



Impact and Engagement Statement

Office of Environment & Heritage and University of New South Wales
Memorandum of Understanding Annual Report 2017-18

The Office of Environment & Heritage and University of New South Wales Memorandum of Understanding aims to use the strengths of the two organisations for science, particularly in relation to environmental management. The partnership is designed to be a catalyst for scientific research, student engagement, and mentoring of OEH scientific staff, resulting in postgraduate degrees and scientific publications. All of these help the NSW Government to protect and conserve the environment and heritage of New South Wales.



Crest-tailed mulgara

Welcome

Welcome from the Co-chairs of the Memorandum of Understanding (MoU) Steering Committee: Kate Wilson Ana Deletic.

The NSW Office of Environment and Heritage (OEH) has a longstanding and highly productive partnership with the University of New South Wales (UNSW). We have had a formal Memorandum of Understanding with UNSW since 2009, and in that time, we have delivered many notable achievements together. These include regional-scale climate modelling for all of New South Wales and the development of new criteria for assessing the vulnerability of ecosystems.

These are examples of partnership work that is being used widely by the NSW Government and partners to better manage our environment, and demonstrates scientific excellence with application well beyond our state borders. There are many more joint projects and partnerships across a range of fields.

This is the first time we have produced an annual snapshot of our achievements together. We hope you will enjoy reading about them.

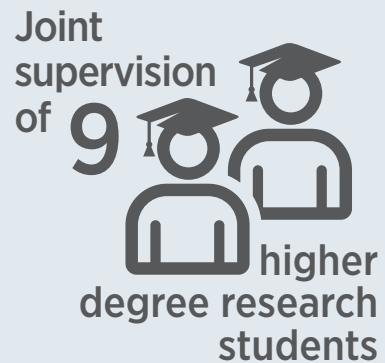


Kate Wilson
Former Executive Director
Science Division
OEH



Ana Deletic
Pro-Vice-Chancellor Research
UNSW

Our success so far



Over the next year, in addition to tracking the above KPIs, the MoU Steering Committee will be collecting metrics to report on the following success measures:

- number of UNSW graduates employed by OEH
- research dollars spent on co-supported projects
- communication of joint research findings.

Collaborative research highlights

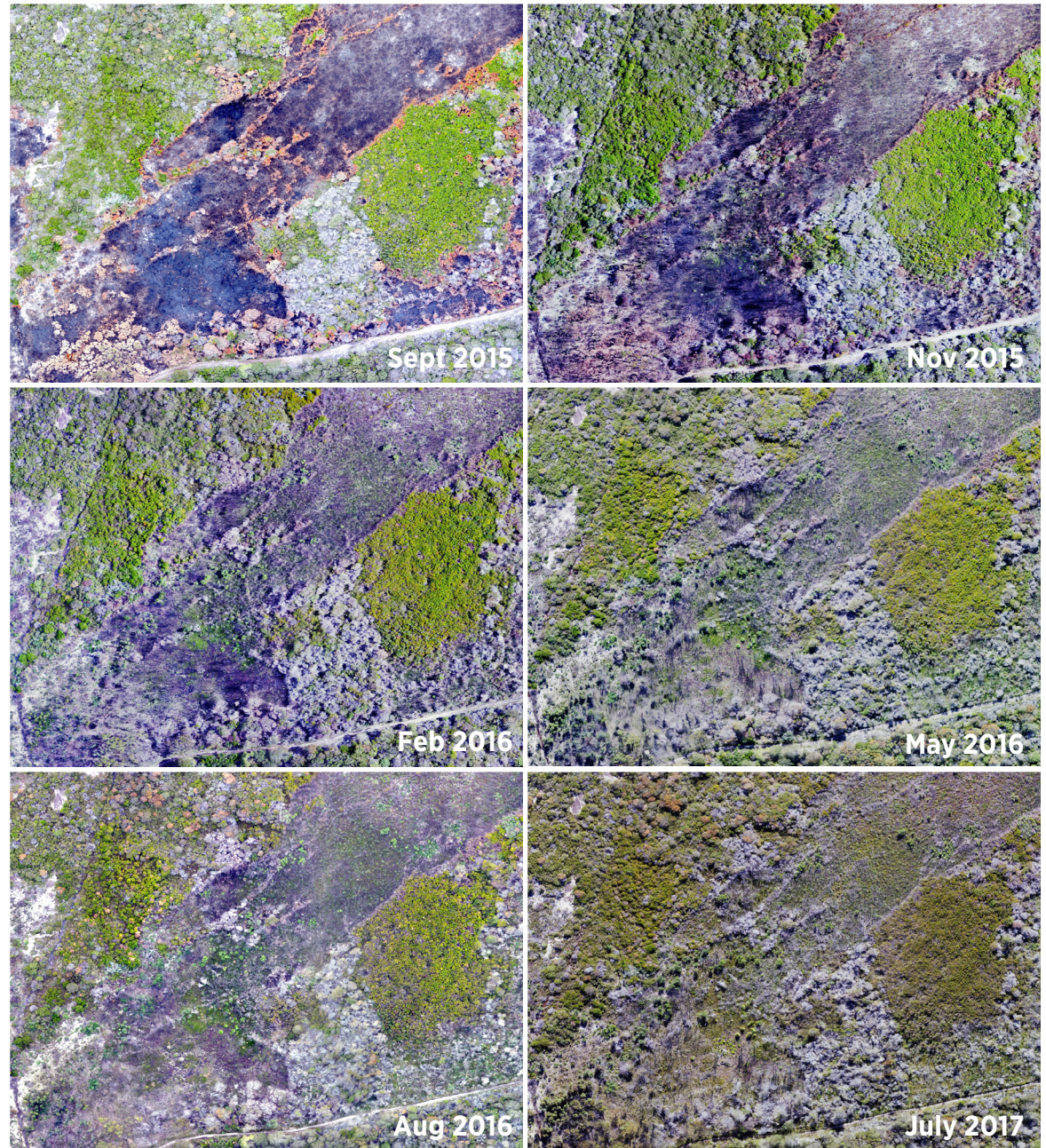
Advancing vegetation classification and mapping to meet conservation needs

Project Lead: David Keith (OEH/UNSW);
Project Investigators: Dr Mitchell Lyons, David Warton (UNSW),
Daniel Connolly (OEH)

This project aims to develop modern, advanced statistical and modelling techniques to classify and map vegetation over very large areas. This will be done using the largest and most detailed vegetation data set in Australia, and new methods to evaluate these classifications.

Detailed classifications and maps of vegetation provide the key data source for making biodiversity conservation decisions, yet current methods are limited over very large areas, and cannot deal with varied sources of uncertainty. Expected benefits include an improved fine-scale vegetation classification and map for New South Wales (covering almost a million square kilometres), and associated tools and guidelines for large scale vegetation classification and mapping globally.

The project will improve capacity building in OEH, with one postdoctoral fellow (Dr Lyons) working part-time at OEH to enhance skills transfer.



Time series of drone captured images detailing vegetation changes over time after hazard reduction burning. This is part of a long-term study site with over 20 years of data.

Flooding regimes of floodplain wetlands for environmental water management

Project Lead: Rachael Thomas (OEH), Professor Richard Kingsford (UNSW) and Dr Jessica Heath (OEH)

Much of the environmental water purchased by the NSW Government and the Commonwealth Environmental Water Holder under the Murray–Darling Basin Plan is targeted at major wetland sites, including internationally important sites such as the Macquarie Marshes.

This project has developed novel and rigorous methods for identifying the flooding regimes on these wetlands that are linked to ecological responses, particularly flood-dependent vegetation and waterbirds. For the first time, the project is able to use remote sensing imagery (Landsat) to develop a long-term data set of the flooding regimes for each of the major wetlands in New South Wales. This is critical for long-term environmental flow management for sustaining wetland ecosystems, and for providing the necessary information for reporting on environmental flow outcomes, linking these to key ecological response indicators.



Macquarie Marshes inundation across the floodplain in the north during spring (October 2016)



Macquarie Marshes inundation in lagoon habitats of the southern marsh (October 2016).

Wild Deserts – reintroduction of seven locally extinct mammal species into Sturt National Park

Project Lead: Professor Richard Kingsford (UNSW), Dr Reece Pedler (UNSW), Dr Rebecca West (UNSW), Professor David Keith (OEH/UNSW), Dr Keith Leggett (UNSW), Associate Professor Mike Letnic (UNSW), Dr Katherine Moseby (UNSW), Dr John Read (Ecological Horizons), Dr Tanya Leary (OEH), Ryan Duffy (OEH), National Parks and Wildlife Service, NSW Office of Environment and Heritage

This project is funded for 10 years from the *Saving Our Species* program, and includes the NSW Government boldly starting an initiative in 2014 to return locally extinct mammals to three protected areas. This project aims to reintroduce seven locally extinct mammal species into Sturt National Park.

These include:

- the greater bilby (*Macrotis lagotis*)
- western barred bandicoot (*Perameles bougainville*)
- golden bandicoot (*Isodon auratus*)
- greater stick-nest rat (*Leporillus conditor*)
- crest-tailed mulgara (*Dasyercus cristicauda*)
- western quoll (*Dasyurus geoffroii*)
- burrowing bettong (*Bettongia lesueur*).

Two exclosures (enclosed areas to keep predators out) are being built and feral animals removed (e.g. cats, foxes, rabbits, goats and pigs) and should be completed by November 2018.



Traditional owners surveying artefacts along proposed fence line.

The scale of the project is significant in time and area: the two exclosures will cover about 2000 hectares, while a separate training area will cover about 10,000 hectares. There will be a range of scientific projects, including collaborative research with OEH and other partners.

The project has collected extensive baseline data on plants and animals. A comprehensive on-ground monitoring program has been established to measure performance of the project against the aim of improving ecosystem health, including the impacts and benefits of the reintroduction project on plants, animals and ecosystem processes. Over the past year, several significant planning documents have been prepared and approved, including a review of environmental factors, the ecological health and monitoring framework and the research strategy. Detailed Aboriginal heritage surveys were conducted collaboratively with the Traditional Owners of the affected land before construction of the exclosures.

Collaboration of OEH staff is building capacity for other regional programs. During the first survey, a juvenile crest-tailed mulgara was captured, representing the first live mulgara ever caught in New South Wales (previous records were from owl pellets at Mutawintji National Park).



Vegetation and ground cover surveys

Other OEH-UNSW collaborative projects

Project title	Collaborators
Testing the waters: Impacts of contaminants on ecosystem structure and function in urban waterways	Project lead: Peter Scanes (OEH)
Thresholds of Potential Concern for threatened biodiversity: Work Package 4 under the new Bushfire Risk Management Research Hub	Project manager: Matthew Adams (OEH), Project Lead: Professor David Keith (OEH/UNSW)
Fire regime thresholds for Threatened Ecological Communities: Investigating the long-term conservation risk to the Bendethera shrublands via a spatially explicit model simulating variation in fire severity and frequency	Project manager: Mark Tozer (OEH)
To what extent does fire affect karst processes? Burning questions for fire management	Project team: Professor Andy Baker (UNSW), Sophia Meehan (OEH), Mark Tozer (OEH) and Andrew Baker (OEH)
National Environmental Science Program Threatened Species Conservation Hub Project 1.3.1: Fire and threatened flora	Project team: Professor David Keith (OEH/UNSW), Dr Mark Ooi (UNSW), Dr Tony Auld (OEH), Berin Mackenzie (OEH) and Justin Collette (UNSW)
Dingoes can yield important benefits for native mammals in forest ecosystems	Project leads: Rosalie Chapple (UNSW), Mike Letnic (UNSW) and Chris Banffy (OEH)
Red Listing ecosystems: Testing the new global standard for conservation	Project team: Professor David Keith (OEH/UNSW), Dr Nick Murray (UNSW), Professor Richard Kingsford (UNSW), Dr Tony Auld (OEH) and Mr Mark Tozer (OEH)
ARC Centre of Excellence for Climate Extremes	Project team: Matt Riley (OEH), Dr Kathleen Beyer (OEH), Dr Stephanie Downes (OEH), Dr Fei Ji (OEH), Dr Ian Macadam (OEH), Professor Andy Pitman (UNSW) and Professor Jason Evans (UNSW)
ARC Centre of Excellence for Climate System Science	Project team: Matt Riley (OEH), Dr Kathleen Beyer (OEH), Dr Stephanie Downes (OEH), Dr Fei Ji (OEH), Dr Ian Macadam (OEH), Anthony Coward (OEH), Professor Andy Pitman (UNSW), Professor Jason Evans (UNSW), Dr Giovanni Di Virgilio (UNSW), Dr Alejandro Di Luca (UNSW)
Energy Efficiency Decision Making Node: Energy Efficiency Research Hub	Project Manager: Dr Kathleen Beyer (OEH)



Project title	Collaborators
Platypus Conservation Initiative: ARC Linkage Grant (LP150100093)	Project team: Professor Richard Kingsford (UNSW), Dr Gilad Bino (UNSW), Professor Bill Sherwin (UNSW), Dr Tom Griffiths (UNSW), Dr Jaime Gongora (USyd), Dr Dan Lunney (OEH, Sydney University), (main partner – Taronga Conservation Society, Dr Neil Jordan (UNSW/ Taronga)), Mike Fleming (OEH), Josh Griffiths (Caesar Australia), Dr Sarah Munks (Tasmania Forestry and Practice), Dr John Koehn (Arthur Rylah Research Institute, Victoria Department of Environment Land, Water and Planning) and Mike Ronan (Queensland Department of Environment and Science)
Aerial surveys of waterbirds – eastern Australia and the Murray-Darling Basin	Project lead: Professor Richard Kingsford (UNSW), Dr John Porter (OEH), Dr Kate Brandis (UNSW), Dr Gilad Bino (UNSW), Dr Evan Webster (UNSW) and other state agencies (Queensland, South Australia, Victoria) and the Murray-Darling Basin Authority
Environmental Water Knowledge and Research (EWKR) Project – Vegetation response to flow regimes	Project lead: Rachael Thomas (OEH), Professor Richard Kingsford (UNSW), Ryan Sims (KEY BOTANY) and EWKR Vegetation Theme leadership team: Dr Susan Gehrig (La Trobe), Dr Cherie Campbell (La Trobe), Dr Sam Capon (Griffith), Dr Kaye Morris (ARI, DELWP Vic), Dr Jason Nicol (PIRSA-SARDI), Cassandra James (James Cook) and Dr Daryl Nielsen (La Trobe)
Wetland restoration – trajectories of change for wetland plants	Project lead: Dr Sam Dawson (UNSW), Professor Richard Kingsford (UNSW), Professor David Keith (OEH/UNSW), Dr Peter Berney (OEH) and Dr Adrian Fisher (UNSW)
Waterbird breeding – response to environmental flow regimes	Project lead: Dr Kate Brandis (UNSW), Professor Richard Kingsford (UNSW), Dr John Porter (OEH/UNSW), Dr Jennifer Spencer (OEH), Dr John Martin (Royal Botanic Gardens) and Commonwealth Environmental Water Holder
NSW and ACT Regional Climate Modelling (NARClIM)	Project team: Professor Jason Evans (UNSW), Dr Daniel Argueso (UNSW), Dr Alejandro Di Luca (UNSW), Dr Roman Olson (UNSW), Dr Lluís Fita Borell (UNSW), Matt Riley (OEH), Yvonne Scorgie (OEH) and Dr Fei Ji (OEH)
NARClIM Climate Extremes	Project team: Professor Jason Evans (UNSW), A/Professor Lisa Alexander (UNSW), A/Professor Donna Green (UNSW), Dr Daniel Argueso (UNSW), Dr Alejandro Di Luca (UNSW), Dr Roman Olson (UNSW), Dr Giovanni Di Virgilio (UNSW), Matt Riley (OEH), Dr Kathleen Beyer (OEH), Yvonne Scorgie (OEH) and Dr Fei Ji (OEH)
NARClIM 2	Project team: Professor Jason Evans (UNSW), Matt Riley (OEH) and Dr Kathleen Beyer (OEH)
Forecasting air pollution impacts from hazard reduction burns	Project team: Melissa Hart (UNSW), Giovanni Di Virgilio (UNSW) and Ningbo Jiang (OEH)
Effects of grazing in red gum, cypress pine and black box reserves	Project team: Dr David Eldridge (OEH), James Val (OEH), Dr Ian Oliver (OEH), Dr Samantha Travers (OEH/UNSW), Dr Greg Summerell (OEH), Mark Peacock (OEH), Ross McDonnell (OEH), Sarah Carr (OEH), Tim O'Kelly (OEH), Rick Webster (OEH) and Paul Childs (OEH)
Assessment of Wild Horse Impacts on Ecosystem Structure and Function, Kosciusko National Park	Project team: Dr David Eldridge (OEH), James Val (OEE), Dr Ian Oliver (OEH), Dr Samantha Travers (UNSW), Dr Greg Summerell (OEH), Peter Scanes (OEH), Mick Pettitt (OEH), Rob Gibbs (OEH) and Adriana Zaja (UNSW)
BIODESERT: Assessing the impacts of grazing and climate change in global drylands	Project team: Dr Fernando Maestre (Spain), Dr David Eldridge (OEH), James Val (OEH), Dr Samantha Travers (UNSW) and Dr Keith Leggett (UNSW)



More information

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Read:

OEH Research Partnerships Strategy 2017-2020
www.environment.nsw.gov.au/research-and-publications/our-science-and-research/research-partnerships

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