2022 NRM KNOWLEDGE CONFERENCE ABSTRACTS

CONCURRENT SESSION 1

Transforming How We Work Together – Practice Change science and technology

Using behavioural science to improve Natural Resource Management (NRM) outcomes, Sam Moore, Evidn

Complex challenges such as agricultural land management or drought resilience often hinge on the willingness of people to adopt new practices and different ways of thinking. Put differently, these challenges require people to change their behaviour. This presentation will outline a partnership between behavioural science consultancy, Evidn, and leading Natural Resource Management (NRM) provider, Fitzroy Basin Association (FBA), to embed behavioural science alongside Natural Resource Management to increase the adoption of sustainable farming practices throughout the Fitzroy Basin. This presentation will adopt a case study approach by drawing on learnings and insights from the partnership between Evidn and FBA. It will equip attendees with an understanding of behavioural science, how it can be applied to agriculture and NRM, and will describe how it is currently being applied to increase community drought resilience and sustainable land management. To our knowledge, this approach is one of the first to systematically incorporate behavioural science into the design and delivery of Natural Resources Management in Australia.

Measuring Practice Change – how do we know if we are succeeding? Pippa Jones and Stephanie Drum, North West Local Land Services (NSW)

Developing meaningful measures for practice change in natural resource management is challenging. Often practice change data is not collected in a coordinated and consistent way, and there are few meaningful established metrics available. Even when data is collected, there is often no clear framework to describe links between desired outcomes and actions on the ground so the data doesn't tell the story of the given practice change. North West Local Land Service (NWLLS) recognised that the data they were collecting on practice change was not providing the insights they needed to monitor their Check Ready Grow program – a program where landholders could improve their knowledge and apply for funding to change practices in order to improve soil and groundcover on their properties. NWLLS and RM Consulting Group worked in collaboration to develop a fit-for-purpose evaluation framework for the Check Ready Grow program. This framework guided collection of landholder capacity and practice change adoption data in order to

more effectively demonstrate the impact of the program and help identify where the program is working well and what improvements could be made to future delivery. The framework was designed around a simple practice change continuum that moves from awareness, knowledge and skills through to building confidence, building networks, adoption and finally sustainable land use. This framework was used to develop a set of indicators to measure progress of participants in the Ready Check Grow along this continuum. A set of products was developed to assist NWLLS in the collection of data. These products included a program logic, evaluation framework, surveys, interview guides, case study template, database and presentation template to communicate the results of the program to various audiences (internal, community, investors). These products have been road tested by NWLLS and together with RMCG refinements to the products were made based on feedback and use. The products have now been adopted by NWLLS and the data is being collected in a consistent, intentional and meaningful way and providing robust information to demonstrate the effectiveness of the Ready Check Grow program. NWLLS will extend this approach to reporting for other programs (refining it as necessary to ensure it is fit for purpose). The products will also be used to provide direction and content for evaluations under the NSW LLS statewide practice change program, Measuring What Matters, which uses the Qualtrics platform to evaluate LLS customers and gather meaningful data. This approach to the long-running challenge of measuring practice change has made valuable progress. The collaborative approach taken between NWLLS and RMCG has seen iterative improvements made over time through application and testing. This includes developing a tool to take data gathered in surveys and interviews and translate it into meaningful outputs that tell a story of the program based on real data, using simple yet engaging graphics.

National projects with local application – sharing through the WA Landcare Network, Mick Davis, WA Landcare Network

WALN is part of the National Landcare Network, and I want to share with you the excitement the WALN team of four p/t staff, eleven volunteers and over 260 members feel at the new ways in which the National Landcare Network members, seven of them representing each state and territory, facilitate cross-pollination on best available practice, and the evolution of dynamic new communication protocols to ensure the great things taking place can be shared and replicated, without wheel spinning and waste. A brief glance across the Value of Landcare Reports from around the nation and some quick maths demonstrates hundreds of millions of dollars' worth of community landcare happening every year through coordinated volunteerism and investment from Commonwealth, state, local governments, along with a growing number of other co-investors, including philanthropists and high net worth tree and sea changers! Drive through any Australian town with a delightful riverside picnic spot with native habitats and healthy trees and new plantings in the

parks and open spaces of regional towns; note the possum dreys, nest boxes and cockatubes growing almost daily in numbers around the country; delight at urban verge gardens providing pollination services to the growing army of suburban food growers. Read about coordinated and collaborative landscape scale projects that are changing the natural state of the environment for the better, critical work for critical times. Lift up the leaves on many of these and you will see the fingerprints of thousands of community members leaning in to landcare. What are the disruptors that are coming to community landcare? Is it just apps and drones or is there more on its way? What role does innovation play in developing resilience in our sector and in ourselves in the landcare movement? How does WALN best incorporate the learnings from around the country and the globe and share them with you? Close your eyes just for a moment and imagine what Australia might look like without community landcare activities? What is the true value of landcare? What is the cost of losing it?

National geoscience datasets to support natural resource management in Australia: How NRM organisations can access and use Geoscience Australia's publically available national spatial datasets, Rod Kennett, Geoscience Australia

Geoscience Australia (GA) is the nation's trusted source of information on Australia's Earth science that delivers data, information and advice that supports government, communities and industry to address challenges and enhance opportunities facing Australia now and into the future. Public access to GA data is via a range of web-accessed portals with interactive tools to display and interrogate a diverse range of NRM relevant data, as well as data downloads for our smaller products. Datasets include national maps of water location and frequency, mineral and soil maps and vegetation location and density maps, as well as foundational Australian location information like positioning and GPS information and elevation data, and regularly updating satellite imagery products.

Geoscience Australia's data and tools can support the interpretation of local scale spatial data collected by NRM organisations. Recognising their mutual interests and responsibilities, GA and NRM Regions Australia signed a Collaborative Head Agreement in 2018, and undertook a series of workshops to demonstrate GA data and data tools and to explore issues and common interests. This presentation in 2022 provides an update on GA data and data tools to the NRM practitioner community and invites a conversation to shape future collaboration.

Transforming our Relationship with Country – Bushfire response and recovery

Cooperative Fish Recovery Post Fire, Andrew Briggs, North East Catchment Management Authority

When the horrific fires of 2019/20 tore through the Upper Murray catchment in North East Victoria, they left a trail of destruction that impacted every facet of the catchment and the flora and fauna that live in them. When flash flooding occurred immediately post fire, the consequences to fish that survived the fires was catastrophic. Multiple sediment, ash and debris flows suffocated surviving fish, and mass fish-kills were observed across all impacted waterways. Once thriving rivers were reduced to sludge laden streams that appeared to have lost all forms of life. Experience tells us that whilst there are always some remaining pockets of surviving fish from which populations can recover, the situation looked grim indeed.

Immediately post-fire, the North East Catchment Management Authority commenced working with multiple partners on the long road to recovery of fire affected fish populations. The Corryong Angling Club, Victorian Fisheries Authority, Landcare, Australian Trout Foundation, Ozfish, Bushfire Recovery Victoria, Traditional Owners and a host of volunteers all came together, alongside a major investment from the Victorian State Government, for fire recovery in the region.

Our coordinated efforts have seen:

•thousands of trees planted with over 30km of riparian fencing,
•placement of hundreds of hardwood logs and boulders for instream habitat,
•construction of a major fishway to restore fish passage in Cudgewa Creek
•Fish stocking trials
•Detailed monitoring of fish recovery put in place, and
•The first stocking of Macquarie Perch into the Cudgewa Creek, where this species has been locally extinct for over 50 years.

From Disaster to opportunity – the Cudlee Creek bushfire recovery experience, William Hannaford, Hills and Fleurieu Landscape Board

The Adelaide Hills has long had more than its fair share of woody weeds, but the action of the 2019 Cudlee Creek bushfire saw this explode to unprecedented volumes. The fire drove carpets of exotic broom, dense thickets of gorse and blackberry, closely followed by exploding rabbit numbers. Other fire driven impacts included the siltation of important waterholes, the death of ancient paddock trees, the loss of agricultural productivity and destruction of rare habitats.

So how does an agency that doesn't own a single hectare of land chase a cataclysmic weed problem across 23,000 hectares and more than 1000 individual land parcels?

In this presentation we will outline some of our braver strategies in engaging with hundreds of individual property owners in a time-limited landscape-scale bushfire recovery effort. We will share our key successes including how we were able to carry out mass engagement with a traumatised and devastated community and deliver a program aligned with their interests, individual stage of recovery and the desperate needs of the landscape.

We will also share our onground outcomes delivered through project areas of weed management, restoring riparian areas, dealing with rabbits, and managing fire-ravaged soils and pastures. We will share some of our challenges and learnings – 'what we would do better next time' and explore our plans for weaning the community off the recovery dollar, towards longer term sustainability and a more resilient future.
This project is being delivered by the Hills and Fleurieu Landscape Board in partnership with the Department of Primary Industries and Regions. This Local Economic Recovery project is jointly funded by the South Australian and Australian Governments under the National Disaster Recovery Funding Arrangements.

Rainforest resilience after the 2019 bushfire season, Paul Donatiu, Healthy Land & Water

Large components of the Gondwana Rainforests World Heritage Area in South East Queensland were affected by fires in late 2019. These fires damaged rainforest and wet sclerophyll communities, opening-up forest canopies, and allowing weeds to become established. These areas provide habitat for many listed flora species and listed communities, such as critically endangered lowland subtropical rainforest.
Post-fire, there was significant evidence of natural regeneration – both resprouting (basal, stem and root) and germination from seed (from established soil seed banks). These regeneration strategies raised questions about the capacity of rainforest and wet sclerophyll flora to deal with fire events of varying intensity:
1.Which rainforest and wet sclerophyll flora are regenerating post-fire?
2.What are the mechanisms used by rainforest and wet sclerophyll flora to regenerate post-fire?
3.Will most regenerating species fall into the Pioneer or Early Secondary categories?
4.Are there strategies that need to be considered (such as supplementary planting) when restoring fire-affected rainforest and wet sclerophyll vegetation communities?
After the fires in Lamington National Park, Healthy Land & Water assessed how rainforest and wet sclerophyll forest species responded to wildfire. 93% of surveyed species resprouted, 5% regenerated from seed, and 2% were killed outright. Furthermore, almost 50% of those species resprouting are successionally advanced Mature Phase species, providing compelling evidence of rainforest diversity, recovery and resilience post-fire. Although slow growing and without the lateral branching structure evident in Pioneer species, their presence provides valuable assurance that large numbers of particular rainforest species were not lost to fire.

Integrating bushfire recovery insights across NRM for resilient recovery – Rachel Morgain, NRM Regions Australia

Abstract to follow

Transforming through Climate Change –
The role of research and information in NRM and Transformation

Opportunities to apply soil data through the Australian National Soil Information System, Troy Clarkson, Department of Agriculture, Fisheries and Forestry

The National Soil Strategy is Australia's 20-year plan to value, manage and improve our soil.

To achieve the Strategy's goals, the Department of Agriculture, Fisheries and Forestry, is working to improve the quality, quantity, and accessibility of Australia's soil data. Soil data and information can support many stakeholders to make effective, data driven decisions on policy, planning and practice change.

A key initiative is the design and build of the Australian National Soil Information System (ANSIS), in partnership with CSIRO. ANSIS federates and standardises soil data from public and private sources; making it available on a single, public portal for all Australians to access and use. A nationally consistent data source will improve the understanding of national soil and state trends over time, provide a stronger evidence base for decision makers, and contribute soil data to modelling, mapping and other applications.

NRM regions will be able to leverage ANSIS to use previously inaccessible and inconsistent soil data to improve the accuracy of existing and new maps and products. By making soil information accessible, it will help inform interventions to manage natural resources, support farm resilience and productivity, and protect the environment and high value agriculture soils. NRM regions can use robust soil data sets to better design future programs, such as soil monitoring that contribute data to their program outcomes, ANSIS for others to use, and support a culture of soil stewardship.

Quantifying the value of NRM in Queensland, Chris Norman, NRM Regions Queensland

The challenge for regional NRM bodies has always been to quantify and benchmark an evidence-based value proposition to attract ongoing investment as efficient and effective businesses. In 2021, NRM Regions Queensland (on behalf of the State's 12 regional NRM bodies) undertook extensive research using a range of consultants to describe the impact of the work of the sector in term of:

* socio-economic value (describing regional economic contribution, leverage, employment multipliers, and delivery efficiencies),
* capacity building (including outsourcing),
* landscape condition change (and future priority setting based on describing assets and threats), and
* a first ever end-to-end market research analysis (to understand current knowledge of NRM and preferred sources for information).

This presentation will share this data and methodologies to encourage a national approach. It will also describe the products produced from this work and how they have been used to date.

Transformative solutions through co-design: natural resource managers and the NESP Resilient Landscapes Hub working together, Dr Alexandra Knight, NRM Regions Australia and NESP Hub

Transformative approaches that build long-lasting solutions for the management of Australia's unique ecosystems and communities require collective efforts at local, regional and national scales. Co-design, where participatory approaches are used to facilitate knowledge production and implementation between researchers and practitioners, is one key to building active responses to the long-term and ongoing downward trajectory of our natural resources. NRM Regions Australia and the NESP Resilient Landcapes Hub are working together to co-design approaches to key resilience issues, including landscape restoration in the face of climate change; hydrological changes; invasive species management and predator-free safe havens; and, better integrated regional planning approaches. Foundation work for co-design has been laid down in regional NRM plans and strategies which reveal key community concerns and knowledge gaps. Building on this foundation, the NESP and NRM RA are bringing NRM practitioners, Indigenous Australians and researchers together through online collaborative tools, Communities of Practice and face-to-face workshops to design integrated research and implementation programs. These processes strengthen understanding between researchers and practitioners and also acknowledge the differing scales at which NRM occurs and enable knowledge exchange and transferability. In this context, co-design is becoming a key tool in 'scaling-up' NRM efforts in Australia, enabling broader-scale pictures and narratives to be presented to decision- and policy-makers in convincing ways.

How the Glenelg River bucked the climate trend and restored fish communities, Adam Bester, Glenelg Hopkins Catchment Management Authority

Even before climate change impacts were felt, diversions and storages had reduced flow in the Glenelg River by about 50%. In 1996/97, south-eastern Australia experienced a climatic step-change, reducing average flow an additional 57%.
By 2010 fish populations were in a parlous state due to reduced flow and landuse and river channel threats, despite a decade of action removing fish barriers, managing sand slugs and improving river habitat. The upper reaches were regularly dry or limited to shallow, saline pools.
In 2010, the 40 GL Wimmera-Glenelg Environmental Entitlement was created, to be shared between the Wimmera and Glenelg River systems. Since then, regular cease to flow events (20% of flow record pre-environmental flows) have been replaced with baseflows. Salinity levels have lowered and ongoing works to improve fish passage and restore the river complement the flows. The results have been dramatic, with a 150% increase in total native fish populations in the past 4 years.
Highlights include:
- A four-fold increase in Glenelg Wimmera River Blackfish abundance
- Increased abundance and distribution of Tupong
- The return of Australian Grayling after 120 years absence
- A 350% increase in the EPBC Act listed Variegated Pygmy Perch population.

The Glenelg River results show that it is possible to restore fish populations despite a drying climate, so long as there is sufficient water to mitigate the catastrophic

extremes of drought and river regulation. The effectiveness of any such restoration is limited by the extent that complementary works overcome threats that constrain the recruitment and survival of species.

CONCURRENT SESSION 2

Transforming How We Work Together – Feral animals: collaboration and innovation

Demonstrating innovative best practice management, monitoring and surveillance of feral pig populations and impacts by land managers using a peer-to-peer approach, Dr Heather Channon, Australian Pork Limited

The adaptiveness and intelligence of feral pigs presents many challenges and frustrations to land managers to achieve desired outcomes from their feral pig management programs. The most successful and effective management programs for feral pigs are those that involve land managers working together in coordinated groups and strategically applying different combinations of humane, best practice control methods.

However, much of this is about people. It is critical that the needs and objectives of individual land managers align with those of the management group to ensure their on-going involvement, and that the group is well facilitated. In many instances, feral pig management activities are largely done in isolation from other groups; little information is shared of what is working, what hasn't and how alternate approaches could be used to achieve better outcomes; what data is and should be collected to monitor and measure progress; and, how existing and new technologies are being applied to improve and inform on-ground management decisions.

These gaps are now being addressed by the National Feral Pig Action Plan (NFPAP) to drive practice change by land managers through the establishment of six demonstration sites in December 2021. This exciting initiative aims to illustrate to land managers the integrated, best practice management approaches, monitoring tools, technical knowledge, and existing and new technologies being used by these programs to deliver effective population and/or impact reduction. Details are being widely shared via field days, dedicated webpages on the NFPAP's website, monthly newsletters, online Stakeholder Forums, media and other engagement activities.

This presentation will showcase some of the key initiatives being employed and how the NFPAP is supporting and adding value to these programs.

Towards a feral cat free Kangaroo Island, Peggy Rismiller and Will Durrack, Kangaroo Island Landscape Board

Feral cats on Kangaroo Island (KI) are a significant threat to wildlife, agriculture and human health through predation, competition and disease transmission. Feral cat densities are also 10 x higher than on mainland Australia. Funding has been provided by State and Federal governments to investigate whether eradication of feral cats from the 384sq km Dudley Peninsula on Kangaroo Island is feasible. Since 2020, we have trialed and refined traditional detection and control methods such that 65% of the Dudley Peninsula is now under active eradication efforts with 99.2%

landholder support. Deployment of advanced technologies such as 4G-connected, solar powered cameras linked to artificial intelligence based image recognition software, have enabled us to achieve significant cost efficiencies.
Threats to KI wildlife were recently exacerbated by the 2019/2020 bushfires that removed up to 96% of some species habitat. Substantial bushfire recovery efforts have been deployed throughout the fire scar and beyond which have resulted in a large knockdown of the feral cat population, the discovery of new localities for previously little recorded species and demonstration of the cost-savings from new technologies, such as large scale remote trap checking networks.
Once completed, the Dudley Peninsula will provide a safe haven for a multitude of threatened species and provide the opportunity for reintroductions. Completing the Dudley Peninsula eradication combined with successes from the other feral cat control programs, will allow us to estimate the costs of scaling up to a whole of island eradication, which would make KI the world's largest inhabited cat-free island.

About Rabbits: Building a future-focused network for rabbit control, Professor Wayne Meyer, Foundation for Rabbit-Free Australia

Rabbits are often under-rated as a pest in modern landscapes yet, even in low numbers, they continue to engineer entire ecosystems (for the worse), impact primary production, and undermine infrastructure. They are a risk to over 300 species of threatened plants and animals and cause losses of over $200 million per year to broadacre agriculture.
Rabbit impacts are often subtle, unseen and interwoven, e.g. an absence of regenerating seedlings or hyper-predation by over-abundant cats and foxes sustained by rabbits.
Additionally, a belief by some that bio-controls have largely fixed the problem overlooks the ongoing evolutionary 'arms-race' between bio-controls and their hosts, which risks lost effectiveness over time.
A challenge in mounting successful campaigns against rabbits is the diverse nature of people, organisations and regions affected by rabbits and the lack of effective communication channels for them to share ideas, information and encouragement.
Foundation for Rabbit-Free Australia is facilitating a 'national conversation' to bring diverse interests together, aiming to:
•Identify and hear from those with an interest in rabbits.
•Share information and insights and respond to common needs.
•Develop forums, networks and communication options to support interaction and collaboration into the future.
The Foundation is keen to facilitate the development of a resilient, always evolving, future-focused network for rabbit-related interests. It is already trialling some new options and is keen to share feedback and explore more. New networks and processes are needed for effective pest control in our ever-changing world and Rabbit-Free Australia is seeking help to facilitate their development.

Testing the use of Felixer' grooming traps to control cats in the jarrah forest of Western Australia, Linda Metz, South West Catchments Council

Predation by feral cats is a major threat to over 120 species of native fauna in Australia. Controlling feral cats to reduce this impact has proven to be a significant challenge. The South West Catchment Council, Department of Biodiversity Conservation and Attractions and the Blackwood Basin Group are testing how Felixer' grooming traps can be used to control feral cats and protect native fauna in the forests of south-west WA. Using available data on feral cat densities and movement in the Upper Warren area in south-west WA we modelled multiple deployment scenarios to determine the most appropriate way to deploy the Felixer' grooming traps. Based on this analysis we deployed eight Felixer traps over two, 14,000 ha sites for an average of eight weeks each. Cat activity before, during and after the deployment of the traps was monitored by an array of 50 remote cameras to determine the number of individual cats present and the total cat activity and to determine how successful the Felixers' were at reducing feral cat activity. We were able to reduce feral cat activity by up to 24% through the use of the Felixer' traps when compared with a site without Felixers' where activity increased by 25% over the same period. This reduction in feral cat activity was sustained for five months after the traps were removed. Our second trial currently underway is testing whether highly specific targeting of Felixer deployment locations can improve this outcome, based on placing Felixers' near landscape features known to be used by feral cats and using data from the remote camera arrays to target areas of high cat activity. Felixer' grooming traps are an exciting new addition to the feral cat control toolbox. Our work is helping to maximise the effectiveness of this new tool for the greatest environmental benefit.

Deer Kings of the North Coast: shoot out at the OK corral, Dean Chamberlain and Mick Elliot, NSW LLS.

Feral deer are an increasing in many landscapes across Australia. Management tools have been limited to shooting with firearms and this presents a significant problem in urban and peri-urban areas. Shooting had to be done at night, with armed shooters faced with shooting elusive animals in often built up areas. Control numbers and success measurements were low.

As there is no rule book for feral deer management, the first step involved researching what had been done in other urban and peri-urban areas across NSW and other states and then determining a best practice approach, in this case an innovative trapping program. Deer habitat areas were already known from ground surveys and local knowledge but population numbers were not. Thermal surveys using both helicopters and drones were used to identify population numbers and further areas of habitat.

The next part of the process was to determine what type of trap to use. The trap had to be reasonably light and easily transportable, considering that a focus of the management would be moving traps to deer habitat, controlling and removing those deer present and then relocating the trap to another site. The corral trap was identified as the most likely to achieve results.

The next step was to put the corral trapping program into action. The presentation will demonstrate who we worked with to bring corral traps into the deer control toolbox, the number of corral traps in place in the North Coast, how we bait and

control them, what we have learnt, what we wouldn't do again, and the overall outcomes.
The experience of North Coast has established corral traps as an effective vertebrate pest (particularly feral deer) control tool in urban and peri–urban areas. The trapping method used on North Coast NSW by Local Land Services to manage feral deer populations in an effective, humane way whilst ensuring the utmost safety of those carrying out the control and to the general public and complying with stringent legislative requirements.

Transforming our Relationship with Country – From recovery to resilience

Bushfire recovery in the Upper Murray, Kelly Behrens, North East Catchment Management Authority

The Upper Murray community defines resilience. Over the last 20 years this rural community has experienced natural disasters including drought, major floods (2011/12), bushfires in 2003 and then again in 2019/20. These most recent bushfires burnt 98% of the forested catchment and are the largest fires since European settlement. Many landholders experienced immediate loss through the destruction of homes, farm infrastructure and stock. The ongoing impact from the fires continues today.

The North East Catchment Management Authority's (CMA) statutory and funded role is primarily focused on restoring river health. Immediately following the fires staff undertook site visits to deal with immediate issues including large scale debris blocking waterways and impacts on essential public infrastructure.

Over the following months North East CMA staff continued to undertake site visits to people with damage to waterways, but it became evident that this was not the most significant issue the community was dealing with. With many agencies unable to undertake site / home visits due to COVID restrictions, the North East CMA staff were often the only agency on the ground. This is when the scale of the trauma faced by landholders became evident to our staff.

The issues being faced by landholders were far more complex than waterway health, and the support people needed was far beyond the scope of what was currently available through the North East CMA. A different model of delivery and partnership was needed.

A coordinated multi-agency approach to addressing mental health and the physical environment to assist landholders was developed. Agencies including the CMA, Landcare, Bushfire Recovery Victoria, Towong Shire, Gateway Health and Angling groups worked together to support the community though a successful model that provides a template for future natural environment disasters.

Building hope in the community after extreme events through habitat management, Dr Alexandra Knight, NRM Regions Australia and NESP Hub

Landcare groups have responded to the threats to wildlife from consecutive extreme events by investing in a range of habitat supplementations. These include a mix of traditional next boxes, natural hollow nest boxes, and the construction of new internal cavities within living trees. In north-eastern NSW, over an area of 32 000 km2, eleven Landcare groups have installed more than 600 artificial hollows and nest boxes since the 2019-2020 bushfire disaster. In an effort to ensure that learning and knowledge exchange result from the installation, Landcare groups have collectively pooled their placement data and early monitoring results. Preliminary evaluation of the results shows that 12% of the constructed hollows are used by native fauna both in fire-impacted and non-impacted sites with species including Feathertail gliders, Sugar gliders, Australian Owlet-nightjar and nesting Galahs. During the monitoring and evaluation processes, participants also shared

evidence of the social outcomes of being involved in restoration work following their experiences. These included stories about the emotions involved in the loss of native wildlife, the value of being involved in habitat interventions and the joy at observing wildlife return. The collective nature of the project has not only had ecological and knowledge sharing benefits, but also demonstrated the social value of community based natural resource management. By facilitating interaction with the recovering natural world, this program created hope in communities dealing with despair and grieving at the loss of local wildlife – a vital component of both personal and community resilience.

Protecting cultural heritage values from wildfire on Bribie Island, Paul Donatiu, Healthy Land & Water

Lack of integrated fire management across vegetation communities in the Moreton Bay Ramsar Wetland has been identified as a major threatening process to biodiversity and cultural heritage values. These communities include fire–prone (wallum, wetlands, Swamp Oak, eucalypt woodland, saltmarsh, etc.) and fire sensitive (littoral rainforest) ecosystems which offer opportunities for landscape management across cultural heritage and ecological concerns.

After extensive consultation with local Traditional Owner groups, a project evolved to examine how fire can be managed on Bribie Island to protect and conserve cultural heritage values.

Land restoration work on Bribie Island – focused on protecting one of the last remaining Ancestral Camp sites in South East Queensland – directly follows efforts on Minjerribah (North Stradbroke Island) where a similar stand of old growth Cypress Pine stand exists. Such work is a fundamental component of the Kabi Kabi peoples continuing effort to identify and protect remnants of a historical cultural landscape by mapping ancestral camp sites, middens, bora rings, remnant old growth trees and other features of landscape significance.

Project work is making a significant contribution to building the land restoration skillset of local Kabi Kabi peoples as they move towards Native Title in 2022/23. On–ground works include reducing fuel loads (manual thinning of juvenile Cypress and some Banksia) and removing woody weeds (such as Lantana) to further reduce fuel loads, establishing a control line around the site, reintroducing cool burns (2022–23 financial year) and establishing monitoring plots to assess changes in species richness and composition on site.

NRM leadership in landscape scale fire management planning, Queensland leading the charge – Joel Bolzenius, Healthy Land and Water (QLD)

The novel approach to fire education and management developed in South East Queensland has gone from strength to strength over the past 24 years, is now recognised regionally and nationally as a leader in the bushfire sector. The Consortium has built a highly successful and respected program, offering a diverse range of targeted services and resources. The once regional program found it was increasingly being called on to host training and disseminate information in other parts of the State, leading to it being officially rebranded as the Queensland Fire and Biodiversity Consortium two years ago. The success of the training in other regions has led to an interest in expanding QFBC and its successful model across

the State. Recently the Consortium has been working together with NRM Regions Queensland to realise this expansion across Queensland. A model is being developing that will see NRM Bodies right across the State support a more coordinated and cohesive approach to fire management planning and mitigation activities that put ecological conservation and cultural heritage recognition and protection at the forefront of the models deployed. The success of QFBC is its partnership approach. It was formed by a network of land managers and stakeholders committed to improving fire and biodiversity management outcomes. The network is devoted to providing a coordinated response and disseminating best-practice recommendations for fire management, fire ecology and the conservation of biodiversity through education, community engagement, landscape scale cross tenure bushfire planning and applied research. Established in 1998, the consortium facilitates partnerships between key stakeholders and builds the capacity of land managers and private land owners to address issues of fire management and biodiversity in the SEQ region and more broadly across Queensland. It was recognised by the recent Inspector General Emergency Management Queensland Bushfires Review, for its good practice in improved education and advice around bushfire risk and mitigation strategies. It has also been appointed as a member of the Practitioner Engagement Working Group of the Ecological Society of Australia (ESA). The Consortium hosts countless regional events every year, periodically hosts national bushfire conferences and its eNews service is nationally recognised as a key information source by organisations, including the AFAC and the new Natural Disaster Research Australia. The QFBC is a program of Healthy Land & Water.

Going with the flow: floodproofing waterways, Louise Orr, North Coast Local Land Services

In 2018 North Coast Local Land Services (NCLLS) was tasked by DPI Fisheries with a big goal: demonstrate a reduction in diffuse sediments flowing from the Richmond River catchment in Northern NSW into the adjoining marine estate.

Funded by the NSW Government 10-year Marine Estate Management Strategy, North Coast LLS conceptualised, designed and developed the Emigrant Creek Pilot Project in partnership with Ballina Shire Council, Big Scrub Regeneration, Soil Conservation Service and multiple farmers.

Four years later, and despite the impacts of multiple extreme rainfall events resulting in three of the worst floods Australia has ever seen, the Emigrant Creek Pilot Project prevents over 3000 tonnes of sediment and soil from reaching the NSW marine estate *every flood event*.

Anyone who has viewed a sediment plume entering the ocean understands the physical and ecological damage that can result – algal blooms, mortality and loss of fish and other marine life, contaminated food sources, loss of restorable habitat. Emigrant Creek, a major tributary of the Richmond River with multiple intensive agricultural enterprises competing on its banks, was heavily eroding and a huge source of sediment and pollution. Today it is living proof that stabilised, ecologically managed waterways can withstand significant flood events, protect, and actively recruit valuable marine habitat, and maintain viable, productive farming enterprises.

The Emigrant Creek Project team had an overarching design in mind to achieve this transformation: mimicking natural post flood recovery processes that deliver multiple outcomes. This presentation will outline the critical steps the team took to make this design a reality.

Transforming through Climate Change – Growing and managing environmental services

The collective experience of carbon farming in Southern Queensland, Jayne Thorpe, Southern Queensland Landscapes

Selling carbon credits is still a new market in the Southern QLD region. This project aimed to understand the experiences of land managers as they explore and participate in this market. The current Emissions Reduction Fund (ERF) ran its first auction on Thursday 16th April 2015 and by Wednesday 13 October 2021 there were 132 registered projects covering approximately 11% of the region (3.5 million hectares). We spoke to people who were part of these projects or had at least investigated what carbon farming would mean for their situation.

Almost three quarters of Queensland's carbon farming projects are in southwest QLD and these represent almost one quarter of projects across Australia. Almost all those we spoke with had negative views of carbon farming with only half sharing positive views.

Our qualitative semi-structured interview process yielded detailed notes from 36 land manager interviews to which we applied a thematic analysis. From the thoughts shared with us by land managers, we defined 5 key theme sets:

- Business Risks
- Carbon Scheme
- Social Impact
- Positive themes
- Conflicting themes

From everything we heard, we have defined a collective best-case and worst-case vegetation-based carbon farming scenarios from a land holder perspective. Overall, it seems like there is an opportunity here for diversification of income, though our interviewees urge everyone to really look into it before you sign up.

Taking real action on climate change, John Riddiford, Corangamite Catchment Management Authority

The Corangamite CMA has adopted a proactive strategy to take real action on climate change by:

1)As a business reaching carbon neutrality by 2024 by aggressively reducing its own emissions, to generate carbon offsets and where possible not to buy Aust carbon credit units as an offset

2)As a region have a central repository and coordinated effort for our climate change adaptation and mitigation programs, and three

3)As a regional leader promote the philosophy of taking action on climate change

The presentation covers these aspects as well as a number of examples of regional climate change projects.

Understanding risks and key considerations for successfully managing a carbon farming project, Skye Glenday, Climate Friendly

There are several key considerations for successfully establishing a carbon project, including: biophysical viability; property management plans & goals; commercial

viability; legal viability; and landscape connectivity. It is important to understand obligations, including in relation to project permanence, in the event of a natural disaster, or when buying or selling land with a carbon project. Find out the key questions to ask carbon farming service providers at the outset to ensure selection of the right project type, structure, management changes and partners, which together provide the foundation for successful project implementation over the long-term.

Cassowary Credits: Market-Based Mechanisms for Attracting Greater Investment into Rainforest Restoration, Bronwyn Robertson, Terrain NRM

The exceptional biodiversity values of the Wet Tropics are under threat from current and emerging issues. Landscape-scale restoration can help build resilience in the region's rainforests, but this requires long term, diversified and large-scale investment. Emerging environmental markets present new opportunities to finance restoration but will require changes to the way we work to ensure our region can make the most of these opportunities.

Supported by the Queensland Land Restoration Fund, Terrain NRM has been working with regional technical experts, landholders, Rainforest Aboriginal Peoples and potential investors to design a new, regionally-focused, voluntary, market-based scheme called Cassowary Credits.

The Cassowary Credit Scheme is tailored for the unique strengths and needs of our region. It aims to deliver significant biodiversity outcomes while also benefitting regional communities and First Nations people.

Evidence-based, robust, yet simple, methods have been developed to calculate Cassowary Credit earnings for landholders and inspire investor confidence, while keeping participation costs to a minimum. In order to encourage landholder participation, returns (i.e., credits) will reflect the real costs of biodiverse restoration, with early returns to cover the high up-front costs and ongoing payments for essential maintenance.

An administrative platform is being established to provide independent, transparent and accountable governance, guaranteeing credibility and providing an enduring investment mechanism.

The scheme will move towards market testing in coming months.

This new approach, built using the knowledge and strengths of regional partners, aims to meet the needs of investors and regional communities and build resilience in the Wet Tropics rainforests.

Demystifying environmental markets: a leadership program for landholders and practitioners, Claire Parkes, Local Land Services

The Environmental Markets Leadership Program is Local Land Services' first official foray into environmental markets extension and advisory services for NSW landholders. It is aimed at helping participants to identify opportunities from, and participate in, new and emerging environmental markets, and is underpinned by behavioural research into their barriers and enablers. Most importantly it also creates a network of environmental markets leaders (including LLS and Landcare staff) that can create and influence new environmental markets.

CONCURRENT SESSION 3

Transforming How We Work Together – Sustainability Frameworks and regional NRMs

Australian Agricultural Sustainability Framework, Warwick Ragg, National Farmers Federation

The purpose of the Australian Agricultural Sustainability Framework (AASF) is to communicate at the national level the sustainability status and goals of the Australian agricultural industry to markets and the community. It enables Australia to set its own narrative about agricultural sustainability domestically and in international fora such as during trade negotiations. The overarching value of AASF is in establishing a nationally consistent language for sustainability that is meaningful to markets, corporates, the community and farm sector. Sustainability reporting is gaining momentum. Consumers, shareholders, financiers and regulators are demanding transparency on sustainability, including corporate ESG reporting obligations. This rapid growth is leading to confusion, with a variety of definitions and expectations emerging. There is no single definition for Australian agricultural sustainability to inform agricultural sustainability decision making. The AASF aims to assist in enabling greater consistency by engaging and working with government, industry and environmental sustainability initiatives.

Stronger Together – NRM Regions & Sustainability Frameworks, Edwina Clowes, Meat & Livestock Australia

The purpose of this presentation is to articulate the collective value of the Australian red meat and livestock industry and NRM Regions further collaborating on sustainable agriculture.

The Australian Beef and Sheep Sustainability Frameworks are customer, investor, external stakeholder focused, they commit industry to a sustainability pathway of best practice and track performance against critical sustainability issues and indicators.

The rapidly shifting dynamics in global sustainability standards and disclosures hold significant ramifications for all countries and industries. These shifts will require greater commitment to and demonstration of sustainability principles and practice change, both at a collective industry and an individual 'on the ground' level.

A collaborative project between NRM Regions and the Frameworks in 2021 examined how regional NRM organisations could support the Australian beef & sheep industries meet their Sustainability Framework commitments. The project found the environmental areas and priorities identified in the Frameworks align well with regional NRM organisations focus areas, but a distinct lack of alignment between Framework indicators and regional NRM indicators.

While the Frameworks provide the 'report card' to demonstrate sustainability commitment, performance, and progress, NRM regional groups can fulfil an

increasingly important role of demonstrating on the ground sustainable management and practice change.
This presentation will articulate the value proposition that continued collaboration between NRM Regions and the Frameworks will become increasingly important to meeting customers, investors and market sustainability expectations and provide NRM regional organisations with long overdue recognition and reward for their on the ground commitments and positive impacts on sustainable agriculture.

Managing biodiversity in the cotton landscapes – NRM and industry collaboration for regional impact, Chris Cosgrove, Cotton Research Development Corporation

The Australian cotton industry since 2014 through its sustainability framework has been developing and setting sustainability targets for 9 key topic areas. One of these topics, biodiversity, does not have a target because of the absence of nationally agreed biodiversity indicators and methodologies. There is a challenge here: the cotton industry must be consistent with other sectors in its biodiversity measurement; it will be some time before national consistency is reached; stakeholders expect agricultural industries to be taking action now. Our approach to this is a draft biodiversity goal of managing biodiversity in line with regional priorities and existing NRM regional plans.
In mid-2021 the Cotton Research & Development Corporation (CRDC) and Cotton Australia (CA) approached NRM Regions Australia seeking to explore how the industry can better coordinate resources towards actions that are aligned to regional, national and global biodiversity priorities. From an initial assessment, the concept of adapting the draft Science Based Targets for nature (SBTn) framework as a basis for setting regional priorities emerged.
The 7 NRM organisations in the NSW-QLD cotton growing region have been supportive of the concept of adapting SBTn to set region-specific targets. We will be collaborating over coming months using the post-2020 Global Biodiversity framework to explore if this is possible. If it is, deep engagement with growers and other stakeholders will be a critical next step.

In the passenger seat with industry, Kylie Fletcher and Johanna Tomlinson, CN30 and South Coast Natural Resource Management Inc.

Agricultural industries globally are driving the sustainability agenda, specifically the road towards carbon neutrality. In support of this, there is a significant body of research being conducted. To ensure research leads to on-ground outcomes, it must be supported by communications and extension aimed at closing the gap between researchers and adopters.
Regional NRM organisations have a key role to play in the success of industry initiatives. With extensive networks locally, regionally, and nationally, NRM bodies have an opportunity to support the adoption pathway and help to translate carbon neutrality research into action.
South Coast NRM are putting this into action as part of a collaborative national project team delivering on the Meat and Livestock Australia funded Carbon Storage Partnership Project and the Australian Wool Innovation BENEFITS project. These projects are delivering research, case studies and extension with the aim of

supporting growers to maximise the emerging opportunities of carbon storage. South Coast NRM is supporting the research through the delivery of communications activities and driving adoption.
This presentation will provide an overview of both projects and discuss in more detail the opportunities for Regional NRM bodies to get in the passenger seat with industry as they drive their sustainability agenda through respective value chains.

Transforming our Relationship with Country – First Nations Leadership

Mapping Wirlomin, Uncle Ezzard Flowers (Wirlomin Noongar elder), Dr Peter Twigg (South Coast NRM), Samya Jabbour (Curtin University)

The Wirlomin Noongar community on Western Australia's south coast has for decades been actively reclaiming their cultural heritage from the remnants of a brutal colonial history. Wirlomin Country is not currently designated on maps, adding to the dispossession of Wirlomin people from the management of Wirlomin Country. A collaboration between the Wirlomin Noongar community, Curtin University, and South Coast NRM, is putting Wirlomin on the map for the first time. Wirlomin spatial data is being handled in accordance with Indigenous data sovereignty protocols to empower and enhance the capacity of Wirlomin community. We explore the barriers that prevent Wirlomin people from managing their ancestral country, the role of digital spatial technologies in decolonising environmental management, and the opportunities that exist for a reimagined relationship with Wirlomin Country.

Progress on the realisation of First Nations rights to care for Country in South East Queensland, Maddie George, Healthy Land and Water (QLD)

Healthy Land & Water is the lead environmental group for South East Queensland (SEQ). For 25 years we have been dedicated to investing in and leading initiatives to build the prosperity, liveability, and sustainability of our 'future region'. As a facilitator and supporter, our organisation has witnessed the shifting relationships and recognition of First Nations in Queensland. The 2000's commenced with broad dissatisfaction in how First Nations consultation was undertaken. This period also saw the development of the South East Queensland Traditional Owner Land and Sea Management Alliance and the subsequent creation of the SEQ Cultural Resource Management Plan. This plan saw the documentation of the collective goals of First Nations for Cultural Heritage, land management, and set the direction for First Nations involvement in State planning and leadership in caring for Country. Over the last 20 years there has been a tremendous increase in the realisation of First Nations rights and interests being recognised. Recently Queensland's Natural Resource Management (NRM) bodies made a state-wide commitment to the empowerment of First Nations to lead caring for Country activities. Healthy Land and Water has begun implementation of this agreement throughout its operations including integration of fire, biodiversity, restoration, and marine programs. This presentation will highlight how First Nations land and sea management aspirations have been realised over recent decades and our observations of how Queensland's NRM bodies are transitioning to First Nations led land and sea management state-wide.

Developing culturally relevant knowledge systems in the Victorian Alps, Scott Allen, Jaithmathang Traditional Ancestral Bloodline Original Owners First Nation Aboriginal Corporation

The Victorian Alps is known for its snow-covered mountains, beautiful scenery, and ski slopes. It is also Bimble, the home of Jaithmathang People. A delicate and ecologically significant ecosystem which for millennia has nurtured Jaithmathang People and kept safe their totemic fauna and flora species and habitats. But it is a place threatened by the pressures of climate change, development and environmental mismanagement. Already there are signs of change. Faced with this challenge, the key question becomes, what can be done to stop this degradation and how can Bimble protected?
One answer emerged from a very special gathering which took place high in the mountains in March 2022. Traditional Owners from two neighbouring Mobs, Jaithmathang and Gunaikurnai, came together with ecologists and land managers for an Alpine Ecology Knowledge Sharing Workshop held in the Victorian Alps. The meeting focused on shared responsibilities for Country and developing a more connected vision for alpine land management. Over three days, the group collectively shared their experiences and expertise, and started a journey of bringing together two different knowledge systems and developing a plan for protecting the Alps into the future. This presentation will explore this journey so far and possible pathway for embedding cultural knowledge into natural resource planning and management.

First Nations Rangers to the Fore, Katherine Allen, Northern Agricultural Catchments Council

First Nations Rangers delivering Natural Resource Management (NRM) activities represent the future of Landcare, reconnecting culture and Country, and gaining the qualifications to become long-term practitioners. In collaboration with key partners and the support of the Department of Prime Minister and Cabinet, NACC NRM's Mid West Aboriginal Ranger Program was launched in September 2017. As this presentation will explore, the program enables a diversity of ranger teams across the region, working with numerous Traditional Owner Groups and regional stakeholders to deliver Landcare Services, Heritage Site maintenance, and developing Aboriginal business opportunity. In so doing, it provides opportunities for Aboriginal people across the Mid West region to engage in NRM activities while delivering on-ground conservation with a strong cultural emphasis on Caring for Country. This presentation highlights how a partnership approach supports members from diverse communities to participate in Ranger teams, and by working cross regionally, the ambition and priorities of many Traditional Owner groups can be addressed. It will highlight the value of Rangers on Country, how they can support broader Landcare initiatives and the rapidly advancing amalgamation of Traditional and Western knowledge emerging in this sector.

Transforming through Climate Change – Landscape-scale planning, prioritising & spatial data

The use of spatial data science and technology to enable strategic restoration, Claire Hawke, Greening Australia

The two key global challenges threatening nature and people are climate change and loss of biodiversity. Climate change is the greatest threat to humanity and global biodiversity is in rapid decline. There is an urgent need for restoration at unprecedented scales to address these crises. To ensure that restoration makes impact in combatting these crises, Greening Australia is using spatial modelling to inform its strategic planning and design approach. Rather than considering restoration on a site-by-site basis and focusing simply on biodiversity factors, Greening Australia is using an approach that considers multiple landscape scales (national, regional, local) and includes multiple factors (ecological requirements, restoration feasibility, economic feasibility, co-benefits to landholders, land uses, communities). Employing spatial data science and technology to create models that identify land subject to degradation, Greening Australia is identifying where strategic restoration could aid landscape connectivity and offer opportunities for viable integration of native vegetation into agricultural regions. This approach has provided clear and transparent direction around ecological connectivity, Threatened Species and provenance approaches for seed. Although it had also identified constraints to strategic restoration around land and seed availability, which need innovative and collaborative approaches to circumvent. Strategic landscape scale planning and design of this nature can not only provide efficiencies, but also improve environmental and social outcomes. Further, through the identification of constraints, solutions and mitigations can be implemented prior to the need for those actions.

Regional data, local knowledge, Paul McDonald, SQ Landscapes (QLD)

How do you approach investment into diverse landscapes which together total a region a third times bigger than the state of Victoria? How do you reconcile regional data with local knowledge?

Southern Queensland Landscapes processed readily available but disparate sources of data using a Geographic Information System (GIS) to inform the recent collaborative planning activity across the region.

Twenty-three state and federal datasets including land use, flood plains, agricultural land classes, woody vegetation and remote sensed fractional cover were used to identify areas of Southern Queensland where a confluence of values consistent with regional goals identified by the community potentially existed.

The resultant maps of Water Assets, Grazing Land, Cropping Land and Nature Conservation were further augmented by social, economic and administrative data layers to inform the planning process. From these maps boutique products were produced to identify areas of the region conducive to specific actions or groups of action including landscape rehydration and riparian works. In all eighty different layers can be clicked on or off to explore the region including where action can bring multiple benefits from investment.

This rich regional picture provided a knowledge base for discussions with the community, First Nation's People, industry, research and education and governments to identify how we can work together differently to achieve the common aspiration of Flourishing Landscapes and Healthy Communities. By sharing this data in the form of maps in local contexts across the region, universal issues and opportunities were identified along with locally specific opportunities to support social capital. Local knowledge was key to making the maps meaningful and accurate for planning and investment purposes.

Value of planning and relationships for fire recovery, Leigh Blackmore, Murray LLS

Immediately following the Black Saturday fires, NRM agencies and local groups worked closely together to plan, coordinate and collaborate in the ecological recovery efforts in the Murray and Riverina Regions.
This presentation will detail the recovery journey, focusing on the functional roles of planning, coordination and collaboration. It will highlight the value of existing relationships and networks using case studies from the experiences in the Murray Region.

Wheels within wheels: NRM planning for national, state and regional priorities, Dr Jo Fearman, NRM North

The three Tasmanian NRM regions launched updated regional strategies together in June 2022, after an extensive and collaborative review process. For the first time, Tasmania has a consistent strategy framework applied in all three regions.
Designed to capture priorities for federal, state and regional partners and investors, the strategy development navigated a delicate balance to meet state legislative requirements and federal funding requirements, while also seeking input from regional partners and stakeholders. With an elevated focus on healthy Country and climate resilience, the regional plans identify opportunities to work across regional boundaries and establish clear priorities and goals for natural resource management to 2030.

CONCURRENT SESSION 4

Transforming How We Work Together – Biodiversity and NRM: Partnerships for Change

Alpine Peatlands Protection – tackling landscape-scale challenges through cross-regional partnerships, Jessica Houghton, North East CMA

Alpine peatlands are a nationally endangered ecological community, both iconic and an integral component of the hydrology of the Australian Alps. With limited and scattered distribution across a wide range, the management of alpine peatlands is a cross-regional affair of national interest.

The Cross-Regional Alpine Peatlands Protection project, supported through funding from the Australian Government, is a joint initiative of the Victorian Alpine Peatlands Project Coordinating Committee (VAPPCC) formed by Parks Victoria and three Catchment Management Authorities (West Gippsland, East Gippsland, and North East).

The VAPPCC provides strategic project oversight and facilitates adaptive management. Delivered collaboratively across three NRM regions, the project focuses on finding solutions for shared challenges – such as managing pest weeds and animals (deer, pigs, and horses). The current project builds upon more than ten years of work among multiple stakeholders, including six different Traditional Owner groups.

By integrating field and evidence-based knowledge with planning and funding opportunities from both the Federal and State governments, this strategic partnership has enabled the delivery of targeted on-ground works that have led to an overall improvement in the condition of alpine peatlands.

The project incorporates an INFFER (Investment Framework for Environmental Resources) analysis to inform investment priorities, a monitoring program to understand long-term trends, and a deer control trial to determine impacts and best control methods to manage deer on peatlands. The deer control trial is a case of how strategic collaboration provides the resources and support needed for innovation – and how the results will shape the project moving forward.

How one small angler-focused project led to lots of big ones, Stephen Ryan, Glenelg Hopkins Catchment Management Authority

Connecting people to nature through recreation is a growing concern for public policy and investment. To maximise the benefits and increase the chances of funding, NRM bodies must engage directly with recreational users and partner with them.

Just a few years ago, the Glenelg Hopkins CMA had minimal engagement with anglers and few projects directly targeting their interests. In 2017, the CMA had an idea to run a crowdfunding campaign called 'Funds for Fish'. By using social media and a ridiculous but effective character named 'Perce Perch', the campaign raised well over its modest funding goal to install fish habitat in the Merri River. More

importantly, it reached 320,000 people and angler and community interest in river restoration.
That exposure led to confidence to seek further funding to deliver small riparian works and fish habitat works in 2018. In 2019, funding was received to install more fish habitat in direct partnership with anglers and OzFish members, who also helped to construct the habitat. The CMA brought celebrity anglers to the region and sponsored key fishing competitions to spread river restoration awareness.
Growing angler relationships helped to gain input in identifying locations within 6 estuaries requiring fish habitat which then led to 3 large partnership projects to build and install habitat. Angler identified priorities for removing fish barriers helped secure investment to remove a large weir in Warrnambool.
Our success working with anglers has now led to new investment and partnerships with Local Government in construction of recreational infrastructure upgrades, servicing more of the community.
The CMA has been able to leverage angler engagement effectively to secure a wide range of increasingly large projects to support fish populations and recreational access. In a positive feedback loop, these projects increase social and traditional media engagement for the CMA.

A collaborative, whole of landscape approach to increasing breeding success of Carnaby's Cockatoo *(Calyptorhynchus latirostris)* within the South Coast Region of WA, Dr Sandra Gilfillan, South Coast Natural Resource Management Inc.

South Coast Natural Resource Management Inc. (South Coast NRM) is working with private landholders to look after and improve nesting and feeding habitat for Carnaby's cockatoo on privately-owned land. The project is also helping to protect and improve the condition of Proteaceous-dominated Kwongkan Shrubland – a listed Threatened Ecological Community (TEC) – in the region which is key feeding habitat for these cockatoo species.
The importance of privately owned properties is increasingly recognised as vital for the recovery of threatened species. Almost half (48%) of threatened species' distributions occur on private freehold land, even though only 29% of Australia is privately owned so there is much opportunity for private landholders to contribute to cross-tenure and landscape-scale threatened species management (Kearny et al 2022).
Collaborating with Birdlife WA (providing technical advice and baseline data), Community Landcare/ Catchment Groups, Not-for-Profit organisations and local landholders South Coast NRM has engaged twelve landholders to carry out a variety of recovery actions on their properties which range from small conservation properties to large-scale farms.
Broadscale recovery actions include revegetating feeding habitat with key food plants for black cockatoos, controlling stock access to improve the quality of nesting and feeding habitat (including within Kwongkan TEC), weeding and pest management. These actions are complementing breeding site specific recovery actions such as erecting artificial nesting structures and repairing natural nesting hollows.
Through the implementation of these recovery actions, the project is addressing all the requirements of breeding birds to support successful breeding within the project

sites. Initial monitoring has recorded four successful breeding events in newly installed artificial hollows demonstrating improved breeding success within the first two years of the three-year project.
A comparison between initial and final Landholder surveys will assess changes in landholder awareness of the threats facing black cockatoos and the knowledge of their ecological needs.

In it for the little guys. Working towards saving endangered small mammals in arid South Australia, Brett Backhouse, Alinytjara Wilurara Landscape Board

Arid Australian mammals have suffered since European settlement due to the impacts of feral cats, the red fox and introduced herbivores. More recently, threats have also appeared in the forms of highly invasive weeds, such as buffel grass. Critical Weight Range (CWR) mammals have suffered the most, with many populations retracting severely in range, or becoming extinct in the wild.
However, we can focus on species that have persisted and work towards alleviating pressures from threats and potentially increase the trajectory of these animals. Two such mammals are priorities within the Alinytjara Wilurara region – the black-flanked rock wallaby (Warru) and sandhill dunnarts.
Warru have been in focus since the early 2000s, when scientists and APY Land management noted a decrease and disappearance of the species at many sites. Since then, projects have focused on removal or exclusion of feral threats, treating, and attempting to slow the spread of weeds, which has improved the trajectory of the species. This has facilitated the translocation into areas which they had become extinct.
APY Land management has three distinct Indigenous Warru ranger teams who monitor Warru and are part of the warru recovery team. This recovery team compromises a multi-faceted and multi-agency approach; APY land management, AWLB, Zoos SA, private ecologists, DEW, and the Australian museum making up the team. Since 2007, there has been two translocations and several supplementations to smaller colonies; the latest translocation occurring in August 2022.
Sandhill dunnarts, a dasyurid with a restricted range, projects focus on determining the preferred habitat, the effect of fire and reducing feral animal numbers in known areas. Over the last five years the knowledge in the Great Victorian Desert of South Australia has greatly improved, with the species found in many areas, due to the main habitat that the species prefers becoming clearer. These insights can now be used for future land management, prioritising areas that are key habitats which can be targeted to inform threat abatement and direct weed management.

Transforming our Relationship with Country – Restoring the Coast

Accelerating progress towards Reef 2050 water quality targets through social change, Charles Hammond, Terrain NRM

The long-term health and resilience of the Great Barrier Reef is under threat: after climate change, the most significant challenge is declining water quality, influenced by land-based pollutant run-off.

We've been working with farmers to adopt more sustainable ways of farming for 15 years. This is a vast and complex task. We've had some great successes, but progress towards reef water quality targets is still too slow: we needed to do something different to make transformational change.

We know that farmers are fixers, so with the Wet Tropics Major Integrated Project we threw out the rule book and got farmers to help design the solutions.

This project was about creating social change to accelerate progress towards Reef water quality targets. By transforming the way we worked with the community, and designing and implementing together, we:

•Built trust in reef water quality science by farmers;

•Bridged the disconnect between what farmers want to achieve, and what the government need;

•Had unprecedented levels of engagement – more than any other Reef water quality project;

•Stopped 73 tonnes of dissolved inorganic nitrogen from flowing to the Reef;

•Upskilled 13 Indigenous staff in water quality monitoring;

•Developed the recently launched Reef Credits scheme which traded its credits in late 2021.

The grassroots, place-based approach has become an accepted blueprint for subsequent reef water quality projects and the Queensland Government has recognised the critical role of credible, relatable water quality monitoring data in influencing change and has committed to a further three years of funding.

Building native oyster shellfish reefs to improve fish habitat on Kangaroo Island, Will Durack, Kangaroo Island Landscape Board

Native flat oyster (Ostrea angasi) reefs were once widespread across southern Australia. Overexploited as a source of food and building material, these living reefs were lost on mainland Australia and Kangaroo Island over a century ago. Funded by the Australian Government's Fisheries Habitat Restoration Program, this project is working with community to create artificial structures for the angasi spat to attach to, thereby improving available habitat for key recreational fish and threatened species. This project aims to build a series of twenty small reefs, contributing to the national shellfish reef restoration initiative and engage fishers to share local history of oysters, inform site selection and assist with construction of reef components. Each low profile (≤0.4 m high) reef will be ~10 m^2 in size and seeded with the locally collected angasi spat. A range of experimental substrates have been used in the collection of spat and as reef materials, including discarded oyster shells, limestone, terracotta tile, ceramic razorfish forms made by a

Tasmanian artist and timber modules constructed by the local Men's Shed. The condition of newly formed reefs and the fish they attract will be monitored seasonally. Spat have successfully settled on collectors deployed during the summer and autumn angasi spawning season. Densities have varied across collecting materials and informed the selection of materials and reef configuration. By restoring lost substrate, these reefs will reinstate the ecological benefits of this community, including improved fish and invertebrate habitat, enhanced fish and shellfish stocks, improved water clarity and stabilised sediment.

Mitigating marine debris impacts on seabirds at the Houtman Abrolhos Islands, Alanah Campbell, NACC

This 2-year project aims to reduce the impact of marine debris on threatened seabirds at the Houtman Abrolhos Islands. NACC NRM's Coastal and Marine team are working with Dr Chris Surman of Halfmoon Biosciences to complete detailed surveys, quantify data and conduct a community and stakeholder workshop initiating source reduction activities.

Marine restoration in southern Tasmania, Jennifer Hemer, NRM South

The marine and coastal systems of the southern NRM region of Tasmania support ecological communities which provide environmental services of significant economic and social value. Commercial and recreational wild caught fishing and marine farming for salmonoids, shellfish, and seaweeds are important to the Tasmanian way of life and economy. It is recognised that to maintain these values, cumulative pressures associated with climate change and changing patterns of use require integrated and coordinated management. NRM South delivers the Tasmanian Smart Seafood Partnership project with the Tasmanian Seafood Industry Council. This unique collaboration brings together all sectors of the wild-catch fishery and marine farming sectors, the Tasmanian state government, researchers, and community groups. Its activities focus on training, education, research, and restoration to improve outcomes for marine biodiversity in Tasmanian waterways. The partnership model enables the Tasmanian seafood industry to identify its priorities and provides a framework to unite various sectors of the seafood industry in aspirations to improve processes, practices, and sustainability. The Partnership supports restoration initiatives for important marine ecological communities including Giant kelp forests. It also assists to build the capacity of the Tasmanian seafood industry to participate in marine restoration activities through market access opportunities. The Partnership has been underway since 2019 and trusted, local relationships are critical to its success. The Partnership has enabled NRM South to build a portfolio of marine restoration activities in the Southern region of Tasmania, including native oyster reef and seagrass restoration projects, and fish habitat restoration projects in the coastal zone.

Transforming through Climate Change – NRM and transformation

South Australian Landscapes – REFORM to TRANSFORM, Jodie Gregg-Smith, SA Arid Lands Landscape Board

At the last NRM knowledge conference, SA presented on the natural resource management model in South Australia and the legislative reform that was underway. These reforms have now transitioned to reality and landscape boards have been established on new boundaries, with new priorities, new leadership with a modernised delivery model. These changes took place in 2019 and notwithstanding the advent of COVID – among other natural hazards and risks, 9 landscape boards have begun collaborating, influencing and taking control of their own destinies with SA communities and in partnership with state, interstate and national bodies.

Our work in conservation biodiversity, sustainable agriculture, pest plant and animal control and the management of our lands and waters with First Nations communities, protecting the most scarce, precious and vital natural resources, is founded in partnerships.

Transformation is occurring on many levels and our organisational transformation is helping reshape and improve natural resource management in South Australia. This presentation will include case studies from different boards, sharing accomplishments across partnerships, through respect and protection of Country, with plans for a bright and sustainable future in the face of climate change.

Positioning NRM's as drivers of regenerative economic development, Stewart Christie, Terrain NRM

The Wet Tropics is one of the most biologically diverse regions on the planet and the only place where two World Heritage listed sites are located side by side. It is essential that future economic development in our region is regenerative.

In 2020, the COVID-19 border lockdowns hit the region's economy hard. Due to its heavy reliance on tourism, which has always created boom/bust cycles in the economy, it was forecast to have the highest unemployment in the country.

Seeing an opportunity to lobby government for economic stimulus that also benefitted the environment, Terrain NRM worked with over 20 partner organisations to develop the Green & Blue Economic Stimulus Package. It advocated for investment in shovel-ready restoration projects to boost short-term activity and sustain key industries. It also included support for the region's longer-term aspiration to transform into the Smart Green Capital of Australia through the development of new, clean and green industry sectors.

New alliances were forged and there is now widely held view that ecosystem restoration can be a key driver of the regional economy. This is a win win for our natural resources and for increasing the economic resilience of our region.

This presentation outlines how NRM's are well positioned to be the drivers of regenerative economic development.

Futures-thinking in Natural Resource Management organisations in Australia, Carla Alexandra, Institute for Water Futures, Australian National University

Accelerated impacts of climate change and other global drivers pose significant challenges for natural resource management (NRM), challenging traditional environmental planning and decision-making approaches. This requires forward-looking, anticipatory approaches, firstly to avoid path dependencies that foreclose adaptive responses, and secondly, to steer transformative changes needed to meet goals and targets. Approaches to anticipate uncertain futures, so called "futures-thinking methods" provide strategies and tools to explore, identify, and navigate choices when anticipating and responding to socio-political and environmental change. Whilst futures-thinking and related tools and methods are increasingly being applied to NRM, the full potential contribution of futures-thinking has not been realised as the broad range of futures methods are largely unused (Bengston, 2019), pointing to the need for more sharing of methods, results, and experiences in the NRM context.
Drawing on a recent survey of regional NRM organisations across Australia, this paper presents empirical insights on current approaches to futures-thinking. The paper explores futures-thinking capacities and knowledge across NRM organisations and investigates potential enablers and barriers to futures-thinking in NRM. Finally, the paper presents novel futures-thinking methods developed in the NRM context, before concluding with key insights on futures-thinking applied to NRM. The paper more broadly addresses the call from practitioners and researchers for increased understanding of futures-thinking methods, their uses, and limitations.

Activating a roadmap to resilience campaign: switching from supporting to leading, Julie McLellan, Healthy Land and Water (QLD)

This paper shares how Healthy Land & Water transitioned from a responsive, supportive organisation to one leading the change required in South East Queensland. This year we kick started an innovative campaign called 'Roadmap to Resilience'. We didn't expect that the foundation of the campaign would be something which has been in place and being built on for decades – our region's Natural Resource Management Plan (the SEQ NRM Plan) which is driven by the community. The NRM Plan is a great tool, but a tool on its own doesn't necessarily herald change. Real change occurs from within. Expecting others to act and change is, in my opinion, unreasonable if we don't lead and demonstrate the change ourselves. This means we need to act commercially, be on the front foot, invest our own hard-earned money and demonstrate what can be achieved, for the betterment of all our environs and communities. Just like community groups invest their time, energy and often blood, sweat and tears – so too must regional bodies. This talk shares the initial strategies we've activated to seek broadscale public support to flip the disaster model from response to proactively building resilience, so we are not so badly impacted in the first place. At the same time, as an organisation, we are also flipping our own approach, from the time-honored reactive, supportive approach to one where we take the needs of our community and environment and proactively lead the change to ensure we create a liveable and prosperous future environment for generations to come.