

Reptiles' burning question

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Bushfires that sweep through the remnant vegetation of South Australia's peninsulas may represent either salvation or doom to the native reptile inhabitants.

A two-year study headed by Flinders biologist Dr Don Driscoll at five sites across Eyre Peninsulas has found that the total burning of mallee scrub remnants leaves the resident native reptiles little room to manoeuvre.

At the same time, a lack of fire for decades in some areas has negative consequences for species reliant on fire to kick-start vital cycles of plant regrowth.

One answer may be to set up a systematic mosaic of burning off remnant scrub.

"The most important patterns are that different species have opposite responses to fire," Dr Driscoll said.

"Some species do well immediately after the fire, but then they decline over time; whereas other species almost disappear straight after a fire and then recover slowly.

"The pattern of succession after fire in reptiles is dependent on vegetation."

A total of 47 different species were recorded, and of 15 common species, five were most abundant and four were least abundant immediately after fire, one species had a response that varied among study sites, and five species showed no impact of fire at all.

It was discovered that species that depend on clumps of *Spinifex* recover in line with the six or so years that the grass takes to regenerate; other species dependent on leaf litter from bushes and trees may have to wait decades for their habitat and numbers to recover.

Burning off whole sections of remnant bush to induce regeneration is not the solution. "It's way too simplistic," Dr Driscoll said.

"The results of this study show that we really need to plan in a more complex way to ensure that species that need a long recovery time stay in the landscape alongside species that are most abundant immediately after fire."

More work remains to be done on the reptiles' natural cycles and population levels.

"When their numbers drop off after fire, it's not clear if they can survive at those low levels for long periods waiting for the next fire to boom again, or whether they're actually going to decline and disappear entirely," Dr Driscoll said.

He said it may well be that the reptiles' continued existence in the long-term has been dependent on the right pattern of fires naturally occurring in the landscape, which enabled recolonisation of burned areas from adjacent areas.

"Potentially there are species at risk of extinction if the right management isn't imposed, and this is particularly important in fragmented landscapes," Dr Driscoll said.

Fragments of bush are usually subjected to a single fire regime: it's all or nothing, Dr Driscoll said.

"The only way to keep these species in the landscape, with their opposite needs, would seem to be to have a mosaic of fire," he said.

While good in theory, there is little knowledge about how to implement such a system

effectively, and there is scientific doubt as to its effectiveness.

"We have established that fire management is an important issue, and that there are species that may be at risk from cycles of fire suppression and total incineration," he said.

"While we have a clear handle on which species decline and increase immediately after fire, we now need some detailed information about the biological basis of those responses.

"Then we can use that information to build a simulation model to understand how to implement a whole landscape mosaic."

The model will encompass variables such as climate change, which is likely to make bushfires bigger and more frequent, Dr Driscoll said.

"We should also be able to work out whether it is possible to implement a small-scale mosaic within a nature reserve, or whether we really need more hands-on management, including translocation after species become locally extinct."

The study was undertaken in collaboration with SA's Department of Environment and Heritage.