3. The Problem with Weeds

The Australian continent has for many millions of years been the evolutionary centre of a unique suite of plant species. The relative significance of conservation of these plant species in tropical areas of Australia has been demonstrated by many authors (e.g. see Braithwaite and Werner 1987; Stanton 1992; Woinarski et. al. 1992). In the Northern Territory there are large areas of land that have experienced little ecosystem disturbance. However, the relatively recent invasion of natural ecosystems by exotic plants is now looming as one of the Territory's major environmental threats (Rae & Storrs 1999). The rapid degradation of intact ecosystems worldwide suggests that as pristine or largely non-degraded landscapes become more rare, their economic as well as intrinsic value will increase.

Few, if any Australian ecosystems appear to be immune to invasion by introduced plants (see Groves 1991; Fox and Carr 1986; Carr 1988). Already the introduction of exotic plant species with resultant displacement of native plants has had a major impact on ecological processes in northern Australia. Further, weeds are also now a major blight on most agricultural areas in Australia including the Northern Territory, with the annual impact in Australia estimated at around $3.3 billion.

The study of weeds in non-agricultural or non-pastoral areas is a comparatively new concept, particularly on Aboriginal land in the tropical savanna zone of northern Australia. This is especially so where weeds are considered in the broad sense to include all unwanted exotic plant species. Weed management is however, set to become a key issue on Aboriginal land as current weed species gain a foothold and move into a phase of rapid spread and also as new potential weeds are being trialed for pasture improvement (e.g. see Lonsdale 1994, Rae and Storrs 1999). Unfortunately most of the pasture species under trial have proven track records overseas and interstate as invasive weeds e.g. *Hymenachne amplexicaulis* (Rudge) Nees (olive hymenachne) and *Digitaria milanjiana* (Rendle) Staf. (finger grass.)

Aboriginal people own, or have under claim, nearly 50% of the land in the Northern Territory. The Northern Land Council's region covers the northern half of the Territory, of which 87 per cent of the coastline is Aboriginal freehold land (see Figure 1). These lands support diverse land uses including hunting and gathering activities through to commercial pastoralism, mining and tourism.

Weeds on Aboriginal land constitute a major threat to the cultural and environmental values of traditional lands as well as precluding many future land-use options if not properly managed. Weeds have alread been identified as a problem on some lands currently owned and managed by Aboriginal people. In some cases large sums of money have been spent in attempts to control weeds. (For example, considerable resources have been expended on the control of *Mimosa pigra* at the community of Kunbarllanjnja, see Sanford-Readhead 1995.)

The increasing vulnerability of large tracts of Aboriginal land in the Northern Territory to weed incursion can be attributed mainly to the increasing pressure of human activity e.g. tourism, mining and pastoralism (Storrs and Finlayson 1997). There are also significant areas of wetlands that, according to Lonsdale (1990), exhibit rapid species turnover and thus are readily colonised by invasive species. These expansive natural areas combined with limited human and financial resources to deal with the problem make Aboriginal land priority areas for dealing with unwanted exotic plants.

The assessment, control and eradication of unwanted exotic plants on Aboriginal land is an extremely urgent task that needs to be carefully considered and wise decisions made about future land use and management priorities (Storrs et al. 1996). These decisions need to be made now, before control of invasive weeds becomes impracticable.

3.1 What is a weed?

> A weed is a plant which has, or has potential to have, a detrimental effect on economic, social or conservation values (National Weeds Strategy 1997).

There are many definitions in common usage of what constitutes a weed. The word 'weed' is, however, a disputed term that often means something different to everyone that uses it. While many formal definitions of a weed have been proposed, no single definition has been widely accepted as adequate (National Weeds Strategy 1997). Smith (1995) lists some of the more commonly used definitions currently in use in the Northern Territory as:

- A plant that is growing where it is not wanted.
- A plant growing out of place.

There will always be a great deal of subjectivity about weed definitions as people's opinions differ as to what they consider desirable. A plant's status as a weed largely depends upon where it is and what use is made of that place (NTDPIF 1996). What is considered a weed in one area may not be a weed in another. In Kakadu, as in many other conservation areas, a weed is defined as any naturalised alien plant (Cowie & Werner 1987). They consider a naturalised alien plant to be one that has become established and reproduced for several generations. Adventive species are plants that persist without human intervention at one or few separate locations, generally for less than 25 years, reproducing sparingly (Kloot 1987).

Weeds that affect the integrity and biodiversity of natural areas are termed "environmental weeds[1]", "bushland weeds" or "weeds of conservation". Fensham and Cowie (1998) also refer to such plants as "naturalised exotics". For detailed definitions of environmental weeds see Csurhes and Edwards (1998). Once these naturalised exotic plants have become established they can hinder the survival and regeneration of native plant species causing flow-on effects to native fauna. A naturalised exotic is not simply just another plant but something that changes the very nature of the habitat it invades. Csurhes and Edwards (1998) summarise that the major impacts of environmental weeds on ecosystem function as:

- Competition for resources.
- Prevention of recruitment.
- Alteration of geomorphological processes.
- Alteration of hydrological processes.
- Alteration of nutrient content of soil.
- Alteration of fire regimes.
- Changes to abundance of indigenous fauna.

Weed invasion can also affect the following:

- Ecotourism—loss of unique environments.
- Recreation—loss of access to recreational sites.
- Health—increasing allergic reactions to some introduced plants, animal welfare etc.
- Landscape—loss of visual aspect and ecosystems can appear unnatural.
- Economics—high costs involved in weed control work.

Ironically many of our worst naturalised exotics are considered useful plant species in a different land use context (see inset text overleaf on buffel grass).

1. The use of the term 'environmental weed' has been avoided in this document because the meaning of this term is unclear. The use of the word naturalised exotics has been used throughout instead.

Cenchrus ciliaris (Buffel Grass) useful plant or weed?

Buffel grass is an erect deep-rooted perennial grass that grows to a height of around one metre, often forming loose tufts. Buffel is an introduced species native to Africa and India which is now widespread throughout the Northern Territory. In the southern regions of the Northern Territory this species was previously known as Cenchrus pennisetiformis.

Buffel colonises both disturbed areas, often around urban areas such as schools, homesteads, outstations, parks, roadsides, areas on and near coastal dunes, along river and creek lines, swamp margins as well as natural bush areas. Seeds are spread short distances by wind, however it appears that people aid in the spread of this species by deliberate plantings, in the movement of contaminated hay and by vehicles. Buffel is now considered a major weed in Kakadu National Park and is prevalent in some other conservation areas in the northern regions of the Territory such as Flora River Conservation Park and Gregory National Park. Buffel is an aggressive invader that displaces native grasses by competition. In the more mesic species-rich habitats of central Australia, such as along creek lines it has become a major weed problem. Increased fire intensity along creek lines and river levees caused by thick swards of buffel have affected the regeneration of Eucalyptus camaldulensis (river red gum). As it is unpalatable to rabbits it survives well in areas with high rabbit numbers. Also at risk from altered fire regimes are the fragile coastal dune plant communities in the Top End where buffel grass has now established itself forming dense swards. This now includes some coastal areas in Arnhem Land and offshore Islands that until very recently were considered weed free.

The same species is, however, widely planted on pastoral properties in the Northern Territory where it is a valued fodder species that can withstand heavy grazing. The species has also been extensively planted in land reclamation programs for soil stabilisation, particularly on sandy soils where its deep root system enables it to establish and survive extremely well. In these latter cases this plant is not considered a weed but a very desirable plant. Despite the useful or beneficial aspects of this species considerable resources and money has been applied to control of buffel in conservation areas. Urgent consideration needs to be given to realistically weighing up both the costs and benefits of this species.

References: Cameron & Justin (1988); Fensham (1996), Griffin (1993); Latz (1991), Smith (1995); Wheaton (1994).

Weeds that affect primary industries including horticulture, forestry, pastoralism, by reducing productivity are sometimes termed “weeds of agriculture” or “crop weeds” e.g. *Calotropis procera* (rubber bush), *Jatropha gossypifolia* (bellyache bush) and *Themeda quadrivalvis* (grader grass). Weeds in these instances normally have some negative effect on human and animal welfare or activities. Weeds of agriculture can be indigenous plants as well as introduced plant species including naturalised exotics. For example, the problem of woody weeds in pastoral areas is often one of encroachment of native woody trees and shrubs on grazing land (see inset text on woody weeds).

Woody Weeds

Woody weeds have been a perceived problem in pastoral areas of the Northern Territory for over a century. They are considered to make rangelands less productive by growing into dense thickets which prevent stock from foraging, make mustering difficult, out-compete native grasses and hence lower the carrying capacity. Many native plant species are adapted to survival in harsh conditions and will germinate on mass when environmental conditions are appropriate. This is a common natural feature in the pastoral zone, particularly the arid and semi-humid zones of Australia. Through the processes of natural attrition, Aboriginal burning regimes, climate, competition and ecological succession, there has, in the pre-colonial past, been a balance between grasses, trees and shrubs giving rise to climax vegetation and stable ecosystems. The term “woody weed” then is a Euro-centric construction that applies to the build up of these native plants under changed and changing management regimes.

The Problem with Weeds

Woody Weeds

The term woody weeds, is commonly used for native shrubs and trees that hinder pastoralism. The existence of woody weeds can also threaten other native plants and also animals. The endangered *Imperata cylindrica* grasslands of Cape York are threatened by native woody weed species due to reduced frequency and intensity of fire (Neldner et. al. 1997). The golden-shouldered parrot (*Psephotus chrysopterygius*) in Cape York is declining in numbers as a result of increased predation from native predators. These predators have been able to take advantage of changes to the parrot's habitat as a result of changed fire regimes, notably an increase in the woody weed *Melaleuca viridiflora* (Garnett & Crowley 1995). The build-up of these plants is a result of detrimental changes to the native ecosystem. Predominantly they are symptoms of both changes in burning regimes and of overgrazing. Overgrazing can have the following effects:

1. reduces perennial grass cover, which previously provided fuel for fires that controlled shrub build-up.
2. reduces the competition from perennial grasses which therefore enhances woody weed germination and survival.
3. causes soil disturbance resulting in greater opportunities for weed establishment.
4. can result in supplementary feeding with resultant increase in the likely hood of weed introductions.

The prevention of fire increases the survival of trees and shrubs past the seedling stages. Vulnerability of species to fire differs between plant species. Some species are known to be very fire sensitive i.e. *Callitris* spp. (native pine). However most shrubs and trees seem vulnerable while they are seedlings. Therefore the lack of fires allows establishment of shrubs which become more fire resistant with age. Fewer fires has led native shrubs (woody weeds in pastoral areas) to become more prolific. Other causes may include rising CO_2 levels, which promotes all vegetation, but particularly C4 plants.

Some pastoralists are concerned about the use of fire in weed control because of:

1. the economic necessity to maintain pastures until the beginning of the wet season or through dry years.
2. the cost and difficulties involved with burning.
3. the potential litigation resulting from escaped fires.

The deliberate use of fire through prescribed burning can retard shrub increase by either killing fire sensitive species (e.g. *Acacia aneura*, mulga) or by reducing the vigour of other less fire sensitive species (e.g. *Acacia lysiphloia*, turpentine). A substantial reduction in shrub cover can be achieved through the use of follow-up fires or chemicals to further damage the shrubs while they are recovering from the first fire treatment. Further burns as required may maintain an acceptable level of shrub cover. Mechanical control of woody weeds is possible but very expensive when applied over large areas. Techniques include chaining, stick raking and blade ploughing. Revegetation of any treated areas with vigorous native grasses will help suppress the germination of shrubs and seedlings. Some common identified woody weed species include *Acacia aneura* (mulga), *Acacia estrophiolata* (ironwood), *Acacia lysiphloia* (turpentine), *Acacia farnesiana* (needle bush) and *Acacia kempeana* (witchetty bush).

References: Bastin (1998a&b); White (1997a&b).

Urban weeds or weeds in highly disturbed areas are generally those found around communities, townships, out stations and roadsides in developed areas e.g. *Phyllanthus amarus, Mitracarpus hirtus* and *Trianthema portulaccastrum.* Fensham & Cowie (1998) call these weeds "disturbance exotics". Often they are very widespread and can also be both agricultural and environmental weeds. These weeds are predominantly colonisers that would normally disappear when native vegetation re-establishes. However under such circumstances naturalised exotics tend to persist or even flourish.

Most of the weeds present in the Northern Territory are exotic plants originating from outside of Australia. Increasingly indigenous plants that are planted outside their normal biogeographical range are causing weed and other problems e.g. populations of *Acacia umbellata, A. gonocarpa* and *A. dunnii* (all Northern Territory native plants), are establishing themselves outside of cultivation and are spreading into Eucalyptus woodlands in the Darwin region (see inset text on white cedar).

Melia azedarach (white cedar)

A Northern Territory native plant as a weed

A deciduous tree to about 8 m high with densely hairy branchlets. Bark grey-brown, smooth when young, cracked and scaly in older plants. The leaves are mostly bi-pinnate (sometimes tri-pinnate), 140-440 mm long, leaflets 4-7 cm long, 1.5-3.5 cm wide with serrated margins and pointed tips. Flowers small, in sprays 1-12 cm long, white, scented. Fruit is an globular or ovoid yellow drupe, 9-16mm long, 5-12 mm wide. *Melia azedarach* is superficially similar to *Azadirachta indica* (neem tree) which has been introduced into Australia and has pinnate leaves instead of bi-pinnate.

Native to the Victoria River District in the Northern Territory its known range also extends into the Kimberley region in Western Australia, Queensland and New South Wales. Overseas it is found in India, tropical China, Indonesia, New Guinea and the Solomon Islands. *Melia azedarach* (white cedar) is widely cultivated and has become naturalised in the warmer parts of the world. In the Northern Territory it has become naturalised around the Alice Springs area where it was planted as a shade tree. It has also been reported as a weed in the Nhulunbuy area. In these situations white cedar competes with local native plants species and displaces them. As yet the environment effects of competition from this species are not well known.

References: Dassanayake et. al. (1995); Everist (1981); Wheeler (1992).

A further problem arises where native plant species are planted as ornamentals or used in vegetation rehabilitation works outside their own provenance. This is commonly called genetic invasion (Harlan 1983). The risk here is that genetic material of related local species will be adversely affected by hybridisation or there will be a pollution of gene pools within the same species from different provenances. For example, some local nurseries in Darwin import from north Queensland many species which are found growing locally in the Top End. These plants are then purchased and planted all around the Top End, including extremely remote areas in Arnhem Land. Very little is known about the extent of genetic invasion in the Northern Territory or about the effects that it may have on native ecosystems. It is therefore essential that any revegetation or landscape work carried out uses local seed sources and local plants. As yet there has been very little work carried out in the Northern Territory as to the current state of this problem. Recent studies have shown that *Ptychosperma bleeseri* specimens in cultivation in Darwin are in fact crosses with introduced *Ptychosperma* spp. (Pers. Com. Colin Wilson, PWCNT).

The weed situation in all areas of the Territory is getting worse, no matter what the definition of a weed is followed. It should be recognised that weeds are both a symptom and a cause of land degradation, and that the invasion of weeds is currently being exacerbated by:

- land degradation by overgrazing and land clearance.
- increases in all types of vehicle movement e.g. mining exploration, recreational and tourist 4-wheel drives, military vehicles, cattle trains, etc.
- increased population pressure causing changes to the environment e.g. disturbance, urbanisation etc.

- pollution through unsustainable land management practices e.g. increased levels in nutrients which favours some weeds.[2]
- continued intentional distribution as pasture species despite the fact that many introductions have known records as weed elsewhere in the world, including similar habitats in other parts of australia.
- shifts from traditional burning regimes.

3.2 Aboriginal perceptions and recognition of weeds

There is little doubt that there is a vast body of knowledge existing in Aboriginal communities in the Northern Territory about the structure and floristics of local native vegetation communities. This knowledge has variously been recorded as Traditional Botanical Knowledge (TBK), Traditional Ecological Knowledge (TEK) or Indigenous Botanical Knowledge (IBK)[3]. With this in-depth knowledge of the environment it becomes easy for landowners to recognise plants that don't occur naturally in a given area. Many of the Aboriginal people consulted on this survey demonstrated quick recognition of a wide range of exotic plant species; both naturalised and disturbance exotics. Exotic species were variously defined as "white fella plants", "plants that don't belong to this country", "plants not from here" and "plants with no family". The latter definition is a reference to the fact that at this point in time some of the recent plant introductions have no cultural significance.

Historically in the Northern Territory western scientific approaches to land management have proceeded in ignorance of ecological constraints. This has resulted in land degradation and extinction of species through destruction of habitats, direct killings and the introduction of exotic plants and animals. Rose (1988) reports Aboriginal perceptions on this type of mismanagement as turning "quiet" managed country into "wild" country. With increasing documentation on Aboriginal management of the environment in the Northern Territory (e.g. Langton 1998), western scientists are at last starting to understand the ways Aboriginal people manage their land. Despite this, very little work has been targeted specifically at weed issues to determine Aboriginal perceptions of weeds, to gauge the perceived effects of weeds on country and to investigate alternative approaches to weed control. Wilson (1993) has looked at weed perceptions with Aboriginal people in NSW while in the Central Australian region (Rose 1995) has examined attitudes towards both feral animal and feral plants.

During this overview of weeds the following perceptions of weeds were observed:

1. In some instances it was acknowledged that some plant species were only recently found in people's country. Although not considered to be useful species to humans, these species were not considered deleterious to the environment and were now accepted as part of the local flora. They fit in and are surviving e.g. some animals now eat them and so they form part of the landscape. Often in these situations there is no perceived need to remove them. Furthermore some people reported they were confused about weed scientists' desire to remove some species and keep others for no apparent reason.
2. Some Aboriginal people may also consider as plants weeds that are recognised by western scientists as both introduced and native to the Northern Territory. For instance, those native species that originated from other people's country that previously did not grow on one's own country but now do so.
3. A number of naturalised and disturbance exotics species were considered highly useful plants and the desire to control or remove these plants is not always evident. For instance a number of species were considered by some Aboriginal groups to be useful plants rather than weeds (see Table 1).

2. Fensham and Cowie (1988) report that on the Tiwi Island the naturalised exotic *Hyptis sauveolens* (hyptis) favours areas of high fertility. They conclude that fertilized forestry plantations and nutrient rich settlements are sensitive to invasion by this species.

3 TBK or TEK knowledge refers to the body of knowledge built up by a group of people through generations of living in close contact with nature. However there is no universally accepted definition of this concept.

Table 1 Aboriginal uses for some currently listed weeds and their perceived status (NLC region only)

SCIENTIFIC NAME	KNOWN USES	STATUS BY GROUP REPORTING USE	REFERENCE
Agave sisalana	Fibre for weaving	Introduced	Smith (1991)
Arundo donax	Spears from stems	Introduced	Wightman et. al. (1994)
Anacardium occidentale	Edible fruit	Introduced	Pers. Obs. N. Smith
Azadirachta indica	Insecticide/shade	Introduced	Pers. Obs. N. Smith
Citrullus colocynthis	Medicinal use from fruit	Introduced	Pers. Obs. N. Smith
Citrullus lanatus	Edible fruit	Introduced	Pers. Obs. N. Smith
Crotalaria goreensis	Necklace production	Introduced	Smith (1991)
Euphorbia drummondii	Medicinal use	Native	Pers. Obs. N. Smith
Euphorbia hirta	Medicinal use	Native	Smith (1991)
Gmelina arborea	Carvings	Introduced	Pers. Obs. N. Smith
Grewia asiatica	Edible fruit/string	Native	Raymond et. al. (1999)
Hibiscus sabdariffa	Edible fruit	Native/Introduced	Pers. Obs. N. Smith
SCIENTIFIC NAME	**KNOWN USES**	**STATUS BY GROUP REPORTING USE**	**REFERENCE**
Hyptis suaveolens	Children's spears, smoking tobacco	Native	Pers. Obs. N. Smith
Leucaena leucocephala	Edible seeds?	Introduced	Pers. Obs. N. Smith
Momordica balsamina	Edible fruit	Native	Smith (1991)
Parkinsonia aculeata	Medicinal/shade tree	Introduced	Pers. Obs. N. Smith
Passiflora foetida	Edible fruit/medicinal use	Native/Introduced	Smith (1991)
Phyllanthus embellica	Edible fruit	Introduced	Pers. Obs. N. Smith
Physalis minima	Edible fruit	Native	Pers Obs. N Smith
Senna alata	Medicine/ringworm	Introduced	Smith (1991)
Sida acuta	Broom manufacture	Introduced	Pers. Obs. N. Smith
Ziziphus mauritiana	Edible fruit	Introduced	Pers. Obs. N. Smith

Usher (1988) argues that in countries that have been explored and settled by Europeans in the last 200 years the distinction between native and introduced plant species is relatively clear. However, some Aboriginal people dispute the status of some plant species classified by western plant scientists as weeds. For example, in coastal communities there is considerable Aboriginal local knowledge that points to *Tribulus cistoides* (bindii/caltrop) and some forms of *Tribulus terrestris* (bindii/caltrop) being species that have a long history of establishment in the north. This is certainly backed up by early botanical collections of these species. The same applies to *Hyptis suaveolens* (horehound/hyptis), *Acacia farnesiana* (needle bush) and *Pistia striatoides* (water lettuce), which are all declared noxious weeds in the Northern Territory. Miller & Schultz (1993) believe these may have been introduced to Australia before European settlement. Other widespread plants that are currently listed as weeds, but definitely considered to be native species by some Aboriginal groups, include *Physalis minima* and *Passiflora foetida* (see Table 1 for others). It is obvious then that there is a need to carefully examine the local botanical knowledge as it relates to perceived introduced plant species before widespread control of plants in local areas occurs. This should be carried out by trained ethnobotanists using appropriate and well-recognised approaches to the study of indigenous knowledge.

Some of these introduced species have now taken on the name and classification system of related native plant species e.g. the Wardaman term for the introduced creeper species *Passiflora foetida* is "Mardawg", a name which is also applied to the native creeper *Cucumis melo*. Since both have edible fruits and are creepers they are classified as "Wolon" (plants without woody stems) (Raymond et. al. 1999). Little work has been done to document ethnoclassification including the incorporation of native and exotic plants in the Northern Territory. There is an urgent need to carry this work out.

All this not withstanding, Aboriginal people do recognise certain invasive, non-useable weed species as problems. At a Caring for Country workshop representative traditional landowners and managers from Aboriginal communities across the NLC region identified weeds as their major land-use problem (NLC 1996).

3.3 Legislative requirements for weed control

The Northern Territory Noxious Weeds Act 1980 provides the legislative framework for weed control in the Northern Territory under the jurisdiction of the NT Department of Primary Industry and Fisheries. An Agnote explaining details about the Act can be seen in Appendix 4. The aim of the Act is to prevent the introduction and spread of noxious weeds in the Territory (Miller 1988). However, since its introduction circumstances changed and there it was recognised that a review of the Act was necessary.

The Northern Territory Weeds Management Strategy (Northern Territory Government 1996) and the draft 1997 Northern Territory Weeds Management Bill, currently before Parliament, propose substantial changes to the way weeds are managed in the Northern Territory. They both propose that regional or catchment-based committees generate enforceable Weed Management Plans. This would further increase responsibility for weeds from government onto all landholders and land management agencies.

The current Northern Territory Weeds Act gives the NTDPIF power to enforce weed control on Aboriginal land (Miller & Schultz 1993). This option has, however, never been carried out—partly because there has been a lack of power to bring any action to a conclusion. Previously inalienable freehold land could not be sold, mortgaged or dealt with to recover debts for compulsory control of weeds carried out by government.

Other legislation that impacts on weed control includes the Northern Territory Government's legislation National Parks & Wildlife Conservation Act, the Biological Control Act, the Poisons and Dangerous Drugs Act, the Seeds Act, the Environmental Assessment Act, the Pastoral Lands Act and the Fisheries Act as well as Commonwealth legislation such as the Endangered species Act, the World Heritage Conservation Act, Wildlife Protection (Regulation of Exports and Imports) Act and Quarantine Act.

Landholders may also have some responsibility under common law for damage caused to neighbouring lands caused by weeds, although this is unclear and needs further investigation.

This study revealed that in many Aboriginal communities in the Northern Territory there is a real lack of knowledge about the current Northern Territory Weeds Act. Information has not filtered through to many communities and landholders about their responsibilities under the Act. The new draft bill has large implications for Aboriginal landowners, especially in terms of sale of freehold land to cover government debts incurred during any weed control. However very few people consulted in this study had any idea of this pending legislation.

There is an urgent need to get information on both the existing and pending weed legislation to Aboriginal landowners in a culturally appropriate format so that landowners are in a position to make informed decisions about land management on their country.

3.3.1 Recommendations

Recommendations 1: NLC legal staff to investigate the implications of the new weed management bill particularly in relation to enforcement and compulsory acquisition of land.

Recommendation 2: Urgent need to inform landowners of their responsibilities under the NT Noxious Weeds Act and also of the implications of the impending weed bill. This needs to be presented in a culturally appropriate format. NLC to collaborate with NTDPIF and produce extension material on this.

Recommendation 3: The NLC should investigate a range of approaches to meet the cost of controlling species that were recommended for sowing and which have now spread to Aboriginal land. These could include government control/eradication programs and compensation and legal remedies.

3.4 Declared plants

In Australia there are more than 250 plant species declared under noxious weeds legislation and many more prohibited as contaminants under seed and stock feed legislation (National Weeds Strategy 1997)[4]. There are always plants being added to those listed, rarely is one dropped off. The consideration of plants for noxious status is ongoing in Australia owing to the increasing number of species that become naturalised and subsequent major problems (Panetta 1993).

The term “noxious weed” has legal ramifications and for this reason control has concentrated on this category at the expense of other weeds. Noxious weeds are usually those that cause serious damage to agriculture and for which there is a clear public benefit to government intervention and control (See Appendix 4 for Declaration tables).

For a plant to be declared noxious it must be (from Miller 1988):

1. a significant threat to the productivity of land and water, flora and fauna resources or human health.
2. controllable i.e. means are available to kill the plant.
3. there is an ability and firm intention to enforce control.
4. a worthwhile benefit to the community can be anticipated from enforced control.

Under the Noxious Weed legislation there are three classes of noxious weeds:

- Class A: to be eradicated.
- Class B: growth and spread to be controlled.
- Class C: not to be introduced into the Territory (this includes all Class A and B weeds).

The weed categories listed in Section 4.6, such as naturalised exotics and disturbance exotics, can be noxious weeds. However many are not listed because they are considered to be easily controlled by cultural practices and their enforced control is considered impractical. There has

4. These are now listed on the National Weeds Strategy Website: www.weeds.org.au

been a reluctance by NTDPIF staff to admit that many of these species are major threats to the environment; or ironically, they are currently being promoted as pasture species.

The fact that many exotic weed species are not listed under the Act has meant the focus of weed control in the Northern Territory is on noxious weeds while other non-listed species are building rapidly in numbers. For example, naturalised populations of the exotic pasture species *Clitoria ternatea* (butterfly pea) are expanding into undisturbed native vegetation at great rates including culturally significant areas in Nhulunbuy, Katherine, Roper River, Flora River and Darwin. (Pers. Obs. N. Smith, 1998).

Clearly, if appropriate weed risk assessment studies had been carried out this species would never have been introduced into the Northern Territory as a pasture species.

The question then should be asked of who is responsible for the cost of control of this species on Aboriginal land, especially considering the fact that previous to European settlement all Aboriginal land was relatively free of weeds.

The question should also be asked of species such as *Hymenachne amplexicaulis* (olive hymenachne) which is recognised as a weed of national significance (WONS) but was, until recently, still being promoted, planted and spread by NTDPIF (Rea and Storrs 1999) and *Digitaria milanjiana* (finger grass) which is also known as a weed overseas but is still actively promoted by NTDPIF. Should these species turn up unwanted on Aboriginal land then surely the question of who pays for control needs to be examined carefully.

3.4.1 Recommendation

Recommendation 3: The NLC should investigate a range of approaches to meet the cost of controlling species that were recommended for sowing and which have now spread to Aboriginal land. These could include government control/eradication programs and compensation and legal remedies.

Recommendation 4 : NLC to pursue negotiations in association with other interested groups to increase the number of weeds declared noxious under the Noxious Weeds Act.