

Louis A. Schipper, PhD

Contact

Department of Earth and Ocean Sciences
University of Waikato, Private Bag 3105
Hamilton, New Zealand 3240
Ph: 64 7 838 4468
Schipper@waikato.ac.nz
Website: <http://sci.waikato.ac.nz/staff/erth/schipper>

Education

BSc (1985), MSc 2(1) (1987), PhD (1992), University of Waikato

Employment record

2005-present: Department of Earth and Ocean Sciences, University of Waikato
Associate Professor 2007 –present
Senior Lecturer 2005 – 2006
1994-2005: Landcare Research, Hamilton, New Zealand
Programme leader 1995 – 2005
Scientist, Objective leader 1994 – 2005
1992-1994: Postdoctoral Research Associate, Soil and Water Science Dept., Gainesville,
University of Florida.
1989-1992: PhD candidate, Forest Research Institute, Rotorua, NZ
1987-1989: Research Assistant, Forest Research Institute, Rotorua, NZ

Awards

- Elected a Fellow of the Soil Science Society of America, 2009.
- Elected a Fellow of the New Zealand Soil Science Society, 2008.
- Kudos Award for Excellence in Environmental Science from The Hamilton Science Awards Trust and Environment Waikato (\$8,000 Award) October 2007.
- Presented with an award for “Outstanding services” March 2006 by the Technical Committee of the New Zealand Land Treatment Collective.
- Ronald Hicks memorial award (2005) New Zealand Water & Wastes Association. This annual award is to be made to the author(s) of an article or paper considered significant in solving or clarifying sewage treatment or water pollution problems in New Zealand.
- Citation of Excellence for Associate Editors, from President and Editor-in-chief of Soil Science Society of America, 2006.
- Humes/NZ Water and Wastes Association paper of the year 1999. NZ Water and Wastes Association annual conference.
- Morice Fieldes Award (NZ Society of Soil Science) for most meritorious PhD thesis of 1993.
- Manaaki Tanagata fellowship (2000) from Landcare Research funded travel throughout research centers throughout the US and Canada for three weeks.
- Travel and accommodation grant NATO Advanced Research Workshop. Nebraska, 1990.

Service and membership of professional societies

- Appointed to the William H. Patrick Memorial Lectureship Committee by President of Soil Science Society America, 2009-2010.

- Associate Editor Soil Science Society of America Journal (2005–2010).
- Guest Editor Ecological Engineering (2009-2010) Special issue on denitrification.
- Convening judge for KUDOS environmental award on behalf of The Hamilton Science Awards Trust 2008, 2009. Contributing judge 2010.
- Editorial Committee of Australian Journal of Soil Research as a representative of the New Zealand Soil Science Society (October 2007-2010)
- Committee member of New Zealand Soil Science Society (2006-2008; re-elected 2008-2010)
- Appointed chair "Glossary of Soil Science Terms" committee of Soil Science Society America, 2006.
- Presented to Parliamentary Primary Production Select committee (April 2005) with Parliamentary Commissioner for the Environment on his Growing for Good report and New Zealand Nitrogen budget.
- Steering committee Research Coordination Network (RCN) for Denitrification funded by United States NSF (2005–present)
- Committee member representing Division S-10 (Wetlands) on the "Glossary of Soil Science Terms" committee of Soil Science Society America. (2004–2006)
- Twice elected Committee member, Land Treatment Collective Technical Committee (1999 – 2005). Seconded member of committee 2005-2006.
- Member of Soil Science Society of America, New Zealand Society of Soil Science, and New Zealand Microbiology Society Inc.

Invited speaker/panel discussions

- Asked by MAF to present on behalf of New Zealand researchers on potential for collaboration between New Zealand and Australia at a joint workshop between New Zealand and Australian researchers invitation only. Joint presentation with Dr Jeff Baldock (CSIRO) selected by Australian equivalent. 2009.
- Schipper L.A. (2009) Enhancing denitrification by incorporating carbon sources. Denitrification in Managed Ecosystems, Denitrification Research Collective Network Workshop, University of Rhode Island. 12-14th May.
- Vice Chancellor Winter Seminar Series “Changing elements of sustainable landuse: carbon, nitrogen, and phosphorus” University of Waikato. August 2008.
- Livestock Long Shadow recorded panel discussion with Dr Henning Steinfeld, Hamilton, 30th Nov 2007
- Schipper, L.A. (2007) Manipulating Denitrification: Lessons Learnt from Riparian Research. Soil Science Society of America Annual Conference. New Orleans.
- Invited panelist PCE20 Forum 20th year forum Parliamentary Commissioner for the Environment, Wellington 1-2 March 2007.
- Keynote address: Land Treatment Collective conference. Auckland 7-9 March 2005.
- Invited opening plenary speaker to American Water Resources Association “Riparian Ecosystems and Buffers: Multi-scale structure, function, and management”. June 28th – 30th, 2004 Lake Tahoe. Travel and accommodation expenses paid.
- Schipper, L.A. (2001) Denitrification walls: successes and limitations. American Geophysics Union, Boston May 2000. Registration waived.
- Schipper, L.A. (1999) Environmental filters. Manaaki Whenua conference. Wellington
- Schipper, L.A. (1995). Wetlands: microbial playgrounds and hideouts. Invited presentation Soil Science Society of America Annual Conference, Wetland symposium. October 1995.
- Schipper, L.A. (1994). Nitrogen dynamics in riparian wetlands - recent New Zealand research. Invited speaker at the Riparian Symposium at Soil Science Society of America

Annual Conference. Seattle 14-17th November.

- Schipper, L.A.; Cooper, A.B.; Dyck W.J. (1990). Mitigating non-point source nitrate pollution by riparian zone denitrification. Nitrate Contamination: Exposure, Consequence and Control. A NATO Advanced Research Workshop. Lincoln, Nebraska Sept 1990. Travel and accommodation expenses paid.

Courses taught

2005-present

Erth234 Soil Properties and their Management

Erth334 Soil and Land Management

Erth531 Soil and Environmental Quality

Student and postdoc supervision

Postdoc

- S Rutledge (2010-present) Manipulating soil carbon in pastures
- J. Nieveen (2002-2003) Controls of peat degradation used for agriculture

PhD

In progress

- P. Mudge (PhD candidate 2009-present) ^{15}N as an indicator of land development. Chair.
- B. Welten (PhD candidate 2009-present) Nitrification inhibitors. Chair.
- S. Warneke (PhD Candidate 2007-present) Microbial ecology of denitrification beds. Chair.
- S. Cameron (PhD Candidate 2006–present) Nitrate removal potential and hydraulic performance of carbon media for denitrification reactors. Chair.
- S. Rutledge (PhD candidate submitted) Controls of organic matter degradation at Torehape peat mine. Co-chair.
- T. Hodges (PhD candidate at Massey University 2006-present) Competition between wetland plant species *Empodisma minus* and *Chionochloa rubra*. Committee member.
- S Lambie (PhD candidate, 2006–present) Soil Organic Matter Loss Under Pasture and Pine: Responses to Urine Addition. Chair.

Completed

- S. Rutledge (PhD completed 2010) Controls of organic matter degradation at Torehape peat mine. Co-chair.
- Zoe Xie (PhD completed 2009) Environmental Impacts of Effluent Containing EDTA from Dairy Processing Plants. Committee member.
- S. Fraser (PhD completed 2007) Effects on Forest Ecosystems due to Application to Soil of Pulp and Paper Waste Solid Residuals. Co-chair.
- B. Clarkson (PhD completed 2005) Restiad peat bog development, with emphasis on nutrition and mineral use efficiency of dominant species. University of Waikato, NZ. Committee member.
- J. Smith (PhD completed 2003). Water and carbon budgets of Waikato peat bogs. University of Waikato, NZ. Committee member.
- L. Barton (PhD completed 1998). Denitrification in a land treatment system. University of Waikato, NZ. Committee member.

M.Phil and MSc (Chair)

- L. Long (MPhil 2010-present) Longevity of nitrate removal in a denitrification wall. University of Waikato

- D Wallace (2010) Carbon dynamics of a dairy pasture: annual balance and impact of cultivation. University of Waikato.
- P. Mudge (2009) Annual carbon balance of an intensively grazed pasture: magnitude and controls. University of Waikato. Winner *TW Walker Prize* for best oral presentation by a student at NZSSS annual meeting.
- C. Fritz (MPhil 2007) Mire breathing. Committee member.
- N. Watkins (2007) Nitrification inhibitors and denitrification. University of Waikato. Awarded Sir Theodore Rigg award for masterate thesis.
- L. Duncan (1999). Controls of microbial functional diversity. University of Waikato.

MSC (committee member)

- James Blyth (present), Glen Treweek (present), Riki Lewis (present), Tehani Kuske (2009), Danfung Binoka (2008).

Major funded projects (GST exclusive)

- SLMACC funding through MAF2010-2012. Soil profile C resampling. Subcontract to Landcare Research. Pending contract signing. \$86K (initial estimate)
- DairyNZ funding for students stipends 2010 \$20K.
- Contract to NZ Centre for Agricultural Greenhouse Gas Research 2010. Manipulating Carbon stocks \$53K.
- Contract to NZ Centre for Agricultural Greenhouse Gas Research 2010. Soil Carbon map. \$35K
- Contract to NZ Centre for Agricultural Greenhouse Gas Research 2010. Equipmeny funding to purchase Eddy-covariance tower. \$67K.
- DairyNZ funding for students stipends 2009 \$15K.
- Contract to MAF (2009) to contribute to a review of measurement techniques for assessing soil carbon stocks and change in NZ's agricultural soils. Subcontract through Landcare Research \$17 K.
- Riches to rags: does elevated productivity drive ecosystem decay in adjacent natural habitats? Marsden Fund proposal with Canterbury University. Associate investigator (\$ 114K total 2008 – 2010).
- Subcontracted GNS Science Isotopes as Indicators of Land-to-Water Nitrogen Transfers (\$206,000 total Oct 2008 – July 2010).
- DairyNZ funding for students stipends 2008 \$10K.
- MAF carbon stocks and change in NZ's soils and forests, and the implications of post-2012 accounting options for land-based emissions offsets and mitigation opportunities. Subcontract to Landcare Research \$10.2K. 2008.
- Subcontracted "Sustaining Soil Services" \$76.5K/yr for 6 years Landcare Research (2007-present)
- Subcontracted "Soil Services for sustainable land development" \$50K/y (2005-2007), and "Wetland Restoration" \$5K Landcare Research (2005-2009).
- Soil Services for sustainable land development. 2003 – 2005. Foundation for Science, Research, and Technology. \$1,500,000 annual budget for 4 years.
- Soil Processes and Ground water protection. 2001–2003. Foundation for Science, Research, and Technology. \$1,200,000 annual budget for 3 years.
- Land-based effluent treatment. 1998-2000. Foundation for Science, Research, and Technology. \$525,000 annual budget for 6 years.
- Ten proposals addressing soil quality issues in effluent irrigated sites granted over the past 7 years. New Zealand Dairy Research Institute totaling nearly \$350,000.

- Trialing soil quality indicators for State of the environment monitoring. 1995. Ministry for the Environment with supporting funding from three Regional Councils. \$259,102 over 3 years
- Land-based effluent treatment. 1995-1998. Foundation for Science, Research, and Technology. \$409,000 annual budget for 3 years.

Patents

Daughney C.J.; Cameron S.C.; Reeves, R.R.; **Schipper**, L.A. (2005) Nitrate removal in waste water systems. New Zealand patent 535179.

Cameron S.C.; **Schipper**, L.A. (2009) Nitrate removal in waste water systems. New Zealand patent 575770.

List of publications

Refereed Research Publications including book chapters

Schipper, L.A.; Gold, A.J.; Davidson E.A. (accepted) Managing denitrification in human dominated landscapes. Editorial for *Ecological Engineering special issue*.
doi: 10.1016/j.ecoleng.2010.07.027

Schipper, L.A.; Robertson, W.D.; Gold A.J.; Jaynes, D.B.; Cameron, S.C. (accepted) Denitrifying bioreactors – an approach for reducing nitrate loads to receiving waters. *Ecological Engineering*. doi:10.1016/j.ecoleng.2010.04.008.

Parfitt, R.L.; Ross, C; **Schipper, L.A.**; Claydon, J.J.; Baisden, W.T.; Arnold, G. (2010) Correcting bulk density measurements made with driving hammer equipment. *Geoderma*, 157: 46-50.
doi: 10.1016/j.geoderma.2010.03.014.

Cameron S.C.; **Schipper L.A.** (accepted) Nitrate removal and hydraulic performance of carbon substrates for potential use in denitrification beds. *Ecological Engineering*.
doi:10.1016/j.ecoleng.2010.03.010.

Schipper, L.A.; Cameron, S.C.; Warneke S. (on line) Nitrate removal from three different effluents using large-scale denitrification beds. *Ecological Engineering*.
doi:10.1016/j.ecoleng.2010.02.007.

Rutledge, S.; Campbell DI; Baldocchi D.; **Schipper, L.A.** (on line) Photodegradation leads to increased CO₂ losses from terrestrial organic matter. *Global Change Biology*. doi: 10.1111/j.1365-2486.2009.02149.x

Schipper, L.A.; Sparling, G.P. (on line). Accumulation of soil organic C and change in C:N ratio after establishment of pastures in New Zealand. *Biogeochemistry*. Doi: 10.1007/s10533-009-9367-z.

Schipper, L.A.; Dodd, M.; Fisk, L.M.; Power, I.; Parenzee, J.; Arnold G. (on line) Trends in soil carbon and nutrients of hill-country pastures receiving different phosphorus fertilizer loadings for 20 years. *Biogeochemistry*. Doi: 10.1007/s10533-009-9353-5.

Clarkson, B.R.; **Schipper, L.A.**; W.B. Silvester (2009) Nutritional niche separation in co-existing bog species demonstrated by 15N-enriched simulated rainfall. *Austral Ecology*, 34: 377-385.

Schipper, L.A.; McGill, A. (2008) Nitrogen transformation in a denitrification layer irrigated with dairy factory effluent. *Water Research*. 42:2457–2464 doi:10.1016/j.watres.2008.01.033

Parfitt, R.L.; Baisden, W.T.; **Schipper, L.A.**; Mackay, A.D. (2008) Nitrogen inputs and outputs for New Zealand at national and regional scales: past, present and future. *Journal of the Royal Society of New Zealand*. 38(2): 71–87.

Schipper L.A. (2008) In: Discussion of: Schroder, J.J. Neeteson, J.J. (2008) Nutrient management regulations in The Netherlands (with Discussion), *Geoderma*. 144: 426–434.

Barkle, G.F.; **Schipper, L.A.**; Burgess, C.P.; Milne J.; Painter, B.D. (2008) Insitu mixing of organic matter decreases conductivity of denitrification walls in sand aquifers. *Groundwater Monitoring*

- Remediation*. 28(1): 57-64, doi: 10.1111/j.1745-6592.2007.00185.x
- Fritz C.; Campbell D.I.; **Schipper L.A.** (2008) Oscillating peat surface levels in a restiad peatland, New Zealand—magnitude and spatiotemporal variability. *Hydrological Processes*. 22, 3264–3274 DOI: 10.1002/hyp.6912
- Sparling, G.; **Schipper, L.A.**; Yeates, G.; Aislabie, J.; Vojvodic-Vukovic, M.; Ryburn, J.; Di H.J. (2008) Soil characteristics, belowground diversity and rates of simazine mineralisation of a New Zealand Gley Soil in a chronosequence under horticultural use. *Biology and Fertility of Soils*. 44 (4): 633-640
- Schipper, L.A.**; Baisden, W.T.; Parfitt, R.L.; Ross, C.; Claydon J.J. Arnold, G. (2007) Large losses of soil C and N from soil profiles under pasture in New Zealand during the past 20 years. *Global Change Biology*. 13:1138-1144.
- Parfitt, R.L.; **Schipper, L.A.**; Baisden, W.T.; Elliot, A.H. (2006) Nitrogen inputs and outputs for New Zealand in 2001 at national and regional scales. *Biogeochemistry* 80: 71-88.
- Sparling, G.P., L. Barton, L. Duncan, A. McGill, T.W. Speir, **L.A. Schipper**, G. Arnold and A. Van Schaik (2006). Nutrient Leaching and Changes in Soil Characteristics of Four Contrasting Soils Irrigated with Secondary-Treated Wastewater for 4 Years. *Australian Journal of Soil Research* 44 (2): 107-116.
- Sparling G.P.; Wheeler, D.; Vesely E.T.; **Schipper L.A.** (2006) What is soil organic matter worth? *Journal of Environmental Quality* 35: 548-557.
- Nieveen, J.P.; **Schipper L.A.** (2005). The carbon budget of New Zealand peatlands. Pp 411. In: *The Peatlands of Australasian Region*. Whinam, J.; Hope, G. (Eds) Museum of Upper Austria, Austria.
- Schipper, L.A.**; Barkle, G.F.; Vojvodic-Vukovic, M. (2005) Maximum rates of nitrate removal in a denitrification wall. *Journal of Environmental Quality* 34: 1270-1276.
- Clarkson, B.R.; **Schipper, L.A.**; Moyersoen, B.; Silvester, W.B. (2005) Foliar ¹⁵N natural abundances indicates phosphorus limitation of bog species. *Oecologia* 144: 550-557.
- Nieveen, J.P.; Campbell, D.I.; **Schipper L.A.**; Blair, I. (2005) Carbon exchange of grazed pasture on a drained peat soil. *Global Change Biology*. 11: 607-618.
- Barton, L.; **Schipper, L.A.**; G. F. Barkle, M. McLeod, T. W. Speir, M. D. Taylor, A. C. McGill, A. P. van Schaik, N. B. Fitzgerald, and S. P. Pandey. (2005). Plant Uptake and Leaching of Nutrients from Four Contrasting Soil Types Irrigated with Secondary-Treated Domestic Effluent. *Journal of Environmental Quality* 34: 635–644.
- Schipper, L.A.**; Percival, H.J.; Sparling G.P. (2004) An approach for estimating maximum nitrogen storage in soils. *Soil Use and Management* 20:281-286.
- Schipper, L.A.**; Sparling, G.P.; Ross, C. (2004) Letter to editor, *Journal of Soil and Water Conservation* 59(2): 25.
- Clarkson, B.R. **Schipper L.A.**, Lehmann, A. (2004) Vegetation and peat characteristics in the development of lowland restiad peat bogs, North Island, New Zealand, since 13,000 14C years BP. *Wetlands* 24 (1): 133–151.
- Clarkson B.R.; **Schipper, L.A.**; Clarkson, B.D. (2004) Vegetation and peat characteristics of restiad peat bogs on Chatham Island (Rekohu), New Zealand. *New Zealand Journal of Botany* 42: 293–312.
- Schipper, L.A.** and Lee, W.G. (2004) Microbial heterotrophic diversity and community structure in ultramafic soils of West Dome, New Zealand. *Plant and Soil*. 262 (1-2): 151–158.
- Yeates, G.W.; **Schipper, L.A.**; Smale, M.C. (2004) Site condition, fertility gradients and soil biological activity in a New Zealand frost flat heathland. *Pedobiologia*. 48(2): 129-137
- Sparling G.P.; **Schipper, L.A.**; Hill, R.; Bettjeman, W. (2004) Soil quality monitoring in New Zealand: establishment of a national scheme and selecting a minimum data set. *Agricultural Ecosystems and Environment*. 104: 523–534.
- Lilburne L.; Sparling, G.P.; **Schipper, L.A.** (2004) Development of an interpretative framework for soil quality assessment. *Agricultural Ecosystems and Environment*. 104: 535–544.

- Sparling G.P.; **Schipper**, L.A. (2004) Soil quality monitoring in New Zealand: trends and issues arising from a broad-scale survey 1995-2001. *Agricultural Ecosystems and Environment*. 104: 545–552.
- Schipper**, L.A.; Barkle, G.F.; Vojvodic-Vukovic, M.; Hadfield, J.C.; Burgess, C.P. (2004). Hydraulic constraints on the performance of a groundwater denitrification wall for nitrate removal from shallow groundwater. *Journal of Contaminant Hydrology*, 69:263–279.
- Stevenson B.A.; Sparling, G.P.; **Schipper**, L.A.; Degens, B.P.; Duncan, L. (2004) Pasture and forest soil microbial communities show consistent patterns in their responses at a landscape scale. *Soil Biology and Biochemistry* 36:49–55.
- Sparling G.P.; Ross, D.; Trustrum, N.; Arnold, G.; West, A.; Speir, T.; **Schipper**, L. (2003) Recovery of topsoil characteristics after landslip erosion in dry hill country of New Zealand, and a test of the space-for-time hypothesis. *Soil Biology and Biochemistry*, 35: 1575–1586.
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- Sparling G.P.; **Schipper**, L.A. (2002) Soil quality at a national scale in New Zealand. *Journal of Environmental Quality*. 31(6): 1848–1858.
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- Schipper**, L.A; McLeod, M. (2002) Subsidence rates and carbon loss in peat soils following conversion to pasture in the Waikato Region, New Zealand. *Soil Use and Management*. 18 (2): 91–93.
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- Barton L.; **Schipper** L.A. (2001) Regulation of nitrous oxide emissions from soils irrigated with dairy farm effluent. *Journal of Environmental Quality*.30:1881-1887.
- Schipper** L.A., Vojvodic-Vukovic M. (2001) Five years of nitrate removal, denitrification and carbon dynamics in a denitrification wall. *Water Research*. 35/14: 3473–3477.
- Sparling G.P.; **Schipper** L.A.; Russell, J.M. (2001) Changes in soil properties after application of dairy factory effluent to New Zealand volcanic ash and pumice soils. *Australian Journal of Soil Research*. 39(3): 505-518.
- Degens B.P.; **Schipper** L.A.; Sparling, G.P; Duncan L.C. (2001) Is the microbial community in a soil with reduced catabolic diversity less resistant to stress or disturbance? *Soil Biology and Biochemistry*. 33:1143–1153.
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- Sparling, G.P.; Shepherd, T.G.; **Schipper** L.A. (2000). Topsoil characteristics of three contrasting New Zealand soils under long-term indigenous forest, plantation forest, pastures or arable cropping. *NZ Journal of Agricultural Research*. 43:569-583.
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- Degens B.P.; **Schipper**, L.A.; Claydon, J.J.; Russell, J.M. and G.W. Yeates (2000) Irrigation of an allophanic soil with dairy factory effluent for 22 years: responses of nutrient storage and soil biota. *Australian Journal of Soil Research*. 38(1) 25-35.
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