

CAREX News

The CAREX project is funded by the Mackenzie Charitable Foundation



Newsletter of the Freshwater Ecology Research Group

May 2016

Welcome to our May CAREX newsletter - here are some things that are keeping us busy!

Macrophyte control trials scaled-up

Based on the success of our small-scale weed mat and hand-weeding trials, we have scaled up our efforts to test how well these tools work over longer reaches. In a Hinds waterway, we are using black polythene (suspended over the water surface), hand-weeding, and weed mat to control bank-based and bed-rooted macrophytes along 50m sections. In Rangiora, we have covered a 350m reach of a stream bank with weed mat alongside Todds Road, and also intensively hand-weeded a 100m section of a stream running along Southbrook Park with support from the Waimakariri District Council. We see these tools as potential interim solutions to use while riparian plants establish and eventually provide shade to limit weed growth. Monitoring of these trials is on-going.



Suspended polythene (left), handweeding (center), and weed mat (right) treatments extend over 50m reaches in a Hinds waterway.



Hand-weeding is labour intensive. Initial clearance of macrophytes from a 100m section of this waterway took 3 people approximately 12 hrs to complete. After clearing, some weed fragments were still present in the reach. Time will tell how effective this tool is and whether efforts will decrease for subsequent clearings.

The value of shade along waterways

One key role riparian plants play is providing shade, which reduces high water temperatures in a waterway. Cooler waters have more dissolved oxygen available for invertebrates and fish. In addition, by limiting light, shade also reduces aquatic weed growth and may outcompete nuisance weeds from establishing.

The native sedge, *Carex*, is often planted along waterways and ideally grows to overhang the banks and provide shade. Overhanging plants also provide valuable cover for fish and are used by aquatic insects. Any plant or waterway maintenance should support their growth (i.e., control other weeds and pests) and not cut the plants back. As part of our research, we are adding *Carex* to enhance riparian zones and measuring the impact this plant can have on improving freshwater health and biodiversity by providing shade, control other weeds and pests) and not cut the plants back. As part of our research, we are adding *Carex* to enhance riparian zones and measuring the impact this plant can have on improving freshwater health and biodiversity by providing shade,



Carex planted in 2013 is already providing some shade and cover.

Showcasing our research

In early March, CAREX research was shared with Sir Jerry Mateparae, the Governor-General of New Zealand, who visited the University of Canterbury specifically to learn more about science and engineering innovation. CAREX was one of the few research groups to be featured on his tour. Angus, Catherine, Katie, Jon and Brandon described the science behind our rehabilitation tools and the nature of our community partnerships and stakeholder engagement that make CAREX so innovative.



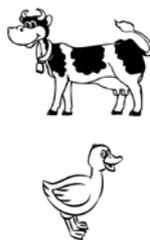
CAREX PhD students Katie Collins and Brandon Goeller explain their research to the Governor-General.

Understanding *E. coli* in waterways

The presence of *Escherichia coli*, often called *E. coli*, is frequently used as an indicator of faecal contamination in waterways. This bacteria is found in the guts and faeces of warm-blooded animals and people. *E. coli* can pose human health risks when concentrations in the water exceed water quality standards for drinking or contact recreation. The national bottom line is 1000 *E.coli* CFU (or colony forming units)/ 100ml (about half a cup). These standard counts only give an indication of numbers of *E.coli* but not the source.

Ministry for Environment freshwater surveillance, alert and action levels		
Mode	<i>E. coli</i> / 100 ml	Action
Acceptable (green)	< 260	- continue weekly monitoring
Amber (alert)	> 260	- increase to daily sampling - identify potential sources
Action (red)	> 550	- increase to daily sampling - identify potential sources - inform public via media/signs

Runoff from farm animals and wildlife, waterwater discharges and leaky septic systems are possible sources of faecal inputs into agricultural streams. In some cases, waterfowl can be significant contributors (e.g., duck ponds). The source of the inputs can be determined using faecal source tracking, a sophisticated set of tools that identify markers or “fingerprints” specific to different animals, including humans. We are working with scientists from ESR to use these tools in agricultural waterways. Across the CAREX sites, *E. coli* ranges from 140 - 6367 CFU/100 ml, with the highest levels reported in summer. Faecal source tracking has shown that most inputs in our sites are from ruminants (e.g., cattle, sheep, goats) or birds. Clearly, faecal contamination is a problem at some sites and we are working to identify and implement measures to reduce this issue. For example, we have found that the sediment traps we are testing may help reduce *E. coli* numbers, so are investigating this further.



Demonstration site development

A key goal of the CAREX programme is to showcase successful riparian and in-stream management methods to the public. One way we are doing this is through developing demonstration sites, where people are able to see and discuss how different management tools for weed, sediment, and nutrients have been applied and are working on local farms. Over the past year, hundreds of farmers, community groups, university students, and a wide range of local and central government staff have visited these sites.



Annual trustees visit

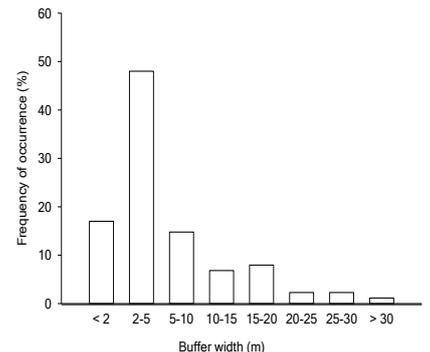
Trustees from the Mackenzie Charitable Foundation visited three of our demonstration sites in the Hinds area in early April. Here they are looking under the black polythene for weeds with a landowner and the CAREX team.



What do riparian zones look like?

Riparian zones are strips of land bordering waterways, which can vary in size and amount or type of vegetation. Grasses, low growing plants such as sedges, and taller shrubs and trees can all be part of the riparian zone.

In a survey of 88 agricultural waterways in lowland Canterbury*, we found most riparian zones are narrow (< 5m wide) and dominated by grasses and exotic weeds. Gorse hedges were also common. Plant diversity was highest in the wider buffers (> 25m wide).



*Renouf & Harding 2015. NZJMF 49: 323-332

Our CAREX work has shown that fencing and maximising grass cover (>50% cover in riparian zone) is a good first step in improving riparian zones, particularly to reduce stock access and sediment inputs to waterways. We encourage high quality, diverse plantings of species that provide a range of functions for waterway health (e.g. stabilize banks, provide shade and habitat) as well as being practical on the farm for irrigators or digger access. Since 2014, over 17 000 plants have been planted along CAREX waterways as part of our work.

Upcoming community planting day

On Sunday 15th May, the CAREX team will be joining forces with members of the local community and Hinds school to plant hundreds of native and locally-sourced riparian plants along one of our waterways. The planting is supported by Environment Canterbury's Immediate Steps program to improve habitat and increase biodiversity in and around fresh waters. We will have some on-site demonstrations, invertebrate and fish displays, and shared kai. CAREX team members will be on-hand for informal discussions and the chance to share information. Contact us for more details.

CAREX team news

Are you interested in having a member of the CAREX team talk to your organisation, group or class about our research? Please contact us at carex@canterbury.ac.nz for more information. We are happy to welcome Catherine Febria back from maternity leave and to have Helen Warburton continuing on as part of the team.

Contact Information

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