

# CAREX News

The CAREX project is funded by the Mackenzie Charitable Foundation



Newsletter of the Freshwater Ecology Research Group

September 2016

Welcome to our September CAREX newsletter - here are some things that have been keeping us busy over winter.

## Identify and treat “hotspots”

Hotspots are points where sediments, nutrients, and bacterial inputs enter a waterway and are a point source of pollution. They can include broken fences, slumps, rills, open and tile drains, or intermittent channels that circumvent fencing and riparian planting buffers. For example, a single, unfenced ditch or rill could compromise hundreds of meters of fencing and planting by allowing sediments in to the waterway. We recommend treating these hotspots, with an appropriate restoration tool, after fencing, re-battering (if needed) and planting.



Hotspots: Low-laying areas in paddocks (left) and tile drains (right) can be point sources of sediments and nutrients to waterways.

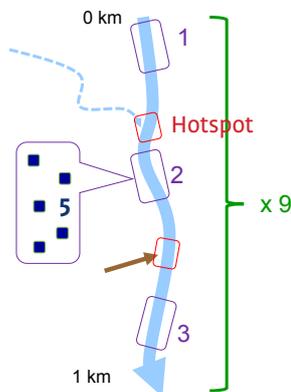
## Scales in CAREX

In CAREX, we are testing 14 restoration tools applied in different combinations and at different scales.

1. Waterway (1 km) - 9 in CAREX project
2. Reach (20m) - 3 in each waterway
3. Small sampling unit (<1m) - 5 or more in each reach

+ Hotspots (<20m) - type and location differ in each waterway

The effect of scale is important in understanding how to target rehabilitation efforts. For example, our results show that most of the difference in nitrate levels occurs between CAREX waterways but hotspots are important local sources. Nutrient management needs to address on-land nutrient inputs at the catchment level and hotspots can be targeted in the interim. Look for more results on this in coming newsletters and on our website.



## Macrophyte control trial update

Nine months into our larger-scale trials, weed mat is effectively controlling bank macrophytes (monkey musk, watercress) and polythene is controlling bed macrophytes. On the other hand, large-scale hand-weeding has been unsuccessful. This treatment acted as a disturbance to reset weed growth and change community composition, with a short-term shift from emergent to submerged species. Hand-weeding is very labour intensive and it is difficult to remove all seedlings and fragments that can regrow into new plants.



Within 3 months of hand-weeding this 100m section of waterway, weeds had re-established but community composition had shifted (right).

## Why re-batter the banks?

Steep, highly eroding or slumping banks are important sources of sediments to waterways, particularly when combined with high flow events that mobilise sediments.

Bank re-battering is a key step in rehabilitating waterways and should be done prior to planting, where needed. Re-battering involves earthworks to reduce the slope, which stabilises the banks and removes point sources of sediments that accompany bank collapse. After re-battering, the banks should be planted or seeded with grass to minimise bare ground cover. In some cases, weed mat can be put down to control weeds and reduce erosion while new plants grow. These earthworks can help to address oversteepened banks caused by years of mechanical digging and also increase the flood capacity of a waterway.



An oversteepened bank was re-battered prior to planting with Carex plants.

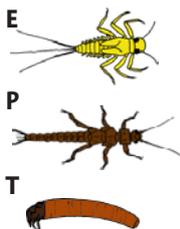
## WANTED: Macrophyte survey sites

Where and how well macrophytes grow in waterways can be influenced by a range of conditions, such as shade, disturbance, sediments and nutrients. This spring, PhD student Katie Collins is leading a Canterbury-wide survey to determine environmental conditions that affect macrophyte distribution and growth.

**Can you help?** Katie is looking for a range of sites, including waterways with riparian plantings more than 2 years old and sites with no riparian planting that also lack macrophytes. Please contact us at [carex@canterbury.ac.nz](mailto:carex@canterbury.ac.nz) if you know of sites that might be suitable.

## What is %EPT?

A commonly used indicator of water quality worldwide, %EPT is based on the abundance of invertebrates **E**phemeroptera (mayflies), **P**lecoptera (stoneflies), and **T**richoptera (caddisflies) orders that are generally sensitive to pollution and habitat degradation. Low %EPT values are indicative of poor water quality and degraded habitats. We sample invertebrates three times a year during habitat assessments.



Across the CAREX sites, %EPT ranges between 0-24% (based on two sampling periods from 2013 & 2014 summer). Generally, this is quite low as we have measured %EPT to approach more than 75% across a wide range of nitrate levels in an earlier survey. Understanding why sensitive taxa can live across a range of nitrate conditions (along with other stressors) can help us learn more about ways to enhance local biodiversity/restore healthy freshwater communities.

## Demonstration site progress

Together with the landowners, sharemilkers, and our partners at Living Water, we have been working to enhance our Silverstream demonstration site. Over the past few months, we have installed two new sediment traps, completed substantial weed control in the 1-ha QEII wetland, and have improved tracks and site accessibility. In coming months, we will be establishing an interpretative walking track through the wetland, which will be open for public visits. This demonstration site is regularly used as an outdoor classroom, for outreach events, and as a meeting place for stakeholders. Our collaborative work with Richard and Jill Simpson, Living Water, and scientists at ESR at this site was recently featured in a story on Radio NZ's Country Life programme and in an article on NZ Farmer. You can find links to the stories on our website.



## Successful community planting day

Thanks to all who attended and supported our community planting day in May! It was a great, family-oriented event with over 40 people helping to plant more than 600 *Carex* plants. The kids enjoyed learning about agricultural waterways through a scavenger hunt and building food webs, while the bugs and fish on display were popular with the kids and adults, alike. This planting was supported by Environment Canterbury's Immediate Steps programme.



## Spreading the word

Communicating the science and knowledge we are gaining through CAREX is a key part of our work. Over the past few months, we have reached over 900 people directly through presentations at overseas conferences, seminars at Environment Canterbury, outreach events with primary and secondary school students, community meetings in the Waimakariri District, and a public lecture at the University of Canterbury.



Full house at the UC public lecture (left) and Hinds School (right) for CAREX talks on ways to fix agricultural waterways.

## Find us on Facebook & Twitter

We are excited to have launched our CAREX Facebook page. Like us @UC.CAREX



#UC\_CAREX



## 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](mailto:carex@canterbury.ac.nz) for more information.

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