Large-Scale Experiments Needed to Save Australia's Biota

Ecological research and management in Australia is lacking adequate knowledge from good science, says internationally noted ecologist Charles Krebs.

Charles Krebs: "CSIRO is not currently doing the field research needed to achieve the goal of biodiverse, healthy ecosystems for Australia".

We can be successful in addressing ecological problems and their social dimensions, but only if we rely on strong science. However, we do not currently have all the ecological information needed to guide fruitful actions in natural resource management. If we want to sustain our continent over generations by ensuring adequate biodiversity, we need to focus on conservation of biodiversity, restoration of damaged ecosystems and sustainability of agricultural production.

The four major threats to conservation of biodiversity are introduced predators, fire, land clearing and climate change. We must mitigate their effects. Land clearing is less a scientific issue than a political one. Climate change requires long-term policies but these are lacking.

Despite these huge gaps in policies, we can do much about introduced predators and fire. However, both problems require intervention on a large scale over the next 10–50 years. For example, we do not know how to control foxes and cats cleverly because we cannot measure their populations accurately. Comprehending the impact of fire on native and introduced species is essential if we are to manage much of Australia properly.

We cannot achieve the necessary knowledge with purely observational, small-scale studies after the damage has become starkly evident. Effective measures for controlling pests will help to restore ecosystems and will conserve native animals.

Agricultural areas leave us with fragmented habitats for wildlife. While we have acquired much snapshot data on these areas, the long-term consequences of fragmentation are far from clear. What is there today may be gone tomorrow. Some areas may be impossible to restore, so we ought to spend our funds on treating areas that will give the largest payoff in biodiversity.

As Hugh Possingham articulated in this column in September, restoring areas without monitoring the consequences is a waste of funding. I see this as akin to using good money to buy shares on the stockmarket without knowing if they are valuable or worthless.

Restoration ecology is local, complex and specific to particular species. While natural resource managers would like to have general, simple rules to follow, there are no simple solutions for ecological problems. This is a hard message for policymakers.

For instance, it is not clear that if we can restore saline areas in Western Australia we will know how to solve salinity problems in Queensland. Restoration of ecosystems happens slowly and we can gain reliable knowledge only from carefully designed experiments.

We cannot import ecological knowledge for Australia from the Northern Hemisphere like we import medical knowledge. Only our universities, states, Cooperative Research Centres and the CSIRO have the potential to conduct research in natural resource management. These organisations have differing goals and time frames and only partly overlapping mandates. All are constrained by shortfalls in funding.

CSIRO should be conducting the long-term, large-scale research needed to complete coverage of resource management problems that involve both the public and the private good. But CSIRO is not currently doing the field research needed to achieve the goal of biodiverse, healthy ecosystems for Australia. Its shift to computer models is a shortcut that does not meet these challenges because models are useful only with reliable fundamental knowledge.

We do not have the wide consultation among the public that is needed to guide strategic priorities or the extensive discussions among scientists and policymakers needed to decide what can be done in practice.

If you ask 10 people to list the most important resource management problems you will get little agreement. We cannot afford to muddle along. We must use our limited resources to the most pressing problems on time and spatial scales to give answers that we can obtain only with our best scientists applying the finest experimental methods.

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