

Symposium Presentation No. 3

Connectivity Conservation – connecting nature in space and time

Professor Andrew Bennett

La Trobe University and Arthur Rylah Institute

Summarised by Peter Mitchell

This talk was about connectivity conservation in general and connectivity in space and time. Connectedness is a fundamental aspect of conservation. Connectivity and biolinks are about connected systems and networks; it is the habitat and the capacity for movements and interactions and flows between habitats that is important for conservation.

A simple example is the connection between a creek in Central Victoria flowing down to the pelicans at the mouth of the Murray. Another example comes from work in Rushworth Forest. Over 20 years, most species were only seen occasionally – they come from somewhere else. Some came from the more open woodland country nearby, some were seasonal migrants that came from many different parts of Australia. Even the abundant Red Wattlebirds had peaks and troughs related to the flowering of ironbarks. These bird movements demonstrate that nature is connected in many ways. But this connectivity can be disrupted and lost.

Landscape genetics can show a lot about patterns of connectivity over long periods of time. Studies of Yellow-footed Antechinus showed that the genetic composition of populations within a locality are similar but the genetic composition differed at different sites along the Murray. These studies can provide a measure of connectivity. For example, populations on opposite side of the river were similar indicating that the river is not a barrier to movement, and similarities between Rushworth Forest and Reedy Lake also demonstrated that there is still continuity for Antechinus between these sites. That is what we want to preserve.

The challenge is that different species have different movement patterns and habitat tolerances which makes it difficult to come up with solutions to maintain the connectivity that Veronica Doerr referred to (see previous talk). Veronica noted some general similarities between the species she described, but different species

Linking Landscapes Symposium

Bendigo, May 2017

Biolinksalliance.org.au



often have different scales of movement and capacities to move through disturbed landscapes.

The starting point for conservation is to protect and maintain what is already there. Streamside vegetation even in the largely cleared landscapes of northern Victoria are important for a range of fauna. Riparian strips are more productive and bird composition is disproportionately higher in these areas. Roadside systems are also important. They provide both continuity for movement and good habitat including large old trees and diverse understorey where a variety of species can live.

At a larger regional scale, ARI modelled the least-cost way for 10 different species to move across the northern plains. The model has limitations but highlights the things to consider in landscape design. Habitat networks need to be built between the large blocks (core habitat) containing large populations (source populations), incorporating streamside systems in particular but also existing remnants - roadside corridors, patches and scattered trees. By building from this base, we also increase the total amount of habitat important for sustaining populations. The more habitat there is, the more likely it is to be close and connected.

Connecting nature in time is also important. Species depend on resources that change in availability through time, so a sequence of resources is needed. Structural connectivity is easy to see and map, but functional connectivity – whether organisms can actually move through a landscape - is less obvious. Is there a sequence of resources in the right place at the right time in our biolinks?

For honeyeaters, the continuity of eucalypt nectar depends on the flowering times of a range of tree species living in different parts of the landscape. For Antechinus, disturbances such as fire can affect habitat quality and hence functional connectivity: fire will reduce the number of den sites available and frequent burns can create large problems for local populations. For Fairy-wrens, the millenium drought caused a decline in the cover provided by wattles and cassinias in box ironbark forests and the species disappeared; they are only recently returning as shrubs recover. Are we thinking at large enough scales with networks of habitat that will improve the capacity of species to recolonise?

Finally, what everyone does matters. Landscapes are made up of many individual bits on properties, streams, roadsides, etc. Take one away and the whole landscape is affected. On the other hand, our conservation activities have both local area benefits and also large benefits for connectivity across the wider landscape.