Project Summary

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.

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- 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.

Outcomes and findings to date:

- At the Bass River trial site, herbivory has limited the survival and growth of many seedlings, with the relatively unpalatable *Goodenia ovata* plants now the most numerous across the trial;
- Hand weeded plots had higher rates of seedling establishment than sprayed plots;
- Sowing and planting at the Cardinia Creek Retarding Basin trial site was completed in November 2016 and monthly monitoring of seedling establishment will be undertaken initially;
- The 2016 planting and sowing at Emu Creek trial site was undertaken in July 2016 and good rains have promoted good rates of seedling establishment for all sown species;
- Two additional weed sprays will be undertaken for the remaining plots at Emu Creek over the coming 12 months, with these plots to be sown/planted in winter 2017;
- Soil seedbank analyses found that the native rush *Juncus bufonius* dominated the Bass River samples, while *Urtica urens* (an exotic) was the most common species in the Emu Creek samples;
- Monitoring has been undertaken at four operational sites, with additional sites identified for monitoring: at all sites direct seeding has resulted in plant establishment but species diversity is low at some sites.

Project Team

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