WATERBIRDS *in a changing world*

There is no doubt that we live in a changing world, and predicting how species will respond to environmental modifications caused by human activity is a key aim of conservation biology. If, for example, we can make accurate forecasts about how species' ranges might change in the future, it may be possible to plan strategic networks of protected areas in order to conserve the maximum amount of our biodiversity.

A natural resource in southern Africa that is under ever-increasing pressure from human demands is water; apart from the immediate human need for it, water is fundamental to industry and agriculture. These demands have altered the face of South Africa's wetlands and some birds dependent on this habitat have already responded by expanding or contracting their ranges. However, in order to plan for future scenarios, it is necessary to understand why certain species respond in a particular way.

In 2008, Fitztitute researchers Nicola Okes, Phil Hockey and Graeme Cumming published a paper in the American journal *Conservation Biology* (Vol. 22: 151–162) that undertook just such an analysis of southern Africa's waterbirds. In particular, they attempted to identify suites of attributes that distinguished range contractionists from expansionists. This first involved identifying those species that had decreased in range and/or abundance (26 species), those that had increased (32 species) and those that had remained stable (28 species). All were then characterised in terms of their life-history traits, such as breeding parameters, movements and diets, and ecological traits, such as habitat usage.

Theory predicts that life-history traits should be effective in predicting species' responses to environmental modification (although very few studies have tested this idea using hard data). Interestingly, this study could not make that linkage with any confidence, despite employing some fairly fancy mathematics. Rather, the study demonstrated convincingly that range changes could be explained with high confidence based on the habitats used by different species.

In essence, two types of range changes have occurred. Expansionist species have typically extended their distributions towards the arid west of the subregion, while range contractionists have shrunk their ranges in the opposite direction, towards the moist east. One of the features that characterises expansionists is their use of natural, open water bodies. This, it seems, has pre-adapted them to be able to exploit farm dams and other water-storage bodies that have proliferated in the dry west of southern Africa. Examples of such expansionists include Maccoa Duck *Oxyura maccoa*, Black-winged Stilt *Himantopus himantopus* and African Spoonbill *Platalea alba*. Range contractionists, on the other hand, are species of marshes and vegetated wetlands, and many breed in reedbeds. An analysis of the status of South Africa's wetlands published in 1995 showed unequivocally that the rate and extent of wetland loss and degradation in the east of the country was far greater than in the west, driven mostly by agriculture and urbanisation. This has reduced the ranges of several species, including Lesser Jacana *Microparra capensis* and Rufous-bellied Heron *Ardeola rufiventris*.

Not only was this study able to explain patterns of range changes that have already occurred, it also identified some species that cluster ecologically with the contractionists but have not as yet undergone detectable range reductions. This list includes Marsh Owl *Asio capensis*, African Snipe *Gallinago nigripennis*, African Pygmy-Goose *Nettapus auritus* and White-backed Night-Heron *Gorsachius leuconotus*. It is possible, of course, that these species have already undergone range or population contractions, but that we are unable to detect these because of poor historical data. Nonetheless, these are species whose status should be monitored carefully because, based on what has gone before, they are potentially at risk of reductions in the near future. □

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African Spoonbill – one of the species whose range has expanded thanks to artificial waterbodies.

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