

NATIONAL BIODIVERSITY

OFFSETS CONFERENCE

26 AUG - 28 AUG 2019 | HOTEL REALM, CANBERRA



Environment Institute
of Australia and
New Zealand

CONFERENCE DAY ONE | MONDAY 26 AUGUST 2019

Introduction	8:30am-9:00am	Welcome and conference opening
		Welcome to Country
	9:00am-10:00am	Keynote David Takacs, University of California Hastings, College of Law
Morning Tea		
Setting the Scene	10.30am-12:00pm	<ul style="list-style-type: none">David Francis, CardnoAscelin Gordon, RMITMartine Maron, University of QueenslandTor Hundloe, Griffith University
Lunch		
Existing Policy Panel Discussion	1.00pm-2.30pm	<ul style="list-style-type: none">Alaric Fisher, NTPeter Volker, TASPenny Croucamp, VICIan Walker, ACTCarol Rayner, QLDJelena May, WARussel Seamen, SADennis Snowden, CommonwealthJane Gibbs, NSW
Afternoon Tea		
Markets	3.00pm-4.00pm	<ul style="list-style-type: none">Christopher Ewing, CO2 AustraliaAlan Key, EarthtradeMaria Kwiatkowska, Biodiversity Conservation Trust
Poster Session	4.00pm-5.00pm	Interactive poster session

EVENTS

Sunday 25 August 2019 | 5.30pm - 7.30pm

Welcome Function | Hotel Realm, Ostani Restaurant

Monday 26 August | 7.00 - 11.00pm

Gala Dinner | Old Parliament House

CONFERENCE DAY TWO | TUESDAY 27 AUGUST 2019

Law & Policy	8:30am-10.00am	Keynote Kerry ten Kate, Forests Trends Association
		<ul style="list-style-type: none">Nick Thomas, Clayton UtzCarole Rayner, DES
Morning Tea		
Metrics	10.30am-12:00pm	<ul style="list-style-type: none">John Seidel, DPIEScott Whiting, DBCA (WA)Travis Peake, Umwelt AustraliaAdam Schutz, DoEW (SA)
Lunch		
Case Examples & Industry	1.00pm-2.30pm	<ul style="list-style-type: none">Renee Rossini, Queensland Trust for NatureKate Auty, Commissioner for Sustainability and the EnvironmentChris McCombe, Minerals Council of AustraliaGareth Rees, Inland Rail ARTC
Afternoon Tea		
Panel / Workshop	3.00pm-5.00pm	Workshop facilitated by Garry Middle

CONFERENCE DAY THREE | FIELD TRIP WEDNESDAY 28 AUGUST

DELEGATES ASSEMBLE AND BRIEFING AT 8AM

Hotel Realm - depart

Dudley St

Barrer Hill

Arboretum

Throsby

Lunch at Heritage Park

Franklin grasslands

Travel to Airport or Hotel Realm

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Keynote speakers



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Professor David Takacs

Professor David Takacs is a proud UC Hastings alumnus. He also holds an LL.M. from the School of Oriental & African Studies at the University of London, and a B.S. (Biology), M.A., and Ph.D. (Science & Technology Studies) from Cornell University. He has been a consultant for international NGOs and US government agencies, analyzing legal and policy issues pertaining to REDD (Reducing Emissions from Deforestation and forest Degradation) and global climate change. His scholarly work addresses carbon offsetting, biodiversity conservation law, and the human right to water. He is the author of *The Idea of Biodiversity* (Johns Hopkins U. Press). In 2017, he received the Rutter Award for Outstanding Teaching at UC Hastings. Before his legal career, David was a professor in Earth Systems Science & Policy at CSU Monterey Bay, a lecturer in the John S. Knight Writing Program at Cornell, and a Peace Corps Forestry Volunteer in Senegal.



Kerry ten Kate

Working towards no net loss and a net gain of biodiversity: Some key lessons on law and policy

Kerry ten Kate directs Forest Trends' Biodiversity Initiative, advising companies, banks, governments and professional organisations in the development and application of strategies and tools such as metrics to attain a Net Gain of Biodiversity in the context of development. In 2004 she founded and until December 2018 she led the Business and Biodiversity Offsets Programme (BBOP): 100 companies, banks, government agencies and NGOs working for a net gain of biodiversity. Formerly a barrister in London, Kerry served on the Secretariat of the United Nations Conference on Environment and Development in 1992 (the "Rio Earth Summit") then founded the consultancy Environmental Strategies. She was Director of Investor Responsibility at asset manager Insight Investment, engaging with companies on their strategies and environmental performance. Formerly, she was Policy Adviser at the Kew Gardens and before that head of the CBD Unit. Kerry has written extensively, including for Science and International Affairs, and has broadcast for BBC Radio 4 and the World Service. Kerry served on the UK's Natural Capital Committee from 2012-2015. She is a trustee of the Royal Society for the Protection of Birds, a member of IUCN's

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Speakers



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David Francis, Cardno

David is an environmental 'Scientist with over 25 years' experience in flora and fauna studies, vegetation mapping, ecological assessments, revegetation plans and environmental planning. He has an excellent botanical knowledge having undertaken studies in a geographical area spanning the Wet Tropics through to Victoria, and abroad in PNG. David has had considerable experience in Regional Ecosystem and wetland mapping and conservation significance assessments. He is an expert in 'nature conservation mapping systems and planning at a local and regional scale

David is actively involved in the environmental industry. This has included participation in the Queensland Department of Energy and Resource Management's Expert Panel for the SEQ Biodiversity and Planning Assessment and being involved in organising the Australasian Network for Ecology and Transportation (ANET) 2015 and 2018 conferences.



Ascelin Gordon, RMIT

The challenge of no net loss: a framework for evaluating biodiversity offset policies

Ascelin Gordon is a Senior Research fellow in conservation science within RMIT University's ICON Science group. His research focuses on quantitative approaches for conservation planning, conservation on private land and understanding the impacts of environmental policies on biodiversity values. He has run a 3 year ARC Discovery project developing model-based approaches to evaluate biodiversity offset policies, and works with state and federal government in Australia to improve offset policy and practice.



Martine Maron, University of Queensland

Martine Maron is a Professor of Environmental Management at The University of Queensland. Her research is in environmental policy and conservation ecology. She is a Deputy Director of the NESP Threatened Species Recovery Hub and leads its Policy research theme, which includes projects seeking to improve biodiversity offsetting for threatened species and ecological communities. She helped draft the IUCN Biodiversity Offsets Policy and the UNCCD's Land Degradation Neutrality approach, and has helped develop numerous policy tools including the EPBC Act Offsets Assessment Guide, the Reef Trust offsets calculator, and New Zealand's biodiversity offsets accounting model. She continues to work with governments around Australia and the world to improve offset policy and practice, and leads an international working group which is developing a new approach to aligning ecological compensation with conservation targets.



Tor Hundloe AM FEIANZ, Griffith University

You can have your cake and eat it too

Tor Hundloe is an Environmental Economist and an Environmental Scientist. Tor is in his semi-retirement is a researcher and author. In 2018, he had two books published—"Adani versus the Black-throated Finch" and "The Cheapest Electricity on Earth" with Keeley Hartzler. Prior to that he had three books published by CSIRO Publishing and has in press "Environmental Offsets", with Shelley Burgin. As well as a long academic career at Griffith University, Bond University and the University of Queensland, Tor Hundloe was Chair of the Wet Tropics Management Authority when its first management plan was approved by government; he was the Marine Park Planner when the first zoning plan was prepared for the Great Barrier Reef; and he was the Environment Commissioner of the Industry Commission during its life of six years.

Tor was a late-comer to the world of research and writing as he left school at the age of 14 and worked in shearing sheds and wool stores until he was 27.

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Christopher Ewing, CO2 Australia

Australia's Biodiversity Offset Market - Panacea or Pipe Dream?

Christopher is an environmental offsets specialist whose key area of expertise is providing clients with tailored solutions for acquitting their offset requirements under Australian and state government offset policies. He has extensive experience managing teams to identify and secure environmental offsets for a diverse range of large and complex projects for clients in the resource, energy and transport sectors. This includes property assessments, development of offset strategies, preparation of management plans, engagement and negotiation with landholders, and securing offsets on title. Over the last decade, Christopher has been heavily involved in the rapid development of the environmental offsets market in Queensland. As a result of this experience, he has a deep understanding of environmental offset policies and the complexities of the offset market. Christopher is currently working with several coal seam gas and coal mining companies in central Queensland to find, deliver and implement offsets for projects that represent a total of more than 2000 km of linear infrastructure stretching from the Curtis Coast through to the Desert Uplands, and have a combined project footprint in excess of 100,000 ha.



Alan Key, Earthtrade

A leader in the offset industry, Alan has been the Managing Director of earthtrade since its inception in 2007. Alan supports clients with a strategic approach to biodiversity offsets, aligning future growth projects and corporate strategy with a solution enabling projects to proceed with regulatory and budgetary certainty.

Over the last decade, Alan has secured the two (2) largest Koala Offsets in South East Queensland, as part of the overall seventy-three (73) biodiversity offset projects secured by earthtrade. Alan has supported a plethora of community infrastructure projects in South East Queensland, the Australian Coal Industry & associated infrastructure developments in Central Queensland, mineral development projects in North Queensland, as well as residential & commercial developments in various locations across Australia.

Alan has had extensive experience assisting clients with the policy, legal, financial and operational aspects of over seventy-three (73) biodiversity offset projects (equating to over AUD\$75M in value) to the corporate, government and rural sectors. He also has strong links with landholders in the agricultural, resources, and development sectors, and Indigenous landowners.

Alan is an active member of a number of industry groups and regularly speaks at conferences and events held by industry associations, law firms and academia both in Australia and internationally. Alan is an active Advisor for the Business & Biodiversity Offsets Program (BBOP) Advisory Group, a member of Queensland Environmental Law Association, The Environmental Institute of Australia & New Zealand, and has been an executive member of a regional landcare group, a not for profit association, for the last fifteen (15) years.



Maria Kwiatkowska, Biodiversity Conservation Trust

Delivering a strategic biodiversity offsetting service

Maria Kwiatkowska has 15 years' experience delivering major environmental programs and policy reform in NSW. She led the establishment of the NSW Biodiversity Conservation Trust's Biodiversity Offsets Program and has subsequently managed this program for almost two years. Prior to this role, she played a key role in developing the NSW Biodiversity Conservation Act 2016 and amendments to the Local Land Services Act 2013. She has worked in central and line agencies across a range of issues, including biodiversity conservation, water management and climate change policy. Maria has a degree in Economics (Social Sciences) and has completed post graduate studies in public administration.



Nick Thomas, Clayton Utz

Nick has over 15 years' experience advising on the full spectrum of environment, planning and local government law and policy (including planning and environmental impact assessment, pollution control, land contamination, biodiversity and environmental protection), as well as climate change (including renewable energy, carbon farming and energy efficiency), sustainability (including green buildings and green infrastructure), mining and petroleum, water management, property laws (including compulsory acquisition and land valuation), and government decision-making and policy.

Nick acts on transactions, assessment and approvals processes, operations and compliance incident management and dispute resolution. He advises on environmental auditing and due diligence, environmental aspects of corporate governance and risk management. His experience extends to drafting legislation. He has provided advice at board and other senior levels of corporations and government agencies.

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John Seidel, DPIE

Lessons and outcomes from a decade of using biodiversity assessment metrics in NSW

John Seidel is the Senior Team Leader of the Ecosystem Assessment unit with the NSW Office of Environment and Heritage. Since 2008, John has worked extensively on the development and implementation of the NSW government's innovative approaches to biodiversity offsets through programs such as the Biobanking scheme. More recently, he has led the successful finalisation of the Biobanking program and has played a key role in the development and transition to the new Biodiversity Offsets Scheme in NSW.

John has wide-ranging experience in conservation and impact assessment from a career working in rural and regional NSW for different government and non-government organisations. John enjoys the challenges of implementing environmental policy through practical programs that provide opportunities for private land conservation and improved stewardship of our unique ecological heritage. John is based in the NSW regional city of Newcastle where he lives with his wife and three children.



Scott Whiting, DBCA (WA)

Planning, implementing and measuring the effectiveness of a long-term marine offset: The Northwest Shelf Flatback Turtle Conservation Program.

Scott is a Principal Research Scientist with the Western Australian Department of Biodiversity, Conservation and Attractions. He coordinates the long-term North West Shelf Flatback Turtle Conservation Program and the Kimberley Turtle Project (Western Australia Marine Science Institution). Scott has worked for university, non-government and government sectors across Queensland, Northern Territory, Western Australian and Australian Indian Ocean Territories (Ashmore Reef and Cocos Keeling Islands). Research and management roles have included marine turtles, sea snakes, birds, dugongs and marine debris. He is currently focused on delivering marine conservation outcomes through good science, knowledge uptake to decision makers, partnerships, capacity building and Indigenous collaborations. Scott is a member of the IUCN Marine Turtle Specialist Group and has been involved in the Australian marine turtle recovery process since the early 2000s.



Travis Peake, Umwelt Australia

Travis Peake is Umwelt's National Ecology Leader and has worked for 25 years in the field of biodiversity survey, management, restoration and impact assessment. He has prepared and led numerous investigations into vegetation survey, mapping and classification, threatened species management and ecological reconstruction. Travis has had a particular focus on biodiversity offsetting, ecological mine rehabilitation and threatened ecological community assessment and management, and provides expert advice to industry in addition to State and Commonwealth government. Travis is proud to lead a strong, large team of Ecologists across the nation.



Adam Schutz, DoE (SA)

Adam has been working on native vegetation offsets for the last 8 years with the Department of Environment and Water in South Australia. This initially involved on ground monitoring of established offsets to ensure compliance with approved conditions. This was followed by 2 years in policy and legislative development relating to offsetting including authoring the offsetting policy for South Australia. Subsequently, for the last 3 years, Adam has had oversight of the process of reviewing and making determinations on applications to clear native vegetation and the provision of associated offsets for South Australia.

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Renee Rossini, Queensland Trust for Nature

Renee has over a decade experience working from the coastlines to the arid zone, but always with a strong focus on the conservation of Australia's unique flora and fauna. She joined the ecology team at qtn in 2018 and maintains her research and education positions at the University of Queensland and Griffith University. If she's not in the office she'll be out chasing snails around desert springs, adventuring around the islands of Quandamooka Country, or meandering through the forests of South-East Queensland.



Kate Auty, Commissioner for Sustainability and the Environment Offsets and Strategic Assessment Audits

Professor Kate Auty is the ACT Commissioner for Sustainability and the Environment and a Professorial Fellow with the University of Melbourne. Other recent roles included Vice Chancellor's Fellow (University of Melbourne), Victorian Commissioner for Environmental Sustainability (2009-2014), Chair of the Ministerial Reference Council on Climate Change Adaptation (Victoria 2008-2010), member of the Victorian Premier's Climate Change Advisory Council (2009-2010), and a City of Melbourne Climate Change Ambassador developing the Future Melbourne Plan 2026 (2015). She was previously a member of the advisory board of AURIN, chair of the advisory board of NeCTAR (both Super Science initiatives funded through NCRIS), and a member of the advisory board of ACSEES (MDBA). Kate was a director on the Board of the AWiA Ltd in 2017 and a member of the board of MSRF Ltd from 2016-2018. She chairs the Board of the Banksia Foundation Ltd. In early 2018 Kate agreed to be co-opted to the board of Sustainable Business Australia. Kate's Office has recently completed the first two independent audits of Strategic Assessments in the ACT – of Gungahlin and Molonglo Valley.



Chris McCombe, Minerals Council of Australia

Chris is an experienced sustainability/environmental policy specialist for the mining & metals industry. Chris is skilled in sustainable development, public policy, engagement and collaboration, environmental assessment and management, mine rehabilitation, sustainable land and water use, compliance and regulatory engagement.



Gareth Rees, Inland Rail ARTC

Gareth Rees works in the environmental approvals and assessment field for the delivery of major infrastructure projects. He is currently the Environmental Manager for the Queensland section of the Inland Rail Program, a nationally significant transport initiative being delivered by ARTC on behalf of the Commonwealth Government. In this role, Gareth is responsible for the environmental assessment, approvals and environmental performance of approximately 400km of new and upgraded rail through Queensland.



Carole Rayner, DES

Carole Rayner BSc is an environmental scientist with over 25 years' experience in environmental planning, environmental impact assessment, and the development and implementation of local, state and national government policy and programs including environmental offsets. Carole has a particular interest in the conservation of biodiversity and ecological systems. Carole is currently Team Leader of the Offsets Policy Implementation Unit within the Department of Environment and Science, Queensland.

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Posters presentations



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Poster Presentation

Constructed cohabitat stacks for fauna recovery within vegetation offset projects

Presenter: Steven Milner

Constructed "habitat stacks" for fauna recovery within vegetation offset projects Theme: Practices need to change – Re-assembling habitat features to accelerate ecological recovery within biodiversity offset sites Bush restoration has few documented terrestrial examples of constructed ground habitat as an essential component that facilitates accelerated restoration and ecosystem recovery. Most of the current literature on this topic describes the installation of coarse woody debris (CWD) and habitat pods in marine, estuarine and freshwater ecosystems. Terrestrial habitat recovery is an essential emerging practice. CWD can take centuries to develop on the forest floor. Micro-organisms and insects use CWD as a substrate to enrich the soil and increase fertility as well as building food webs for the new ecosystem. Five years ago Sunshine Coast Council (SCC) commenced delivering vegetation offset projects onto ex-livestock or sugar cane paddocks which were devoid of CWD.

Salvaging large tree stumps and stem timber from the likes of civil works projects has now been identified as having immense ecological value. Subsequently, SCC commenced constructing "habitat stacks", using a 6 tonne excavator with a log grab to artificially construct a useable habitat and installed infra-red motion detection cameras to monitor the stacks. These cameras have proved to attract a large range of fauna within 12 months of construction and for reptiles, as soon as overnight. This method very quickly increases the biodiversity of an area and accelerates fauna establishment compared to sites reliant on natural recruitment of native fauna. Fauna use these "habitat stacks" as stepping stones to traverse and populate a previously open space. Where possible this process is now being incorporated into SCC's delivery of broad scale revegetation projects and vegetation offset projects as an important element of advanced habitat restoration. Keywords – habitat, recovery, offset, fauna



Biodiversity Credit Exchange

Presenter: Sarah Reachill

The Native Vegetation Council (NVC) of South Australia has developed an initiative to promote biodiversity offsetting on private land. The initiative known as the Biodiversity Credit Exchange provides private landholders with the ability to develop and receive income from biodiversity credits on areas of their land. The objective is to accelerate the establishment of an offset credit market in South Australia and provide opportunities for third party providers and private landholders to work with the Native Vegetation Council to achieve robust offsetting outcomes. Through use of the Native Vegetation Fund, the NVC are paying landholders to establish credit sites.

The program will include the provision of an on-ground assessment and management plan to guide the achievement of a "net gain" at each site. In addition, the Native Vegetation Branch of the Department for Environment and Water will administer the process to assist landholders and industry in the provision and purchase of credits. The Biodiversity Credit Exchange is the result of a substantial shift towards contemporising legislation and policy to support better conservation outcomes and provide alternatives to offset payments.



Avoided loss and habitat restoration combination offset, Hanson Wolffdene Quarry, south-east Queensland

Presenter: Penn Lloyd

The offsets policy framework in Australia allows the use of avoided loss as well as restoration offsets to counterbalance significant residual negative impacts of a development project on protected biodiversity. The Hanson Wolffdene Quarry in south-eastern Queensland had a legacy approval to quarry land in the Ormeau hills, portions of which support significant threatened biodiversity. A review of the quarry's future expansion needs identified a new 113 ha area of suitable quarrying resource in eucalypt forest outside the existing approval. The new expansion area had lower biodiversity values but included habitat for the vulnerable Koala (low-density population), Grey-headed Flying-fox, Glossy Black-Cockatoo and Slender Milkvine. To compensate for this impact, a 189 ha offset surrounding the quarry was secured. It includes the avoided loss of areas with the highest threatened biodiversity values under the legacy approval as well as a habitat restoration offset to restore degraded habitat patches in historically cleared areas.

The avoided loss component avoids the loss of 12 ha of critically endangered lowland rainforest, the second-largest population in Australia of the vulnerable Macadamia Nut and known habitat or populations of a further one critically endangered, one endangered, four vulnerable and one near-threatened species.

The restoration component includes tree plantings to restore habitat for Koala and Grey-headed Flying-fox and restoration of 14 ha of critically endangered lowland rainforest regrowth that requires substantial weed management. Rainforest restoration also provides the opportunity to enhance a new population of the critically endangered Ormeau Bottle Tree, one of Australia's top 30 priority threatened plant species. The Hanson Wolffdene Quarry offset successfully provides a net conservation benefit for the threatened species habitat impacted by the quarry extension as well as for other threatened biodiversity of greater conservation significance.



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Strategic Biodiversity Offsets for Large-scale Infrastructure Achieves Regional Conservation and Community Benefits

Presenters: Chris Thomson & Kylie Wells



Achieving offsets for large infrastructure projects presents challenges and the focus on like-for-like offsets can result in missed opportunities. One such opportunity is to deliver regional benefits to biodiversity and communities. The upgrade of the Pacific Highway from Woolgoolga to Ballina in NSW was approved in 2015 with conditions to secure like-for-like offsets for biodiversity impacts. To meet this condition, Transport for NSW developed a strategy centred on engaging with the community to secure a network of offset sites and achieve regional conservation benefits. The program was not limited to like-for-like offsets. Community interest was sought, resulting in a 'long-list' of properties that were assessed by selection criteria facilitated through joint agency assessment panels. Panel participants were presented with data on bioregional values and rapid site assessments. The owners of 'short-listed' properties were interviewed to determine suitability.



Stewardship agreements for each property were established as the mechanism for conservation and meeting the offset obligation in perpetuity. Transport for NSW managed and funded the development of each agreement, including formal contractual commitments to landowners, completion of biodiversity assessment reports, and identifying threats to biodiversity. We worked with the landowners to develop management actions and funding plans. The strategy has been successful in meeting the conditions of approval and averting loss of biodiversity. To date, 30 properties have been selected forming a regional network of offset sites conserving over 4,000 hectares of private and public land. Importantly, positive regional benefits were realised through securing landscape connectivity, conservation of threatened species, funding revegetation and koala habitat restoration, and engaging with the community in conservation actions. This approach of involving the community to deliver a large offset program with regional benefits provides a positive model for future programs. Shifting the focus to regional conservation allows for like-for-like offsets plus a range of other benefits and has identified issues and solutions for improvement.

Enhancing Livelihood Outcomes in Biodiversity offset Schemes in Uganda's Oil and Gas Industry

Presenter: Ritah Kigonya



In Uganda, commercially viable oil deposits were discovered in the Albertine Graben, a global biodiversity hotspot. The area contains most of the nation's unique species of high conservation value, distinct ecosystems, several tourist destinations and several forest ecosystems that are sources of livelihoods for the surrounding communities, wildlife habitats and wildlife corridors especially for the primates. To ensure net positive impacts of exploration and development of extractive industries in wildlife conservation areas, Uganda's Wildlife Policy (2014) recommends that biodiversity offsets be pursued where mitigation is inappropriate. Whereas Biodiversity offsets are increasingly adopted to ensure 'No Net Loss (NNL) of Biodiversity', they also have social impacts as societies value and use biodiversity.

The Biodiversity offset principles, standards and policies recommend that people's use and cultural values of biodiversity be considered while designing and implementing biodiversity offsets. If there are residual negative effects on the biodiversity-based livelihoods after avoidance and mitigated measures have been fully exhausted, these are to be offset through compensation. These considerations were reported absent in technical debates with fundamental lack of understanding of how to achieve NNL with regard to people's interactions with biodiversity. The poster is going to rely on empirical findings from existing offset projects in Uganda to provide learning lessons for the oil and gas industry on how to enhance people's use and cultural values of biodiversity while implementing offset projects. Specifically, the paper will explore the extent and nature of offset projects, their impact on community livelihoods, the extent to which they have addressed people's use and cultural values of biodiversity and stakeholders' suggestions on how to enhance NNL of People's use and cultural values of biodiversity.

Lessons learned from hands-on application of the NSW Biodiversity Offset Scheme

Presenter: Christina Maloney



The NSW Biodiversity Offset Scheme has been operating since the introduction of the Biodiversity Conservation Act 2016. Assessments are carried out using the Biodiversity Assessment Method (BAM). Overall, the BAM is a substantial and positive advance on how biodiversity is assessed before and after the anticipated impact of a proposed development. However, as practitioners working under this relatively new scheme we have encountered a range of challenges particularly when applying the BAM to planted and degraded vegetation. We will present technical and client-related challenges from case study examples from a major project as well as smaller developments.

These challenges have the potential for producing perverse outcomes that may include impacts upon a proponent's credit obligations; a requirement for costly and high maintenance retention of patches of vegetation of questionable environmental value; and rework resulting from required planning changes to accommodate retained vegetation. We propose a number of potential solutions that relate to a practitioner's response to technical issues and dealing with client expectations and communication with a focus on planted, regrowth and weedy vegetation communities.

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City of Gold Coast External Environmental Offsets Program - Simplifying Offset Delivery

Presenter: Sinclair Britton

The City of Gold Coast has developed a formal, external environmental offset program based on a highly successful three year trial program. The program simplifies the delivery process for external entities, and to date has delivered substantial koala habitat restoration on behalf of external entities. The City developed its program to provide external entities with access to expert knowledge of environmental offset legislation and policy, professional contract management and delivery of on-ground restoration works. The program was developed following a successful trial consisting of three offset delivery projects.



The City's trial projects assisted three external entities (Energex, the Department of Transport and Main Roads, and the Department of Education and Training) in meeting their offset obligations by delivering restoration on City of Gold Coast conservation reserves. The offset partnerships have delivered over 45 hectares of koala habitat, with an additional 8 hectares due to commence in 2020. The program has had positive benefits for koalas and their habitat on the Gold Coast, by ensuring that restoration works associated with impacts are kept local (a practice which is not strictly required under all offset regimes). By having strategic control over the delivery of the offsets, the City has ensured that specific offset receiving sites are located in areas that are the most beneficial to the city's local koala populations. While the City's program has had measurable benefits to local koala populations, there are still many improvements that could be made to offsets policies at all levels of government, including: Ensuring true costs for offset works are factored in to financial settlement calculators making it easier for entities who are in the business of undertaking restoration to get access to funds and opportunities to deliver works reducing the risk for landholders wanting to undertake advanced offsets.

New Generation Tools for Monitoring Offsets

Presenter: Julian Kruger

Effective monitoring is critical for evaluating the effectiveness of offsets that involve rehabilitation or other management actions. Recent advances that can assist in monitoring offsets include freely available satellite imagery, unmanned aerial vehicle imagery, ecoacoustics, laser scanning and proximal sensors connected to the internet of things. These new technologies provide cost effective and practical tools for monitoring to occur more widely and frequently. This paper outlines four examples of new generation monitoring tools.



1. Habitat condition and diversity from remote sensing. Imagery from remote sensing platforms provides data that enables landscape-scale analysis of habitat condition and diversity. In this example, habitat diversity of native remnants and plantings on a farm in the WA Wheatbelt were assessed using Sentinel-2 imagery. Results were compared with on-ground data.
2. Ecoacoustics. Ecoacoustics is a relatively new and rapidly emerging field that may provide a way forward for low cost, quantitative monitoring of fauna communities. Automated sound recorders are set up for the area described in 1 above. Data were collected and analysed to demonstrate the technology; results accorded with other on-ground data.
3. Vegetation cover and structure from terrestrial laser scanning (TLS). This technology reduces the field labour while eliminating many of the errors associated with traditional field based methods (e.g. tree height measurements and projected foliar cover). An example is presented showing key metrics obtained from TLS in a native vegetation remnant.
4. Automated acquisition and analysis of vegetation health via the internet of things. Low cost systems that provide real time data on ecosystems have recently emerged. In this example, a system for monitoring the health of vegetation at a remote mine site was developed and implemented. Processing and analysis was performed in near real time with warnings generated and sent automatically when trigger levels were exceeded.

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What ecological and conservation outcomes were achieved in 10-years of the Biobanking Program

Presenter: John Seidel



What ecological and conservation outcomes were achieved in 10-years of the Biobanking Program The Biodiversity Banking and Offsets Program (Biobanking) has been the flagship program of the NSW government for assessing and securing offsets sites since it commenced in 2010. Since the approval of the first biobanking agreement in 2010, the scheme has grown dramatically in recent years with 190 biobanking sites now registered in NSW. With the program now coming to a close and transition to a broader regulatory based Biodiversity Offsets Scheme well under way, the poster will provide a description of the types of biodiversity outcomes secured under the biobanking scheme. This includes a range of endangered and critically endangered ecological communities, as well as habitat for endangered and critically endangered flora and fauna. Here we will provide an analysis of the improvement in the extent and condition of different native plant communities that is expected to be achieved over time from implementation of the management plan at different biobank sites.

The extent of expected gain is an outcome from application of the Biobanking assessment methodology based on a range of site factors. This gain is measured in different types of biodiversity credits. Biodiversity credits are then able to be sold to developers which provides a key funding source for the ongoing management of the biobank site. Finally, will present some examples of how the NSW biodiversity offset market has valued the private land conservation of different types of plant communities and how this may can vary in different regional areas.

What did we learn about offset programs from 10-years of the Biobanking Program

Authors: Phil Wood & Jean Henderson



The Biodiversity Banking and Offsets Program (Biobanking) has been the flagship program of the NSW government for assessing and securing offsets sites since it commenced as a voluntary program in 2010. Since the approval of the first biobanking agreement in 2010, the scheme has grown dramatically in recent years with 190 biobanking sites now registered in NSW. We will identify the key drivers behind the increasing participation and interest in the scheme, including the increasing diversity of landholders and development proponents who have set up biobank sites. Related to this is the variety of different ways that development proponents have used the scheme to meet their offset requirements. We will explore some of the key factors that were learnt from a program development and implementation perspective, and how this learning has been used to make improvements in settings for the new scheme. This includes explaining the benefits of using a consistent and reliable method for assessing biodiversity and providing users with a system that records the outcomes.

This has enabled us to undertake systematic and objective evaluations of the method and identifies areas that require improvement to achieve better biodiversity outcomes. This includes approaches such as external peer review and sensitivity analysis. Finally we will explain how this analysis of outcomes from the biobanking scheme has contributed to a process of review and continual improvement in the biodiversity data used in the new Biodiversity Assessment Method and some of the techniques used to improve the our biodiversity data set by capturing the collective knowledge of species experts.

What is the UK up to?

Presenter: Sian John



This poster will look at three biodiversity offset projects delivered in the UK and consider target setting and monitoring results 14 years on. For two managed realignment projects - Trimley Marshes Managed Realignment in Suffolk and 'Site A' Managed Realignment in Essex, for for Port of Felixstowe and London Gateway developments respectively - it will discuss how targets were set for the sites, based on the impacts predicted with respect to intertidal and subtidal habitat, and review the results of a decade of monitoring against these targets. The third project included biodiversity offsetting as compensation for the loss of intertidal habitat associated with the York Potash (mine) Harbour Facilities in the North Yorkshire Moors National Park. The measures were derived based on the methodology set out in the Department for Environment, Food and Rural Affairs' Technical Paper: the metric for the biodiversity offsetting pilot in England (Defra, 2012). Lessons were learnt regarding the potential pitfalls of the application of such a metric in the coastal environment, for example, regarding the calculation of biodiversity units using multipliers to address risks.

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Dingoes: A biological management tool for Biodiversity Offset Sites

Presenter: Jack Tatler



Conservation management is a complex undertaking that is largely influenced by dynamic ecological processes. Trophic interactions drive ecosystem functioning, with top predators directly and indirectly governing the structure of ecosystems to the benefit of biodiversity. Australia's largest terrestrial predator, the dingo *Canis dingo*, has been almost completely eradicated from the country's south-east as a result of human-wildlife conflict (i.e., predation of sheep) that dates back to European settlement. Consequently, the ecosystem services once provided by dingoes have been eliminated, replaced by the detrimental impacts of invasive mesopredators; red foxes *Vulpes vulpes* and feral cats *Felis catus*. These generalist mesopredators have been implicated as the primary cause of Australia's mammal extinction crisis, and continue to threaten the persistence of native wildlife despite our best efforts. In the absence of dingoes, large native and introduced herbivores can become overabundant; limiting food resources and shelter for vulnerable smaller species, which exposes them to predation.

Moreover, recent evidence suggests the presence of dingoes can shape vegetation communities, leading to a different geomorphological landscape. Under the NSW Biodiversity Offset Scheme, landholders are required to manage their Stewardship Site to maintain, with the aim of increasing, biodiversity value. We hypothesise that restoring dingoes (i.e., top order predators) in the landscape within large Biodiversity Stewardship Sites to benefit ecosystems via a number of pathways that will result in increased primary productivity (e.g., recruitment of plant communities) and an increase in native mammals (e.g., rock-wallabies, bandicoots, potoroos, bettongs, and rodents) and sensitive ground-nesting birds (e.g., Bush-stone curlew, Squatter pigeon and Button-quails), which have been removed from the landscape by over-predation from mesopredators. With dingoes in the landscape, management efforts have the potential to prove more effective at conserving and increasing the biodiversity values of a site.

The ecological outcomes of biodiversity offsets under 'no net loss' policies: a global review

Presenter: Sophus zu Ermgassen



No net loss (NNL) biodiversity policies mandating the application of a mitigation hierarchy (avoid, minimise, remediate, offset) to the ecological impacts of built infrastructure are proliferating globally. However, little is known about their effectiveness at achieving NNL outcomes. We reviewed the English-language peer-reviewed literature (capturing 15,715 articles), and identified 32 reporting observed ecological outcomes from NNL policies, including >300,000 hectares of biodiversity offsets.

Approximately one third of NNL policies and individual biodiversity offsets reported achieving NNL, primarily in wetlands, although most studies used widely-criticised area-based outcome measures. The most commonly cited reason for success was applying high offset multipliers (large offset area relative to the impacted area). We identified large gaps between the global implementation of offsets and the evidence for their effectiveness: despite two-thirds of the world's biodiversity offsets being applied in forested ecosystems, we found none out of four studies demonstrated successful NNL outcomes for forested habitats or species. We also found no evidence for NNL achievement using avoided loss offsets (impacts offset by protecting existing habitat elsewhere). Additionally, we summarised regional variability in compliance rates with NNL policies. As global infrastructural expansion accelerates, we must urgently improve the evidence-base around efforts to mitigate development impacts on biodiversity.

Logan City Council's Environmental Offsets Estimator

Presenter: Rodney Adam



Governments around the world are increasingly using environmental offsets to replace the environmental values inevitably lost in development that supports a growing economy and population. In 2010 changes to the Queensland Sustainable Planning Act 2009 gave local governments a formal statutory power to impose environmental offset conditions on development approvals. Logan City Council developed an Environmental Offsets Policy based on 10 weighted criteria which determines the Ecological Index of potential clearing sites. A higher Ecological Index requires a larger offset area to be provided.

Logan City Council has a portfolio of advanced offset land and the offset cost is calculated by the size of the offset required multiplied by the land, administration and rehabilitation cost Council incurred to provide the offsets. Logan's Environmental Offset Policy received wide support from residents, the development industry, State Government and other Local Governments in SEQ. However, the calculation of offset costs relied on a large information database and a complicated GIS process rather than simple multipliers used in many offset policies including the Queensland State Government Financial Settlement Calculator. The only way a proponent could determine offset costs for their proposed development was to contact Council. It was recognised that this process was not ideal because:

- It would require significant time from Council officers; and
- Slow down the planning process for developers. As a result Council developed a web based Environmental Offset Estimator whereby proponents can access their property online, draw a polygon of the proposed clearing site, submit it to Council and within minutes receive an offset report with all the information they need for:
- Minimising environmental harm;
- Minimising offset costs; and
- Maximising development yield. The Environmental Offset Estimator has far reaching advantages for Logan City Council, the development industry, residents and the environment.

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The Rookwood Weir Project

Presenter: Laura Hewitt

The Rookwood Weir Project involves the development of a new weir and associated infrastructure near the Rookwood Crossing, approximately 66km west of Rockhampton on the Fitzroy River, Queensland. At full capacity, the weir will provide 76,000 megalitres [ML] of water for strategic water supplies including for agriculture and industry. Due to the inundation extent of the Project, potential impacts to a range of both State (Matters of State Environmental Significance – MSES) and Commonwealth (Matters of National Environmental Significance – MNES) environmental matters including terrestrial, aquatic and water quality are expected. These offset obligations as outlined in the Project's Environmental Impact Statement approval conditions, and are required for impacts to:

- Brigalow (Acacia harpophylla dominant and co-dominant) ecological community
- Black Ironbox (Eucalyptus raveretiana)
- Red Goshawk (Erythrorchis radiates)
- Fitzroy River Turtle (Rheodytes leukops)
- Great Barrier Reef World Heritage Area and National Heritage place
- White-throated Snapping Turtle (Elseya albagula)
- Powerful Owl (Ninox strenua)
- Fish habitat
- Regulated vegetation and connectivity areas. As such the offset obligations are quite onerous and require new thinking to address these obligations in the most efficient manner, using approaches co-locating and/or stacking offsets that have not been undertaken previously.

Our novel approach is to utilise natural ecosystem functioning to achieve multiple offset benefits such as using riparian vegetation as an offset for connectivity, vegetation and fauna habitat, to intercept sediment and nutrients from adjacent agricultural practices which provides an offset for impacts to water quality. This novel offset approach is discussed with particular reference to utilising common offset methods to achieve multiple outcomes.



From outputs to outcomes: broadening impact evaluation design for the Australian Government's Environmental Stewardship Program

Presenter: Philip Martin

The Environmental Stewardship Program (ESP), currently administered under the National Landcare Program, aims to maintain and improve the condition of highly significant ecological communities on private land and support enduring improvements in land managers' attitudes and practices with respect to environmental protection and sustainability. The ESP represents Australia's longest running natural resource management (NRM) program/subprogram and beginnings of the Australian Government's NRM transition from an extension centred community-based NRM approach, towards longer-term market-based approaches. Various authors and national NRM program level audits, however, suggest there has been a repeated inability for national programs/subprograms, such as the ESP, to demonstrate measurable outcomes and impact, providing limited evidence and understanding of program efficacy, and limited support for future NRM investments.

Since its beginnings in 2007, the ESP has been evaluated through self-monitoring, evaluation and reporting at a land-holder project level, and impact evaluation at a sub-program level. While these evaluations have contributed to various useful conclusions about the ESP, they have nonetheless been limited to examining outputs, rather than outcomes and impact. There is a need, rather, for a broader range of impact evaluation designs to be used in order to reliably infer outcome and impact causality for the ESP. In particular, greater attention should be paid to matching impact evaluation design to the ESP's evaluative purpose and context, to facilitate generation of more robust causal evidence.



Newmont Goldcorp Suriname - Merian Mine Biodiversity Action Plan

Presenter: Kamal Khodabaks

Newmont Goldcorp Suriname operates the Merian Mine, an open pit gold mine located in Suriname, South America. Suriname is situated in the Guiana Shield of the Amazon rainforest and has a population of 575,763 with the highest forested land area (93%) in the world. With Dutch as the national language and ethnic diversity comprising of Indians, Creole, Javanese, Amerindian, Chinese, European, Maroons and more, the challenges and opportunities for biodiversity conservation are unique. Artisanal Small-scale mining (ASM) gold operations strongly influence surface water hydrology and the result is that vegetation is removed from the valley bottoms, the valley bottoms are widened with remnant pit excavations and a large amount of coarse sediment are left in the floodplain. Visual inspection of aerial photographs shows that, to significant extent, the drainages on or adjacent to the Merian site have been affected by past or current ASM. Newmont Goldcorp Suriname is implementing a biodiversity action plan, with the identification of key biodiversity values that require protection, including *Virola surinamensis* (IUCN- EN), *Vouacapoua americana* (IUCN-CR) and *Oenocarpus* sp.

The biodiversity mitigation hierarchy has been applied to avoid and minimize impacts, and a biodiversity-offset through the reclamation of abandoned small-scale mining site is being applied. The aim is to improve the quality hectares of reclamation above what was present prior to Merian operations. Pilot test plots will be monitored to determine the best methods to roll out this offset on a larger scale. Seed harvesting, wildlife recordings, stream restoration, tree planting, on-site nursery cultivation of plants, monitoring of biodiversity-offset test plots are part of efforts to restore impacted catchments. ASM and local community expectations are managed with extensive community engagement and communication programs to educate and address potential future impact from the ASM activities in the restored land.



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Automated detection of threatened bird species from passive acoustic recordings in Biodiversity Offset Sites

Presenter: Kurtis Lindsay

Traditional analysis of fauna sound recordings necessitates laborious, manual identification of very large audio files by experienced personnel. Under current NSW legislation, the guidelines for identifying threatened vocal fauna species (e.g. large forest owls) requires intensive field hours of spotlighting and call playback. Results can be easily skewed by bias associated with human presence or weather conditions on the nights of survey. Over the past ten years, the use of passive acoustic recorders has become more prominent in surveying for cryptic, vocal fauna species. Devices are deployed to record nightly for weeks to months on end, through all-weather conditions. This has eliminated many of the traditional survey bias experienced from conventional survey techniques, however, the resulting datasets are significantly large and can take days or weeks to analyse. The process of manually processing and listening to audio datasets is costly and time intensive.

Recent advances in automatic classification of audio signals within user friendly software programs enables accurate identification of a range of vocal taxa in a fraction of the time. Narla Environmental has trialled the software program Kaleidoscope (Wildlife Acoustics Inc.), which delivers automatic classification of individual species from field collected acoustic recordings. We were able to rapidly identify several bird species, including Powerful Owl, a sought after 'species credit' under the NSW Biodiversity Offset Scheme. This was achieved by tuning an Advanced Classifier to recognise the calls of individual species. Once a training dataset has been created for each focal species, we predict overall analysis time will be reduced from several days to a matter of hours. Use of automatic classification software has the potential to provide considerable benefits to clients and consultants whilst increasing our ability to detect threatened species and provide a reliable, comprehensive assessment of difficult to detect fauna.



A framework to identify potential serious and irreversible impacts on biodiversity

Presenter: Dr Michelle Cox

An important element of any rigorous biodiversity offset scheme is the ability to identify and hopefully circumvent impacts of development that are likely to cause irreversible environmental damage. The new Biodiversity Offset Scheme now operational in NSW under the Biodiversity Conservation Act includes provision that requires a consent authority to consider whether any residual impacts of a development will result in a serious and irreversible impact (SAIL). As such, the concept of SAIL is a central component of the NSW biodiversity offsets scheme. It is fundamentally about protecting threatened species and threatened ecological communities that are most at risk of extinction from potential development impacts or planning proposals.

We will explore the framework for decision making that has been prepared by the Department of Planning, Industry and Environment (DPIE) to assist a consent authority with their role in determining an impact likely to result in a SAIL. The framework allows decision-makers to take into account the potential for avoidance and mitigation, as well as the scale and extent of the residual impact. These factors are weighed against the status and vulnerabilities of the entity at risk of the SAIL to ultimately determine if a proposal will indeed have a serious and irreversible impact. Here we will explain the four principles and the supporting criteria that assist a consent authority to apply the principles. The principles set out in the regulation broadly align with the approach used by the IUCN to identify entities with the greatest risk of extinction, or they identify the types of impacts that cannot be offset. We will describe how DPIE have applied the criteria to every listed threatened entity to identify the species and communities most at risk of a SAIL. Finally, we will explain how we link this to the impact assessment requirements set out in the Biodiversity Assessment Method to provide the consent authority with information on the extent and scale of the proposed impact.