

Implementing the Bitou Bush Threat Abatement Plan across different land tenures: challenges and successes

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Summary

Threats to biodiversity are not constrained by land tenure. The serious threat posed by bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata* (DC.) T.Norl.) to native plant communities in New South Wales is the shared responsibility of most coastal councils, the Department of Environment and Climate Change, the Department of Lands, numerous private land holders and public trusts, as well as indigenous people, volunteers and community groups. The five coastal Catchment Management Authorities also have an essential role in engaging land managers in threat abatement, and supporting on-ground control through delivery of additional resources. The successful abatement of this wide-scale threat will require the active cooperation of all affected parties.

The NSW Bitou Bush Threat Abatement Plan (TAP) has prioritized 169 sites for bitou bush control, independent of land tenure. These sites encompass 38 different land tenures, leading to many challenges in implementing the plan, three of which are discussed here: (i) incorporating new ideas into existing control programs; (ii) providing information to stakeholders to implement the TAP, and; (iii) ensuring the TAP objectives are achieved on the ground.

A range of measures were developed to ensure the involvement of as many land managers as possible. These measures will help to coordinate threat abatement across all land tenures and encourage long term maintenance of on-ground biodiversity outcomes at priority sites.

Introduction

Landscape-scale threats to biodiversity are rarely constrained by land boundaries or ownership. Thus broad-scale threat abatement strategies must gain the support and cooperation of a range of different land managers to succeed.

One such landscape-scale threat is the invasion of native plant communities by the weed bitou bush. Bitou bush poses a serious threat to coastal biodiversity; it has invaded over 80% of the New South Wales coastline (Thomas and Leys 2002), and the prospect of eradication is unlikely. The scale of the problem led to bitou bush being listed as a key threatening process under the NSW *Threatened Species Conservation Act 1995* (NSW SC 1999). In response to this listing, a bitou bush threat abatement plan (Bitou TAP) was prepared that identified the native species and ecological communities most at risk, and the specific sites at which control will have the greatest benefit to biodiversity, independent of land tenure (DEC 2006).

The Bitou TAP identified 169 priority sites for control, spanning 38 different land tenures and more than twice this number of site managers. The NSW Department of Environment and Climate Change (DECC) is responsible for approximately half of the priority sites, with the remainder being managed by the Department of Lands (DoL), coastal councils, private land holders and public trustees. Additional stakeholders include the contractors, indigenous people, volunteers and community groups, who undertake a significant proportion of the bitou bush control each year. Lastly, the implementation of the TAP is consistent with the regional natural resource management targets of the five coastal Catchment Management Authorities (CMAs), who with the Australian Government's Natural Heritage Trust (NHT), are contributing funds and supporting land managers to control bitou bush through the TAP. Thus, reducing the threat of bitou bush to native species is heavily dependent on a collaborative approach involving all of these stakeholders. Here we present a discussion of the major challenges and hurdles encountered during the development of the TAP and

its initial implementation, with respect to engaging these stakeholders.

Challenges to implementing the Bitou TAP

The Bitou TAP is the first threat abatement plan for a weed in Australia. The TAP adopts a different approach to conventional weed strategies by prioritizing weed control to protect the biodiversity most at risk, as opposed to broad-scale weed control or eradication. This new approach has left many land managers cautious about implementing the TAP, and has resulted in a number of challenges. The main challenges have included: (i) incorporating new ideas/approaches into existing control programs; (ii) ensuring land managers have the information necessary to implement the TAP, and; (iii) ensuring the TAP objectives are achieved on the ground. Below we present a short discussion about each, and explain some of the strategies employed to address these challenges.

Incorporating new ideas

The principle aim of the TAP is to reduce, abate or ameliorate the threat posed by the invasion of bitou bush to threatened species, populations and ecological communities, or those species which may become threatened as a result of bitou bush invasion (DEC 2006). Few of the pre-existing bitou bush control programs at priority sites shared this objective. Many had eradication as the aim, and while others aimed to conserve biodiversity, the specific biodiversity at risk was not identified or monitored (see King and Downey 2008). Successful implementation of the TAP therefore, required a change in the approach of existing bitou bush control programs. To facilitate incorporation of new ideas, a site-specific management planning process and an incentive funding program were implemented.

Incentive funds, provided by NHT and delivered through the CMAs, offered land managers the resources to initiate implementation of the TAP at over 40 priority sites. This encouraged land managers to gain practical experience and confidence in implementing the TAP on-ground, and provided CMAs the opportunity to guide and support land managers through the essential elements of implementing the TAP, while leveraging additional resources. It is hoped that the use of incentive funds to help land managers successfully implement the TAP at a limited number of priority sites will increase their understanding and acceptance of the TAP, and facilitate their implementation of the TAP at additional sites in future, and/or contribute to the priorities after these incentive funds end.

The requirement to prepare site-specific management plans using a standard proforma provided a structured mechanism

for landholders to document the TAP implementation process, helping them to systematically work through this new approach to weed control. This process was designed to ease the transition for land managers in adopting the new threat abatement approach to bitou bush control, specifically aimed at protecting biodiversity. During the approval process for these site-specific management plans, it became evident that many land managers were trying to fit their existing control programs into the TAP framework, rather than re-designing their programs to meet the key TAP objective of targeting bitou bush control to protect priority species. Surprisingly, some of these land managers had contributed significantly to the TAP development process. It is a challenge to alter pre-existing control programs that land managers consider to be successful. This resistance to change reflects the common belief that any weed control will automatically result in positive biodiversity outcomes. However, there is increasing evidence that this is not the case (D'Antonio and Meyerson 2002), and such views hamper successful threat abatement, and protection of those species most at risk (Downey 2008).

Information to support TAP implementation

While the TAP outlines the native plant species at risk from bitou bush invasion, priority sites for control, and a summary of control options, more information is needed to help land managers successfully implement the key objective of the TAP on the ground. A number of initiatives have been put in place, and were only made possible with the financial assistance of the NHT/Australian Government in partnership with the five coastal CMAs in New South Wales and the DECC. These initiatives include a full-time coordinator, a website, an identification guide to the native species at risk, monitoring guidelines and best practice management guidelines.

The NHT grant allowed employment of a full-time TAP coordinator to review site-specific management plans, administer a community education and awareness campaign, provide advice and support to all stakeholders, and undertake some of the monitoring programs.

The Bitou TAP website (DECC 2007) explains the background of the TAP, lists the priority species and sites, shows examples of completed site plans, and explains how people can get involved. The site also contains downloadable resources to help land managers implement the TAP, such as copies of the TAP, site plan pro forma, as well as links to current funding opportunities.

The NHT grant initially contained funds to train volunteers to work with threatened species. However, the limited

funds available would only have trained about 30 volunteers a year for three years. Feedback from land managers and volunteer groups revealed that many of them could not readily identify the uncommon priority species. Instead of the limited training, a field guide to the native species at risk was produced. This will increase the capacity of all stakeholders to save the species most at risk of extinction by teaching them what these species look like and where to find them. The guide contains descriptions and photos or illustrations of all the native plants and vegetation communities threatened by bitou bush as outlined in the TAP (Hamilton *et al.* 2008). The guide is available free to all stakeholders, with a PDF version available on the TAP website.

A recent survey highlighted the need to guide land managers with respect to monitoring of their bitou bush control programs (King and Downey 2008). To assess the effectiveness of threat abatement through the TAP approach, monitoring information needs to be collected in a standard format from all priority sites. The bitou bush monitoring guidelines (see King *et al.* 2008) describe three levels of monitoring programs of varying complexity to suit the different resources and skills available to each land manager. All three monitoring options require the production of maps to show the extent of bitou bush, priority species, ecological communities, other weeds and control areas. However, each approach differs in the level of observation and measurement required, allowing land managers to select their preferred monitoring approach, based on their skills and resources.

Several best practice guidelines have been produced to assist land managers to maximize the efficiency of their on-ground control. Guidelines have been developed for aerial spraying of bitou bush (Broese van Groenou and Downey 2006), as well as a management manual for boneseed (*Chrysanthemoides monilifera* subsp. *monilifera* (L.) T.Norl.), the other invasive subspecies (Brougham *et al.* 2006). A management manual for bitou bush is currently being drafted and is due for publication in mid-2008. These guidelines are already available in hard and electronic format from the website (see DECC 2007).

Achieving objectives on the ground

The challenge of supporting land managers to deliver the objectives on the ground was addressed by the development of site-specific management plans (see DECC 2006, DECC 2007). These site plans are prepared utilizing a standard proforma, and require the approval of DECC. Site plans give land managers the opportunity to account for variations at each individual site to best meet the objectives of the TAP, and allow managers to develop a greater sense

of ownership over their priority site. An additional benefit is that these plans can be used to attract additional funding and demonstrate outcomes.

Each site-specific management plan also incorporates an essential monitoring and evaluation component to help ensure TAP objectives are achieved. This monitoring and evaluation of on-ground outcomes, undertaken in accordance with the bitou bush monitoring guidelines (King *et al.* 2008), will facilitate adaptive management and maximize effectiveness of control programs and recovery of priority entities.

DECC-approved site plans (i.e. that are consistent with the TAP) are issued with a generic Section 132C scientific licence for the Bitou TAP under the *National Parks and Wildlife Act 1974*. This licence authorizes land managers to control bitou bush near threatened species and ecological communities if the work is undertaken in accordance with the Bitou TAP and the conditions of the licence. This generic licence avoids the necessity of individual site managers having to apply for individual licences.

Delivery of initial incentive funds through a partnership between DECC and the CMAs has also helped to ensure objectives are achieved on-ground. The CMAs have staged the payment of incentive funds, and linked payment to implementation of site-specific management plans. This encourages close liaison between each CMA and land manager throughout the life of the project, and allows provision of early advice and support if problems are encountered. Land managers should be able to apply the practical experience and understanding of TAP implementation gained through this initial funding to other sites in future.

The TAP should increase the ability of land managers to access future funding opportunities. The TAP sets out a strategic approach to control of bitou bush for biodiversity outcomes that is based on best available knowledge and is consistent with the regional priorities of the coastal CMAs. This makes it a valuable tool to guide investment in weed control in an environment where the need far exceeds the limited resources available. Projects that implement the TAP should therefore receive favourable consideration for future funding opportunities. This will help to facilitate implementation at all sites and ensure that resources are available to maintain biodiversity outcomes beyond the term of the site plans.

References

- Broese van Groenou, E.A. and Downey, P.O. (2006). 'Best practice guidelines for aerial spraying of bitou bush in New South Wales'. (Department of Environment and Conservation NSW, Hurstville).

- Brougham, K.J., Cherry, H. and Downey, P.O. (eds) (2006). 'Boneseed management manual: current management and control options for boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*) in Australia'. (Department of Environment and Conservation (NSW), Sydney).
- D'Antonio, C. and Meyerson, L.A. (2002). Exotic plant species as problems and solutions in ecological restoration: a synthesis. *Restoration Ecology* 10, 703-13.
- DEC (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 (2007). 'Bitou bush and boneseed threat abatement plan'. (Department of Environment and Climate Change, Sydney). URL: http://www.national-parks.nsw.gov.au/npws.nsf/content/bitou_bush_tap (accessed 2 August 2007).
- Downey, P.O. (2008). Determination and management of alien plant impacts on biodiversity: examples from New South Wales, Australia. In 'Plant invasion: human perception, ecological impacts and management', eds B. Tokarska-Guzik, J. Brock, G. Brundu, L. Child, C. Daehler, P. Pyšek, pp. 369-85. (Backhuys Publishers, Leiden).
- Hamilton, M.A., Winkler, M.A. and Downey, P.O. (2008). 'Native plants at risk from bitou bush invasion: a field guide for New South Wales'. (Department of Environment and Climate Change NSW, Hurstville).
- King, S.A., Burley, A.L. and Downey, P.O. (2008). 'Monitoring manual for bitou bush control and native plant recovery'. (Department of Environment and Climate Change NSW, Sydney).
- 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.
- NSW SC (Scientific Committee) (1999). 'Invasion of native plant communities by bitou bush and boneseed – key threatening process declaration, Final Determination'. (NSW Scientific Committee, Hurstville).
- Thomas, J. and Leys, A. (2002). Strategic management of bitou bush (*Chrysanthemoides monilifera* ssp. *rotundata* (L.) T.Norl.). Proceedings of the 13th Australian Weeds Conference, eds H. Spafford Jacob, J. Dodd and J.H. Moore, pp. 586-90. (Plant Protection Society of WA, Perth).

National western boneseed containment: a line in the sand on the Eyre and Yorke Peninsulas, South Australia

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Boneseed (*Chrysanthemoides monilifera* subsp. *monilifera* (L.) T.Norl.) appears to have been a popular although isolated garden plant on the Eyre and Yorke Peninsulas, where it has since escaped and established wild populations. Infestations in the Eyre and Yorke regions are the western most in South Australia and despite being recorded in twenty nine locations, currently impact an area of less than 190 ha of bushland. Boneseed is growing in northern mallee areas with rainfall as low as 200mm and in areas of up to 500mm of rainfall in blue gum, *Eucalyptus petiolaris* (Boland) Rule, and sugar gum, *E. cladocalyx* F.Muell, country in the south.

The first recording of boneseed on Eyre Peninsula was in 1985, where it was recognized growing in an old township and on an adjacent rail reserve. The majority of boneseed infestations on the Eyre and Yorke Peninsulas occur in native vegetation on roadsides, on public reserves and on private property. Commonly escaped from gardens, this weed is spread by animals, wind or water. Birds, including emus (*Dromaius novaehollandia*) and animals such as foxes (*Vulpes vulpes* L.) are contributing to the spread of the seed.

The majority of boneseed control in the Eyre and Yorke regions is carried out annually by hand pulling of plants in bushland areas, with some targeted spraying in areas of prolific germination. In January 2005, bushfires completely burned a major boneseed infestation on southern Eyre Peninsula. The high fuel load at this blue gum site, estimated at 5–7 tonnes per hectare, meant the native vegetation burned much longer and hotter than surrounding areas. All mature boneseed plants were killed and seeds were presumed destroyed by the intense fire. However, boneseed seedlings appeared along the edge of Pirlaworta Creek 10 months later.

Heightened community awareness of the threat of boneseed and increased support for control is an important goal of the Eyre and Yorke Peninsula Natural Resources Management (NRM) Boards. In 2007, all 190 ha of boneseed are targeted for initial control. The control of all standing plants and the elimination of existing seed sources on Eyre and Yorke Peninsulas will be a major achievement over the next ten years. Work towards this goal will be possible through a project funded by the Australian Government's Defeating the Weed Menace Program in 2007/2008.

A ten year Boneseed Management Plan is being developed for both NRM regions with the aim of developing a national Western Boneseed Containment Line. All boneseed plants west of the containment zone will be destroyed. Landholders will be engaged to apply follow-up control over the ten year period and the NRM Boards will be responsible for long-term coordination of continued control. Officers of the NRM Boards will ensure that all landholders, those with boneseed infestations and those adjoining these infestations, are aware of the plant and will undertake annual inspections of suspect areas and eradicate any plants found. It is anticipated the Western Boneseed Containment Line will protect the western regions of South Australia and all of Western Australia by eliminating the seed source and preventing further spread.

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