Nursery Establishment
Establishing a Small Scale Nursery

Participants will be able to plan and set up a small scale Nursery to suit their production needs.

Introduction

Creating a Native Plant Nursery is a wonderful way to support and learn about your local environment. You should consider your aim for such a project. Will it impact positively or negatively on the community and environment around you?

There are two major parts to creating such a nursery:

1. Planning and
2. Implementing the plan.

It would be wise to remember that your plants will be at the mercy of the elements and a plan will help protect them as much as is possible.

Without a plan major things could go wrong. Some problems could seem minor until they start impacting on the plants or the workers down the track.

If there is no sequence of implementation a lot of time could be wasted going back, undoing previous tasks and redoing them.
PART ONE

Planning

You have found your chosen site for a small nursery. It could be in your back yard, your back paddock or on a rented piece of land. To establish your nursery you must first plan, follow these steps to save time and energy:

1. **Write down your aims & objectives**
   1.1 Site requirements
   1.2 Production Goals
   1.3 What kind of Nursery - non profit (utilizing volunteers) or business making profit with labour hire needs

2. **Get the facts**
   2.1 Site specific issues
   2.2 OH&S

3. **Site Assessment**
   3.1 Assess the site for your requirements

4. **Draw up a plan.**

You will save a lot of time and agony if you do this before you move in any structures or irrigation.
1. **Aims and Objectives**

Ask yourself some questions?

- Why do you want to start a native plant nursery?
- Will the plants be local or from other parts of NSW or Australia?
- Does your aim comply with the flora bank guidelines for collecting seed and propagating native plants?
- Have you considered licenses to collect and propagate?
- Is there anyone else filling the niche you planned to?
- Who will buy your plants?
- Can you afford to employ workers?
- Are you aware of workers and volunteers rights at work?
- Are you aware of your OH & S obligations?

If you can see good reasons to go ahead, please consider the following:

### 1.1 Site Requirements

Write down your requirements for the site use and include the following:

**Structures**: Areas delegated to igloos and shade houses; sheltered work areas; storage areas for seed, poisons, tools and equipment, pots and trays; office space; kitchen area and amenities

- Main production areas and size requirements - Potting up, seed raising and cutting production, seed cleaning and weed control areas
- Composting and weed storage areas – appropriate size, contamination time frame turnover
- Plant and disease isolation areas
- Sinks and wash-down areas
- Soil Bay - delivery and access
- Exits and entrances
- Kitchen and facilities
- Amenities
- Water drainage and run off areas
- Irrigation system and pipes
Structures and Space Requirements

- Igloos

Igloos should be in a sunny position. There should be a wind break situated on the predominant wind side, usually south and south west and a shade tree on the due west for summer and afternoon shade. Winter sun is very important so definitely no trees or structures in the North, North East or North West.

The size will be dictated by production size and compound area size, that is how many plants you want to propagate and how many plants you can fit when potted up.

Some seed will not germinate in winter without heat and cuttings will most likely fail if they are cold. So it is important to contain at least half of the space with a heat bed(s) which can be turned down or off in summer or when not in use.

There should be a way of ventilating the space when it gets too hot, so two doors or a window or ceiling flap and door would be ideal.

Both glass and plastic make great igloos. Plastic eventually breaks down in the sunlight and needs redoing. Both can be damaged by hail stones and strong winds, but glass can be more expensive to fix.

A heat bed is important if you want to germinate all year round.
- **Shade houses**

Shade Houses are for plants which have been potted up and need protection.

Some plants are more sensitive to heat and wind than others but all plants are sensitive when just potted up.

If there is a sheltered area available most just potted plants need not go into a shade house at all, and if you can get away with this, it is preferable as it helps plants harden at an earlier age and saves double or triple handling.

Plants should only be left in a shade house for a week or two at the most. Plants left too long with lack of sunlight will be weak and soft and less resilient when planted out.

It is not recommended to keep plants in a shade house or shady area that have already been hardened, as it sets them back significantly. This practice makes plants spindly and less resistant to extremes of weather and to insect attack and disease.

There needs to be a small area or shade cloth area for established plants for sale, which naturally prefer a shady position. For example Rainforest plants with large leaves and ferns.

These rainforest plants have shade from the potting up area, a Jacaranda and the office building.
• **Fern Propagation Houses**

Ferns are shade loving species and are extra sensitive to the elements and so need a protected place to grow and produce offspring. Spores produced under the leaves need to fall on a moist spot to germinate. As some ferns need more chill for germination than others, it is ideal to have the south end of the designated place in the shade while the north area is still protected but warmer in winter.

• **Hardening Areas**

A large amount of space needs to be put aside for hardening plants. It should be located in the main sunny area of the nursery. It may be necessary to have a semi shaded area for your plants to rest for a few days after being in the shade house, or just potted up on a hot day and before going out to the more unprotected site.

• **Seed cleaning areas**

An enclosed dry area dedicated for the cleaning of seed is required for nursery production. This area can store specialist equipment such as sieves and seed separators as well as the collected seed awaiting processing. This area has its own set of requirements. It should:

- Be a dry airy space
- Have space to hang collection bags off the ground for drying
- Be well ventilated for dusty seed
- Be spacious enough to move about in
- **Storage areas**

Enough space should be set aside for storage areas. Make sure your space / shed proposals fit with council regulations and check if you need a Development Application.

A large spacious shed with

- a high ceiling to keep space cool in summer,
- adequate lighting
- a loading door
- ventilation

The shed should be big enough to store all tools and equipment.

- **OH&S**

There should also be a lock up ventilated cabinet for chemicals and poisons and another for any petrol or petroleum products. Heavy gear and frequently used equipment should be kept at hip level. The floor should be kept clear at all times.

- **Seed storage areas should**

  - Be fitted with an air conditioner to keep temperatures cool and constant- see the Seed Storage workbook in the Seedy Side of Plants series.
  - Be free from rats and mice
  - Have minimal window space to keep temperature regulated
Storage areas for pots and trays

Clean pots should be stored separately to dirty pots to avoid contamination.

Pots and trays should be stored:

- Close by to the potting on area
- In a covered area to protect them form harsh weather, for longer life.

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Main production Areas

Main production areas should be placed in the middle of the nursery area central to all storage areas. There should be enough space for bins to temporarily hold weeds, used soil and liverwort contaminated soil. Bins should be no larger than garbage bins due to the weight when they are full. Anything used on a daily basis for plant production should be kept close by in a storage area within this area.

• Potting up areas

These are placed within the production area. Potting up areas need to be in a sheltered position with a roof. The area needs to be sunny in winter and shady in summer with protection from hot afternoon sun and the cold southerly wind.

• The work tables should be 800 – 900mm high and ideally should be stainless steel for low contamination.
Two (wooden) tables to separate tasks such as weeding and potting on are a must. Make sure there are no crevices in the table to harbor disease or weed seeds. If the table surface is uneven a plastic cover should be used to reduce contamination.

The tables or plastic covers should be washed down after each project to minimise contamination.

- **Seed raising areas**

A third table is necessary for seed raising and should not be used for potting on or weeding because of the potential for contamination. The area should be free from wind and sheltered from the harsh sun and rain. This area should always be kept clean. Wash down with bleach every few weeks.
• **Composting and weed storage areas**

A series of bins should be set aside in the main weeding areas. There should always be a composting area set aside in a sunny spot to take the bins when they are full.

Due to the effort involved in turning a compost heap the type of composting system should be looked at. There are two main types of compost, aerobic or anaerobic.

- A turning compost bin makes an OK aerobic system.
- A 240L Rubbish bin (Wheelie bin) makes a great anaerobic composting container to store weeds while waiting for use of the turning compost bin. Put drainage holes in the base.
- A wheelie bin makes an ideal water storage composting container for stubborn environmental weeds. No drainage holes.

• **Plant isolation areas**

Plants with infectious disease should be either destroyed by composting or fire or set aside from other plants for treatment and monitoring.

Areas used for the latter should always be cleaned with bleach and weeded.
• **Sinks and wash-down areas**

Areas are set aside for

- A sink for the cleaning of pots and tools with bleach and one for rinsing the bleach off.
- A filter should be set up to catch soil and other larger particles before they enter the drain; this should be emptied after a couple of washes.
- A sink for the cleaning of hands.
- It is useful to have an area for washing down clothing, and other items which have come into contact with fine weed seeds and contaminants such as round-up.
- A soaking trough for very dry plants

• **Soil Bay**

The soil bay should be easily accessible to enable filling with a small truck, without disruption of daily duties. It should be accessible to wheel barrows and preferably have a concrete base. Care should be taken to keep the bay well away from a source of weed seeds. It should also be irrigated to keep it moist in summer.
• **Seed raising area**

An area to hold a turning bin for combining the ingredients of the seed raising mix is highly desirable.

• **Exits and entrances**

The nursery layout shows an exit and an entrance into the compound and an entrance through the office. It is ideal to have an entrance for pick up of plants on order which is situated adjacent to the orders area.

A separate entrance for delivery of materials like soil, brought in by trucks, is recommended for safety and flow of operations. This also makes a good exit for nursery operations utilizing trailers and drop off area to access storage.

• **Office**

This building should be situated to the front of the entrance and exit areas.

Ideally this building should have heating, ventilation and air conditioning. It should have at least two exit/entrances and an additional door into the compound. It could be big enough to have a flow through past the administration area and out to the main nursery areas. The work areas should be separated from the thoroughfares to minimise disturbance.

Enough space for storage of records and a library is important but you can get away with the bare minimum.

**Record Keeping**

Some record keeping is

- An OH&S requirement.
- A legal requirement.
- Necessary to keep the nursery functioning more efficiently.
- Necessary for plant and seed propagation, distribution and production.

The Florabank Guideline #4 outlines a variety of record keeping methods. (http://www.florabank.org.au)
• **Kitchen Spaces**

Adequate rest from the elements is essential for nursery worker’s health and safety.

A warm, dry or cool and airy and well functioning kitchen to take a break in will keep production going in the coldest of winters and hottest of summers.

• **Amenities**

A separate building with male, female and wheelchair access should be included in new building plans.

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12 Production Goals

You will need to know

- How many plants do you aim to propagate and house
- Do your plants need specific requirements?
- How much call is there for your product?
- Contacts and suppliers

- Tables

Tables for storing plants to harden should be

- At least a height of 900mm and fit 21 or 22 trays of 240mmx385mm in size.
- Of uniform size and height.
- Made with an open mesh top, with the mesh guiding line allowing trays to be easily accessible from the sides for ease of movement on and off.
- Able to have adequate water (see irrigation).

- Small Scale Nursery - Parry Street example

The TIN Parry Street nursery contains 49 tables

- 30 tables each table contains 880 mature plants = 26,400 plants
- 10 tables each containing 880 immature plants = 8,800 plants
- 4 tables each containing 880 plants for orders awaiting pick up or delivery = 3,520 plants
- 5 tables holding seed trays in the igloo
TIN's nursery needs to have enough space for

41,400 plants held on 44 outdoor tables
\(26,400 + 8800 + 3520 = 41,400\) plants

and

125 seed trays held on 5 tables in an igloo

How much space for 1 table (880 plants)?

1 table = 2.20m x 1.25m + walkway (access) = 6m².

This includes room for access on three sides of the table.

How much space for 41,400 plants?

44 tables x 6m² = 264 m²

How much space for the igloo?

The igloo contains 5 tables each holding 5 seed trays.

5 tables x 6m² = 30 m²

TIN's total plants space requirements are 264 m² + 30 m² = 294 m²

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How much space do you need for your nursery?
Irrigation for Small Scale

Considerations

- **Water Restrictions.**

Restrictions will ultimately affect the amount of watering you can do and the amount and maybe type of plants you can grow.

Are there any water restrictions in your area?

- **Water conservation**

It is increasingly important to conserve water. This can be done by

- Using the right nozzles
- Recycling water
- Using irrigated space efficiently

- **Sprinkler nozzles**

The type of sprinklers you use depends on your water source.

**High pressure nozzles** - If you are connected to mains water then water pressure will not be an issue.

- Pop-up sprinklers need lots of pressure and are made to retract back into a protective layer so as to restrict dust and dirt from blocking the filter inside the head.

**Low pressure nozzles** - If connected to tank, bore or dam water choose low pressure nozzles. They don’t need pressure to push them up as they are already open. A pump will also be necessary to make the water travel up the risers with any force.
Sprinkler coverage

- A nozzle with a 3m radius will give the right amount of water coverage to our sized table set up example as the tables are 2.2 m wide and the walkway is 1m wide.
- With a 3m radius nozzle you would place the sprinklers 3m apart so that water throws to the base of the next sprinkler.
- Pop up nozzles have a fixed angle of spray for example 180° or 360°.
- Fully adjustable nozzles give more flexibility and are often cheaper. For example if you have table against a wall or walk way you can turn the nozzle to water in half the direction.

• Risers

The height of the risers is important.
- For our design – table height and pot size - 150 cm is a good height. This gives 40 – 45 cm clearance above the pot and tray and is ideal for young plants.
- For mature plants a 150 cm riser will allow spray through the stems. Additional sprinklers may still be required.

• Wind Factor

Wind will affect the spray field. Depending on which direction the wind will come from, there will be plants that miss out on water. There is no way around this it just means windy days need more monitoring than others.
• **Requirements**

Once you have calculated how many tables you can fit, allowing 1m walkways between them, draw up a plan to suit your site based on the diagram and the information below.

- Diagram 1.2.1 (see next page) shows the layout of tables and sprinklers and the spacing between them. This set up works for growing plants.
- The layout of Polypipe for the irrigation system is shown in Diagram 1.2.2
- If you have a lot of mature plants close together then additional watering or sprinklers may be necessary, as overlapping foliage will prevent water from reaching the soil in the tube. See Diagram 1.2.3

**Diagram 1.2.2 Polypipe and Sprinkler layout for 10 tables**

**Diagram 1.2.3 Sprinkler layout for small, medium and tall plants**
Diagram 12.1Nursery & Irrigation Layout for 44 tables

Key

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- Water coverage/sprinkler
- Total area covered by spray
- Sprinkler
For 44 tables set up like diagram 1.2.1 (with 44 400 plants) you will need:

- Power Source
- 36 Sprinklers- nozzles 3m radius
- 36 risers
- 36 Filters
- Elbows, corners and T pieces and clips to hold connections- amounts of these depend on how many corners and directions you need to take each pipe line for each station.
- 5 Solenoids
- 200m polypipe (A type) - it is cheaper to buy pipe in 200m rolls.
- 1 Timer Box with 6 station connections (one for earth usually green & 5 for solenoids) see Diagram 1.2.4.
1.3 What kind of Nursery

Consideration needs to be taken before deciding what kind of nursery you will have. If you will be non profit and utilise volunteers you must be aware of the rights of volunteers and have a volunteer policy. TIN’s Volunteer Policy is included and available at http://www.treesinnewcastle.org.au/what_volunteering_tin.

Volunteers need to be recognized for their wealth of knowledge and skills that they bring to an organisation. What can you offer volunteers by way of education and training? What can you offer the community?

Volunteers can not be gifted or remunerated without paying tax and the legalities of paying out any remuneration should be looked at as an action of precedence. Volunteers can be recognized with awards and certificates of appreciation.

Trees in Newcastle is a non profit community based organisation. TIN utilises volunteers for many parts of the nursery operations. Volunteers are titled Nursery Assistants. They play no role in customer service, ordering products or supervising daily activities.

The tasks performed are important to the daily running of the nursery and are generally labour intensive unless helping in the office. TIN staff train the volunteers in every facet of the job that needs to be done. Volunteers are an integral part of TIN’s activities such as

- Seed collection, processing
- Potting on seedlings
- Plant maintenance
- Weeding pots
- Nursery hygiene and maintenance
- Loading and unloading stock
- Record keeping
- External Projects: Coastcare and schools
Without volunteers TIN would struggle to offer the services and numbers of plants that we do. Also TIN would pay a large percentage of its income into salaries.

Depending on the scale of the nursery you are planning you should also consider the financial needs and risks to set up and run your nursery. Talking with other community nursery operators can be very helpful to determine what financial system may work best for you.

- **Product suppliers**
  - Is it easy to get the supplies you need?
  - Are they available and can you afford them?

- **TIN suppliers include**
  - Beresford Park: Organic native soil mix, perlite, low phosphate fertiliser, vermiculite, cocoa peat.
    
    Enterprise Drive
    
    Holmwood Business Park
    
    Beresfield NSW 2322
    
    Telephone: (02) 4966-5477
    
    Facsimile: (02) 4966-5525
  
  - Teralba Worm Farm: worm castings
    
    Location: off Griffen Road, Teralba
    
    Opening Hours: 7.30am to 3.00pm, Monday to Friday
    
    Phone: 4950 6551 or 0439 484 721
  
  - Norwood Industries: TagPic - tags printed or plain.
    
    Head Office: 6 Wedgewood Road, Hallam, Victoria 3803 Australia. Toll free Australia: 1800 337 465
    
    Facsimile: (+61) 03 8796 9301
    
    E-mail: create@norwood.com.au
  
  - Garden City Plastics: pots and tubes
    
    PO Box 3108, Rouse Hill
    
    Phone: 02 9679 1173 or 0410 549 630
2. Get the facts

2.1 Site Specific Issues

Your local council, water authority, the Department of Environment & Climate Change and Dial B4UDig will have information on the following:

- **Endangered species**
  
  – (Department of Environment & Climate Change)  

  Are there any plants or animals that use or frequent your site and will be affected by any changes you make to the area?

- **Water restrictions (water authority or local council)**

  Some councils have water restrictions in place for either part of the year or all of the year; find out how that will affect your plans.

- **Zoning (local council)**

  Will your nursery fit in with zoning? Do you need approval for your operations; have you considered parking, traffic, and noise?

- **Pipes and Cables**

  (Dial Before You Dig http://www.dialbeforeyoudig.com.au/)

  Get a map outlining where your infrastructure is. This is handy to know for planning purposes to tap into infrastructure easily and because pipes and cables can be easily damaged.

- **Pollution control**

  There may be strict legislation you need to adhere to when preparing a site for your operations and also managing your pollution on site during operations and production.

  Please see sections on Pollution Control and Assessment of Site Specific Issues.
2.2 Occupational Health & Safety

Occupational Health and Safety (OH & S) in the workplace is a legislated requirement and under the OH&S Act of 2000 employers and employees and volunteers can be fined for failing to comply with rules and regulations.

All people working in the nursery must be inducted and trained. Trees in Newcastle has an induction checklist which covers Equal Employment and Anti-harassment issues. The induction process ensures the safety and health of all people as it sets out guidelines for risk assessments, safe work methods and safe handling, including safe use of the work area, tools, equipment, materials and your rights at work.

Your nursery should be open and free from clutter, trip hazards and dangerous equipment should be stored properly. This should be assessed daily and processes and risks minimized quickly.

A risk assessment may need to be conducted more often if conditions in the nursery change, for example: the weather, a large delivery, an event, new products and equipment.

Signage

It is advisable and sometimes mandatory to erect signage for various reasons such as

- limiting access to areas
- identifying danger zones
- Identifying chemicals and machinery
- directing customers and workers to the right area.
- correct lifting technique

WorkCovers “Watching out for you” poster must be displayed in the workplace.
3. Site assessment

An assessment of the proposed site needs to cover the following concerns and requirements, after which a site map will be drawn up locating the main uses and structures.

3.1 Assess the site for your requirements

- Area size
- Danger zones
- Orientation
- Sun and shade, hot and cold
- Prevailing wind direction
- Pollution control areas: slope and run off
- Area specific issues
• **Area size**

The size of the area will determine how many plants you can grow and the site characteristics will have a bearing on what you grow.

Look at the diagram of the ideal nursery. One third of your space will be for plants growing on, the other two thirds will be for production, operations and storage.

• **Danger zones**

Look at the site in terms of the following

- Subsidence
- Flood potential
- Proximity to railway lines and highways

• **Orientation**

Does the land have a natural slope or undulation from any aspect or direction?

This will effect where structures are placed and limit the size of shrubs or trees in some areas.

• **Sun and shade, hot and cold**

Ideally a nursery should be set up in a sunny position. There will always be hotter and cooler spots on your site even if they’re only marginally different. You can enhance the cool areas by the use of built structures, trees and shrubs.

There should be established wind breaks and well chosen shade breaks already in place, but if not, plant them first after your plan has been drawn up.
• Shade breaks
  - Westerly side – shrubs and tallest trees.
  - Southerly side - shrubs
  - One or two large trees strategically placed on the south side of the middle area for shade for office and production area.

Remember the shade from trees and structures in winter is longer and colder than in the summer, and if you get a frost this is where it will sit for longer.

• Prevailing wind direction

  • Wind breaks. The prevailing wind sides need two to three rows of bushy shrubs to protect against
    - Hot Summer westerlies
    - Strong Summer north easterlies
    - Cold Winter southerlies.

• Pollution Control

Assess your slope direction as this is where your run off will end up.

Pollution of our creeks and water ways and ground water is a modern problem. Don’t contribute to this. Make sure your runoff has somewhere responsible to go and any chemicals are used safely and wisely.

Your highest aims should be to

• Use the lay of the land to your best advantage for pollution control
• Minimise your run off
- Minimise erosion
- Be “Water Wise” and where possible reuse your water
- Use no harsh chemicals
- Use minimal fertilizers—natural or synthetic

The environment and your plants will thank you for this in the long run.

The following information outlines a basic drainage system for taking irrigation water away from the tables and walkways. This can be taken off into a garden or a man made wetland. If it is to go into a storm water drain it needs to be filtered and preferably reduce its fertilizer or nutrient loading.

**A basic drainage system**

Spanning the row at the end of the tables

- on the lowest side or depression where water naturally sits dig out a long pit (deep and wide enough to put aggregate underneath, around and on top of the pipe to allow drainage and keep blockage from silt to a minimal).
- lay in a 150cm round aggregation pipe
- Cover

**A constructed wetland**

Direct the water to a running ditch filled with reeds and sedges to filter, then into a holding pond, where the water can be pumped out and reused or guided back into a garden.

This mini wetland filters the grey water from the office sink. It is contained in plastic tubs.
Even if you don’t reuse this water at least it will be clean. Further by having a pond nearby you will support the pest predator population as a part of your integrated pest management system.

Please see our TIN Topics

- #12 Grey-water reed bed filter system
- # 11Stabilising creek banks, ponds and dams with native wetland plants
- Brochure: Frog friendly plants for wetland wonderland
- Booklet: How to make a frog pond with local native plants

- **Area Specific Issues**

Look for signs of

- Environmental damage from past weather events
- Past land use
- Contamination of any kind
- Class one Noxious Weeds

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A Grey-water Reed bed Filter System

Grey-water drains through reed beds into oxygenation flow forms and into a pond or dam and used on the vegetable or flower garden, native garden or orchard.

Reed-bed plants are chosen for their tolerance to boggy situations and higher salt & nutrient loading. If using "bog bins": pebbles must be on top of the soil and the draining pipe must be low enough (half way depth of pebbles) so as not to allow grey water to sit on the surface.
The finer points of a Grey-water Reed Bed Filter System

1. **Filter the food**: Initially food scraps and other material needs to be filtered off before it gets to the first part of the bog garden. A simple strainer over the plug hole will help catch most bits.

2. **No pooling of potential problems**: Grey water must not be allowed to pool on the surface of the bins or bog area as it can cause spread of disease and mosquito problems.

3. **The bigger the bed the better the filter**: The bog area must be big enough to cope with the amount of grey water needed to recycle.

4. **Bubbles are beaut for bogs**: It is necessary to run water from the bog garden into some kind of oxygenation area before it reaches the pond. i.e. a series of shallow channels snaking down a slope. Moving, bubbling water picks up more oxygen. There are some 'flow forms' that can be bought for this purpose as shown in the picture.

5. **Deliver to the deep end**: If possible the runoff should enter the pond/dam at the deepest part where any material in the water drops to the bottom.

6. **Send it out through the shallows**: The water should exit the dam or pond at the shallow end. This adds more oxygen to the system through the movement of the water. This is also good if the water is going to enter a creek as it gets filtered again at the shallow end through the vegetation.

Other TIN topics that are also helpful

TIN Topic #11- Native Wetland Plants for stabilizing creekbanks, ponds and dams.
TIN Topic #6- A local wetland bushfood garden
Stabilising creekbanks, ponds & dams with native wetland plants

**Water Plants**
Plants that are able to be in permanent water either at a creek or dam edge or in permanent swamps.

- **Persicaria lapathifolium**  Knotweed
- **Ranunculus inundatus**  River Buttercup
- **Phragmites australis**  Native Reed
- **Restio tetraphyllus**  Tassel-rush, Tassel Cord-rush
- **Triglochin microtuberosum**  Water Ribbons

**Groundcovers**
Low growing soil stabilisers for moist creek banks and dams.

- **Commelina cyanea**  Creeping Christian
- **Viola hederacea**  Native Violet
- **Dichondra repens**  Kidney Weed

**Climbers & Twiners**
Vines which aid soil stabilisation of creek and dam banks.

- **Hardenbergia violacea**  Purple Twining Pea
- **Kennedia rubicunda**  Running Postman
**Sedges & Rushes**

Plants that grow in permanent to seasonal fresh water swamps, creek and dam banks. (c)=Coastal

- **Carex appressa** Tall sedge
- **Gahnia clarkei** Tall Saw-sedge
- **Gahnia melanocarpa** Black-fruit Saw-sedge
- **Gahnia aspera** Rough Saw-sedge
- **Isolepis nodosa (c)** Knobby Club-Rush
- **Juncus kraussii (c)** Sea Rush
- **Juncus usitatus** Common Rush
- **Lomandra longifolia** Spiny-headed Mat Rush
- **Dianella caerulea** Blue Flax Lily
- **Crinum pedunculatum (c)** Swamp Lilly
- **Cladium procerum (c)** Leafy Twig Rush

**Grasses**

These grasses form a mat to stop soil erosion and are great for creek, river and dam banks.

- **Austrodanthonia fulva** Wallaby Grass
- **Echinopogon caespitosus** Hedgehog Grass
- **Poa labillardieri** Tussock Grass
- **Poa affinis** Clumping Grass
- **Entolasia stricta** Wiry Panic
- **Themeda australis** Kangaroo Grass
4. Draw up a plan

Review **Diagram 1.1.1. The nursery Layout**

Is it possible to implement something like this even if it is on a small scale?

**Draw up a mud map**

1. First draw on the directions
2. Sun and wind
3. Draw in the existing vegetation and structures
4. Entrances and exits
5. Place a map of the existing pipes and lines over your page
6. Mentally divide the area into 3 parts.
7. Part One: structures
8. Part Two: outside work areas
9. Part Three: plant holding areas
10. Draw in structures
11. Work areas
12. Plant holding areas
13. Plan for your shade – draw in bushes and trees
14. Drainage lines and pond areas

Try to include as much detail as possible about where your structures will go and how big they will be.

You will need to pace the area out for your mud map. When you are content with your placements it will be time to draw up a site map including actual sizes and scale. Get someone to help if you need to build structures.
PART TWO
Implementing

Now you have found out all there is to know about your site and have drawn up a plan and a mud map, follow these steps to establish your nursery:

1. Get your facts together
2. Survey your site
3. Get approvals from council
4. Peg out your area
5. Dig holding pond
6. Erect necessary fencing
7. Erect structures and amenities
8. Connect electricity, water and phone
9. Place igloo(s)
10. Place tables
11. Lay and connect irrigation
12. Lay run-off drain pipe
13. Dig run-off ditch and plant sedges
14. Place signage, sinks and bays
15. Order materials
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