Towards more strategic management of weeds on 'Top End' Aboriginal lands

Mark R. Gardener[1], Michael J. Storrs[2] and Steve Wingrave[3]
[1] Tropical Savannas Management CRC, Charles Darwin University, Northern Territory 0909, Australia
[2] Caring for Country Unit, Northern Land Council, PO Box 42921, Casuarina, Northern Territory 0811, Australia
[3] Weeds Branch, DIPE, Northern Territory Government, PO Box 496, Palmerston, Northern Territory 0831, Australia

Summary In the 'Top End' of the Northern Territory Aboriginal people own approximately 50% of the land, yet in many areas their capacity to manage environmental threats such as weeds is low. The reasons for this are complex, but include problems associated with many lower socio-economic communities, such as limited resources and lower standards of health and formal education. The aim of this project is to develop a Strategic Weed Management Plan on Aboriginal land in the Top End that could act as a template for management of weeds on Aboriginal land throughout northern Australia. The different activities feeding into the plan will assess the current state of knowledge of weeds on Aboriginal land and the existing capacity of different communities to deal with them. This paper presents preliminary findings of a review into two components of the *Mimosa pigra* L. (mimosa) management program and accesses how well these agreements have met the dual objectives of preventing the spread of mimosa and building community capacity and awareness in weed management issues. This mimosa review will be combined with existing management knowledge including recommendations from the extensive review by Smith (2001) to develop the Strategic Weed Management Plan.

Keywords Strategic weed management, Aboriginal land, *Mimosa pigra*, spread, community capacity.

INTRODUCTION

This paper continues to report developments in weed management on 'Top End' Aboriginal land which have featured at the Australian Weeds Conference for the last eight years (Storrs *et al.* 1996, Storrs *et al.* 1999, Storrs *et al.* 2002). In the Top End of the Northern Territory, Aboriginal people own approximately 50% of the land, on which between 1.4 and 4.6% of the flora is exotic in origin and naturalised (Smith 2001) compared with about 15% in the rest of Australia (J. Hosking pers. comm.). Weeds that are a major problem in some areas include mimosa and perennial grassy weeds such as *Andropogon gayanus* Kunth, *Pennisetum polystachion* (L.) Schultz. and *Hymenachne amplexicaulis* (Rudge) Nees. However, with a greater number of enterprises such as grazing, tourism and mining on Aboriginal lands, weeds will increasingly impact on land management in the future.

In many areas, the capacity of Aboriginal communities to manage environmental threats such as weeds is low. The reasons for this are complex, but include problems associated with many lower socio-economic communities such as limited resources and lower standards of health and formal education. In addition there is often a lack of clear direction on how to effectively implement weed management programs. In order to have a framework to address these gaps in weed management, the National Heritage Trust invested funds to develop a Strategic Weed Management Plan for Top End Aboriginal Lands. The Northern Land Council (NLC) which has a statutory role with respect to land management for Aboriginal lands in the Top End has taken a step-by-step approach to the management of weeds. In the mid 1990s, through its Caring for Country Unit (CFCU), the NLC facilitated and assisted a number of Aboriginal community groups in strategic areas to build their capacity to deal with mimosa. This initiative was greatly enhanced and extended with the instigation of the Top End Aboriginal Land Management and Employment Strategy (TEALMES) agreement in 1999 which in turn had backed up the Mimosa Aerial Control Agreement (MACA) instituted in 1998 (see Storrs et al. 1999).

Mimosa was first recognised as a problem in the 1970s on the Adelaide River near Acacia Larrakia land and started to appear on Aboriginal Lands in Western Arnhem Land and Malak Malak in the early 1980s (Lonsdale *et al.* 1995). Currently it has a total distribution of approximately 100,000 ha of which 20% is on Aboriginal land (Figure 1). Mimosa forms dense thickets on floodplains impacting on biodiversity, rendering prime grazing land useless and reducing aesthetic values. Aboriginal people consider mimosa undesirable because it is dense and prickly impeding access to wetlands for hunting and ceremonies.

Mimosa has a biology that mitigates against eradication once it is established (see Lonsdale *et al.* 1995). Techniques for management include chemical, biological and manual control and the establishment and maintenance of competitive grass species.

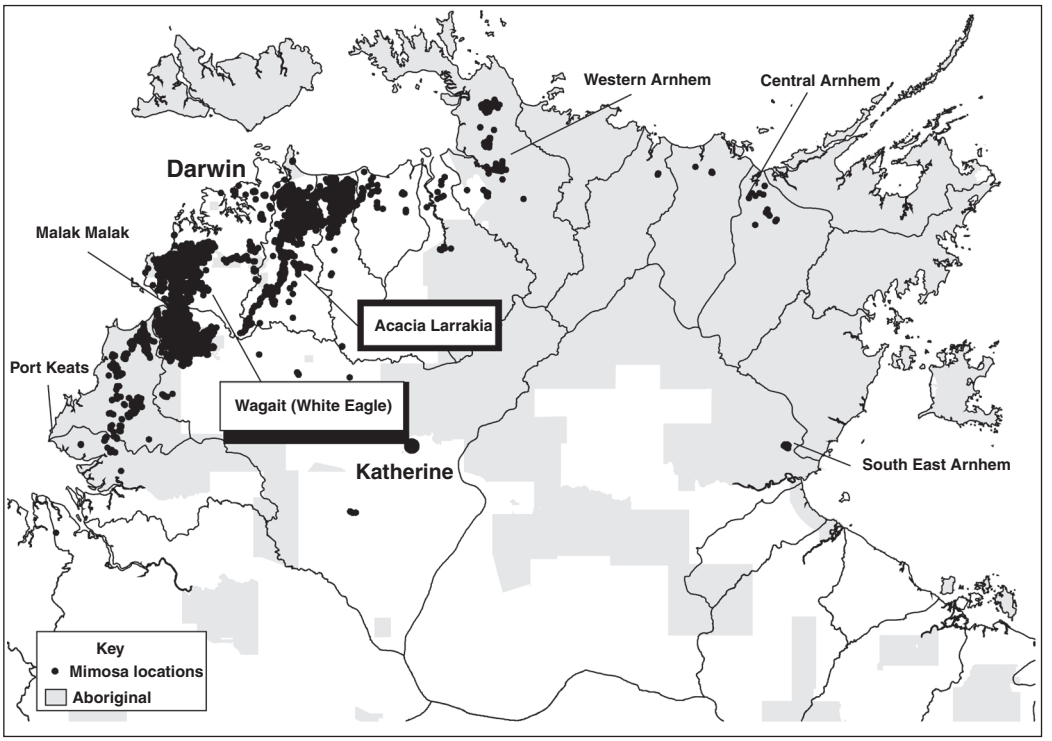

Figure 1. The current locations of mimosa in the Top End of Northern Territory (black dots). Black lines, apart from coastlines, denote catchments (Australian catchment definition standards) and shaded areas denote extent of Aboriginal owned land. Areas mentioned in this paper are labelled. Data were derived from an aerial survey of mimosa in August 2003 (S. Wingrave unpublished data).

In 2001 the CFCU contracted a report on the status of all weeds on NLC lands in an effort to broaden the mimosa focus (Smith 2001). Currently there are over 30 Aboriginal community-based land management programs across the Top End addressing a broad range of issues including weeds (see Storrs *et al.* 2002). It is timely now to look at the situation with regard to the broader range of weeds, how they are being dealt with and make recommendations on how to deal with them more effectively.

As a case study for current weed management capacity we assess the multi-agency (approximately $10m) funded Aboriginal mimosa program, which ran between 1998 and 2003. This program is the latest in a long history of mimosa research and management in the Top End which totals at least $50 million since the early 1980s with investment mostly coming from the Northern Territory (NT) and Australian Governments (S. Wingrave unpublished data). This paper examines two components of the multi-agency funded mimosa program: the MACA and TEALMES to assess how well they prevented the spread of mimosa and increased community capacity in weed management.

METHODS

Quantitative and qualitative data was collected from unpublished TEALMES and MACA reports and through conversations with stakeholders. Other sources are acknowledged in the text.

RESULTS AND DISCUSSION

Preventing spread The combined result of MACA and TEALMES programs has been large reductions in both the extent (from about 8800 to 3300 ha) and density of mimosa in all project areas over a period of five years (Table 1). Initially large areas of mimosa were sprayed by helicopter during the wet season until density was reduced to a level where ground control was a viable management option. Aerial spraying was repeated annually between 1999 and 2003. After training in weed management, Aboriginal rangers started on-ground operations in 2000. During the dry season

they searched the target area for plants that were missed by the aerial spraying and treated emerging seedlings. The outlying populations in Central and South East Arnhem Land, which were discovered in the early 1990s and 1997 respectively, have been managed to prevent the establishment of infestations in these strategically important areas. Work at Port Keats, Malak Malak and Western Arnhem has been strategic, having concentrated on peripheral and upstream populations. Conversely, Acacia Larrakia typifies the problem of non-strategic management since unmanaged populations upstream make reinfestation almost inevitable.

It is important to remember that vast areas of land (Table 1) are managed by a few Aboriginal rangers and government workers. These lands are very remote, unpopulated with little or no access. Helicopter access was only limited by availability of money but access for follow-up ground-work was limited by flooding, permission to cross neighbours land and ownership disputes.

Building community capacity and awareness The Aboriginal ranger movement has come a long way since 1995. In the Top End there are now over 30 land management programs with over 300 members. These rangers do a variety of Natural Resource Management (NRM) jobs including management of fire, feral animals and weeds. They form part of the front line for plant and disease incursion in northern Australia. Most rangers have no formal work experience except the Community Development and Employment Program (CDEP), which is essentially work for the dole. They generally have no western style NRM experience.

Moderate levels of vocational education and training have been achieved through the Charles Darwin University and the Batchelor Institute of Indigenous Tertiary Education (Table 2). More students are currently enrolled in certificate courses, however, formal education may not be appropriate for everyone. Many people have limited literacy and numeracy or have little incentive as there are few jobs at the end of the training. Number of days worked in 2003 (Table 2) are roughly proportional to the area of work in each community. One of the key indicators of success is awareness of weeds and a capacity to deal with them within the community. Different communities have different exposure to formal education and weed management. Acacia Larrakia has the highest level of formal training with ten Certificate 1s. This community is the most exposed to western education and in close proximity to Darwin. Aboriginal people in Western Arnhem Land have been involved in mimosa management for nearly 20 years. The associated training has given rangers more confidence to manage weeds and other NRM issues and the community feels that they have more ownership of projects. The recent graduation of the two Certificate 2s was important in the community. In Port Keats at the start of the program, mimosa wasn't even on the community radar. However a huge change has occurred. Now they have an understanding of the problem and more confidence in managing it. There

Table 1. Estimated change in the extent and density of mimosa in Aboriginal land over the period 1998 to 2003 (aerial and ground control are combined). Total area of Aboriginal land owned by each landholder illustrates the proportion of land managed for mimosa (estimated from aerial surveys, MACA and TEALMES reports).

Community	Total area (ha)	1998 extent (ha)	1998 density	2003 extent (ha)	2003 density (ha)
Acacia Larrakia	3,200	350	high	100	low
Malak Malak	42,300	862	high/med	200	low
Port Keats	1,404,000	66	high/med	20	low
Western Arnhem	1,122,000	1,500	high/med	1,000	med/low

Table 2. Indices of training including the approximate number of people-days worked specifically on mimosa control, and formal training achieved during the program (source TEALMES reports).

Community	4 h days worked (2003)	Vocational education and training
Acacia Larrakia	256+	Ten Certificate 1 in Land Management Skills
Malak Malak	Not known	None
Daly/Port Keats	82+	Some accredited NRM courses
Western Arnhem	183+	Two Certificate 2 Conservation and Land Management

is a knowledge exchange between rangers and their families resulting in a greater engagement of the whole community.

Framework for strategic weed management on Aboriginal land It is expected that the mimosa review will be completed by the end of August 2004. Further interviews with Aboriginal land managers are still required to determine Aboriginal community goals and expectations in relation to land management issues. Other cultural issues such as conflicts between weed management work and cultural obligations such as ceremony also need to be explored.

The mimosa review will be combined with existing recommendations from an overview of the status of weeds on Aboriginal lands of the Top End by Smith (2001) and other relevant weed management information to develop a Strategic Weed Management Plan (Figure 2). The Plan will be used to inform the future direction and priorities in a number of bodies including the NLC, ILC, and Northern Territory and Australian Governments.

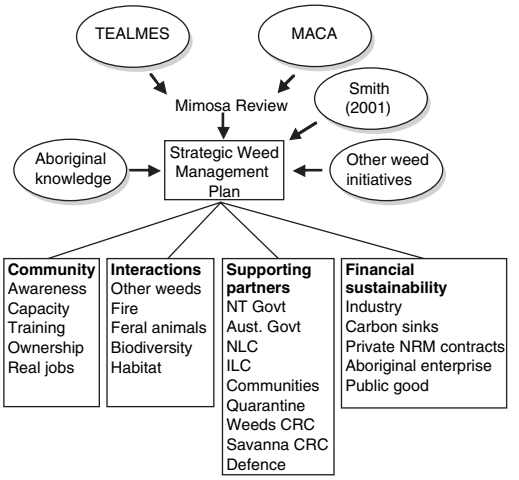

Figure 2. A schematic diagram on how current weed management knowledge will feed into the Strategic Weed Management Plan.

CONCLUSIONS

Preliminary findings from the mimosa review suggest that the capacity of a number of Aboriginal communities to manage mimosa has increased greatly over recent years. The training of rangers in a broad range of NRM issues and the resulting practical know-how has been one of the most successful components of the TEALMES. Mimosa funding has facilitated training in the three big NRM issues of the Top End – weeds, fire and feral animals. Training has included the use of herbicides, occupational health and safety, weed identification and collection techniques, global positioning system (GPS) use, map reading, fire management, feral animal control, firearm safety, disease inspection of animals, harvest of wild animals, community education techniques, machine maintenance and site rehabilitation.

Increasing community capacity in strategic weed management is a long-term goal and will require clear lines of support (financial, technical and logistical) from partner agencies. Development of new linkages is necessary, such as that with defence, as their involvement in the Top End increases.

Finally, long-term financial sustainability is essential. As well as traditional Government-based funds, new sources need to be explored such as fire management for carbon credits, and Aboriginal enterprises such as tourism, pastoral enterprise development and harvest of wild animals.

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