

CAREX News

The CAREX project is funded by the Mackenzie Charitable Foundation



Newsletter of the Freshwater Ecology Research Group

May 2017

Welcome to our fall newsletter - here are a few highlights of what is keeping the team busy.

Research updates

Over the past few months, we have started to wrap up trials for some aquatic weed and nutrient tools and completed a survey to better understand the factors influencing the growth and distribution of aquatic plants (aka macrophytes) across Canterbury. Results of Katie's macrophyte survey coming soon! We are busy processing lab samples, analysing data, preparing new toolbox resources, and presenting our findings to local groups and at national and international conferences on freshwater and restoration.



Aquatic plants were surveyed in 28 sites across Canterbury, including high country, Banks Peninsula and lowland waterways.

Community planting - one year later

We are happy to report one year on from our community planting day in Coldstream, that the *Carex* plants are doing really well. The planting and regular maintenance at this site was supported by Environment Canterbury's Immediate Steps programme.



Does riparian management influence greenhouse gas emissions?

In New Zealand, 49% of greenhouse gas emissions come from agriculture. The three main gases, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), are released from agricultural activities, including soil cultivation, ruminant (cattle and sheep) manure, and fertilizer use. Riparian management of agricultural waterways aims to improve water quality and waterway health, but it is not known if riparian management influences greenhouse gas emissions here in Canterbury. Last summer, Nikki Burrows (MSc student, University of Auckland), measured emissions of the three main greenhouse gases from riparian soils and waterways at multiple sites along four CAREX waterways. These sites had different types of riparian management, including: rebartering, *Carex* plantings, two-stage ditch, mature riparian plantings and fencing alone. Soil and waterway gas samples were collected along with information on soil properties and vegetation to investigate what factors were driving differences in gas emissions. Early results show that emissions tended to be lower in riparian zones than paddocks and varied between riparian management type. Both carbon dioxide and methane emissions were related to soil temperature, ground cover and the number of plant species. Nikki is continuing with lab work and analysis on this project, so stay tuned for further updates.

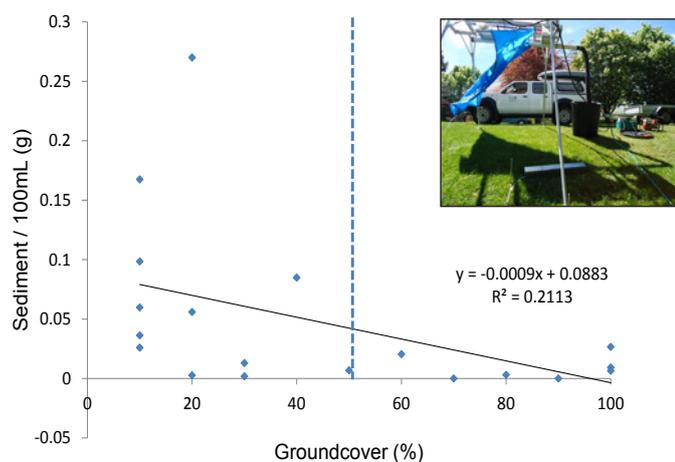


Sampling for GHG along CAREX waterways - Soil gases were collected using field chambers that were placed along 50m transects at 4 CAREX waterways (~1m away from water's edge).

How much groundcover is enough?

Groundcover is an important consideration when planning or undertaking a riparian management project. If sediments are coming into the waterway from the riparian zone, maintaining a high amount of groundcover can be important in reducing sediment runoff into the waterway. We have found that more than 50% groundcover is needed to effectively filter sediment and reduce inputs to adjacent waterways.

It is better to have rank grass than bare ground, as the thick clumps of grass stems can slow surface runoff and trap sediments. Spacing between riparian shrubs and trees should allow light through to support growth of groundcover. Along with fencing to exclude livestock and rebattering banks to reduce erosion, maximising riparian vegetation cover (e.g., > 50% grass cover) is a best practice to reduce sediment inputs into agricultural waterways.



Rainfall simulator experiments identified that >50% groundcover reduced sediment entering waterway. Rainfall simulator set up (inset photo). MSc research by Emma Porter (2014).

Wetland track works underway



The springs that feed the waterway are protected in the 1-ha wetland.

Ground preparation and clearing for a new walking track are underway at the 1-hectare wetland at the top of Silverstream waterway. The wetland, which is protected by a QEII National Trust covenant, has been a labour of love for landowners Richard and Jill Simpson for over 15 years. Together with their children and staff, they have planted and maintained hundreds of native plants. Through our partnerships with the Simpsons and Living Water, we are working to help achieve their dream to create an interpretive walking track and open the wetland to the public. The track will open this spring!

Maintaining riparian plantings

Regular maintenance of riparian plantings is important to help support the growth of new plants, reduce competition from weedy plants, and increase chances that plants will survive and thrive. Ongoing maintenance, including release spraying, use of combiguards, and replacement planting, has been a key part of the riparian planting plans that have been undertaken at four CAREX sites.



Release spraying promotes early growth and establishment of new plantings by reducing competition from weedy plants. This should be carefully done as you need to be close to the new plants to be effective but they are very sensitive to chemical (herbicide) sprays.



Combiguards enhance survival and growth by protecting plants from competing weeds, chemical sprays, extreme weather conditions, and animals. Replace or repair protectors, as needed, and remove once plants are well-established and before plant growth is restricted.

Replacement planting is done after checking in on plant survival. In some cases, a different species might be better suited to local environmental conditions.



Regular maintenance makes a difference: riparian plantings at a CAREX site shown here 1 (right) and almost 3 years (left) post-planting.

Looking for kōura and kākahi

Freshwater kōura (crayfish) and kākahi (mussels) are valuable mahinga kai species that are under threat from pollution and habitat degradation. To better understand the environmental factors shaping their distributions, PhD student Channell Thoms, is looking for populations living in small drains and waterways across Canterbury. Channell will use this information as a tool to inform restoration and translocation of these valued species in Canterbury. If you have seen any kōura and/or kākahi in your waterway or one nearby, please contact Channell at channell.thoms@pg.canterbury.ac.nz.

CAREX team news

Please take note of our new office and mobile phone numbers:

Catherine: 03 369 3 5148 extn 95148 (office); 027 555 4357 (mobile)

Hayley: 03 369 5144 extn 95144 (office); 027 559 7693 (mobile)

Kristy: 03 369 5179 extn 95179 (office); 027 702 7307 (mobile)

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.

Contact Information

Catherine Febria / Kristy Hogsden
Freshwater Ecology Research Group
School of Biological Sciences, University of Canterbury
phone 03 369 5148/ 03 369 5179
carex@canterbury.ac.nz
www.carex.org.nz