

NZ has 425,000 km of rivers and streams and 3,820 lakes

Degradation in water quality is due to high inputs of nutrients, sediments and bacteria from farm run-off; and removal of vegetative filters around rivers and lakes.

UTILISING MĀNUKA TO IMPROVE WATER QUALITY

KEY BENEFITS OF MĀNUKA RIPARIAN PLANTING



Decreased levels of nitrate and *E. coli*.



Opportunities for honey and essential oils development.



Increased native planting and ecosystem services



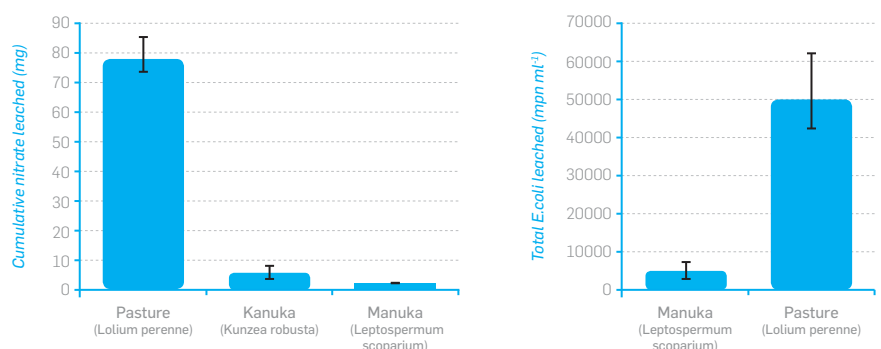
Decreased sedimentation and improved erosion control

Water pollution in NZ is an increasing concern. Nutrient loss from agricultural areas is a major source of pollution for freshwater and coastal systems. The three main water pollutants of greatest concern (the big three) are: **Pathogens** (measured by *E. coli*), **Sediment**, and **Nutrients** (N and P).

The research team at CIBR have shown that incorporating bioactive plants into bio-diverse riparian planting schemes has the potential to both filter and inactivate pollutants from intensive agriculture leading to improvements in water quality.

*“bioactive/antimicrobial compounds produced by myrtaceae plants, especially Mānuka (*Leptospermum scoparium*), can inhibit the conversion of ammonia into nitrate and nitrous oxide, and also enhance the die-off of pathogenic organisms in the wastes that pass through their root systems.”*

Reductions in Nitrate and *E. coli* leaching



Project Update

	2014	2015	2016	2017	2018	2019	2020
Experimental proof of concept	█						
Lab validation	█						
Validation in small scale soil systems		█					
Validation in large scale soil systems			█				
Validation in operational environment				█			
Demonstrable environmental benefits on key flag ship sites						█	
Data on nitrogen and <i>E. coli</i> reductions for potential incorporation into farm models such as OVERSEER®.						█	
System complete and qualified.							█

We're currently looking at setting up working examples of the manuka-dominated riparian zone that can be used as "flagship" sites to collect data and develop farm models. This work will enable detailed plans to be drawn up for retirement and planting of riparian zones and critical source areas, which maximises the benefits to water quality, biodiversity, and cost off-sets, such as the production of natural products or browse supplements. If you wish to help with this project please contact Jacqui below.

Biographies



Jacqui Horswell

Jacqui Horswell is an environmental microbiologist and science leader at ESR. She has a wealth of experience of the New Zealand waste and land management sectors, having worked with them on her research for over 18 years. She is one of New Zealand's leading experts on microbial contaminants (e.g. pathogens) in human and agricultural waste.

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Brett Robinson

Brett is an associate professor in the Faculty of Agriculture and Life Sciences at Lincoln University. In addition to teaching a range of courses on soil science, chemistry, biogeochemistry and climate change, he researches soil-plant interactions.

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James Ataria

James is a senior lecturer at Lincoln University where he lectures in ecotoxicology and Māori and the environment. James also works for the Cawthron Institute on Māori business development and ecotoxicology. He has an interest on freshwater quality and the application of science to align with Māori concerns and its interface with mātauranga Māori.

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Research Articles

Dickinson, N.; Marmiroli, M.; Das, B.; McLaughlin, D.; Leung, D. and Robinson, B., (2015). [Endemic Plants as Browse Crops in Agricultural Landscapes of New Zealand.](#)

Franklin, H.M.; Dickinson, N.M.; Esnault, C.J.D. and Robinson, B.H., (2015). [Native Plants and Nitrogen in Agricultural Landscapes of New Zealand.](#)

Hahner, J.L.; Robinson, B.H.; Zhong, H.T. and Dickinson, N.M., (2014). [The Phytoremediation Potential of Native Plants on New Zealand Dairy Farms.](#)

Prosser, J.A.; Anderson, C.W.N.; Horswell, J.; Speir, T.W., (2014). [Can Manuka \(Leptospermum Scoparium\) Antimicrobial Properties be Utilised in the Remediation of Pathogen Contaminated Land?](#)

Prosser, J.A.; Woods, R.R.; J.A., H. and Robinson, B.H., (2016). [The Potential In-situ Antimicrobial Activity of Myrtaceae Plant Species on Pathogens in Soil.](#)