



## Rebecca S. Eivers, PhD

*Freshwater Ecologist /Constructed Wetland Specialist*

### Education

PhD – Agricultural Constructed Wetlands, University of Waikato, 2018

MSc (Hons) – Environmental Science/Freshwater, University of Canterbury, 2006

BSc – Zoology & Psychology, University of Canterbury, 2001

Rebecca has twelve years' experience as a freshwater ecologist and scientist working in stream, wetland and lake environments focusing on freshwater resource management issues. She has excellent knowledge of land use impacts on water quality, sources of contaminants (nitrogen, phosphorus, sediment, heavy metals and pathogens) as well as transport mechanisms and pathways. Rebecca has a comprehensive knowledge of water quality impacts on ecological health, biodiversity and ecosystem resilience, particularly regarding macroinvertebrate, fish and zooplankton communities. Her PhD research on constructed treatment wetlands in agricultural landscapes and MSc investigating riparian buffers in pine forested catchments epitomizes Rebecca's passion for applied ecological solutions to land use impacts. Both local government and consulting experience enables Rebecca to provide sound and relevant expert technical advice regarding environmental and freshwater issues relating to land use impacts and developments within private, public and industry sectors. Rebecca has project management experience overseeing work plans, organising staff and managing budgets, and has excellent communication skills with a proven ability to translate technical work for non-technical audiences. She is also proficient in using GIS mapping software, and conducting statistical analyses using R software.

Specialty areas:

*Water quality*

*Freshwater ecology*

*Constructed treatment wetlands*

*Wetland restoration*

*Riparian management*

*Environmental Impact Assessments*

*Integrated Catchment Management*

*Stream Ecological Valuations (SEVs)*

### Experience Highlights

- Wetland Ecologist, Waikato Regional Council, Hamilton, August 2014-August 2016
- Freshwater Ecologist, Morphum Environmental, Auckland, 2008-2010
- Environmental Consultant, Mouchel Parkman, London UK, 2007-2008
- Field Research Assistant, Operation Wallacea, Cusuco National Park, Honduras, 6 months, 2007
- Freshwater Ecologist, Selwyn Plantation Board, Christchurch, 6 months, 2005

### Selected Examples of Relevant Experience

**Floating Treatment Wetland (FTW), Lake Areare, Manaaki Whenua Landcare Research, 2019-present.** Investigated the treatment performance of a FTW installed on a major inlet watercourse to Lake Areare as part of the Living Water partnership. The FTW aims to reduce nitrogen, phosphorus, and sediment inputs to the lake.

**Constructed treatment wetland (CTW), Wharekawa Focus Catchment, Waikato Regional Council, 2020.** Designed farm-scale CTW consisting of two offline sedimentation ponds on watercourses that discharges into the Wharekawa Stream, (Coromandel). The CTWs are a demonstration site and aim to reduce sediment inputs to the Wharekawa Harbour. They are also part of the restoration of a downstream wetland which aims to improve habitat for wildfowl and wetland birds.

**Lake Ruatuna Restoration, Living Water (Department of Conservation & Fonterra partnership), 2018-present.** Investigated nutrient and sediment sources to the lake, provided expert analysis of existing data, FEPs, historical information, council routine monitoring, and Living Water monitoring of existing CTWs. Implemented water quality and quantity monitoring to better quantify pollutant loads to the lake and understand seasonal variability. Involved local hapu, Ngaati Apakura, with monitoring and surveying for black mudfish. Provided technical advice regarding on farm good management practices, helped to prioritise activities, and identified what edge of field interventions are likely to have the greatest impact on reducing sediment and nutrient inputs to the lake for the lowest cost.

**Expert Witness, Plan Change One, Auckland Waikato Fish & Game, 2019.** Provided technical advice and evidence relating to contaminant sources, pathways, and mitigations. Prepared and presented evidence at the PC1 hearings.

**Water Quality & Quantity Monitoring, Cookson Trust Farms, 2018-present.** Monitoring of water quality and quantity for watercourses draining intensive agricultural catchments, one supporting dairy cow grazing, the other a cut-and-carry dairy goat operation. Monitoring supports on-going works to reduce downstream exports of nitrogen, phosphorus, and sediment, to the Waitoa River.

**Advance Riparian Management Zones (ARMZs), Cookson Trust Farms, 2019.** Designed ARMZs on watercourses draining intensive agricultural catchments, one supporting dairy cow grazing, the other a cut-and-carry dairy goat operation. The watercourses flow to the Waitoa River on the Hauraki Plains, near Springdale (Waikato). The ARMZs consisted of recontouring the upper banks of the watercourse to create a floodplain, and planting with variety native wetland sedges, grasses and rushes to improve water quality and biodiversity values.

**Constructed treatment wetlands (CTWs), Waitekuri Focus Catchment, Waikato Regional Council, 2019.** Designed farm-scale CTW consisting of an offline sedimentation pond on a watercourse that discharges into the Waitekuri River and Whangapoa Harbour (Coromandel). CTW is a demonstration site and aims to reduce sediment inputs to the Whangapoa Harbour.

**Constructed treatment wetland treatment train (CTW-train), Cookson Trust Farms, 2019.** Designed farm-scale CTW-train on a watercourse draining an intensive agricultural catchment supporting dairy cow production. The watercourse flows to the Waitoa River on the Hauraki Plains, near Springdale (Waikato). The CTW-train consists of an offline sedimentation pond-module and shallow wetland-module in series, designed to reduce sediment, nitrogen, and phosphorus exports to the downstream receiving environment.

**Constructed treatment wetland treatment train (CTW-train), Lake Milicich, NZ Landcare Trust, 2019.** Designed farm-scale CTW-train on an inlet watercourse draining an agricultural catchment to Lake Milicich, Rukuhia (Waikato). CTW-train consists of an offline sedimentation pond-module and shallow wetland-module in series designed to reduce sediment, nitrogen, and phosphorus loads to the shallow peat lake.

**Constructed treatment wetland, Lake Ngaroto-iti, NZ Landcare Trust, 2019.** Designed farm-scale CTW on an inlet watercourse draining an intensive agricultural catchment to Lake Ngaroto-iti, Ohaupo (Waikato). CTW consists of an offline sedimentation pond-module designed to reduce sediment and phosphorus loads to the shallow peat lake.

**Constructed treatment wetland guidelines for agricultural shallow lake catchments, Waikato Regional Council, 2016.** Created constructed treatment wetlands (CTW) technical guidance document based on PhD research. Details designs and considerations for CTWs treating diffuse sources of nutrients and sediment from intensive agricultural land use (dairy farming).

**Constructed treatment wetland, Lake Rotopiko/Serpentine, Department of Conservation, 2015.** Designed constructed treatment wetland on Lake Rotopiko/Serpentine South, Ohaupo. CTW was installed to improve the water quality of two streams draining an intensive agricultural catchment and four-laned highway, flowing into the lake.

**Constructed treatment wetland, Lake Ngaroto, NZ Landcare Trust, 2015.** Designed constructed treatment wetland on private land within the Lake Ngaroto catchment. CTW was installed to improve the water quality of a stream draining a large intensive agricultural catchment, flowing into the lake.

**Integrated Catchment Management Plan – Lake Ngaroto, NZ Landcare Trust, 2014.** Created ICMP for Lake Ngaroto with NZ Landcare Trust drawing upon field assessments of ecology,

**Integrated Catchment Management Plan – Lake Rotomanuka. NZ Landcare Trust, 2013.** Created ICMP for Lake Rotomanuka with NZ Landcare Trust drawing upon field assessments of ecology, engineering assets and water quality.

**Meola Creek Watercourse Management Plan, Metrowater/Auckland City Council, 2009.** Created a Watercourse Management Plan (WMP) drawing upon stream-walk assessments of ecology and engineering assets carried out by Morphum Environmental Ltd.

**Peer Review of SEV and Stream Diversion Design, Auckland Regional Council, 2009.** Critiqued an Assessment of Environmental Affects (AEE) for a proposed stream diversion including the diversion design and stream ecological assessments including Stream Ecological Valuations (SEVs).

**Warkworth Stream Survey, Rodney District Council, 2009.** Carried out stream surveys and ecological assessments on a number of rural streams in the Warkworth area. Included assessments of ecological and chemical variables as well as assessments of engineered assets and GIS mapping.

**Station Rock Subdivision, Great Barrier Island, Private Developer, 2009.** Surveyed 3 native-forested headwater streams on Great Barrier Island. Included macroinvertebrate sampling, assessments of channel morphology, stability, flow velocities, water chemistry (testing for drinking water standards) and GIS mapping.

**Manukau Harbour Stream Assessment, Metrowater, 2008.** Assessed 3 urban streams within partially forested catchments based on the Auckland City Urban Stream Classification 2004 (Technical Publication No. 232; NIWA, 2005), the ARC Air Land and Water Plan and the Stream and Asset Survey Stream Walk Methodologies (MEL, 2007). Included assessments of ecological and chemical variables as well as engineering assets.

## **Recent Peer Reviewed Publications**

**Eivers, R.S. (2018).** Constructed treatment wetlands: Tools to attenuate diffuse agricultural pollution and enhance the biodiversity of eutrophic peat lake ecosystems. A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Biological Sciences at the University of Waikato.

**Eivers, R.S.**, Duggan, I.C., Hamilton, D.P., Quinn, J.M. (2018). Constructed treatment wetlands provide habitat for zooplankton communities in agricultural peat lake catchments. *Wetlands*, Volume 38, Issue 1, pp 95–108

**Eivers, R.S.**, Hamilton, D.P., Quinn, J.M. (in review). Constructed treatment wetland design considerations to mitigate diffuse pollution from intensive agricultural peat lake catchments. *Submitted to Ecological Engineering*.

**Eivers, R.S.**, Hamilton, D.P., Quinn, J.M. (in review). Spatial and temporal complexity of nutrient and sediment loads to peat lakes from intensive agricultural catchments. *Submitted to Nutrient Cycling in Agroecosystems*.

**Eivers, R.S.** (2006). The response of stream ecosystems to riparian buffer width and vegetative composition in exotic plantation forests. *MSc thesis, Department of Biological Sciences, University of Canterbury, Christchurch, NZ.*

**Eivers, R.S.**, Norton, D.A. & J.S. Harding (in prep). The response of pine forested stream invertebrate communities to forest age and riparian composition. *Journal of Marine and Freshwater Research*.

**Eivers, R.S.** & J.S. Harding (in prep). The influence of vegetative age and composition at multiple scales on stream geomorphology and water chemistry in pine plantations. *New Zealand Journal of Marine and Freshwater Research*.

## **Selected Reports**

**Eivers, R.S.** (2016). Guidance & considerations for design and installation of constructed wetlands in shallow lake catchments. Waikato Regional Council Internal Series 2016/10. *Technical report prepared for Waikato Regional Council*.

**Eivers, R.S.** (2014). Lake Serpentine South: Inflowing Drain Water Quality. Centre for Biodiversity and Ecology Research, The University of Waikato. *Report prepared for Waikato Regional Council*.

**Eivers, R.S.** & D. Young (2009). Little Shoal Bay Stream - Stream Ecological Evaluation. *A report prepared for the North Shore City Council*.

**Eivers, R.S.** & D. Young (2009). Alexandra Stream - Stream Ecological Evaluation. *A report prepared for the North Shore City Council*.

**Eivers, R.S.**, Coup, J. & D. Young (2009). Meola Creek Watercourse Management Plan. *A report prepared for Auckland City Council & Metrowater*.

Clarke, C. & **R.S. Eivers** (2009). Stream Survey and Asset Assessment of the Warkworth Catchment. *A report prepared for Auckland City Council & Metrowater*.

Coup, J., **Eivers, R.S.** & D. Young (2009). Manukau Harbour Streams Survey and Classification. *A report prepared for Auckland City Council and Metrowater*.

**Eivers, R.S.** & J.S. Harding (2005). Assessment of the ecology of Tumbledown and Te Oka Bay streams. *A report prepared for Selwyn Plantation Board Ltd.*

## **Recent Presentations**

**Eivers, R.S.**, Hamilton, D.P., Quinn, J.M. (2013). A decision making toolbox for constructed wetland design within areas of intensive agricultural land-use. Poster presentation. *New Zealand Freshwater Sciences Society Annual Conference, Hamilton, NZ.*

**Eivers, R.S.,** Hamilton, D.P., Quinn, J.M. (2012). Attenuating Sediment and Nutrient Losses from Intensive Agriculture – Restoring Eutrophic Shallow Lakes. Oral presentation. *13<sup>th</sup> International Conference Wetland Systems for Water Pollution Control, Perth, Australia.*

**Eivers, R.S.,** Hamilton, D.P., Duggan, I.C., Quinn, J.M. (2012). The dual benefits of constructed wetlands: Pollutant attenuation and habitat provision. Poster presentation. *National Wetland Symposium, Invercargill, NZ.*

**Eivers, R.S.,** Hamilton, D.P., Quinn, J.M. (2011). Restoring Eutrophic Shallow Lakes using Constructed Wetlands: Pollutant attenuation & Habitat Provision. Oral presentation. *Joint Australian Society for Limnology and New Zealand Freshwater Sciences Society Conference, Brisbane, Australia.*

**Eivers, R.S.,** Hamilton, D.P., Quinn, J.M. (2011). Attenuating Sediment and Nutrient Losses from Intensive Agriculture – Restoring Eutrophic Shallow Lakes. Oral presentation. *15<sup>th</sup> International Conference of the IWA Diffuse Pollution specialist Group, Rotorua, NZ.*

**Eivers, R.S.,** Hamilton, D.P., Duggan, I.C., Quinn, J.M. (2011). Lake Restoration and the Dual Benefits of Constructed Wetlands - Habitat Provision and Pollutant Attenuation. Oral presentation. *New Zealand Ecological Society Annual Conference, Rotorua, NZ.*

**Eivers, R.S.,** Hamilton, D.P., Quinn, J.M. (2010). Attenuating Sediment and Nutrient Losses from Dairy Farms – Restoring Shallow Peat Lakes. Poster Presentation. *New Zealand Freshwater Sciences Society Annual Conference, Christchurch, N.*

