ALEP

Aboriginal Landcare Education Program

11

# Treat Weeds

Learning Guide

Greening Australia

# CONTENTS



Front cover photo shows flower of Wild Passion Fruit *(Passiflora foetida)*

Student name:.....

Student number:.....

# INTRODUCTION

Welcome to *Treat Weeds*. You may need to identify and treat weeds when doing revegetation or landscaping work when working for your council, doing ranger work or when managing your own country. *Treat Weeds* is aimed at students who will be treating weeds under supervision. Training should be completed on the job over an extended period of time.

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**NOTE**

If you are working with chemicals you should do a chemical use unit such as Apply Chemicals Under Supervision as well as *Treat Weeds*. There are other higher level qualifications you need to consider if working on your own or if your team is planning to undertake weed contracts. The most relevant are SMARTtrain and ChemCert at Level 3 and the Professional Ground Spray Applicators Licence.

## EQUIPMENT REQUIRED

To complete this training you will need the following:

1. Appropriate Personal Protective Equipment (PPE).
2. Safety gear for field work including first aid kit and water.
3. Secateurs and other equipment for collecting weeds, and a plant press and newspaper for pressing weeds.
5. Tools and equipment for treating weeds such as rakes, shovels, hoes, mattocks, saws and spray packs.
6. Chemicals for treating weeds.

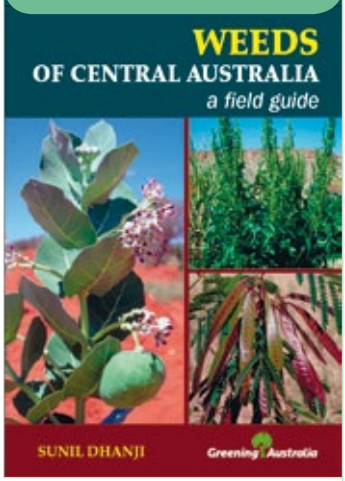
## ASSIGNMENTS

There are three assignments you will need to complete.

Some of these assignments may go towards your final assessment.

| Section | Assignment | Competent (C)<br>Not yet competent (NYC) | Date Achieved |
|---|---|---|---|
| **Getting Prepared** | Assignment 1.<br>Project Risk Assessment | | |
| **Treating Weeds** | Assignment 2.<br>Treat Weeds Using Chemicals | | |
| **Finishing Up** | Assignment 3.<br>Record and Monitor Weed Treatment | | |

# 1 GETTING PREPARED






## 1A. COLLECTING INFORMATION

Information about treating weeds can be obtained from many sources. There are a few excellent weed books available that will help you, see the References on page 40. The two main field guides for the NT are:

- *Weeds of Central Australia: a field guide* (2009) by Sunil Dhanji and published by Greening Australia.
- *Weeds of the Wet/Dry Tropics of Australia: A field guide* (2002) by Nicholas Smith and published by the Environment Centre NT.

There is also information available online.

1. For information on Northern Territory weeds, including the *Northern Territory Weed Management Handbook*, go to the Department of Natural Resources, Environment, The Arts and Sport.

   **www.nretas.nt.gov.au/natural-resource-management/weeds**

2. PestGenie has information about herbicides including labels and MSDS (Material Safety Data Sheets). The Australian Pesticides and Veterinary Medicines Authority has good information about chemical safety, picking the right chemical and legislation.

   **www.pestgenie.com.au** and **www.apvma.gov.au**

3. For information on community activities about weeds go to Weedbusters – an Australian Government sponsored program aimed at increasing the awareness about weed issues nationally.

   **www.daff.qld.gov.au/4790_7012.htm**

4. For Australia wide information and some very useful weed links go to Weeds Australia (an Australian Weeds Committee National Initiative), or the Australian Government's Weeds in Australia page, or the Invasive Species Council.

   **www.weeds.org.au** and **www.weeds.gov.au** and **www.invasives.org.au**

## 1B. TREATING WEEDS SAFELY

There are many dangers associated with treating weeds. It is important that you be aware of some of the potential dangers so you can avoid getting injured or poisoned.

Some of the things you can do to keep yourself safe include:

1. Wear thick gardening gloves at all times.
2. Wear appropriate clothes for outdoors – at least long trousers, hat and boots.
3. Watch out for snakes, spiders, wasps etc. and rusty iron or broken glass in amongst weeds.
4. Keep safe distances away from other workers around hand tools.

5. Extreme caution should be taken using chemicals and motorised machinery. Only properly trained people should use motorised machinery and chemicals.
6. Always carry a first aid kit and make sure someone has a first aid certificate.
7. Always consult expert advice about weed control before you start to avoid any dangerous pitfalls.
8. Always lift heavy objects correctly to avoid injuring your back (see Resource 1 for correct lifting procedures).

## CHEMICAL SAFETY

**The use of chemicals, such as herbicides, when carrying out any weed control work requires some extra special precautions. Only people with the right training should use chemicals.**

**Chemical poisoning can occur through the skin or eyes, by swallowing, or by breathing it in. Pregnant women should not use chemicals.**

- Poisoning can happen quickly, for example if poison is swallowed. Symptons can include fatigue, headache, sweating, dizziness, fever, intense thirst, increased rate of breathing, vomiting, uncontrollable muscle twitches, pinpoint pupils, convulsions, inability to breathe and unconsciousness.
- Poisoning can also happen bit by bit over many years. For example someone who does not wear good PPE all the time might get slowly poisoned. Symptoms may include nervousness, slowed reflexes, irritability, or a general decline in health.

**NOTE**


*For any poisoning immediately contact the following*

*POISONS INFORMATION CENTRE*

*Phone 131126*

*Call from anywhere in Australia 24 hours a day*

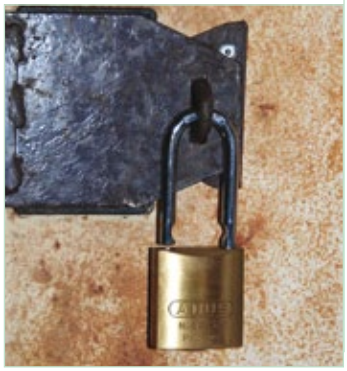
### Personal Protective Equipment

The following PPE should be considered when using chemicals.

1. PVC or other chemical resistant gloves.
2. Goggles or protective glasses – they protect your eyes which easily absorb chemicals (a full face shield is needed for mixing some concentrated chemicals).
3. Dust mask or respirator – these help prevent the inhalation of dangerous chemicals.
4. Cotton hat – protects the head from chemicals and can be washed clean after each use.
5. Rubber boots – prevents spray getting onto your feet - the overalls should cover the outside of the boots so drips don't run down the inside of the boot.
6. Cotton overalls – suitable for general chemical work and will protect work clothes underneath – wash after each use or use disposable overalls.
7. PVC apron – used to protect clothing when mixing concentrated chemicals (a PVC suit may be necessary for some dangerous chemicals).

## Safe use of chemicals

1. Always read the label before using the chemical.
2. Do not transport chemicals in the passenger compartment of a vehicle.
3. Be careful when opening containers to avoid spills and only mix chemicals in areas where spills can be controlled.
4. If there is a spill tell your trainer immediately.
5. Never pour chemicals into other containers (like drink bottles).
6. Do not spray herbicides near bystanders or unprotected workers.
7. Always have clean water on hand for washing eyes (including eyewash bottle) and other spills.
8. Remove all PPE including overalls after spraying and before eating or smoking.
9. Always wash hands before eating or smoking.
10. Always wash your personal protective equipment, such as overalls, separately to all other clothes.

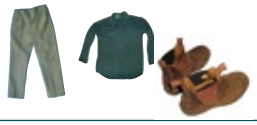



## Safe storage of chemicals

1. Keep all chemicals **locked** in an appropriate chemical store such as a shed or cabinet.
2. The chemical store must have a folder with the labels and MSDS (Material Safety Data Sheets) for every chemical in the store.

3. The chemical store must have running water on hand and should also have an eyewash facility.
4. Do not store other things in the chemical store such as food.
5. Always store your personal protective equipment away from the chemicals.

Before you begin, use this checklist to confirm you have followed good safety procedures and have all the right resources.

| SAFETY CHECKLIST ACTIVITY | | ✓ |
|---|---|---|
| Long trousers, shirt and boots |  | |
| Hat and gloves |  | |
| Sunscreen, insect repellant and sunglasses |  | |
| Dust mask and rubber gloves |  | |
| Respirator |  | |
| Rubber boots |  | |
| Eyewash bottle |  | |
| Soap |  | |
| Water |  | |
| First aid kit |  | |
| Notified others and have phone/2 way radio |  | |
| Checked weather, road and fire reports |  | |
| Permits (if required) and maps |   | |
| MSDS folder |  | |

Water Hyacinth *(Eichhornia crassipes)* choking a waterway

## 1C. WHAT IS A WEED?

A weed is a plant growing where it is not wanted, and it usually has negative environmental and/or economic effects:

- **Invasive weeds** produce seedlings in large numbers and spread over a big area.
- **Environmental weeds** are plants that are not native to an area.
- **Transformer weeds** are highly invasive weeds that cause serious environmental damage – these are the ones we really have to worry about.

Weeds that have become big problems are included in legislation by the government:

- **Declared (noxious) weeds**: Weeds that have been declared by law, e.g. those weeds declared under the *NT Weeds Management Act* (a list of all declared weeds in the NT can be found at Resource 2).
- **WONS (Weeds of National Significance)**: These weeds have been listed by the Australian Government as posing very significant problems to pastoralism, biodiversity, conservation, or human and animal welfare (a list of all WONS can be seen in Resource 3).

Different land managers often disagree on what is a weed. What one person sees as a weed may be a useful plant to someone else (see the Buffel Grass story in the box).

### Buffel Grass (*Cenchrus ciliaris*) – useful plant or weed?

Buffel Grass is a perennial grass that grows to around one metre high, often forming loose tufts. It is an introduced species which is native to Africa and India and is now widespread throughout the Northern Territory.

Buffel takes over disturbed areas such as community areas and roadsides and natural areas like creek lines, swamp margins, and coastal dunes. Seeds are spread short distances by wind, deliberate plantings, movement of contaminated hay and by vehicles. Buffel is a major weed in many NT national parks. It is an aggressive invader that chokes out native grasses. In central Australia it has increased fire intensity along creek lines which is affecting the regrowth of the majestic River Red Gum (*Eucalyptus camaldulensis*). It is not eaten by rabbits and survives well in areas with high rabbit numbers.

However Buffel Grass is widely planted on pastoral properties in the NT where it is a valued fodder species that can withstand heavy grazing by cattle. 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 grow and survive extremely well. Here it is not considered a weed but a very desirable plant.

Despite the useful or beneficial aspects of this species considerable resources and money have been spent to control Buffel Grass in conservation areas. Urgent consideration needs to be given to realistically weighing up both the costs and benefits of this species.

## WHERE WEEDS COME FROM

Weed plants may come from other areas in Australia, or more often, from overseas. Weeds can come from:

- **Escaped pastoral plants:** Many of our worst weeds have been introduced as pasture species and have gone wild, e.g. Gamba Grass which is now a major weed across northern Australia. It is particularly bad in the Darwin area.
- **Escaped garden plants:** Some of our serious weeds have jumped the garden fence from urban gardens into the bush, e.g. Mimosa escaped from the Darwin Botanic Gardens and is now a weed of national significance.
- **Accidental introductions:** Numerous weeds are accidental introductions such as Mossman River Grass whose spiny burrs on the fruits enabled the fruit to stick to clothing, fur and machinery.

Gamba Grass
*(Andropogon gayanus)*

## THE PROBLEMS WITH WEEDS

Reasons for getting rid of weeds include:

- **Environmental:** Weeds compete with native species, change the habitats that native animals live in, and change natural processes (eg. fire intensity and stream flow).
- **Economic:** They can compete with and contaminate crops, affect mustering, restrict people movement, be toxic to stock and increase vehicle cleaning costs.
- **Safety:** Weeds can increase wildfires, cause allergic reactions and illnesses such as asthma, and obstruct visibility on roadsides.
- **Pests and diseases:** Weeds can provide places for pests to hide (such as feral pigs) or harbour diseases (especially in horticultural areas).
- **Aesthetic:** They can appear unnatural and unsightly.

The weed situation in the Northern Territory is being made worse by:

- Overgrazing and tree clearing.
- Increases in vehicle movement e.g. mining exploration, recreational and tourist four wheel drives, military vehicles and cattle trains.
- Increased population causing more disturbance and urbanisation.
- Pollution through bad land management practices e.g. increased levels in nutrients such as fertilisers and sewerage.
- Continued spreading of pasture species which turn into bad weeds.
- Changes in the way country is now burnt.

Bushland weeds can increase the intensity of fires

Woodland destroyed by intense Gamba Grass fire

### ACTIVITY

With your group talk about why weeds are a problem in your area. Talk about a plant found in your area that some people think is good and other people think is bad. Should this plant be called a weed?

Weeds spread by wind

Weeds spread in animal fur and hair

Machinery such as graders are often responsible for weed spread

## HOW WEEDS GET AROUND

Working out how weeds spread is an important part of knowing how to control them. Weeds normally spread by the movement of seeds or growing parts (rhizomes, tubers, bulbs etc). Weeds spread by the following means:

- **Water:** Rain and surface water runoff can transport seed long distances. Some seeds have air bladders that enable them to float. Flooding rivers can move large quantities of seed very easily.
- **Wind:** Wind can carry seed long distances. Weeds dispersed by this method often have light fluffy or even winged seeds that can easily be blown around. In some cases the whole plant will be blown by the wind.
- **Animals:** Mammals and birds can carry all sorts of seeds on their bodies. Some weeds have special mechanisms that enable them to stick to fur or hair e.g. hooks, spines or burrs. Some seeds are also eaten and excreted out at new locations. These seeds have adapted to pass through the digestive system unharmed.
- **Humans:** Humans are probably the most active spreaders of weeds. Seeds can be transported on clothing, soles of shoes, on mud and radiators on vehicles and machinery, in hay and as contaminated pasture seed. Planes and boats can move seeds long distances.

## A SUCCESSFUL WEED

Plants that become problem weeds show a combination of some of the following characteristics.

### The plants:

- grow fast
- grow in a wide range of conditions
- outcompete native plants after a disturbance
- reproduce in many ways (seeds, suckers, bulbs etc.)
- have few natural enemies.

### The seeds:

- spread easily by wind, water and animals (like sticky or floating fruits)
- are small
- are produced in large numbers
- can stay dormant in the soil for long periods
- germinate even when conditions are harsh
- are produced when the plant is still young.

## 1D. WEED IDENTIFICATION

It is important to know what weeds you have so you can control them properly. You should be able to identify the main common weeds in your area using the field guides listed on page 2. We also recommend you work through the *Recognise Plants* learning guide as it has lots of information about identifying plants, including references.

Some plant characteristics that are important for weeds are described next.

**TIP**

*You may need to describe the leaves, flowers, fruit, seed, trunk, bark and/or roots to help identify the weed.*

### SHAPE OF THE PLANT

Habit means the shape or growth form of the plant. Some common habits include:

**Tree**
Poinciana
*(Delonix regia)*

**Shrub**
Rubber Bush
*(Calotropis procera)*

**Vine**
Centro
*(Centrosema molle)*

**Herb**
Sesame
*(Sesamum indicum)*

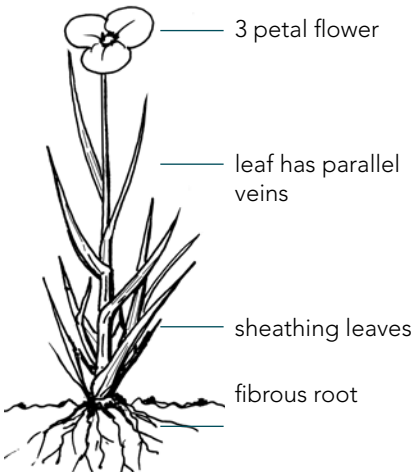
**Grass**
Mission Grass
*(Pennisetum pedicillatum)*

### MONOCOT OR DICOT

Knowing whether a weed is a monocot or a dicot will help you choose a successful control method.

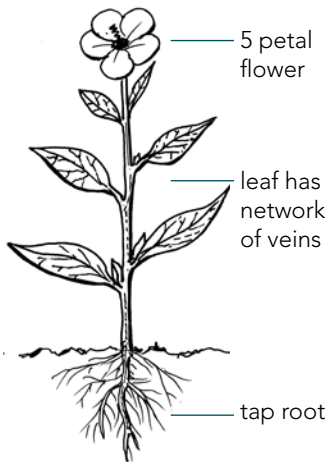
- **Monocots:** Narrow leaved grasses and sedges. New seedlings have only one seed leaf. Leaves have parallel veins and the roots are fine and fibrous.
- **Dicots:** Broad leaved plants like trees, shrubs and herbs. New seedlings have two seed leaves. Leaves have a network of veins and roots are thick often with a strong tap root.

Gamba Grass
*(Andropogon gayanus)*




**Monocot**

Bellyache Bush
*(Jatropha gossypifolia)*




**Dicot**

## LIFE CYCLE

Understanding the weed's life cycle can help you decide how to control it.

- **Annual:** A plant that lives for only one year. They complete their life cycle from flowering, producing seed to death within the year. Control programs should aim to prevent seeding.

Calopo
*(Calopogonium mucunoides)*

Sicklepod
*(Senna obtusifolia)*

- **Perennial:** A plant that lives for many years. Perennial plants include woody trees and shrubs that last for a long time. They also include herbs and vines with soft green leaves – sometimes the leaves die off leaving tubers and bulbs under the ground that reshoot the next year. Perennial weeds can be difficult to control as the seed and the root must be destroyed.

Snakeweed
*(Stachytarpheta sp.)*

Coffee Bush
*(Leucaena leucocephala)*

## COLLECTING WEEDS FOR IDENTIFICATION

To check the identification of a weed you can show it to a weed expert. You need to dry and press the weed so it keeps for a while. We recommend you work through the *Collect, Prepare and Preserve Plant Specimens* learning guide if you plan to collect lots of weed samples. Here are some hints to get you started.

- Take a photo first.
- Collect a sample of the whole plant if possible.
- Try and include leaves, flowers and seeds.
- Place the plant in between newspaper pages and put something heavy on it or use a plant press, change the paper every day or so.

- If the plant is too large it may be folded in a zig-zag fashion so it fits inside the paper.
- Do not store plants in plastic bags for long as they will go mouldy very quickly.
- Record as much information as you can including the location, the type of habitat, what other plants were growing with it, and any features about the plant that might be lost when the plant is dried (such as flower or fruit colour or smell of crushed leaves).
- Be careful not to spread weed seeds around by being careless with dried specimens. Always burn any unwanted material you have collected.

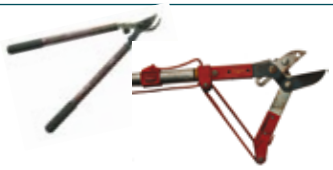
## ACTIVITY

Your trainer has tagged 10 common local weeds. Identify the 10 weeds and write their Common and Scientific names:

| | Common Name | Scientific name |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

## 1E. TOOLS AND EQUIPMENT

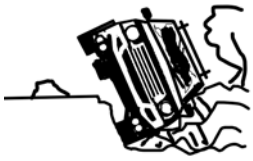
Using the correct tools will make your task easier and will help to keep you free from injury. Tick off the items you think you will need.

| ACTIVITY | | ✓ |
|---|---|---|
| Weed ID books |  | |
| Plant press and newspaper |  | |
| Knife |  | |
| Secateurs |  | |
| Machete |  | |
| Loppers |  | |
| Trowel and Fork |  | |
| Mattock |  | |
| Crowbar |  | |
| Spade and shovel |  | |

| | | |
|---|---|---|
| Saws |  | |
| Rakes |  | |
| Hoe |  | |
| Slasher/mower |  | |
| Brushcutter |  | |
| Spray packs |  | |
| Measuring jugs |  | |
| Herbicides |  | |
| Surfactant |  | |
| Storage box |  | |

## PROJECT RISK ASSESSMENT


- Stop and think before starting work.
- What needs to be done so you can work safely?
- Complete the **What to do about it?** column – we have written one thing in each box – try and think of some others.
- Fill in all of the last row by adding a new hazard.

| **HAZARD**<br>**and what can happen = the risk** | **What to do about it?** |
|---|---|
| **USE OF CHEMICALS**<br>Risk of:<br>Poisoning  | • Read label and understand what the chemical is used for<br>•<br>•<br>• |
| **LIFTING THINGS**<br>Risk of:<br>Injured back  | • Lift correctly bending knees and not straining back<br>•<br>•<br>• |
| **USE OF MOTORISED EQUIPMENT**<br>Risk of:<br>Injury from being caught in machine  | • Don't wear loose fitting clothing<br>•<br>•<br>• |
| **SUN EXPOSURE**<br>Risk of:<br>Heat exhaustion, deyhydration and sunburn  | • Wear a hat<br>•<br>•<br>• |
| **ROAD TRAVEL**<br>Risk of:<br>Injury in vehicle accident  | • Minimise distraction in vehicle<br>•<br>•<br>• |
| | •<br>•<br>•<br>• |

# 2 TREATING WEEDS

## 2A. SUCCESSFUL WEED MANAGEMENT

### PREVENTION IS THE FIRST PRIORITY

Preventing weeds is much better than trying to get rid of them later. Good land management will reduce the chances of weeds entering and spreading on your land.

- **Recognise weeds and educate your local community:** See the posters in Resource 5 for some ideas on community education, the more people keeping a look out for weeds the better.

- **Maintain natural areas:** Maintain natural areas so everything is in balance with as little disturbance as possible. Drive on tracks rather than off the road. Use local native plants in your gardening, landscaping and revegetation.

- **Reduce disturbed areas:** Weeds often invade disturbed areas first. Disturbance can be caused by many factors such as overgrazing, feral animals, roadside grading and vehicle traffic. In bare areas native plants can be used to establish ground cover and stop weeds from invading. Revegetation should immediately follow weed control to prevent weeds from re-establishing.

- **Prevent weeds entering area:** Remove and destroy weed seed and dirt from your clothes. Wash vehicles and machinery in wash down bays to remove weed seed. Destroy weed seeds by bagging and incinerating. Check there are no weeds in soil, sand and hay brought into your area. Feral animals and stock can also move seeds around.

- **Quarantine:** If there is an outbreak of weeds quarantine the area to reduce the chances of it spreading. Quarantine can be used to isolate small outbreaks for eradication, or larger infestations as a part of preventative measures.

- **Fire:** Good use of fire is essential. Fire can remove some weeds (particularly some woody weeds and fire sensitive weed species), however it can encourage some weed species and aid in the germination of others. Increased germination can be an advantage as long as follow up control methods are used to kill the germinated seeds.

- **Reporting weeds:** Reporting weeds to your local authority is essential to prevent weeds spreading or new weeds establishing themselves.

**NOTE**

*Any burning must be in line with the* Bushfires Act *and* Fire and Emergency Act. *Please contact your local fire station for permits to burn if you live within a Northern Territory Fire and Rescue Service Emergency Response Area. If you live outside those areas, contact your local Volunteer Fire Brigade Captain or local area Fire Warden through the Bushfires Council on 8922 0844 (Darwin) or 8976 0098 (Batchelor).*

## INTEGRATED WEED MANAGMENT

A successful weed control program combines different treatment methods, not relying on a single method. This is called integrated weed management. For instance the use of chemical, biological and physical methods combined may give a better result than just spraying weeds.

Integrated weed management can use methods such as mowing and slashing (physical) followed by spraying when seedlings emerge (chemical). The use of fire can kill seedlings and can also improve access to use other methods. Biological control can reduce the reproduction rates of weeds and make other methods more cost effective. There are lots of other examples.

A good weed control program should focus on the following:

- **Early detection and control:** Once weeds have taken a hold they are hard to remove. It is far better to get in early before they spread. Look out for isolated plants and get rid of them.
- **Regular follow up:** Once off treatment of weeds rarely is successful. Going back and checking and retreating if necessary is important.
- **Long term commitment:** Successful weed control will mean working hard at it over many years. Some weeds have seeds that can last over 25 years in the soil.

The type of treatment you choose depends on the type of weed (its habit, whether its annual or perennial, its method of reproduction and spread etc.) and your resources and budget. Check the *Northern Territory Weed Management Handbook* for the best treatment for your weeds.

Quad bike set up to find, map and treat weeds

**NOTE**

*All land owners and managers are required to take all reasonable measures to prevent their land being infested with a declared weed.*

## B. PHYSICAL METHODS

Physical control methods are the oldest forms of weed control and until fairly recently were the only way to control weeds. The **advantages** of physical methods are:

- They can be applied with equipment that is normally readily available.
- They can be cost-effective.
- They are non-polluting to the environment and non-toxic to the operator.
- They can help retain ground cover.

The **disadvantages** of physical methods are:

- They can sometimes be costly and time consuming when used over large areas.
- Some weeds can be spread by physical means such as road side slashers.
- Some machinery can cause erosion and soil degradation.


Handpulling


Grubbing


Mowing


Felling


Mulching

Grazing

## TYPES OF PHYSICAL TREATMENTS

- **Handpulling:** A labour intensive method which can be very effective when carried out before seed is set. Well suited for small areas and shallow rooted plants. Don't leave plants on the ground as they can reshoot, and make sure all roots are removed.

- **Grubbing:** A similar method to hand pulling however the use of spades, shovels and mattocks make the job a bit easier. Normally used on deep rooted perennials where it is important to remove all the roots.

- **Slashing:** Normally used over large areas to prevent seed from setting. Often will not remove the plants but stops them setting seeds. Helps to maintain ground cover without disturbing the soil. However some plants can set seed close to the ground out of the reach of machinery.

- **Mowing:** Very similar to slashing but is useful for smaller areas. A brushcutter can also be used around native plants, make sure you don't ringbark the natives.

- **Cultivation:** The aim is to kill the weed by exposing the root and to bury the plant at a depth where it cannot regrow. A cost effective method of control for annuals, herbs and seedlings. Deep cultivation and ripping can be used for perennial woody species. Cultivation can disturb the soil and expose it to erosion.

- **Chaining:** Bulldozers in pairs pull chains between plants and knock them over. Chained weeds are often piled and burnt. Used mainly for woody species. Chaining pulls the plants over and exposes the roots above the ground.

- **Felling:** Used for trees and large shrubs where the whole plant is removed by machinery or chainsaws. In some cases the stumps may need to be treated with herbicide to stop reshooting (see chemical treatments).

- **Mulching:** Mulching around plants can be effective for small areas by preventing weeds from germinating and smothering existing plants. Many materials can be used such as cardboard, straw, saw-dust, wood-chip, lawn clippings etc. Mulching has the advantage of helping prevent soil erosion and conserving soil moisture.

- **Nets:** Erection of nets across a river or creek is used to control the movement of aquatic plants.

- **Grazing:** Trampling and grazing by livestock can keep some weeds under control – it should be followed up with other methods such as chemical treatment.

## 2C. CHEMICAL METHODS

**Advantages** of chemical treatments include:

- They can be cost effective when used in an integrated control program over a large area.
- They minimise soil erosion and degradation.

**Disadvantages** of chemical treatments are:

- They require specialised equipment and training.
- There is the risk of pollution to the environment (eg. soil residue and water pollution).
- They can be toxic to the operator.

### IMPORTANT POINTS WHEN USING CHEMICALS

- Wear good PPE.
- Always read the label first.
- Be careful when opening containers to avoid spills and only mix chemicals in areas where spills can be controlled.
- If there is a spill tell your trainer immediately.
- Never pour chemicals into other containers (like drink bottles).
- Do not spray herbicides near bystanders or unprotected workers.
- Always have clean water on hand.
- Always wash hands before eating or smoking.
- Keep all chemicals locked in your chemical store.'


**NOTE**

*It is very important that you only kill the weeds, not other plants such as native plants or crops. Make sure your spray does not "drift" on to the wrong plants.*


### WHEN TO USE HERBICIDES

- When the plant is actively growing.
- Early in the morning or late in the afternoon – the plant is more likely to absorb the herbicide
- When the plant is not under stress.
- When it is not windy, not raining, and rain is not expected within the next few hours (rain can wash the chemical off the plant before it is properly absorbed).

Foliar spray

Basal bark application

Cut stump

## TYPES OF CHEMICAL TREATMENTS

- **Foliar spray:** Suitable for weeds with soft green leaves and stems and for regrowth. Herbicide is mixed with water and a wetting agent and sprayed using equipment that is portable, manually operated and easy to use. A hand held spray unit, a back pack or a vehicle mounted spray unit can be used.

- **Rope wick application:** Suitable for weeds with soft green leaves and stems and for regrowth. Herbicide is usually mixed with water and a wetting agent. Herbicide wets the wick or rope and this is brushed on the plants. Rope wick applicators are often hand held or mounted on a tractor. A big advantage is that there is no damage to other plants caused by drift of sprays.

- **Basal bark application:** Best suited to stands of shrubs or sucker regrowth. Herbicide is mixed with diesel and applied as a spray to the bark at the base of plants. Herbicide may also be painted on with a brush. The herbicide enters the bark where it is carried throughout the plant. You must make sure you apply it right around the stem of the weed.

- **Cut stump:** Usually used for a stand of a few trees or shrubs. Herbicide is painted on freshly cut stumps either mixed with water or diesel to kill the roots to prevent further shooting. You must apply the herbicide immediately after cutting – no more than 10 seconds.

- **Stem injection:** Suitable for treating large areas of trees or shrubs. Herbicide is injected directly into the sapwood or applied via cuts made around the trunk.

- **Soil application:** Herbicide is applied in the form of granules, pellets or liquid to the ground around the plant. The herbicide is absorbed through the roots. Rain is normally needed to wash the herbicide into the root zone for uptake by the plant.

## TYPES OF HERBICIDES

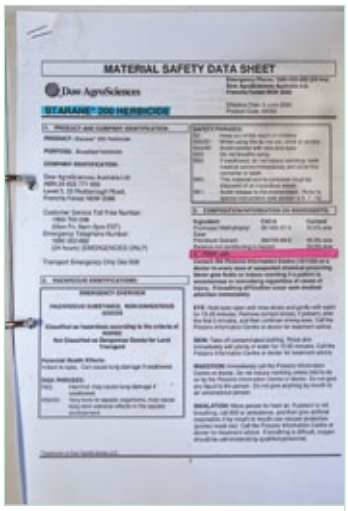
The type of herbicide you use depends on your weed. You will need to find out the best herbicide for your situation. Herbicides kill plants in different ways:

- **Systemic herbicides:** Herbicides that travel throughout the plant and kill the whole plant (e.g. Glyphosate ROUNDUP®).

- **Contact herbicides:** Herbicides that kill only the parts of the plant that they land on (e.g. Paraquat GRAMOXONE®).

- **Residual herbicides:** Herbicides that stay in the soil and continue to kill plants over time (e.g. Oxadiazon RONSTAR®).

**Selective herbicides** kill some plants but not others (e.g. 2,4-D AMICIDE 50®). A **non selective herbicide** will kill most plant species (e.g. Glyphosate ROUNDUP®).


MATERIAL SAFETY DATA SHEET

## MSDS AND LABELS

### Material Safety Data Sheet (MSDS)

A Material Safety Data Sheet (MSDS) is a legal document explaining the effects on your health from exposure to a herbicide. Information is provided on toxicity, storage, use, handling and any emergency procedures. You must make sure you have the MSDS available nearby when working with any chemicals.

### Labels

Before using any chemical make sure you read and understand the label – it may save your life. It is a requirement of use that anyone applying the chemical MUST read the label before using the chemical. There are many different versions of the same chemical and it is important that you know about the one you are using. Sometimes the label might be a little book rather than just a sticker. The most important parts of the label are shown below.

**Trade name** is the common name of the product

**Signal heading** tells you how dangerous the chemical is

**Storage and disposal** gives information how to store and dispose of the chemical



**Active constituent** is the main chemical that kills the weed

**Directions for use** this includes information about rates as well as how to apply the chemcial

**Safety directions and first aid** gives information on what PPE to wear and first aid if an accident occurs

## 2D. BIOLOGICAL CONTROL METHODS

Biological control is the use of naturally occurring enemies of the weed to control the numbers of the pest. It is not aimed at eradicating the weed. Once established there is a natural balance between the control agent and the pest plant. Biological control is relatively expensive, very specific, permanent and yet environmentally safe. It is only used on weeds of major significance.

A biological control program has four stages:

- **Overseas exploration:** Once the origin of the weed has been determined, a search is made for its natural enemies.
- **Quarantine and testing:** The most promising insects are imported into Australia where they are tested on a very wide range of native plant species.
- **Mass rearing and field release:** Selected species are raised in large numbers in the laboratory then released on mass into the field.
- **Monitoring:** The weed populations are monitored to see if the biological control agents are working and to check that no native plant species are being attacked.

A number of biological control agents have been released in the Northern Territory to control weeds such as Noogoora Burr, Salvinia, Parkinsonia, Spinyhead Sida and Mimosa. See Resource 4 for some examples of biological control.

Salvinia *(Salvinia molesta)* infestation – Salvinia weevil has been released to control this weed

## 2E. OTHER METHODS

Other chemical free methods are becoming increasingly popular as new technologies develop and methods are further developed. They have similar advantages to physical treatments. Some chemical free methods include:

- **Hot water:** Several types are available with hot water sometimes combined with compressed air or a foaming agent. Delivery is via a long hose and wand with a nozzle attachment. Small hand held applicators powered by electricity can be used for weeds around homes with larger vehicle mounted models suitable for roadsides and storm water drains.
- **Infrared radiation:** This method is powered by gas and combines infrared radiant heat with a strong flow of hot air. Equipment pushed like a mower is suitable for paved areas with larger machinery pulled units used for weeding orchards, vineyards etc.
- **Pine oil:** Pine oil spray is an effective product derived from pine trees. Some people consider this product to be a chemical.
- **Flaming:** Normally these are gas or kerosene powered flamers that heat the cell sap by slowly passing the flame over the plant. It is not necessary to blacken and burn the weed to kill it. Best used before seed set and most suitable for young broad leaf plants. Perennial weeds usually die off but may reshoot from the roots later. Special nozzles spread the flame evenly over the plant.

## ACTIVITY

Decide on a weed treatment for each of these situations – it may be physical, chemical or biological.

| Weed problem | Treatment |
|---|---|
| Groups of large trees | |
| Weeds in a garden bed | |
| Large patches of weeds with bulbs underground | |
| Large shrubs | |
| Masses of creeper growing up trees | |
| Long strips of roadside weedy grasses | |
| Large areas of a perennial grass | |
| Weeds growing in amongst native plants | |
| Free floating aquatic weeds | |
| Annual weeds in a vegetable patch | |

# ASSIGNMENT 2 A2

## TREAT WEEDS USING CHEMICALS

With your trainer carry out all the steps of treating a weed with chemicals.

On this page draw a simple picture of each step you took.

# 3 FINISHING UP

## 3A. CLEANING UP AND WASTE DISPOSAL

- Wear good PPE when cleaning up and disposing of waste.
- Only mix enough chemical for the job.
- Do not leave mixed chemicals in the container.
- Triple rinse all containers and equipment after use.
- Carefully clean all the nozzles on spray equipment to stop them getting blocked.
- Never use containers for other purposes.
- Always read the label for disposal instructions.
- Keep all chemicals locked in the chemical store.

**NOTE**

*Unused chemicals and empty containers must be disposed of properly.*

**DrumMuster** *is a national program for the collecting and recycling of empty, cleaned containers (www.drummuster.com.au or phone in NT 8942 2544 or 0418 892 260 or nationally 1800 008 707).*

**ChemClear** *provides a reliable and responsible collection and disposal service for obsolete chemicals (www.chemclear.com.au or phone 1800 008 182).*


## 3B. TOOL MAINTENANCE

To make the next job easy and to prevent personal injury it is very important to keep tools in good condition. Follow the steps below:

- Wash all tools of mud and dirt and oil any metal parts to prevent rusting. Steel wool and a light oil will remove any surface rust.
- Keep tools sharp and in good working order. Bevel the back edge of a spade off with a bench grinder or a coarse sharpening stone.
- Replace any broken handles. Never use bush sticks as handles as they often break causing injury.
- Sand and oil all wooden handles to avoid getting nasty splinters. Use 50% mineral turpentine and 50% raw linseed oil on wood.

## 3C. RECORD KEEPING

It is very important to keep good records of everything you do in weed management. This will help to check if your weed treatment is working. After a few year's work you can check back through your records and see how it is all going.

### HERBICIDE APPLICATION RECORD

On the following page is a **Herbicide Application Record** sheet (there is an example of a filled in one after it). The law says you must keep these records. It will help you if someone claims you have poisoned their plants or animals as well as providing you with good monitoring information.

### MONITORING

#### Photo points

Photo points are photographs taken from the same point every time. These photographs will allow you to compare the site over time allowing you to see the effects of your weed control work. A stake or star picket is often driven into the ground to mark the point. You should take photos:

- Before you start treating the weeds
- After you have treated the weeds
- Each year after the treatment

August 2005

August 2006

August 2007

August 2008

June 2005

June 2006

November 2006

April 2007

#### Mapping

It is important to keep track of the weeds on your land with weed maps. If possible try and keep maps showing where the weeds were, where the weeds were treated and then go back and see if the treatment worked.

| HERBICIDE APPLICATION RECORD | |
|---|---|
| **Name of group or landowner** | |
| **Applicator's name** | |
| **Applicator's phone no.** | |
| **Applicator's address** | |
| **Date** | |
| **Time started** | |
| **Time finished** | |
| **Have you read the labels?** | |
| **Are you properly dressed?** | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Weather conditions** | Clear sky | | Light cloud | | Overcast | | | |
| **Temperature** | Pleasant | | Hot | | Really Hot | | | |
| **Wind speed** | No wind | | Light wind | | Windy | | | |
| **Wind coming from** | North | | East | | South | | West | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Method** | Foliar (leaf) spray | | Cut stump and paint | | | |
| **Container size in litres** | | | | | | |
| **Herbicide product name** | | | | Expiry date | | |
| **Herbicide amount** | Rate | | Per load | | Total | |
| **Surfactant product name** | | | | Expiry date | | |
| **Surfactant amount** | Rate | | Per load | | Total | |
| **Weeds treated** | | | | | | |
| **Weed density** | Low | | Medium | | High | |
| **Comments – including any potential spray drift** | | | | | | |

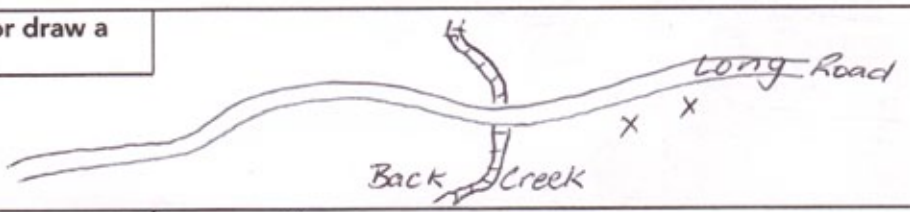
| | |
|---|---|
| **Location – describe or draw a mud map** | |
| | |
| **Signature** | |

## EXAMPLE HERBICIDE APPLICATION RECORD

| HERBICIDE APPLICATION RECORD | |
|---|---|
| Name of group or landowner | Back Creek Landcare Group |
| Applicator's name | Joe Blogs |
| Applicator's phone no. | 89123456 |
| Applicator's address | 2 Smith Street Back Creek |
| Date | 15/11/10 |
| Time started | 8:00 am |
| Time finished | 9:00 am |
| Have you read the labels? | Yes |
| Are you properly dressed? | Yes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Weather conditions | Clear sky | ✓ | Light cloud | | Overcast | | |
| Temperature | Pleasant | | Hot | ✓ | Really Hot | | |
| Wind speed | No wind | ✓ | Light wind | | Windy | | |
| Wind coming from | North | | East | | South | | West |

| | | | | | | |
|---|---|---|---|---|---|---|
| Method | Foliar (leaf) spray | | ✓ Cut stump and paint | | | |
| Container size in litres | 5 | | | | | |
| Herbicide product name | Glyphosate | | | Expiry date | 12/06/12 | |
| Herbicide amount | Rate | 10ml/L | Per load | 50 ml | Total | 200 ml |
| Surfactant product name | LI 700 | | | Expiry date | 09/10/11 | |
| Surfactant amount | Rate | 2.5ml/L | Per load | 12.5ml | Total | 50 ml |
| Weeds treated | Mission Grass<br>Gamba Grass | | | | | |
| Weed density | Low | ✓ | Medium | | High | |
| Comments – including any potential spray drift | | | | | | |

| Location – describe or draw a mud map |  |
|---|---|
| Signature | JBlogs. |

# ASSIGNMENT 3 A3

## RECORD AND MONITOR WEED TREATMENT

After treating weeds fill in a Herbicide Application Record.

Use the box below to draw a map showing where you treated the weeds.

## RESOURCE 1: BASICS OF GOOD LIFTING

Correct handling of materials is important to ensure a safe working environment. Improper lifting techniques can lead to back pain and learning the right way to lift will help you avoid this.

1. **Plan ahead**
   - Size up the object and test to see if it is possible to lift by yourself
   - Clear a path and make sure there are no obstacles in your way
   - Practice the lifting motion before you lift the object

2. **Lifting the object**
   - Place your feet shoulder width apart with your feet close to the object
   - Keep the object close to your body
   - Bend your knees and tighten your stomach muscles
   - Get a firm hold on the object and stand up slowly keeping your back straight
   - Let your legs do the lifting work
   - Take short steps and do not twist

3. **Putting the object down**
   - Keep the object close to your body
   - Bend your knees and keep your back straight
   - Let your legs do the work
   - Wait until it is firmly in place before letting go

## RESOURCE 2: DECLARED WEEDS IN THE NORTHERN TERRITORY

Weed management in the Northern Territory falls under the *Weeds Management Act* which is run by the Department of Natural Resources, Environment, The Arts and Sport. The declared (noxious) weeds are divided into three categories:

- Class A – to be eradicated.
- Class B – growth and spread to be controlled.
- Class C – not to be introduced to the Northern Territory.

**NOTE**

*All Class A and B weeds are also considered to be Class C weeds as well.*

Himalayan Raintree
*(Dalbergia sissoo)*

Paterson's Curse
*(Echium plantagineum)*

Water Hyacinth
*(Eichhornia crassipes)*

Mexican Feather Grass
*(Nassella tenuissa)*

### CLASS A – TO BE ERADICATED

| Botanical Name | Common Name |
|---|---|
| *Acacia catechu* | Cutch Tree |
| *Acacia nilotica* | Prickly Acacia |
| *Alternanthera philoxeroides* | Alligator Weed |
| *Andropogon gayanus* | Gamba Grass |
| *Annona glabra* | Pond Apple |
| *Asparagus asparagoides* | Bridal Creeper |
| *Asphodelus fistulosus* | Onion Weed |
| *Barleria prionitis* | Baleria |
| *Cabomba* spp. | Cabomba |
| *Chrysanthemoides monilifera* | Bitou Bush/Boneseed |
| *Cryptostegia* spp. | Rubber Vine |
| *Dalbergia sissoo* (Area: N of 18° S latitude) | Himalayan Raintree |
| *Datura ferox* | Fierce Thornapple |
| *Echium plantagineum* | Paterson's Curse |
| *Eichhornia crassipes* | Water Hyacinth |
| *Jatropha curcas* | Physic Nut |
| *Jatropha gossypiifolia* | Bellyache Bush |
| *Lycium ferocissimum* | African Boxthorn |
| *Martynia annua* | Devil's Claw |
| *Mimosa pigra* | Mimosa, Giant Sensitive Plant |
| *Nassella neesiana* | Chilean Needle Grass |
| *Nassella tenuissa* | Mexican Feather Grass |
| *Nassella trichotoma* | Serrated Tussock |
| *Parthenium hysterophorus* | Parthenium Weed |
| *Prosopis* spp. | Mesquite |
| *Rubus fruticose* agg. | Blackberry |
| *Salix* spp. except *S. babylonica*, *S.* X *calodendron* & *S.* X *reichardtiji* | Willows (except Weeping Willows, Pussy Willow and Sterile Pussy Willow) |
| *Ulex europaeus* | Gorse |
| *Ziziphus mauritiana* | Chinee Apple |

## CLASS B – GROWTH AND SPREAD TO BE CONTROLLED

| Botanical name | Common Name |
|---|---|
| *Acanthospermum hispidum* | Star Burr |
| *Alternanthera pungens* | Khaki Weed |
| *Andropogon gayanus* | Gamba Grass |
| *Argemone ochroleuca* | Mexican Poppy |
| *Calotropis procera* (Area: S of 16°30' S latitude) | Rubber Bush |
| *Carthamus lanatus* | Saffron Thistle |
| *Cenchrus echinatus* | Mossman River Grass |
| *Emex australis* | Spiny Emex |
| *Hymenachne amplexicaulis* | Olive Hymenachne |
| *Hyptis capitata* | Knobweed |
| *Hyptis suaveolens* | Hyptis |
| *Jatropha gossypiifolia* | Bellyache Bush |
| *Lantana camara* | Lantana |
| *Lantana montevidensis* | Creeping Lantana |
| *Leonotis nepetifolia* | Lion's Tail |
| *Mimosa pigra* | Mimosa, Giant Sensitive Plant |
| *Mimosa pudica* | Common Sensitive Plant |
| *Opuntia* spp. (Area: S of 18° S latitude) | Prickly Pears |
| *Parkinsonia aculeata* | Parkinsonia |
| *Pennisetum polystachion* | Mission Grass |
| *Pistia stratiotes* | Water Lettuce |
| *Ricinus communis* | Castor Oil Plant |
| *Salvinia molesta* | Salvinia |
| *Senna alata* | Candle Bush |
| *Senna obtusifolia* | Sicklepod |
| *Senna occidentalis* | Coffee Senna |
| *Sida acuta* | Spinyhead Sida |
| *Sida cordifolia* | Flannel Weed |
| *Sida rhombifolia* | Paddy's Lucerne |
| *Stachytarpheta* spp. | Snakeweeds |
| *Tamarix aphylla* | Tamarisk, Athel Pine |
| *Themeda quadrivalvis* | Grader Grass |
| *Tribulus cistoides* | Caltrop |
| *Tribulus terrestris* | Caltrop |
| *Xanthium spinosum* | Bathurst Burr |
| *Xanthium strumarium* (syn. *X. occidentale*) | Noogoora Burr |

Khaki Weed
*(Alternanthera pungens)*

Knobweed *(Hyptis capitata)*

Mimosa *(Mimosa pigra)*

Noogoora Burr
*(Xanthium strumarium)*

Siam Weed
*(Chromolaena odorata)*

Lion's Tail *(Leonotis nepetifolia)*

Common Sensitive Plant
*(Mimosa pudica)*

Prickly Pear *(Opuntia stricta)*

## CLASS C – NOT TO BE INTRODUCED TO THE NORTHERN TERRITORY

(Includes all class A and class B weeds)

| Botanical Name | Common Name |
|---|---|
| *Acroptilon repens* | Creeping Knapweed |
| *Ageratina riparia* | Mistflower |
| *Amaranthus dubius* | Chinese Spinach |
| *Ambrosia artemisiifolia* | Annual Ragweed |
| *Ambrosia psilostachya* | Perennial Ragweed |
| *Austroeupatorium inulaefolium* | |
| *Baccharis halimifolia* | Groundsel Bush |
| *Boerhavia erecta* | |
| *Brachiaria paspaloides* | Common Brachiaria, Thurston Grass |
| *Chromolaena odorata* | Siam Weed, Christmas Bush |
| *Clidemia hirta* | Koster's Curse, Soap Bush |
| *Coix aquatica* | Job's Tears |
| *Croton hirtus* | |
| *Datura* spp. | Thornapples |
| *Digitaria fuscescens* | Common Crabgrass |
| *Digitaria insularis* | |
| *Diodia sarmentosa* | |
| *Echinochloa glabrescens* | Barnyard Grass |
| *Echinochloa stagnina* | |
| *Egeria densa* | Dense Waterweed |
| *Elodea canadensis* | Canadian Pondweed |
| *Equisetum ramosissimum* | Horsetail, Scouring Rush |
| *Equisetum* spp. | Horsetails |
| *Eriocaulon truncatum* | |
| *Eriocereus martinii* | Harrisia Cactus |
| *Eriochloa polystachya* | Carib Grass |
| *Fimbristylis umbellaris* | Globular Fimbristylis |
| *Hybanthus attenuatus* | |
| *Hyptis brevipes* | Lesser Roundweed |
| *Ischaemum timorense* | Centipede Grass |
| *Kochia* | Burning Bush |
| *Kochia scoparia* (all except subsp. *Trichopyla*) | |
| *Lagarosiphon major* | Lagarosiphon |

| | |
|---|---|
| *Leptochloa chinensis* | Red Sprangletop, Feathergrass |
| *Leptochloa panicea* | Sprangletop |
| *Limnocharis flava* | Yellow Burrhead, Yellow Sawah Lettuce |
| *Miconia* spp. | Velvet Tree |
| *Mikania cordata* | |
| *Mikania micrantha* | Mile A Minute |
| *Mimosa invisa* | Giant Sensitive Plant |
| *Myriophyllum spicatum* | Erasian Watermilfoil |
| *Orabanche* spp. (all except *O. minor* and *O. cernua* var. *australiana)* | Broomrape |
| *Paederia foetida* | Lesser Malayan Stinkwort |
| *Piper aduncum* | |
| *Rhodomyrtus tomentosa* | Downy Rose Myrtle |
| *Rotala indica* | Toothcup |
| *Sacciolepis interrupta* | |
| *Salvinia cucullata* | Salvinia |
| *Salvinia natans* | Salvinia |
| *Schoenoplectus juncoides* | |
| *Scirpus maritimus* | |
| *Sorghum halepense* | Johnson Grass |
| *Spermacoce mauritiana* | |
| *Striga angustifolia* | Witchweed |
| *Striga asiatica* | Witchweed |
| *Striga* spp. (all non-indigenous) | Witchweed |
| *Trapa* spp. | Floating Water Chestnut |
| *Xanthium* spp. | Burrs |

Water Lettuce *(Pistia stratiotes)*

Castor Oil Plant *(Ricinus communis)*

Candle Bush *(Senna alata)*

Spinyhead Sida *(Sida acuta)*

Caltrop *(Tribulus cistoides)*

**NOTE**

*WONS status brings a weed species under national management for the purpose of restricting its spread and/or eradicating it from parts of Australia.*

Rubber Vine
*(Cryptostegia grandiflora)*

Olive Hymenachne
*(Hymenachne amplexicaulis)*

Lantana *(Lantana camara)*

Athel Pine *(Tamarix aphylla)*

## RESOURCE 3: WEEDS OF NATIONAL SIGNIFICANCE (WONS)

In 1999, the Australian Government endorsed a list of Weeds of National Significance (WONS). Most of the WONS weeds are both weeds of agriculture and the environment.

WONS species for which the NT Department of Natural Resources, Environment, The Arts and Sport is the lead agency:

- **Athel Pine/Tamarisk** *(Tamarix aphylla)*: A shelter tree threatening water courses like the Finke river.
- **Mimosa/Giant Sensitive Plant** *(Mimosa pigra)*: A botanic garden escapee which takes over floodplains.

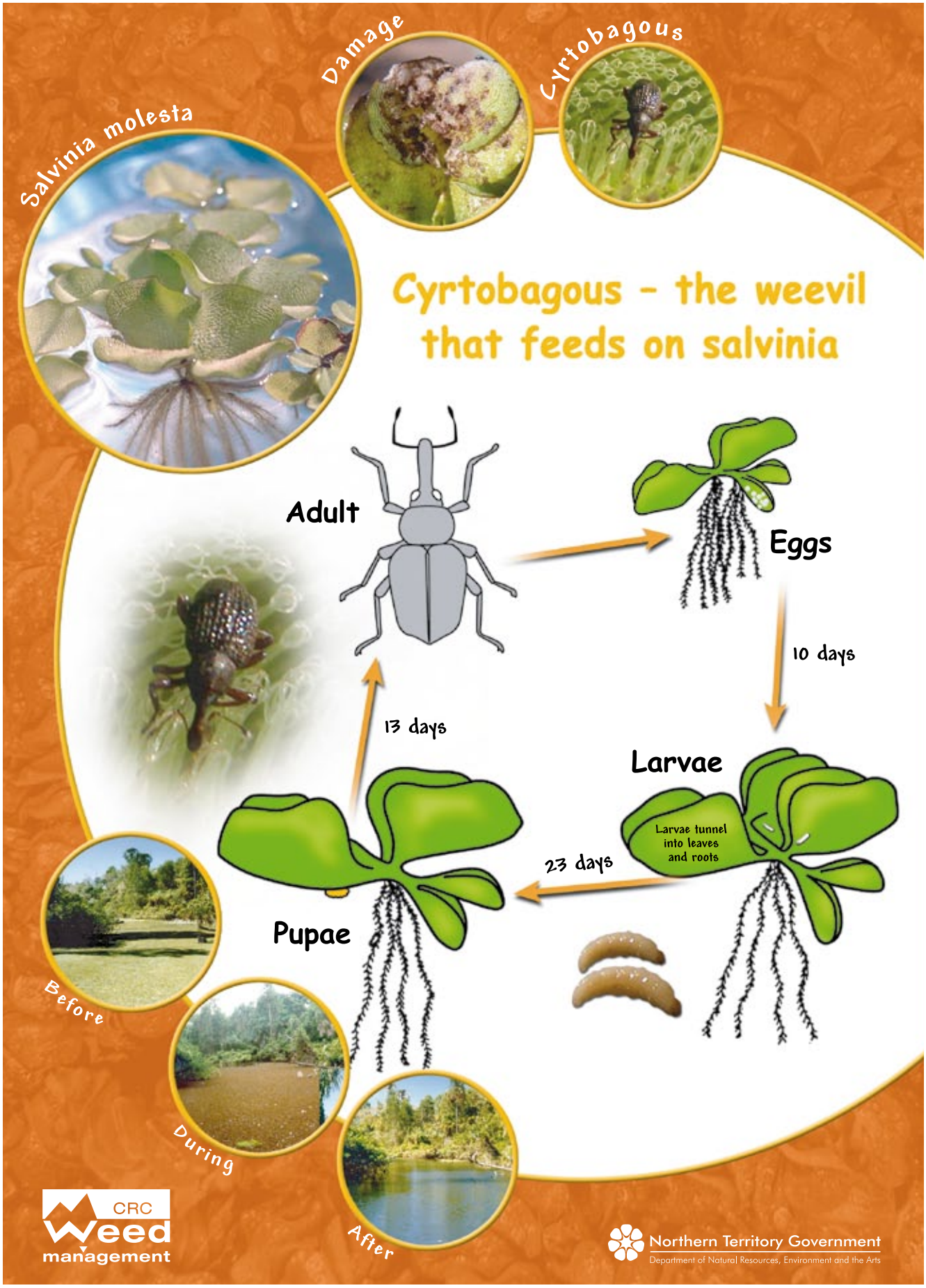
Other WONS species that are, or have been found, in the NT:

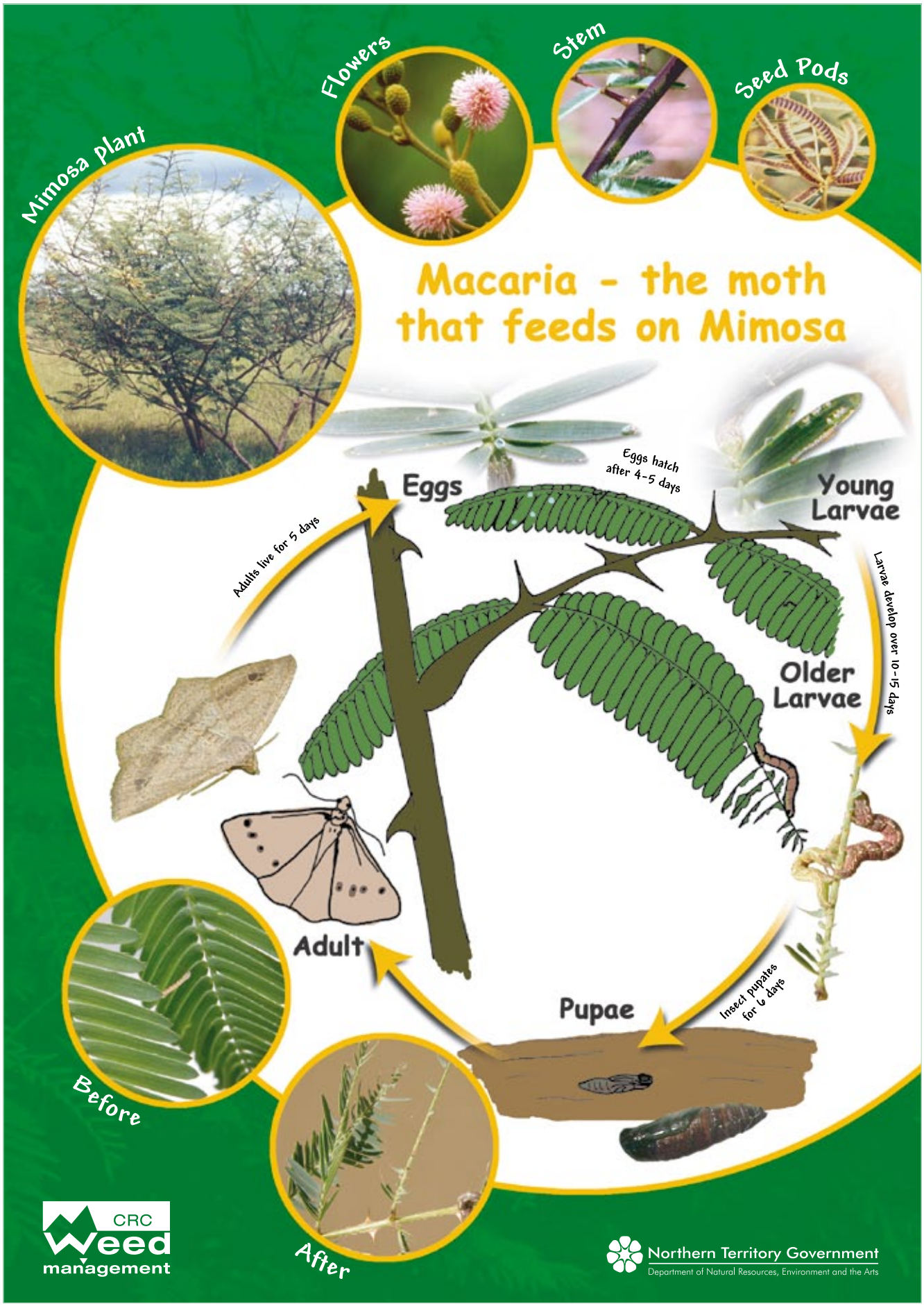
- **Cabomba** *(Cabomba caroliniana)*: An aquarium plant which can invade rivers.
- **Lantana** *(Lantana camara)*: A garden shrub that overtakes bushland.
- **Mesquite** *(Prosopis* spp.): A fodder and shelter tree which takes over grazing lands.
- **Olive Hymenachne** *(Hymenachne amplexicaulis)*: A ponded pasture grass that threatens wetlands.
- **Parkinsonia** *(Parkinsonia aculeata)*: A shelter tree which forms large dense thickets and makes areas inaccessible.
- **Parthenium Weed** *(Parthenium hysterophorus)*: An allergy threat capable of invading grazing land.
- **Pond Apple** *(Annona glabra)*: A tree that threatens wetlands, including mangroves.
- **Prickly Acacia** *(Acacia nilotica)*: A shelter tree that can out-compete native plants.
- **Rubber Vine** *(Cryptostegia grandiflora)*: A garden plant that is poisonous to stock.
- **Salvinia** *(Salvina molesta)*: An aquarium plant now choking streams and ponds.

WONS that only occur in other states:

- **Alligator Weed** *(Alternanthera philoxeroides)*: An aquarium plant that threatens rivers.
- **Bitou Bush/Boneseed** *(Chrysanthemoides monilifera)*: A plant threatening dune zones and southern native forests.
- **Blackberry** *(Rubus fruticose* agg.): A fruit vine that overtakes bushland.
- **Bridal Creeper** *(Asparagus asparagoides)*: A garden vine that chokes ground cover in the Mallee.
- **Chilean Needle Grass** *(Nassella neesiana)*: An unpalatable pasture weed.
- **Gorse** *(Ulex europaeus)*: A plant once used for fences, now barricading the bush.
- **Serrated Tussock** *(Nassella trichotoma)*: Unpalatable pasture grass.
- **Willows** *(Salix species)*: Trees that choke river banks.

## RESOURCE 4: BIOLOGICAL CONTROL POSTERS




Mimosa plant
Flowers
Stem
Seed Pods
Macaria - the moth that feeds on Mimosa
Eggs
Eggs hatch after 4-5 days
Young Larvae
Larvae develop over 10-15 days
Older Larvae
Pupae
Insect pupates for 6 days
Adult
Adults live for 5 days
Before
After
CRC Weed management
Northern Territory Government
Department of Natural Resources, Environment and the Arts


Flowers
Stem
Seed Pod
Sida plant
Calligrapha - the beetle that feeds on Sida
Young Larvae
Eggs hatch after 3-4 days
Larvae develop over 7-10 days
Eggs
Older Larvae
Adults mature in 5 days and live for about 5 months
Adult
Pupae
Larvae pupate in soil for 7-10 days
Before
After
CRC Weed management
Northern Territory Government
Department of Natural Resources, Environment and the Arts

## RESOURCE 5: COMMUNITY EDUCATION POSTERS

# Nhäŋu yan gi Mimosawnydja

## Mimosa ŋunhi dharpa yätjkurru

Gulmaraŋ Yolŋuwal wäŋaŋur.

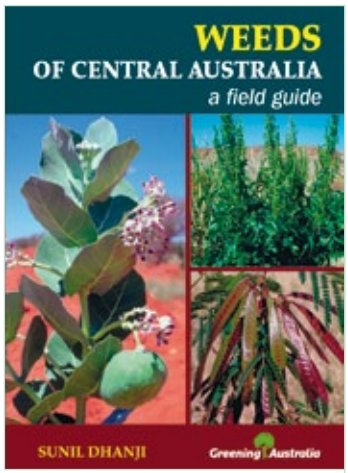
Nyumukuniny dukitjmala märr yaka dhu ŋutthan bawalamirriŋur wäŋaŋur.

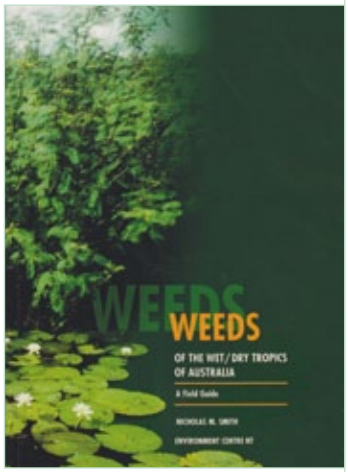
Nhäŋu balanya dharpa, dhunupa ringimup.

Northern Territory Government

NORTHERN LAND COUNCIL

**8920 5100**
**8999 4567**




*Go to the* **Resources** *section of Greening Australia's website (***www.greeningaustralia.org.au***) for more information about books – look for the link to NT publications.*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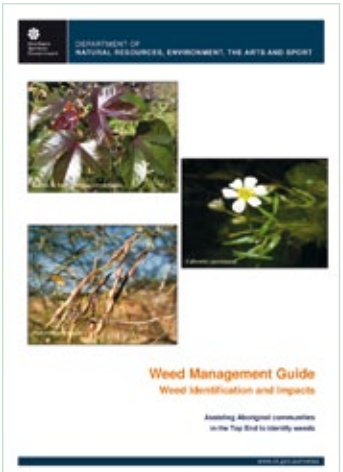


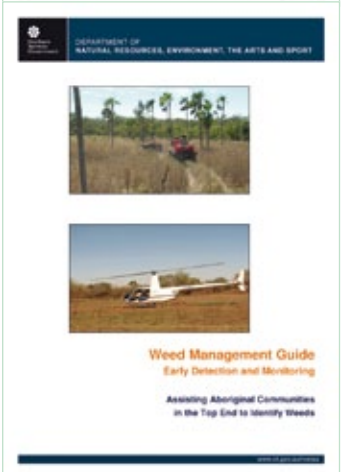


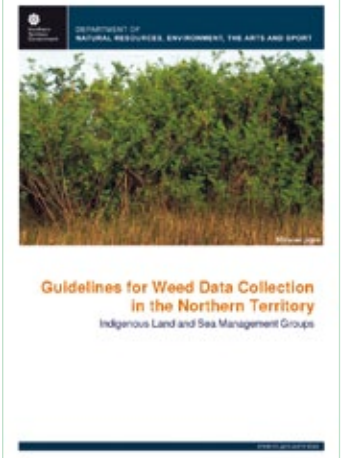


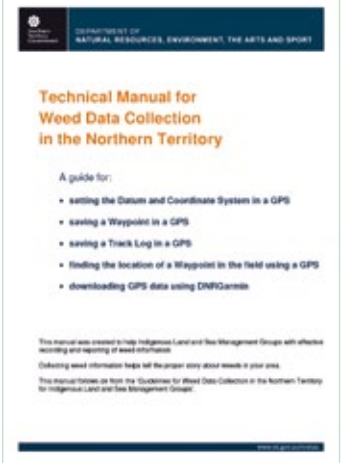


## WEED IDENTIFICATION POSTERS

Download these posters off the NRETAS website (www.nt.gov.au/nreta/natres/weeds):

- Weeds of the Top End
- Weeds of the Katherine Region
- Weeds of the Barkly Region
- Weeds of the Alice Springs Region

ALEP

Aboriginal Landcare Education Program

***ALEP Learning Guides***. These full colour, step-by-step guides provide practical, easy to follow instructions. Based in the Top End of the Northern Territory, they can also be adapted to other regions.


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1. ALEP Learning Guides – Trainer's Guide
2. Carry Out Natural Area Restoration Works

RECOGNISING PLANTS

3. Recognise Plants
4. Collect, Prepare and Preserve Plant Specimens

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6. Maintain Properties and Structures
7. Install Micro-irrigation Systems
8. Undertake Propagation Activities
9. Pot Up Plants
10. Tend Nursery Plants

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13. Plant Trees and Shrubs
14. Perform Basic Water Quality Tests

**In this learning guide, *Treat Weeds* you will learn how to:**

- IDENTIFY AND PREPARE TO TREAT WEEDS
- TREAT WEEDS USING DIFFERENT METHODS
- CLEAN UP AND MONITOR WEED TREATMENT

**ISBN 978-0-9806872-2-4 (2012)**

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