The NSW Bitou Bush Threat Abatement Plan: the first two years

Alana L. Burley[1], Scott A. King[1,2] and Paul O. Downey[1]
[1] Pest Management Unit, Department of Environment and Climate Change NSW, PO Box 1967, Hurstville, New South Wales 1481, Australia
[2] Present address: Monitoring, Evaluation and Reporting Unit, Department of Environment and Climate Change NSW, PO Box 1967, Hurstville, New South Wales 1481, Australia
Email: alana.burley@environment.nsw.gov.au

Summary In 1999 *Chrysanthemoides monilifera* (L.) Norl. (bitou bush and boneseed) was listed as a Key Threatening Process under the NSW *Threatened Species Conservation Act 1995*. In response to this listing, an approved Threat Abatement Plan (TAP) was released under the Act in 2006 identifying 158 plant species, three endangered plant populations and 26 ecological communities as being threatened. Priority sites (n = 169) for control were selected where significant conservation would be achieved for the biodiversity at risk. Implicit in the TAP is the acknowledgment that, at least in the immediate future, complete eradication is not a realistic goal.

Many new initiatives have been developed to encourage widespread adoption of the TAP by 38 different groups of stakeholders. These include securing an Australian Government Natural Heritage Trust grant to fund control and monitoring at 50 priority sites and support a dedicated TAP coordinator. Other initiatives include the development of monitoring protocols, site-specific management plans, best practice management guides, a website, and an identification guide for the biodiversity at threat. Over 70 site management plans have been prepared that describe five-year control strategies to save the native species at risk. Monitoring is a critical component of any control program and will be used here to measure the success of the threat reduction actions in the TAP. Progress to date highlights the potential of this major new innovative approach to deliver biodiversity conservation through targeted weed management, and the challenges of implementing such a strategy.

Keywords Bitou bush, *Chrysanthemoides monilifera*, threat abatement plan, biodiversity, conservation, management, native species.

INTRODUCTION

There is an increasing conservation focus associated with the control of weeds (Wittenberg and Cock 2005), as awareness that these weeds pose major threats to biodiversity grows (Vitousek *et al.* 1997, Mack *et al.* 2000). In addition, the sheer geographical range of some invasions makes it impossible or impractical to control all infestations across their entire range. Thus there is a need for developing conservation priorities for control.

The *Chrysanthemoides monilifera* (L.) Norl. (bitou bush and boneseed) threat abatement plan (TAP) (DEC 2006) provides a framework in which native species threatened by bitou bush (being the main subspecies in NSW) invasion are identified, prioritised for control and monitored for recovery. Historically, weed management primarily focused on the eradication of weed species or was based on the premise that control alone would lead to biodiversity outcomes (Downey 2008). Instead, the TAP aims to target limited resources to the protection of priority native plants by carefully choosing which areas of bitou bush to control. Prioritising the species, populations and ecological communities at risk, and sites for control as well as monitoring, focuses management practices and funding where positive outcomes for biodiversity are greatest, regardless of land tenure. The implementation of the TAP is a combined effort between 38 different stakeholders including Catchment Management Authorities (CMAs), NSW National Parks and Wildlife Service and other government agencies, local councils, contractors, and community groups/volunteers.

INITIATIVES TO AID THREAT ABATEMENT

Several initiatives were developed to provide an additional support framework for the TAP's implementation. These initiatives include funding, a range of tools to help with on-ground implementation, site management plans, and monitoring guidelines which account for the skills and resources of 38 different groups of land managers.

Funding A Natural Heritage Trust (NHT) grant devolved through the five coastal CMAs in NSW enabled control and monitoring to be undertaken at 50 of the 169 priority sites as well as employ a dedicated TAP coordinator. This funding essentially initiated the implementation of the TAP by providing the necessary incentive for land managers to commit to this new approach. In many cases, the TAP has complemented existing control programs by providing an additional justification and a framework in which to monitor

progress. On the other hand however, the aim of some existing programs differed from that of the TAP and realigning the priorities of these programs has presented a range of problems (Strehling *et al*. 2008). To assist in this changeover process, the TAP coordinator, in conjunction with staff from the CMAs, played a vital role. The coordinator provides information, assistance and advice to land managers. They are also able to review and approve site management plans, develop monitoring guidelines and other tools to aid implementation, undertake independent monitoring of bitou bush and native species recovery, and facilitate community education and awareness programs.

Tools for implementation With the TAP in place, it was recognised that further tools were needed to help in its application on the ground. Three main tools were developed: a website; monitoring guidelines; and a field identification guide.

A website specifically for the TAP has been developed (see DECC 2007). Although a hard copy of the TAP had been widely distributed and was freely available to any who wanted it, the website provides additional information, assistance (e.g. downloadable templates) and links to other information integral to its implementation. Given the TAP is a complex document exceeding 130 pages, summary information and the ability to quickly access it was needed to assist with implementation. Thus the website was created. The website has the advantage of being updated on a regular basis, when new information becomes available or as new tools are created.

The second tool is the monitoring protocol aimed at providing land managers with guidelines for monitoring their control program, the response of native species and other weed species as well as the cost involved (see further discussion below).

Thirdly, identification in the field of the 158 species, three endangered plant populations and 26 ecological communities is dependent on the skills and experience of the land managers. Given that many of these species are rare, little information is available to assist land managers with their management. Correct identification is essential for their protection. We have rectified this by developing a field identification guide to the priority species, populations and ecological communities under threat from bitou bush. The identification guide has been widely distributed without charge and will accompany any request for the monitoring guidelines.

Site management plans A site management plan is produced prior to undertaking control and monitoring. This allows the individual site manager to examine the site in the context of the biodiversity to be protected, their resources and any constraints associated with control. This flexibility at a site level has a significant advantage as it helps to ensure conservation outcomes and instils local ownership of the TAP site. The site plan includes a map of the priority biodiversity threatened by bitou bush. The map of the site is perhaps the most important part of the site management plan. The map not only contains a base layer with bitou bush and the priority biodiversity, but also a mapped control program using a three-stage approach. This collated map thereby helps to ensure that the biodiversity is protected.

The first stage of control requires that the immediate threat to native species is reduced by the removal of bitou bush and other weeds from the immediate proximity of the priority species. The second stage expands the area of removal by targeting suitable habitat into which the threatened species can re-colonise. The third control stage is the removal of all bitou bush in the site and surrounding areas to prevent re-invasion. Stages two and three also include follow up control of newly established bitou bush seedlings in the previous stages/controlled areas.

Monitoring guidelines Monitoring is perhaps the most neglected aspect to date of bitou bush (and other weed) control programs. Despite several decades of bitou bush control in natural ecosystems, very little monitoring to determine the effects of this control has occurred, particularly on native species' populations (King and Downey 2008). This has also hindered our understanding in other areas like the impacts of invasion on fauna (Downey 2004). The overall aim of the monitoring guidelines is to address the issues of monitoring and reporting deficiencies. The monitoring guidelines provide a standardised methodology across a range of differing resource and skill levels. For example, the first level of monitoring will involve simple mapping, photopoints and counts to monitor changes in spatial extent with the aim of identifying the reduction of threat to native species that occurs through control of bitou bush. The second level involves a more rigorous monitoring program using scientific methods to monitor on ground results of control. An example is using permanent quadrats or transects to monitor bitou bush invasion and native species diversity and abundance before and after control. The third level involves a full experimental design conducted by researchers with the aim of determining whether or not bitou bush control has led to improved native species diversity and recovery. The guidelines were trialled on a range of end users in the field to identify and fix errors before they were finalised.

CONCLUSIONS

The bitou bush TAP is the first approved threat abatement plan for a weed species in Australia. The TAP has established an innovative approach for weed management which aims to reduce the threat to biodiversity. While it is still in the early phases of implementation, feedback already indicates that it is being widely accepted and implemented. Production of the TAP is only one part of successful implementation, however. We have developed a range of tools and initiatives to assist the 38 different stakeholders with implementing the TAP on the ground. It is anticipated that control of bitou bush, in conjunction with monitoring, will provide us with discernible results in the recovery of native species, populations and ecological communities in areas currently infested with bitou bush.

The success of the TAP approach is being replicated nationally for lantana (*Lantana camara* L.) (see Turner *et al*. these proceedings).

ACKNOWLEDGMENTS

This work was supported by a Regional Competitive Component Grant under the Australian Government's Natural Heritage Trust. We would also like to acknowledge the project steering committee, Nicole Strehling and Roger Stanley (Northern Rivers CMA), Brian Hughes and Dean Chapman (Hunter-Central Rivers CMA), Jo Lynch (Sydney Metro CMA) and Neil Rendell (Southern Rivers CMA) for their involvement and help in implementing the project as well as the numerous staff of the Department of Environment and Climate Change involved in this project.

REFERENCES

DEC (Department of Environment and Conservation) (2006). NSW Threat Abatement Plan – invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed). Department of Environment and Conservation NSW, Hurstville.

DECC (Department of Environment and Climate Change) (2007). Bitou bush and boneseed threat abatement plan. http://www.nationalparks.nsw.gov.au/npws.nsf/content/bitou_bush_tap.

Downey, P.O. (2004). Bitou bush management and plant conservation: establishing priorities for control. Proceedings of the 14th Australian Weeds Conference, eds B.M. Sindel and S.B. Johnson, pp. 697-700. (Weeds Society of New South Wales, Sydney).

Downey, P.O. (2008). Determination and management of alien plant impacts on biodiversity: examples from New South Wales, Australia. *In* 'Plant invasions: human perception, ecological impacts and management', eds B. Tokarska-Guzik, J. Brock, G. Brundu, L. Child, C. Daehler and P. Pysek, pp. 369-85. (Backhuys Publishers, Leiden).

King, S.A. and Downey, P.O. (2008). Assessing the recovery of native plant species following bitou bush control – the need for monitoring. *Plant Protection Quarterly* 23, 40-1.

Mack, R.N., Simberloff, D., Lonsdale, W.M., Evans, H., Clout, M. and Bazzaz, F.A. (2000). Biotic invasions: causes, epidemiology, global consequences, and control. *Ecological Applications* 10, 689-710.

Strehling, N., Rendell, N., King, S.A. and Downey, P.O. (2008). Implementing the Bitou Bush Threat Abatement Plan across different land tenures: the challenges and successes. *Plant Protection Quarterly* 23, 45-7.

Vitousek, P.M., D'Antonio, C.M., Loope, L.L., Rejmánek, M. and Westbrooks, R. (1997). Introduced species: a significant component of human-caused global change. *New Zealand Journal of Ecology* 21, 1-16.

Wittenberg, R. and Cock, M.J.W. (2005). Best practices for the prevention and management of invasive alien species. *In* 'Invasive alien species: a new synthesis', eds H.A. Mooney, R.N. Mack, J.A. McNeely, L.E. Neville, P.J. Schei and J.K. Waage, pp. 209-32. (Island Press, Washington, USA).