crows. House Crows hitch-hiked on man-made boats, but did Black Sparrowhawks island-hop through man-made stepping stones of alien trees? Is there such a big difference? Perhaps the time has come to look more closely at how our activities may be affecting the distribution patterns of indigenous species and to question rigorously whether they do or do not make valuable additions to local biodiversity. □

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SOURCES FOR RANGE MAPS

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