

Project 4.6 Evaluating direct seeding as a cost effective technique for riparian revegetation

Revegetation of riparian areas is a significant area of investment for Melbourne Water, with about \$7m spent annually on revegetation programs. Planting is currently the most commonly used revegetation technique, but direct seeding has the potential to be more cost-effective, if barriers to seedling establishment can be overcome. Although project costs such as fencing, site preparation and site maintenance are likely to be similar for the two techniques, the costs of plant materials are significantly different. The costs of seed and sowing are about 10 – 20% those of plants and planting. Thus with a fixed budget, it would be possible to achieve revegetation over larger areas using direct seeding techniques than by planting, allowing Melbourne Water to better meet its revegetation targets.

Research aims

This project aims to provide Melbourne Water with an understanding of the cost-effectiveness of direct seeding as a revegetation technique at riparian sites, compared with planting. In assessing the outcomes of direct seeding activities, the project is focussing on two primary areas of interest:

- the extent of site preparation required prior to sowing, particularly weed control; and
- the extent and most effective method/s of post-sowing weed control.

Research methods

The research approach includes both specifically designed field trials (at Bass River, Cardinia Creek Retarding Basin & Emu Creek) and monitoring of operational Melbourne Water direct seeding projects which are either already underway or due to be established.

Data from the trials and from operational projects will be used to develop a decision-making framework to assist waterway managers in evaluating which revegetation options are most appropriate for a site, based on site characteristics. The field trials are testing the following treatments:

- standard site preparation (2 sprays) vs additional site preparation (4 sprays);
- post-sowing weed control by hand or using herbicide, or a combination of both;



Figure 1. Researchers monitoring and recording vegetation growth at a direct seeded plot at the Bass River.

- direct seeding compared with tube-stock planting (compared with natural recruitment at one site);
- application of mycorrhizal inoculants;
- spring vs autumn sowing;
- 2 designs of wire fences and unfenced tube-stock protected with tree guards compared with unprotected plants.

A monitoring protocol has been developed that captures a range of data relating to site characteristics, revegetation activities (including site preparation and site management activities) and outcomes at operational sites already established by Melbourne Water.

Analysis and synthesis of data from both the research trials and from monitoring operational sites will be used to develop a decision-making framework which can assist waterway managers to determine the likely outcomes of direct seeding at the site level.

Progress and outcomes to date

Field Trials

- At the Bass River trial site, spring-sown and autumn-sown plots have been monitored at 6 monthly intervals;
- More seedlings established in hand weeded plots than in plots sprayed either monthly or quarterly, but overall seedling survival and growth was compromised by herbivory;
- The Cardinia Creek Retarding Basin trial site was sown and planted in November 2016;
- More than 6,000 seedlings emerged in the first six months, with more seedlings establishing in weeded rows than in unweeded rows, and in fenced than in unfenced rows;

- At the Emu Creek trial site, sowing and planting were undertaken in July 2016 (Phase 1) and in July 2017 (Phase 2);
- Seedling numbers 3 months after sowing (October 2016) reached 1,700 seedlings, but had dropped to about 850 seedlings 12 months after sowing (July 2017);
- The most abundant species 12 months after sowing were *Allocasuarina* spp., *Acacia paradoxa*, *Acacia pycnantha* and *Eucalyptus microcarpa*.

Monitoring

- Monitoring has been undertaken at operational sites on the Yarra River (Launching Place and Bradleys Lane, Warrandyte), Hoddles Creek, Sheep Station Creek and Deep Creek, Diggers Rest;
- Additional sites identified for monitoring in 2017 include Upper Bass River near Poowong, Yarra River at McMahons Creek and at Ivanhoe, Dandenong Creek at Heatherton Road, Woori Yallock Creek and Boggy Creek in Langwarrin.

Project Team

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