

CAREX News

The CAREX project is funded by the Mackenzie Charitable Foundation



Newsletter of the Freshwater Ecology Research Group

January 2018

Kia ora! Welcome to our January newsletter - best wishes for 2018 from the CAREX team.

Boost carbon to help reduce nitrogen?

Through the removal of riparian plants, intensive agricultural land uses can reduce canopy cover over waterways and the amount of leaves falling in, which are an important source of carbon for streams. When combined with substantial increases in nitrogen inputs, a nutrient imbalance is created with many agricultural waterways being carbon-limited. Moreover, the effectiveness of many nitrogen reduction tools depends on the availability of carbon, as it provides a suitable substrate and stimulates the activity nitrogen-removing microbes. We tested the potential to boost nitrogen cycling with carbon additions, by adding packs of leaves to small agricultural waterways around Rangiora. Carbon addition enhanced the activity of denitrifying microbes. Denitrification rates within the study reaches were three times higher in waterways with added leaves compared to those without added leaves. Thus, riparian plantings can help to restore agricultural waterways by enhancing in-stream processes to reduce nitrogen. To be effective, the number and species of plants and the ability of the waterway to retain the leaves (e.g., in-stream woody debris or boulders would help) also need to be considered in a restoration plan, alongside land-based nutrient management practices. For more details on the study, check out the open access paper in **Ecosphere at: 10.1002/ecs2.2018**.



A total of 600 leaf packs each containing 350g of leaves were added to three waterways into the Ruataniwha/ Cam River catchment in Rangiora.

Proud of your riparian plantings?

Have you done some planting along your waterway and are willing to share some information on the planting (e.g., planting size, plant types, investment)? If so, you will be able to help scientists at NIWA and DairyNZ to better understand the extent of riparian plantings across the country by adding to the National Riparian Restoration Database. The information will also be used to determine what makes some plantings more effective than others, which will inform the guidance given for future plantings to improve the benefits for water quality, biodiversity and waterway health. For more information or to add your info, see: <https://riparian.niwa.co.nz/>

Glyphosate to control aquatic weeds

Glyphosate is a non-selective, broad-spectrum herbicide that is commonly used to kill weeds. It works by preventing plants from making certain proteins that they need to grow. Glyphosate is the active ingredient in Roundup, a herbicide used widely in New Zealand and worldwide to control weeds on farms, in parks, industrial areas and around home gardens. Glyphosate is also commonly used to control aquatic weeds, particularly emergent (on the water surface) and bankside weeds, but there are concerns about potential effects on waterways. Last summer, we worked with the Waimakariri District Council (WDC) to see how long glyphosate persists in water and sediments and to identify any effects on aquatic life.



Spraying with glyphosate reduced aquatic weeds from 80-100% cover (left photo) to 20% cover (right photo) by three weeks post-spray. Within three months, the weeds had grown back.

As expected, we found that the glyphosate effectively controlled the aquatic weeds. Glyphosate and the product it breaks down into, called AMPA, were found in the water 1-2 days after spraying and in the sediment before and for up to 14 weeks after spraying. We did not find any effects on invertebrates or fish, but many sensitive species are absent from these degraded waterways. These findings were presented to the WDC in December.

Funding for your waterway project

If you are looking to improve biodiversity or habitat around your waterway, funding may be available to help you. We have worked with several CAREX landowners to obtain funding through various initiatives to support earthworks, plantings and plant maintenance to improve riparian zones and wetlands. Check out ECAN's Immediate Steps, the Selwyn Natural Environment Fund, and Te Ara Kakariki Greenway Trust to see if your project fits with their objectives.



Think of the fish

Routine management and maintenance involving diggers is common in and around many farm waterways, to remove nuisance weeds or repair tracks. Sediment traps, a tool that we have tested to address sediment issues, also require a digger for installation and maintenance to ensure traps continue to work effectively. As part of our trials, we are investigating the practicalities of these activities and their impacts on freshwater communities. One challenge when digging out accumulated sediment from the traps is to minimise animal losses, including mahinga kai species such as eels/tūna and fish that become entrained and stranded in the sediment. In December, CAREX team member Hayley Devlin worked alongside PhD student Channell Thoms, to monitor animal stranding during routine maintenance of two sediment traps. They recovered 14 small eels/tūna and fish (bully, galaxiid, trout) and returned them to the waterway. When undertaking earthworks in or near a waterway, keep this important consideration in mind.



Channell and Hayley, with project partner Greg Bennett (WDC), returned fish recovered following sediment trap maintenance to the waterway.

Celebrating CAREX successes

Big congrats to our two CAREX PhD students who both gave great talks at the Waterways Conference at Lincoln University in November. Brandon was awarded the People's Choice award for his talk on nitrate loads - sources, scale and solutions and Katie won best poster for her research on glyphosate use near waterways. Katie also picked up kudos for her poster at the International Society for River Science Symposium, at the end of November.



As a team, we were honoured and humbled to receive the 2017 Award & Trophy from the Canterbury Aoraki Conservation Board (CACB) at their annual awards ceremony. These awards recognise the efforts of local groups and individuals in supporting conservation within the wider Canterbury region. We will use the prize money to further science communication efforts in our solutions-focused project aimed at improving freshwater biodiversity and ecosystem health in agricultural waterways.



Outreach October

In October, we hosted several events which brought hundreds of people, including farmers, neighbours, stakeholders, students, tamariki and whānau to a CAREX demonstration site to learn more about our tools and solutions for improving waterway health and biodiversity. Many good connections were made and conversations had - thanks to all who joined us!



Spreading the word in 2017

FACTS & FIGURES

950+ people reached via presentations, public meetings and seminars

Outreach events with schools and communities **7**

21 Demonstration site visits with farmers, community groups, stakeholders and students

New newsletters subscribers & reach of Facebook posts **21 844**

Coming soon.....

Due to website redevelopment at the University of Canterbury, the look and some content of the CAREX website has changed, but we plan to resolve this ASAP. In the next couple of months, we will also be launching several new resources and handouts to support farmers, landowners and stakeholders interested in undertaking agricultural waterway rehabilitation and improving waterway health. Stay tuned for research updates on nitrate loads, factors affecting aquatic weed growth, and in-stream habitat additions in our next newsletter.

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.

Please note: The information provided in this newsletter is based on preliminary findings and is subject to revision and peer review. We share our results and findings to meet the need for best available science. Newsletters and information within cannot be reproduced without our express permission.

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