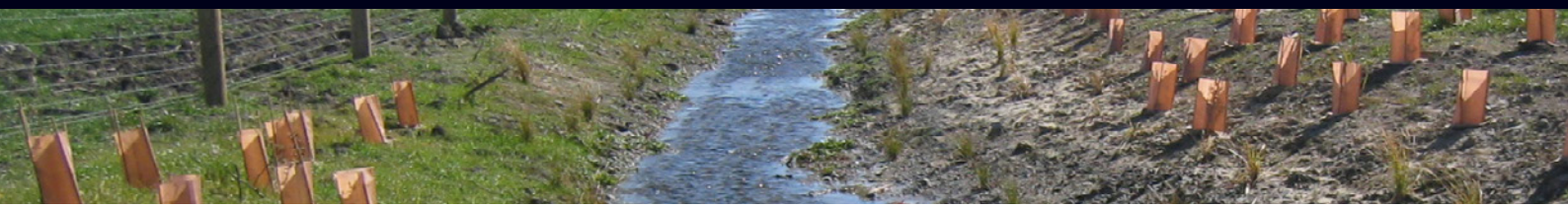
CAREX News

The CAREX project is funded by the Mackenzie Charitable Foundation



Newsletter of the Freshwater Ecology Research Group

December 2016

Welcome to our December newsletter - we are looking forward to another busy summer!

Woodchip experiment underway

Brandon Goeller, PhD student, is testing an affordable, low-tech solution to remove high in-stream nitrate levels by adding bags of untreated pine woodchips to four waterways near Hinds. The idea is simple and two-fold: woodchips provide the energy for microbes to remove nitrate while also improving habitat for in-stream invertebrates and fish. We will be monitoring water chemistry upstream and downstream of the experiment to measure changes in nutrients, carbon, and invertebrate and fish abundance for 12-18 months. Since wood breaks down so slowly, it is expected that water quality changes will happen slowly at first but be sustained over a longer period (~1 year).

Restoration double whammy? A total of 125 woodchip packs were added to 4 waterways to remove nitrate and improve in-stream habitat.

Spreading the word in 2016

Facts & Figures

1200+ people reached via workshops, presentations, public lectures and seminars

Outreach events with schools and communities **6**

10 Demonstration site visits with **hundreds** of farmers, community groups, stakeholders and students

Newsletters, publications, posts & news stories **27**

An interim solution for weeds

Weed mat works by limiting light and reducing weed growth. Our trials have shown that weed mat is an effective option to control weeds that grow from the banks but not the waterway beds. Following rebattering, this waterway bank (pictured above) was covered with coir mat to help control weed growth and reduce erosion while new *Carex* plants establish. The coir mat controls weeds that grow from the banks, but needs to be replaced annually, compared to black plastic which lasts longer. It is important for the weed mat to extend down the bank and into the water. Otherwise, weeds will take advantage of the gap along the edge and any available light to grow, as seen above. Weed mat is a useful, practical and afforable interim solution to use while riparian plants grow to provide shade and cover banks to prevent weed establishment.

Optimising habitat in waterways

Many agricultural waterways lack important habitat needed for freshwater insects and fish to thrive. For example, rocky substrates used by insects to lay their eggs and woody debris, used by fish as cover are often missing.

The availability, diversity and condition of habitat play important roles in the structure and function of a healthy waterway. This summer, MSc student Tim Green will begin trials to optimise habitat additions with rocks and increase sites for insects to lay or deposit their eggs, a process which is called oviposition.

Fish eggs and invertebrate cases found on a rock two weeks after habitat addition in a CAREX waterway.

Habitat assessments done for 2016!

Three times a year, our field team led by research technican, Hayley Devlin, heads out to the 9 CAREX waterways to undertake seasonal habitat assessments. During these assessments, we measure and sample a full suite of environmental variables, including physical and chemical parameters and biological indicators of water quality and health.

The team travels from Rangiora to Hinds, spends 45+ hours sampling in the field and a few months processing water, sediment, algae, and invertebrate samples in the lab for each round of samples collected. When sampling, we get a chance to see differences in water levels and weed growth among seasons and years at the different waterways. This month, field work for round #10 was completed.

Some of the key variables measured during habitat assessements.

Physical	Chemical	Biological
water velocity	nitrate	algae
temperature	phosphorus	macrophytes
dissolved oxgyen	pH	invertebrates
sediment depth	conductivity	
vegetation cover		

The habitat assessment data is useful to look at changes and trends in a waterway over time and to see what impact a restoration tool might be having on water quality and biodiversity.

As part of our research, we are also assessing which combination of indicators are most useful in agricultural waterways.

Hilary measuring sediment depth.

Science outreach - He Puna Pūtaiao

We have been involved with this University of Canterbury Outreach programme, which brings together research, Māori youth and science, since it began in 2013. Students from four local high schools work together with scientists and postgraduate mentors from UC on research related to water quality issues in Te Waihora/Lake Ellsemere.

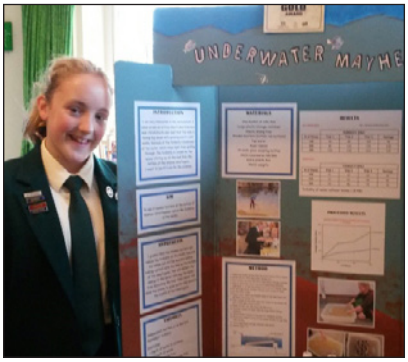
Our CAREX site at Silverstream was one of the sites students visited to learn about water chemistry and invertebrate sampling techniques and to collect samples for analysis.

UC postgrads help students with field sampling.

Inspiring young scientists

Congratulations to Jessica, a year 7 student at Craighead School in Timaru who won the CAREX Prize for best freshwater related project at the Sanford Science and Technology Fair in September. Jessica tested whether wooden barriers placed at the bottom of shallow lakes or lagoons could reduce turbidity and increase light penetration so plants could grow. These kinds of barriers could be trialled in Te Waihora/Lake Ellesmere, which has significant turbidity issues. This month, Jessica joined the CAREX team for a day in the field to learn more about agricultural waterways and help with sampling.

We were also excited to see the results of Sara's weed mat project, which looked at different types of weed mat and soil moisture. Sara's parents are landowners involved in the CAREX project. She won a bronze award for her research - well done, Sara!



New website address

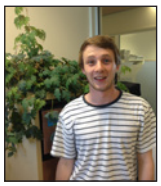
We have a new website address with the same good stuff! Check it out at: **www.carex.org.nz.** Look there for a few new handouts on macrophytes, sediment and nutrient tools early in the new year.

CAREX team news

Congrats to PhD student, Katie Collins, who won 2nd best talk at the Waterways conference held at LIncoln University in November!

We welcome Alice, Will, and Tim to the CAREX team this summer. Alice and Will are UC summer students who will be helping with on-going experiments and field work. Tim is an MSc student working on habitat additions. We are also pleased to be collaborating with Nikki Burrows and Dr. Kevin Simon from the University of Auckland on their project looking at greenhouse gas emissions and riparian management practices. More on their research in our next newletter.

Alice



Will

Tim

Nikki

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.

CAREX Canterbury Waterway Rehabilitation Experiment

UC SCIENCE

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