The Valley Ponds

Stage 1 Germination Report

Introduction

This report for the ACT Urban Waterways Coordinator, Edwina Robinson, outlines Stage 1 of Greening Australia's rehabilitation work at The Valley Ponds.

Stage 1 involved identifying six zones for recovering wetland plants, relocating representative plant material to a small dam on site, and collecting seed cores (mud samples) from three zones for germinating at Greening Australia's nursery in Aranda.

The aim of Stage 1 works was to conserve locally adapted genetic material, for reintroduction to the Valley Ponds in mid 2012 following completion of the constructed wetlands.

Materials and Methods

Plant material

Six zones from which to recover plant material were identified in and around the main dam, ensuring submerged and emergent plants were recovered.

61 styrofoam boxes were filled with plant material from the main dam in August 2011 (see Figure 1) and relocated to the small dam in the south-western section of the Valley Ponds. Holes were cut into the bottom and sides of the boxes to ensure the roots of the plants remained moist. The boxes were initially placed in the shallow (emergent) zone of the dam.

The main genera recovered included *Juncus, Eleocharis,* and *Myriophyllum*. Particular species targeted for collection included *Amphibromus nervosus* and *Ranunculus papulentus*.

Ten buckets full of *Myriophyllum crispatum* were relocated to the small dam. Unlike the other plant material that was kept in the

Figure 1 - collecting plant material

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styrofoam boxes, the *Myriophyllum* as placed directly into the dam. The request to relocate *Potomogeton tricarinatus* to the small dam could not be fulfilled as the species was not found in the main dam.

A dry spell in January 2012 led to a marked drop in the water level of the small dam. The styrofoam boxes were therefore moved further into the dam to ensure plant roots remained moist (see Figure 2).

Figure 2 – Plant material in the small dam

Seed cores

The following methodology was adapted from a wetland trial conducted by Dr Patricia Murray in 2004 (Murray 2008).

Seed cores (mud samples) were collected from the emergent/ littoral zone (or high water mark), submergent zone (or mid water mark) and the open water zone (or low water mark), at both the large dam and the nearby frog pond (smaller dam near the Scout hall) in September 2011. The mud was collected using a shovel and buckets (See Figure 3). A total of 24 buckets' worth of seed cores was collected from the large dam, and 12 buckets collected from the frog pond.

Figure 3 – Collecting seed cores

Half the seed cores from each of the three collection zones (high water, mid water and open water) were dried at ambient temperature, and half were kept moist, to help indicate whether a trigger event like wetting improves the rate of germination.

The seed cores (both dried and moist) were placed in 2L ice-cream containers on top of a mixture of washed sand and vermiculite. Holes were drilled in the bottom of each ice-cream container. The cores were further divided into moist and submerged treatments. Each pair of treatments was placed in a styrofoam box. Submerged treatments were placed on the bottom of the box, while the moist treatments were raised above the bottom using an inverted ice-cream container. The styrofoam boxes were filled with water to a level 2cm above the submerged treatments, which also ensured the moist treatments were sitting in 2cm of water.

The water level in the styrofoam boxes was checked regularly and topped to initial levels when necessary, and the water was changed periodically to prevent algal build-up.

Some dried seed cores were put aside as a source of micro-crustaceans and seed, to be reintroduced later with the plants.

Results

See tables opposite.

Discussion

Plant material

The relocated plant material has grown well in the styrofoam boxes. The targeted nature of the plant material has resulted in less exotic species than have germinated in the seed cores, with 9 native species and 5 exotic species identified. The main challenge was to keep the roots moist, with the fluctuating water level in the dam.

Weeds will be removed in preparation for planting. At this stage species that are easier to separate such as *Juncus* will be separated, whereas smaller or more fragile species will be planted in clumps. Care will be taken in separating plants to ensure root damage is minimised.

Seed cores

Species that germinated included 9 natives and 10 exotics. Comparing the different treatments, a greater abundance and diversity of species was found in the moist than the submerged treatments. There was little difference in abundance between dried and wet samples. This suggests the mud samples did not require drying to trigger germination. There was also no significant difference between samples taken from high, mid and low water marks, with perhaps a few more stems found in the high and mid water samples.

Challenges with the seed cores included algal growth, which necessitated periodic changing of the water. The styrofoam boxes were also exposed to the elements, resulting in occasional inundation during heavy rainfall.

Next steps

Plants will be monitored until the time of reintroduction to the Valley Ponds. Following the planting, a final report will be produced.

References

Brock M (1997) 'Are there seeds in your wetland? Assessing wetland vegetation', Land & Water Resources Research & Development Corporation, University of New England, Department of Land & Water Conservation and Environment Australia, Canberra

Clifton, E (2004) Murrumbidgee Wetland Seedbank Research Project, Preliminary Report, Land & Water Australia, Canberra

Murray P (2008) Survey of soil seed bank of Murrumbidgee floodplain wetlands, Land & Water Australia, Canberra

Results

Table 1 - Plant material species

The most abundant native species were *Juncus usitatus*, *Eleocharis acuta*, and *Myriophyllum crispatum*. Notable species were *Amphibromus nervosus* and *Ranunculus papulentus*.

Scientific name	Common name	Origin	Life cycle	No. of stems (~)
Amphibromus nervosus	Common Swamp Wallaby Grass	N	P	<10
Crassula helmsii	Water Stonecrop	N	P	<20
Eleocharis acuta	Common Spikerush	N	P	1000+
Epilobium sp.	Willow Herb	N	P	25
Hydrocotyle peduncularis	Stinking Pennywort	N	P	50+
Juncus articulatus	Jointed Rush	N	P	120
Juncus bufonius	Toad Rush	N	A	100
Juncus usitatus	Common Rush	N	P	100+
Lythrum hyssopifolia	Hyssop Loosestrife	N	A	20+
Myosotis caespitosa	Forget-me-not	E	A	250+
Myriophyllum crispatum	Upright Water Milfoil	N	P	750+
Paspalum dilatatum	Paspalum	E	P	10
Polypogon monspeliensis	Beard Grass	E	P	30
Ranunculus papulentus	Large River Buttercup	N	P	350
Rumex crispus	Dock	E	P	30
Trifolium sp.	Clover	E	P	<10
Veronica anagallis-aquatica	Blue Water Speedwell	E	P	20

(N = native, E = exotic, P = perennial, A = annual)

Table 2 - Seed core species

The most abundant native species, *Elatine gratioloides* and *Juncus bufonius*, are both annuals.

Scientific name	Common name	Origin	Life cycle	No. of stems (~)
Amphibromus nervosus	Common Swamp Wallaby Grass	N	P	10
Cirsium vulgare	Spear Thistle	E	A	<5
Cyperus eragrostis	Umbrella Sedge	E	P	75+
Echinochloa crus-galli	Barnyard Grass	E	A	<5
Elatine gratioloides	Waterwort	N	A	500+
Eleocharis acuta	Common Spikerush	N	P	250+
Holcus lanatus	Yorkshire Fog	E	P	10
Juncus articulatus	Jointed Rush	E	P	500+
Juncus bufonius	Toad Rush	N	A	500+
Lythrum hyssopifolia	Hyssop Loosestrife	N	A	200+
Myosotis caespitosa	Forget-me-not	E	A	25+
Myriophyllum crispatum	Upright Water Milfoil	N	P	375+
Ranunculus papulentus	Large River Buttercup	N	P	10
Rumex crispus	Dock	E	P	<5
Trifolium sp.	Clover	E	P	<5
Veronica anagallis-aquatica	Blue Water Speedwell	E	P	10