Case Study 1

Grassy Ground Cover Project

Grassy Ground Cover SPA managed by Andrew Wolstenholme at the Maffra Seed Bank (Photo A. Wolstenholme 2007)

The Maffra seed production area is located at the Maffra Seed Bank in Central Gippsland and is managed by Greening Australia in Gippland. The SPA was established to aid the supply of seed for the re-establishment of three hectares of native grassland in Central Gippsland as part of the Grassy Groundcover project. The species chosen either proved difficult to collect large volumes or the natural seed production is limited by environmental factors (Paul Gibson-Roy *pers comm* 2007). All plants are local to the area. The boxes were placed on pallets to provide drainage and spaced 2 metres apart for easier harvesting. Fencing was then constructed around the compound to reduce the effects of wind, keep out weed seed and prevent rabbits from destroying plants. Part of the fence was made out of shade cloth while the rest is a paling fence. The production area was constructed in May – June 07 while the seed to grow the plants was collected in the previous summer and grown in the autumn. Maffra Seed Bank harvested the seed in summer 2008 and direct sow the seed for revegetation the following autumn.

Species grown include:

- *Acaena ovina* Australian Sheeps Burr
- *Arthropodium milleflorum* Pale Vanila-Lily
- *Bulbine bulbosa* Bulbine lily
- *Craspedia variabilis* Common Billy Buttons
- *Dichelachne crinita* Long-hair Plume-grass
- *Elymus scaber* var. *scaber* Common Wheat-grass
- *Linum marginale* Native Flax
- *Microseris lanceolata* Yam Daisy
- *Glycine clandestina* Twining Glycine

- *Chrysocephalum apiculatum* Common Everlasting
- *Stylidium graminifolium* Grass Triggerplant
- *Senecio spp* Fire weeds
- *Wahlenbergia spp* Blue Bells
- *Xerochrysum viscosum* Sticky Everlasting

The plants are grown in polystyrene containers with 8 – 30 plants per box and will be replaced after 2 years to increase the gene pool of the seed being collected from the seed production area. The seed is collected by hand by seed collectors that are employed casually over the summer months. The seed is then stored in the seed bank until autumn sowing. The plants are watered with a drip irrigation system with a manual timer during the drier months to ensure plant survival. Maffra Seed Bank manager Andrew Wolstenholme (pers comm.) suggests that this may need replacing with automated timers if the seed production area is expanded.

One of the major issues that this seed production area has faced is local water restrictions. This delayed the potting up of seedlings and as a result some plants may not flower or seed in the first season. This may be overcome by growing plants on at nurseries with water rights.

The cost of the Maffra SPA per year is said to be approximately $7300 to set up 288 polystyrene boxes, including labour and collection costs.

Case Study 2

Euroa Arboretum Seed Production Area

Euroa Arboretum Seed Production Area (Photo J. Begley, DPI 2006)

The Euroa SPA was set up in 2005 by Sally Mann at the Euroa Arboretum to address the shortfalls in seed supply of smaller ground cover species that could be direct seeded easily. These species often proved to be difficult to collect in the wild or in a 'bush' seed production area due to sequential ripening, prostrate habit or non-persistent seed that opens without warning in hot dry weather.

- *Glycine tabacina* — Variable Glycine
- *Pultenaea williamsonii* — Williamson's Bush Pea
- *Templetonia stenophylla* — Leafy Templetonia
- *Einadia nutans* — Climbing Salt Bush
- *Chenopodium desertorum* — Frosted Goosefoot
- *Desmodium varians* — Slender Tick Trefoil

The Seed Production Area was designed with seed traps that collects the seed in specially designed ditches that enable easy access and collection for species that ripen sequentially.

Plants were established on mounds spaced 3 metres apart, using a machine called a delver to form ditches. Boards were then inserted into ditches to act as a separator within the ditches between seed of different species. All ditches, mounds and boards were covered with weed cloth to provide low maintenance weed control. A drip watering system has been introduced to keep plants watered during dry periods. Fencing was also set up to prevent native and introduced animals from entering the compound and consuming plants. Windbreaks using *Hardenbergia violacea* (Purple Coral Pea) will be introduced on to trellises and will also be harvested in the future.

Once seed is ripe it falls into the ditches, where predation by ants was said to be a problem, but easily overcome by regular harvesting of seed from the ditches using a soft bristle broom to sweep up the seed. Initial harvesting used a small vacuum cleaner but proved too difficult due to the time consuming effort of removing seed from the vacuum dust bag. Estimated material and equipment cost was around $6000 which was sourced from grants, while labour costs during the planning and construction of the SPA is estimated to be between $20,000 - $25,000.

Case Study 3

Inverleigh SPA

Inverleigh SPA - site boundary in yellow. Map: I. Shurvell, DPI 2006.
Inset: Drought conditions during the year of planting resulted in some losses. Photo: Nov 2006 M. Butler. DPI

Located on the floodplain of the Leigh River at Inverleigh, this SPA was planned by the Geelong Landcare Network in 2004 with assistance from the Corangamite Seed Supply and Revegetation Network. The site is public open space and links to a large block of riparian vegetation that may introduce insect and bird pollination to the site. The SPA was planted in spring 2006 for future seed supply to local revegetation projects. Species were chosen based on the local demand for seed, and to compensate for difficulties with collecting from wild populations due to low fruit set, non-persistence of seed or fragmentation of sites.

Species grown include:

- *Leptospermum continentale* Prickly Tea Tree
- *Dodonaea viscosa* Sticky Hop Bush
- *Bursaria spinosa* Sweet Bursaria
- *Banksia marginata* Silver Banksia
- *Acacia dealbata* Silver Wattle
- *Eucalyptus leucoxylon* subsp *connata* Yellow Gum
- *Callitris columellaris* Native Cypress Pine

The seed was collected from local provenances with 1600 seedlings that were then raised by the local nursery. The site was fenced and planted by a Greencorp team. Plants were guarded against rabbits. Funding from the Corangamite Seed Supply and Revegetation Network covered fencing materials at a cost of $630, tree guards and stakes at $670 and seed collection and nursery costs at $1120.

Planning and effort focused on species selection, spacing guidelines, site preparation and sourcing seed from a high number of parent plants. All species were sourced from a minimum of 10 to 50 parent plants. Initial weed control on this site was excellent but constant dry conditions became an issue. There were a number of losses to Prickly Tea Tree and Sticky Hop Bush during the summer of 2006/2007. This may have been overcome with watering during the dry months had have been available, however the lack of clear management agreements made this difficult. Supplementary planting has been recommended by the Corangamite Seed Supply and Revegetation Network and a site visit in 2007 found that a spring flush of weedy grasses (such as *Phalaris)* was out-competing the remaining seedlings. This highlights the need to dedicate maintenance time and labour resources to a site in an ongoing capacity. Clear management agreements that indicate responsibilities may also be needed to then allocate tasks to individuals within the group or to seek additional funding to supply contractors in an on-going capacity for maintenance activities.

APPENDIX

Seed Production Area Planner

Year	Tasks	J	F	M	A	M	J	J	A	S	O	N	D
1	Identify local need for SPA – species & provenances												
	Identify sites for SPA												
	Determine costs, acquire funds if applicable												
	Design planting lay out, including plant numbers and seed requirements												
	Plan and undertake seed collection activities – determine species and locate remnants for collection	**x**	**x**	**x**	x	x	x	x	x	x	**x**	**x**	**x**
	Seed collection – source populations *	**x**	**x**	**x**	x	x	x	x	x	x	**x**	**x**	**x**
	Document all seed sourcing	x	x	x	x	x	x	x	x	x	x	x	x
2	Seed collection – source populations *	**x**	**x**	**x**	x	x	x	x	x				
	Plant propagation **									x	x	x	x
	Site preparation (weed control and ground preparation)					x	x		x	x			
	Planting according to plant layout								x	x	x	x	
	Erect signage to recognise SPA and denote individual species								x	x	x	x	
	Maintenance weed control (spray or slash)					x	x		x	x			
3	Seed collection from SPA****, take all available, record weights	**x**	**x**	**x**	x	x	x	x	x	x	**x**	**x**	**x**
	Maintenance check plant survival replace as necessary*** remove tree guards weed control (spray or slash), including between rows pruning tip or branch								x	x	x	x	
	Replanting of non survivors								x	x	x	x	
	Assess seed availability and collect what is available												
	Seed collection - SPA****	**x**	**x**	**x**	x	x	x	x	x	x	**x**	**x**	**x**
4-10	Maintenance weed control pruning Seed Collection - SPA****	 x **x**	 x **x**	 x **x**	 x	 x x	 x x	 x	 x x	 x x	 **x**	 **x**	 x **x**

* seed collection timeframes will depend on the species selected for the SPA. Collection may need to be extended depending on seed availability
** whilst the majority of plants can be propagated in spring, there are a number of species can be slow growing or need to be propagated at another time
*** ensure that replacement stock is of the same integrity as original source populations
**** species dependant but mostly from December to February. Bold **x** denotes peak seed collection times

Seed collections marked in blue.

Ballarat Region Seed Bank

Seed Production Area,

Revegetation Site or Plantation

Original Seed Source Information

To ensure the integrity of seed supplied to Ballarat Region Seed Bank and consequently our clients and revegetation programs, seed from Seed Production Areas (SPA), revegetation sites or plantations requires additional information. We need to know about the original seed source used in its establishment. We require you to fill out the details below.

FloraBank

	BRSB site registration no.:
	Original batch no. (BRSB No. if applicable):
	Date site established: …….day …….month …….year
Original seed source collection site name:	**or Latitude:** …….º ……’ ……” South
Original seed source collection location/town:	**Longitude:** …….º ……’ ……” East

Original tenure: *please circle*

Roadside Private Land Public Land

State Forest Reserve Waterway Unknown Other ……..

Original vegetation community (e.g. BVT or EVC) :	

Plant form: *please circle*

Tree Shrub Understorey Sedge Grass Other ……

No. of Plants Collected from? *please circle* Specify b/w 1-10 …… 11-25 26-50 50-100 100+	**Population Size:** *please circle* Specify b/w 1-10 …… 11-50 51-100 101-500 500+
Geology:	
Other information:	

Glossary

EVC - Ecological Vegetation Class is defined by a combination of floristic, lifeform and position in the landscape. Each EVC includes a collection of floristic communities (ie groups based on co-occurring plant species) that occur across a biogeographic range, and although differing in plant species, have similar habitats and ecological processes (DSE 2007).

EVC Benchmark - Developed as standard vegetation-quality reference points that are applied in carrying out vegetation quality assessments. Represents the average characteristics of a mature and apparently long-undisturbed stand of the same vegetation type (DSE 2007).

Genetic Diversity - The extent of variation in a population, or species, or across a group of species (Frankam et al 2002).

Hybrid - Offspring of a cross fertilization by parents with different genetic systems (Debenham 1971).

Hybridisation - Production of hybrids from either different species or individuals of the same species and may lead to ultimate divergences from the parental form (Debenham 1971).

Inbreeding - Production of offspring by related individuals eg self fertilisation, brother X sister and cousin matings. Characteristics reduced or affected by inbreeding include pollen quantity, number of ovules, amount of seed, germination rates, growth rates and competitive abilities (Frankham et al 2002).

Indigenous - Indigenous often refers to a plant or animal that originates from a particular area or region and is thus native to that site. For the purposes of these notes, indigenous refers to plant species that occur naturally in the Corangamite region at particular localities. For example, *Hakea decurrens* is a native plant of the Corangamite region but is only indigenous to the northern part of the catchment.

Provenance - The Geographic origin or source of the seed (Debenham 1971). An area where a species is found naturally, showing variation from the same species found in other locations. It may appear physically different or perform differently from seed or plants from another location of the same species.

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