North Coast Regional Seed Bank Network - Standard Operating Procedures

REVISED 2025 v5

STEP 2 — Record Keeping and Collecting Seed

These Steps of the Standard Operating Procedures of the North Coast Regional Seed Bank Network are to inform the activities of all members and associates collecting, processing and storing native seed within the network. The information in each Step is based on the Florabank Guidelines and the advice of experienced seed collectors.

Detailed guidance on seed collecting and processing should be gained by completing the free online Florabank Guideline modules available at:
https://www.florabank.org.au/guidelines

TOPICS COVERED UNDER THIS STEP

1. Record Keeping: a Field Data Sheet for each Seed Lot
2. Plant Identification and Verification
3. Useful Definitions and Types of Fruit
4. Tips for Collecting Mature Seed
5. Seed Collection Methods
   By Fruit/Seed Type and General Methods
6. Assessing potential seed viability – the cut test.
7. Post-harvest handling of seed

FLORABANK GUIDELINES RELATED TO THIS STEP

Module 4: Record Keeping
https://www.florabank.org.au/guidelines?link=Module4

Module 6: Seed Collection
https://www.florabank.org.au/guidelines?link=Module6

1. RECORD KEEPING: A FIELD DATA SHEET FOR EACH SEED LOT

The seed collection Field Data Sheet (FDS) used by the North Coast Regional Seed Bank Network is essential to recording the provenance of the seed lot and to track the seed lot through subsequent processing, testing and storage steps to final use in propagating plants for revegetation programs.

Vital to this is a unique **seed lot collection number** which is printed on each Field Data Sheet.

The essential data to record in the Field Data Sheet while collecting seed includes:

1 Date Collected

2 Plant species and number of plants collected from

- Mark the species name 'to verify' if not sure of the species and take and add tagged photos with the seed lot collection number
- Number of plants from which the seed is collected at the one site (see below on how to define a site.)

3 Collection site location:

- Site Name, GPS Coordinates, Road Name, Nearest Town, Local Government Area
- Land Ownership type: public or private. Land Owner (or type of public land)

Given the location is recorded the following information can be added later:
Catchment, IBRA Subregion

4 Collection Site information:

- Aspect, Landform type
- Soil type if known (this can be determined from the location later)

5 Collector Details

- Collector Name (s) and Signature
- Organisation/hub/program collecting for.

The original copy of the Field Data Sheet for the seed lot is removed from the FDS book and remains with the seed lot through the whole collection, processing and transport process.

When a seed lot is received at the Seed Bank facility at the Botanic Garden in Coffs Harbour the data from the FDS for the seed lot is entered into the Seed Bank Network database.

2. PLANT IDENTIFICATION AND VERIFICATION

On seed collecting expeditions take some plant identification books, mobile phone with plant ID apps, and/or a set of specific profiles of the plant species being targeted with some identifying characteristics to aid in confirming plant species identity while in the field.

Where there is any uncertainty in the identification take photos of the plant and label the photos with the unique seed lot collection number from the Field Data Sheet to later include with seed lot or file online. This will assist to verify the species identification. Taking photos of the plant is good practice as it may also inform planning for seed collecting in future seasons.

Key photos to take to help verify a species identification:

1. **Of the whole plant** – showing its habit or vegetative form: is it a tree, shrub, grass/sedge, vine, herb/form, other?
2. **Of the leaves and leaf arrangement on a stem.**
   TIP: turn over one leaf with your thumb to have both sides of the leaf appear in the one photo, with your thumb as a scale reference.
3. **Of the fruit or seed pod**
   And of any flowers if still on the plant.

Photos can be uploaded to the iNaturalist mobile app in the field or on a website later to assist in verifying the identification of the plant. This also keeps a record with GPS coordinates on the iNaturalist site and once verified on the Atlas of Living Australia database.

See these helpful instructional videos on using the iNaturalist mobile app and website.

Voucher specimens

A voucher specimen is a collection of dried and pressed plant parts to help confirm identification of a plant and is only needed in exceptional cases where plant identification is difficult using photos alone. Sometimes a voucher specimen is useful to make as a ready reference to help train seed collectors when similar species are hard to identify or to distinguish in the field. The voucher specimen should include at least the leaves, stems, flowers and/or fruits. Press and dry the specimen between sheets of newspaper in an A3 size notepad. For guidance on preparing voucher specimens see this video by Kew Botanic Gardens.

3. USEFUL DEFINITIONS AND TYPES OF FRUIT

Seed Lot	Is a batch of seed from one species collected from a defined site.
Dehiscent fruit	fruits that open to release seeds, often after a period of drying.
Indehiscent fruit	fruits that do NOT open to release seeds.
Orthodox seed	seed which can tolerate drying to increase the storage period
Recalcitrant seed	seeds that do NOT tolerate drying and need to be used after harvest

TYPES OF FRUIT AND SEED

Drupe	a fleshy fruit containing one seed (EG: Elaeocarpus, Persoonia)
Berries	a fleshy fruit usually with multiple small seeds (EG: Dianella)

Seed Pods	EG: Acacia, Dillwynia, Hardenbergia, Pultenaea
Woody Capsules	EG: Eucalyptus, Angophora, Melaleuca
Papery Capsules	EG: Lomandra, Wahlenbergia
Seed Follicles	EG: Banksia, Gevillea, Hakea
Cones	EG: Casuarina, Allocasuarina, Cyprus, Exocarpus
Grains	EG: Themeda, Spinifex
Nuts	an indehiscent dry fruit with a hard shell and a single seed EG: Ghania, Baumea
Achenes	an indehiscent small dry fruit with one seed EG: Brachyscome, Helichrysum

4. TIPS FOR COLLECTING MATURE SEED

Only mature seed should be collected as immature seeds generally do not ripen off the plant and will result in low rates of germination. The general indicators of seed maturity are listed below for seed types.

Fleshy fruit 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.
- Dry, woody or papery fruits can be collected when they:
- Appear dry, brown and woody.
- Dehiscent (fruit opening to release seed) have started to drop or open.

Grass seed can be collected when:

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

To consider from seed collecting guides/resources and local monitoring:

- how long the targeted seed remains on the plant when the seed matures.
- best timing to collect at peak seed maturity.

The usual fruiting periods of the 100 native plant species targeted under the North Coast Regional Seed Bank program can be found in a Seed Collecting, Processing and Storage Guide (Part 2) available at: northcoastseedbank.com.au

5. SEED COLLECTION METHODS

Reminder: To follow the Code of Practice when collecting seed - see Step 1.

Methods of Seed Collecting - Introduction

Seed collection methods vary according to the plant species and to the scale of seed collection required. The following methods are based on smaller scale seed collection which generally do NOT require mechanical harvesting or specialised equipment.

The methods are presented by:

- Harvesting techniques by fruit/seed type
- General methods of seed collecting – in two groups: lower to the ground and tall trees

For all methods: When transferring the collected seed to a collection bag ensure the bag is labelled (preferably both outside and with a tag inside) with the seed lot collection number from the Field Data Sheet and with the species name, location and date collected.

[PHOTO: Labelled Seed collection bags: paper bag written on and a calico bag with a tag label]

HARVESTING TECHNIQUES BY FRUIT/SEED TYPE (T=Type)

T1 Plants with seed pods – includes *Acacia* sp. and other legumes.

These species are collected by hand, wearing leather gloves, to strip pods from branches. Alternatively, the plant can be shaken or beaten over a bucket or with a pole over a tarp spread on the ground. For larger specimens the extension tool may be used.

T2 Plants with woody fruits – includes *Allocasuarina* sp., *Casuarina* sp., and *Banksia* sp.

These species are best when the seed cone/fruit is collected individually without branches or leaves and makes extraction easier and cleaner. *Eucalypt* sp., *Callistemon* sp., *Leptospermum* sp., and *Melaleuca* sp. are collected by removing small branches with secateurs, leaving the capsules attached to small branches makes seed release and extraction easier.

T3 Plants with fleshy fruits – includes *Ficus* sp., *Acmena* sp., *Dianella* sp., and *Glochidion* sp.

These species are handpicked when ripe or shaken/stripped over a small tarp or tub.

T4 Plants with seed heads – includes sedges, daisies and native grasses.

These species are collected by stripping seed heads off stems by hand wearing heavy duty leather gloves, or he stems are cut off with secateurs. For larger scale seed collecting mechanical harvesting

will be more efficient and is covered under the Florabank Guidelines.

GENERAL METHODS OF SEED COLLECTING (M= Method)

The following seed collection methods are grouped by
1 seeds can be harvested by hand or with tools within easy reach of the ground, and
2 taller plants which may require special equipment or methods to reach seed bearing branches.

Group 1: Seed Collection by Hand and Useful Tools

M1 Collecting bucket and hand strip

For seed within easy reach collectors pick or shake the fruit or seed heads into a plastic tub or bucket, or into a waist mounted bucket or calico bag such as a fruit pickers apron. Leather gloves should be worn.

PHOTO: Hand picking into a bucket and an apron. (wearing gloves)

M2 Drop sheet and ground collection

Alternatively, a collection drop sheet or tarp can first be spread out under the plant and the plant then shaken or beaten with a pole to dislodge fruit or seed pods. This is useful for prickly plants or where seed is hard to reach. If the seed does not dislodge easily it may not ready to harvest and the plant is noted to return to and try again.

PHOTO: Tarp placed below and shaking/beating a plant

NOTE: Collecting fallen seed directly lying on the ground is not recommended as it may NOT come from the target species or may be of poor quality.

M3 Seed Traps

Sometimes a fruit or seed pod may open over a small period of time and the seed released before it can be harvested. When the timing of seed shed is uncertain or when seed dispersal is spread over a long period of time a seed trap can be used to catch seed.
Seed traps range from small bags (recycle from old stockings) tied around individual fruit/seed pod clusters to large porous tarp traps (such as shade cloth) that are placed under the plant to catch seed.

PHOTOS: Fruit enclosed in a small seed collecting bag, shadecloth under a plant.

Good record keeping and regular follow up is essential to check the seed traps, remove the seed traps, and/or to harvest seed regularly from larger shade cloth type seed traps before the seed is eaten by birds and other animals. Seed collecting or licence permit conditions also need to be considered when using these methods.

Useful Tools

Tools such as short or long handled secateurs are often needed to cut stems or small branches or to remove seed pods or fruit from the plant. A waist belt is very useful to store these tools.

PHOTOS: Secateurs, and secateurs being cleaned.

Clean these tools regularly with bleach or alcohol to reduce the risk of accidental transfer of disease between plants.

Beating tools such as poles, or racquets, or brooms may be useful for collecting from some species. An extendable pole pruner tool incorporating a hook is useful as a multi-functional tool for this purpose – see below.

Group 2: Seed Collection from Tall Plants

Collecting seed from tall trees is more difficult and riskier requiring special equipment and techniques. Hard hats, eye protection and gloves are essential.

M4 Extendable Pole Pruners

Pole pruners are a useful tool which can often be fitted using different telescopic pole arrangements to extend the cutting mechanism and hook up to about 5-7 metres in height. It is more difficult to control (wobble) and manoeuvre the pole pruner when extended to greater heights.

Pole pruners can often be fitted with an optional saw or a motorised pole saw can be used. These are hard to manage and are less safe to use at greater heights.

PHOTOS: Pole pruner head (hook/cutting) close up + optional saw. Pole pruner in action (hard hat and glasses)

M5 Weighted Throw Line

A weighted cord (5mm braided cord) and rope may be a useful method for reaching high branches beyond the safe reach of pole pruners. The line is thrown over the branch, and when needed for a larger branch is used to pull a stronger rope up and over the branch. This can then be used by two people (NOT standing under the branch) to shake small branches or to cut or pull branchlets if a rope saw is attached to the cord/rope.
This requires at least two people at each end of the cord/rope, standing well away from the branch and wearing hard hats and eye protection and preferably a third person to watch for anyone else who may inadvertently wander underneath the branch. Refer to the Florabank Guidelines for further details on safe use of this method.

PHOTOS: Throw rope and 2 people pulling (hardhats/eyewear), Close up with weight and a rope saw.

M6 Ladders and Climbing Equipment

Ladders may be useful to reach higher seed directly, or with a pole pruner. However, ladders involve much higher risk and need training for safe use in a bush or forest environment on uneven ground. The use of ropes or climbing equipment requires advanced training. More information about these methods can be found in the Florabank Guidelines.

M7 Opportunistic hand collection from fallen branches

If an opportunity arises to harvest seed from fallen trees or branches first check the fallen branch and tree for any signs of infection or disease before collecting. Opportunistic seed harvesting from fallen trees or branches is generally required very quickly for species such as *Melaleuca* and *Eucalyptus* which may begin to drop seed within hours.

[PHOTO: Collecting from fallen branches – of seed NOT in direct contact with the ground]

6. ASSESSING POTENTIAL SEED VIABILITY – THE CUT TEST

While seed collecting it is useful to check that the fruit or seed pods being collected are from a healthy plant and the fruit or seed pods contain seed that appears to be viable. This is achieved by general observations of the plant health in the field and by a cut test.

General Observations of Plant Health

Before collecting inspect the plant and fruits for any signs of disease or insect infestation such as gall formation. Collect only from healthy plants.

The Cut Test

The cut test is a simple and quick method of checking likely seed viability while in the field collecting. The equipment needed is a sharp cutting instrument and a magnifying glass or 10x hand lens for smaller seeds. Using a sharp knife, scalpel or secateurs, cut the seeds or fruit in half. Inspect the internal structures of the seed.

Generally, the inside of the cut seed with a healthy viable embryo should appear firm, fresh, healthy in appearance and be white to ivory in colour, sometimes ranging to yellow. A green embryo may be an indication of immaturity. A seed which appears discoloured inside (i.e. brown, grey, black) is considered non-viable. Cut tests can also reveal if the seed inside has already been eaten by an insect. It usually takes a little bit of training and practice with someone more experienced in seed collecting but is worth learning to help avoid wasting seed collecting effort.

Some seeds may be too small or difficult to check in the field and the cut test can be done during seed extraction and cleaning using a 10x hand lens or a microscope.

7. POST HARVEST HANDLING OF SEED

After collecting the seed, each seed lot should be bagged and labelled ready to transport back to the place where the seed will be dried, extracted and cleaned. Refer to the Step 3 Guide for Post-harvest Drying, Extraction and Cleaning of Seed.

Ensure all seed lots are tagged with the seed lot collection number from the Field Data Sheet and with the plant species name, site name/location and date.

Have a good supply of seed lot bags, tags/labels and marker pens with the Field Data Sheet book.

Transport seeds or fruits as quickly as possible to the respective processing facility in tubs, calico bags or sturdy paper bags – ensuring good airflow to help the seed dry. Breathable bags help prevent excessive moisture retention and sweating which can lead to rapid seed deterioration. Fleshy fruit should be collected into plastic bags or tubs which should be checked regularly and given plenty of fresh air to avoid rotting or fermentation.

Generally the collected seed should be kept cool and dry during transport. Keep in a drafty and shady place, or in very hot weather place the seed lots in a cooler where feasible. If using a cooler keep seed at no less than 15°C if fleshy-fruited, and no less than 5°C for most other types of seed.

When handling plant and seed material appropriate personal protective equipment should be used to avoid contact with potentially hazardous substances such as saps or irritant hairs.

References

Crawford A, et al. (2021) *Florabank Guidelines Module 6 – Seed Collection*. In 'Florabank Guidelines (2nd edn).' (Ed. LE Commander) (Florabank Consortium: Australia).
Greening Australia. Aboriginal Landcare Education Program: Collect, Treat and Store Seed Learning Guide.
Murray Local Land Services. (2018) *Murray Region Seed Services SOP 001 - Seed Collection, Version 2.1*.
NSW Office of Environment & Heritage. (2011) *Seed Collecting: Conservation Management Notes*. OEH, Sydney.
Ralph, M. (1994) *Seed Collection of Australian Native Plants For Revegetation, Tree Planting and Direct Seeding*. Second Edition. Bushland Horticulture. Fitzroy.