

Soil News



Issue # 2 – Vol # 65 – May 2017

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- ◆ Obituary – Dr John Watkinson
- ◆ Book reviews:
 - Essential Soil Physics. An introduction to soil processes, functions, structure and mechanics
 - Interpreting Soil Test Results: What Do All the Numbers Mean?

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

News, views, letters, articles (serious or otherwise)—send to:

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Deadline..... For the August issue of Soil News is Friday 18th August 2017

Visit our website:

<http://nzsss.science.org.nz/>

New Zealand Soil News

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NZSSS subscriptions become due on **1 July** each year. Individual members who do not pay their subscription before 31 October in a given year will be asked to pay an additional \$NZ10.00 as a penalty for late payment.

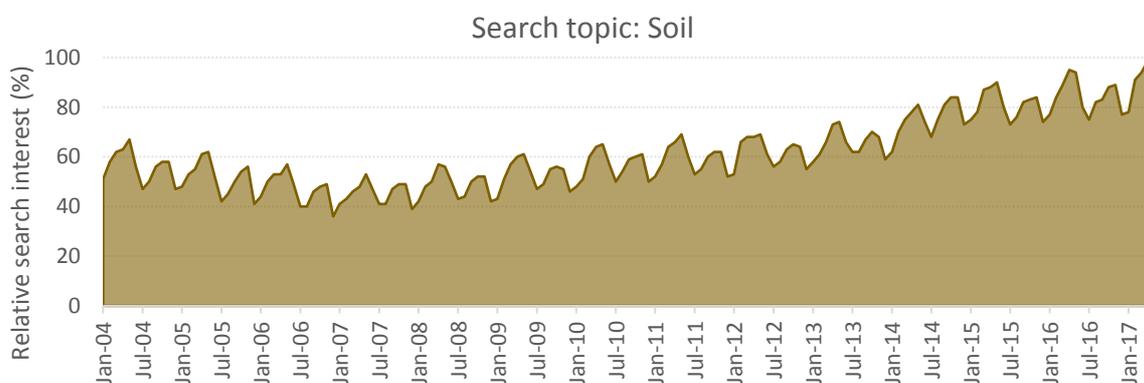
	<i>If paid by 31st October:</i>	<i>After 31st October:</i>
Member (NZ)	\$60.00	\$70.00
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Editorial: by Gina Lucci

Welcome to the second edition of *Soil News* for 2017. Although I was named as editor for the last edition, I must admit that this is the first *Soil News* I have actually helped put together. I will also take this opportunity to acknowledge Isabelle Vanderkolk as the one who does all the hard work of managing contributions and formatting them together into this publication you have in front of you. I want to thank Dave Houlbrooke, my fellow correspondents, and all the other contributors for their engagement and dedication to the *Soil News* over the years. I know from experience that it's not always easy to find time to write a brief for the *Soil News*, but I am always proud to see the final publication.

For those of you who love the *Soil News* just as it is –fear not! It will look the same for a wee while longer. For those of you who are open to change –fear not! Change is on its way. The *Soil News* is the glue that holds this society together between conferences and symposia and it will continue to do so. However, it would be a mistake to ignore the opportunities that this new digital age has afforded us, and continue to do things the same way. Later in the year we will begin experimenting with different formats and media types to bring a new dimension to the *Soil News*. I hope you will join in by pitching new ideas, giving feedback or suggestions for improvement, but you are also welcome to just sit back and enjoy the evolution of the *Soil News*. What is important is that we all move together to promote soil science, have a place to discuss the issues that are important to us and keep up to date with the latest society news.



These are exciting time for soil. Interest in soils is peaking, likely due to the 2015 International year of soils. According to Google Trends, worldwide searches for the topic of “soil” are at an all-time high (graph below). For interest, the annual search peaks occur in May (Any thoughts on the drivers of this would be gratefully received). In the journal *Nature*, the past few years has also seen an increase in the number of letters, notes and reviews with “soil” in the title. Some notable titles include: “Global soil week: Put soil security on the global agenda” (2012); “The contentious nature of soil organic matter” (2015); “International policy: Bury the idea that soils are a local issue” (2015) and this years “The business case for soil”. We wanted to spotlight the importance of soils and now, I think it’s safe to say, we have it. What next?

Last week we had news of the new budget. While it was received with mixed reviews there is a bit more money to go around, including the Endeavour Fund. Soil is “trending” and this seems like the perfect time to be pushing forward on BIG ideas like Paul Mudge’s “Soils version of the Dunedin study” or Peter Singleton’s “National Policy Statement on Strategic Land Resources”. Let’s not let this opportunity pass by. If history is anything to go by, we may not enjoy this level of exposure for long!

Obituary – Dr John Herbert Watkinson

One of my great pleasures in my time as the Group Leader of the Soils and Fertiliser Group at the Ruakura Agricultural Research Centre on the outskirts of Hamilton, was to put together the case to the New Zealand Association of Scientists proposing that Dr John Herbert Watkinson be awarded Marsden Medal. I was delighted for John that my submission was successful.

His citation reads:

“The 1989 Marsden Medal for outstanding service to science was awarded to Dr John H. Watkinson of the Ruakura Soil Research Station. Ministry of Agriculture and Fisheries. The award recognises both Dr Watkinson's valuable and enduring contribution to soil science and analytical chemistry, and the assistance and guidance he has offered his colleagues for many years.

Dr Watkinson completed a B.Sc. with the University of New Zealand in 1953 and joined the Ruakura Soil Research Station of the then Department of Agriculture in 1950 as a soil scientist. He was awarded a Ph.D. in chemistry from Victoria University of Wellington in 1967. His most significant work has been in the study of selenium, ranging from studies of selenium deficiencies in soils to contributions to the understanding of the biological cycle of selenium and its significance to human health. He devised the internationally accepted standard for the analysis of selenium in the nanogram range. He has published 80 scientific papers, is a subcommittee member on selenium for the International Union of Pure and Applied Chemistry, is a referee for several international journals and has been the recipient of a State Services Commission Study Award and a 'Thimble Fellowship.’”

This citation focusses quite correctly on his major work up to that time, selenium, but in my time as his 'manager' in the mid-1980s, I got him involved, together with his close colleague Dr Ken Perrott, in fundamental research on developing models for the oxidation of elemental sulphur and dissolution of reactive phosphate rocks (RPR). Surprisingly although different mechanisms were involved it turned out that both models contained cubic functions.

This research was very important at the time because RPRs and elemental S were introduced into New Zealand agriculture as serious alternatives to the then mainstay of the fertiliser industry, superphosphate. The commercial and hence research stakes were high, as indicated by the fact that about 50% of the research dollars were allocated to this end.

This type of research played to John's strength: importantly both projects had a practical purpose – something that greatly motivated John. But also they required the application of fundamental chemistry and mathematics. John excelled at both.

The elemental S oxidation model was used to define the particle size requirements for fertiliser elemental S products in different climatic regions in New Zealand and the RPR model was used to predict the agronomic effectiveness of new RPRs coming onto the market. Both of these mechanistic models reduced the need for further expensive field trials to test the agronomic effectiveness of new products.

The value of these models is not so apparent today because the use of RPRs, and hence elemental S, is now much less than it was, but nevertheless this science is preserved for posterity in the published scientific literature.

Dr Watkinson's major contribution in his later years of his career was the development and calibration of a soil test to measure that proportion of the organic sulphur which becomes available for plant growth during the season. Scientists had known for years that the small pool of sulphate sulphur could not account for the amount of S taken up by pastures, and in any case, it was not a robust predictor of the responsiveness of pasture to external additions of fertiliser S. It was suspected that some component of the organic S pool was contributing to the pool of available S. Indeed the S model then used to describe the S cycle used 'years in pasture' as a proxy for this, at that time, 'unmeasurable' available S.

John's papers on this development is a complete example of how he went about his science. It is these papers¹ I would recommend to any young scientist wanting to learn about the philosophy and application of the science method. It accurately exhibits the depth of John's scientific mind and contains wonderful insights generated by deduction. For example he argues, based on the evidence, that soil organic S is

homogenous, with respect to microbial decay and accumulation – it is not comprised of chemically defined components of different stability. I do not think that mainstream soil science realises the significance of this possibility - yet.

John was a delightful man: he was quiet, softly-spoken, undemonstrative, unassuming and modest to a fault. He also possessed a wonderful sense of humour, which was often lost on those who were not paying quiet attention - perhaps it was gift afforded only to those close to him! He had strong religious beliefs but these never interfered with his working relationships, which is remarkable considering the diverse nature of colleagues he worked with.

His close colleague for many years, Dr Ken Perrott, tells a wonderful anecdote about John which reflects some of these qualities. Ken was assigned to referee one of John's papers (In those days papers were refereed internally before going to the editor). It was about an HPLC method John had developed to measure sulphate S. He had included in the paper a mathematical section which reach a conclusion that the answer was 42. In their report back to John it was suggested that this section be removed "despite the theological significance of the final result." This was duly done but to this day Ken believes its insertion in the draft was a JHW joke.

Because of his personal characteristics only those who got close to John knew the fullness of the man; a great man, a great mind and a great loss.

¹Watkinson JH, Kear MJ (1996a) Sulphate and mineralisable organic sulfur in pastoral soils of New Zealand. I. A quasi equilibrium between sulphate and mineralisable organic S. Australian Journal of Soil Research 34, 385–403. doi:10.1071/SR9960385

¹Watkinson JH, Kear MJ (1996b) Sulphate and mineralisable organic sulfur in pastoral soils of New Zealand. II. A soil test for mineralisable organic sulfur. Australian Journal of Soil Research 34, 405–412. doi:10.1071/SR9960405

*Dr D C Edmeades with assistance from Dr Ken Perrott
8 May 2017*

John



NOTICE

Taita DSIR Reunion

It is nearly 25 years since the Taita campus closed and we thought it might be a good time to think about a reunion. A reunion of whom you might say. Well if we have thought of them all, it would comprise staff and family from the following organisations and groups:

- NZ Soil Bureau DSIR, and substations of Botany and Ecology divisions DSIR based on the Taita campus;
- Land and Soil Sciences, DSIR;
- DSIR Land Resources;
- The regional offices associated with the above DSIR entities.

Our thinking is to have an informal family affair/picnic somewhere in the Wellington/Hutt area, perhaps in late October – possibly Labour Weekend. If interested, could you please respond to Peter Barker at the email address given below, with likely numbers and any ideas/thoughts you have about this. This will not commit anyone, but is just an attempt to get a feel for likely numbers, as this will obviously affect any future planning. Could you please also pass this email on to anyone else you think might be interested.

PBarker@iconz.co.nz

With our best wishes – Helen Kettles, Peter Barker, Bob Lee

HOLD THE DATE – SOILS2018

Hold the Date – Soils 2018. 3-6 December 2018, Napier, New Zealand

Soils2018 will be held in Napier from 3 to 6 December 2018. This biannual conference is a must attend event organised by the NZ Society of Soil Science and OnCue Conferences, and will cover a range of topics under the theme '**diverse soils - productive landscapes**'. The wider Hawke's Bay region is home to a diverse mix of primary production, from forestry and sheep and beef production on the coastal and northern hill country, intensive dairy systems on the flat and rolling terraces abutting the ranges, to highly productive horticulture and cropping on the fertile Heretaunga and Ruataniwha plains. During the 4-day conference you'll get a chance to hear from a wide range of researchers, industry leaders, consultants and advisors, regulators and land managers on all things soil-related, anchored by a range of exciting keynotes focused on soils, food production and hot topics around water use and environmental indicators. The conference will be held at the new Napier War Memorial Conference Centre, a great venue on Napier's iconic Marine Parade that looks out on Cape Kidnappers and the city coastline. Centrally located, the NWMCC is across the road from local hotels, restaurants and the downtown shopping precinct. Around the conference you'll have a chance to connect with your colleagues during social activities at some of the Bay's well known wineries, and look at a wide range of offerings from our event sponsors. Further details will be released in the coming months, including a call for paper submissions. In the interim, we'd like to hear your ideas for the science programme – send any suggestions to Diana Selbie Diana.Selbie@agresearch.co.nz.

Rebecca Withnall and Paul Johnstone, co-convenors
Lea Boodee, On-Cue Conference

EUROPEAN SOIL DATA CENTRE NEWS

Presentations of the “Soil Erosion modelling workshop”



The workshop took place in Ispra, Italy (20-22 March 2017) and was organized by the Joint Research Centre (JRC). It hosted more than 110 participants and the **83 presentations** are available for download. This workshop discussed mainly issues how the local/regional modeling results can be upscaled (or applied) at European scale. Emphasis was also given to management practices that can reduce soil erosion and small scale applications. <http://esdac.jrc.ec.europa.eu/themes/erosion-modelling-workshop>

European Digital Archive of Soil Maps (EuDASM)



A new interface of this important archive is presented in ESDAC. The **5500 maps** are available for download (PDF, JPEG) and allow the user to browse by country or continent. The EuDASM archive is the result of a collaboration between JRC and ISRIC. The objective of this collaboration was to transfer paper-based soil maps into a digital format with the maximum possible resolution and to ensure their preservation and easy disclosure. Many of those documents are more over 50 years old and include information and data from developing countries in Africa, Asia and Latin America.

<http://esdac.jrc.ec.europa.eu/resource-type/national-soil-maps-eudasm>

Global assessment of pressures on soil biodiversity

The JRC's Soil Team is working on the first global assessment of the impacts on soil biodiversity by both anthropogenic and non-anthropogenic pressures. To reach this goal, JRC carries out a **survey** to incorporate expert judgments. The result of this survey will allow to rank the main pressures on soil life and map their distribution at the global scale. Responses are essential for determining how to weight each pressure in the cumulative impact maps that will be produced. Therefore, participation in this process is highly appreciated. Contact point: Alberto Orgiazzi (alberto.orgiazzi@ec.europa.eu). Link to the survey: <https://goo.gl/forms/F2MZb4hNUNGx4mCt1>

New Zealand Soil Science Society Awards 2017

Nominations for the following awards opened **1 March 2017** (with the exception of the US/NZ Exchange Award, for which nominations opened 25 January). Key details regarding nomination requirements are provided in the table below.

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

Dr Brendon Malcolm
 NZSSS Awards Convenor
 C/O Plant and Food Research
 Private Bag 4704, Christchurch Mail Centre, Christchurch 8140
 New Zealand

Email: Brendon.Malcolm@plantandfood.co.nz

Award	Presented	Nominations close	Nominee eligibility	Nominator eligibility
<i>NZSSS Fellowship</i>	Annually	31 July 2017	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.
<i>The Grange Medal</i>	Biennially (conference year)	31 July 2018	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.
<i>The Blakemore Award</i>	Biennially (conference year)	31 July 2018	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).
<i>The Leamy Award</i>	Biennially (conference year)	31 July 2018	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).
<i>The Quin Award</i>	Annually	31 July 2017	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.

Award	Presented	Nominations close	Nominee eligibility	Nominator eligibility
<i>The Fieldes Award</i>	Annually	31 July 2017	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.
<i>The Rigg Award</i>	Annually	31 July 2017	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.
<i>Undergraduate Prizes</i>	Annually	31 December 2017	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.
<i>The US/NZ Exchange Award</i>	Annually	15 April 2017 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.



Have you liked us on Facebook?

Unless you've been living under a lump of greywacke, you will already be aware of the importance of social media, and the benefits of having an active presence. The NZSSS has a Facebook page and Twitter handle (@NZ_Soil_Soc). If you are already a user, please follow us. If you are new to social media, or not sure about getting involved, you can now keep an eye out for new NZSSS posts by checking the feed from our website:

<http://nzsss.science.org.nz/>

NZSSS meeting held at Mercure Wellington Abel Tasman, 169 Willis Street. 16th February 2017

Present:

Megan Balks, Brendon Malcom, Sam Carrick, Hamish Lowe, Reece Hill, Haydon Jones, Tim Clough, David Houlbrooke, Selai Letica

Apologies:

Roger McLenaghan, Mike Hedley.

Welcome to new members: Selai and Brendon.

Secretariat:

Minutes of the last NZSSS meeting (phone conference 9:30 – 12: noon 21 November 2016) were read and it was moved these were a true and accurate record (moved Tim, seconded Megan).

Matters arising

No matters arising not already on the agenda

Items for General Business

- Norman Taylor Trowel
- NZ student judging trophy

Approval of Agenda

Agenda was approved (moved Tim, seconded Reece).

Treasury

- Balance sheet, year to date, as at 31 January 2017: Assets \$173,660, Liabilities \$0.
- Profit/Loss July 2016 to January 2017: Profit \$22,380, Loss \$26,301 operating mainly due to conference expenses (mainly support for student travel, and awards). It was moved and accepted that these were a true and accurate record. (moved Haydon, seconded Hamish)

Action point: Committee should have a future discussion on formalising long-term expenditure goals

Membership

Membership/database activity since November

New member applications awaiting approval

- The Librarian, Waikato Regional Council (reinstated)
- Aimee Robinson, Lincoln University

Member applications approved by email since previous meeting

- Penelope Maccormick
- Alastair Maccormick
- Angela Doherty
- Olivia petrie
- Matilda Hasselman
- Minakshi Mishra
- Matthew Riddle
- Michael David White
- Tash Styles
- Gerard Grealish
- Simeon Smaill
- Carmen Rosa Medina Carmona
- Gina van der Klei
- Jane Mitchell

Resignations

- Edouard Périé - Resigned
- Susanna Rutledge - Resigned
- Jennifer Prosser - Resigned

Deceased

- None

Membership Database Summary

MEMBERSHIP GROUP	QUANTITY
NZ Member	240
Overseas Member	20
NZ Student	56
Overseas Student	1
NZ Retired	22
Overseas Retired	3
Life Member	10
Honorary	1
Libraries	12
TOTAL MEMBERSHIP	365 *

*** NOTE:** Membership total above includes **2** new members awaiting approval (refer next page). Subscription invoices have been sent to these new members.

Secretariat activity summary

Email and mail management

- Collecting and processing association mail from PO Box
- Processing incoming emails relating to other fields below

Financial management

- Processing payments (incoming via bank transfer and cheque)
- Preparing and loading monthly bills for payment
- Managing taking off discount for paying before October 31st

Membership database

- New membership applications (above/attached)
- Updating member details
- Processing member resignations

Mailouts/Email

- *November Soil News on the 5 December 2016*
- *World Soils Day at Waikato Museum Dec 5th 2016 to Waikato, Bay of Plenty and Auckland members. Emailed on 29 November 2016*
- *On December 15 2016 circulate the following call for abstracts for the ACPA/ACPLF conferences that will be held here in Hamilton next year?*

Financial accounting

- Tagged 59 Members with overdue tag

It was moved and accepted that applications for membership and resignations be accepted and that these records were a true and accurate record of the secretariat's activities (moved Tim/seconded Hayden).

Roles and responsibilities for next 2 years

Roles and responsibilities for the next two years will be as follows: President – Dave; Past President – Reece; Vice President – Megan; Secretary – Tim; Treasurer – Haydon; Soil News Editor - Gina Lucci; Kai Whakahaere – Selai; Awards Convenor - Brendon; Science Fairs – Roger; Records & information management – Sam; Student Liaison – Mike, Tim, Megan; RSNZ constituent organisations – Dave/Reece; Outreach coordinator – Megan/Sam; Social media – Trish/Brendon; Website – Hamish; Soils and public policy – Reece/ Hamish

Action point – Dave to brief Mike

Action point – Update member profiles (contact details etc.) for www site

RSNZ changes

- *RSNZ are changing their website provider.* Currently RSNZ is website host for NZSSS. The new provider is 'Prefer' that will run the website for the RSNZ. No fee for this (paid by RSNZ). Can run set formats and templates. May/may not need to alter current NZSSS website. Appears we can still manage content ourselves. *Action point* - Reece and Hamish to investigate further and either confirm change or suggest an alternative.

- *Invoicing period changed.* Invoice will be larger as a result due to this. 50% by end of March this year and rest in 2018 or pay the lot now.
- *Voting scale changed.* NZSSS will get 5 votes.
- *RSNZ are setting up a new membership portal.* Details to follow.

Feedback from RSNZ constituent organisation meeting (Reece)

- RSNZ will hold a 150 year celebration this year.
- RSNZ keen to potentially have an award for emerging scientists
- At the meeting the loss of productive land was noted.
- RSNZ keen to extend into Pacific region
- RSNZ Fellowship awards to also have more emphasis on more applied sciences.

Soil News

- Editor (Gina) is going to explore email style soil news.
- More opinion pieces would be welcomed (see correspondence from Allan Hewitt).
- Council members will assist in contributing new ideas and suggestions for Soil News.
- Review of Conference will be asked for from NZ members for soil news.

NZSSS World Wide Web

- Check cross linkages are all up and running.
- New page for calendar of upcoming events – needs to be relevant and kept updated (e.g. visitor seminars at various sites, conferences, events).
- Add a page of NZSSS award recipients.

Action point: Hamish to check these.

NZSSS Drop-box account (Hamish)

- This has been set up with a gmail address.
- Could act as a central repository for NZSSS council documents & or other documents.
- Agreed this be initially trialled from an operational point of view for NZSSS minutes, financial reports, and Soil News.

Action point: Hamish to facilitate the commencement of this with Tim.

Awards

Three nominations for the 'Fellow of the Royal Society' award in the system.

General Business

Storage of files electronically (Sam).

- At this moment Sam has a student cataloguing and stocktaking the physical archive. This will then be used to decide what needs scanning. The digital archive can then be built.

Contact point for council.

- Could have an email address on www site forwarding to Groundwork. *Action point:* Hamish and Reece to investigate.

Partnership with Soil Science Australia.

- Following discussions between David and Australian Soil Science Society representatives a discussion on the value of Certified Practising Soil Science (CPSS) was held. This raised more questions than answers. David will discuss further with Australian representatives. Potentially there are niches where a CPSS scheme would give credibility – but this will only be required if regional councils require such certification. Need to understand what the demand would be within industry – is it needed? There would also be a lot of administration involved. *Action point:* Hamish will summarise the issue for further consideration.
- Council agreed there would be value in having trans-Tasman society meetings on a regular basis (every 6 months), with President, Vice President, and Past President.

NZ Grassland Association

- David had an approach from NZGA about the possibility of working together in future. In the past, NZSSS conference 'off-year' has seen NZSSS combine with NZGA. There are a lot of competing conferences for limited conference money. Keynote speaker exchanges could be

used to raise issues at conferences, Soil News etc. *Action point:* David will continue to liaise with NZGA and offer feedback.

Copyright

- Correspondence from Copyright licensing New Zealand showed that NZSSS published works had been copied and potentially there was \$436 dollars owing over a three or four year period. The council agreed there was no need to chase this.

NZ Student Soil Judging Award

- Will soil judging happen at every conference? To be decided.

Awards

- Haydon recapped 2016 award results presented at the Queenstown Conference.
- Review of awards portfolio is almost completed. Haydon has collated all information to improve and streamline administration of the awards and sent a draft to council members. *Action point:* Before next meeting ALL members to read and comment on the next draft's recommendations to be circulated. Early career scientist was seen as an award that is lacking following the review of the awards structure. See recommendations made in the draft. Council noted its appreciation for Haydon having undertaken this
- Norman Taylor Trowel
 - Keep this with the Blakemore award.

Promoting soil science

- Pioneers of Soil Science in NZ poster provides material for Soil News.
- Website 'Soils of NZ' will go onto NZSSS Facebook page.
- "I love soils website" inaccessible due to technical issues but some content is available to rebuild it and it is available to be used. *Action point:* Reece to discuss with 'Prefer' when RSNZ site is up and running.

Conferences

- Debrief Queenstown: Sam noted – minor issues traffic and sponsors displays tucked away. Town centre was an excellent venue for attendees to socialise. OnCue yet to assemble/finalise accounts. Cecile will present a final report from the conference organising committee. Good numbers in attendance. *Action point:* Sam to thank organizing committee and OnCue.
- Conferences/meetings before Hawkes Bay 2018.
 - WaiBOP 5th December 2017, David Lowe has offered to run it.
 - Lincoln Regional and Palmerston North workshops on different days so Norman Taylor lecture is delivered around country.
 - *Action point:* identify Norman Taylor recipient.
 - *Action point:* organise people at Lincoln Palmerston Nth to lead workshops.
 - Landtreatment Collective 24th March in Christchurch
 - World Soil's Conference 12-17th August in Brazil
- Hawkes Bay conference 2018.
 - Organizing committee being led by Paul Johnstone at Plant and Food. Assisted by David, Reece, Will Bodeca Analytical Research Laboratories (Ravensdown), Rebecca Withnall (ARL & ASPAC Inc.), Massey (*Mike to recommend some body*), Landcare staff member *to be confirmed*. Field trips could be related to SMAP work, and many other issues. Provisionally 3rd-6th Dec
 - Moved David/Second Megan to keep OnCue as conference organiser.
 - Moved David/Second Hamish that the organizing committee for the Hawkes Bay conference receive \$10,000 seed money
 - Moved David/Second Megan that, subject to Paul Johnstone accepting the role, he lead the organizing committee.
 - Moved David/Reece ARL be involved in the
 - Venues being considered.

Meeting Ended 4:05

Next meeting End of April/Start of May.

Profit & Loss

The New Zealand Society of Soil Science 1 July 2016 to 30 April 2017

	30 Apr 17	30 Apr 16
Income		
Awards Sponsorship	5,000	-
Interest (Current a/c)	14	29
Interest (Fixed Deposits)	141	-
Sales - SITNZL & LUC Handbooks	1,485	720
Subscriptions (members)	17,000	17,815
Total Income	23,640	18,564
Gross Profit	23,640	18,564
Less Operating Expenses		
Awards & Grants	7,400	2,000
Bank fees & interest	(32)	(3)
Conference expenses	9,317	11,264
Council - General Expenses	2,165	3,663
Council - Travel Expenses	2,724	-
Norman Taylor Lecture costs	-	661
Printing - Soil News	4,232	-
Printing & Stationery - General	-	2
Royal Society Membership Fees	1,250	1,214
Secretarial Services	5,665	3,068
Subscriptions (Xero & Capsule)	394	776
Website & Resources (International Year of Soils)	3,000	-
Total Operating Expenses	36,116	22,645
Net Profit	(12,476)	(4,080)

Balance Sheet

The New Zealand Society of Soil Science As at 30 April 2017

	30 Apr 2017	30 Jun 2016
Assets		
Bank		
BNZ Current Account	13,119	5,627
eWAY payments	73	-
Total Bank	13,192	5,627
Current Assets		
Accounts Receivable	3,455	2,813
Prepayments	625	-
Term Deposits (Combined)	147,833	169,632
Total Current Assets	151,913	172,445
Total Assets	165,105	178,071
Liabilities		
Current Liabilities		
Accounts Payable	-	491
Total Current Liabilities	-	491
Total Liabilities	-	491
Net Assets	165,105	177,581
Equity		
Accumulated Funds (Opening Balance)	177,581	178,484
Current Year Earnings	(12,476)	(903)
Total Equity	165,105	177,581

News from the Regions

Waikato/Bay of Plenty

Waikato University

Congratulations to **Jack Pronger** who submitted his PhD thesis: “Water use efficiency of grazed pastures under contrasting diversity”. Jack measured evaporation and water use efficiency at paddock scales. Using eddy covariance techniques, he compared spatial and temporal difference in evaporation at three sites on one farm and showed variation was very low. He also compared evaporation and water use efficiency between diverse and traditional ryegrass/clover swards and tested whether ^{13}C could be used as a more rapid measurement approach. Jack was supervised by **Louis Schipper**, **Dave Campbell** and **Mike Clearwater**. Jack has just taken up a scientist position at Landcare Research (Hamilton).



Not all hard work at 'A Greener World' workshop, UK

Louis attended a workshop in Frost Flat near Bristol, UK, that was hosted by an NGO 'A Greener World' to explore the role of grazed pastures in managing greenhouse gas emissions from productive agriculture. While in the UK he caught up with Jenni Dungait (Rothamsted, North Wyke) and David Hopkins (The Royal Agricultural University).

The Waiber group also had a couple of cakes to celebrate research publications and completing students: see waiber.com/research-cake/ for all the details or our group (search “research cake” on face book). Olivia Petrie submitted her masterate thesis on the changes in microbial respiration under irrigated and non-irrigated soils. Olivia was supervised by **Tanya O'Neill** and Louis Schipper. Liam and CJ were summer students mapping soils at the Troughton farm where full carbon balances and nitrous oxide emissions are being measured at paddock scales. They were supervised by **Aaron Wall**.



Changes in microbial activity in irrigated and non-irrigated soils by Olivia Petrie.



Soil mapping by CJ and Liam (summer students)

AgResearch Ruakura

Focus on Peat

Dave Houlbrooke, **Bill Carlson** along with **Scott Fraser** (Landcare Research) and **Peter Singleton** were all involved in presentations at the April field day of the “Nutrient Management on Peat soils” Sustainable Farming Fund project. The field day was well attended by approx. 90 farmers and rural business professionals who learnt about dairy effluent and nitrogen management on peat, classification of peat soils and challenges of pasture persistence on peat soils. In addition to a greater awareness of peat specific nutrient management and water quality risk, the project will provide farmers with an understanding of soil risk related to effluent storage requirements and the influence of peat development status.

Out of office



A delegation of the New Zealand – China Water Research Centre, including **Jiafa Luo** and **Sheree Balvert** from Ruakura (pictured above on left, both in white), visited potential partners in China. During the trip, they visited a number of research institutes and universities and discussed potential collaboration opportunities in the environmental research area.



Gina Lucci has taken up a new, one year role working as the executive coordinator for a Strategic Partnership (Alianza Estratégica) between INIA (Uruguay), AgResearch, IRTA (Spain) and Teagasc (Ireland), and will be regularly based in Uruguay. This partnership aims to create a world-class science community to address common challenges in pasture-based livestock productivity, competitiveness and sustainability. Gina has already spent 2 months in Uruguay visiting INIA’s research stations including La Estanzuela founded in 1914

(The iconic water tower is pictured on left).

Stewart Ledgard, **Jiafa Luo** and **Sandra Payen** recently returned from a project meeting in China with Chinese Academy of Science researchers to discuss work on a joint MBIE NZ-China International Fund project on Water and Nitrogen Footprinting of dairy systems. The Chinese dairy farms, including one visited, were all based on full housing of cows and brought-in feeds. After the visit, Stewart went to Guilin to check out the Karst formations (largely limestone based) that make up the renowned landscape of the area and that features on their 20 yuan note (Pictured right).



NZSSS 2018!

Dave Houlbrooke, Diana Selbie and Reece Hill (WRC) travelled down to Napier in April to attend the initial local organising committee meeting of the Napier 2018 NZSSS conference. They joined **Paul Johnstone** and **Matt Norris** (Plant & Food), **Rebeca Withnall** and **Will Bodeker** (ARC), **Barry Lynch** (HBRC) and **James Hanly** (Massey) and looked at potential conference venues and discussed potential themes. If you would like to suggest content or ideas for the conference then please contact either Paul Johnstone or Dave Houlbrooke.

Manawatu

Plant & Food Research – Palmerston North

The Production Footprints team welcomes **Liz Farley**, a teacher at Parkland School. Liz has been working with **Ian McIvor** and **Trevor Jones** since late January as a part of the Royal Society of New Zealand's "Science Teaching and Leadership Programme". Part of this programme has her based at Plant & Food Research to experience "real world" science and what it is like to be within the science research field. This experience will help her learn more about the nature of science. The aim is that when she returns to school in July that she is able to help develop the way that the school teaches science curriculum and help teachers be able to teach science more effectively to the students.



Roberta Gentile has returned full-time to the team following a year's parental leave. She is enjoying the more relaxed pace of project work.

Liz Farley (right) assisting Roberta Gentile in the lab.

Excavating the root system of three year old poplar trees on a hill slope can be interesting work when water drains into the hole overnight! **Mike Marden** (Landcare Research) here pictured loosening roots under water, **Ian McIvor** and **Liz Farley** (a Royal Society primary teacher fellow) spent two days excavating roots at Lonestar Station in northern Wairarapa in a joint project investigating the influence of soil type on root extension for poplars grown from 3 m poles. The weather was fine and the slope was saturated at depth, so the clay-loam got very sticky at depth. The roots extended up to 2 m laterally and up to 1.5 m depth, though of course they never grow straight out or straight down. They turn and branch and when they branch often one branch goes downwards. Among qualities required when excavating are planning, patience, persistence, good humour, and ability to lift mud-caked boots. We did create some pugging too, for which we sincerely apologise to the soil science community.



Massey University



After 36 years **Mike Tuohy** has retired from his fulltime position in Soil and Earth Sciences. He will retain a part-time position for the foreseeable future, but is looking forward to having more time to pursue his many interests beyond the University.

Mike was appointed in 1981 to teach Soil Conservation to the 4th year B.Agric.Sci and B.Hort.Sci students. In more recent times he has specialised in GIS and remote sensing and has taught image analyses skills to students over many disciplines.

Mike has made an enormous contribution to teaching, postgraduate research and the psychological morale of the Soil & Earth Sciences Group. We wish Mike well for the future.

Dorian Maniel is an intern student visiting Soil & Earth Sciences at Massey University for three months, taking a break from his studies in biological engineering at Polytech Clermont-Ferrand in France. During the internship he will study dissolved organic carbon and its effects on groundwater denitrification. Dorian is assisting with our Hill Country research at Tuapaka, where staff and postgraduate students are investigating nitrate attenuation capacity and processes in pastoral hill country landscapes.



Dorian Maniel

A visiting Professor from China, Fei Shen, will stay with us at the Institute of Agriculture and Environment, Massey University, from 10 May to 17 June. Prof. Shen is the Head of the Institute of Ecological and Environmental Sciences of Sichuan Agricultural University in China. His institute is mainly focused on the ecological and environmental issues in rural areas and farmland, especially, the environmental pollutions and waste valorization. His visit is supported by the “NZ-China Scientists Exchange Programme in 2017”, a Royal Society of New Zealand initiative, and will work with **Marta Camps Arbestain** on the topic of “Biochar Application in Soil and Environment”. They will thoroughly communicate and discuss the core points on the biochar classification and suitable and safe application of biochar to soil, the use of biochar for the control of pollutants, and some other topics related to the impact of agriculture on the environment. Also, the substantial co-operation between these two organizations will be proposed and discussed during the visit.

Congratulations to **Sarah Whiteman**, who was presented with the NZSSS Massey University Undergraduate Student Prize for 2016 when she returned to Massey to graduate with a Bachelor of AgriScience degree in May. Sarah is currently working at the Foundation for Arable Research (FAR) in



Christchurch as an industry graduate. Sarah has been involved in a number of research projects across the arable sector in her time with FAR, including those to do with clover desiccation trials, barley yellow dwarf virus, fodder beet and fertiliser application and herbicide resistance. Sarah’s main project is measuring nitrate levels across 51 wells in the Ashburton area and looking for patterns across time, depth and location. This year Sarah has also enrolled in a Postgraduate Diploma in Agricultural Science to undertake study in advanced nutrient management, and her prize from NZSSS has been applied to assist with the cost of this course.

Mike Hedley presented Sarah Whiteman with the NZSSS Massey University Undergraduate Student Prize for 2016.

Canterbury

Plant and Food Research, Lincoln

Staff: **Esther Meenken**, biometrician, resigned in February to head to the green pastures of Agresearch. Esther will be missed by the Lincoln team. **Abie Horrocks** resigned from PFR in April to take up a position at FAR. We're very sorry to see Abie leave. **Gina van der Klei** is taking parental leave as **Erin Lawrence-Smith** returns from parental leave

A huge amount of time has been invested in the lysimeter facility recently. The lysimeters from Methven have been changed for ones now with Eyre soil. Lots of work with loaders, wheelbarrows and shovels have gone into this changeover. **Steve Thomas** says that the focus of the new work, part of the MBIE funded irrigation project, will look at maximising value from irrigation, but now on shallow stony soils. Landcare, PFR and FAR are the science providers for this project. Steve says that the team will be looking at how to manage soil water properties on these shallow, stony soils with the aim on increasing water use efficiency and how soil water holding capacity properties change over time. Dirk Wallace's PhD work investigating soil amendments to increase soil water holding capacity will link to the lysimeter work. Italian ryegrass has been planted under differing tillages with other treatments being varying soil moisture deficits and irrigation management and what this matrix does to pasture production.

Council member **Brendon Malcolm** featured recently on the TV One program Rural Delivery, talking about trial work investigating the use of winter sown cover crops to reduce the leaching potential of autumn grazed paddocks. The work looks promising and is being extended out onto dairying farms soon in collaboration with Dairy NZ. See Brendon in action at <https://www.facebook.com/RuralDeliveryNZ/posts/1744388062468498>

Trish Fraser gave a talk about "Caring for your Soil" at a Soil Management Field Day organised by the Waihao Wainono Catchment group at Hugh Wigley's property near Waimate, South Canterbury, on 4th May. The field day was supported by FAR to help people get the most out of their soil and understand new land management rules. Trish demonstrated water movement through different soils and showed how continuous cultivation aka plunger (see pic below) can affect soil structural condition.



Trish Fraser demonstrating water movement through a range of soil types and simulating the effect of cultivation on soil structure

Trish was active at the Lincoln Bioblitz in April, presenting with Nicole Schon from Massey on the diversity of earthworms by the Liffey Stream at Lincoln. She was a taxa leader of Team annelids, searching for species of earthworms.

Abie Horrocks has been busy presenting at a series of IPM field days around NZ.

Sam McNally has made a series of presentations on the carbon sequestration potential of NZ soils. Sam and co-authors **Mike Beare, Denis Curtin, Esther Meenken**, Frank Kelliher, Roberto Calvelo Pereira, Qinhua Shen, and Jeff Baldock have had success getting a paper accepted to Global Change Biology.

Richard Gillespie presented to farmers and industry reps at an end of season round up at a dairy farm at Highbank, Canterbury. PFR at investigating soil fertility and quality and pasture composition as influenced by soil fertility management via two systems. Two adjacent farms were converted to dairy and each farm is managed as either 'best management practice' conventional method using synthetic fertiliser at rates recommended by a depletive model or a biological approach using the Albrecht-Kinsey method. It was interesting to see both farms producing to similar levels. The usual lively discussion ensued following a number of presentations.

Sarah Sinton, Steve Dellow and **Alex Michel** are continuing their work in the FAR-lead SFF funded potato project. They are working closely with PFR entomology and plant pathology staff. Sarah and Steve are focussing on the project component looking at the effects of soil quality and crop rotation on yield while Alex is looking more at seed borne diseases in a project aligned to PFR Core funding. The SFF team have found a correlation between soil structural condition and paddock history, discovering that the biggest effect on potato yield is the physical condition of the soil followed by the incidence of soil borne disease. They planted the same potato seed lines into paddocks whose 10 year histories were either predominantly pasture or grass, or crops. Paddocks were also divided as to whether potatoes were or were not grown in the previous 10 years. An interim finding indicates that having predominantly grass in the rotation in the last 10 years has a significant bearing on the structure of the soil, and possibly on subsequent potato crop performance (yield). This recent work acknowledges early studies which have shown grass or pasture needs to be in for a minimum of 18 months to have any effect on improving soil structure.

A fodder beet trial has just finished at the PFR rainshelter complex. The trial looked at water and nitrogen interactions and was led by **Edmar Teixeira** with inputs from **Hamish Brown, Shane Maley, Mike George, Alex Michel, Steve Dellow** and **Richard Gillespie**. Additionally, summer student **Will Burrow** will be using this platform for his honours project on nitrogen management of fodder beet.



UAV picture of the rainshelter fodder beet trial



The range of fodder beet plants from the six treatments at the rainshelter



Mike George has been investigating the use of UAV's for field trial support. In soils' work at Lincoln an example of this at the treading and tillage trial was shown in the last edition. Mike has extended the definition of drone images by creating orthomosaic composition pictures. These are produced by integrating multiple photos taken at low altitude to create extremely high resolution images.

A composite picture of the rainshelter fodder beet trial



Completed orthomosaic image of the rainshelter fodder beet trial

Lincoln University

New Head of Department at Lincoln University.

Carol Smith is the new Head of Department of Soil and Physical Sciences. She takes over from **Peter Almond** who stepped down from the role in February, after 5 years at the helm. Carol started at Lincoln in 2005 as a lecturer in pedology, geomorphology and earth science, following the retirement of Phil Tonkin. She emigrated with her family to New Zealand in 1993 from the UK, where she has a PhD in soil science from Aberdeen University. More recently, she helped organise the recent Wanaka soil judging competition at the Queenstown conference last year.



Caption. Carol Smith in one of the competition pits at the soil judging competition, Wanaka (Maungawera deep silt loam, Pallic Orthic Brown).

Book Reviews

Essential Soil Physics. An introduction to soil processes, functions, structure and mechanics by Karl-Heinrich Hartge and Rainer Horn.

Edited by Robert Horton, Rainer Horn, Jorg Bachmann and Stephan Peth. CSIRO publishing, Australia. 391 p. ISBN 978-1-4863-0727-2.

“Essential soil physics” is the first English language edition of Hartge and Horn’s book which has had four previous editions in German. The book is also available in Spanish. I found this an excellent and accessible book which meets its stated target of readers who have a “knowledge of soil science and are interested in understanding the underlying physical processes which control soil functions to, ultimately, improve soil management and use.”

Overall I found this a very readable, practical, and useful summary of the main tenants of soil physics including: soil texture and structure; soil mechanics; soil water and air content and movement; thermal behaviour; water, heat, and gas budgets of soils; plant habitats; soil erosion; and solute transport. Key literature is referenced for readers who need further detail in a particular area. The writing is clear and concise and all the major soil physical topics are explained without getting bogged down in the detail of the derivation of formulas. The practical applications related to topics such as drainage and irrigation scheduling were covered. Each chapter included a set of practical problems, with clear solutions given in an appendix, which would greatly aid the motivated readers understanding of the topics discussed.

I particularly liked the inclusion of a chapter on “Mechanical and hydraulic forces in soils” that crossed over into engineering soil mechanics, an important area that is not always well covered in soil physics texts which tend to focus primarily on agronomic applications. In the chapter on thermal behaviour of soils I found the treatment of soil freezing and thawing processes particularly insightful as, though mainly written in the context of the winter freezing of soils in continental Europe and USA, it could be applied to the Antarctic cryosol situation.

A final chapter on the future of soil physics provided some interesting perspectives. Of interest it pointed to the potential of “biological engineering” the study of the connection of physical and biological processes in soils, particularly in the thin moisture films on soil surfaces. The concluding comment that “Intensive research in the past decades has shown, however, that simple models, oblivious of the actual processes taking place in soils, are unable to predict or even approximate future changes in soils ... or predict the consequences for ecosystems” provides the basis of the challenge for future work in soil physics.

For a working soil scientist I recommend this book as a reference to own. I will also recommend our university library acquire a copy. I think it a useful text for graduate students to use however I suspect that only the most motivated and mathematically literate of undergraduate students would cope with it – the book assumes a basic knowledge of soil science and mathematics. If there was an opportunity to run a focussed soil physics course this would certainly be a recommended, if not required, text. It is also a book I would recommend to civil engineering and geotechnical engineering students and practitioners.

Interpreting Soil Test Results: What Do All the Numbers Mean?

Pam Hazelton, Brian Murphy

Third Edition Paperback | November 2016 | AU\$ 59.95

ISBN: 9781486303960 | 200 pages | 245 x 170 mm

Publisher: CSIRO Publishing

See more at: <http://www.publish.csiro.au/book/7386/#details>

“Interpreting Soil Test Results: What Do All the Numbers Mean?” by Pam Hazelton and Brian Murphy is a practical resource for soil scientists, environmental scientists, and others involved in land management, who need to better understand a range of soil test and interpret the results of these tests, to understand and manage specific land use issues. Pam Hazelton has worked as a soil scientist for over 35 years and lectures in the Faculty of Engineering and IT at the University of Technology Sydney. In recent years her interests have been in urban and coastal soils with an emphasis on environmental engineering. Brian Murphy has worked as a soil scientist for over 30 years, with a strong focus on applied soil science. He is an experienced pedologist and provides day-to-day advice on the management of soils for a range of natural resource issues.

This is the 3rd edition of the book and legacies of the purpose of the original edition are evident throughout. The 1st edition was written specifically for officers in the then Soil Conservation Service of NSW, Australia, to provide general background information on the type of soil tests available, and how results of these tests can be interpreted. Thus, the 3rd edition is still very NSW, Australia-centric, which is not necessarily a negative thing, as many of the tests and example data is appropriate for New Zealand soils and land management, but there are clearly larger sections on saline, sodic, and acid sulphate soils, which are more common in Australia.

Despite this books apparent length, the criteria, definitions, and concepts, presented are very condensed. It therefore provides a quick reference guide with lots of tables of data for various tests, with typical values, but it is not intended to give specific advice on any particular problem or issue. The book would be best understood by readers with some basic understanding of soil physics and chemistry, such as cation exchange and hydraulic conductivity, as it launches straight into these concepts with little basic explanation. The authors do however, urge the readers to review more comprehensive information, and consistently give additional references throughout.

There are 11 chapters in this book, two new chapters, on Soil Carbon and Soil Contamination. The 3rd edition also includes updated interpretations for phosphorus in soils, soil pH and the cation exchange capacity of soils. Chapter 1 is dedicated to ‘Soil sampling issues: aspects of design and implementation of soil investigations’, a very useful chapter, which I would recommend all undergraduate and graduate soil science students to read. ‘Soil physical properties’, ‘soil behaviour for engineering’ and ‘soil erodibility’, are covered in chapters 2-4. The authors then move onto soil chemistry, with an overarching chapter (5) briefly describing the different chemical properties of soil, such as soil pH, salinity, CEC, and soil nutrient availability, all of which influence plant growth and agricultural productivity; and the specific soil tests available. More specific chapters follow on ‘soil organic matter’, ‘application of waste-water and waste materials’, and ‘soil contamination’ (chapters 6-8). Chapters 9 and 10 are worthwhile additions, on units and conversions (9), and further suggested references for more general and technical detail (10). This book was originally designed as a reference to aid advisory officers when providing advice on a wide variety of soil management issues. Subsequent editions and additions make this a useful resource for a wide range of professionals working in land management, and also for soil, civil or environmental engineering, or environmental science students, interested in a career in soil or geotechnical consultancy.

Tanya O’Neill, PhD

Soil scientist

Waikato University, Hamilton, New Zealand

Abstracts

- McNally SR, Beare MH, Curtin D, Meenken ED, Kelliher F, Calvelo Pereira R, Shen Q, Baldock J 2017c. Soil carbon sequestration potential of permanent pasture and continuous cropping soils in New Zealand. *Global Change Biology* In press.
- McNally SR, Laughlin DC, Rutledge S, Dodd MB, Six J, Schipper LA 2017a. Herbicide application during pasture renewal initially increases root turnover and carbon input to soil in perennial ryegrass and white clover pasture. *Plant and Soil* 412: 10.
- Pollacco, J. A. P., Webb, T. H., McNeill, S., Hu, W., Carrick, S., Hewitt, A., Lilburne, L., 2017. Physical pedotransfer functions to compute saturated hydraulic conductivity from bimodal characteristic curves for a range of New Zealand soils. *Hydrol. Earth Syst. Sci.*, in press.
- Fei, Y.H., She, D. L., Yao, Z.D., Li, L., Ding, J.H., Hu, W., 2017. Hierarchical Bayesian models for predicting soil salinity and sodicity characteristics in a coastal reclamation region. *Ecological Engineering*, 104, 45–56. <http://doi.org/10.1016/j.ecoleng.2017.04.006>.

Conferences:

27-31 August 2017

Soil Science in a Changing World - Wageningen, The Netherlands

<http://www.wur.nl/en/Research-Results/Projects-and-programmes/Wageningen-Soil-Conference-2017.htm>

3 – 7 September 2017

6th International Symposium on Soil Organic Matter

<http://www.som2017.org/index.php?id=14387&L=1&type=300>

10 – 12 October 2017

NZARM Conference – Managing Soil and water interaction through people and science
Transport Museum, Invercargill

<http://nzarm.org.nz/events/conferences/conference-2017-details/>

5 December 2017

Early announcement - **WaiBoP Soils Biennial Conference 2017**

University of Waikato, Hamilton

We plan to hold the 4th biennial regional soils conference at the University of Waikato, Hamilton, on World Soils Day (5 Dec). More information will be available later in the year. The meeting is likely to feature members and students mainly from the Waikato-Bay of Plenty regions but we welcome as always soil scientists and associated supporters from elsewhere as contributors or participants to an informative and friendly day. The only criterion for entry is that all participants must be signed-up members (or student members) of NZSSS.



To get you in the mood, check out this photo from way back in 2013!

David Lowe, Louis Schipper, and Megan Balks (convenors),
School of Science, University of Waikato, Hamilton