Raptor responses to habitat fragmentation

The development and spread of agriculture has caused substantial landscape-level changes on every continent except Antarctica. The accompanying loss and fragmentation of natural habitats is one of the greatest threats to the planet's biodiversity and one of the greatest challenges facing conservation biologists.

However, human activities also result in the creation of 'new' habitat fragments, such as urban gardens, and plantations. Where these add to the structural diversity of the landscape, they provide opportunities for colonisation by species previously absent.

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Fragmentation of shrublands in the Overberg may have reduced Black Harrier numbers by as much as 85 per cent.

Both types of fragmentation have occurred in close juxtaposition in the Western Cape. Many of the lowland shrublands have been replaced by structurally more simple and seasonally more variable croplands and pastures. By contrast, on the Cape Peninsula, many shrublands have been replaced by alien trees, providing taller, more three-dimensional and more stable habitats than the ones they replaced.

Predicting the responses of birds to fragmentation is difficult, and MSc student Odette Curtis is comparing the ways in which two species at the top of their respective food chains respond to the different types of fragmentation. On the one hand, the Black Harrier *Circus maurus*, the rarest and most range-restricted of the world's continental harriers, is a specialist inhabitant of native shrublands and may have lost as much as 50 per cent of its natural habitat to crop farming and viticulture. On the other hand, the Black Sparrowhawk *Accipiter melanoleucus* has been able to colonise the Cape Peninsula in the past 15 years, seemingly by virtue of its affinity for patches of alien pines.

The Swartland and Overberg lowlands are characterised by remnant patches of renosterveld, many of which are very small. In a survey of about 80 such patches in both the west and south coast lowlands, ranging in size from a few hectares to several thousand hectares, Curtis located breeding Black Harriers in fewer than 10 patches, all in the Overberg. Most of the sites where harriers bred were patches larger than 100 hectares and where the plant community was relatively intact. Harriers only bred in smaller patches where the surrounding landscape was dominated by renosterveld rather than crops or old lands. This requirement for renosterveld while breeding appears to be linked to the birds' foraging. When provisioning males were radio-tracked, they spent only a miniscule proportion of time hunting over transformed land, even though such habitat was readily available within striking distance of the nest.

Unlike some northern harriers, Black Harriers do not breed in croplands, and it appears that renosterveld patches are critical to the birds not only as nesting sites but also as feeding areas. It can therefore be predicted that the birds would respond negatively to fragmentation. This seems to be the case. Curtis has calculated that in the Overberg alone, the minimum historical size of the population was about 400 pairs; today, this population is thought to number fewer than 60 pairs.

The larger Black Sparrowhawk, by contrast, has shown the opposite response to fragmentation and has thrived in patches of pine trees scattered among suburbia. So why the completely different responses by two top predators?

The answer seems to lie in the nature of the birds' reliance on habitat fragments. Harriers need fragments both for breeding and feeding, whereas sparrowhawks need them only for breeding. Sparrowhawks rarely (if ever) hunt in pine plantations, but rather plunder the superabundance of doves (their main prey) in adjoining suburbia.

Returning to the broader picture of biodiversity implications of fragmentation, this study suggests that if scientists are to become more accurate in their predictions about which species will be lost as fragment sizes decrease, it is of vital importance to understand why a particular species needs the patch. Species dependent on remnant patches for all aspects of their existence may be those most prone to local extinction, whereas species dependent on the patch for only a limited suite of their requirements may be able to persist – or as in the case of Black Sparrowhawks, thrive – in much smaller patches. □

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