Weed Management Guide

Version 1
14/01/12

Prepared by
Climate Change & Environment
and
Parks & Reserves

1. Introduction

Recreational parks, nature reserves, national parks and native bushland contribute to 3,100 hectares of the 140,000 hectares of the City of Darwin municipality. City of Darwin manages 400 of those hectares while the Federal and Northern Territory governments manage the remainder. Despite efforts, loss of habitat, biodiversity and ecosystem function are ongoing management issues. Actions to date have focused on key issues such as weeds and pests (in particular Weeds of National Significance (WONS) such as gamba grass and mimosa), remnant vegetation clearing, changed fire regimes, erosion and disturbances to acidic and sodic soils.

The purpose of this Weed Management Guideline is to assist Council staff and the community at large to manage and control weeds within the municipality.

1.1 Operational Plans

City of Darwin's strategic plan *Evolving Darwin Strategic Directions: Towards 2020 and Beyond*, provides direction for the management of parks and reserves within the municipality. The following goals, outcomes and key strategies specifically relate to weed management:

Goal 1 Collaborative, Inclusive and Connected Community

Outcome 1.2 Desirable places and open spaces for people

Key Strategy 1.2.1 Enhance places and open spaces.

Goal 2 Vibrant, Flexible and Tropical Lifestyle

Outcome 2.1 Increased sport, recreation and leisure experiences

Key Strategy 2.1.1 Improve the landscaping, streetscape, infrastructure and natural environment

Goal 3 Environmentally Sustainable City

Outcome 3.3 Conserve and protect the Darwin environment

Key Strategy 3.3.1 Advocate for the conservation of natural systems

Key Strategy 3.3.2 Increase biodiversity richness and abundance across Darwin

Key Strategy 3.3.3 Increase community understanding of environmental issues

Council has a number of operational plans which ensure the above goals are met. The operational plans take into account:

- Coordination of a cooperative weed management program involving input from relevant government and non-government organisations, accounting for relevant legislation, Regional Weed Management strategies and projects.
- GIS based weed map data base for areas managed as Urban Bushland Identification of best practice weed management for Darwin's tropical environment. This relates directly to Action B1 in the *Climate Change Action Plan 2011-2020* which states 'Increase native endemic vegetation to ensure conservation of existing communities'.
- Best practice weed management techniques on road verges, median strips, stormwater drains and parklands.
- Improvement of habitat health, biodiversity and reduced high temperature wildfires in native bushlands and valuable environments.
- Increased community awareness and encouraging ownership and participation in weed management.

2. Legislation and policies

2.1 Federal Government

The *Australian Weeds Strategy* provides a framework ensuring consistent guidelines across the States and Territories. The Strategy defines a weed as 'a plant that requires some form of action to reduce its harmful effects on the economy, the environment, human health and amenity.' The Strategy's key principles include:

1. Weed management is an essential and integral part of the sustainable management of natural resources for the benefit of the economy, the environment, human health and amenity.
2. Combating weed problems is a shared responsibility that requires all parties to have a clear understanding of their roles.
3. Good science underpins the effective development, monitoring and review of weed management strategies.
4. Prioritisation of and investment in weed management must be informed by a risk management approach.
5. Prevention and early intervention are the most cost effective techniques for managing weeds.
6. Weed management requires coordination among all levels of government in partnership with industry, land and water managers and the community, regardless of tenure.
7. Building capacity across government, industry, land and water managers and the community is fundamental to effective weed management.

These principles relate to three goals, each accompanied by a suite of objectives. These goals are:

1. Prevent new weed problems.
2. Reduce the impact of existing priority weed problems.
3. Enhance Australia's capacity and commitment to solve weed problems.

The Strategy identifies twenty Weeds of National Significance (WONS). Twelve WONS are found within the Northern Territory with seven across the Top End (Natural Resources, Environment, The Arts and Sport 2012).

Individual landowners and managers are ultimately responsible for managing WONS on their property. State and territory governments are responsible for overall legislation and administration. The list of WONs is provided in Appendix A.

2.3 Northern Territory

Controlling weeds is the responsibility of land managers under the Northern Territory's *Weeds Management Act 2001*. The Act reflects contemporary thinking with respect to community weed management; provides greater responsibility for all land managers, and ensures landholders are responsible for carrying out weed control on land they manage. Under the Act:

- The Minister may declare plants to be declared weeds or potential weeds.
- The Minister's intent to declare a weed will be by way of notice in the Gazette.
- The classification of a weed may be in accordance with a nationally agreed scheme or code.
- The Minister may approve weed management plans which must include the name of the plan, area of activity, name and classification of the declared or potential weeds and methods used for control.
- The Minister may establish weed advisory committees for regions, districts and catchments, or for specific purposes and declare Quarantine and cleaning areas for the purpose of preventing a declared weed entering into the Territory, or to manage a declared weed in the Territory.

- Owners and occupiers of land are responsible for weed management and have a general duty to control weeds.
- Persons must dispose of potential weeds only on their own land or at a designated weed disposal area.
- Persons can be penalised for moving weeds, selling or growing weeds.
- The Act binds the Crown, so that Government has obligations to manage weeds in the same manner as other landholders.
- Penalties for offences under the legislation are at the “environmental offence level 3”, under the *Environmental Offences and Penalties Act 1996* and range between $5,000 to $50,000 for an individual and $25,000 to $250,000 for a body corporate.

The Act is linked to the *Northern Territory Weeds Management Strategy 1996-2005* which led to a series of Statutory Plans being developed for each declared weed. Declared Weeds are grouped into three categories:

Schedule A – weeds to be eradicated.

Schedule B – weeds which the growth and spread must be controlled.

Schedule C – weeds not to be introduced to the Territory.

Appendix B lists the Northern Territory Declared Class A, B and C weeds.

2.4 City of Darwin

Weeds which are of considerable concern to City of Darwin include *Mimosa pigra* and Gamba grass. By-law 31 (1) (a) and (b) state City of Darwin may impose a notice on a land owner if the land is deemed to have:

(a) plants, grass or weeds:

(i) that are, or are likely to become, injurious, flammable or noxious; or

(ii) that have become unkempt; or

(b) litter (including unsightly car bodies, machinery or other chattels),

The Parks and Reserves Service have site specific management plans for Rapid Creek, East Point and Duke Street Rainforest and plan to develop further site specific management plans for other areas classed as Urban Bushland in the near future.

4. Treatment

In many instances, plants grown for ornamental purposes in home gardens have escaped and invaded bush and coastal land. Early detection of these invasions and quick, coordinated responses are required to eradicate or contain species before they become widespread and out of control. Weed populations not addressed early can often become costly in the long run. However, even the best weed prevention efforts may not stop weed introduction.

Once a control action has been undertaken to eradicate or contain a weed, the source of the original infestation continues to pose a risk. It is important to identify any continuing entry source or spread pathway of the weed, and understand why the weed infested occurred. Many weeds produce seeds that are able to survive for decades in the soil, awaiting the best opportunity to sprout, therefore weed mapping and identification is considered a vital tool.

4.1 Restricting new weeds

Restricting the opportunity for new weeds to invade and spread is vital in weed management. To do so:

- purchase certified weed free mulch and seed
- restrict movement of vehicles and machinery where seeds are likely to spread
- establish tracks and laneways so vehicle movement is concentrated
- wash down vehicles which have visited infested areas in appropriate wash down bays
- plant appropriately and be aware of WONS and other Classed weeds, and
- Limit disturbed sites.

4.2 Restricting spread of existing weeds

Restricting the spread of existing weed infestations can be undertaken by:

- appropriate weed management using controls outlined below
- ensuring clean areas are worked first, followed by infested areas
- work takes place from the outside in, and
- equipment including vehicles are cleaned down in appropriate wash down bays.

4.3 Control methods

Physical or chemical methods are employed to control weeds which are outlined above. Timing of control methods also impacts the success rate. For example, weed treatment should only be carried out during dry and calm conditions to reduce seed transportation. Herbicide should not be applied if rain is forecast for the following 24 hours. It is also vital personnel are trained in correct plant identification and the handling of chemicals.

Physical control

Physical control is the removal of weeds by physical or mechanical means, such as mowing, grazing, mulching, tilling, burning or by hand. The method used depends on the area of weeds, land use, and physical characteristics. When using physical control, all machinery and tools used in a weed infested site must be washed down before moving to a clean site.

Chemical control

In some situations herbicides offer the only practical, cost-effective and selective method of managing particular weeds. In some cases, a weed is only susceptible to one specific herbicide and it is important to use the correct product and application rate for control of the particular weed. Common mistakes include incorrect identification of the weed or using inappropriate products. In most cases, weeds must be actively growing to be vulnerable to herbicide treatments. Herbicide resistance can also be an issue with some species. Conditions such as wind speed and direction, the possibility of rain and proximity to waterways must also be taken into account when using herbicides.

By law, herbicides must be used in accordance with the label. The Australian Pesticides and Veterinary Medicines Authority (APVMA) is the Australian Government authority responsible for the independent assessment and registration of pesticides and veterinary medicines. The APVMA keeps a record of all registered herbicides and pesticides in Australia, as well as reviewing chemicals to ensure contemporary standards are met.

Herbicides control weeds by :

- speeding up, stopping or changing the plant's normal growth patterns
- desiccating (drying out) the leaves or stems, and
- defoliating the plant (encouraging the plant to drop its leaves).

Herbicides are taken by the plant in various ways including:

- contact – kill plant tissue at or near the point of contact, even coverage application is required.
- systemic – chemical moves through the plant tissues via the plant's circulation system, often injected into the plant.
- residual – added to the soil in order to kill weeds through root/shoot uptake, chemical remains active in the ground for a certain length of time, used to control germinating seedlings.

Herbicides are categorised as either broad spectrum (working on a wide variety of plants) or selective (working on a specific range of plants) and it is important to identify the weed species first to ensure the correct herbicide is used.

There are many ways in which herbicides can be applied including foliar spraying, basal bark spraying, stem injection, cut stump application, cut and swab, stem scrape and wick application.

For more information on weed treatment or reporting weed infestations, contact

Weeds Branch

Northern Territory Government

http://www.lrm.nt.gov.au/weeds

General Enquiries - Tel: (08) 8999 5511

APPENDIX A – Weeds of National Significance

For more information on description, distribution and management, visit the jointly administered by the Department of Sustainability, Environment, Water, Population and Communities and Department of Agriculture, Fisheries and Forestry *Weeds in Australia* website (http://www.weeds.gov.au)

Common Name:	**Scientific Name**
Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul	*Acacia nilotica*
Chilean Needle Grass	*Nassella neesiana*
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow	*Salix spp*. except *S.babylonica, S.x calodendron & S.x reichardtii*
Alligator Weed	*Alternanthera philoxeroides*
Gamba grass	*Andropogon gayanus*
Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock	*Nassella trichotoma*
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed	*Salvinia molesta*
Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood	*Annona glabra*
Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean	*Parkinsonia aculeate*
Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar	*Tamarix aphylla*
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus	*Asparagus asparagoides*
Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed	*Parthenium hysterophorus*
Gorse, Furze	*Ulex europaeus*
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Caroline Fanwort, Common Cabomba	*Cabomba caroliniana*
Mesquite, Algaroba	*Prosopis spp.*
Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda	*Cryptostegia grandiflora*
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild sage	*Lantana camara*
Blackberry, European Blackberry	*Rubus fruticosus* aggregate
Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass	*Hymenachne amplexicaulis*
Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant	*Mimosa pigra*

APPENDIX B – Northern Territory Declared Class A, B & C weeds (at 25/10/12)

Common Name	Scientific Name	Class A	Class B	Class C
Cutch Tree	*Acacia catechu*	X		X
Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul	*Acacia nilotica*	X		X
Star burr, goat's head	*Acanthospermum hispidum*		X	X
Creeping knapweed	*Acroptilon repens*			X
Mistflower	*Ageratina riparia*			X
Alligator Weed	*Alternanthera philoxeroides*	X		X
Khaki weed	*Alternanthera pungens*		X	X
Chinese Spinach	*Amaranthus dubius*			X
Annual ragweed	*Ambrosia artemisiifolia*			X
Perennial ragweed	*Ambrosia psilostachya*			X
Gamba Grass	*Andropogon gayanus*	X	X	X
Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood	*Annona glabra*	X		X
Mexican Poppy	*Argemone ochroleuca*		X	X
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus	*Asparagus asparagoides*	X		X
Onion Weed	*Asphodelus fistulosus*	X		X
	Austroeupatorium inulaefolium			X
Groundsel bush	*Baccharis halimifolia*			X
Baleria	*Barleria prioritis*	X		X
	Boerhavia erecta			X
Common Brachiaria, Thurston grass	*Brachiaria paspaloides*			X
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Caroline Fanwort, Common Cabomba	*Cabomba caroliniana*	X		X
Rubber Bush	*Calotropis procera*		X	X
Saffron Thistle	*Carthamus lanatus*		X	X
Mossman River Grass	*Cenchrus echinatus*		X	X
Siam Weed, Christmas bush	*Chromolaena odorata*			X
Koster's curse, Soap bush	*Clidemia hirta*			X
Job's tears	*Coix aquatica*			X
	Croton hirtus			X
Boneseed, Bitou Bush	*Chrysanthemoides monilifera* subspp. *Monilifera* and *rotundata*	X		X
Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda	*Cryptostegia grandiflora*	X		X
Dalbergia	*Dalbergia sissoo*	X		X
Longspine Thornapple	*Datura ferox*	X		X

Common Name	Scientific Name	Class A	Class B	Class C
Thornapples	*Datura* spp.			X
Common Crabgrass	*Digitaria fuscescens*			X
	Digitaria insularis			X
	Diodia sarmentosa			X
Barnyard grass	*Echinochloa glabrescens*			X
	Echinochloa stagnina			X
Patterson's Curse	*Echium plantagineum*	X		X
Water Hyacinth	*Eichornia crassipes*	X		X
Dense waterweed	*Egeria densa*			X
Canadian pondweed	*Elodea canadensis*			X
Spiny Emex	*Emex australia*		X	X
Horsetail, Scouring rush	*Equisetum ramosissimum*			X
Horsetails	*Equisetum* spp.			X
	Eriocaulon truncatum			X
Harrisia cactus	*Eriocereus martinii*			X
Carib grass	*Eriochloa polystachya*			X
Globular Fimbristylis	*Fimbristylis umbellaris*			X
	Hybanthus attenuatus			X
Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass	*Hymenachne amplexicaulis*		X	X
Lesser Roundweed	*Hyptis brevipes*			X
Knob weed	*Hyptis capitata*		X	X
Hyptis	*Hyptis suaveolens*		X	X
Centipede grass	*Ischaemum timorense*			X
Physic Nut	*Jatropha curcas*	X		X
Bellyache Bush	*Jatropha gossypiifolia*	X	X	X
Burning bush	*Kochia*			X
	Kochia scoparia (all except subsp. *Trichopyla*)			X
Lagarosiphon	*Lagarosiphon major*			X
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild sage	*Lantana camara*		X	X
Creeping Lantana	*Lantana montevidensis*		X	X
Lion's Tail	*Leonotis nepetifolia*		X	X
Red sprangletop, Feathergrass	*Leptochloa chinensis*			X
Sprangletop	*Leptochloa panicea*			X
Yellow burrhead, yellow sawah lettuce	*Limnocharis flava*			X
Devil's Claw	*Lycium ferocissimum*	X		X
Velvet tree	*Miconia* spp.			X
	Mikania cordata			X
Mile a minute	*Mikania micrantha*			X
Giant sensitive plant	*Mimosa invisa*			X

Common Name	Scientific Name	Class A	Class B	Class C
Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant	*Mimosa pigra*	X	X	X
Mimosa, Giant Sensitive Plant	*Mimonsa pudica*		X	X
Erasian watermilfoil	*Myriophyllum spicatum*			X
Chilean Needle Grass	*Nassella neesiana*	X		X
Mexican Feather Grass	*Nassella tenuissa*	X		
Serrated Tussock	*Nassella trichotoma*	X		X
Prickly Pears	*Opuntia spp.*		X	X
Broomrape	*Orabanche spp.* (all except *O.minor* and *O.cernua* var.*australiana*)			X
Lesser Malayan stinkwort	*Paederia foetida*			X
Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean	*Parkinsonia aculeata*		X	X
Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed	*Parthenium hysterophorus*	X		X
Mission Grass	*Pennisetum polystachion*		X	X
	Piper aduncum			X
Water Lettuce	*Pistia stratiotes*		X	X
Mesquite, Algaroba	*Prosopis* spp.	X		X
Downy rose myrtle	*Rhodomyrtus tomentosa*			X
Toothcup	*Rotala indica*			X
Castor Oil Plant	*Ricinus communis*		X	X
Blackberry, European Blackberry	*Rubus fruticosus* aggregate	X		X
	Sacciolepis interrupta			X
Salvinia	*Salvinia cucullata*			X
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed	*Salvinia molesta*		X	X
Salvinia	*Salvinia natans*			X
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow	*Salix* spp. except *S.babylonica*, *S.x calodendron* and *S.x reichardtii*	X		X
	Schoenoplectus juncoides			X
	Scirpus maritimus			X
Candle Bush	*Senna alata*		X	X
Sicklepod	*Senna obtusifolia*		X	X
Coffee Senna	*Senna occidentalis*		X	X
Spinyhead Sida	*Sida acuta*		X	X
Flannel Weed	*Sida cordifolia*		X	X
Paddy's Lucerne	*Sida rhombifolia*		X	X
Johnson grass	*Sorghum halepense*			X
	Spermacoce mauritiana			X
Witchweed	*Striga angustifolia*			X
Witchweed	*Striga asiatica*			X

Common Name	Scientific Name	Class A	Class B	Class C
Witchweed	*Striga spp.* (all non-indigenous)			X
Snake Weed	*Stachytarpheta* spp.		X	X
Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar	*Tamarix aphylla*		X	X
Grader Grass	*Themeda quadrivalvis*		X	X
Floating Water Chestnut	*Trapa* spp.			X
Caltrop	*Tribulus cistoides*		X	X
Caltrop	*Tribulus terrestris*		X	X
Gorse, Furze	*Ulex europaeus*	X		X
Noogoora Burr	*Xanthium occidentale*		X	X
Bathurst Burr	*Xanthium spinosum*		X	X
Burrs	*Xanthium* spp.			X
Chinee apple, Indian jujube	*Ziziphys mauritiana*	X		X

For an updated list of Declared Weeds, or how to manage or report weeds, contact:

Weeds Branch
Northern Territory Government
http://www.lrm.nt.gov.au/weeds
General Enquiries - Tel: (08) 8999 5511