ALEP

Aboriginal Landcare Education Program

5

Collect, Treat and Store Seed

Learning Guide

Greening Australia

CONTENTS

Student name:……

Student number:……

INTRODUCTION

Welcome to *Collect, Treat and Store Seed*. This learning guide covers the collection, treatment and storage of seed from native plant species. You might need to be able to collect and treat seeds when working for councils, carrying out bush regeneration work, nursery work or ranger work or when managing your own country.

Training for this module should be completed on the job and out in the field in various habitats such as woodlands and monsoon forests.

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, maps and water.
3. Secateurs, bags, buckets and other equipment for collecting seed.
4. Sieves, scales, bags, labels and containers for cleaning and storing seed.

NOTE

It is recommended you work through the Recognise Plants *learning guide first. This will give you the plant identification skills needed to collect seeds.*

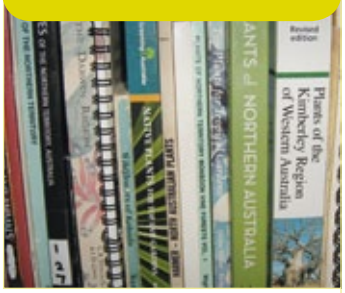
ASSIGNMENTS

There are three assignments you will need to complete.

Some of these assignments may go towards your final assessment.

Section	Assignment	Competent (C) Not yet competent (NYC)	Date Achieved
Getting Prepared	Assignment 1. Project Risk Assessment		
Collecting Seed	Assignment 2. Flowering and Fruiting Calendar		
Clean and Store Seed	Assignment 3. Collect Seed		

1 GETTING PREPARED



1A. COLLECTING INFORMATION

Some good books about collecting seed and identifying plants can be found in the References on page 20. We recommend you work through the learning guide for *Recognise Plants* first as it has lots of information about identifying plants, including more references.

There is also a wealth of information available online.

1. For Australia wide information on seed collection go to the Florabank website.

   www.florabank.org.au

2. For information on Northern Territory plants go to the Department of Natural Resources, Environment, the Arts and Sport.

   www.nretas.nt.gov.au/plants-and-animals

3. For Australia wide information on plant classification, plants names and identification go to the Australian National Botanic Gardens.

   www.anbg.gov.au

1B. COLLECTING SEEDS SAFELY

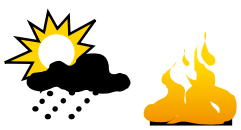
When collecting seeds it is recommended that you use sunscreen, wear a hat, and have sturdy shoes. It is also a good idea to wear a protective long-sleeved shirt and long trousers to keep the sun off. This is called Personal Protective Equipment (PPE).

It will also be essential to carry plenty of water for drinking and also for washing hands, especially if handling poisonous or irritating seeds.

Remember some seeds are very poisonous or should not be handled for spiritual reasons. Always ask your elders or trainer first before handling any plants. Gloves are also recommended when collecting seeds as some sap, fruits, seeds or dust from dried seeds can be toxic and may also cause allergic reactions on the skin. A hard hat may also be useful as there can be dangers from falling branches or fruit. Some seeds are very fine, dusty or hairy and dust masks may be need for the cleaning process.

Make sure that you are familiar with your organisation's occupational health and safety policies and procedures before doing any work. When collecting seeds in the field always inform your trainer or supervisor about where you are going and when you expect to return. Ideally you should not go out into the field with less than three people. Always carry a first aid kit and maps with you. Make sure your vehicle is properly maintained. Check all safety equipment such as radios and mobile or satellite phones before you leave to see if they are working properly. Before you set off also check the weather, road and fire reports for your local area.

Before you begin, use this checklist to confirm you have followed good safety procedures.

SAFETY CHECKLIST ACTIVITY		✓
Long trousers, shirt and boots		
Hat (hard hat if necessary) and gloves		
Sunscreen, insect repellant and sunglasses		
Dust mask		
Water		
First aid kit		
Notified others and have phone/ 2 way radio		
Checked weather, road and fire reports		
Permits (if required) and maps		
Compass or GPS		

Cycads are threatened species

Example of permit for NT Government

1C. PERMITS AND PERMISSION

PERMITS

The Northern Territory Government has restrictions on what native plants and seeds can be collected and has a permit system for collecting them. **Make sure you have the right permit before you start collecting seed.** See this website for the latest details.

www.nt.gov.au/nreta/wildlife/permits

THREATENED SPECIES

Various laws protect all plants listed as threatened. The main laws are the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* and the *NT Government's Territory Parks and Wildlife Conservation Act 2006.*

These acts conserve biological diversity, and help to prevent the extinction and promote the recovery of, populations of threatened animals and plants and ecological communities. They also aim to stop processes that threaten the survival of these plants and animals.

Make sure you do not collect seeds from any threatened plants. Information on threatened plants can be accessed online.

www.nretas.nt.gov.au/plants-and-animals

PERMISSION

Before collecting seed you need to get permission from the landowner. This includes private landowners, the government and Aboriginal landowners. Most landowners are generally helpful and you can collect seeds without too many problems but always ask first. You should get permission in writing, especially if the land is owned by the government or a council (eg. national parks, roadsides and Aboriginal land).

In many communities you may also need permission from local traditional owners before collecting any seeds. Some plants may have special significance and should never be touched (e.g. totemic plants, local restrictions, local protocols etc.). Always seek local advice before you start collecting seed – not afterwards.

ACTIVITY

Find out who you need to get permission from to collect seeds in these areas.

Aboriginal owned land	
Roadsides	
Private land	
Pastoral properties	
National or conservation parks	
Council reserves	

1D. ABOUT COLLECTING SEED

WHY COLLECT SEED

The main reasons for collecting seed are:

- To grow plants from seed in a nursery situation.
- To direct seed areas for revegetation purposes (like a farmer sowing a crop).
- For use in arts and crafts.
- To make food.

FROM FLOWER TO SEED

Collecting seed makes us watch the life cycle of plants:

- A flower grows and is pollinated.
- Fruit develops which contains seed.
- The seed is blown, washed or carried away to a new location where it starts growing into a new plant.

ACTIVITY

Pick a plant that you know well. Draw a series of pictures showing the life cycle of the plant from the flower bud to the mature seed.

WHEN TO COLLECT

You should have a list of trees and shrubs you want to collect seed from. Keep a constant watch out for them in flower so you can prepare to get the seed later on. It is a very good idea to make a calendar of fruiting and flowering times so you can easily work out a seed collection program for the year. Seed collecting should occur on dry days to prevent the seeds rotting.

WHERE TO COLLECT

Collecting seeds might mean travelling large distances. Its a good idea to have map of the area with the plants marked for easy finding.

If you are collecting seed to revegetate your area it is important to collect seed from native plants in the same area. The plants that are native to a particular area have adapted to the local soils, climate and other vegetation and are more likely to grow well there.

It is very important to keep seed from each species separate throughout the whole seed collection and storage process so the right seed goes back to the right area.

1E. EQUIPMENT

Using the correct tools will not only make the job of collecting seed easier but will also help to keep you free from injury.

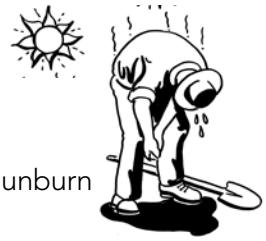
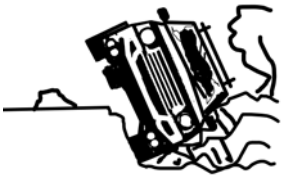
The following basic tools will help you. Tick off the items you think you will need for your particular activity.

ACTIVITY		✓
Plant identification books		
Knife		
Secateurs		
Long handled pole with hook, saw and secateur attachments		
Ladder		
Tarpaulin		
Buckets		
Calico and paper bags		

Seed Collection Record sheets		
Pen/pencil		
Large plastic box to transport equipment in		
Sieves of various sizes		
Scales		
Storage bags and containers		
Labels		
Chemicals for pest protection		

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 **and what can happen = the risk**	**What to do about it?**
SUN EXPOSURE Risk of: Heat exhaustion, deyhydration and sunburn 	• Wear sunscreen • • •
ROAD TRAVEL Risk of: Injury in vehicle accident 	• Don't speed • • •
POISONOUS AND PRICKLY PLANTS Risk of: Poisoning or skin injury 	• Learn about plants first • • •
BITING INSECTS Risk of: Bites and stings 	• Have first aid kit on site • • •
LOOSE BRANCHES Risk of: Being injured by falling branch 	• Wear a hard hat • • •
	• • • •

2 COLLECTING SEED

2A. TYPES OF FRUIT AND RIPENESS

It is important to collect only ripe or fully mature fruit. If the fruits are not ripe the seed may not be fully developed and will not germinate when you plant it.

Small Red Apple
(*Syzygium fibrosum*)

FLESHY FRUIT

Fleshy fruits are often eaten by birds, bats and other animals which then carry the seeds to new locations. The fruit may have only one big seed, or many small seeds.

Fleshy fruit are ripe and can be collected when they:

- Appear round and full.
- They soften or wrinkle and change colour.
- They are falling to the ground.
- Birds are feeding on the fruit.

Deep Gold Wattle
(*Acacia torulosa*)

DRY FRUIT

Dry, woody or papery fruits can be spread by ants, wind or water.

Woody fruit are ripe and can be collected when:

- They appear dry, brown and woody.
- Some fruit capsules have started to drop or open (these fruit open by themselves to release the seed, you can collect some species when they are still closed and open them up yourself).

Grass seed can be collected when:

- The seed heads change colour.
- The seed strips off easily by hand.

2B. HEALTH OF PLANTS

You should collect from a range of healthy plants – say about ten different plants each about 100 metres apart. This should ensure that your seeds are not all from the same genetic stock. Inbreeding can produce weakened plants.

Don't collect more than a third of the seed on each plant – leave the rest for nature. This leaves enough seed for new plants to grow and will leave food for animals.

2C. COLLECTION TECHNIQUES

You should take plant identification books with you to make sure that you identify the correct plants. Its no good collecting the wrong seeds.

Put the seeds in calico pags, paper bags, cardboard boxes or buckets.

Keep seeds separate so you can keep track of different species and locations. Give each species a seed lot number and fill out a Seed Collection Record (see Resource 1).

HAND PICKING

The easiest method of seed collecting is to hand pick ripe fruit or pods off the plant or collect fallen fruits from the ground. You can also use secateurs or a knife to cut the fruit off.

LONG HANDLED SECATEURS, LADDER AND TARPAULIN

Long handled secateurs or a ladder may be required to reach seed high on the tree. Place a tarpaulin underneath the tree while the fruit is cut off. Seed from eucalypts are often collected in this way. You may also be able to shake the fruit off onto the tarpaulin with a long pole.

PICK WHOLE TWIGS

In some cases it may be easier to pick twigs especially if the fruits are small, e.g. Weeping Ti-Tree (*Leptospermum madidum*) and Turkey Bush (*Calytrix exstipulata*).

ASSIGNMENT 2 A2

FLOWERING AND FRUITING CALENDAR

Complete the following table for 10 local native plants in your area. Information can be obtained by observing plants in the field or from available reference books.

Use FLW to indicate flowering and FT for fruiting. One plant has been given as an example.

Species name	Common name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Acacia auriculiformis	**Black wattle**					**FLW**	**FLW**	**FLW**	**FT**	**FT**	**FT**		

3 CLEAN AND STORE SEED

3A. CLEANING AND DRYING SEED

Cleaning and drying should happen as soon as possible after the seed has been collected.

FLESHY FRUIT

Cleaning

If the flesh is thin the fruits can just be dried and then stored or sown. Thick fleshy fruits should be cleaned before they are stored or sown. Some fruits can not be stored and must be sown straight away. Three methods for cleaning are:

- Place fruit in a bucket of water, wearing gloves gently squeeze the fruit removing the skins, drain off excess water and skins, repeat until seeds are clean.
- Place fruit on wire mesh and run water over fruit as they are gently rolled, removing the skins and pulp.
- Compost fruit by storing in a plastic bag for a short period to allow flesh to be easily washed from seed.

Drying

It is important that all seed is very dry if it is going to be stored – otherwise it will go mouldy. Use the drying methods on the next page in the dry fruit section.

NOTE

Some seeds and fruits are toxic so you should always find out whether there are any hazards and risks involved with cleaning the seed. For instance Acacia oncinocarpa *has a very fine dust-like powder surrounding the seed which can be irritating to the lungs. Make sure you wear an appropriate face dust mask.*

Seeds of Brachychiton diversifolius *are surrounded by irritant hairs that can make the skin itch so wear thick gloves.*

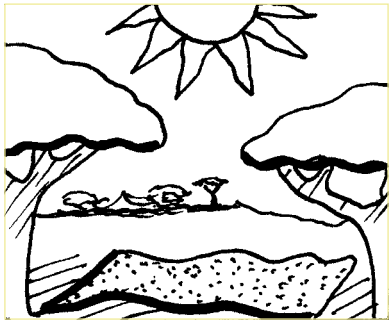
DRY FRUIT

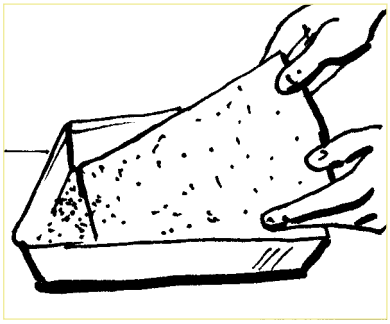
Drying

To extract the seed of dry fruits (such as eucalypts, grevilleas and acacias) they need to be well dried. Dry the seeds in a place where:

- It is well ventilated.
- It is light and dry using natural light and heat.
- It is protected from rain.
- It is out of the direct heat of the sun.
- The seed will not be blown around by any wind.
- Birds, insects, rats and mice can't eat the seed.

Place fruits in a paper or calico bag, or spread out on a sheet of newspaper or in open flat boxes or trays. The seed is released when the fruit or seed pod opens up. This may take a few weeks. Sometimes you need to shake the bag to get the seed to come out.





Cleaning

Eucalypt seed and chaff

Cleaning means separating the seed from everything else (pods, chaff, sticks, leaves). You need to be sure you know what the seed looks like so you don't keep the chaff by mistake.

- For some species you can pick out the seed by hand.
- For other you can use a sieve to separate the seeds from everything else. Hand sieves with different sized mesh are used to do this, catch the seeds on a sheet placed underneath.
- Blowing the lighter chaff away from the seeds is another method.
- Vibrating or shaking the seeds in a dish can also help to separate seeds.
- Threshing or beating can work for some grass species.

3B. WEIGHING SEED

It is often necessary to know how much seed you have. This can be done by weighing the seed. Weighing should happen after drying and cleaning.

Normal kitchen scales are suitable for larger seeds and fruits. Many seeds are tiny and light in weight. Kitchen scales don't usually have the accuracy for such small weights. You will need to use electronic scales to weigh these seeds.

Write the weight on the Seed Collection Record.

3C. PACKAGING AND LABELLING SEED

Packaging

Dry, clean and weighed seed should be sealed in airtight containers so they stay dry and aren't eaten by rats or insects. Containers include:

- Screw topped jars.
- Zip-topped plastic bags.
- Sealed plastic boxes.

To be on the safe side and to help with organising your seed, put groups of small containers into large sealed plastic boxes (eg. all the species starting with A in one box).

Labelling

Before storing make a label for the seed. The label should record:

- Seed lot number.
- Genus and species.

The seed lot number is found on the Seed Collection Record. It is very important that this record is kept somewhere that is easy to find so you always know where the seed came from.

Stick the label on to the container.

An example label is found in Resource 2.

3D. STORING SEED

Keep the packaged seed in a cool dry location away from direct sunlight such as in an air-conditioned room. Seeds may keep for several years if stored correctly.

Before storing remove any seeds that show signs of insect damage or mould or fungus. Insect attack may appear as small holes in the seed or as a webbing over the seeds. Another tell-tale sign is the presence of powder in the bottom of the container - a sure sign that insects are inside eating the seed.

Check regularly to make sure the seeds are free of insects. If insects are a problem place opened containers of seed in a box with a pest strip for a few days and then reseal before restoring. Seeds can also be treated with carbon dioxide to kill the insects. You may need to put moth balls, rat poison or other pest treatments in your seed store.

Make sure you have a good method of keeping your seeds and your Seed Collection Records so you can always match them up. Whenever you use some seed fill in the weight section at the bottom of the Seed Collection Record.

3E. SEED TREATMENT

Some seeds require treatment before they will germinate. Usually this treatment happens just before the seed is planted. However it is important to understand what treatments may be necessary as it may affect how you clean the seed or how long you store it for. For example some grasses have an in built dormancy to help them survive in the wild – they need to be stored for up to a year before being sown.

Find out what sort of treatment these seeds will need before they are planted (hint: *Native Plants for Top End Gardens* is a great resource for this).

NOTE

You will learn more about treating seed in the learning guide for Undertake Propagation Activities.

ACTIVITY

Seed Type	Treatment Required
Hard wattle seeds from a dry pod of Mountford's Wattle (*Acacia mountfordiae*)	
Small gum tree seed from a dry capsule such as Scarlet Gum (*Eucalyptus phoenicea*)	
Fine dry seed from dry capsules of the Paperbark (*Melaleuca leucadendra*)	
Hard shiny seeds inside woody capsules of the Soap Tree (*Alphitonia excelsa*)	
Yellow itchy seeds inside boat shaped capsule of the Northern Kurrajong (*Brachychiton diversifolius*)	
Fleshy fruits from White Bush Apple (*Syzygium forte*)	
Fleshy figs from the Fig (*Ficus coronulata*)	
Multiple fleshy fruits from Pandanus (*Pandanus spiralis*)	

ASSIGNMENT 3 A3

COLLECT SEED

- Collect seeds from five different species of plants.
- Make copies of the Seed Collection Record (see Resource 1) and fill one in for each species.
- Dry and clean the seed.
- Weigh, package, label and store the seed.

Answer the following questions about ONE of species you collected. You can write the answers here OR tell your trainer the answers.

What is the name of the plant you collected the seed from?

.....

Where did you collect your seed?

.....

What permission and/or permit did you get to enter the land?

.....

How many plants did you collect this species from?

.....

What seed collection method did you use?

.....

What did you do to dry and clean your seed?

.....

How much did the seed weigh?

.....

What sort of container is the seed stored in?

.....

Where is the seed stored?

.....

RESOURCES AND REFERENCES

RESOURCE 1: SEED COLLECTION RECORD

Seed lot number		
Genus		
Species		
Common name		
Local language name		
Date collected		
Collector		
Site collected from		
Latitude		
Longitude		
Starting weight in grams		
Use the section below to record seed as it is used from the Seed Store		
Date	Weight used	Weight left in store
Date	Weight used	Weight left in store
Date	Weight used	Weight left in store
Date	Weight used	Weight left in store

RESOURCE 2: LABELS

Use the following labels to attach to the seed storage container.

- Copy the labels on to sticky paper and cut up.
- Or just photocopy the labels and stick on with sticky tape.

Seed lot number	
Genus	
species	

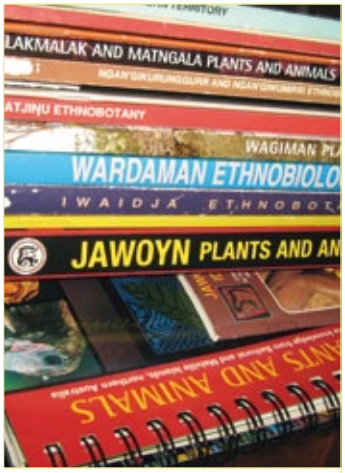
Seed lot number	
Genus	
species	

Seed lot number	
Genus	
species	

Seed lot number	
Genus	
species	

Seed lot number	
Genus	
species	

Seed lot number	
Genus	
species	



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.*

REFERENCES

SEED COLLECTION, TREATMENT AND STORAGE

Anonymous. 1993. *Guide to requirements for collecting Australian plants and animals.* Australian Nature Conservation Agency, Canberra.

Bonney N. 2003. *What Seed Is That? A guide to the identification, collection, germination and establishment of native plant species for central southern Australian landscapes.* Neville Bonney, Tantanoola.

Crisp M.D. & Cummings D.J. 1997. *How to use field note books.* Centre for Plant Biodiversity Research, Australian Government. www.anbg.gov.au/cpbr/herbarium/collecting/field-note-book.html (Accessed: February 2010).

Doran J. 1991. *How to collect native tree seed easily.* 14 page pamphlet, Greening Australia, ACT.

Flanery F., Carr D. & Rawlings K. 2006. *Thinking Bush: Thinking Seeds.* 8 page brochure, Greening Australia, ACT.

Guerrant E.O., Havens K. & Maunder M. (Eds.) 2004. *Ex-situ plant conservation: supporting species survival in the wild.* Island press, Washington DC.

Gunn B. 2001. *Australian Tree Seed Centre Operations Manual.* CSIRO. Forestry and Forest Products, Canberra, ACT. www.csiro.au/files/files/pmrb.pdf (Accessed: February 2010).

Kraatz M., Jacklyn P. & Clark M. (Eds) 2009 *The Bush Book: A manual for managing native vegetation across northern Australia.* Greening Australia (NT) Ltd, Darwin.

Smith R.D., Dickie J.B., Linington S.H., Pritchard H.W. & Probert R.J. (Eds.) 2003. *Seed Conservation: Turning Science into Practice.* Kew Publishing, UK.

Sweedman L. & Merritt D. (Eds.) 2006. *Australian Seeds: a guide to their collection, identification and biology.* CSIRO Publishing.

Vallee L., Hogbin T., Monks L., Makinson B., Matthes M. & Rossetto M. 2004. *Guidelines for the translocation of Threatened Plants in Australia.* Australian Network of Plant Conservation, Canberra.

Willan R.L. (Compiler) 1985. *A guide to forest seed handling with special reference to the tropics.* FAO Forestry Paper 20/2, FAO Rome. www.fao.org/docrep/006/ad232e/ad232e00.htm (Accessed: February 2010).

PLANT IDENTIFICATION

(See the *Recognise Plants* learning guide for a longer list of references)

Brock, J. 2007. *Native Plants of Northern Australia.* Reed New Holland, Sydney.

Clark, M. & Traynor, S. 1987. *Plants of the Tropical Woodland.* Conservation Commission of the Northern Territory, Darwin.

Crowder, S. & Saggers, B. 2010. *Grasses of the Northern Savannas: a field guide.* Greening Australia (NT) Ltd, Darwin.

Dhanji, S. 2009. *Weeds of Central Australia: a field guide*. Greening Australia (NT) Ltd, Darwin.

Smith N. 2007. *Native Plants for Top End Gardens.* Greening Australia (NT) Ltd, Darwin.

Smith, N.M. 2002. *Weeds of the Wet/Dry Tropics of Australia. A field guide.* Environment Centre NT, Darwin.

Urban, A. 1990. *Wildflowers and plants of Central Australia.* Southbank Communications Group, Port Melbourne.

Vinter, A. & Forth, F. 2007. *Native Plants for Central Australian Gardens.* Greening Australia (NT) Ltd, Darwin.

Wightman, G. & Andrews, M. 1989. *Plants of Northern Territory Monsoon Vine Forests.* Conservation Commission of the Northern Territory, Darwin.

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.

GETTING READY

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

GROWING PLANTS

5. **Collect, Treat and Store Seed**
6. Maintain Properties and Structures
7. Install Micro-irrigation Systems
8. Undertake Propagation Activities
9. Pot Up Plants
10. Tend Nursery Plants

MANAGING COUNTRY

11. Treat Weeds
12. Install, Maintain and Repair Fencing
13. Plant Trees and Shrubs
14. Perform Basic Water Quality Tests

In this learning guide, *Collect, Treat and Store Seeds* **you will learn how to:**

- PREPARE TO COLLECT SEED
- COLLECT SEED
- CLEAN, LABEL AND STORE SEED

ISBN: 978-1-875345-98-4 (2012)

For further information contact Greening Australia (NT) Ltd on
(08) 8947 3793 or info@nt.greeningaustralia.org.au or go to www.greeningaustralia.org.au

Australian Government

Greening Australia

Nelumbo Botaniks