

Quarterly Newsletter

Issue 4, September 2013

Supersite Central Update

Welcome to Issue #4 of the ASN/OzFlux newsletter. This last quarter has seen some important milestones in the development of the Supersite network. The Australian Supersite Network is now a full facility of TERN. While the MSPN has been dissolved, the ASN interactions with the other TERN plot networks (LTERN, ATN, AusPlots) will be maintained and expanded where possible. The collective TERN plot networks, currently referred to as the TERN "Multi-Scale Plot System" (MSPS), will continue to have annual meetings and work on integrative projects together.

The SuperSites network has been represented by Mirko Karan at the 2013 Ecological Society of America in Minneapolis in August, with a presentation at a NEON session. Our early entry into continental scale ecosystem monitoring and cooperation with NEON was highlighted, with this talk being the only international linkage presented at the meeting. This was a great opportunity to meet with the majority of NEON personnel and also visit the Cedar creek LTER. Suzanne Prober has also flown the ASN flag in the US recently by presenting a talk on Great Western Woodlands Supersite activities to NEON Inc. and touring the facilities on Sept 10.

The TERN-Wide synthesis project "Integrating Field, Airborne and Satellite Biomass Measurements from Desert to Rainforest – Australia's Contribution to Global Biomass Mapping and Monitoring" has been accepted for funding and will be progressed over the coming months. New activities will include contemporaneous LAI comparisons between ASN and AusCover methods and comparisons of LiDAR derived and on-ground biomass determinations.

A Supersites Fair Use and Acknowledgement Policy has been developed to ensure that data users can easily cite ASN data and acknowledge the use of the Supersite infrastructure in publications. It also encourages contacting PIs to explore collaborations, checking appropriate use of the data.

ASN Website developments

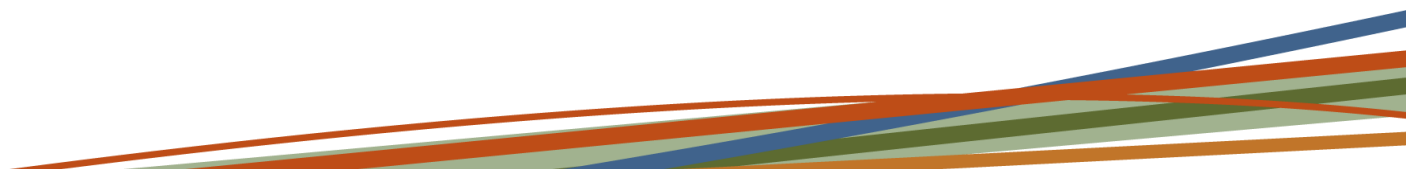
We are in the process of adding Supersite presentations to the Publications page on the ASN Website. We have started with the seven presentations from the Supersites session of the 10th annual Asia Oceania Geosciences Society, 24-28 June 2013, Brisbane. Please pass on any other Supersite presentations you would like to see listed.

The FNQ Rainforest Supersite webpage now has a "Resources for Managers" page which aims to provide links to, or copies of, documents and data relating to the area covered by the Supersite. This includes local NGO project results and publications, postgraduate theses relating to lowland or upland rainforest studies in the region and other documents likely to be of interest to local natural resource managers or researchers contemplating a study in the area.

We would like to see similar resources made available for each Supersite to help integrate the activities of the Supersite with local natural resource managers. Shiela will be contacting individual Supersites to ascertain if they would be interested in developing a similar page. We need to build local collaborative networks at each Supersite that extend to state government bodies that will eventually provide a secondary funding stream to each Supersite to keep the sites running during any slump in federal funding (once it begins).

NCRIS-II Funding

The TERN NCRIS-2013 (or NCRIS II) funding allocations have been declared by the TERN board. The ASN has received \$900k funding until June 2015. This is on top of the CRIS funding and represents a reduction below the cut-back level requested that would allow a continuing defined minimum data stream. The quanta of funding was of a similar magnitude to OzFlux, AusCover and LTERN. Three Facilities were not funded and the remainder received less substantive funding. We came in the group of 4 Facilities who all received within \$200k of \$1M. This is a very significant and positive outcome for the Supersite network and shows that the board recognises what we have developed and delivered over the last 2 years and they have welcomed the addition of the 5 Supersites which were not funded under EIF into the network. The Supersite PIs have been



consulted about the proposed budget which will allocate funding to individual Supersites based on the number of nodes. The nodes are spatially distinct physical monitoring sites that are operated by different organisations within the Supersite. Three Supersites currently have two nodes: FNQ Rainforest (Cape Tribulation, Robson Creek), SEQ Periurban (Samford, Karawatha) and Victorian Dry Eucalypt (Whroo, Wombat). The funding will allow for the collection of consistent fauna (avifauna, acoustic) and flora datasets across the ASN. The details of what is to be delivered and the contractual side of things will be developed before the end of November.



Soil Meta-barcoding

We have been invited to submit soil samples to the Biome of Australia Soil Environments (BASE) project run by Bioplatforms Australia. The initial phase of the BASE project will develop a snapshot of the soil microbial communities from a range of different soils across Australia using next generation sequencing technology. We have been asked to collect and send soil samples for sequencing by the end of September. This is an important opportunity for the ASN to collect baseline data across the network using a standardised procedure that should result in an early network-wide publication. Eventually the soil microbial diversity at all Supersites will be monitored seasonally using similar techniques.

Logo change for the Australian SuperSite Network

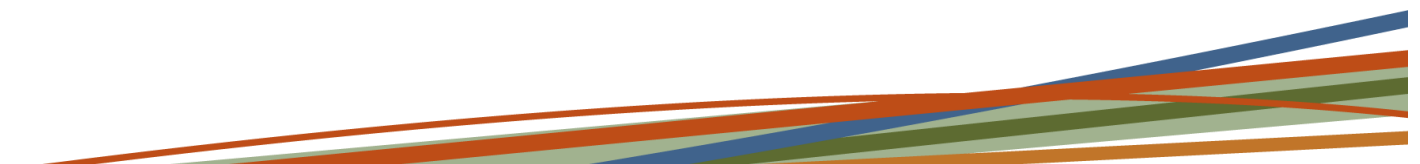
Australia's Terrestrial Ecosystem Research Network is made up of a number of facilities including the Australian... blah... blah...blah... By the time they have gotten this far most people's eyes have already glazed over and looking for an escape route.

If only there was a shorter way to refer to our network without relying on using "ASN" or other acronyms. We were shown the light by our fearless leader, Tim Clancy who coined the term "SuperSites" in a draft document to avoid the repetitious use of "ASN" which can get confused with ATN (Australian Transect Network) and starts to form a blancmange with the other Australian this or that facility within TERN. We liked the effect in the document and have decided to adjust the word "supersite" (a word I am constantly editing to "Supersite" for emphasis) to "SuperSite". This slight change makes the word distinctive and hopefully it will become a bit of a trademark representing the physical and intellectual infrastructure we are developing. This means only a minor change to the logo so won't impact on the effect of the branding we have in place.

The aim is to make life a little easier and TERN documents a little more readable while helping to reinforce the SuperSite branding that we would like to see become much better known within our learning, research and policy making institutions.



A quick mock up of what the new logo will look like



OzFlux Central Update

NCRIS-II Funding

OzFlux received \$1M from the NCRISII, on top of the \$191k CRIS funding already allocated. While less than the amount requested, the combination of NCRISII and CRIS funding will allow OzFlux to continue operating with the current number of sites. OzFlux was one of four facilities, along with LTERN, AusCover and ASN, to receive substantial funding under NCRISII. This is a very positive outcome and demonstrates that OzFlux is recognized as a mature facility that is able to deliver quality outcomes for the funding received.

The OzFlux Steering Committee met on the 5th September to discuss the general principles for allocating the NCRISII and CRIS funding across the OzFlux network site. General agreement was reached and the meeting asked Helen Cleugh and Eva van Gorsel to prepare a draft statement of the principles and a draft budget.

This has been done and after we have signoff from TERN Central and the OzFlux Steering Committee, we will be sharing this proposed budget and principles with you over the next week.

Data Processing Workshop and OzFlux Conference

The annual OzFlux Data Processing Workshop and OzFlux Conference were held back to back in Cairns from 1st July to 10th July. A science discussion day was held on the 11th July.

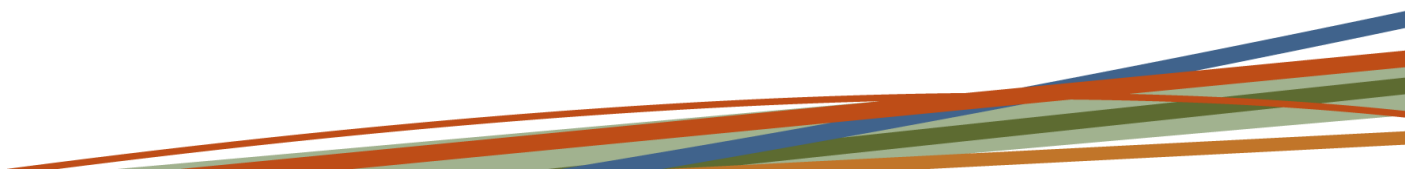
The Data Processing Workshop was well attended this year with about 15 people wandering in and out during the week. This year we were lucky to have James Kathilankal and Israel Begashaw from Li-cor Biogeosciences in attendance and they shouldered the brunt of the formal lectures in the morning sessions. Afternoons were again devoted to training people in the use of the OzFluxQC data processing system. New participants this year were Victor and Matthias from Cumberland Plains, Lona who has partially inherited Samford, Trish and Richard from Gingin and Great Western Woodlands, Darren (Wallaby), Anne (Wombat) and Caitlin (NATT). Commiserations to Eva, whose laptop died during the week but congratulations to Nina and Eva for processing data from the CO₂ profile system at Wombat State Forest.

The conference was held over 3 days in a very plush resort in Palm Cove on the coast north of Cairns. The format followed previous years with updates from many of the tower sites on the Monday and more targeted science talks on the Tuesday. Having been to a few of these now, there is a noticeable shift from talks about “what we intend to do” to “this is what the data looks like” and a smattering of talks that use flux tower data in the context of other information to improve understanding of particular ecosystems. As always, there was a strong showing from New Zealand with John Hunt, Dave Campbell, Susanne Rutledge and expat Miko Kirschbaum. And thanks to the representatives from Campbell Scientific and Li-cor who also attended. Wednesday was devoted to a trip to Mike Liddell’s new site at Robson Creek, a testament to his unflinching optimism and Nico’s ingenuity. In light rain, almost everyone made the pilgrimage up the new tower.

The Thursday following the conference saw a group of 20 or so people gather round tables to discuss ideas for papers using data from the OzFlux network. After a general discussion, four break-out groups formed to flesh out their ideas. These groups reported back during the afternoon session and some strong outlines emerged. All groups undertook to prepare draft papers over the next 12 months. This is a very significant milestone for OzFlux and should see some important papers showcasing flux tower data being published over the next year, contributing to OzFlux’s profile and further evidence of its effectiveness as a network of collaborators.

NEON Teleconference

On Friday 16th August, a group of ASN and OzFlux people held an hour long phone conference with representatives from NEON in the United States. The call was organised by ASN to compare notes on flux measurement techniques, data processing and calibration protocols. The main themes were a friendly envy from the Australian side at the resources available to NEON, surprise from the NEON side at what ASN and OzFlux have managed to achieve with limited resources and respect on both sides for each other’s commitment. Both groups would like to see exchange visits in the future as time and resources allow.



Data Processing

There have been a number of important developments in data processing and the OzFlux Data Portal over the last 3 months.

Firstly, some errors have been found in the OzFluxQC system as this begins to be exercised harder as people's data processing advances. Unfortunately, the errors are significant enough to require re-processing of the data that has already been submitted to the ODP. However, this was a task that had already been flagged as necessary to get all data on the portal to the same version to ensure consistency in the variable names and metadata content. A new version of the OzFluxQC scripts is being prepared and will be ready for release in early October. In a parallel exercise, Eva van Gorsel and Peter Isaac are comparing the results of the OzFluxQC system with EddyPro at 3 sites and, at Tumberumba, with the software developed by Ray Leuning. The comparisons will be a final check on the integrity of the OzFluxQC system and will form a "golden" data set against which future releases of the OzFluxQC system can be checked.

Secondly, there will soon be methods available to do gap filling and partitioning of OzFlux data. Jason Beringer from Monash University has developed a system for ingesting data from a number of sources (Bureau AWS, AWAP and MODIS) to fill gaps in meteorological drivers coupled to a neural network for gap filling fluxes and partitioning NEE into GPP and ecosystem respiration. The OzFlux Central Node has integrated several flux gap filling and partitioning techniques, including a neural network, into the existing OzFluxQC system. A small working group has also been established to explore several techniques for estimating ecosystem respiration for Australian ecosystems.

Finally, the OzFlux Central Node has been contacted by representatives from FluxNet about OzFlux contributing data to the next synthesis data set to be released by FluxNet. This is a very good opportunity to have the OzFlux data released to a global audience which will result in a greater level of international citation and collaboration. Three things have to be done before this contribution can happen. Firstly, the data on the ODP needs to be re-processed with the latest version of OzFluxQC, once this is ready, to remove any errors in the processing and to ensure that all data conforms to the same variable naming and metadata conventions. Secondly, site PIs need to remove restricted access from data being submitted to the FluxNet synthesis because this data will be publicly available once the synthesis is released by FluxNet. Thirdly, the OzFlux Central Node will negotiate with FluxNet to have the OzFlux data license transferred with the data.

Anyone with questions regarding any aspect of the data processing is welcome to contact Peter Isaac or Eva van Gorsel.

OzFlux Communications

A few issues have arisen over recent weeks that have led the OzFlux Central Node (CN for short) to re-evaluate our communications with the OzFlux community.

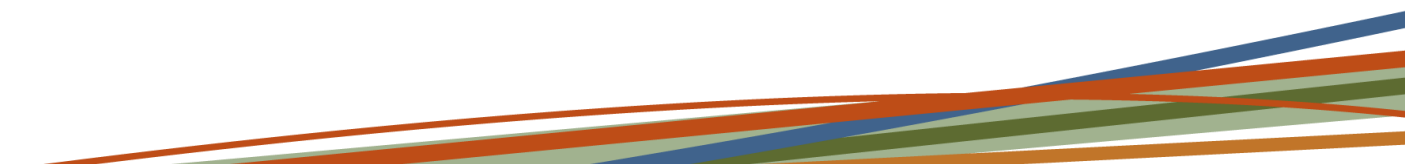
CN appreciate that there is a need for improved transparency about how decisions are made by the CN; and better communication of these decisions and other important information across OzFlux (i.e. two-way communications between the community and the CN).

As a result of that reflection, CN have committed to the following arrangements, which we want to share with you. We welcome feedback from the OzFlux community.

- a) **The OzFlux Steering Committee (OSC)** will meet bi-monthly, co-chaired by Helen & Eva. This will be the forum where issues will be discussed, and recommendations and advice made to the OzFlux Facility Leader for a final decision and/or approval. There is a need to confirm the OSC membership with TERN Central, communicate this to the OzFlux community, and develop clear Roles & Responsibilities for the OSC.

One of the roles for the OSC, apart from providing advice and recommendations to the Facility Leader and CN, will be to form Working groups (as needed) to work through technical or policy issues; with recommendations coming to the OSC for endorsement.

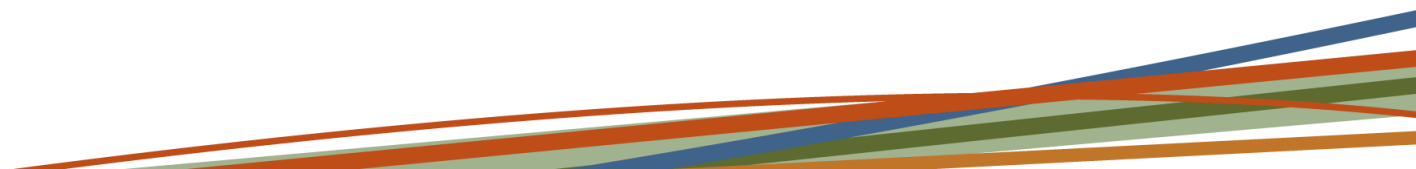
- b) CN will facilitate and run a **quarterly teleconference with all OzFlux PIs**. The purpose of this will be to provide updates from TERN Central via the CN; any updates from the OSC; and an opportunity for the OzFlux PIs to inform the CN and OSC of significant events and issues.
- c) CN will continue to provide **regular updates via ResearchGate; and the ASN/OzFlux newsletters**.
- d) CN will draft clear statement of **roles & responsibilities** for OzFlux CN, OSC, TERN-OzFlux PIs, and all PIs.



Site News

It is with sadness that we have to report the passing of the Daly Pasture site, see photograph below, due to a suspected cigarette butt induced fire. Beware the dangers of smoking. While not a TERN-funded site, many Monash and Charles Darwin University people have fond memories of this site, though it's possible Matt Northwood won't be sorry it's gone. It could be a brutal place in the build-up.

In other site news, Robson Creek (QLD) is now running, the new site at Litchfield (NT) is progressing with permission gained for establishing the site and plans for the tower underway. While the loss of the Daly Pasture site reduces the number of OzFlux sites over managed landscapes, we are hoping to bring a group from Monash Geoscience into the fold soon with a site over pasture in the Oven's Valley (VIC) and there are plans to introduce a new site in western Queensland run by the Samford node of the SEQ Peri-urban Supersite in an agricultural grazing landscape.



News from around the ASN and OzFlux Sites

Alice Mulga



Yes, it does rain in the Red Centre of Australia, and field work continues in spite of it. Derek is seeking shelter whilst looking for the next leaf sample to arrive.

Data is being collected routinely and being used by a range of people. Currently the team are at Alice installing additional sapflow sensors, sampling soils and downloading birdsong and phenology camera data.

Derek is a co-author on a Nature paper on a global comparison of water use efficiency in contrasting hydroclimatic periods using data from a number of LTERs around the globe including data from Great Western Woodlands and Chowilla.

Ponce-Campos, GE, Moran, MS, Huete, A, Zhang, Y, Bresloff, C, Huxman, TE, Eamus, D, Bosch, DD, Buda, AR, Gunter, SA, Scalley, TH, Kitchen, SG, McClaran, MP, McNab, WH, Montoya, DS, Morgan, JA, Peters, DPC, Sadler, EJ, Seyfried, MS & Starks, PJ (2013) Ecosystem resilience despite large-scale altered hydroclimatic conditions. *Nature* **494**: 349-352.

The first two ecosystem function papers for the Alice site were recently published:

Cleverly J, Boulain N, Villalobos-Veg R, Grant N, Faux R, Wood C, Cook PG, Yu Q, Leigh A & Eamus D (2013) Dynamics of component carbon fluxes in a semi-arid *Acacia* woodland, central Australia. *Journal of Geophysical Research: Biogeosciences* **118**: 1-18. DOI 10.1002/jggr20101, 2013.

Eamus D, Cleverly J, Boulain N, Grant N, Faux R & Villalobos-Vega R (2013) Carbon and water fluxes in an arid-zone *Acacia* savanna woodland: an analyses of seasonal patterns and responses to rainfall events. *Agricultural and Forest Meteorology*. Available On-line at Ag. For. Met.

Calperum Mallee



The Mallee after a rare rainfall event

The plant physiology campaign is now complete and the AusCover campaign is scheduled for September. Repeat vegetation and faunal surveys will be undertaken in the coming months.

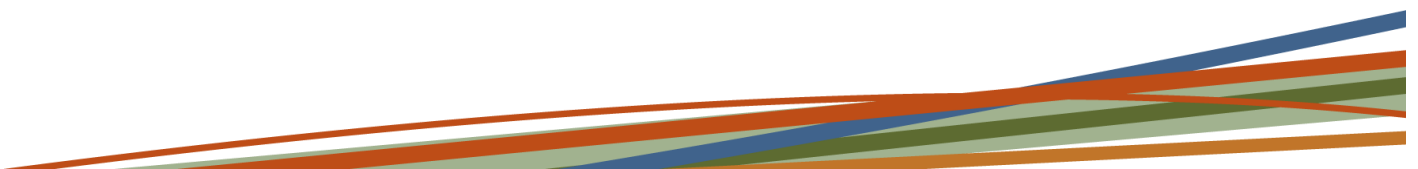


Ken and Georgia off into the bush to find the survey pegs

Cumberland Plains EucFACE

The CUP is 1

Australia has a well-earned reputation for being a country with high climatic variability, and these past 12 months have been no exception. Floods, heat waves, drought and fires have concatenated during this time in the South East. And many of them have been captured by sensors on the Cumberland Plains (CUP) Supersite, run by the University of Western Sydney, which celebrates its 1st birthday this October. Continuous measurements began only before heavy rains led to flooding in the dry sclerophyll woodland where the UWS flux tower, embedded within the OzFlux network, is located. In January, we hit a maximum of almost 47 °C and, after a wet summer, the lack of significant rain over the past three months resulted in an early start of the fire season with fires burning out of control within only ~1 km from the tower. Luckily wind directions remained West until the fire was brought under control. Although ecosystem monitoring is, sometimes, being considered as a minor science, perhaps the only way



to learn how ecosystems respond to such extreme events may be actually by continuous monitoring. This is particularly important because models are parameterized based on current data, and the ability to predict future biosphere-atmosphere interactions thus relies upon the ability of scientists to capture these novel or, at least, infrequent conditions.

The Supersite sits within almost fully remnant, Cumberland Plain forest that once covered almost 30% of the Sydney Basin. The soil is very low in nutrients, especially phosphorus, and the local area receives just half the rainfall (about 800mm) of Sydney coastal areas. The forest primarily consists of *Eucalyptus moluccana* and *Eucalyptus fibrosa* with a variety of shrubs and grasses taking over the understory.

FNQ Rainforest

Robson Creek flux tower now running and flux data is being collected. In July, OzFlux Conference participants made the trip from Palm Cove to inspect (and climb) the new tower at Robson Creek. The weather mostly behaved with most people getting off the tower before the rain started.



View from the top of the Robson tower

Results of the 25 ha rainforest vegetation survey at Robson Creek have been submitted for publication to the Journal of Tropical Forest Science (Bradford, MG, Metcalfe, DJ, Ford, AJ, Liddell, MJ, Green, PT & McKeown AT. Floristics, stand structure and above ground biomass of a 25 ha rainforest plot in the Wet Tropics of Australia) and presented at INTECOL, London Aug 2013.

Making science in the Daintree: Students and teachers from Carey Baptist Grammar School travelled to the Daintree to experience the reality of science in the field. See [QUT eTV Youtube channel](#) for a documentary account of what they did.

It is hoped that the documentary will be part of a future "virtual supersite"; an online place where the public and learners can conduct their own experiments, share their collected data and learn more about the environment and TERN infrastructure.

Take a tour of Robson Creek with Matt Bradford on ABC's [Off Track](#).

Great Western Woodlands

Basic monitoring and flux towers are working smoothly at Credo. Two permanent bores have now been installed. A plant physiology campaign and repeat vegetation and soil surveys are coming up. Lately, Suzanne Prober has been visiting the Konza Prairie Biological Station in Kansas, USA.

Litchfield Savanna

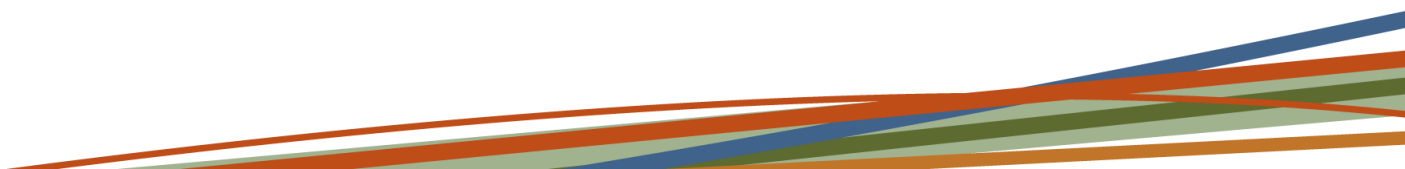
The Litchfield Savanna Supersite still getting off the ground with indigenous approval granted three months ago and tower construction started in September. A combined AusCover and AusPlots campaign was completed in June but Supersite surveys were not possible due to arsonists burning the site. The site vegetation survey was completed in August with Matt Bradford from the FNQ Rainforest Supersite assisting.



Phenocam photo of site before fire



Phenocam photo of site post-fire



SEQ Peri-urban

There have been problems with thieves at the Samford site with the solar panels which run the water quality monitoring system having been stolen three times. Julia Cook and David Ellsworth have completed plant physiology sampling. A manuscript on the spatial arrangement of above ground live biomass at Karawatha forest is nearing to submission "Hero J-M, Castley, JG, Butler, SA & Lollback, GW. Biomass estimation within an Australian eucalypt forest: meso-scale spatial arrangement and the influence of sampling intensity."

Tumbarumba Wet Eucalypt

2013 has been very good at Tumbarumba, flux and meteorological measurements are logged continuously with very few data gaps occurring. Arantxa has worked up a library of leaf chemistry and leaf spectral properties which will soon be submitted to the TERN data portal. We have started to analyse the LiDAR data to assess the selective logging in our footprint. There is a non negligible area in the SW of our footprint that has been thinned. How strong the impact on the fluxes is yet to be determined. We look forward to putting our hands on the hyperspectral data from the last campaign, which should be shipped by ARA any day now.

Victorian Dry Eucalypt

The vegetation plots at Whroo have been completed. Dendrometer bands are now on all trees to take continuous measurements of diameter at breast height. Network census of flux tower going well. Physiology campaign was completed in August.

Warra Tall Eucalypt

Business as usual at Warra with continuing efforts to ensure that the Supersite research activities will not be impacted by the recent inclusion of the area in the Tasmanian Wilderness World Heritage Area.

A manuscript on bird responses to proximity to mature forest and time since harvesting is nearing submission. The paper (Hingston A., S. Baker, G. Jordan and T. Wardlaw. Temporal and spatial aspects of land sharing versus land sparing: The relative importance of successional age of clearcuts and distance from old-growth edges to birds in Tasmanian wet eucalypt forest) is the first to come from an ARC Linkage project "Managing variable retention harvesting to maintain forest biodiversity? effects of forest influence and successional stage on recolonisation trajectories." Currently insect pit-fall traps are being re-instated in this trial.

A new ARC Linkage project is being developed with VicForests to expand this area of research to larger and more dispersed landscapes in Tasmania and Victoria as

well as evaluate new technologies to measure biodiversity including LiDAR for floristics, acoustic recorders for birds and metagenomics for insects.

New Faces

Marco Fahmi has taken on the role of Manager Research Data systems co-ordinating the delivery of research data systems for the TERN Australian Supersite Network (ASN) and the Long-Term Ecological Research Network (LTERN).



Ivan Hanigan has taken on the role of Research Data Scientist assisting the development of the online data portal and analytical software tools.

Upcoming Events

8–11 October 2013

Greenhouse 2013, Adelaide. Conference on climate change science, communication and policy. Details at [Greenhouse 2013](#)

24–29 November 2013

EcoTas13, 5th Joint Conference of New Zealand Ecological Society and Ecological Society of Australia. Details at [EcoTas13](#)

9–13 December 2013

TERN and NEON session on [Scaling ecosystem observations through space and time](#) at American Geophysical Union Fall Meeting, San Francisco. Details at: [AGU Fall Meeting](#)

19–21 March 2014

Global Land Project 2nd Open Science Meeting, Berlin, Germany. Details at [Conference Website](#).

The next issue of the Newsletter will be published in December 2013. If you have any news articles, photos, upcoming events, etc that you would like included please email shiela.lloyd@jcu.edu.au