

Welcome to the Soil News

February 2025 Issue 1 -Vol 73

ISSN 1178-8968 (Online)

In this issue...

Welcome to the Soil News

Report from the 2023 to 2024 NZSSS Council

Photos from the conference

Society News

Celebrating our 2024 Award Recipients

NZSSS Award Recipients

New Zealand Society of Soil Science Awards 2025

NZSSS & SSA Soil Judging Competition 2024

Updates to the New Zealand Soil Classification and Soil Description Manual

News from the Regions

Abstracts



Your contributions are required - New Zealand Soil News is your newsletter

John Drewry Manaaki Whenua - Landcare Research Private Bag 11052 Manawatu Mail Centre Palmerston North 4442 email: drewryj@landcareresearch.co.nz



Have you liked us on Facebook? The NZSSS has a Facebook page and Twitter handle (@NZ_Soil_Soc). If you are already a user, please follow us. You can also keep an eye out for new NZSSS posts by checking the feed from our website

Officers of the NZSSS December 2024-2026

President: Pierre Roudier (Manaaki Whenua-Landcare Research) Vice President: Diana Selbie (AgResearch) Past President: Sam Carrick (Manaaki Whenua-Landcare Research) Secretary: Wei Hu (Plant and Food Research) Treasurer: Natalie Bartlett (AgResearch)

Council: Chris Anderson (Massey University); Kirstin Deuss (Manaaki Whenua-Landcare Research; Early Career Researcher); Brendon Malcolm (Plant and Food Research; Awards); Tanya O'Neill (Waikato University); Dori Torres-Rojas (Waikato University); Haydon Jones (Waikato Regional Council; Policy); Jim Moir (Lincoln University); Fiona Curran-Cournane (Ministry for the Environment)

Report from the 2023 to 2024 NZSSS Council

Wow its 2025 - we trust summer has treated all NZSSS members well.

On 4 December 2024 the NZSSS held its Biennial General Meeting (BGM), the primary purpose being the election of a new council for the 2025 - 2026 term. I am very happy to update you that Pierre Roudier was elected as the NZSSS President for this term - I know Pierre will do a great job. It is also great to see the rest of the council decide to stand for another term, with new members Dori Torres-Rojas (Waikato University), Jim Moir (Lincoln University) and Fiona Curran-Cournane (MFE) also putting their hands up and being elected. This year Council farewell Immediate Past President Tim Clough who is retiring from Council after a number of years of service. I'd like to take this opportunity to extend my gratitude to Tim, and the other council members, for your selfless contribution to support our soil science community really is appreciated.

The other important function of the BGM is to present to members the report of council activities for that term. For those members that were unable to attend the BGM, the full report is in this edition of Soil News. A summary of highlights includes:

- A number of outstanding members were recognised through NZSSS awards, with a full report provided in this Soil News. Presentation of awards is always the highlight of the year, and I'd like to take the chance to extend my thanks to Brendon Malcolm for all of your behind-the-scenes organisation.
- This term also saw the addition of two new awards, an Early Career Researcher award, and the Allan Hewitt Trophy, for the New Zealand winners of the Soil Judging Competition.
- The NZSSS finances continue to be in good shape (thanks to the stewardship of our Treasurer Natalie Bartlett, supported by our secretariat Lea Boodee from OnCue)
- The NZSSS website has been refreshed with a range of new content added, thanks to the efforts of Wei Hu and OnCue
- The main initiative of council this term was organizing the Soils Rotorua 2024 joint NZSSS & SSA conference. NZSSS would like to thank the organizing committee of Pierre Roudier (chair), Natalie Bartlett, Kirstin Deuss, Sam Carrick, Carol Smith, Lea Boodee, Sheree Balvert, Jen Owens, Penny MacCormick, Megan Balks, Michael Walker (SSA), Alex Bagnara (SSA). NZSSS would also like to thank the many members who contributed to the field trips, science program, social events and soil judging subcommittees.
- Soils Rotorua was a great success with over 390 attendees from across Oceania, presenting over 190 oral talks and over 70 posters. As expected, the sold-out field trips were a highlight, as was the chance to celebrate World-Soils day on the final day of the conference.
- In the week prior to the conference, 51 attendees from 13 Oceania nations had a great week at the Pacific Soils Analysis and Advice Network, and Pacific Soils Partnership workshop.
- Many of us participated in the hugely successful Moana Oceania Soil Judging Competition, with 150 competitors participating in the 3-day event over the weekend before the conference. NZSSS would like to thank the organizing committee of Carol Smith and Kirstin Deuss (co-chairs), Veronica Penny, Ivanah Oliver, Josh Nelson, Josie Lopez Mazetto, Julie Gillespie, Che

Xueying, Lea Boodee, Sam Carrick, Pierre Roudier, Bianca Das, Callum Rees, Brett Robinson. NZSSS council would also like to extend special thanks to Scott Fraser, Emily McKay, David Lowe, Simon Stokes, Jessie Ross, Gigi Woods, and the 40+ coaches and event volunteers for their amazing contribution and hard work to make the event happen, both during the event and over the preceding months.

Thank you to all our members who contributed to the success of the Rotorua conference, both through your attendance, but particularly the large number that volunteered your time, energy and enthusiasm to help organise over the prior months. I encourage all readers to browse the photo collection in this edition of Soil News. The happiness embodied in these photographs captures a central purpose of the NZSSS, to support a strong peer-network amongst NZ soil scientists. This healthy peer-network was the beating heart of the Rotorua conference, with many new connections made.

Looking forward, many of us face significant change through the science sector reforms over the year ahead. As with any change, the opportunities and risks will vary depending on your position. To me the peer-network of the NZSSS members is a real strength that we have, and I encourage members to not be shy, reach out to your peers - whether it's for support, advice, brain-storming new opportunities, or just having a laugh.

Best wishes to all NZSSS for a successful 2025 Sam Carrick

Photos from the conference

Below are photos from the Soils Rotorua 2024 joint NZSSS & SSA conference in December. All photo credits: Alex Bagnara, Soil Science Australia.



Hon Penelope Wensley delivering the plenary talk to open the conference.



Soil scientists listening to an absorbing talk in the main lecture room.



Andrew Biggs launching the new edition of the Australian 'Yellow book'.



The hall of poster presentations.



The tree of earth-paint hand prints grows during the soil art display.



Dinner at Te Puia with many happy soil scientists.



The Parliamentary Commissioner for the Environment, Simon Upton, during his plenary talk on World Soils Day.



Soil scientists celebrate World Soils day morning tea.



Cutting of the World Soils day cake by the Hon Penelope Wensley and the Hon Simon Upton.

Society News

NZSSS Thirty-Sixth Two-Yearly Report of the NZSSS Council for 2023 - 2024

Covering the period 30 November 2022 until 4 December 2024

SECRETARIAT:

Council meetings:

Eight full meetings of the present Council were held during the reporting period. Meetings were held in 2023 on: 17 March, 9 June, 8 September, 10 November, and in 2024 on: 1 March, 23 May, 12 August and 21 October.

Council:

Members of Council, the number of meetings attended during the reporting period, and roles are reported as follows:

Sam Carrick	8 President	RSNZ, IUSS Liaison, International Soil Initiatives, Public Policy, Constitution review, Conference & Soil Judging committee, Awards committee
Tim Clough	4 Past President	Student Liaison (Lincoln), Constitution review, Awards committee
Diana Selbie	5 Vice President	Strategy & survey, Promotions committee, Awards committee
Wei Hu	6 Secretary	Secretariat Liaison, Website
Natalie Bartlett	6 Treasurer	Finance, Conference committee
Chris Anderson	6	Science Fairs. Student Liaison (Massev)
Brendon	6	Awards Convenor
Malcolm	-	
Havdon Jones	7	Public Policy. Constitution review
Pierre Roudier	8	Public outreach, Soil News Liaison, Conference Chair, Conference & Soil Judging committee
Tanva O'Neill	6	Student Liaison (Waikato)
Kirstin Deuss	7	Early Career rep, Conference & Soil Judging
Dori Torres- Rojas*	3	committee Student Liaison (Waikato)
Non-Council Role	es:	

Secretariat Services
Soil News Editor
Social Media
Soil judging committee chair

*Co-opted member from May 2024 to transition with Tanya O'Neill as Waikato Uni representative once Tanya moved to working in the private sector

General Meetings:

A Special General Meeting was held virtually (online) on 10 November 2023, at which the audited financial report for 2022/23 was approved, as well as the 2022 BGM minutes, the 2023 Presidents report, and initiation of the constitution review.

TREASURY:

The full audited financial statement of the Society's accounts for the 2023/24 period will be presented to the Biennial General Meeting of the Society on 4 December 2024.

The Society's financial position continues to be secure. OnCue Conferences (Lea Boodee) are now conducting administrative duties on the Society's behalf, including managing and reporting membership changes, communicating reminders for annual subscriptions, recording all income and payments, making income payments, and providing secretarial services.

MEMBERSHIP:

Membership	2024	2023	2022	2021	2020
Ordinary	252	250	242	224	245
Student	38	36	39	36	29
Honorary	1	1	1	1	1
Life	14	14	13	13	11
Corporate	0	0	0	0	0
Retired	14	14	16	19	20
Total	319	315	311	293	306
Library subscriptions	8	8	8	8	8

A summary of the Society's membership since 2020 is reported below.

- Membership has been relatively steady over the past 5 years.
- The online membership form is working well. The process in place for overdue memberships including reminders, or resignations if overdue subscriptions persist, is working well.
- Council would like to take the opportunity to recognise our former members who have passed away during this term.

GENERAL COUNCIL:

- A NZSSS Council Strategy for 2023-24 was developed, as well as roles and responsibilities documentation for future NZSSS councils
- A early-career survey has sent out to members to inform future NZSSS strategy and activities (led by Kirstin Deuss)
- A review of the NZSSS constitution has been instigated, to align with the new Incorporated Societies regulations.
- The draft constitution is ready for independent legal review, provided by the Royal Society. Following this the draft will be circulated to members, with the aim to adopt at the 2025 annual general meeting.

SCIENCE POLICY:

- In October 2023 the NZSSS council submitted on the MFE / MPI consultation around two proposed amendments to The National Policy Statement for Highly Productive Land (NPS-HPL).
- The Society will continue to promote the NPS-HPL to protect our valuable soil resource, with further amendments possible, as suggested by the election manifesto of incoming Government political parties.

2023 CONFERENCES & WORKSHOPS:

- The 2023 Norman Taylor awardee was Prof Hong Di, with the lecture series held on 27 November 2023 in Hamilton; 5 December 2023 in Lincoln; and 7 December 2023 in Palmerston North.
- A world soils day event was held on 5 December 2023 at Lincoln University, in collaboration with the Lincoln University Soil Society.

2024 CONFERENCE:

- The main initiative of council this term was organizing the Soils Rotorua 2024 joint NZSSS & SSA conference.
- NZSSS would like to thank the organizing committee of Pierre Roudier (chair), Natalie Bartlett, Kirstin Deuss, Sam Carrick, Carol Smith, Lea Boodee, Sheree Balvert, Jen Owens, Penny MacCormick, Megan Balks, Michael Walker (SSA), Alex Bagnara (SSA)
- NZSSS would also like to thank the many members who contributed to the field trips, science program, social events and soil judging subcommittees.

SOIL JUDGING:

- The NZSSS contributed sponsorship support to the Lincoln University student team to attend the 2023 Australian Soil Judging competition.
- The 2024 Moana Oceania Soil Judging Competition was held in Rotorua, immediately prior to this conference. The event was highly successful with 150 competitors participating, supported by 50 volunteers.
- NZSSS would like to thank the organizing committee of Carol Smith (co-chair), Kirstin Deuss (vice-chair, secretary), Veronica Penny, Ivanah Oliver, Josh

Nelson, Josie LopezMazetto, Julie Gillespie, Che Xueying, Lea Boodee, Sam Carrick, Pierre Roudier, Bianca Das, Callum Rees, Brett Robinson

 NZSSS council would also like to extend special thanks to Scott Fraser, Emily McKay, David Lowe, Simon Stokes, Jessie Ross, Gigi Woods, and the 40+ coaches and event volunteers for their amazing contribution and hard work to make the event happen, both during the event and over the preceding months.

CONTACT WITH OTHER SOCIETIES:

Soil Science Australia (SSA):

- Sam attended the SSSA soil conference in June 2023.
- Rich McDowell was a keynote speaker
- Allan Hewitt, Megan Balks, and David Lowe received the prestigious J.K Taylor medal, in recognition of the outstanding contribution of their book 'Soils of Aotearoa-New Zealand'. Megan and David both attended the conference.
- NZSSS & SSA have collaborated closely on the Joint conference and Soil Judging competitions in Rotorua

Royal Society of New Zealand (RSNZ):

• The NZSSS is a constituent member of the RSNZ, with representation sitting with the President role in the NZSSS. Brent Clothier, past President and chair of the NZSSS, was President of the RSNZ until mid 2024.

International Union of Soil Science (IUSS):

- The NZSSS is a constituent member of the IUSS, with representation sitting with the President role in the NZSSS. RSNZ pays our fees for IUSS membership via the Catalyst fund.
- Pierre Roudier is vice-chair of the IUSS Working Group "Global Soil Mapping", and member of the Advisory Board for IUSS Commission 1.5: Pedometrics
- Carol Smith has agreed to be the NZSSS representative on the newly established IUSS Working Group for International Accreditation.
- NZSSS members Carol Smith, Nicole Schon, Hadee Thompson-Morrison and Yuxin Ma attended the 2024 IUSS centennial celebrations

Global Soil Partnership (FAO, linked to IUSS):

- Sam Carrick, Megan Balks and Pierre Roudier maintain relationships with GSP.
- Primary focus is on the Pacific Soil Partnership, which was formally endorsed at the Pacific Heads of Agriculture and Forestry (PHOAFs) meeting in March 2023.
- Sam Carrick was asked by MFAT and MPI in 2024 to be the NZ focal point representative for the Pacific and Global Soil partnerships.
- Megan Balks is associate editor of upcoming 2025 State of the World Soils report (last published 2015), with Nina Koele and Mathew Taylor leading a cross-agency group of NZ members helping write the NZ section.

EDUCATION, AWARENESS AND COMMUNICATION:

- Council continues to use the NZSSS Strategy to guide activity and resource use, as well as being informed from the 2021 survey of NZSSS membership.
- The NZSSS website continues to be maintained by the NZSSS council, with support from OnCue Conferences. It contains a range of helpful resources including Soil News publications, conference details, promotional activities, soil-related events, and a facility to purchase well-known soil books.
- Over this term the website was updated to include improved navigation, accessibility, and consistent design across devices, along with refreshed content like awards, resources, and member information. New features such as a "Jobs" tab, enhanced social media integration, and streamlined links to publications, organisations, and research centres were also added.
- Trish Fraser continues to maintain and update the NZSSS facebook page.
- We continue to support school science fairs by donating copies of the "Soils in the NZ Landscape' as prizes.
- The Land Use Capability Handbook and reprints of the Soils in the NZ Landscape continue to be sold via the NZSSS website.

PUBLICATIONS:

Soil News:

- John Drewry is editor of the NZSSS quarterly newsletter, Soil News, with ongoing support from the regional correspondents: Thomas Caspari, Carol Smith, Callum Rees, Suzanne Lambie, Tanya O'Neill, Dori Torres-Rojas, Matthew Taylor, Nicole Schon, Juliet Clague, Richard Gillespie, Matt Norris, Simeon Smaill.
- Soil News is now shared via the website with members accessing it using a password shared via email. This quarterly newsletter continues to be the main forum for sharing soil-related information and community activity. The cycle is still four issues per year in approximately February, May, August and November.

Soils in the NZ Landscape:

- 'Soils in the New Zealand Landscape' continues to be available in individual chapters on the NZSSS website and free to download.
- Some additional hard copies have been printed and are available for sale on the NZSSS website.

LUC handbook:

• Hard copies are available for purchase on the NZSSS website.

NZSSS AWARDS (2022 - 2024 PERIOD)

NZSSS Fellowships:

"The NZSSS highest award conferred for distinction either in research, technology, teaching, extension or the advancement of science." **2023** Jiafa Luo

2024 Announced in this Soils News

Grange medal (biennial award):

"Awarded every second year for extraordinary contribution to the promotion or advocacy of soil science." 2022 Keith Cameron 2024 Announced in this Soils News

M.L. Leamy (biennial award):

"Awarded every second year to the author of the most meritorious contribution to soil science published in the last three years." 2022 A Hewitt, M Balks, D Lowe (jointly) 2024 Announced in this Soils News

Blakemore Award (biennial award):

"Awarded every second year for outstanding performance in soil science technical support." The recipient of the Blakemore Award also receives the 'Norman Taylor Trowel'. 2022 John Dando 2024 Announced in this Soils News

Norman Taylor Memorial Award:

"Awarded by the President in recognition of outstanding contributions to soil science in New Zealand." 2022 Mike Beare 2023 Hong Di 2024 Announced in this Soils News

Morice Fieldes Memorial Award (PhD thesis):

"Awarded for the PhD thesis of exceptional merit from those nominated by university departments undertaking soil science work." 2022 Balin Robertson 2023 Hadee Thompson-Morrison 2024 Announced in this Soils News

Sir Theodore Rigg Award (MSc thesis):

"Awarded for the masterate thesis of exceptional merit from those nominated by university departments undertaking soil science work." 2022 Allycia van de Lar 2023 S Ray 2024 Announced in this Soils News

Fertiliser Association Award for final year of study:

"Awarded to third-year doctorate students for their efforts and likely contribution to New Zealand soil science." 2022 Chris Chisholm 2023 Max Nightingdale 2024 Announced in this Soils News

Undergraduate Awards:

2022 H Hay (Waikato) B Deacon (Massey) M Dumaine (Lincoln)

2023 E Morgan (Waikato) O Arnold (Massey) M Picard (Lincoln) **2024** Announced in this Soils News

TW Walker Award for best student oral presentation at the NZSSS Conference: 2022 H Ruffell 2024 Announced in this Soils News

TW Walker Award for best student poster presentation at the NZSSS Conference: 2022 C Chisholm

2024 Announced in this Soils News

INTERNATIONAL AWARDS:

The NZSSS council would like to acknowledge members who received awards from external agencies over the last 2 years, in particular:

- Allan Hewitt, Megan Balks, and David Lowe received the prestigious J.K Taylor medal from SSA, in recognition of the outstanding contribution of their book 'Soils of Aotearoa-New Zealand'.
- Ravi Naidu who was awarded the Glinko World Soil Prize by the Global Soil Partnership
- Megan Balks was awarded The New Zealand Antarctic Medal in the 2023 NZ Royal Honours

CONCLUDING COMMENT:

Council members are extremely grateful to the many people who have supported the Society in its range of activities over the last two years. In particular, we wish to thank: Lea Boodee and her OnCue team for exceptional conference and secretarial support, John Drewry of Manaaki Whenua for production of NZ Soil News, and Trish Fraser for maintaining our facebook site. This year Council farewell Immediate Past President Tim Clough who is retiring from Council.

Celebrating our 2024 Award Recipients

Compiled by Dr Brendon Malcolm, NZSSS Awards Convenor (2017-present)

The 2024 biennial NZSSS conference in December 2024, jointly held with Soil Science Australia was not only a huge success, but also another excellent opportunity for the Society to honour and celebrate the success of those who have made significant contributions to soil science. On behalf of Council and all our members, congratulations to those who received awards.

The awards presented and the recipients of those awards are profiled below.

The Norman Taylor Memorial Award

The Norman Taylor Memorial Award (Lecture) is awarded by the President of the NZSSS in recognition of outstanding contributions to soil science in New Zealand. The recipient of the Norman Taylor Memorial Award for 2024 was **Associate Professor Peter Almond**. Peter gave a captivating talk to a large conference delegation on his prolific research career as a pedologist, including the important contribution soil science can make to understanding ecosystems, earth surface processes, climate and hazards. The title of his lecture was: "The Soil-Rock Interface: Soil Science's Role in the Earth Sciences."



Associate Professor Peter Almond receiving the Norman Taylor award (left) and giving his lecture (right; photos, B. Malcolm).

Peter is a pedologist and geomorphologist at Lincoln University. He began his career in the 1980s mapping soils in the rainforests of South Westland on the West Coast of Te Wai Pounamu, the South Island. The work evolved into a PhD when Peter accepted a lecturer position in the early 90's at Lincoln University. Peter's efforts to understand the soil-landscape took him into areas of glacial geomorphology, glacial chronostratigraphy, soil and loess stratigraphy and Quaternary climate change. With PhD students he pioneered application of concepts of upbuilding pedogenesis to loess stratigraphy and soil biogeochemistry in Aotearoa-NZ.

In the 2000's he co-led an international programme sponsored by the International Union of Quaternary Science called Australasian-INTIMATE (INTegration of Ice core, Marine and Terrestrial records) dedicated to deciphering in detail the climate history of the Australasian region from the Last Glacial Maximum into the Holocene. At this time he was also elected president of the Australasian Quaternary Association (AQUA). Subsequently, Peter expanded his application of pedology, soil and loess stratigraphy to evolution of landscapes in other parts of the South Island, in Wisconsin and in Oregon in the United States.

In the 2010s Peter took on the role of Head of the Soil and Physical Sciences Department at Lincoln University (2012-2017), began work in Antarctica, and was heavily involved in science response and rural recovery during the devastating Canterbury Earthquake Sequence of 2010-2013, working with colleagues from the University of Canterbury and GNS science. Liquefaction was a major focus of the latter work, but Peter also collaborated with GNS Science paleoseismologists in fault trenches applying soil stratigraphy to fault dynamics and earthquake risk. His work in seismic hazard has included assessments of wider landscape impacts to great earthquakes on the Alpine fault, recently quantifying for the first time the timescales and magnitudes of river and fan responses on the West Coast.

Peter's service to science outside the university extends to stints on the Royal Society Scientific Committee on Antarctic Research, The Royal Society's Marsden Panel for Earth Sciences and Astronomy, coordinator of the Geosciences Society of NZ Friends of the Pleistocene special interest group, numerous conference organising committees and leader of national and international conference field trips.

Life Membership of the Society

Life Membership of the Society recognises outstanding service to the New Zealand Society of Soil Science. Our very deserving recipient for 2024 was the late **Dr Allan Hewitt**.



The late Dr Allan Hewitt (left), and Allan's son Tim Hewitt (centre) receiving the award at the conference dinner (right; photo, L. Humphrey). Presentations throughout the night were made by outgoing President Dr Sam Carrick (left) and incoming President Pierre Roudier (right).

Allan is remembered fondly by his colleagues in soil science throughout New Zealand and his Manaaki Whenua - Landcare Research co-workers.

Allan has made an outstanding scientific contribution to soil classification, land evaluation and soil mapping in New Zealand and also overseas. He is the sole author of the New Zealand Soil Classification, the accepted source for naming, characterising, mapping, sampling and reporting for the national inventory of soils in New Zealand. The publication of the New Zealand Soil Classification in 1992 was acknowledged as a 'major milestone in New Zealand soil science'. It was the culmination of some 10 years of work by Allan and others. More recently, Allan was lead author of the textbook "The soils of Aotearoa New Zealand" - launched in 2021.

Allan pioneered New Zealand's spatial soil information system S-map. Further, his lifetime contribution to soil classification has provided the foundation for training an entire generation of undergraduates, emerging scientists and farmers with the critical skills needed for soil and land management across New Zealand.

Allan is a past President of the New Zealand Society of Soil Science and former Senior Pedologist and Research Leader at Manaaki Whenua - Landcare Research. He went on to create impact in his field that was highly regarded and recognised through the prestigious Norman Taylor Memorial Lecture, and the Leamy Award (for "most meritorious New Zealand contribution to soil science"). Allan was also awarded the prestigious Lincoln University Bledisloe Medal at the Graduation ceremony in May 2019. Fellowship of the Society

Fellowship of the New Zealand Society of Soil Science is an honour conferred for distinction in any or all of the following areas; research, technology, teaching, extension, and/or the advancement of soil science. In 2024, the Society had great pleasure in appointing **Dr Douglas Hicks** as Fellow of the Society.



Dr Douglas Hicks (right) receiving the NZSSS Fellowship of the Society award (photo, L. Humphrey).

Doug is a retired soil scientist with almost 50-years' career experience. He started his career in 1976 with the Ministry of Works and Development, Water & Soil Division, at the Soil Conservation Centre at Aokautere, transferred into DSIR in Land Resources in 1988 when the Ministry of Works and Development was disestablished, and then into Manaaki Whenua - Landcare Research in 1992 when the CRI's were created. From 1994, as a member of Ecological Research Associates, Doug undertook full-time consultancy for government departments, local authorities, commercial companies and private landowners. From 2009 until 2018 he worked part-time in a private capacity for a similar range of clients.

Initial work for central and local government entailed measuring soil erosion, extent of soil conservation measures, and their effectiveness or otherwise for erosion control. Since the transition to consultancy in 1994, an additional component has been farm-scale land use capability maps and soil maps. Maps prepared by Doug personally or by trainees under his supervision would now number several hundred.

Doug has contributed immensely to mentoring and training. This has centred around on-the-ground application of soil conservation and sustainable land use management, and has benefited hundreds of regional council land management officers and soil scientists across New Zealand, particularly in the North Island. Later in his career and into his retirement, Doug has acted as an expert witness on behalf of Auckland Council for an Environment Court hearing in relation to Land Use Capability farm-scale mapping and providing evidence on matters relating to elite and prime soils occupying Land Use Capability classes 1-3 land. In addition, he has been involved in making submissions on the National Policy Statement for Highly Productive Land, drawing upon his deep technical expertise to assist with policy development.

The L.I. Grange Medal

The L.I. Grange Medal is awarded for outstanding service to New Zealand soil science and commemorates Dr Leslie Grange's extraordinary leadership and service to New Zealand soil science. In 2024, the Grange Medal was awarded to two recipients: **Professor Leo Condron** and **Dr Stewart Ledgard**.



Grange Medal recipient Professor Leo Condron (left; photo, L. Condron), and Associate Professor Carol Smith receiving the award on Leo's behalf (right; photo, L. Humphrey).

Leo is currently a Distinguished Professor of Soil Science at Lincoln University. Reserved for only four academics at any one time, the title of Distinguished Professor pays tribute to leadership of the highest order in research and education at an institutional, national and international level. The honour was conferred on Leo in recognition of his world-class leadership and international eminence in his field of soil phosphorus dynamics and the interplay with organic phosphorus.

Leo's research has focused on assessing the short- and long-term impacts of changes in land-use, inputs, and vegetation on phosphorus and organic matter dynamics in grassland and forest soils. The collective findings of this research have made a significant contribution to improving fundamental understanding of key factors that determine the nature and dynamics of soil organic phosphorus in particular, and the role and function of biological and biochemical processes in determining phosphorus bioavailability and input use efficiency.

Leo has published over 300 cited articles to date, including 290 journal papers in over 50 peer-reviewed journals and 15 book chapters, which have received 17,700 citations with an H-index of 67.

Since joining Lincoln University in 1992, Leo has committed himself to being an outstanding mentor and teacher and taken significant administration roles. Leo has continuously maintained a substantial teaching portfolio, and to date has supervised and mentored over 120 postgraduate students from 21 countries (including 60 PhD students), as well as mentoring and supervising 13 postdoctoral fellows.



Dr Stewart Ledgard receiving the Grange Medal award (photo, L. Humphrey).

Dr Stewart Ledgard is a Principal Scientist with AgResearch and is an adjunct Professor in Life Cycle Management at Massey University. He has worked with the agricultural sector and policy groups in the areas of life cycle assessment and greenhouse gas emissions for over 20 years, and in field of nutrient management in pastoral ecosystems for over 40 years.

Stewart is a recognised international expert in nutrient management, with a strong focus on nitrogen cycling. He has worked with policy, industry and farmer groups in evaluation of policy and meeting water quality targets. Stewarts research work has involved large research programmes on nitrogen leaching, ranging from lysimeter to farm system scale, quantifying losses and evaluating management options and mitigations. He also led AgResearch's first iteration nutrient budget model, which developed into the Overseer model.

In the second half of Stewart's career, he has become the key expert in Life Cycle Assessment for agriculture in New Zealand. Stewart has worked with government, agricultural sector groups and farmer groups in determining and reducing the carbon footprint of agricultural products. The Leamy Award

The M.L. Leamy Award commemorates the outstanding ability and contributions to New Zealand soil science of Michael Lucas Leamy, and recognises meritorious contemporary work. The award is made to the author or authors of the most meritorious New Zealand contribution to soil science, published in the past three years.

The Society had pleasure in presenting the Leamy award to Dr David Leslie.



Dr Thomas Caspri accepting the award on Dr David Leslie's behalf (left; photo, L. Humphrey), and Thomas handing the award over to David post-conference (right; photo, M. Leslie).

Anyone who has worked on the nature and properties of Pacific soils in the past 50 years will be familiar with the name 'Dave Leslie'.

In 2010, Dave published an inventory of the soils and related research in the Pacific, supported by New Zealand over the last 70 years. It covers the Cook Islands, Fiji, Niue, Samoa, and Tonga. Without compilations like this, there is a high risk of knowledge lost due to institutional change, staff turnover, retirements and loss of data within both Pacific and New Zealand organisations. The document, titled 'Record of significant soil and land resources research in the South West Pacific' since helped to minimise the impact of those factors.

In a 2022 landmark publication, Dave documented the 'History of soil research conducted by the New Zealand Soil Bureau in five southwest Pacific countries'. The document - co-published between the Secretariat of the Pacific Community (SPC) and Manaaki Whenua Landcare Research - provides context, names and stories relating to his 2010 compilation.

Dave's soil research and collaboration has ever since strengthened the partnership between New Zealand and the Pacific soils community. His publications collating decades of soils research are helping to safeguard vital soils knowledge for current and future generations; and they underpin ongoing work.

The Early Career Researcher Award

The Early Career Researcher (ECR) award is a new award offered by the Society to recognise outstanding research contributions by a New Zealand-based soil scientist within 8 years of completing their highest qualification (either Masterate or PhD). Outstanding research includes: research that demonstrates science vision; research that is highly citable or published in high-impact journals; research that has been, or has potential to be, incorporated into the management of New Zealand's primary production landscapes, and/or; research that has led to the advancement of science communication and education.

The inaugural recipient of the ECR award was Dr Sam McNally.



Dr Sam McNally (right) receiving the ECR award at the conference dinner (photo, L. Humphrey).

Sam was awarded his PhD degree at the University of Waikato in 2016 and has subsequently been engaged in research at Plant & Food Research and Manaaki Whenua - Landcare Research.

Sam exemplifies the new generation of soil scientists that are making critical contributions to providing solutions for enhancing productivity and profitability while reducing environmental impact for New Zealand's agricultural industries. Sam's fundamental focus is on the physical, chemical and biological processes regulating the formation and decomposition of soil organic carbon. He is revealing new insights by integrating descriptive soil properties with physical properties and the use of stable isotopes and gene sequencing to reveal the role of microbial processes driving changes in the components of organic carbon, then scaling these processes spatially using mapping and remote sensing techniques. When combined with models, this research is providing recommendations for best management practices to retain or

increase soil carbon stocks and predictions of the vulnerability of soil carbon stocks to changing climate at farm to national scale.

Sam's science excellence is demonstrated in his 20 authored and co-authored publications in peer-reviewed international journals. The impact of his findings is demonstrated by his reporting and engagement with Ministry for the Environment, Ministry for Primary Industries and He Waka Eke Noa, New Zealand Agricultural Greenhouse Gas Research Centre, Farmed Landscapes Research Centre, Foundation for Arable Research and Marlborough District Council.

The L.C. Blakemore Award

The L.C. Blakemore Award honours the outstanding ability and contributions to New Zealand soil science of Les Blakemore and recognises meritorious contemporary work by technicians. The recipient of the Blakemore award for 2024 was **Leanne Hassall** from Lincoln University.



Recipient of the Blakemore award Leanne Hassall (left; photo, Lincon University), and Associate Professor Peter Almond accepting the award (trophy of Norman Taylor's trowel) on Leanne's behalf (right; photo, L. Humphrey).

Leanne Hassall has been an invaluable member of the Department of Soil and Physical

Sciences at Lincoln University since she began her career in 1983. Throughout her tenure, Leanne's role has evolved significantly, transitioning from technical assistant to becoming the second in charge of the pan-University Analytical Services Unit. In her early career, Leanne specialised in wet chemistry and method development, supporting the pedology and soil mineralogy staff. Her expertise was crucial during a time when many academic staff were balancing full-time employment with PhD studies.

In recent years, Leanne has taken on managerial responsibilities within the Analytical Services Unit, including workload management, requisitions, and quality assurance. Her extensive experience and institutional knowledge have been 'instrumental' in maintaining the laboratory's high standards and reputation.

One of Leanne's most significant contributions came recently during the relocation from the earthquake-damaged Burns Building to the new Waimarie building at Lincoln University. She played a pivotal role in the design and planning stages for a Burns replacement building which commenced in 2018. She also had a significant leadership role in managing the outfitting of new laboratory spaces, coordinating the external relocation team, and overseeing the timeline and planning for each lab and floor. Her leadership ensured the safe relocation and reinstallation of analytical equipment, minimising disruptions to postgraduate and research projects.

The Postgraduate Bursary Award

The Postgraduate Bursary Award (previously the Fertiliser Association award) recognises the efforts and present, or likely, contribution to New Zealand soil science arising from a Doctorate study. Eligible candidates for this award must be PhD students entering their 3rd year of study, working on the properties, productivity or sustainability of NZ's soil and land resources.

The recipient of Postgraduate Bursary award for 2024 went to Franco González of University of Waikato.



Franco González (right) receiving the Postgraduate Bursary at the conference dinner (photo, L. Humphrey).

Franco's research will contribute to advancing soil science in New Zealand by offering a deeper understanding of the interactions between ammonia and soil organic matter. By elucidating the abiotic mechanisms of ammonia retention by soil

organic matter, his work could lead to innovative methods for enhancing nitrogen retention in soils.

Franco's passion extends beyond research. He loves teaching and outreach, working as a Teaching Assistant at the University of Waikato. He has demonstrated the ability to teach basic concepts in soil science and is always available to students.

He has authored and co-authored peer reviewed journal articles and book chapters, with significant publications in the New Zealand Journal of Agricultural Research and Animal Production Science. He's presented his research at various international conferences, sharing his insights on greenhouse gas emission estimation methodologies and soil carbon and nitrogen content measurements.

The Morice Fieldes Memorial Award

The Morice Fields Memorial Award recognises a PhD theses from the previous calendar year of exceptional merit. In 2024 this award was made to **Fevziye Hasan** of University of Waikato for her thesis *"The Effects of Dung Beetles on Ecosystem Functioning: From Global Trends to New Zealand Pastures"*.

Judges noted that the thesis was highly novel and demonstrated an advanced understanding of dung beetle ecology, paired with a robust application of statistical analysis techniques.



Award recipient Fevziye Hasan (left; photo, website <u>Dung Beetle Ecosystem</u> <u>Engineers</u>), and Franco González receiving the award on Fevziye's behalf (right; photo, L. Humphrey).

The Sir Theodore Rigg Memorial Award

The Sir Theodore Rigg Memorial Award recognises a Masterate theses of exceptional merit from the previous calendar year. **Madison Farrant**, University of Waikato, was our recipient of the award for 2024, for her thesis *"Role of Seasonal Melt Streams in Heavy Metal and Nutrient Transport from an Antarctic Penguin Colony"*.

Judges noted the comprehensive literature review and range of field sampling methods employed. In addition, concepts, procedures and results were conveyed clearly with little ambiguity.



Award recipient Madison Farrant (left; photo, A. Powell, Antarctica New Zealand, website <u>RNZ</u>) and Franco González receiving the award on Madison's behalf (right; photo, L. Humphrey).

The TW Walker Prizes

The TW Walker prizes are presented to students who deliver the best oral and poster presentations at the NZSSS biennial conference. This year, award winners were **Janani Palihakkara** (Massey University) and **Emelia Livingstone** (University of Canterbury) for best oral and best poster presentation, respectively.

Undergraduate Prizes

Each year the Society awards the best performing third year undergraduate student in each of the three major universities (Lincoln University, Massey University and University of Waikato). For 2024, the recipients of the undergraduate prizes were **Georgia Higinbottom** (Lincoln University), **Donna Hannan** (Massey University), and **Kelly Chow** (University of Waikato).

Congratulations again to all our deserving award winners for 2024.

NZSSS Award Recipients

President's Invitation Lecture

1972W A Pullar1973T W Walker1974A J Metson1975H S Gibbs

Norman Taylor Memorial Award

Award	l
1976	I L Baumgart
1977	G D Smith
1978	I D McCraw
1070	
1979	GGCOSSEIIS
1980	A C S Wright
1981	C During
1982	C G Vucetich
1983	N Wells
108/	G M Will
100-	
1965	J K Syers
1986	L C Blakemore
1987	W M H Saunders
1988	K R Tate
1989	P J Tonkin
1990	E LB Cutler
1000	C Childe
1000	
1992	D R Scotter
1993	No award
1994	A Sinclair
1995	B Clothier
1996	A Hewitt
1997	K M Gob
1007	A Maakay
1990	A Mackay
1999	J watt
2000	V Neall
2001	S Saggar
2002	D J Lowe
2003	P Singleton
2004	G Sparling
2004	D Mol oron
2005	
2006	Greates
2007	A Carran
2008	M Balks
2009	P Fraser
2010	C de Klein
2011	TWebb
2011	M MeLood
2012	
2013	M Hedley
2014	S Ledgard
2015	R McDowell
2016	L Schipper
2017	T Clough
2019	A Poborto
2010	M Compo
2019	in Camps
2020	C Smith
2021	L Condron
2022	M Beare
2023	H Di
2024	P Almond
2024	

NZSSS Postgraduate Awards

1971	D W Ives
1972	I Nairn
1973	-none-
1974	V E Neall

1975 -none-

Morice Fieldes Memorial		
Award	d for PhD Thesis	
1976	J C Ryden	
1977	-none-	
1978	A N Sharpley	
1979	K W Steele	
1980	-none-	
1981	A G Hogg	
1982	A W Limmer	
1083	A B Cooper	
100/	A D Mackay	
1004	A D Mackay	
1900		
1900	I R Phillips	
1987	D J Home	
1988	J S Rowarth	
1989	A W Young	
1990	P B Greenwood	
1991	C D A McLay	
1992	A W Rate	
1993	L A Schipper	
1994	D Tambunan	
1995	No award	
1996	R Lieffering	
1997	H Wang	
1998	P Almond	
1999	B Robinson	
2000	T. I van der Weerden	
2001	B Miller	
2002	G Barkle	
2002	C Booney	
2003	L Monnoor	
2004	J Jonas / E Marana	
2005	D Haulbracka	
2000		
2007	S Gaw	
2008	M Hugnes	
2009	M Bloomberg	
2010	SCarrick	
2011	N Schon	
2012	A Eger	
2013	N Balaine	
2014	P Mudge	
2015	B Welten	
2016	D Huang	
2017	S McNally & J Owens	
2018	M Bucci	
2019	C Gardiner	
2020	F Rambags	
2021	J Ratcliffe	
2022	B Robertson	
2023	H Thompson-Morrison	
2024	F Hasan	
2027		

Sir Theodore Rigg Award for Masterate Thesis

maste	
1976	K D Earl
1977	T H Webb &
	N E Logan
1978	-none-
1979	D A McKie
1980	C Hedley (née Hubbard)

1981 D Karageorgis 1982 DJLowe 1983 L A Benny 1984 K B Marsh 1985 B McLaughlin 1986 -none-1987 C D A McLay 1988 B E Green 1989 S P Cameron-Lee 1990 P J de Lange 1991 G N A Wigley 1992 R B Doyle 1993 -none-1994 PLCarey 1995 J Moir 1996 -none-S Park 1997 1998 S Thiagarajan 1999 H Jones 2000 R Dragten 2001 B Robinson 2002 S Tutua 2003 D J Palmer 2004 MW Hughes 2005 R Standish 2006 D Dewar 2007 E Hoftsee 2008 N Watkins 2009 DA Lloyd 2010 P Mudge 2011 DF Wallace 2012 E Harris 2013 A Barnett 2014 A Robinson 2015 T Norris 2016 N Laubscher 2017 J Robinson 2018 O Petrie 2019 J Millar 2020 M Kokiri Huirama 2021 K Numa 2022 A van de Laar 2023 S Ray 2024 M Farrant Fertiliser Association Award 2019 Was Bert Quin Award 2014 Was Summit Quinphos **Bursary (renamed Altum** Award 2012) 1993 J Luo 1994 W J Morrell 1995 I Vogeler 1996 C W Gray 1997 B Robinson & B Miller 1998 A Mitchell 1999 A Khan 2000 Chengrong Chen 2001 Suman Mishra 2002 S Gaw 2003 D Houlbrooke & R Bhandral 2004 D Palmer

2006	S Knan
2007	B Kusomo
2008	S Carrick
2009	P Jeyakumar
2010	G Lucci
2011	N Wells
2012	R Dodd
2013	No award
2014	S McNally
2016	J Pronger
2018	T Geretharan
2019	A Wecking
2020	T Corbett
2021	K Deuss
2022	C Chisholm
2023	M Nightingale
2024	F González
The L	C Blakemore Award
(Bienr	nial award)
1992	N P Smith
1994	H Kettles
1996	No award
1998	L Currie
2000	B Daly
2002	P Theobald
2004	T Hendry
2006	B Toes
2008	C Smith
2010	M Sprosen
2012	C Tregurtha
2014	M Premaratne
2016	J Jiao
2018	B Moorhead
2020	R Cresswell
2022	J Dando
2024	L Hassall
The M (Bienr 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022 2024	I L Leamy Award iial award) B E Clothier A Hewitt No award S Cronin H J Di K R Tate N S Bolan S Saggar R McDowell Not awarded D Curtin L Schipper D Selbie, L Buckthought, M Shepherd (jointly) J Luo D Curtin, M Beare (jointly) A Hewitt, M Balks, D Lowe (jointly) D Leslie

The T	W Walker Prizes
1992	(oral paper) —S T
	Olykan

1994 1995	(poster)—G N Magesan (oral paper)—J Luo J Zanders & S Park (oral paper) – L Managar
1998	(oral paper)—J Menneer (poster)—C P Rooney
2000	(oral & poster papers) —L Barton
2002	(oral paper)–D Houlbrooke (poster)—K Wilkins
2004	(oral paper)—J Singh (poster)–D Dewar
2006	(oral paper)-R Parkinson
2008	(poster)–F Scherr (oral paper) – P. Mudge (poster) – G M Lucci
2010	Not awarded
2012	Not awarded
2014	(oral paper) O Jordan (poster) J Owens
2016	(oral paper) – R Woods (poster) – A Contron 2018
2018	(oral paper) – A
	Tumbure
2020	(poster) – K Deuss
2020	(oral paper) – H Ruffell
	(poster) – C Chisholm
2024	(oral paper) – J.
	Palihakkara (poster) – E Livingstone
	(1) = =
Under	graduate Prizes
Under 1994	graduate Prizes R McDowell
Under 1994	graduate Prizes R McDowell (Lincoln University) R Hodoson
Under 1994	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University)
Under 1994	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boves
Under 1994	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University)
Under 1994 1995	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson
Under 1994 1995	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University)
Under 1994 1995	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland
Under 1994 1995	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer
Under 1994 1995	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University)
Under 1994 1995 1996	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten
Under 1994 1995 1996	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University)
Under 1994 1995 1996 1997	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University) J McCaw
Under 1994 1995 1996 1997	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University) J McCaw (Lincoln University) C Eastwood
Under 1994 1995 1996 1997	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University) J McCaw (Lincoln University) C Eastwood (Massey University)
Under 1994 1995 1996 1997	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough
Under 1994 1995 1996 1997	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University)
Under 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett
Under 1994 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Menneer (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar
Under 1994 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) R Dragten (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar (Massey University)
Under 1994 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) J McCaw (Lincoln University) V Gough (Waikato University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar (Massey University) C Rissman
Under 1994 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar (Massey University) N Treloar (Massey University) C Rissman (Lincoln University)
Under 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) W R Cookson (Lincoln University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Casswood (Massey University) V Gough (Waikato University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar (Massey University) A Manderson (Massey University)
Under 1994 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Menneer (Waikato University) J C Caw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett (Waikato University) L Garrett (Waikato University) N Treloar (Massey University) C Rissman (Lincoln University) A Manderson (Massey University) K McLauchlan
Under 1994 1995 1996 1997 1998 1999	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar (Massey University) N Treloar (Massey University) C Rissman (Lincoln University) A Manderson (Massey University) K McLauchlan (Waikato University)
Under 1994 1995 1996 1997 1998	graduate Prizes R McDowell (Lincoln University) R Hodgson (Massey University) M Boyes (Waikato University) W R Cookson (Lincoln University) A Reyland (Massey University) J C Menneer (Waikato University) J C Menneer (Waikato University) J McCaw (Lincoln University) J McCaw (Lincoln University) C Eastwood (Massey University) V Gough (Waikato University) L Garrett (Waikato University) N Treloar (Massey University) N Treloar (Massey University) C Rissman (Lincoln University) A Manderson (Massey University) K McLauchlan (Waikato University) S Petrie

2000	S Pitcher-Campbell (Massey University)
	N Dunn
	(Waikato University)
	C Ducey
2001	C Davies-Collev
2001	(Waikato University)
	M Buchan
	(Lincoln University)
	P Nelson
2002	A Souness
2002	(Lincoln University)
	T A O'Neill
	(Massey University)
	D Worthy
2003	S O'Driscoll
2000	(Waikato University)
	F Shanhun
	(Lincoln University)
2004	M Clancey
	(Walkato University
	(Lincoln University)
2005	Vanessa Coombe
	(Waikato University)
	Samuel Dennis
2006	(LINCOIN UNIVERSITY)
2000	Georgina Mackie
	(Lincoln University)
	Louise Fisk / Paul
	Mudge
2007	(Waikato University)
2007	(Lincoln University)
	Hamish Mulcock
	(Massey University)
	Georg Kruger
0000	(Waikato University)
2008	GIEN TREWEEK
	Emma Anne Phillips
	(Massey University)
	Nicola Jane Kelland
0000	(Lincoln University)
2009	Rebecca Bylsma
	Helen Free
	(Massey University)
	Sean Gresham
~~ ~ ~	(Lincoln University)
2010	Josh Scarrow & Jack
	(Waikato University)
	Louise Anne McCormack
	(Massey University)
	Aimee Elizabeth
	Robinson (Lincoln
2011	AM Carter
	(Waikato University)
	Joel Perry
	(Massey University)
	Roshean R Fitzgerald

	(Line a la Line in a maiter)
0040	(Lincoln University)
2012	L Creswell (Vvaikato
	University)
	J Howes (Massey)
	A Whitley (Lincoln)
2013	H Bredin-Grey (Waikato)
	Massey – N Hyslop
	N Mesman – (Lincoln)
2014	D Le Lievre – (Waikato)
	J Winters – (Massey)
	S Rayner – (Lincoln)
2015	T Leabourn (Massey)
	B Robertson (Lincoln)
	F Garrity (Waikato)
2016	M O'Grady (Waikato)
	H Jensen (Lincoln)
	SA Whiteman (Massey)
2017	C Tomlinson (Waikato)
	S Pike (Massey)
	I Setiawan (Lincoln)
2018	M Hall (Waikato)
	M Van Baarle
	C Chisholm
2019	E Kitchen (Waikato)
	S Earl-Goulet (Lincoln)
2020	A Carrington (Waikato)
	P Chapman (Lincoln)
2021	R Brodnax (Waikato)
	E Stubbs (Massey)
	A Wells (Lincoln)
2022	H Hay (Waikato)
	B Deacon (Massey)
	M Dumaine (Lincoln)
2023	E Morgan (Waikato)
	O Arnold (Massey)
	M Picard (Lincoln)
2024	K Chow (Waikato)
	D Hannan (Massey)
	G Higinbottom (Lincoln)
	/

Fellows of the NZ Society of **Soil Science**

L C Blakemore R Naidu M R Balks V E Neall N Bolan R L Parfitt K C Cameron J A Pollock I B Campbell AHC Roberts C W Childs S Saggar J Churchman A G Sinclair B E Clothier G Sparling I S Cornforth T W Speir J K Syers H J Di K M Goh K R Tate P Gregg **BKG** Theng R J Haynes P J Tonkin S F Ledgard T W Walker D J Lowe J H Watkinson J D McCraw G W Yeates A Mackay A Hewitt L Schipper M Beare L Condron M Hedley D Ross C De Klein T Clough R Monaghan

R G McLaren P Fraser J Luo **Honorary Fellow B** Miller Life Members of the N.Z. Society of Soil Science L C Blakemore I B Campbell C W Childs **R J Furkert** R Lee **R B Miller** V Orchard W M H Saunders J K Syers P J Tonkin T W Walker J P C Watt J Adams R McLaren P Gregg A Mackay P Fraser B Quin D Lowe M Balks A Hewitt

Grange Medal

(Biennial award) 2012 K Tate 2014 B Clothier 2016 G Rys 2018 M Hedley 2020 F Curran-Cournane 2022 K Cameron 2024 L Condron S Ledgard

Early Career Researcher

(Biennial award) 2024 S McNally

D Curtin D Houlbrooke C Hedley D Hicks

R McDowell

New Zealand Society of Soil Science Awards 2025

Nominations for the following awards open **1 March 2025** (with the exception of the US/NZ Exchange Award, which open 25 January). Key details regarding nomination requirements are provided in the table below. Not all awards are offered outside of the conference year; awards on offer for 2025 are shaded.

Please contact the NZSSS Awards Convenor for full award details (<u>Brendon.Malcolm@plantandfood.co.nz</u>).

Award	Presented	Nominations close	Nominee eligibility	Nominator eligibility
NZSSS Fellowship	Annually	31 July 2025	Nominees must be active members of the Society at the time of nomination.	Nominations must be made by two Full Members, or Life Members of the Society.
The Grange Medal	Biennially (conference year)	31 July 2026	Open to both non- members of the Society as well as members, fellows, or life members of the NZSSS.	Nominations must be made by two or more active members of the Society.
The Blakemore Award	Biennially (conference year)	31 July 2026	Open to technicians/support staff who have been employed in the field of science for at least three years.	Any two active members of the NZSSS can nominate an eligible candidate from a university, CRI, or other organisation (e.g. a Regional Council).
The Leamy Award	Biennially (conference year)	31 July 2026	Open to the author or authors of the most meritorious New Zealand contribution to soil science, published in the previous three calendar years.	Any two active members of the NZSSS can nominate an eligible candidate(s) from a university, CRI, or other organisation (e.g. a Regional Council).
The Postgraduate Bursary	Annually	31 July 2025	Open to postgraduate (PhD) students in soil science about to enter their third year of study. Candidates must be either student or full members of the NZSSS and should not be on the academic or technical staff of the department that nominates them.	Nominations must be received in writing from the Head of the Soil or Earth Science Department/Group at a New Zealand University. Only one nomination will be accepted from each University Department/Group.

The Morice Fieldes Award	Annually	31 July 2025	A PhD thesis submitted within the previous calendar year.	The Head of the Soil or Earth Science Department/Group at a New Zealand University may nominate the best PhD thesis from their department/group.
The Rigg Award	Annually	31 July 2025	A Masterate thesis submitted within the previous calendar year.	The Head of the Soil or Earth Science Department/Group at a New Zealand University may nominate the best Masterate thesis from their department/group.
Early Career Researcher (ECR) Award	Biennially (conference year)	31 July 2026	Open to ECR's within eight years of completing their highest research qualification (Masterate or Doctorate).	No more than 2-page written nomination by any two active members of the NZSSS.
Undergraduate Prizes	Annually	31 December 2025	A third-year student in Soil or Earth Sciences.	The Head of the Soil or Earth Science Department/Group at Massey, Lincoln, and Waikato University may each nominate the best third-year student from their department/group.
The US/NZ Exchange Award	Annually	15 April 2025 for initial submission (18 April for final submission)	Nominees are required to have at least seven years of membership in SSSA or the NZSSS. Former recipients of this Award are not eligible.	This award allows self- nominations.
Soil Judging Stipend (\$2,000)	Annually	31 July 2025	Open to student teams for attendance at a conference-related soil judging competition in New Zealand or Australia. Priority will be given to the highest performing team from the previous calendar year.	The Head of the Soil or Earth Science Department/Group at a New Zealand University may nominate a team from their department/group.

Nominations and requests for further information regarding NZSSS awards should be addressed to:

Dr Brendon Malcolm *NZSSS Awards Convenor* C/O Plant & Food Research Private Bag 4704, Christchurch Mail Centre, Christchurch 8140 (normal post), or Canterbury Agriculture & Science Centre, Gerald St, Lincoln 7608 (courier) New Zealand

Email: <u>Brendon.Malcolm@plantandfood.co.nz</u>

NZSSS & SSA Soil Judging Competition 2024

Emily McKay, Veronica Penny, Scott Fraser, Kirstin Deuss.

The 2024 Joint NZSSS and SSA Moana Oceania Soil Judging Competition in November 2024 set a new benchmark as the largest Soil Judging Competition held in the Southern Hemisphere, and possibly even the world.

This year's competition brought together over 200 people from Australia, New Zealand, Fiji, Tonga, Kiribati, Samoa, Tuvalu, Vanuatu, and the USA. Held over three days across three farms in the Bay of Plenty Region of New Zealand, the event showcased exceptional talent, expertise, and collaboration in soil science. Its success was made possible by months of dedicated planning by the organising committee, the enthusiasm of the participants to learn, and the tireless efforts of a relatively small group of volunteers.

The competition featured 35 teams, comprising 80 students across 24 universities and 70 working professionals representing 9 regional councils, 6 private consultancies, 12 research institutes, and 7 government ministries. Teams were supported by their own expert coaches, alongside roaming expert coaches from Manaaki Whenua - Landcare Research, Lincoln University and Waikato University, who provided engaging and supportive coaching and mentorship.

Over 30 volunteers ensured the event ran seamlessly, taking on tasks such as digging and describing soil pits, setting up sites, feeding hungry brains, keeping spirits high when the rain set in, as well as marking over 200 score cards from participants during the competition day.

Soil Judging Competitions are a great opportunity to learn more about soils in-depth how they appear and behave in the landscape, how to define and understand soil characteristics, and how to interpret their appropriate land uses. This event focussed on the unique volcanic landscape of Rotorua, New Zealand. Participants enjoyed presentations and mentoring from local experts Professor David Lowe on soil geomorphology, MWLR Senior Pedologist Dr Scott Fraser on pedology, and environmental consultant Simon Stokes on land use capability.

The first two days focused on teaching and familiarising participants with soil descriptions and classification. The third day held at the outstanding Highlands Station in Tumunui, was competition day, where participants tested their skills that they had developed. This included describing soil pits as a team within a set time, as well as an opportunity to compete individually and challenge themselves further.

Through this event, participants gained beneficial practical skills in describing and assessing soils, as well as valuable opportunities to expand professional networks, share knowledge, and develop connections with consultancies, regional councils and other organisations across the Pacific region. Competitors and coaches praised the event, expressing gratitude for the experience, and interest to attend future Soil Judging Competitions.

This competition would not have been possible without the generous support of our sponsors. We would like to express our sincere gratitude to:

- Platinum Sponsor: Manaaki Whenua Landcare Research
- Silver Sponsors: ACIAR, ASPAC, Australian Aid
- Bronze Sponsors: B&P Consulting, Landsystems

Competition Winners



Basalt-n-Pepper on competition day

University Teams

1st Place: Basalt-n-Pepper (Lincoln University)

- Tess Brown
- Meila Picard
- Lauren Roberts
- Kate Sheehy

2nd Place: Fertile Minds (Lincoln University)

- Beaulah Pragg
- Maxwell Singers
- Kaitlin Watson
- Kayley Wiffen

3rd Place: University of Sydney

- James Garnsey
- Minca Mellen
- Ava Robertson
- Teale Simmons
- Tom Swan
University Individuals

1st Place: Teale Simmons (University of Sydney) 2nd Place: Oliver Arnold (Massey University) 3rd Place: Maille Todd (Monash University) & Ethan Potgieter (University of New England)

Working Professionals Teams



Sore Loesses at the competition site

1st Place: Sore Loesses

- Alice Wheatley-Wilson (Waikato Regional Council)
- Hadee Thompson-Morrison (Manaaki Whenua Landcare Research)
- Holly Fleming (Terra Pura Consulting Limited)
- Robyn Simcock (Manaaki Whenua Landcare Research)

2nd Place: CSIRO

- Erinne Stirling
- James Moloney
- Stirling Roberton
- Uta Stockmann

3rd Place: Young in Soil and Earth Science Society SA

- Bonnie Armour (Hills and Fleurieu Landscape Board)
- Emily Leyden (The University of Adelaide)
- Liam Thompson (Landloch Pty Ltd)
- Richard Koech (Central Queensland University)

Working Professionals Individuals

1st Place: Judith Van Dijk (Babbage Consultants) 2nd Place: Hadee Thompson-Morrison (Manaaki Whenua - Landcare Research) 3rd Place: Alice Wheatley-Wilson (Waikato Regional Council)



All three South Pacific Island teams at the practice site

South Pacific Island Teams

1st Place: Pacific 1

- Sili'a To'o Perez (The University of The South Pacific)
- Simon Iro Sefa (Massey University)
- Sootino Marcallonlani Taungakava (The University of The South Pacific)
- Vikashni Devi Prasad (Fiji National University)
- Philip Cliftonville Feao (The University of The South Pacific)

2nd Place: Pacific 3

- Salote Puletau (Ministry of Agriculture, Food and Forest, Tonga)
- Kerry Ola Lelei I Vaiola Ae Kakala Hingoa Lepa (Tonga National University)
- Hepisipa Lavaka (Ministry of Agriculture, Food and Forest, Tonga)
- Deeksha Krishna (Fiji National University)

3rd Place: Pacific 2

- Binesh Prasad (The Pacific Community (SPC))
- Lincoln Hoponoa (MORDI Tonga Trust)
- Junior Meter Alehe Salong (Department of Agriculture and Rural Development, Vanuatu)
- Rutiana Kareba (Ministry of Environment, Lands, Agriculture Development, Kiribati)

Trophy Winners



Walker Family Trophy presented to CSIRO team

New Zealand University Trophy:

Basalt-n-Pepper (Lincoln University)

- Tess Brown
- Meila Picard
- Lauren Roberts
- Kate Sheehy

Bennison Trophy (Australian University Winners):

(Vic)Raw(R)(ia) (Monash University and La Trobe University)

- Berenice Della Porta (La Trobe University)
- Ella Lausberg (Monash University)
- Julie Tan (Monash University)
- Maille Todd (Monash University)
- Sarah Tinsley (Monash University)

NZ Working Professionals Trophy:

Sore Loesses

- Alice Wheatley-Wilson (Waikato Regional Council)
- Hadee Thompson-Morrison (Manaaki Whenua Landcare Research)
- Holly Fleming (Terra Pura Consulting Limited)
- Robyn Simcock (Manaaki Whenua Landcare Research)

Walker Family Trophy (Australian Working Professionals Winners): CSIRO

- Erinne Stirling
- James Moloney
- Stirling Roberton
- Uta Stockmann

Allan Hewitt Trophy (Overall New Zealand Winners):

Basalt-n-Pepper (Lincoln University)

- Tess Brown
- Meila Picard
- Lauren Roberts
- Kate Sheehy

Social Media Prize Winner

A special congratulations to the Tasmanian Institute of Agriculture for winning the Social Media Prize for their fantastic coverage of the event!



Photo of the individual competition site, from Tasmanian Institute of Agriculture



Organising committee at the competition site



Figures 1 & 2 Professor David Lowe and Dr Scott Fraser giving an introduction to the tephras of the Bay of Plenty region at the practice day farms near Rerewhakaaitu & Mamaku.





Figures 3 & 4. Participants describing a soil profile during practice days, including MWLR Researchers Robyn Simcock, Hadee Thompson-Morrison, Allycia Van de Laar, and Josh Hughes.



Figures 5 & 6. Participants in action describing soils



Updates to the New Zealand Soil Classification and Soil Description Manual

Lauren O'Brien, Andre Eger

The Manaaki Whenua pedology team are excited to announce that draft updates to our two core field standards for soils fieldwork are now available for review. The two drafts were released at the New Zealand-Australia Joint Soils Conference ('Weaving Soil Science Across Cultures & Environments', Rotorua, December 2-5, 2024).

The **New Zealand Soil Classification** was last updated in 2010. The large tranche of new fieldwork completed during the S-Map Expansion Programme has led to several new subgroups being identified. Additionally, some changes are proposed around classifying Anthropic Soils, making the classification more useful in human-modified environments. Lastly, an effort has been made to explain terminology more clearly and consistently.

The **New Zealand Soil Description Handbook** was last updated in 1995(!). The draft revision offers a substantial rewrite to modernise the text and make sure it can support the National Soil Data Repository, which relies on the Handbook to guide the database's structure. At the same time, an effort has been made to keep the standard compatible with the NZSC, other New Zealand land and vegetation survey standards, and international soil description standards.

The new drafts are being hosted on GitHub, which offers open discussion spaces and lets us simultaneously generate the documents in multiple formats - as a website, a Word document, and an ePub for the Kindle fans. We recognise that GitHub might not suit all reviewers, so we welcome comments made using track changes in the Word versions.

The draft NZSC word document can be downloaded from the <u>Soils Portal</u> and the repository can be viewed at <u>https://manaakiwhenua.github.io/nzsc_v4/.</u> The draft Description Manual can be <u>downloaded here</u> and viewed at <u>https://manaakiwhenua.github.io/NZ_soildesc_2024/</u>.

We're extremely keen to hear from the wider soils community. If you work with or adjacent to soils and soils data, please consider participating! Feedback on both documents should be submitted either via their respective GitHub sites or directly to <u>SoilStandards@landcareresearch.co.nz</u>. The deadline for comment is April 30, 2025.

Links

NZSC Revision Working Group - <u>https://soils.landcareresearch.co.nz/topics/soilclassification/nzsc/nzsc-wg</u> GitHub repository - NZSC draft - <u>https://github.com/manaakiwhenua/nzsc_v4</u> NZSC draft on the web - <u>https://manaakiwhenua.github.io/nzsc_v4/</u> NZSC draft Word document - <u>https://soils.landcareresearch.co.nz/assets/Soil-</u> classification/NZSC-4th-edition-MASTER_web.docx GitHub repository - Soil Description Manual draft -<u>https://github.com/manaakiwhenua/NZ_soildesc_2024</u> Soil Description Manual on the web -<u>https://manaakiwhenua.github.io/NZ_soildesc_2024/</u> Soil Description Manual Word document -<u>https://manaakiwhenua.github.io/NZ_soildesc_2024/MWLR_2024_DRAFT_soil-</u> <u>description-handbook.docx</u>

News from the Regions

Waikato/Bay of Plenty

University of Waikato

Louis Schipper has returned from sabbatical in Ireland rounding of his trip with a visit to Teagasc, Wexford to meet with research partners exploring greenhouse gas emissions from drained peat soils in a joint project: MAPSERS-C (Modelling and measuring agricultural management on organic soils to enhance removals and sequestration of carbon programme). This programme is led in Ireland by Dr Guilia Bondi. He also gave a webinar hosted by NZAGRC with Dr Owen Fenton (Teagasc) on the joint work being more broadly undertaken by Ireland and New Zealand on emissions from agricultural peats.

Aaron Wall spent three weeks in Ireland during November hosted by Dr Rachael Murphy of Teagasc (Figure 1) as part of the MAPSERS-C joint project. The highlight of the trip was the opportunity to visit multiple eddy covariance field sites located over drained and intact organic soils throughout Ireland (Figure 2). This provided the opportunity to engage with both the researchers running the field sites and the farmers on whom land the sites reside to gain an understanding of the different challenges in managing these drained organic soils in Ireland compared to NZ. Aaron also gave a daylong seminar on carbon balance measurements in agricultural systems to researchers from Teagasc, Trinity College Dublin and Agri-Food and Biosciences Institute.



Figure 1: Rachael Murphy of Teagasc, Ireland and Aaron Wall beside a snowy Easky Lough in County Silgo.



Figure 2: Aaron Wall and the Teagasc MAPSERS-C research team in front of the eddy covariance systems located on the Gurteen College farm.

Manaaki Whenua-Landcare Research

Really diggin' that soil in Northland Emily McKay

Northland is a priority region for new soil information. In partnership with Northland Regional Council, and the Ministry for Primary Industries, Manaaki Whenua is leading research to expand S-map coverage in the region as part of the S-map Expansion Programme. The current project builds on previous research supported by the Ministry for the Environment. Northland's soils are highly diverse, reflecting the complex geology and landscapes of the region, but available information about these soils has been largely outdated and low-resolution, with minimal soil mapping coverage in S-map Online for the Northland region.

In August 2024, after multiple years of work, c.158,000ha of survey area in the Northland region was uploaded into S-map Online providing higher quality and

resolution soil information on the Dargaville flats to Poutō Peninsula; and the Kaikohe to Waitangi River catchment area.

Survey work continues in the region, extending to c. 127,000ha across two new areas: the Northern Kerikeri area, and from Northern Whangārei to Waipu, including the Hikurangi swamp. These areas are due to be uploaded into S-map Online in August 2025. A large group of MWLR surveyors have contributed to the survey work in these areas, with over 1000 soil observations collected so far. These observations are then incorporated using a modelling approach to predict soil pattern with the use of covariate layers including numerous terrain attributes derived from high resolution digital elevation models (DEM). In the field, this approach involves collecting as many representative soil observations as possible across the "covariate space", that is; the key covariate combinations that cover the landscape such as geology, climate, and terrain attributes.

Soil samples are collected to provide analytical data to better define soil map units and the S-map siblings that populate them. These samples are analysed for distinguishing soil characteristics such as particle size (texture), pH, and phosphate retention. As part of the Northland S-map expansion programme, there have also been 10 reference soil pits sampled to collect in-depth data to help define these soil properties. The data from these pits are fed into S-map Online to help with modelling of pedotransfer functions and to provide more up to date and accurate soil information.

Sampling soil pits begins with selecting sites that we have visited previously for soil surveying that we have found to have representative soils of the area. We try to sample a range of soils in our area, as well as targeting the more poorly understood soils of Northland. These have included Oxidic Soils, Ultic Soils, and Organic Soils. In November 2024, our team carried out in-depth pit sampling in the Northern Whangārei to Waipu area. These targeted some of the most common, although still poorly understood, soils of Northland; Ultic Soils. We have also completed soil pit sampling for an Organic Soil site within the Hikurangi Swamp, and a unique soil found on young Kerikeri basalt, an Oxidic Brown Soil.

Samples were collected at each of these sites from a roughly 1 m wide to 1.2 m deep pit dug with a light excavator. Soils were described and classified using New Zealand Soil Classification by pedologists to 1 metre. Horizon boundaries were defined and, in each horizon, samples for dry bulk density, water release, chemistry, and hydraulic conductivity were taken. Samples are analysed at MWLR Soil Physics and Environmental Chemistry laboratories. For more information about how MWLR Laboratories could help your research, see here: https://www.landcareresearch.co.nz/partner-with-us/laboratories-and-diagnostics/



Figure 1&2. Photos showing reference pits dug in Northland in November 2024. Left: Typic Oxidic Brown Soil; Right: Perch-Gley Albic Ultic Soil. Figure 3: Digger in use on farm in Hikurangi Swamp sampling peat soils. Soil Physics Technician Allycia Van de Laar seen in pit collecting intact soil cores.



Figures 4-5. Soil profiles seen in the Whangārei survey area, left: Brown Oxidic Soil, Right: Mottled Yellow Ultic Soil.

Figure 6: MWLR Surveyors discussing an imperfectly drained Yellow Acidic Gley soil at the base of a melange hill and the impacts for land use.

Manawatu

Manaaki Whenua - Landcare Research

Feiko van Zadelhoff left us in January to start a new job in Switzerland. Feiko has been a post-doc working on using proximal sensing, LiDAR-derived and laboratory data to predict soil properties including spatially evaluating selected soil chemical and physical properties on the Lincoln University Dairy Farm. He worked with a range of colleagues to put a manuscript together.

Showcasing MWLR soils and mapping skills to resource managers at the 2024 NZARM Conference

Late last year, the lower North Island soil mapping team (Andrew Manderson, Anthony Ward, Lauren O'Brien, and Kaleb McCollum) recently showcased some of our skills, experiences, and mapping techniques at the 2024 NZARM Conference held in Palmerston North. This was a three-day conference bringing together resource managers and other expertise from across NZ, and served as a great chance for us to rub shoulders with the people who use our data and provide information on the work we do.

On the first day we ran a Masterclass with about 60 people, starting with presentations from Andrew and Lauren on the intricacies of MWLR soil mapping and classification, including a detailed introduction to S-map using the Horowhenua S-map soil survey as an example. Presentations were followed by Anthony and Kaleb running a group activity, in which participants were asked to undertake some challenging farm scale soil mapping and matching soil photos to S-Map factsheets.

On the third day, we hosted a fieldtrip stop at a cropping farm near Levin in the Horowhenua. This site was selected because much of the surrounding land qualifies as Highly Productive Land (HPL) and thus falls under the somewhat now topical protections of the NPS HPL, and because the property is within the intensively cropped Arawhata Catchment feeding into Lake Horowhenua, one of New Zealand's most degraded freshwater lakes. It also happens to be one of our more challenging soil mapping locations, with a combination of historical alluvium and loess deposition across an extensive outwash fan, producing a complex of Allophanic, Brown, Pallic, Gley and Organic Soils within a relatively small catchment area.

Lauren and Alan Palmer (Massey University) provided presentations on the Horowhenua S-Map and the soils and geology of the area. At the site Anthony and Kaleb had dug an enormous soil pit and had extracted a series of soil cores to help demonstrate differences. Anthony then provided a presentation on the way we map soils and the different ways we collect data. "Our contribution was positively received, and we achieved what we set out to do, namely to maintain connections with the resource management community to showcase our work and expertise, and to promote our MWLR soil information systems and resources. We received some great feedback for both the Masterclass and fieldtrip on the day and since the conference. This is also reflected in preliminary results of the NZARM 2024 survey, which is great to see," says Andrew.

(Adapted with permission from a Manaaki Whenua newsletter)

Images from the 2024 NZARM Conference soil mapping techniques:







Massey University

Rangitīkei River Terraces

Callum Rees and Alan Palmer are busy putting together a paper that defines type sections for the last glacial river terraces in the Rangitikei Valley. This builds on the seminal work of Martin Te Punga (1952) and Derek Milne (1973) who originally recognised and surveyed the terraces and their cover beds in detail. Paleosol type sections were designated in Leamy et al. (1973), however, type sections have never been established for the terraces where you can observe the underlying geology, strath, alluvium and overlying coverbeds.

A range of sites have been visited up and down the Rangitīkei Valley and have been progressively whittled down based on outcrop quality, ease of access, landowner relationships, health and safety considerations, preserving historic precedence and achieving geographic proximity to associated place names where practical. Sites are now being cleaned up, photographed and described for incorporation into the publication.



A suite of river terraces preserved along the eastern side of the Rangitīkei Valley near Marton.



Track exposure through Rata Terrace alluvium (30-50ka) and overlying coverbeds. The terrace strath can be observed at the base of the channelized brown, weathered gravel at the base of the section. 8.7m of gravel alluvium overlies Pleistocene bedded silty sands. The Kawakawa Tephra 25.5ka is marked for reference, preserved within Ohakea aged dune sand (15-30ka).



Type locality for the Whanahuia Paleosol on Table Flat Road (Leamy, 1973) with Ohakea loess, Kawakawa Tephra, Whanahuia paleosol and Rata loess exposed. Spade is 1m for scale.

References:

Leamy ML, Milne JDG, Pullar WA, Bruce JG 1973. Paleopedology and soil stratigraphy in the New Zealand Quaternary succession. New Zealand Journal of Geology and Geophysics 16(3): 723-744.

Milne JDG 1973a. Upper Quaternary geology of the Rangitikei drainage basin, North Island, New Zealand. Unpublished PhD Thesis, Victoria University of Wellington, Wellington, New Zealand. 472 p.

Te Punga MT 1952. The geology of Rangitikei Valley. New Zealand Geological Survey Memoir 8, Wellington, New Zealand. 46 p.

2024 Oceania Moana soil judging competition in Rotorua

In what turned out to be the biggest soil judging competition in the world, Massey University was represented by a team at the 2024 Oceania Moana soil judging competition in Rotorua. The team, consisting of postgraduate students Janani Palihakkara, Ben Woolston, Zachary Dewhurst and Oliver Arnold, was put together and coached by Callum Rees. The soil judging competition is an excellent opportunity to learn and refine the skills required to describe soil profiles. Being able to dig a hole and 'read' the soil is an invaluable skill for scientists, land managers, farmers and rural advisors. The competition also brings together a diverse group of people with a shared interest in soil, facilitating networking and sharing ideas. A conversation with members of one of the Lincon University teams inspired the Massey University team to establish a Soil Society at Massey University to improve students' knowledge and appreciation of soils and to ensure students attend future soil judging competitions. This initiative is still in its early stages; however, the team is enthusiastic and determined to make it happen.

A fantastic week spent in Rotorua was punctuated by an eye-opening field trip 'Funtastic Forests' led by Megan Balks (University of Waikato), John Moore and Loretta Garrett (SCION) into the Kaingaroa Forest, the largest plantation forest in the Southern Hemisphere. Seeing 100 yr+ stands of radiata pine, whole stems being transported along haul roads and pumice soil profiles beautifully exposed in soakage pits was a real highlight. Great discussion was had around harvesting practices and sustainability.

Finally, the trip was capped off by Oliver Arnold taking out 2nd place in the university individual Soil Judging Competition and Janani Palihakkara being awarded the best student oral presentation at the Joint New Zealand Society of Soil Science and Soil Science Australia Conference.



Massey soil judging team on a fine first day at the Rerewhakaaitu soil judging pits



Massey soil judging team, from left to right: Janani Palihakkara, Zachary Dewhurst, Ben Woolston, Callum Rees and Oliver Arnold.



Oliver Arnold picking up 2nd place in the university individual award for the Soil Judging Competition.



Oliver Arnold enthusiastically cleaning up a section under strict instruction from Peter Almond in Kaingaroa Forest. One of several outcrops visited on an absolutely fantastic field trip put on by Megan Balks from the University of Waikato.



Janani Palihakkara taking out best student oral presentation at the Joint New Zealand Society of Soil Science and Soil Science Australia Conference in Rotorua from 2nd to 5th of December 2024.

Oliver Arnold working on phospholipid fatty acid analysis

At the beginning of this year I was working with Natascha Lewe and Julie Deslippe at Victoria University of Wellington to learn how to do phospholipid fatty acid (PLFA) analysis. Phospholipids make up the cell membranes of all organisms and do not persist for long in the soil outside of a living cell, making them a useful bioindicator for living microbial biomass. Certain fatty acids that make up these phospholipids are present predominantly or exclusively in specific microbial groups. Therefore, analysing which phospholipid fatty acids are present in a sample provides information about the microbial community structure in the soil. PLFA analysis involves using analytical chemistry to extract the phospholipids, chemically separate the fatty acids and modify them to a detectable form, and identify and quantify them using gas chromatography and mass spectroscopy. Multivariate analysis is then used to determine differences in the microbial biomass and community between samples.

I also carried out neutral lipid fatty acid (NLFA) analysis, which functions on the same principles as PLFA analysis, however extracts and examines the fatty acids of neutral lipids. These are used as energy storage molecules in cells. Of particular interest is one neutral lipid fatty acid that is specific to arbuscular mycorrhizal fungi (AMF) and can therefore be used to determine the amount of AMF biomass present in the soil.



Oliver Arnold's samples ready for analysis at Victoria University.

Canterbury and Otago

Lincoln University

A large contingent of students and staff attended the joint conference of NZ Society of Soil Science and Soil Science Australia in Rotorua. This year, Lincoln academic

and professional staff and students were honoured with a number of Society awards.

Distinguished Professor Leo Condron was awarded the Grange Medal, to recognise an individual who has made an extraordinary contribution to the promotion or advocacy of soil science.

Associate Professor Peter Almond was awarded the Norman Taylor Memorial Award, in recognition of his outstanding contributions to soil science in New Zealand.

Leanne Hassall received the Les Blakemore Award, in recognition of outstanding performance as a soil science technician.

Tess Brown, Meila Picard, Lauren Roberts and Kate Sheehy (Lincoln University 1) won the Alan Hewitt Trophy as the best overall New Zealand team (university and working professional) in the soil judging competition. This trophy is in recognition of the pioneering pedology work of Alan Hewitt, a Lincoln alumnae and Bledisloe medallist, and was awarded for the first time this year.



Photo: L to R: Peter Almond, Leanne Hassall, Leo Condron, Julie Gillespie, Kaitlin Watson, Kayley Wiffen.

Lincoln student success at the 2024 Moana Oceania Soil Judging Competition

Lincoln University had 3 teams participating. Lincoln took out the top 2 places in the overall university teams competition, out of 19 teams from Australia, NZ and Pacific Islands. Lincoln University 1 ("Basalt-n-pepper") was 1st (Tess Brown, Meila Picard, Lauren Roberts and Kate Sheehy); and Lincoln University 2 ("Fertile minds") was 2nd (Beaulah Pragg, Maxwell Singers, Kaitlin Watson and Kayley Wiffen). LU1 also won the NZ university teams competition and the overall NZ teams competition (universities and working professionals), winning the Alan Hewitt Trophy.

Running this event would not have been possible without the significant input from many Lincoln staff and students over the last 18 months; Carol Smith, Josie Mazzetto, Josh Nelson, Roger McLenaghen, Louisa Hall, and collaboration with many Manaaki Whenua and Australian colleagues from Soil Science Australia. Special thanks to two of our postgraduates, Julie Gillespie and Sherry Xue, who led the team of 30+ volunteers during the competition, helping to ensure the competition run smoothly.



The participants at the 2024 Moana Oceania Soil Judging Competition



Alan Hewitt trophy



LU2 team (fertile minds) in one of the competition pits)



LU1 - (Basalt-n-pepper) winning team (L to R: Meila Picard, Kate Sheehy, Tess Brown, Lauren Roberts)



World soils day (5th December) cake



Lincoln people at the awards ceremony

Manaaki Whenua - Landcare Research

A quiet achiever retiring with style

After an impressive 49-year career, **lan Lynn** recently celebrated his retirement from Manaaki Whenua, having officially stepped down in June. True to his practical nature, lan delayed his farewell celebrations to avoid the rush of other departures and to enjoy some well-deserved overseas travel.

lan's journey began with a BSc (Hons) in Geology from the University of Canterbury in 1972, specialising in soft rock geology and geomorphology. In 1975, he joined the Ministry of Works Water & Soil Division as a Land Resource Scientist, where he made his mark working on the 1st Edition NZ Land Resource Inventory (NZLRI). He describes this period as "an opportunity to travel most of the South Island back roads, do extensive tramping trips, and get paid for it." He also managed to find the time to complete a Masters (with Hons in Soil Science) from Lincoln University. Ian says that none of this would have been possible without the years of steadfast support from his partner Fleur.

lan's career of almost 50 years has spanned multiple aspects of soil and land management, including wind and rill erosion studies, soil landscape modelling and mapping, as well as investigations into floodplain geomorphology and soil carbon stocks, particularly in relation to erosion impacts. He played a key role in managing the South Island 2nd Edition NZLRI mapping and lead-authored both the Marlborough Region extended LUC legend and the 3rd Edition of the Land Use Capability Survey Handbook. As one of the last remaining members of the original survey team, lan recently compiled a comprehensive National Land Use Capability extended legend that standardises descriptions across New Zealand. Additionally, lan was also part of the founding S-map team and made significant contributions to the growOTAGO project.

lan's legacy extends beyond his technical achievements. His easy-going personality and old-school commitment to excellence have made him a valued colleague and mentor. While officially retired, his unique expertise means we haven't seen the last of him - we're already seeking his input on specialised projects where his depth of expertise will be invaluable for mentoring our early-career researchers.

His colleagues at Manaaki Whenua wish Ian all the best in his well-earned retirement. His 49 years of dedicated service have significantly contributed to both Manaaki Whenua and New Zealand's land management knowledge base. Thank you, Ian, for your exceptional career and lasting impact on our field.

Andrew Manderson

(Adapted with permission from a Manaaki Whenua newsletter)



Photo: Ian Lynn conducting fieldwork



Photo: Ian Lynn leading a field trip of the MWLR Soils and Landscapes team, on the way to Arthur's Pass in February 2019. Photo: Joseph Pollacco.



Photo: Farewell function for Ian Lynn at Manaaki Whenua, Lincoln

Joseph Pollacco has resigned, his last day in office having been Monday 2nd December 2024. Joseph joined the MWLR Lincoln office as a hydrological modeller in 2014. He leaves us with an impressive legacy in terms of his science contribution to soil hydrological modelling, especially as it relates to some of the more difficult modelled soil properties in S-map. Joseph has returned to Europe to spend time with family in the first instance. We wish him all the best for the future!



Photo: Joseph on his last day in office, with a pounamu pendant as a farewell gift (Photo credit: Thomas Caspari).

AgResearch

AgResearch summary of NZSSS conference

The AgResearch cohort attending the Joint NZSSS-ASS conference in Rotorua was made up of mainly staff from the North Island (Keren Ding, Moira Dexter, Natalie Bartlett, Jiafa Luo, Marta Alfaro, Stuart Lindsey, Stewart Ledgard, Dave Houlbrooke, Estelle Dominati, Grace Chibuike, Alec Mackay), as well as a few South Island people (Nicole Schon, Diana Selbie). AgResearch environmental science teams have a good connection with the Rotorua district, primarily through nitrogen research. Examples are work on nitrogen leaching experiments (e.g. high rainfall with Patterson farm), research with proactive farmer discussion groups (e.g. Lake Rerewhekaitu), Lake Taupo limit setting processes and Overseer (development, use by farmers and policy makers).

Random observations, trends and key points that stuck with us:

- Simon Upton PCE a common favourite keynote amongst attendees. Interesting points: soil features in all 6 PCE reports, soil not well defined contributes to it not being valued in NZ, urban development is stripping topsoil recklessly, what we don't know [data gaps around land and soil] is harming us, we need priority focus for a soil strategy, government should invest in high quality information as a public good.
- Brent Clothier PFR worrying extent of soil degradation and water scarcity globally.
- Penelope Wensley and Troy Clarkson Australian political perspective on how to make progress advocating for soil provided useful learnings that NZ should take heed of, especially on extension services, still lacking in NZ, and how to share soil knowledge the right way, through the right channels, to create impact with the farming community.
- Amazing Te Ao Māori scene setting throughout the conference by Kingi Diddle (Ngāti Whakaue), our MC, who did a fabulous job at translating the turangawaewae of the place into stories, putting the soil science presented into perspective to illustrate impacts on people.
- Strong presence of the Pacific Island Soil Science Research Community, and great presentations of community initiatives in the Pacific.
- Soil judging record numbers, brilliant performance by organising team, fantastic team sport.
- Three members of Te Pu Oranga whenua, a long term partner of AgResearch, were present at the conference and presented, for the first time, on work done with both AgResearch and other CRIs on Māori data sovereignty and tikanga around soil sampling and soil data management - a great example of co-learning and the real impact of creating long lasting relationship on capability building of our Māori partners.
- Strong theme of soil carbon running through attendee presentations (possibly due to significant representation from MWLR noticeable this year). Multiple, and very interesting, talks on carbon sequestration technologies such as biochar and enhanced rock weathering (ERW) which helped inform some recently acquired funding for AgResearch in this space.
- Nitrogen economy and long-term implications for the environment continue to be key challenges.
- New soil pollutants will need to be considered in the coming years.
- S-map update: 11 million hectares mapped which represents 20% of land area.
- Conference seemed very well designed and organised (nod to committee and OnCue).
- Noticeable how similar the research is some of us are doing, still not well linked into what each other are doing, perhaps timely the new CRI merger has been announced.
- Volcanic Vigor field trip (including visit to Mt Tarawera) gave a fascinating and useful background to land formation following volcanic activity, to those of us used to emphasising the *management* of soil.
- A highlight was seeing Stewart Ledgard being awarded (1 of 2) NZSSS Grange Medals, which for Outstanding Service to New Zealand Soil Science, at the conference dinner.

• Diana and Natalie remain on the NZSSS Council as Vice President and Secretary, respectively. We farewelled Sam Carrick from President into his Immediate Past President role, Tim Clough out of his past president role, and welcomed Pierre Roudier as the new President.

I personally feel grateful for developing as a researcher within this supportive community and look forward to being part of continuing in this spirit. We look forward to seeing you all again in Christchurch in 2026/27.

Diana Selbie, on behalf of AgResearch team






Abstracts

Implementing plantain (*Plantago lanceolata*) to mitigate the impact of grazing ruminants on nitrogen losses to the environment: A review

Urine patches from grazing ruminants contain high concentrations of nitrogen (N) and are the main source of N leaching from grazed pastoral farming systems. While there have been various options identified to substantially reduce N leaching, in general these practices increase the cost of production or reduce production per hectare. In New Zealand, multi-species pastures were evaluated as a cheaper option that would potentially retain productivity. Early research showed these pastures had lower urinary N excretion from grazing animals and increased plant N uptake, compared with standard New Zealand perennial ryegrass/white clover (PR-WC) pastures. Further research highlighted the beneficial attributes of the pasture herb narrow-leaved plantain (*Plantago lanceolata*; PL), specifically: reduced urine N concentration, reduced urine N excretion, and reduced rate of soil nitrification. Significant reductions (14%-89%) in N leaching were found from cow urine applied to lysimeters with pastures including PL, compared with PR-WC pasture. Paddock-scale measurements confirmed the effects of PL, with 20%-60% lower N leaching when PL comprised 30%-40% of the dry matter (DM) of PL-PR-WC grazed pastures. There were no negative effects on milk production and composition when feeding PL to dairy cows, but small positive effects on fatty acid profiles. However, weed and pest management, palatability and persistence remain challenging in pastures containing PL on commercial farms. Management options need to be clarified to ensure successful establishment and maintenance of PL. Additionally, the cultivar differences in secondary compounds and their impact on nitrification rate and N leaching need to be better understood.

Pinxterhuis JB, Judson HG, Peterson ME, Navarrete S, Minnée E, Dodd MB, Davis SR 2024. Implementing plantain (Plantago lanceolata) to mitigate the impact of grazing ruminants on nitrogen losses to the environment: A review. Grass and Forage Science 79(2): 144-157. <u>https://doi.org/10.1111/gfs.12649</u>

Redox-induced phosphorus release from critical source areas following rainfall events in New Zealand

Critical source areas (CSAs) can act as a source of phosphorus (P) during intermittent rainfall events and contribute to dissolved P loss via runoff. Dissolved forms of P are readily accessible for plant and algal uptake; hence it is a concern in terms of the eutrophication of freshwater bodies. The potential of CSAs to release dissolved P to surface runoff upon intermittent short-term submergence caused by different rainfall events has not been studied at a field-scale in New Zealand previously. A field study was conducted to investigate the potential of two different pastoral soil CSAs (Recent and Pallic soil) to release soil P over five rainfall events during winter and to explore the mechanisms of P release in these soils. Ten sampling stations were installed within each CSA in an area of $6 \times 2 m^2$. Each sampling station had two porewater samplers installed at two depths (2 and 10 cm) below the soil surface. Two platinum half-cell electrodes were installed at the same two depths. Porewater and floodwater samples were collected following five rainfall

events. Redox potentials were measured in-situ. Dissolved reactive phosphorus (DRP), pH, dissolved organic carbon, cations, anions, and alkalinity of the water samples were measured. Soil chemical P fractions were assessed at the beginning, middle and end of the experiment. Thermodynamic modelling was used to infer dissolution and formation of P and P-associated minerals. The average porewater DRP at the two depths during the rainfall events of the Recent and Pallic soils were 0.32-1.3 mg L⁻¹ and 0.26-2.31 mg L⁻¹, respectively. The average floodwater DRP concentrations of the Recent and Pallic soils were 35 and 43-fold higher than the target DRP concentration (0.01 mg L^{-1}) for the Manawatū River. The study highlights the substantial risk of P loss from CSAs to surface water, driven primarily by the reductive dissolution of Fe and Mn oxy(hydr)oxides. The findings underscore the importance of targeted management strategies to mitigate dissolved P runoff, particularly in high-risk CSAs frequent submerged during rainfall events. This study developed an effective method for monitoring soil porewater P and redox conditions, offering valuable insights and practical tools for resource managers seeking to reduce P contamination.

Palihakkara J, Burkitt L, Jeyakumar P, Attanayake CP 2025. Redox-induced phosphorus release from critical source areas following rainfall events in New Zealand. Journal of Environmental Management 374: 124006. https://doi.org/10.1016/j.jenvman.2024.124006

Assessment of spatial variability and temporal stability of groundwater redox conditions in New Zealand.

Mitigating the impacts of agricultural nutrients (nitrogen and phosphorus) on water quality requires a clear understanding of their transport pathways and transformation processes from land to receiving waters. For nitrate, which is subject to subsurface denitrification, it is therefore important to assess the spatial variability and temporal stability of groundwater redox conditions, as nitrate reduction typically occurs in reducing conditions. This paper presents a robust assessment of a large groundwater quality data set collected across New Zealand landscapes, develops methods to impute missing groundwater redox-sensitive variables and characterises the spatial variability and temporal stability of groundwater redox conditions against relevant landscape hydrogeochemical characteristics. Random forest and extreme gradient boosting (XGBoost) outperformed linear regression in predicting missing Mn²⁺ values, achieving higher accuracy $(R^2 > 0.8)$ and lower error (RMSE < 0.2 mg/L). Analysis of groundwater redox conditions highlights considerable spatial variability, particularly influenced by subsurface geology (rock types) and soil characteristics such as soil carbon and drainage across various hydrogeological settings. Our findings also reveal a higher prevalence of oxidised redox status in shallower groundwater and greater temporal stability in oxidised conditions across New Zealand landscapes. These insights have significant implications for targeted management strategies to reduce nitrate losses from farming activities, particularly in oxidised, shallow groundwater across different hydrogeological land units.

Collins SB, Singh R, Mead SR, Horne DJ, Roygard JKF 2024. Assessment of spatial variability and temporal stability of groundwater redox conditions in New

Zealand. Environmental Monitoring and Assessment 197(1): 58. https://doi.org/10.1007/s10661-024-13427-y

Abandoned Mines in New Zealand

Abandoned mines in New Zealand span unrehabilitated (and essentially derelict) mines to, more recently, those undergoing planned rehabilitation and closure. The environmental state of these mines is influenced by the time mining was consented (and thus any legislative requirements for rehabilitation) alongside mine type, geological setting and impacted ecosystem. Historical mining is dominated by underground coal mining, alluvial gold mining and underground mining for gold and base metals in epithermal deposits and gold in orogenic deposits. Over time there has been a shift to open-cast mining, which dominates current mining activities. The most extensive environmental effects from legacy mining arise from acidic and metalliferous drainages and substrates associated with potentially acid-forming coal measures, and epithermal deposits. While particularly impacting aquatic ecosystems, this can also impact terrestrial rehabilitation, including endemic ecosystems. Human health concerns more often arise from derelict mines in orogenic or epithermal gold deposits where arsenic can be significantly elevated in processing ore or waste rock, while historical alluvial gold mining has altered landscapes and removed productive soils. Nonetheless, historical mining provides positive contributions in several mining-related locations now considered as iconic sites showcasing New Zealand's cultural heritage, and unique halophyte communities in Central Otago.

Cavanagh J, Simcock R. 2024 Abandoned Mines in New Zealand. In: Abandoned Mines. Ed: Naidu R. CRC Press. <u>https://doi.org/10.1201/9781315141855</u>

Evaluation of the potential for nine established and emerging interventions to reduce soil carbon losses and increase stocks in grazing systems: A case study for Aotearoa New Zealand

This article reviews nine soil carbon interventions to reduce soil carbon losses or increase stocks in grazing management systems, using their potential application in Aotearoa New Zealand (A-NZ) as a case study. The interventions are classified into three strategies: (1) increasing carbon inputs through deep-rooting and diverse species grasslands, reducing forage cropping and deferred grazing management; (2) increasing protection of carbon stocks by water table management on organic soils, reducing cropping on organic soils, full inversion tillage grassland renewal, the addition of clay minerals and enhanced rock weathering and (3) the adoption of integrated systems including establishing tree clusters into grasslands and agroforestry. We estimated the land area where these interventions could realistically be implemented in A-NZ and assessed their potential impact on mitigating national overall agricultural greenhouse gas emissions. The potential impact of each intervention ranged from <1% to 2.5% of national agricultural greenhouse gas emissions over 20 years. However, confidence in these approaches is hindered by a lack of research data where these approaches have been tested for different soil types and conditions. Notably, water table management, which reduces carbon loss from organic soils, was the only

intervention that could achieve moderate, short- and long-term impacts with a confidence level assessed as 'likely'. We conclude that reducing further soil carbon losses and achieving modest increases in soil carbon stocks are possible but will require economic and political incentives that encourage the integration of multiple interventions at the farm scale.

Whitehead D, McNally SR, Graham SL, Pronger J, Wall AM, Isson T, Beare MH, Tozer KN, Doole GJ, Murray S and others. 2024. Evaluation of the potential for nine established and emerging interventions to reduce soil carbon losses and increase stocks in grazing systems: A case study for Aotearoa New Zealand. Soil Use and Management 40(3): e13113. <u>https://doi.org/10.1111/sum.13113</u>

Organic phosphorus in the terrestrial environment: an update on current research and future directions

In 2016, a group of experts convened to set priorities for organic phosphorus (P) research, addressing global issues, methodological strengths and weaknesses, and the benefits of understanding the organic P cycle. Seven years later, scientists and students with an interest in organic P reconvened to discuss progress and new insights, and this review highlights recent major research updates. Interest in organic P research has increased since 2016, and new priorities have emerged. including the impact of climate change on organic P, the influence of geopolitical crises on P supplies, and the adoption of sustainable practices like regenerative agriculture. Climate change was a central theme in the 2023 discussions, with an increased emphasis on integrating P and especially organic P into climate change research, which has traditionally focused more on carbon (C) and nitrogen (N). The discussions highlighted disparities in accessing analytical equipment globally, and its consequent impact on research quality and scope. To address these issues, coordinated efforts involving the research community, government policies, and international cooperation are needed, much the same as we see with the climate and biodiversity crises. Promoting sustainable agricultural practices, investing in soil health, and enhancing education and extension services are crucial. Future research should focus on standardizing analytical methods, integrating nutrient balance into models, and exploring soil-microbiome-plant interactions. Regular and intedisciplinary workshops, social media engagement, and the establishment of research networks are recommended to maintain momentum in organic P research. Raising public and stakeholder awareness about the importance of organic P is essential for advancing knowledge in this area.

Lucas ER, Nguyen ND, Celi L, Condron LM *et al.* Organic phosphorus in the terrestrial environment: an update on current research and future directions. *J Soil Sci Plant Nutr* (2025). https://doi.org/10.1007/s42729-024-02140-x

Phosphorus applications adjusted to optimal crop yields can help sustain global phosphorus reserves

With the longevity of phosphorus reserves uncertain, distributing phosphorus to meet food production needs is a global challenge. Here we match plant-available soil Olsen phosphorus concentrations to thresholds for optimal productivity of

improved grassland and 28 of the world's most widely grown and valuable crops. We find more land (73%) below optimal production thresholds than above. We calculate that an initial capital application of 56,954 kt could boost soil Olsen phosphorus to their threshold concentrations and that 28,067 kt yr–1 (17,500 kt yr–1 to cropland) could maintain these thresholds. Without additional reserves becoming available, it would take 454 years at the current rate of application (20,500 kt yr–1) to exhaust estimated reserves (2020 value), compared with 531 years at our estimated maintenance rate and 469 years if phosphorus deficits were alleviated. More judicious use of phosphorus fertilizers to account for soil Olsen phosphorus can help achieve optimal production without accelerating the depletion of phosphorus reserves.

McDowell, R. W., et al. (2024). "Phosphorus applications adjusted to optimal crop yields can help sustain global phosphorus reserves." *Nature Food* **5**(4): 332-339.

Soil phosphorus stocks could prolong global reserves and improve water quality

Combining existing databases, we estimated global phosphorus stocks in croplands and grasslands that are not readily available to plants as 32-41% of the 2020 estimated geologic phosphorus reserves, representing 146-186 years of the 2020 mass of phosphorus fertilizer applied annually. Especially if accessed by more efficient crops, this stock could reduce the need for additional fertilizer, improve water quality and contribute to all-round phosphorus sustainability.

McDowell, R. W. and P. M. Haygarth (2025). "Soil phosphorus stocks could prolong global reserves and improve water quality." *Nature Food*. <u>https://doi.org/10.1038/s43016-024-01086-8</u>

Deadline...... for the next issue of Soil News is 12 May

We are the New Zealand Soil News:

Editor: John Drewry - drewryj@landcareresearch.co.nz

Correspondents: **T. Caspari**, Landcare Research (Lincoln); **C Smith**, Lincoln University; **C Rees**, Massey University; **J Drewry**, Landcare Research, (Palmerston North); **S Lambie**, Landcare Research (Hamilton); **Dori Torres-Rojas**, Waikato University; **M Taylor**, Waikato Regional Council (Hamilton); **N Schon**, AgResearch (Lincoln); **J Clague**, Lincoln Agritech (Hamilton); **R Gillespie**, Plant & Food Research (Lincoln); **N Bartlett**, AgResearch (Hamilton); **M Norris**, Plant & Food Research (Ruakura); **S Smaill**, Scion Research