

Impact of weeds on threatened biodiversity in New South Wales

Aaron Coutts-Smith and Paul Downey

Pest Management Unit, Parks and Wildlife Division
Department of Environment and Conservation (NSW)



Executive summary

Alien species (weeds and pest animals) are acknowledged as the second greatest cause of biodiversity decline, after habitat loss. Despite this, there is a lack of information on the biodiversity at risk from alien species. This lack has hampered effective management of invasive species at all levels from government policy to on-ground control. Given that the number of new introductions of alien species has increased dramatically over the past century, it is imperative that proper information on their impacts be compiled and disseminated.

In Australia, there are approximately 2,800 naturalised alien plant species, of which 71 are recognised as being of national significance. However, information on their impact on biodiversity has not been formally assessed, with the exception of bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*). This lack of information has hampered the ability both to manage weeds and to meet the aims of Goal 2 of the National Weeds Strategy – to reduce the impact of existing weed problems of national significance.

This report aims to comprehensively assess the weed threats to biodiversity within New South Wales (NSW), using the biodiversity listed under NSW threatened species legislation. This is a new approach to assessing the biodiversity impacts of weeds, which should now be applied in other jurisdictions.

Method

A data set was compiled of the threats to the biodiversity listed under Schedules 1 and 2 of the *Threatened Species Conservation Act 1995* (NSW) and Schedules 4 and 5 of the *Fisheries Management Act 1994* (NSW). These schedules listed 945 threatened species, populations and ecological communities, as at January 1, 2005, that span a broad range of biodiversity (mammals, birds, fish, insects, plants). Throughout this report, unless otherwise stated, this collective list of threatened biodiversity is referred to as threatened species for ease of reading.

Information on threats to these 945 listed threatened species was compiled from a range of sources (scientific papers, determinations by the NSW Scientific Committee, recovery plans, threatened species profiles and fact sheets). This process resulted in the identification of approximately 5,300 individual threat descriptions. A threat hierarchy was developed in order to group threats of a similar nature (eg weed invasion) and to enable analysis of the data set. In addition, this process allowed an analysis of the relative impact of each threat. The data set was also reclassified to compare the threats listed as Key Threatening Processes under the *Threatened Species Conservation Act 1995* (NSW).

Threatened biodiversity examined

Of the 945 listed threatened species, 569 are plants, fungi or algae, 271 are animals (including invertebrates), 72 are Endangered Ecological Communities and 33 are Endangered Populations. Approximately half of these threatened species were also listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).

Weeds relative to other threats

Weeds posed a threat to 45% of the biodiversity examined. The threat posed by weeds as a single factor was ranked second after land clearing, was similar to that of altered fire regimes, and was greater than that from alien pest animals. In addition, weeds ranked highly when compared with broader threatening processes such as the destruction and modification of native vegetation.

Weeds threatened 419 listed threatened species, comprising 279 threatened plant species (166 Endangered and 113 Vulnerable species), 62 animal species (30 Endangered and 32 Vulnerable species), 14 Endangered Populations and 64 Endangered Ecological Communities.

Weeds

A total of 127 individual weed species from 120 genera and 51 families were identified as threatening 204 threatened species. For the remaining 215 species threatened by weeds, a specific weed species could not be identified; rather the threat was described as 'weed invasion' or as a weed genus only (eg *Salix*). The five weed species most commonly identified here as threatening biodiversity in New South Wales were:

- lantana (96 threatened species)
- bitou bush (46)
- blackberry (21)
- kikuyu (16)
- Scotch broom (12).

As approximately half the threats did not identify a specific weed species, the impacts of some weed species may be under represented and other weed species that are currently posing a threat may not have been identified here.

Garden escapees

Eighty-two of the 127 weed species identified as threatening biodiversity were deemed to have been deliberately introduced as ornamental plants and are referred to as escaped garden plants. These garden escapees were identified as a threat to 190 threatened species (or 93% of the species for which a defined

weed species was identified). If we assume constant proportions for the remaining 215 species threatened by weeds more generally (ie no specific weed identified), the number of threatened species impacted by garden escapees in New South Wales may be as high as 390.

The continuing threat to biodiversity posed by these deliberate introductions is highlighted by the fact that 56 of these 127 weed species are still available for purchase in Australia, with 36 available in New South Wales. In addition, seven of these were previously identified as in the 10 most invasive weeds still for sale in New South Wales.

Spatial analysis

There are 1,386 naturalised alien plants in New South Wales, which constitute 21% of the total number of plant species in the state. Approximately 9% of these species (the 127 species identified above) were identified as impacting on threatened biodiversity. Using three broad geographic zones in New South Wales, namely coastal, central and western, a spatial analysis of weed impacts was undertaken. This revealed a decrease in weed species and impacts to biodiversity from east to west (ie from coastal to arid western New South Wales).

An analysis of the 13 Catchment Management Authorities (CMAs) in New South Wales was undertaken, which provided a list for each CMA of:

- weed species
- weed species threatening biodiversity
- the biodiversity threatened by weeds.

The Sydney Metropolitan CMA contained the greatest number of weed species ($n = 758$), while the lowest number was found in the Lower Murray–Darling CMA ($n = 187$).

Concluding comment

This report attempts, for the first time in Australia, to quantify the impact of weeds on biodiversity across a broad range of taxa. It illustrates the scale of the weed problem in terms of the number and diversity of species at risk. Whilst the data have some limitations, the information presented provides a long overdue baseline from which informed management and policy decisions can now be made. It is anticipated that the information presented here will stimulate discussion on the management of weed impacts on biodiversity, including the description of threats which is not currently standardised. Finally, while the data presented here illustrate the weed problem for New South Wales at a specific point in time, what is now required is a national analysis, with regular revisions and updates.