

Environmental Biosecurity

Terms of Reference

The adequacy of arrangements to prevent the entry and establishment of invasive species likely to harm Australia's natural environment:

I wish to address only two of the terms of reference in this submission, namely (b) iv and v.
*“iv. the adequacy of current protocols and surveillance and their implementation for high-priority environmental risks,
v. current systems for responses to new detected incursions, the timeliness and adequacy, and the role of ecological expertise”*

I am not a biosecurity expert but have specific information and observations of the impact on native amphibians of the amphibian disease chytridiomycosis, which is caused by the invasive fungus *Batrochytridium dendrobatidis*, and the failure of surveillance, and timeliness of action to reduce its impact.

This disease is considered to have resulted in the extinction of 5 native species of frog since 1980 (for a summary see the National Threat Abatement Plan 2006). In fact there are up to nine species that are most likely extinct due to this invasive fungus, a small number that are functionally extinct in the wild and persist in insurance colonies in zoos, and many other species where populations have declined markedly. The impact of this disease is continuing.

The route by which this fungus arrived in Australia is a matter of some debate. Nonetheless it arrived and has had a devastating impact on native frogs and is an important case study of the effectiveness or otherwise of biosecurity and surveillance. My concern surrounds surveillance procedures to detect that such a disease has arrived on our shores, which leads to the reasons for poor surveillance and that is the lack of ecological expertise and support.

In the case of chytridiomycosis the first people to observe that frogs were declining were scientists who work on frogs.

- There are not more than 30 or so experts in the country that work on native amphibians, most are based in universities and most field work is conducted by postgraduate students.
- State conservation agencies have greatly downsized scientific staff and there are few state government agencies that are involved in geographically wide-scale field surveys.
- There is no museum in Australia that has a curator of amphibians.

Combined with the small number of ecologists actively working in the field was the absence of long-term data sets to enable historical comparison. Most field work is conducted over a short time frame (usually one or two seasons), and when a population declines/disappears it requires that the field ecologist has some previous comparative experience to say that something has changed.

That frogs were declining was an observation made by a small number of field ecologists working on field based projects.

- There was then considerable debate about whether the observations were true.
- The sceptics quickly asked for the long-term data sets to support the claims. Of course there were no long-term data sets of replicated and statistically robust monitoring for any native amphibian species or community. There had been no reason to conduct such monitoring historically, and who would have funded it?

- Another response, common I expect in conservation matters, was for others to see this as a plea for more funds to support research on a particular group of animals. And they quickly questioned the veracity of the claims because the total quantum of funding was low.
- There was no reason to anticipate or expect the invasion of chytrid fungus. Australia was the first country to experience its impact on native amphibians. I am convinced that no sophisticated modelling and surveillance systems other than the work of experienced ecologists would have detected this threat.

The outcome was that it took fully twelve years from the observation of the first extinction (southern gastric brooding frog in 1980) to the acceptance that a disease was responsible. That a disease was responsible was first identified in nature in 1993, and the disease causing organism was formally described in 1998. In that time a further 8 native species went extinct and some 30 others experienced population declines. At every step along the way it was the field ecologists reporting the problem, but there was no contingency strategy or support to test the claims.

The system to detect the incursion of a wildlife disease of significance was non-existent.

Secondly, the timeliness of action once the incursion was detected was inadequate. There was no contingency strategy or capacity.

- First the disease had to be nominated as a “key threatening process” prior to any funding being possible.
- And if the frogs had not been listed as threatened, then listing of a key threatening process would not have been possible.
- Here is the catch- 22; there is no reason to list native fauna as threatened when it is not impacted by threatening processes, but when it does decline rapidly it must be listed before any funds can be made available to understand the cause or take action.

Then, when action was taken by the preparation and funding of the Threat Abatement Plan (and relatively well-funded) the actions were poorly directed. Action was directed to understanding the disease, and little was devoted to saving the critically threatened frogs. The medical model of curing the patient and preventing the disease was not adopted. Emphasis was placed on understanding the disease to finding a means of prevention, despite the fact that preventing a widespread animal disease had not been achieved anywhere in the world. No cryostored genetic material from the critically endangered species was placed in a natural history museum, yet we have human IVF clinics that do this in every major city.

What needs to be done to prevent this from occurring in the future? Two considerations:

1. The role of ecological experts in the observation of native animals and communities is a vital one in detecting change. When change occurs good ecologists ask why. My great concern is that as a nation we are rapidly devaluing ecological expertise; an example is the devaluing of natural science in our museums, conservation agencies and universities. Australia is a big country with many ecosystems and a highly diverse fauna which makes understanding ecosystem change an immense task. However there is a primary need to have experts whose role it is to interpret our natural environment, who are the prime points of surveillance, because it is these experts who know the fauna and flora and observe change. My experience with the arrival of chytrid fungus in Australia was that it took 12 years before a veterinarian was involved, and only then when a field ecologists took them to the remote field site where frogs could be seen dying on a stream. Support for ecological expertise needs to be promoted via the various government funding mechanisms. More deeply, as a nation we need to move to adequate economic valuing of our natural heritage, natural

systems and resources. Only then will we appreciate the importance of protecting these values.

2. The structure of policy needs to be changed to remove the catch-22. If reputable ecologists draw attention to a looming problem there needs to be a contingency fund to enable rapid response, to assess the veracity of the claims and make decisions on the monitoring required. It should not require that a native species goes extinct or is threatened before a policy document is prepared because that is the only way funding can be considered.

Prof Michael Mahony, Prof John Rodger, Dr John Clulow, Mr Simon Clulow and Dr Michelle Stockwell
School of Environmental and Life Sciences
Newcastle University, NSW Australia.

This submission is not an institutional response, the opinions are those of the authors.