Wetland restoration at Wairio, Lake Wairarapa

How best to re-establish a kahikatea swamp forest?

- **Wetlands are highly productive ecosystems that occur at the interface between land and water.**
- **They have the potential to filter out excess nutrients and sediment from water, before it flows into lakes, waterways and the ocean.**
- **New Zealand has lost over 90% of its natural wetlands.**
- **Our aim was to investigate the best, most cost-effective combination of management techniques to re-establish a functioning kahikatea swamp forest on the eastern shores of Lake Wairarapa.**

Figure 1: Location of the Wairio Wetland Restoration Block on the eastern shores of Lake Wairarapa.

Synopsis

In 2010, over 2000 trees were planted in a large-scale field experiment in the Wairio Wetland Restoration Block. Specifically, we compared: (i) *site preparation* [mechanical scraping vs. herbicide], (ii) *planting design* [different spacing and use of nurse trees], (iii) *aftercare* [weedmats vs. release spraying] and (iv) *the moderating influence of hydrological conditions* on each of the above [wet vs. dry sites].

Figure 2: Volunteers helping on the tree planting day, June 2011.

Early results indicate that kahikatea are the most tolerant of extreme inundation, but are also the slowest growing. Weedmats were no more effective than spraying in promoting survival, but were slightly more expensive.

An unmanned drone aircraft has been used to capture ultrahigh resolution (5cm pixel) imagery of the wetland. This will be used to develop a comprehensive vegetation map of the site and a digital terrain model for modelling surface water flows and the influence of hydrology on vegetation.

Figure 3: Bridget Johnson measuring totara, six months after planting in a "scraped-wet" site.

VUW students, Aprille Gillon, Tapuwa Marapara and Cheng Shi are monitoring tree growth, nutrient and water budgets, soil hydrology and the influence of nutrients on vegetation dynamics.

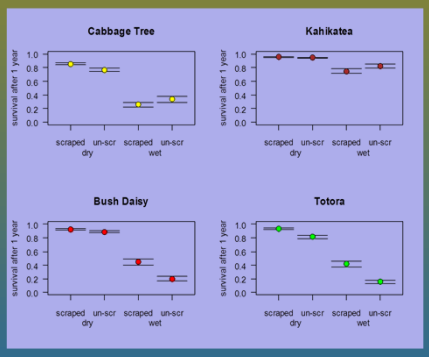

Figure 4: Survival rates of four key species in dry vs wet sites, with and without mechanical scraping

Figure 5: Cheng Shi measuring nutrient levels in one of the wetland's inflowing waterways

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