2022 WA STATE NRM AND COASTAL CONFERENCE
BUILDING RESILIENCE THROUGH INNOVATION

2022 State NRM and Coastal Conference – Abstract Booklet

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Dr Abbie Rogers – INVITED SPEAKER

Priorities for Coastal Research in Western Australian

Dr Abbie Rogers, University of Western Australia – Oral Presentation

Abstract

In a collaborative process with coastal experts in Western Australia, we conducted a workshop to identify coastal knowledge gaps, and a survey to then vote on which knowledge gaps were the highest priority. The results of the voting process, and a discussion of the priority research areas, are provided in the 'Priorities for coastal research in Western Australia' White Paper (Lowe et al. 2022), and summarized in this presentation. The objective of this synthesis is to inform practitioners, researchers and students of issues that will benefit from further research and development, with a view to help guide improved management of our coastal zone.

Western Australia's coastal regions are facing a growing number of complex challenges, and there are many knowledge gaps on how best to address these. We produced a White Paper that reports the outcomes of a collaborative effort aimed at identifying the current research priorities for coastal management in Western Australia. Experts in coastal management from State and Local governments, universities, consultancies, community groups and NGOs participated in the process. We identified a list of nine 'Tier 1' priorities voted as the most important knowledge gaps to address. They included the need for improved coastal monitoring, prediction of future physical and ecological changes, more effective approaches for science communication, improved measurement and integration of coastal community values in decision making, and a review of coastal governance structures. The White Paper provides a useful resource to facilitate discussions and decisions about the most urgent and critical research required to improve the management, protection and sustainable utilization of our coastline.

About the Presenter

Dr Abbie Rogers is Co-Director of UWA's Centre for Environmental Economics and Policy and a Senior Research Fellow in the UWA School of Agriculture and Environment. Her research work is highly applied and end-user driven. She has a key interest in promoting systematic integration of social and environmental values in evidence-based decision making, and works extensively in economic analyses of marine, coastal and other natural environments.

Mr Adrian Brannigan - WA Tsunami Inundation Modelling Project - Methods and Outputs

Mr Adrian Brannigan, Department of Fire and Emergency Services - Oral Presentation

Abstract
In July 2021 DFES, in collaboration with GA, commenced the National Disaster Resilience Program (NDRP) funded Western Australian Tsunami Inundation Modelling Project. This three-year project uses high-resolution hydrodynamic numerical modelling to develop evidence-based tsunami inundation maps to guide emergency management planning for this hazard.

This project builds on GA's 2018 Australian Probabilistic Tsunami Hazard Assessment (PTHA18), which demonstrated that in Australia large offshore tsunamis are considered most likely on the north-west coast of WA; with the south-west coast of WA also having a significant exposure.

GA has been developing modelling methods based on the PTHA18. WA is the first state to benefit from this research. While the ultimate aim will be to develop inundation maps for the entire WA coastline, the current project will prioritise specific coastal areas, which will be modelled in three phases:

- Phase 1 – (FY2021-2022) Metropolitan area between Two Rocks and Mandurah
- Phase 2 – (FY2022-2023) Bunbury to Busselton
- Phase 3 – (FY2023-2024) To be determined based on the availability of data and risk.

Project outcomes
In addition to the inundation modelling undertaken by GA in the areas selected for Phase 1, 2 and 3, this project seeks to:

- Develop evacuation maps
- Compile historical tsunami information, impacts and experiences.
- Develop spatial tools to identify exposure and vulnerability for the selected areas.
- Develop recommendations to update and amend state tsunami plans and procedures.
- Develop the WA State Tsunami Awareness Guide.
- Develop a communications strategy for tsunami awareness promotion.

About the Presenter
Adrian Brannigan is an Intelligence Analyst at the Department of Fire and Emergency Services (DFES), with over 17 years of experience in investigating natural hazards. He is the project manager for the Western Australian Tsunami Inundation Modelling Project and has seven years of experience researching natural hazards at DFES. Prior to DFES, Adrian spent 10 years working as a geologist, completing investigations in coastal geomorphology, marine geotechnics, and other natural hazards. Adrian has completed a Master of Science in Earth Science, with First Class Honours. His research focused on the hydrodynamics, geomorphology, and surficial sediment of New Zealand's largest export port.
This abstract was co-authored by Gareth Davies, Geoscience.

Ms Ashley Marjoram - Flora, Fauna and Farming: Connecting Kids to Country

Ms Ashley Marjoram, The Gillamii Centre – Poster Presentation

Abstract

Connecting Kids to Country is an environmental education program that the Gillamii Centre runs in collaboration with local schools with the goal of enriching classroom teaching, increasing connection to the local environment through providing access to resources and specialist knowledge, and provide the opportunity to get back to nature.

In the program's initial year, the year 4,5 and 6 students from three schools began the journey to connecting to country and learning about their environment. The students had access to pre and post environmental education resources, which enabled each school to get the most out of each excursion. They visited significant areas in our region, including Balijup Sanctuary (a feral proof fenced remnant vegetation sanctuary on agricultural property, managed by Green Skills), The Stirling Range National Park and a local wetland. Each excursion was themed with mixed groups rotating through activities guided by attending specialists, including Sarah Comer (DBCA Regional Ecologist), Menang Elder Larry Blight, DPIRD's Entomologist and environmental consultants Steve and Geraldine Janicke. The activities encouraged learning and exploration across the themes including habitat assessments, black cockatoo hollow surveys, invertebrate hunts (aquatic and land) and dieback discovery.

Rounding off the first year of the environmental education program saw the completion of a brilliant collaborative mural between all three participating schools. This mural is a powerful and creative representation of the environment we live in. The students reflected on what they learnt at each excursion through their experiences and the knowledge from the specialists, moulding this into a creative tile. The environmental education program is being continued this year, with each school participating in a Know Your Patch program, resourced in collaboration with DBCA.

About the Presenter

Ash has always had an affinity for the natural world and a strong passion for the environment and the incredible diversity we share with it. This led her onto a pathway studying Conservation, Wildlife Biology and Animal Health, as well as volunteering her time at wildlife rehabilitation centres and on wildlife population monitoring projects. Eventually Ash found her way into the beautiful Great Southern region, taking on a role in project management with Gillamii, and managing a small farming property with her partner. Ash is passionate about servicing the communities environmental and productive agricultural needs, finding great joy in the variety of projects she manages. She is particularly passionate about bringing environmental education opportunities to the future generation, knowing just how important creating those early connections and values will be to the future of our environment.

Mrs Barbara Sing - School and Community Partnerships: Building Relationships to Enhance Wetland Education

Mrs Barbara Sing, John Tonkin College – Oral Presentation

Abstract

Our students are the future custodians of the Peel-Harvey Estuary helping to look after local ecosystems through a range of projects in their classrooms, schools and communities. These key projects have been created through the development of long-term relationships with not for profits, researchers and environmental groups who have a vested interest in the long-term protection of the estuary. By collaborating and meeting with the various environmental conservation organisations in the catchment there can be more powerful outcomes and messages regarding the health and sustainability of the Peel-Harvey Estuary.

Creating Mandurah's first Dolphin Fin Guide involved creating partnerships with Mandurah Dolphin Volunteer Rescue Group, Mandurah Cruises and researchers from Murdoch University. Passionate students organised Mandurah's first Dolphin Forum to bring these groups together to inform the community about our local dolphin population. This initiative fostered leadership, organisation skills, grant writing and has grown into regular events still hosted by our students.

The Black Bream Stock Enhancement Project partnered with The Peel Harvey Catchment Council and Murdoch University researchers which led to the establishment of a purpose-built aquaculture classroom. Students involved in the pilot built and managed the system along with the researchers. They developed real world skills in practical experimental research in a school-based facility involving dedication, time commitment outside of the class, precision, perseverance and adaption to the changing needs of the project.

Our relationship with the Peel Harvey Catchment Council has been integral to many of these opportunities. The Red-necked Stint Project with Milly Formby and Wingthreads arose through the Shorebird 2020 Birdcount. Our students had the opportunity to become 'experts' on the endangered bird and its specialised adaptions. This developed their creative and communication skills to create an education package around the 'TimTam' bird which thy shared with local primary schools and global partners from India and Manila.

The Shellfish Gardening Project with partners The Nature Conservancy and the Binjareb Indigenous Rangers where students grew mussels from juveniles to adults in specially designed baskets and collected data about mussel growth and other colonising marine life. The mussels will be used to explore mussel colonisation in selected locations in the estuary, where over time, the reefs are expected to become vibrant ecosystems that will help improve water quality, biodiversity, and fish stocks in the estuary.

Although bringing these projects to fruition there has been a massive time commitment outside class time involving volunteering, attending presentations and workshops, linking them to the science curriculum and getting buy-in from other staff members the experiential learning by our students has given them the opportunity to be involved in real world science applications raised their and awareness about the fragility of our local ecosystem. They are helping to raise awareness within the community of the importance of nature conservation

and are actively involved in the quest for sustainability creating resources, games, books and videos presenting at forums, Conferences, Kids Teaching Kids, Primary Schools.

About the Presenter

Barbara Sing is a Science Teacher at John Tonkin College. She is an active member of Mandurah Heritage and Environment Group, Peel Preservation Group, Dolphin Rescue, WA Seabird Rescue and cofounded Estuary Guardians which has grown from a school based to a community led organisation. She has involved her students in a range of initiatives including Fishing Line Bins, Shorebird Education, Estuary Guardians and the Fin Guide, the Bream Project and the Shellfish Farming Project with partners including Peel Harvey Catchment Council, Murdoch University, The Nature Conservancy and the City of Mandurah.

Mr Ben Bassett - WA's Coastal Hazard Risk Management and Adaptation Planning Journey

Mr Ben Bassett, Department of Planning, Lands and Heritage – Oral Presentation

Abstract

Coastal Hazard Risk Management and Adaptation Planning (CHRMAP) was introduced into State Planning Policy 2.6State Coastal Planning Policy in 2013 to enable the appropriate management of risks on the coast. Since this time many CHRMAP have been completed or are underway, by Local government. SPP2.6 is now supported by a suite of detailed policy guidance including SPP 2.6 Guidelines and the CHRMAP guidelines, which has over the course of the last 9 years resulted in the improvement of the CHRMAPs now being completed.

This presentation tracks the preparation and outcomes of Coastal Hazard Risk Management and Adaptation Planning (CHRMAP) by coastal local governments since 2013. Analysis of the CHRMAPs prepared to date reveals distinct strengths and weaknesses in the CHRMAPs being produced. There is room for improvement of critical elements of the CHRMAP process, including, Benefit Distribution Analysis, implementation funding and integration of outcomes into the planning framework.

About the Presenter

Ben Bassett is a land use planning and policy professional with more 16 years specialist experience in coastal planning. He is the author of the Western Australian coastal planning framework including State Planning Policy 2.6 – State Coastal Planning Policy, State Coastal Planning Policy Guidelines and the Coastal Hazard Risk Management and Adaptation Planning Guidelines. Ben provides specialist coastal planning advice on the coastal planning framework for the State government on all matters statutory and strategic on the coast.

Ms Bree Brown - Celebrating the power of partnerships for sustainable agriculture and healthy estuaries

Ms Bree Brown, Department of Water and Environmental Regulation – Oral Presentation

Abstract

Dairy farming is a key agricultural industry in Western Australia with 120 dairy sheds located primarily across the southwest of the state. Dairy effluent management is critical to minimise impacts of nutrients and odours on the environment and public that are generated on dairy farms. With some of the largest dairy herds in Australia, effluent management is an on-going challenge for many dairy farms.

The WA dairy industry has been proactive in improving the adoption of better effluent management practices in partnership with the Department of Water and Environmental Regulation (DWER) and catchment management groups over the past decade. DWER partnered with peak industry body, Western Dairy, and the Geographe Catchment Council to improve effluent management from 2016-2020, through delivery of the DairyCare program.

DairyCare delivered the benchmarking of 65 farm effluent systems against best practice, technical advice to develop tailored effluent plans, training and accreditation opportunities for service providers and incentives for farmers to upgrade 31 effluent systems. Western Dairy also led a review of the Code of Practice for Dairy Farm Effluent Management WA (2021) with support from DWER and wide consultation with stakeholders.

The project worked with farmers in six priority catchments including Geographe, Wilson Inlet, Oyster harbour, Hardy Inlet, Leschenault and Peel-Harvey.

The four-year Dairy for Healthy Estuaries project is continuing to build on the momentum of DairyCare, and the collaborative partnership between government, NRM and industry to protect water quality in key estuaries by supporting farmers to utilise the nutrients in effluent on dairy farms.

About the Presenter

Bree Brown has worked on nutrient management and water quality projects with farmers for 15 years through her roles with NRM groups and State Government. She has established excellent networks and relationships with local farmers and industry partners and is passionate about supporting sustainable agriculture in Western Australia.

Mr Brett Dunn - Working together for water sensitive urban design outcomes in the Peel Region

Mr Brett Dunn, Department of Water and Environmental Regulation – Tour Presentation

Abstract

As urban development in the Peel Region moves into increasingly challenging areas, early planning and collaboration has never been so important to create attractive residential communities and spaces connected to water and the environment. The objectives of this presentation are to:

1. Navigate the policy framework associated with integrated water and land planning;
2. Explore the environmental, hydrological and human challenges of achieving water sensitive urban design in new development;
3. Present opportunities in planning and design to integrate water and environment into attractive and usable public open space.
4. Highlight the advantages of collaborative processes and relationships between local government, state government and private industry to create vibrant communities integrated amongst healthy waterways and wetlands.

Water Sensitive Urban Design (WSUD) in Western Australia has undertaken many stages of evolution over the past decades. In its more recent stages stormwater, in isolation, has been the focus, with the treatment of water quality combined with flood management the primary objectives. Land development since moved into more constrained areas with shallow watertables, flood plains, interconnected wetlands and limited grade for drainage. Now, we are in a drying climate with groundwater no longer readily available as a default source of irrigation for new areas of public open space. Furthermore, the density of urban development has increased to meet the needs of a rapidly growing population whilst streetscapes and public open space within these new residential areas are required to achieve water quality outcomes, flood management, groundwater level control, urban heat island mitigation and retention of natural areas and wetlands, notwithstanding also be attractive and useable community assets. As these challenges become more complex, careful planning, early engagement and collaboration between government and industry are paramount to achieve effective WSUD whilst delivering thriving and attractive neighbourhoods. As important as a rigorous policy framework is to delivering an integrated approach to land and water planning, ultimately policy can only be as effective as the organisations, and more specifically the people, that put them into practice. This paper presents an insight into the planning, the policy, the people and the challenges in creating water sensitive and climate resilient communities in the catchment of the RAMSAR listed Peel Harvey Estuary.

About the Presenter

Brett Dunn is a Mandurah local of 43 years, inspired into the field of environmental science by the Peel-Harvey Estuary. He works for the Department of Water and Environmental Regulation as Program Manager – Planning Advice, informing land planning decisions within the Kwinana–Peel Region, including water sensitive urban design. Brett has worked in the field of natural resource management for over 20 years and is a fellow of the Peter Cullen Water and Environment Trust, Canberra.

Mr Cameron Desfosses and Dr Jeremy Ringma - Research collaboration to improve understanding of interactions between recreational fishers and migratory wading birds

Mr Cameron Desfosses and Dr Jeremy Ringma, Department of Primary Industries and Regional Development – Oral Presentation

Abstract

The Peel-Harvey Estuary is a Ramsar-listed wetland due to its importance to migratory wading birds from the East Asian Australasian Flyway. Yet it is also one of the primary locations for recreational fishers targeting blue-swimmer crabs (*Portunus armatus*) in W.A.

The commercial and recreational crab fishers were first certified as sustainable by the Marine Stewardship Council (MSC) in 2016, and the recreational fishery is the first to be MSC certified globally. However, MSC certification reviews all ecosystem impacts of the fisheries under certification and there has been a scarcity of data for areas and times of the year when recreational fishers may interact with migratory wading birds, some of which are listed as endangered or threatened. Consequently, several conditions were placed on the MSC recertification in 2021, whereby data must be collected for the recreational sector to illustrate the spatial and temporal dynamics of fishing activity within the estuary.

The Department of Primary Industries and Regional Development (DPIRD) is the agency responsible for managing fishing and supporting MSC-certified fisheries in Western Australia. The MSC conditions relating to the interaction between fishers and migratory wading birds presented an opportune moment to collaborate with relevant stakeholders to get high-resolution data over the 6- to 8-month period that migratory birds visit the estuary.

The Department was successful in securing a grant through MSC's Ocean Stewardship Fund to trial the use of satellite imagery to determine areas used by recreational fishing vessels, and potentially recreational scoop-netters and wading birds. This imagery will be validated by on-site surveys to determine the species composition of wading birds and the number of individuals at several sites throughout the estuary.

This presentation will outline the anticipated methods to be used and highlight the benefits and synergies that can be realized when conservation groups and state agencies work together.

About the Presenter

Cameron Desfosses is a research scientist with DPIRD, whose work focusses on electronic monitoring of commercial and recreational fisheries, bycatch assessments, ecological risk assessments and third-party certifications. Recent work in the Peel-Harvey Estuary involved getting fine-scale data for recreational fishing activity to address an MSC condition on the recreational fishing sector targeting blue-swimmer crabs.

Jeremy Ringma (PhD) is a quantitative ecologist and conservation scientist whose role as shorebird project coordinator for the Perth office of BirdLife Australia sees him involved in a range of projects (including the Australian Shorebird Monitoring Program) aiming at improving the situation of our migratory shorebirds.

Dr Carmen Elrick-Barr and Timothy Smith – INVITED SPEAKER
Coastal vulnerability and governance

Dr Carmen Elrick-Barr and Timothy Smith, University of the Sunshine Coast – Invited Speaker
Oral Presentation

Abstract
The objectives of this presentation are to: (i) summarize contemporary issues affecting the Australian coastal zone; (ii) present findings from a national research project examining vulnerability and governance innovations in Australian coastal communities. Presentation outcomes include greater awareness of the policy landscape for coastal planning and management in Australia and insight into vulnerability support groups' and coastal practitioners' perspectives on vulnerability and its management.

Population growth, urbanization and climate change pose significant threats to coastal communities. Coastal hazards are increasing in frequency and intensity and vulnerabilities are exacerbated. Yet knowledge of coastal vulnerability and adaptation is limited, hindering good-practice and innovative response strategies. An Australian Research Council funded project is seeking to fill this knowledge gap, examining vulnerability and governance in Australian coastal communities. Findings indicate a policy landscape that is not intentional or substantive for coastal issues in Australia and that prioritizes humans over nature. Further, coastal managers and vulnerability support groups operate independently, but capacity building is a unifying concept across sectors. Innovations are occurring, but not at the scale required for systemic change. Lessons learned will inform strategies to improve coastal governance in Australia

About the Presenter
Carmen is a human geographer with over 17 years' experience in environmental management and research. Carmen's research focuses on human-environment interactions, coastal governance, adaptation, adaptive capacity and deliberate societal transformation. Carmen holds Research Fellow positions at the University of the Sunshine Coast and the University of Western Australia. Her research has contributed to professional reports and publications in high-ranking journals under the topics of the social and institutional dimensions of environmental change and marine and coastal management.

Professor Tim Smith is a human geographer focused on coastal management and climate change adaptation. He holds an Australian Research Council (ARC) Future Fellowship, and is also an Adjunct Professor with Brock University, Canada, an Adjunct Professor with Southern Cross University, and a Senior Research Associate with Uppsala University, Sweden. His is also currently co-Chair of Future Earth Coasts, on the steering committee of Future Earth Australia, and Editor-in-Chief of the international journal Ocean & Coastal Management.

Dr Carmen Elrick-Barr - Real-time monitoring of coastal community values

Dr Carmen Elrick-Barr, University of Western Australia – Lightning Presentation

Abstract

The objectives of this presentation are to: (i) raise awareness of an innovative approach to understand coastal community values and how those change over time; (ii) disseminate preliminary results of a project examining real-time coastal community values in the PNP region; (iii) initiate discussions regarding how we understand coastal values and their integration in coastal management. The presentation will heighten awareness and interest in innovative techniques to understand and incorporate community values into coastal decision making.

What we protect is a function of what we value – yet our understanding of coastal values is limited. This presentation reports on an innovative project addressing a gap in knowledge regarding community values in coastal areas. Through integration with the CoastSnap citizen science monitoring program, real-time data has been collected on coastal community values in the Peron Naturaliste region. The interim findings of this world-first project will be discussed, starting a broader conversation regarding how we understand coastal values and integrate them within coastal planning and management.

About the Presenter

Carmen is a human geographer with over 17 years' experience in environmental management and research. Carmen's research focuses on human-environment interactions, coastal governance, adaptation, adaptive capacity and deliberate societal transformation. Carmen holds Research Fellow positions at the University of the Sunshine Coast and the University of Western Australia. Her research has contributed to professional reports and publications in high-ranking journals under the topics of the social and institutional dimensions of environmental change and marine and coastal management.

Dr Carmen Elrick-Barr - What information informs coastal household adaptation?

Dr Carmen Elrick-Barr, University of the Sunshine Coast – Lightning Presentation

Abstract

The objectives of this presentation are to: (i) raise awareness of the types of information that inform household action to climate risks; (ii) promote discussion on effective ways to engage communities in adapting to climate change.

Coastal zones are at the forefront of the impacts of climate change and households play an important role in reducing vulnerability. Governments provide information to households to facilitate their adaptation. However, there is limited evidence of the effectiveness of this strategy. This study examined the types of information guiding household response to climate risks in two Australian peri-urban coastal communities (Mandurah WA and Moreton Bay QLD). We found passive information (e.g., brochures, reports), is adopted by governments to promote civil society adaptation, but rarely informs household action. The importance of civil society's engagement in adaptation will intensify as the impacts of climate change continue to be felt. Novel and diverse information channels must be explored if households are to transition from coping to adaptation.

About the Presenter

Carmen is a human geographer with over 17 years' experience in environmental management and research. Carmen's research focuses on human-environment interactions, coastal governance, adaptation, adaptive capacity and deliberate societal transformation. Carmen holds Research Fellow positions at the University of the Sunshine Coast and the University of Western Australia. Her research has contributed to professional reports and publications in high-ranking journals under the topics of the social and institutional dimensions of environmental change and marine and coastal management.

Dr Carmen Lawrence - KEYNOTE SPEAKER

The Limits of Resilience

Dr Carmen Lawrence, University of Western Australia – Keynote Presentation

Abstract

No one denies that resilience – 'the capacity to bounce back' – is a desirable attribute of any individual or system. There is a risk, however, that the concept can be used as a justification for continuing business-as-usual with just a few additional "shock absorbers".

I will argue that the embrace of resilience as a guiding principle in environmental practice and policy carries the risk that the underlying drivers of environmental damage are given too little weight. As a result, conservation responses are correspondingly compromised and inadequate.

About the Presenter

After training as a research psychologist at the University of Western Australia and lecturing in a number of Australian universities, Dr Lawrence entered politics in 1986, serving at both State and Federal levels for 21 years. She was at various times W.A Minister for Education and Aboriginal affairs and was the first woman Premier and Treasurer of a State government. She shifted to Federal politics in 1994 when she was elected as the Member for Fremantle and was appointed Minister for Health and Human Services and Minister assisting the Prime Minister on the Status of Women. She has held various portfolios in Opposition, including Indigenous Affairs, Environment, Industry and Innovation and was elected national President of the Labor Party in 2004. She retired from politics in 2007 and was Director of the Centre for the Study of Social Change in the School of Psychological Science at the University of Western Australia where she is now an Honorary Research Fellow and Professor Emerita. She is currently President of the Conservation Council of WA.

Dr Chadden Hunter - KEYNOTE SPEAKER

Details coming soon

Dr Chadden Hunter – Keynote Presentation

Abstract
Details coming soon

About the Presenter
Few people have more stories from the wild corners of the world than Dr Chadden Hunter.

He has worked alongside Sir David Attenborough for over 20 years, documenting everything from snow leopards in Pakistan to anaconda in the Amazon.

Chadden has produced some of the world's most famous wildlife series. Planet Earth 1 & 2, Wild Arabia, Frozen Planet and Seven Worlds One Planet, have won over 20 Emmys and Baftas. He spent 3 years in the Arctic and Antarctic directing the Frozen Planet series where he learnt that -40C was cold enough to freeze his eyes shut.

His anecdotes are as inspirational as they are entertaining. Sometimes heart-breaking, often humorous, always riveting.

Mr Chaz Roberts - Planning and Coastal Adaptation in Port Hedland

Mr Chaz Roberts, Town of Port Hedland – Oral Presentation

Abstract

Port Hedland is a major economic contributor to the State and Nation, with the Port of Port Hedland exporting over 500 million tonnes of iron ore per annum in 2020/21. It is also located in one of the most cyclone prone regions in the world, with the entire township being vulnerable to coastal erosion and storm surge. In the past 5 years, Port Hedland as a town has seen major changes in zoning and land tenure in response to environmental and health risks from its proximity to port operations. During this time, a significant body of strategic land use and coastal planning has been developed and now there is a major capital works program underway to improve liveability and amenity while being cognisant of environmental values and coastal vulnerability.

Chaz will talk about the journey of land use and coastal change in Port Hedland and how strategic, political and environmental influences has affected outcomes and decision-making. This includes the implementation of an improvement scheme which rezoned half of the townsite from residential to commercial, industry-funded voluntary land buyback scheme, development of a townsite CHRMAP, residential structure plans in inundation-prone areas, townsite foreshore management plans and coastal planning policy. He will also talk about the infrastructure program underway including the spoilbank marina development and the three seawalls that are under construction, and the most contentious coastal footpath in Port Hedland's history.

About the Presenter

Chaz is a strategic and statutory planner with over 15 years experience in local government. He has held roles at senior and management level and is currently Manager Planning & Development at Town of Port Hedland. Chaz is passionate about strategic planning, urban design, masterplanning, placemaking and coastal planning and has overseen Port Hedland's recent journey of coastal and land use adaptation over the past 5 years.

Christian Prokscha - Vertical Farming

Christian Prokscha, Eden Towers – Tour Presentation

Abstract

The farm will be an Australian-first, located next door to the Shire of Murray's Food Innovation Precinct, WA (FIPWA) in Nambeelup (south of Perth) in the Peel Business Park. The four-tower industrial scale farm will be the centrepiece of the site. It will generate 120 tonnes of produce per annum when it is fully operational next year – including lettuce, spinach, kale and basil, as well as the indigenous crops.

The indigenous crop program is supported by the key FIPWA collaborators and championed by the Peel Development Commission. Working alongside Winjan Aboriginal Corporation and Eden Towers will be the first use the vertical farm near Perth to grow food crops like the warrigal plant a type of bush tucker spinach, and bush tucker celery, with a view to broaden this over time to pharmaceutical and cosmetic crops. It also plans to support reforestation projects in the area.

About the Presenter

Mr Cory Kennedy - Managing our reserves and engaging the community through a Reserve Management Database

Mr Cory Kennedy, City of Mandurah – Oral Presentation

Abstract

The City of Mandurah has been utilising the IUCN Ecosystems and Invasive Species Thematic Group's best practice approach to the management and restoration of Reserves. Using this approach, the City has implemented plans across 33 reserves (and counting) including several adjacent the Peel-Harvey Estuary Ramsar Site.

This short presentation will outline this approach which has a key focus on establishing a baseline biodiversity dataset of weed invasion to guide the development of Reserve Management Plans and prioritising restoration and management options across the City's Reserves.

Using a mapping application, we establish "polygons" (or "areas") with the same weed cover value using 5 categories. We then record the native and weed species present within each area. The information recorded in the field is incorporated directly from the mapping application into a Geographic Information System (GIS), which can be used by land managers, traditional owners and others to make informed decisions on where and how to manage weed species and restore ecosystems.

This database also provides countless opportunities for local volunteers to assist in the reserve management through the collection of their own data. Bird watchers, fungi fanatics and wildflower lovers are just some examples of the people who are out using these reserves regularly. The data they collect in terms of the species sighted, and their location, can all be collected through this database. This assists in building a multi-faceted and comprehensive database based on year-round observation.

About the Presenter

Cory Kennedy is an Environmental Management Officer for the City of Mandurah. He recently completed a Bachelor of Environmental Science and has 12 years' experience in the environmental field, from on-ground maintenance to planning and bushland management.

Mr Craig Perry - Community Coastal Values and Coastal Decision Making

Mr Craig Perry, Peron Naturaliste Partnership / Curtin University – Poster Presentation

Abstract

This poster will summarise a research project that explored how community coastal values may be impacted as a result of climate change. The research also examined how specific collaborative learning practices can enhance understanding and knowledge uptake of coastal climate change in the community and how community values of the coast can be incorporated into coastal hazard risk management and adaptation planning.

Coastal cities and towns around the world, including those in the south west of Western Australia, are impacted by coastal hazards such as erosion and inundation. It is widely acknowledged that climate change will lead to an increase in the extent and occurrence of these coastal hazards. To identify and mitigate these hazards and associated risks, coastal decision makers such as local governments, are required to undertake coastal hazard risk management and adaptation planning. A key component of this process is the consideration of social, cultural, economic and environmental values over a 100 year planning timeframe. However, historically, it has often been the case that short-term economic values are given priority. This has generally resulted in the construction of hard engineered structures to protect physical assets, which often leads to the loss of and/or damage to other assets that are highly valued by the community, such as foreshore reserves and sandy beaches. If decision makers are to develop and deliver sustainable policies and outcomes, it is imperative that technical information supports, and is supported by, clear understanding of how the community interprets and values the coast.

About the Presenter

Craig Perry is a Coastal Adaptation Coordinator with the Peron Naturaliste Partnership. and is currently completing his Masters by research at Curtin University researching community coastal values and coastal hazard risk management and adaptation planning in Western Australia. Craig is committed to continue to work with local governments in the promotion and development of resilient coastal communities.

Mr Craig Zanotti - Clearing & Restoration Awareness Community Education Programs

Mr Craig Zanotti, Shire of Waroona – Poster Presentation

Abstract

The Shire of Waroona's Strategic Community Plan, Local Planning Framework and State regulatory frameworks require the enforcement of planning, compliance, health and building, emergency services and community safety regulations. In response, the Shire of Waroona has implemented a new policy to ensure consistency and clarity in how the Shire makes decisions on enforcement actions related to clearing native vegetation. With many residents in Waroona and Lake Clifton having large landholdings, clarity around the process for clearing land and restoration is very important in order to protect endangered species and conserve threatened habitats, including remnants. There was also a need to identify and explain conservation convents and how they may apply to individual properties.

The poster presentation will explain the Shire of Waroona's community education program, consisting of identifying:

- Community education information;
- Identifying valued and threatened species; and
- Targeted communities.

These contribute to education programs through traditional and new communication mediums and community networks. The end goal: Protecting and enhancing valued, threatened and endangered habitats and species. In addition, the Shire of Waroona's Strategic Community Plan, Local Planning Framework and State regulatory frameworks require the enforcement of planning, compliance, health and building, emergency services and community safety regulations. In response, the Shire of Waroona has started to develop and implement a range of new policies to ensure consistency and clarity on how the Shire makes decisions and takes enforcement actions.

About the Presenter

Craig Zanotti recently commenced at the Shire of Waroona as their Senior Planner. He has over ten years' experience in strategic and statutory planning, having worked across a range of metropolitan and regional local governments and the State Government's Department of Planning, Lands and Heritage. He is also a strong advocate for the protection of WA 's flora and fauna and the conservation of natural areas.

Mr Dale Robinson - Managed Aquifer Recharge - An alternative water supply for Mandurah

Mr Dale Robinson, City of Mandurah – Tour Presentation

Abstract

The City of Mandurah (the City) has investigated and implemented alternative water schemes developed by recovering water from around three Resource Recovery Plants maintained and operated by the Water Corporation. The City has identified the need to invest in securing future ongoing fit-for-purpose water supply and the recovery of treated recharged water into the Superficial aquifer as a sustainable water alternative assisting with the City's irrigation demand for the Mandurah region.

The City has been working with the Water Corporation to investigate, secure and implement alternative water supplies associated with ongoing treated wastewater infiltration and Managed Aquifer Recharge (MAR), at three Resource Recovery Plants (RRP's), located within the region.

All MAR projects associated with the RRP's has demonstrated that a long-term water supply to provide fit-for-purpose water has been established. As such, the city has implemented MAR bore fields and continue to expand to abstract, convey and store recycled water for the environment and irrigation of recreational space.

An innovative, climate independent, reliable and affordable recycled water supply has enabled sustainable recreational space be maintained for community use today and into the future. This water for irrigation is acknowledged as low risk and this has been achieved by the high-water quality abstracted from the aquifer, continuous water quality monitoring and irrigation of the recreational areas at night time.

In order to determine if new annual water allocations could be issued to the city hydrogeological assessments were completed at all three RRP's, which included exploratory drilling, monitoring bore construction, water level and quality monitoring with the aim of determining a sustainable MAR allocation from each established fresh-water lens. Information from the newly constructed monitoring bores dramatically improved the understanding of the extent and the thickness of freshwater and how MAR is positively influencing coastal saline intrusion. This new data, together with Water Corporation and Department of Water and Environmental Regulation (DWER) available data, were used to construct a numerical model to assess and implement the MAR extraction regime at all three RRP's.

The completion of hydrological assessments has resulted in the following licensed water allocations (MAR allocations):

- Gordon Road No.1 Resource Recovery Plant – 300,000 kilolitres per annum.
- Halls Head No.2 Resource Recovery Plant – 145,000 kilolitres per annum.
- Caddadup No.3 Resource Recovery Plant – 120,000 kilolitres per annum.

The City will continue to work with DWER and the Water Corporation to recognise and monitor the sustainable groundwater MAR recharge and ever-increasing catchment flows to

the RRP's, due to ongoing development and population growth within Mandurah's catchment, to ensure all water use remains sustainable and available for expansion.

About the Presenter

Dale Robinson has a degree in Environmental Management and is part of the Built and Natural Environment team for the City of Mandurah. Dale's experience has been through previous work with the private sector for 7 years and 10 years with State and Local Government. As part of his current role he has project managed and delivered the City of Mandurah's Managed Aquifer Recharge schemes, providing an alternative water supply for the environment and recreational space. The success of these aquifer recharge projects has led the City of Mandurah to expand on its water recycling schemes and research towards water sensitive urban design principles.

Mr Dale Robinson - Soldiers Cove Waterwise Wetland

Mr Dale Robinson, City of Mandurah – Tour Presentation

Abstract

Waterways and other aquatic environments are valued by the community for their social, cultural, economic and environmental benefits. As a result of urbanisation, the volume of urban runoff increases, along with contaminants such as nutrients, sediment and other pollutants which adversely impacts these valued resources.

Soldiers Cove Foreshore is located adjacent to the Peel-Harvey Estuary and within walking distance to the Mandurah Central Business District. The foreshore has experienced significant changes due to urbanisation and the resulting challenges at the site include road drainage outlets that discharge directly into the estuary and a large onsite sewer infill pump station.

To reduce run-off and potential emergency overflow sewer pump station water from entering the estuary a wetland was designed and constructed using water sensitive urban design principles. This included a bioretention basin and swale, installation of wetland plants, soil amendments and limestone rock pitching to assist with foreshore soil erosion.

The completion of this healthy, water-wise wetland has not only helped to improve water quality in the Peel-Harvey Estuary, but also increased the amenity of a very significant community foreshore. Improving water quality, habitat, erosion control and amenity for residents continue to be the drivers for the City of Mandurah's future water sensitive urban design projects.

About the Presenter

Dale Robinson has a degree in Environmental Management and is part of the Built and Natural Environment team for the City of Mandurah. Dale's experience has been through previous work with the private sector for 7 years and 10 years with State and Local Government. As part of his current role he has project managed and delivered the City of Mandurah's Managed Aquifer Recharge schemes, providing an alternative water supply for the environment and recreational space. The success of these aquifer recharge projects has led the City of Mandurah to expand on its water recycling schemes and research towards water sensitive urban design principles.

Mr Demont Hansen - DoT Maritime's SONDAP Program

Mr Demont Hansen, DoT Maritime – Oral Presentation

Abstract
Collection of site-specific wave, current, and water level data is a critical component of the Department of Transport (DoT) Maritime facility development, maintenance, and investigation of operational issues. The collection and analysis of data is the primary function of the DoT State Oceanographic Nearshore Data Acquisition Program (SONDAP).

SONDAP collects approximately 12 annual Acoustic Wave and Current (AWAC) datasets, 2 Nortek Signature datasets, 12 RBR Pressure Transducer (PT) and 2 Nortek Aquadopp datasets every year. Since 2003 DoT's SONDAP program has collected the equivalent of 150 years of data in 124 locations across Western Australia using AWACs, Signatures, Pressure Sensors, and Aquadopps.

In 2020, DoT Engaged RPS Metocean to begin development of a robust, reliable, and user-friendly post-processing Toolbox to process and perform Automated and Manual Quality Assurance/Quality Control (QA/QC) on the highly valuable data records that DoT collects. The toolbox is now complete, and includes modules for processing AWACs, Signatures, RBR PTs, and Aquadopps. RBR Processing includes both gravity and cutting edge infragravity wave processing capabilities.

In April 2022, RPS began re-processing all SONDAP datasets collected since 2003 (over 600 in total equivalent to 150 years of collected data) using the newly developed Toolbox. Two RPS personnel are involved. One person processes and applies manual QA/QC to the data and the other performs a final QA/QC check. We expect to have all datasets re-processed by July 2022.

During the nearly 20 years of the data collection program SONDAP has collected a number of interesting and key datasets including cyclones and winter storm events. Key datasets will be discussed in terms of relevance and interest.

In this presentation I will discuss, the - Scope of program, data Collection equipment, the SONDAP Processing Toolbox, key datasets, and future program developments.

About the Presenter
Demont is a Bachelors and Masters qualified engineer with over twenty-five years of experience within coastal and civil engineering environments. Before winning a fellowship to specialize in ocean and coastal engineering, he worked within the civil and environmental engineering disciplines to conduct hydrologic and hydraulic modelling in addition to topographic surveys, geophysical investigations, environmental remediation, civil designs, and construction oversight.

For the past seventeen years he has been heavily involved in Coastal Engineering in a variety of aspects including design, numerical modelling, physical modelling, site investigations, oceanographic data analysis, coastal asset condition inspections, and Project Management. His design experience includes coastal features such as breakwaters, revetments, groynes, lagoons, beach nourishment, structure repair and upgrade, and intertidal creek restoration.

He also enjoys the site aspects of coastal engineering including metocean deployments, and conducting investigations.

DFES - Bushfire Centre of Excellence - Cultural Fire Program

Department of Fire and Emergency Services – Tour Presentation

Abstract

In recent years, often in the wake of large and damaging bushfire events, there has been a significant interest from government, community and media in restoring the cultural fire practices of First Nations Australians as a possible approach to reduce bushfire risk.

The DFES Bushfire Centre of Excellence, established in 2019, has established a Cultural Fire Program; the program seeks to enhance understanding, knowledge and application of cultural fire practices to strengthen the capability of the WA bushfire sector.
A long-term goal for the program is to facilitate the integration of both cultural fire practices and contemporary bushfire management policy as a means to reduce the impact of bushfires on WA communities and the things they value.

Whilst meritorious in concept, there are numerous barriers and challenges to more widespread application of cultural fire practices and integration of cultural knowledge throughout WA and across Australia more broadly. BCoE is seeking to address these challenges through implementation of the Cultural Fire Program.

About the Presenter

Mrs Ella Maesepp - Saline Bush Foods – Creating a Paddock to Plate Supply Chain and Improving Degraded Soils

Mrs Ella Maesepp, Katanning Landcare – Oral Presentation

Abstract

The Saline Bush Foods Project (2018 –2022) developed a full paddock-to-plate supply chain utilising plants that can be grown with degraded saline and water, creating environmental and economic benefits for salt affected farming areas.

Back in 2017 when project development began, we suspected there was potential for saline bush foods to become a profitable and sought-after product, but could it be scaled up into a reliable, consistent and effective industry? Could the plants be grown year round? Would customers want to buy them? Does it actually improve the environmental condition of the land? How do you physically get them from a broadacre farm to an exclusive city restaurant in top condition? This project was to test all these questions, and if the answers were positive, provide that information to other farmers to support them to diversify into saline bush foods also.

It brought together a diverse team –Landcare, a host farming enterprise, a gourmet food marketer, a horticulturalist, an engineering company, a social enterprise, TAFE, Aboriginal cultural educators and scientists -to create a holistic approach to improving saline degraded land through producing niche gourmet food.

The project successfully trailed three growing systems –Wild Harvest, Plantation and Shadehouse –growing four species of saline foods(samphire, saltbush, karkalla (pigface) and ice-plant), in a way that could be consistent year-round. But the project also worked to ensure an entire supply chain was ready to service it. Transportation and packing were refined, a harvesting machine developed and a Packing Shed facility built. Marketing across Australia has increased awareness and uptake of the products (even with COVID-19 playing havoc with the restaurant and hospitality industry), and produce awards have been won. Monitoring and analysis by soil scientists has showed a positive trend in soil condition under the growing systems. A Manual was written and released publicly in January 2022, and training course delivered to support other growers with salt-affected land to enter the market.

The project was a huge success. All three growing systems are now operational, producing all four target plants for market. COVID-19 created enormous challenges in sales, such that original targets weren't reached, but trends show that there will be need to bring other farmers into the industry in the near future, and that the supply chain established should be able to support the growth of these new consumer foods.

The Project closed in autumn 2022, leaving behind a viable commercial industry that has potential to grow across southern Australia, supporting new salinity management options, diversified farm income, new employment opportunities in rural towns, contributing to food security and exposing more people to eating Australian foods

About the Presenter

Ella Maesepp (BSc (Env Sc) Hons) has worked with Landcare since 2003, including 16 years with Katanning Landcare, serving on the Australian Landcare Council 2011-13 and winning both a State and National Landcare Award in 2015/16. She delivers a wide range of agricultural, environmental and community projects with passion, enthusiasm and an outcomes-oriented approach. Ella is a farmers' wife, mother of two, a Cub Scout Leader and loves the sport of sailing.

Mrs Ella Maesepp - Lake Ewlyamartup, a Dozen Years In the Making

Mrs Ella Maesepp, Katanning Landcare – Lightning Presentation

Abstract
Back in 2010, a group of concerned community members said "enough is enough" –it was time to fix a once-beautiful local lake that had become triple the salinity of the ocean, eutrophic, yellow and stinky. So began an enormous, concerted community effort to Restore Lake Ewlyamartup.

Over the following years, the Lake was the focus of a diversity of action, lead by Landcare and the Lake Ewlyamartup Working Group (LEWG), a volunteer committee representing famers, water-skiiers, bird-watchers, the Shire and the Aboriginal community:

- The Great Ewlyamartup Sludge Clean-out of 2011, where 1400 man-hours and 1100 machine-hours were donated by local volunteers, farmers, contractors and businesses to remove 40,000m3 of black sludge from the Lake bed in justone week.
- 250,000 trees planted across the catchment
- Stormwater awareness campaign and drain stencilling project
- Fertiliser run-off trial
- An inspiring Aboriginal connection project, resulting in a "Welcome to Country" art installation at the Lake, made by teenage Aboriginal boys supported by Elders and a professional sculpture artist, installed 2016.
- A complete upgrade of the recreation facilities, including picnic and BBQ facilities, boat ramp, toilet and bird hide.

In 2020, the final piece of the puzzle was installed through Living Lakes funding and managed by Wheatbelt NRM -a gated artificial flushing channel which allows water quality to be managed into the future and prevent the lake from returning to its old hyper-saline self.

Incredible winter rain in 2021 saw the flushing channel put properly to use for the first time– with management of the gate in the hands of the LEWG locals.

The summer of 2022 saw the best quality summer water in Lake Ewlyamartup recorded this century. The community are once again loving Lake Ewlyamartup, renewing vigour for it as a popular boating, picnicking and camping spot.95 species of birds have been recorded at the Lake, and with the lake healthier than it has been in more than 30 years, the future looks bright!

About the Presenter
Ella Maesepp (BSc (Env Sc) Hons) has worked with Landcare since 2003, including 16 years with Katanning Landcare, serving on the Australian Landcare Council 2011-13 and winning both a State and National Landcare Award in 2015/16. She delivers a wide range of agricultural, environmental and community projects with passion, enthusiasm and an outcomes-oriented approach. Ella is a farmers' wife, mother of two, a Cub Scout Leader and loves the sport of sailing.

Mrs Eryn Jackson - City of Mandurah Bushland Buyback Site Tour

Mrs Eryn Jackson, City of Mandurah – Tour Presentation

Abstract

The City of Mandurah has been utilising the IUCN Ecosystems and Invasive Species Thematic Group's best practice approach to the management and restoration of Reserves. Using this approach, the City has implemented plans across 18 reserves (and counting) including several adjacent the Peel-Harvey Estuary Ramsar Site.

This short presentation will outline this approach which has a key focus on establishing a baseline biodiversity dataset of weed invasion to guide the development of Reserve Management Plans and prioritising restoration and management options across the City's Reserves.

Using a mapping application, we establish "polygons" (or "areas") with the same weed cover value using 5 categories. We then record the native and weed species present within each area. The information recorded in the field is incorporated directly from the mapping application into a Geographic Information System (GIS), which can be used by land managers, traditional owners and others to make informed decisions on where and how to manage weed species and restore ecosystems.

This database also provides countless opportunities for local volunteers to assist in the reserve management through the collection of their own data. Bird watchers, fungi fanatics and wildflower lovers are just some examples of the people who are out using these reserves regularly. The data they collect in terms of the species sighted, and their location, can all be collected through this database. This assists in building a multi-faceted and comprehensive database based on year-round observation.

About the Presenter

Eryn Jackson is the Senior Environmental Management Officer at the City of Mandurah. She is an avid flora lover with a Bachelor of Environmental Science, Grad Cert in Ecologically Sustainable Development and more than ten years' experience in the environmental field.

Mrs Felicity Gilbert - Building Beetle Highways In The Wheatbelt

Mrs Felicity Gilbert, Wheatbelt NRM – Poster Presentation

Abstract

Dung beetles are becoming an increasingly popular way to manage soil health across the Wheatbelt. This collaborative project is a win-win for Wheatbelt NRM and Wheatbelt livestock farmers. It supports a wider beetle project for Wheatbelt NRM and allows farmers to gain a better understanding of the dung beetle activity on their properties.

There is limited knowledge regarding the present dung beetle species and their dispersion across the Wheatbelt. A collaborative citizen science project was required to gain a better understanding of dung beetle populations in key livestock areas.

About the Presenter

Felicity Gilbert is the Program Manager leading Wheatbelt NRM's Sustainable Industries team. She has been with Wheatbelt NRM for more than five years and has a passion for soil health, sustainable agriculture and low chemical input farming systems.

Miss Freya Spencer and Mrs Stevi Filipowski - Community, Carbon and Conservation

Miss Freya Spencer, Gillamii Centre and Mrs Stevi Filipowski, North Stirlings Pallinup Natural Resources – Lightning Presentation

Abstract
The development of the Community, Carbon and Conservation project from the grassroots has allowed both Gillamii and NSPNR, as local grower groups, a unique opportunity to be involved in a large-scale Carbon Farming project. As the first year of the project reaches completion it has emphasized the complexity involved and the need for community involvement in both the development and establishment phase of the project. Each farmer has a different motivation, succession plan and piece in the landscape which cannot be overlooked and needs careful consideration. The project has also highlighted the need for increased industry education and awareness in regional communities. Competition among carbon service providers is strong, which means landholders have a range of options available to consider. Understanding the drivers of demand, limitations on supply and the associated risk is as important when making carbon farming decisions as it is within grain and livestock markets. It is important to understand the difference between generating carbon credits to offset industry emissions or generating credits for future on-farm offsets. If you're using your land to offset for a polluting entity, it can't also be used to offset your own on-farm emissions. Carbon Sink plantings are just one method for reducing overall on-farm carbon emissions and other options such as soil carbon, reducing livestock emissions and reforestation are currently being established throughout the sector.

"It's has been a good way to begin restoring biodiversity on our farm and make a future income of our marginal land, it is helping to diversify our farming business and build our onfarm resilience" – Project Farmer

For Gillamii, NSPNR and Threshold Environmental, future years of the project will focus on strengthening current relationships with project farmers, taking time to assess the biodiversity outcomes of the large-scale plantings, as well as one-on-one training to assist each individual farmer to understand how to manage the ACCUs produced from the project over time. Resources will also be focused on baselining farms to understand net emissions and provide impartial assistance to individuals considering carbon farming projects, with hopes of empowering farmers to understand the complex industry, its risk and its potential.

About the Presenter
Moving from Perth to a local farm in Lake Toolbrunup, Freya has a strong passion for the environment and sustainable agriculture. Since studying a Bachelor of Science & Natural Resource Management (Bsc). Previously Freya has worked in Tucson, Arizona with the National Park Service as a Research Technician and in Perth as an Environmental Consultant, now currently the Executive Office at the Gillamii Grower Group.

Freya wants to support her community to continue to achieve outstanding environmental and agricultural outcomes by developing new industry relationships to peruse further on-ground resources in saltland pastures and ecological restoration. Freya is also passionate about bringing the environmental and agricultural achievements of our community to a wider audience. Believing strongly in bridging the gap between rural and urban

communities, encouraging people to come together to invest in our land for a sustainable future for all Australians.

Stevi is the Executive NRM Officer at North Stirlings Pallinup Natural Resources and farming with her partner and his family in Borden. Stevi has a background in Zoology but since working in NRM has formed a passion for working with the community to achieve a range of sustainable environmental outcomes in the region.

Please note this project is a collaboration and Gillamii/Freya Spencer is not the sole author.

Miss Freya Spencer - Saltland Genie Web App

Miss Freya Spencer, Gillamii Centre – Lightning Presentation

Abstract

The Saltland Genie Web App is being designed to help you choose profitable options for managing saltland pastures on your property. The App will bring resources, decision making tools and on-farm research trials into one place to help you find the best management option for your salinity problem. Navigate through a range of useful resources:

- soil and water measurement converter
- saltland economics calculator
- 'solutions explorer' – an easy, intuitive way to learn about salinity, and discover recommended species, and management recommendations
- Salt Deck – Saline Pasture Species Info Book
- Genie Maps – navigate around your area to view local research/trials and farmer case studies

Saltland Genie will integrate with the Department of Primary Industries and Regional Development's (DPIRD) website. To provide that extra bit of information and access the research behind the solutions, follow the prompts to DPIRD's website at https://www.agric.wa.gov.au/salinity.

The DPIRD website covers many salinity topics, including plant-based and engineering management options, how salinisation occurs, and how to measure and monitor salinity. If you're wondering how the recommended solutions will work in your area, click onto the 'maps' portal and navigate around WA to see the local farm trials, farmer stories and research that has been conducted in your area. Saltland Genie will be available on any device, whether you are on your phone in the middle of the paddock, or at home on the computer.

The Saltland Genie Web App is being developed from the original (and now not available) Saltland Genie website, as part of the Gillamii Centre's Productive Saltland Pastures for Southern WA Project, a collaboration with Department of Primary Industries and Regional Development, funded by the State NRM Program.

About the Presenter

Moving from Perth to a local farm in Lake Toolbrunup, Freya has a strong passion for the environment and sustainable agriculture. Since studying a Bachelor of Science & Natural Resource Management (Bsc). Previously Freya has worked in Tucson, Arizona with the National Park Service as a Research Technician and in Perth as an Environmental Consultant, now currently the Executive Office at the Gillamii Grower Group.

Freya wants to support her community to continue to achieve outstanding environmental and agricultural outcomes by developing new industry relationships to peruse further on-ground resources in saltland pastures and ecological restoration. Freya is also passionate about bringing the environmental and agricultural achievements of our community to a wider audience. Believing strongly in bridging the gap between rural and urban communities, encouraging people to come together to invest in our land for a sustainable future for all Australians.

Please note this project is a collaboration and Gillamii/Freya Spencer is not the sole author.

Dr Garry Middle - Picturing My Coast

Dr Garry Middle, Vision Environment – Workshop

Abstract

This is a proposal for a separate session of the conference. Photographers will be invited to submit one of their photos that tells a personal coastal story. The session will be 'show and experience' where each photo will be shown on a screen in a darkened room one photograph at a time. The session will open to anyone, and not just the photographers. Participants will begiven time to reflect, react and then comment on each photo in turn. The photographer will then be given the opportunity to respond to the comments and tell the audience what was intended. The session will conclude with a general discussion about the power of photography to tell stories, and it will be proposed that the photographs and the intended stories behind them will be turned into a book. An option will be to display hard copies of each photo in the exhibition area after the session

About the Presenter

Dr Garry Middle has over 35 years' experience in environmental planning, including, coastal planning. Garry is currently Director of an independent environmental planning consultancy, VisionEnvironment, Chair of Great Victoria Desert Biodiversity Trust, and adjunct senior research fellow at Curtin University.

Mr Mike Griffiths and Mr Drew McKenzie - Nature Conservation Margaret River Region

Mr Mike Griffiths and Mr Drew McKenzie, Nature Conservation Margaret River – Oral Presentation

Abstract
Arum lily is the most widespread and invasive environmental weed in the Margaret River region and is well recognised as a significant threat to the region's remnant native vegetation and biodiversity. Despite small and localised successes, in 2019 the threat of arum lily remained largely unaddressed, with most land managers considering the problem well past the point of effective control.

The Arum Lily Blitz is a 20+ year campaign that aims to change community attitudes and empower all land managers to undertake effective, cross-tenure arum lily control across the Margaret River region.

The methodology used to achieve the campaign's vision has included; persistent, highly visible communication to motivate and engage the community; provision of information and assistance to landholders to facilitate effective action; data collection to enable strategic management; targeted engagement and assistance to landholders to undertake control in priority areas; development and implementation of an annual cross tenure control program; and a focus on monitoring to enable evaluation and communication of success.

The first three years of the campaign have been very successful. 1,378 properties covering 17,235 ha have registered with the Blitz, landholders reported 3,304 hours of work representing an in-kind contribution of over $115,000. On 92 properties in high priority areas landholders contributed $108,000 towards shared contractor costs across 1,532 ha. Nature Conservation partnered with local and state government to control arum lily on public land. This included control across 20 sites within the Leeuwin Naturaliste and Wooditjup National Parks representing over 1,277 hours of contractor time. The Yallingup LCDC and Friends of the Cape to Cape Track also joined the Blitz with volunteers completing an incredible 642 hours of work.

The methodology used to deliver the Arum Lily Blitz has so far proven very effective in our region and we are keen to share this story.

About the Presenter
Mike Griffiths has worked in environmental management across several different areas of WA, learning important lessons from farmers, Indigenous people and tireless community volunteers. His work has had a strong focus on weed management and raising awareness of weed impacts in bushland. He joined Nature Conservation Margaret River Region in April 2022 to coordinate work managing Arum Lilies, Sweet Pittosporum and other environmental weeds.

Mr George Walley and Mrs Bronte Grant - Bring Together Walk Together Aboriginal Partnership Engagement Framework

Mr George Walley, Bindjareb Noongar eldership and Mrs Bronte Grant, Department of Water and Environmental Regulation – Oral Presentation

Abstract

The Bindjareb Djilba (Peel-Harvey estuary) Protection Plan is a whole-of-government approach to protecting the Peel-Harvey estuary and its internationally recognised values. The proximity of the Peel-Harvey estuary to Perth has put it under increasing strain over the decades. As agricultural and urban land use has expanded, nutrient enrichment and habitat loss has occurred.

A strong partnership was forged between Department of Water and Environmental Regulation and Traditional Owners in the development of the Plan through meaningful engagement. The partnership has empowered Bindjareb Noongar elders to develop their own overarching water plan to look after their waterways, the Bindjareb Gabi Wonga (Bindjareb Water Story). The plan threads knowledge systems to bring together cultural knowledge and western ways, with key actions aimed at supporting Bindjareb Noongar people as active partners in estuary management.

"Bindjareb Noongar people have a life commitment and cultural responsibility to the preservation of waterways, the management of the waterways based on the six seasons, to identify and associate the changing seasons with the food resources and interconnectedness of all life" – Bindjareb Water Story.

The Bring Together, Walk Together Aboriginal Partnership Engagement Framework outlines the co-design approach to the partnership. This framework communicates a pathway to forge, build and maintain strong partnerships for Aboriginal land water outcomes. It is a guide for water stakeholders, including Local Government and catchment groups, to engage Traditional Owners to lead participatory research, policy and planning, and projects.

Bindjareb Elders, the department and water stakeholders (including the Peel Harvey Catchment Council) continue to Bring Together Walk Together, through the implementation of the Bindjareb Djilba Protection Plan.

About the Presenter

George Walley is a highly respected elder and community leader in Bindjareb country. In George's professional life he has been a primary school teacher, and now works in the health field. George has over many years been an educator in cultural education and cultural awareness; and has been teaching Noongar language for people who have an interest in conversational Noongar. George is a community resource person in cultural knowledge for schools, government, and non-government organisations in the Mandurah area. George is on various boards in the region and appreciates that his presence is based on a long-time mutual respect for community.

Bronte Grant is an Environmental Officer with the Department of Water and Environmental Regulation in Mandurah. Bronte is passionate about looking after our waterways and has experience in waterways planning and management for rivers and estuaries in the mid-west

and south of our state. Bronte has led the Department's engagement with Bindjareb people for the development of the Bindjareb Djilba Protection Plan. Bronte feels very privileged to be walking with Bindjareb people, and along the way she is learning the practice of deep listening, to respectfully share and thread knowledge systems for healthy waterways, healthy communities.

Halls Head Education Support Centre

Halls Head Education Support Centre – Tour Presentation

Abstract
Details coming soon

About the Presenter

Hannah Gulliver - Cultivating coastal and marine stewardship: the WA Coastal and Marine Community Network

Hannah Gulliver, WA Coastal and Marine Community Network – Workshop

Abstract

With 12,889 km of mainland coast, Western Australia's coast is vital –and vulnerable. The West Australian community has a strong coastal identity, with 80% of the population living within 10km of the coast. However, this identity needs to be nurtured into 'caring for coast'. Grassroots communities are integral to coastal and marine management success. This community requires support, yet Federal government funding was lost in 2018 and so too were the coastal facilitators that delivered support. In this 60-minute hands-on workshop we shall discuss how the CMCN is responding to support needs and contributing to marine and coastal conservation in Western Australia. We are inviting participants to attend the CMCN workshop for an update on Network activities, followed by a facilitated discussion on conservation and management priorities and the resources and funding required to achieve success. The knowledge outcomes gained through the workshop will directly feed into the short and long-term actions of the network, with the aim of supporting the needs of the sector. CMCN welcomes coastal and marine community organisations, government agencies and engaged citizens to participate in this workshop and collectively plan for the future of WA's coastal and marine areas.

About the Presenter

Hannah Gulliver is a passionate coastal advocate for grass-roots community action and environment. With 7-years' experience in supporting community in natural area restoration, Hannah believes in community connection as a key driver in conservation action. She strives to strengthen this connection, and protect and restore the Perth Metro coastline as a Coastal and Marine Coordinator at Perth NRM. Hannah's passion led her to start a small business, co-directing environmental education organisation 'Eco Action,' connecting community and school students to nature (especially our smaller and essential creepy crawlies) through engaging experts in their field to communicate research, hands-on learning and conservation action opportunities.

Carmen Elrick-Barr is a human geographer with over 17 years' experience in environmental management and research. Carmen's research focuses on human-environment interactions, coastal governance, adaptation, adaptive capacity and deliberate societal transformation. Carmen holds Research Fellow positions at the University of the Sunshine Coast and the University of Western Australia. Her research has contributed to professional reports and publications in high-ranking journals under the topics of the social and institutional dimensions of environmental change and marine and coastal management.

Claudia Franca de Abreu is the Founding Director of Coastal Connections, a consultancy that specialises in community engagement and coastal rehabilitation and management. Claudia is a Coastal Oceanographer and a Human Geographer with specialist knowledge in Indigenous wellbeing research, and community consultation with participatory and Indigenous methods.

Pierre Bouvais is a marine ecologist with over 10 years' experience working in the academic and private sectors. Pierre's past roles have included working on a UNESCO World Heritage-

listed site in New Caledonia; Resilient Reefs Initiative led by the Great Barrier Reef Foundation; managing a Marine and Terrestrial Nature Reserve in Mayotte; and working in the Pacific and the Indian Oceans on issues related to marine conservation, integrated coastal zone management and climate change.

Hannah Gulliver - WA Coastal and Marine Community Network

Hannah Gulliver, WA Coastal and Marine Community Network – Poster Presentation

Abstract

The Western Australian (WA) Coastal and Marine Community Network (CMCN) supports the connection, collaboration, and engagement of stakeholders working in coastal and marine conservation. The Network is collectively working towards improving the health and sustainability of Western Australia's coastlines and marine environments. Established in February 2020 to enhance coordination across stakeholder groups and support grass-roots coastal and marine management, the network has a strong governance framework and over 140 members (representing government, research, non-government, and community sectors). Together, members have collaboratively set strategic priorities over the next 10 years. This poster will share these priorities, the network's progress to date and invite conference participants to join our Hands-on-Workshop. As the only State-wide network that facilitates resource sharing and cohesive outcome-focused local-scale coastal and marine management practice, membership enables you to join a diverse group of stakeholders with a passion for the WA coastal and marine environment, who interact to learn together and from each other. So, get involved!

About the Presenter

Hannah Gulliver is a passionate coastal advocate for grass-roots community action and environment. With 7-years' experience in supporting community in natural area restoration, Hannah believes in community connection as a key driver in conservation action. She strives to strengthen this connection, and protect and restore the Perth Metro coastline as a Coastal and Marine Coordinator at Perth NRM. Hannah's passion led her to start a small business, co-directing environmental education organisation 'Eco Action,' connecting community and school students to nature (especially our smaller and essential creepy crawlies) through engaging experts in their field to communicate research, hands-on learning and conservation action opportunities.

Carmen Elrick-Barr is a human geographer with over 17 years' experience in environmental management and research. Carmen's research focuses on human-environment interactions, coastal governance, adaptation, adaptive capacity and deliberate societal transformation. Carmen holds Research Fellow positions at the University of the Sunshine Coast and the University of Western Australia. Her research has contributed to professional reports and publications in high-ranking journals under the topics of the social and institutional dimensions of environmental change and marine and coastal management.

Claudia Franca de Abreu is the Founding Director of Coastal Connections, a consultancy that specialises in community engagement and coastal rehabilitation and management. Claudia is a Coastal Oceanographer and a Human Geographer with specialist knowledge in Indigenous wellbeing research, and community consultation with participatory and Indigenous methods.

Pierre Bouvais is a marine ecologist with over 10 years' experience working in the academic and private sectors. Pierre's past roles have included working on a UNESCO World Heritage-listed site in New Caledonia; Resilient Reefs Initiative led by the Great Barrier Reef Foundation; managing a Marine and Terrestrial Nature Reserve in Mayotte; and working in

the Pacific and the Indian Oceans on issues related to marine conservation, integrated coastal zone management and climate change.

Healing Country Panel – KEYNOTE PRESENTATION

Abstract
The Healing Country Program is a ground-breaking training centre based at Curtin university that will drive a diversified Indigenous-led restoration economy. The goal of the federally funded ARC 'Training Centre for Healing Country' is to create and nourish a restoration economy that supports healthy land and transforms Indigenous land management and restoration businesses into a major employer of on-Country regional jobs. The Centre, under the leadership of noted Australian botanical ecologist Professor Stephen van Leeuwen, from Curtin's School of Molecular and Life Sciences, will fuse Indigenous knowledge and traditional approaches with western science to rehabilitate and restore Country.

About the Presenter
Professor Stephen van Leeuwen Botanical Ecologist, BHP Curtin Indigenous Chair of Biodiversity and Environmental Science
Stephen is a respected Aboriginal-Noongar leader with a profound respect for Country coupled with an appreciation of contemporary threats impacting biodiversity and the emerging challenges and opportunities presented through evidence-based natural resources land management. Stephen's work has an emphasis on biodiversity conservation in partnership with Traditional Owners and other land managers to deliver enduring sustainable outcomes for nature conservation, and Country.

Carol Innes AM, Director, Danjoo Koorliny Walking Together program, Centre for Social Impact, UWA
Danjoo Koorlinny is a bold, long-term, large-scale, Aboriginal-led project to help all of us walk together as Aboriginal and non-Aboriginal people to co-create a better future for all. The first milestone on this road is 2029 (200 years of colonisation in Perth), but the project will go far beyond WA's bicentenary. As founding leader Dr Noel Nannup OAM said, "Our focus is on 2029 at this stage. However, we have the potential to go way beyond that because this is about being a person – a human being." Danjoo Koorliny's Caring for Everything philosophy is built on recognising that the social, cultural, environmental and economic spheres of our world are all interconnected. This holistic approach to creating social impact is based on the Noongar dreaming story, Moondang-ak Kaaradjiny – Caring for Everything. It is a story that starts a long time ago, when everything on the planet was being created and humans were tasked with the responsibility to be the carers of everything that exists on the Earth.

Heather Percy and Tom Lerner - Policy approaches to challenging soils in the Peel region - we can change this.

Heather Percy and Tom Lerner, Department of Primary Industries and Regional Development and Shite of Murray – Tour Presentation

Abstract

The Western Australian Food Innovation Precinct (WAFIP) is based on the Peel region in response to the environmental challenges of farming on the coastal catchment of the Bindjareb Djilba (Peel-Harvey estuary). Our talk will describe the region's challenging soils and landforms and some of the policy and planning approaches being used in the Shire of Murray.

New approaches to agriculture State planning policy for the Peel-Harvey coastal plain catchment requires decision makers to consider land suitability when assessing proposals for intensive agriculture including for horticulture. This information was not accessible or easily understood by land use planners. We will describe how we translated this information into a model Local Planning Policy (LPP) for the Peel-Harvey.

Land clearing, drainage and agricultural development of the Peel-Harvey coastal plain catchment substantially increased nutrient loads in the Peel-Yalgorup system, leading to toxic algal blooms and fish deaths. In response, the state government imposed stringent environmental and planning policies to the Peel-Harvey coastal plain catchment, developed water quality improvement plans and water quality targets for the Peel-Harvey catchment, engineered the Dawesville Cut and supported research and extension on improved fertilisers and soil testing.

Soils and landforms are important drivers of the water quality challenge for Bindjareb Djilba. Pale deep sands border the estuary. These soils are infertile with very low soil organic matter and nutrient levels and are found on low lying land interspersed with small rises and sand dunes.

Perth's vegetable growing areas are progressively rezoned for housing, leading some growers to seek new land in the Shire of Murray (SoM). The SoM had limited experience in assessing horticultural proposals and relied on advice from state agencies such as the Department of Primary Industries and Regional Development (DPIRD) and the Department of Water and Environment Regulation (DWER). This led to the development of a model Local Planning Policy (LPP) for new and expanded horticulture in the Peel-Harvey.

The model LPP used regional soil-landscape mapping, based on the Mandurah Murray land capability study (Wells 1989), and interpreted phosphorus export hazard information and land capability to determine the suitability of each map unit for horticulture. This information was presented in simplified tables in the model LPP. The SoM has adapted and used this approach for horticulture and for keeping livestock on small holdings.

As most of the soils and land is not suitable for traditional types of in ground horticulture, new types of protected cropping are needed for the catchment. The WAFIP provides an opportunity to research and trial new systems for horticulture in the region.

About the Presenter

Heather Percy: As DAFWA's State Land Use Planning Coordinator, I work with a small team who provide advice and information about agriculture to land use planners in state and local government. I also support the Commissioner of Soil and Land Conservation.
I provide advice on regulatory and policy settings to ensure appropriate management of and on-going access to land resources. I contribute my expertise and knowledge to the development and review of state, regional and local land use planning policies. These policies guide decisions which enable businesses, communities and government to better manage and optimise their investment in land.

Tom Lerner is the Coordinator Environmental Services at the Shire of Murray. He is an environmental scientist originally from the UK with over 12 years' experience in Western Australia.

Dr Helen Spafford - Preparing for the myrtle rust, a pathogen of serious concern for Western Australia

Dr Helen Spafford, Department of Primary Industries and Regional Development
– Workshop

Abstract
Myrtle rust, *Austropuccinia psidii*, is well-established in the eastern states and found in other areas of Australia. The possible introduction of the rust to Western Australia (WA)is of serious concern as it will likely affect plants in 88 native genera including *Eucalyptus, Callistemon, Melaleuca, Leptospermum, Agonis, Chamelaucium* and *Verticordia*. Developing contingency plans for incursions, such as myrtle rust, enables organizations to respond effectively to an event that may or may not happen. Effective preparation and development of contingency plans involves significant stakeholder engagement and consultation to ensure that the best options for a response are considered. The current contingency plan has been developed by a consortium of agencies. Ongoing development and stakeholder consultation will be needed to ensure that WA is best prepared for an incursion of myrtle rust. In this 120-minute workshop, participants will learn about the key elements of the contingency plan for the possible incursion of myrtle rust, into WA. Participants will explore responses to possible incursion scenarios through structured activities that address elements of the contingency plan in the investigation phase including surveillance and methods to limit spread. Participants will also discuss messaging for community engagement. Feedback from the participants will be reviewed and contribute to refinement of the contingency plan.

About the Presenter
Dr. Spafford has a PhD in Biology and over 20 years of experience as an applied entomologist, working in horticulture and field crops in temperate and sub-tropical environments, in Australia, the mainland US and Hawaii. Prior to joining WA Department of Primary Industries and Regional Development (DPIRD) in December 2019, Dr. Spafford was an Associate Professor at the University of Hawaii, Manoa and The University of Western Australia. After two years in Kununurra as the lead for DPIRD in the management response to fall armyworm, Helen has joined Plant Biosecurity as the Lead of the new Preparedness team.

Miss Jen Kueh - Impacts of Engineered Reef on Local Wave Climate & Sediment Transport

Miss Jen Kueh, M P Rogers & Associates Pty Ltd – Oral Presentation

Abstract

C Y O'Connor Beach, located in North Coogee within the City of Cockburn has been experiencing ongoing erosion issues over recent decades. North of the Catherine Point groyne, this erosion is now threatening recreational areas and assets, including dual use paths and an important foreshore park. As a trial to mitigate erosion issues at the site, as well as providing additional benefits such as fish habitat, Subcon Technologies Pty Ltd proposed to construct an engineered reef for the City of Cockburn. MRA was engaged by the City to assess the impact of the engineered reef on local wave conditions and sediment transport trends. The assessment was undertaken using Delft 3D models calibrated against 2D testing results completed by the University of Western Australia's Coastal and Offshore Engineering Laboratory. Three representative years, i.e. average, mild and stormy years, were modelled with and without the engineered reef. The spatial wave modelling results indicated a reduction of wave height and wave period in the lee of the engineered reef. A reduction in wave power was confirmed, indicating an observable change to sediment dynamics and potential shoreline erosion. The engineered reef in its proposed location was assessed to potentially lead to an accretion of the shoreline in the lee of the engineered reef and subsequent localised erosion on the edges of the sheltered area behind the reef. Cross-shore profile evolution modelling was also undertaken to assess the impact on cross-shore storm erosion potential. Results indicated a reduction in storm bite behind the reef at the mean sea level contour during approximately the 5-year ARI storm cluster. Additional flume testing and in-situ investigative works are recommended to further assess the performance of the engineered reef units and to allow for more accurate predictions of the impacts on local wave climate and sediment transport.

About the Presenter

Jen Kueh is an Experienced Coastal Engineer at M P Rogers & Associates. She has completed a number of projects with the team and has developed a range of engineering skills and sound understanding of coastal engineering principles. Jen has completed work in the Perth Metropolitan area and regional Western Australia for a range of clients, including local government and private companies. Jen has completed a Bachelor of Engineering in Ocean Engineering (Hons) at the University of Tasmania and a Master's degree at the University of Western Australia, specialising in Civil Engineering and is a Professional Member of the Institution of Engineers, Australia.

Trent Hunt is a Project Director and Principal Engineer at M P Rogers & Associates and has over 18 years' experience in coastal engineering. Trent has been at M P Rogers & Associates since 2003, and has worked in both metropolitan and regional Western Australia. Experience and expertise has been developed in project and job management of coastal structures and large scale coastal developments. Trent completed a Bachelor of Engineering (Hons) at the University of Western Australia and is a Chartered Professional Engineer and Corporate Member of the Institution of Engineers, Australia.

Ms Jennie Beeson - Saving Lake McLarty – Retaining Critical Values in a Changing Climate

Ms Jennie Beeson, Peel-Harvey Catchment Council – Oral Presentation

Abstract
Lake McLarty is one of only two fresh water lakes within the Ramsar listed PeelYalgorup Wetland System (Ramsar Site 482). It is a significant wetland in its own right, providing vital habitat for both resident waterbirds and migratory shorebirds. As an ephemeral wetland, it is under threat of losing its unique character being sensitive to altered weather patterns exacerbated by climate change including reduced rainfall and increased dry periods.

The Peel-Harvey Catchment Council was awarded a Community Stewardship Grant from the Western Australian Government's State NRM Program in 2019 to investigate the threats facing the lake in order to assess the risk and develop management strategies around these. Of particular concern was the potential for acid sulfate soils to be present or to form within the lake bed sediments, negatively impacting the ecology of the lake both during and after the rewetting phase.

Here we present the findings of studies undertaken to assess this threat through sediment investigations, installation of a series of groundwater monitoring bores in and around the lake and a flow augmentation study to review the flow regime of the catchment.53

The sediment investigation was designed to survey for the presence of acid sulfate soils as well as the presence of potential acid sulfate soils, that is those soils that under oxidising conditions could progress to contributing acidity to the lake.

Ground water bores were installed to allow for ongoing monitoring of ground water levels and water quality in order to better understand the hydrology of the system and to detect any acidity that may be present or that may form in the system.

The flow augmentation study revealed opportunities to improve the flow of surface water to the lake, increasing the duration of inundation of the lake bed and keeping potential acid sulfate soils from oxidising.

About the Presenter
Jennie Beeson is the Peel-Harvey Catchment Council's Waterways Research Officer. She has qualifications in Conservation and Land Management and since joining PHCC has been active in water sampling and monitoring programs throughout the Ramsar listed Peel-Yalgorup Wetland System.

Mr Jim Churchill - Shire of Murray Coastal Hazard Risk Management and Adaptation Planning (CHRMAP) Project

Mr Jim Churchill, Baird Australia and Mr Tom Lerner, Shire of Murray – Oral Presentation

Abstract
The Shire of Murray (SoM) has completed a Coastal Hazard Risk Management and Adaptation Planning (CHRMAP) project to develop a greater understanding of its coastal areas and support its future coastal management and planning decisions. The study area includes the eastern shoreline of the Peel-Harvey estuary and the tidally influenced sections of the Murray River and Serpentine River and was developed in consultation with SoM, the local community, and a range of stakeholders, in accordance with local and national guidelines.

The project has developed understanding of coastal hazard risk for the SoM through the completion of a detailed coastal hazard study which examined the processes of erosion and inundation within the study area. This provided definition of the coastal hazard affecting the shoreline areas today and the forecast impacts over the next 100 years (to 2120) associated with projected climate change and sea level rise.

The community and stakeholder engagement program was designed to share insights from the coastal hazard study and to gain local insight into coastal values. This was used to inform and guide decision making on effective coastal adaptation approaches for the study area.

The CHRMAP presents adaptation pathways to manage coastal assets and mitigate risk over the short to medium term (next 10-20 years) and in future planning periods (next 100 years). One of the key recommendations from the CHRMAP project is the support of using nature-based solutions (NBS) to increase the resilience of river shorelines that are at risk of erosion around the Murray Delta Islands and South Yunderup. Another important consideration is the use of planning-based approaches to ensure appropriate development in the coastal hazard area.

A general summary of the key stages of the project and how these informed the final outcomes will be presented along with the future recommendations for the Shire.

About the Presenter
Jim Churchill is an Associate Principal Engineer at Baird Australia with over 10-years' experience in WA, working in coastal areas to manage coastal hazard risk. Jim led the consultant team for the CHRMAP project.

Tom Lerner is the Environmental Coordinator for the Shire of Murray. He is an environmental scientist and planner with 12 years' experience within the WA public service at local and state level. He has project managed the CHRMAP for the Shire of Murray

Ms Joanna Wren - Strategic Engagement: The AAA Framework in Practice and 'Talkin After Hours'

Ms Joanna Wren, Lower Blackwood Land Conservation District Committee – Oral Presentation

Abstract

The AAA Framework was developed by the Lower Blackwood LCDC as an approach to create meaningful engagement with their landholders, build communities of practice, support longevity in project outcomes and guide future project investments. The framework has been put into practice over the last 3 years through the group's 'Regenerative Ag in Practice' program and is proving to be an effective approach. It provides a mechanism to integrate project funding from a range of sources in a whole of landscape and whole of community strategic approach. One practical component of the AAA Framework that has seen real growth over the last 3 years is the 'Talkin After Hours' program. Built on a response to landholder's needs for more access to sustainable and regenerative agriculture information and networking opportunities, this innovative program has grown in popularity and provides a long-term resource bank for landholders housed on the LBLCDC's online information hub.

About the Presenter

Joanna Wren is the Executive Officer for the Lower Blackwood LCDC and joined the team in 2018. Prior to her role with the LBLCDC she ran her production horticulture business for 10 years and was very active at an industry level. Joanna is passionate and committed to bringing projects and research into the Lower Blackwood Catchment to assist and support the LBLDC's landowners and protect and enhance the beautiful, unique environment.

Mr John Collins - CODE OFF ROAD: Coastal Zone, Wetland & Rangeland Education Delivery by Stakeholder Partnerships

Mr John Collins, Track Care WA – Poster Presentation

Abstract

Having spoken at the inaugural State NRM and Coastal Conference resulting in the formation of the Tending the Tracks Alliance between 4WD groups and CCWA, Graham Weber is presenting an overview of where Track Care has gone since then and throughout its history brining Collaboration and Partnerships into action to show that seemingly disparate groups actually do have common goals when it comes to this great state and the environment.

From reducing 4WD traffic in areas that need protection to promoting good environmental 4WD habits in all areas, Track Care has been very active in creating partnerships throughout the state. Through developing tripartite relationships, typically between commercial entities, government entities and volunteer groups as supported by research from the Wentworth Group of Concerned scientists, Track Care has lead the way in bringing together seemingly disparate groups to achieve successful environmental outcomes.

Examples will be used to demonstrate the common objectives of groups associated with Track Care, including Albany 4WD club and Micro-plastics, DBCA and Common Education for the public relating to land care while 4W driving via the “Code Off Road” brochures, supporting Indigenous Communities on Country and environmental support of the Wandoo National Park. The talk will demonstrate what has been achieved environmentally by conservation and 4WD groups in the past and present ideas on where we may go in the future.

About the Presenter

Mr John Simons - Updated Land Monitor estimate of the extent of dryland salinity for the South-West of Western Australia

Mr John Simons, Department of Primary Industries and Regional Development
– Oral Presentation

Abstract
The Land Monitor salinity mapping process uses satellite imagery, high-resolution topographic data, ground information and ancillary GIS data sets to map areas of severely salt-affected land identified in consecutive satellite (Landsat TM) scenes (Furby et al 2010). The previous estimate of salinity extent for the year 1998 was 1.05 million hectares (McFarlane et al 2004). To update this estimate, the spatial-temporal methodology was re-applied using the same approach but took advantage of the latest data and improved computational resources. In addition to the area estimate, we report for the first time a *bias adjusted* estimate of the extent of salt affected land for the year 2018.57

The update classified over 1.08 million hectares of land as salt affected for the year 2018 equating to 4.5% of the mapped area with approximately 31,000 hectares more severely salt affected land being detected since 1998. Ground truth mapping provided independent validation of the mapping accuracy and information on the severity of salinity that was being mapped. The updated mapping had an omission error rate of 40.0%, a commission rate of 3.1%, and an overall accuracy of 97% when compared with ground truth mapping.

Further comparison with ground truth identified that the optical satellite-based mapping detects persistent 'severely' salt-affected areas that are highly degraded but less severely affected lands have been omitted. Importantly, this underestimation was embedded in the previous Land Monitor analysis.

For the year 2018, where pixel validation was available, we calculated a *bias adjusted* estimate of the extent of salinity to be 1.75 million hectares ± 345,000 hectares at the 95% confidence level, equating to 7.3% of the mapped area. The adjusted estimate is in good numerical agreement (~1:1 least squares linear fit) with ground truth mapping. Further research is being planned to better detect and map under reported salinity in the future.

About the Presenter
John is a senior research scientist in DPIRDs' water science group. Since graduating from Curtin University in 1989, he has gained over thirty years' experience in hydrology and natural resource management. Based in Esperance on the sunny end of the South Coast, John carries out investigations to assess hydrology related issues and land management risks to provide advice to government, community and agribusiness. He is involved in range of activities in relation to agricultural resource management and assessment including field investigations, resource evaluations, risk assessments, regulation, communication and liaising with land managers and other stakeholders.

Mr Joshua Brown - A citizen science-based assessment of marine species redistributions in Western Australia

Mr Joshua Brown, Department of Primary Industries and Regional Development
– Oral Presentation

Abstract
Climate-driven changes in marine species' distributions affect coastal ecosystem structure and function, impact fisheries and conservation, and present challenges for managers. A recent review of the scientific literature [1] revealed 198 species shifting in Australian waters, but also substantial gaps in our knowledge.

Over the past decade, several citizen science programs have collected large amounts of species observations that could be used to help address these gaps, but these databases have not yet been systematically searched and analysed to characterise species redistributions. We used a peer-reviewed qualitative decision tree analysis [2] to assess potential extensions of marine species distributions along the Western Australian coast, with data from three citizen science projects (Redmap; iNaturalist, especially the Australasian Fishes project; and Reef Life Survey). This analysis considers historical (i.e., recognised as of 2012) southern distribution limits, along with species traits (e.g., migratory behaviour, detectability) and evidence provided by citizen scientists' data (e.g., possible overwintering and/or multi-year observations) to assess overall confidence of potential species redistributions occurring.

In Western Australia, from an initial list of 115 marine species which have been tracked by Redmap over the past decade, we found evidence 24 are potentially undergoing range extensions, ten with 'high', three with 'medium', and eleven with 'low' confidence. These findings provide an early indication of priority species and regions where targeted scientific research may be appropriate. Further, results of the assessment have been incorporated into the Redmap Western Australia Report Card, which provides a demonstration of the scientific value of citizen science and is being disseminated to engage with the broader public on climate change, using their own information.

About the Presenter
Joshua Brown is the Coordinator of Community Education at the Western Australian Department of Primary Industries and Regional Development. The Community Education section aims to raise awareness and understanding of the sustainable management of the State's fisheries and aquatic natural resources, leading to sustainable behaviour and stewardship of the aquatic environment. The school and community-based education and engagement programs are supported by a range of resources, including the Department's fisheries education website Marine Waters and several citizen science programs.

Ms Karen Oborn - Renewable Energy Facilities Policy and Scheme for Development Innovation

Ms Karen Oborn, Shire of Waroona – Tour Presentation

Abstract

In response to the increase in renewable energy projects instigated all over the world and recently within Waroona, the Shire of Waroona has implemented a new policy to guide the development of Renewable Energy Facilities.

In December 2021, the Regional Joint Development Assessment Panel approved a DAP Application from Rangers Loaders Pty Ltd to use their land for a "solar farm" within the Shire of Waroona. Additionally, in 2019, South Energy acquired land in the Shire of Waroona and were given planning approval for a "proposed capacity of approximately 180 megawatts. The project is expected to generate enough clean energy to supply the equivalent of around 67,000 homes, minimising carbon emissions by approximately 285,000 tonnes per year.

This presentation will explain the Shire of Waroona's new Renewable Energy Facility Policy and Scheme Amendment in pictorial form. Key highlights will include the need to keep negative impacts in the community to a minimum, protect productive 'food producing' agricultural land, promote environmental conservation and support sustainable economic development.

About the Presenter

Karen Oborn is a Social Scientist, with post graduate qualifications in Adult Education and Environmental Management. Currently working in Local Government as a Director of Infrastructure and Development Services at the Shire of Waroona. Karen is also a Board Member, Treasurer and Research Associate for the North Midlands Project.

Ms Karen Oborn - Healing Country to facilitate Healing People

Ms Karen Oborn, Shire of Waroona – Poster Presentation

Abstract

This poster presentation will feature research by Shire of Waroona Director of Infrastructure and Development Services, Karen Oborn, who is exploring the connection between 'Healing Country' and facilitating healing for 'Stolen Generation Survivors'. Illustrating how traditional Aboriginal knowledge and connection to 'Country' can be used to combat land degradation and restore the ecological health of the natural environment, the presentation will recognise and respect traditional Aboriginal world views and knowledge.

Featuring an A1 portrait poster with pictorial narrative, the landscape of Country, as a visual metaphor of the cultural impacts inflicted upon Aboriginal society since the arrival of European settlers, will be projected through the lens of the Stolen Generation's storytelling and personal narratives, as well as Aboriginal peoples' self-identified connection to Country. The strong link between Aboriginal People's spirituality, wellbeing, cultural and community identity and their connection to Country will be visually explored, as well as the application of traditional Aboriginal land management methods to support the healing process for Stolen Generation survivors, through Healing Country initiatives.

About the Presenter

Karen Oborn is a Social Scientist, with post graduate qualifications in Adult Education and Environmental Management. Currently working in Local Government as a Director of Infrastructure and Development Services at the Shire of Waroona. Karen is also a Board Member, Treasurer and Research Associate for the North Midlands Project.

Mr Karl Ilich - Renewable Energy Facilities Policy and Scheme for Development Innovation

Mr Karl Ilich, Shire of Waroona and Mr Tom Lerner, Shire of Murray – Tour Presentation

Abstract
The Shire of Waroona (SoW) coastline is an important social, environmental, and economic asset for the region. It contains iconic sandy beaches and foredunes, and areas of significant social and recreational amenity for both residents and visitors alike.

To effectively manage the coast the SoW, with the Preston Beach Progress Association, engaged Water Technology to develop an updated Foreshore Management Plan (FMP) for the area. The FMP identifies issues, pressures, risks, and opportunities - and the actions required to address these issues in a strategic and integrated manner. The Scope of Work comprised:

- A site inspection, and liaison with the SoW staff and project stakeholders
- Review of the existing 2002 FMP
- Review of the prevailing coastal processes, ecological environment and processes and recreational usage.
- Assessment of coastal erosion and inundation hazards
- Assessment of the recreational amenity and community uses
- An overview of existing coastal land use and tenure

The calculated erosion hazard in the vicinity of the car park and Preston townsite in 2030 has relatively low impact. Except for vehicle access ways and sand dunes, no other coastal assets are found located within the predicted erosion hazard zone. Assessment has also shown very minimal inundation risk in the next 10 years.

A community workshop, survey and drop-in session were undertaken to understand the local community's values, and their perceptions of the key issues. The results of the engagement informed the prioritisation of recommendations for the foreshore. The primary concerns from the community related to antisocial behaviour by four-wheel drivers on the beach; misuse and maintenance issues associated with foreshore amenities; and a desire for improved pedestrian access to the beach and dunes.

The FMP provides a summary of recommended management actions for the foreshore and indicative timeframes and cost estimates for implementing them.

About the Presenter
Karl Ilich is an accomplished coastal engineer with 16 years professional experience within Western Australia. He has extensive experience in the evaluation of coastal processes and the implementation of sustainable coastal management practices. Karl has developed bottom-up practical frameworks and guidelines to enable sustainable coastal zone management by different organisations and levels of government. Karl has successfully delivered a wide variety of coastal projects from initiation to completion including monitoring and data analysis; coastal zone investigations; adaptation planning; climate change assessment and advice; structure design; construction management; structural condition inspection; shore protection; maintenance dredging; community engagement; and environmental monitoring.

Tom Lerner is the Environmental Coordinator for the Shire of Murray. He is an environmental scientist and planner with 12 years' experience within the WA public service at local and state level. He has project managed the CHRMAP for the Shire of Murray.

Prof Kingsley Dixon - Bringing Nature Home - Land Restoration & Conservation

Prof Kingsley Dixon, Cypress Farm and Shire of Waroona – Oral Presentation

Abstract
The Shire of Waroona's Strategic Community Plan, Local Planning Framework and State regulatory frameworks require the enforcement of planning, compliance, health and building, emergency services and community safety regulations. As decision makers and regulators, the Shire of Waroona supports the protection of endangered species and threatened habitats. This presentation by Professor Dixon explains the need for conservation and the recommended processes for land restoration, backed by new data.

With many residents in Waroona having large landholdings, clarity around the process for vegetation retention and restoration is very important in order to protect endangered species and conserve threatened habitats, including remnants. The oral presentation will explain the need for conservation related regulations and the reasons for enforcing them, as well as the recommended processes for land restoration:

- Identifying valued and threatened species; and
- Targeted communities.

Contributing to community education programs, through traditional and new communication mediums and community networks. With the end goal of protecting and enhancing valued, threatened and endangered habitats and species.

About the Presenter
Professor Dixon is a world-acknowledged botanist and restoration ecologist who has devoted his research career to unlocking and unravelling the ecology and restoration of Australian plants. His most noted work is the discovery for Australian plants of smoke germination and the chemical responsible. He was the Foundation Director of Science at Kings Park for 32 years, recognised as the 2016 WA Scientist of the Year and in 2015, was awarded a Personal Professorship in Botany at Curtin University.

Lionel Johnston and Prof Kingsley Dixon - A Garden in the Forests of Waroona

Lionel Johnston, Cypress Farm and Prof Kingsley Dixon, Cypress Farm and Shire of Waroona – Poster Presentation

Abstract
Lionel Johnston in association with world-renowned botanist and restoration ecologist, Kingsley Dixon, will take delegates on a journey through the 12 acres of formal gardens known as Cypress Farm and Gardens in Waroona, exploring how to encourage biological diversity while protecting the natural environment. Embedded within a 170 acre property, bounded by Lane Poole Nature Reserve, the garden includes waterfalls, fountains, ponds and streams amidst a canopy of remnant Eucalypt forest trees.

Key features of the garden include:

- More than 50 cultivars and specimen trees of Japanese Maple
- 300 Hydrangeas
- Native sections attracting native birds including robins, honey eaters and wrens
- Hundreds of magnificent tree ferns (*Cyathea Cooperi*), some more than 15 meters high

Beyond the garden area, the property and neighbouring forest provides a habitat for up to 45 species of birds including two nationally threatened black cockatoos (Baudins and Forest Red Tails) plus phascogales, chuditch, quenda, nyngan (echidna) and wallabies.

The A1 poster presentation will include a pictorial narrative showing the ongoing protection work undertaken in the gardens, and examples of the waterfalls, fountains, ponds and streams amidst a canopy of remnant Eucalypt Forest trees. In addition to the cultivars and specimen trees.

About the Presenter
Co-owner of Cypress Farm Gardens, Lionel has developed, managed and cared for the Gardens in the Forest, with partner Kingsley, over the last six years. Exploring how to encourage biological diversity while protecting the natural environment.

Dr Liz Kington - Citizen scientists: The backbone of malleefowl conservation

Dr Liz Kington, National Malleefowl Recovery Group– Lightning Presentation

Abstract

Each year, every year for over 20 years West Australians rally to the call to go 'bushwalking with a purpose'. This purpose contributes to the largest citizen science effort across Australia to monitor a threatened native species – the Malleefowl bird.

Each year, West Australian volunteers are willing to trudge through thick mallee bush under the beating summer sun to monitor over a thousand Malleefowl nests, in often remote parts of WA. From this massive effort happening across four states, national scientists tell us this 'bush-chook' is slowly disappearing from our landscape. Important information that guides policy and management programs for their recovery.

Citizen scientist volunteer commitment has ensured a continuity for this monitoring program. Training our citizens to help science 'keep a finger on the pulse' of environmental change; from threatened species to Rivercare is an underutilised and powerful tool in our future ability to prevent irreversible change.

About the Presenter

Liz has a lot of birds in her life! She is dedicated to malleefowl conservation, working in both a national and state role. At home, six pet emus roam the paddocks along with many other feathered friends. Liz studied at UWA examining the policy environment surrounding dryland salinity problems in Western Australia, and then spent 12-years working in NRM to address them. She authored the Avon region NRM strategy which identified major thresholds of potential irreversible change for the region. Her time is divided between Chittering Landcare Centre Rivercare, Malleefowl Recovery and Activate the Wheatbelt re-vegetation projects.

Dr Lucy Sheehy - CoastWA Local Government Survey

Dr Lucy Sheehy, WALGA – Oral Presentation

Abstract

The 2022 CoastWA Local Government Survey was implemented to improve understanding of the challenges and barriers to coastal hazard risk management and adaptation planning (CHRMAP) for Local Government. Broadly the Survey found that CHRMAPs were assisting Local Governments to better manage current and future coastal hazards and that the resources currently available to Local Governments were helpful. However, a number of challenges were identified for both developing and implementing CHRMAPs and that implementation of CHRMAP actions were generally behind schedule. The presentation will provide an overview of the key findings of the Survey and provide recommendations on how Local Governments can be further supported to develop and implement CHRMAPs.

About the Presenter

Lucy Sheehy is the CoastWA Local Government Facilitator based at the Western Australian Local Government Association (WALGA). Lucy's role was created to provide additional support to the Local Governments who are developing and implementing CHRMAPs. The role includes helping Local Governments to apply for CoastWA grants, particularly smaller, regional Local Governments with fewer resources. More broadly the role also facilitates greater Local Government input and participation in coastal hazard policy and projects implemented by the State Government.

Mr Luke Bayley - Gunduwa - How we collaborate and Why?

Mr Luke Bayley, Bush Heritage Australia/Gunduwa Regional Conservation Assoc – Oral Presentation

Abstract

Collaboration across the Landscape is how Gunduwa Regional Conservation Association (GRCA), Bush Heritage Australia (BHA) and BBBAC operate. This presentation will talk about how organisations can work together in complex and dynamic systems.

Badimia people have always cared for Badimia country. The Badimia Bandi Barna Aboriginal Corporation (BBBAC) is focused on Badimia barna (country) and Badimia badiwi (family). The development of this Healthy Country Plan was made possible with the involvement of a working group made up of elders, BBBAC members, and BBBAC board members for the benefit of all Badimia people now and into the future.

The lessons and understandings gained from the pain and trauma of losing in the game of native title raised the question of how Badimia can care for country going forward. BBBAC has faced this challenge by dedicating its work for country so that values, goals and strategies can be measured and achieved over time in this plan.

As a Badimia corporation, BBBAC intends to use this plan to provide sustained and growing conservation and protection of barna (country), while repairing colonial damage so that younger generations can grow to know and protect their birthright.

This means economic development, cultural tourism and ecological management can all function together. This plan will form the basis for a joint management agreement with DBCA and other partnerships with nature conservancies on Badimia country. It will also greatly assist BBBAC in applying for progressive funding to protect and manage barna (country) in a planned and beneficial way.

Healthy country means healthy people.

About the Presenter

Luke Bayley is the Head of Region for West and South Australia - Bush Heritage Australia 20yrs experience with Government, private sector and communities in development and delivery of community services, natural resource and cultural initiatives across regional and remote Australia. Luke manages a complex portfolio of land and infrastructure assets. He established and led regional Corporations and overviewed the development and implementation of strategic regional projects, on-ground works programs including the acquisition of pastoral and tourism enterprises for conservation and cultural land management programs. He has a deep appreciation of stakeholder and community imperatives necessary to achieve successful project outcomes.

Mr Manoj Barua - City of Rockingham Coastal Facilities Strategy

Mr Manoj Barua, City of Rockingham – Oral Presentation

Abstract

The City has been investing in coastal management planning over a range of timeframes, from medium term(20-50year) masterplans for specific sections of the coast, to long term considerations (over a 100 year timeline) in the Coastal Hazards Risk Management Adaption Plan. To help guide the City's provision of coastal infrastructure and outline coastal management activities in the shorter term (over the next four years) the City has developed a Coastal Facilities Strategy 2021-2025.

The Coastal Facilities Strategy sets out how the City will continue to provide for sustainable coastal recreation throughout the community, while also taking action to adapt for the effects of climate change. Extensive stakeholder consultation was carried out to develop the strategy. The strategy specifically addresses the future management of:

- Boat ramps and jetties.
- Coastal protection infrastructure (e.g. groynes, seawalls).
- Coastal management activities (e.g. erosion and sand movements) impacting marine infrastructure.
- Coastal access paths. The presentation will outline the process followed in developing the strategy and discuss key actions from the strategy. The strategy can be found in the City's website.

About the Presenter

Manoj is the Manager of Technical Services at the City of Rockingham, leading eight functions including Coastal Engineering. Manoj is a qualified Civil Engineer with a MBA degree from Curtin University. Manoj has been working in leadership roles for more than a decade in different Local Governments in Perth and Melbourne. His team has delivered many award-winning road safety, traffic management and coastal infrastructure projects. Manoj has worked in Bangladesh, Dubai, Abu Dhabi and Melbourne.

Mr Matthew Allen - C.Y. O'Connor Engineered Fringing Reef

Mr Matthew Allen, Subcon – Oral Presentation

Abstract

Conventional engineering approaches typically rely on fully emergent breakwaters or seawalls like rubble mounds, caissons or panel attenuators that use concentrated, high energy methods to reflect and/or violently break wave energy. However, naturally occurring fringing reefs (coral or rocky) which protect vast portions of the world's coastline from coastal erosion are typically submerged or partially emergent structures that attenuate energy though distributed energy mechanisms: drag dissipation and low energy wave breaking (Lowe, 2021). Drag is typically provided by canopies such as coral, macro algae or seagrass. Distributed wave breaking is the result of the reef morphology which typically causes a wave to break and reform multiple times over a wide area. A multi-functional engineered reef was designed and installed at C.Y. O'Connor beach in City of Cockburn in April 2022. The reef is designed replicate ecosystem services provided by naturally occurring reefs. The design incorporates reef canopy and morphology, as well as habitat for reef associated fishes. Dune restoration and revegetation also featured in the implementation. Testing, modelling and field trials investigated optimal reef morphologies and the performance benefits provided by canopies to wave attenuation. Design guidelines are being developed with support of the Australian Research Council.

About the Presenter

Matt is passionately enabling our ocean communities to thrive – above and below the waterline! He is a co-founder and director of Henderson based, subcon Technologies Pty Ltd. He is a member of the AICD, holds engineering bachelor degrees in Marine Engineering and Naval Architecture from the AMC and an Executive Masters in Business Administration from UWA.

Matt and the innovative design team at Subcon have pioneered engineering with nature solutions for coastal erosion control, tourism, offshore wind farms, fisheries enhancement and decommissioning.

Dr Matt Eliot – INVITED SPEAKER

Foreshore Restoration using Nature-Based Approaches

Dr Matt Eliot, Damara WA – Oral Presentation

Abstract

Foreshore restoration through planting of native vegetation is a common target on degraded foreshores, as riparian vegetation can significantly improve foreshore stability and provides valuable habitat. However, without additional support or management of pressures, a replanted foreshore is likely to return to a degraded state. Small-scale engineering works may be appropriate to enhance vegetation stability and build natural resilience.

To identify suitable actions, understanding the site and attributes of riparian vegetation is crucial when selecting a bioengineering approach. It is important to recognize that riparian vegetation is not a seawall, with different species tolerances to hydroperiod, hydrodynamic stress, trampling, pollution, and undercutting. Different forms of intervention may be appropriate during an establishment phase, and damage during extreme events may be offset by natural recovery.

Techniques to enhance foreshore restoration can include regrading, nodal hard-points, toe revetments, matting, large woody debris, brushwalls and brush mattresses. Foreshore assessment and implementation of nature-based approaches has been undertaken in the Swan River for over 20 years, supported by the Best Management Practice guidelines for foreshore stabilisation.

About the Presenter

Matt Eliot is a coastal engineer with 28 years of experience.

Ms Meg Anklesaria - Improving coastal dune monitoring and management using high precision aerial surveying technology

Ms Meg Anklesaria, Cambridge Coastcare – Oral Presentation

Abstract

Managing the increasing challenges of coastal change under rising sea levels and a shifting climate require more sophisticated technology than traditionally used by volunteers. With Coastwest grant funding, Cambridge Coastcare has undertaken aerial survey (drone) trials to document and monitor Floreat coastal dynamics to better understand sand movement, landform stability and the effectiveness of erosion control measures.

Our first trial in 2018-19, using high precision aerial surveying technology, sought to capture seasonal changes of a dune area (300 m X 134 m) between Floreat coastal paths CMB12 and CMB14 that had been subject to significant dune blowouts. Although the winter storms of 2019 were mild, limiting the extent of sand erosion, the effectiveness of the lateral fencing and mature vegetation in trapping sand was able to be determined.

To measure changes over several years, in 2021, we commenced a new monitoring trial which expanded the aerial survey to 1,540 m of the Floreat coastline including important infrastructure such as the Floreat Surf Life Saving Club. The adjacent dunes are subject to ongoing erosion from uncontrolled public access and winter storm events.

The current project will conclude in October this year but already we have some preliminary measurements. The geotagged photogrammetry imagery that has been captured and processed to develop orthomosaics (2-dimensional models) and 3- dimensional digital surface models of the dune areas allows for accurate measurement of the dune area.

The aerial survey trials have exceeded our expectations to document and measure changes in dune topography. An added benefit has been the range of ways to visually present the data so that it is accessible to everyone. The orthomosaics, 3-dimensional models and video flyovers from the first trial are available to view on YouTube, Sketchfab and the government's Data WA site.

About the Presenter

Meg is the current Chair of Cambridge Coastcare and seeks to understand the coastal dynamics of the areas within which the wonderful Coastcare volunteers undertake their biodiversity enhancement and dune conservation efforts. She is also keen to ensure their hard work is documented and shared. Meg's other roles include being a Board Director for the Energy and Water Ombudsman of WA, Deputy Chair of Perth NRM and a trained Crisis Supporter with Lifeline.

Ms Mel Horton - How to look after 17km of sand dunes – What's worked & what hasn't & moving forward from here

Ms Mel Horton, Bouvard Coast Care Group – Tour Presentation

Abstract

Bouvard Coastcare Group (BCCG) is a registered not for profit voluntary organisation that works with the City of Mandurah (CoM) to maintain the 17km southern corridor of the city's dunal system. Over 28 years, we've tried many forms of planting to stabilize the dunes and prevent sand erosion from our high westerly wind impacts – some have worked, and some haven't. In this presentation we review the following planting & protection methods, what we've learned, and how we're going forward from here. Methods: - Brushing - Brushing & tube stock planting - Tube stock planting only (without brushing) - Seeding & Seed bombing - Mature stock windbreak planting - Problems (watering/weeds/erosion/animals/vehicles) and protection methods - Generating community engagement & understanding - Moving onto the CoM Weed Mapping system & working with schools

About the Presenter

Mel Horton is from the UK and took over the Chairperson role of Bouvard Coast Care Group (BCCG) in 2017 – even though she knew nothing about the coastal dunal systems and had very limited knowledge of Aussie flora & fauna. However, as a retired company director and IT project manager she knows a thing or two about projects, management & marketing and has steered the group to become a recognised, respected, environmental, registered, not for profit organisation with significant community interest.

Dr Melinda Pickup - From the ashes: planning and predicting the need for restoration in fire-affected landscapes

Dr Melinda Pickup, Greening Australia – Oral Presentation

Abstract

An increasingly important challenge in NRM is how to respond to fires. This response can be two-fold: (1) planning to prevent biodiversity loss if a fire occurs, and (2) outlining actions to support ecological recovery after a fire event. The Black Summer fires (2019/2020) were unprecedented in terms of their scale, severity and impact on native flora and fauna communities. These wildfires also occurred in the context of many ongoing threats and stressors, which can influence the inherent regenerative capacity of fire-affected communities. The level of extent and impact of these fires highlighted the need to understand how and where restoration strategies can be used to facilitate post-fire recovery and how these can be used for risk amelioration and improving landscape resilience to future fire events.

Post-fire restoration activities may range from providing protection to allow natural regeneration through to targeted seed inputs to facilitate the recovery of non-regenerating groups or species. In this talk we present the results of a predictive framework that can be used to help identify the vegetation communities and locations in greatest need of intervention to assist natural regeneration. This framework and spatially based model focusses on fire history, fire severity, pre-fire drought and proximity to cleared areas, but also considers the context of pre-disturbance vegetation condition. For each community, we also use plant trait data such as fire response and regeneration to help identify at risk communities and develop strategies to promote resilience to future fires.

The aim of this model is to develop a practical and applicable tool to assess the need for post-fire intervention and use this model to predict which communities may be at risk under different future fire regimes. This information can be used to help predict and plan with limited resources to improve biodiversity outcomes in fire-prone landscapes.

About the Presenter

Melinda is the Manger of Seed Science at Greening Australia and is involved in improving technical aspects of many of Greening Australia's restoration projects. She holds a PhD in conservation biology (ecology and genetics) from Australian National University. Before joining Greening Australia, Melinda worked as a University researcher and teacher in Australia, Austria and Canada on projects including fire ecology, conservation and restoration genetics, evolutionary models, pollination ecology and seed biology. Melinda has had extensive experience in inter-disciplinary projects that bring together different skill sets to achieve shared goals. Melinda also enjoys science communication to improve understanding of the value and importance of Australia's unique plants and animals.

Dr Melinda Pickup, Claire Hawke, Sarah Bates and Blair Parsons - Restoration and biodiversity conservation in a rapidly changing world: planning with the future in mind

Dr Melinda Pickup, Claire Hawke, Sarah Bates and Blair Parsons, Greening Australia – Workshop

Abstract

Natural resource managers and practitioners are on the forefront of managing Australia's biodiversity in challenging environments and under scenarios of rapid environmental change. When undertaking ecological restoration – whether for habitat reconstruction or environmental rehabilitation – a key goal is ensuring that populations have the genetic diversity and adaptive capacity to survive in current and future environments.

But this leads to many questions: how do we ensure that populations have the adaptive capacity to survive in current and future environments? How does this relate to provenance and seed collection zones? How can we manage these risks but conserve the genetic integrity of extant populations? How can we include this in planning processes? How can these ideas be applied when there is a potential mismatch between what is ideal and the reality of decision making?

The aim of this workshop is to explore how we can combine practical approaches with the best available science to implement innovative strategies for seed sourcing and on-ground restoration. We will discuss and demonstrate some of the spatial tools available to aid decision making when considering climate resilient restoration. Through interaction and breakout groups we will discuss some of the key challenges in applying this to real-world NRM: (i) the need for acceleration and scaling up, (ii) integration into planning processes and project timelines, and (iii) building resilience in ecological communities.

Using a mix of group sessions and presentations we aim to discuss the challenges of these strategies and the need for monitoring and evaluation to assess the success of climate-targeted approaches – both now and in the future. A secondary aim of the workshop is to document key themes and how this translates into how we plan, prioritise and participate in assisting adaptation and innovation in a changing world.

About the Presenter

Melinda is the Manager of Seed Science at Greening Australia and is involved in improving technical aspects of many of Greening Australia's restoration projects. She holds a PhD in conservation biology from Australian National University. Before joining Greening Australia, Melinda worked as a university researcher and teacher in Australia, Austria and Canada on projects including fire ecology, conservation and restoration genetics, pollination ecology, seed biology and hybridisation. Melinda has had extensive experience in inter-disciplinary projects that bring together different skill sets to achieve shared goals. Melinda also enjoys science communication to improve understanding of Australia's unique plants and animals.

Dr Mic Payne - Coastal stakeholder partnerships in the NAR

Dr Mic Payne, Northern Agricultural Catchment Council NRM – Lightning Presentation

Abstract
This presentation outlines the formation of a new joint management group for the southern coast of the Northern Agricultural Region. Clear group consensus has identified unmanaged off-road vehicle and road-registered four-wheel drive use as the primary coastal management issue for the area. This group demonstrates the benefit of regular stakeholder meetings to facilitate project development.

In 2021, NACC NRM received Coastwest Grant Program funding to establish what was to become known as the Turquoise Coast Management Group. This group, comprising LGA and DBCA coastal managers and coastcare group representatives from between Guilderton and Green Head, has met quarterly to discuss management issues. Unmanaged off-road vehicle and road-registered four-wheel drive use impacts were unambiguously considered the top priority, with the group resolving to seek further resources to address the issue via a State NRM Community Stewardship Grant application. Further projects are planned for the future. Regular meetings between coastal stakeholders are an effective means of identifying priority threats and facilitating multi-partner projects to address them.

About the Presenter
Dr Mic Payne has been employed by NACC NRM in their Coastal and Marine Program for most of the last ten years. He has also dabbled in aquaculture, growing seahorses in Kalbarri and kingfish in Geraldton.

Mr Michael Norman - Twenty years of coast care in Sorrento and Marmion – what has been achieved and what is yet to be done?

Mr Michael Norman, Friends of Sorrento Beach & Marmion Foreshore – Oral Presentation

Abstract

"Friends of Sorrento Beach & Marmion Foreshore" have worked on the coastal reserve of for Sorrento Beach for over 20 years, and the coastal reserve of Marmion for over 10 years. Michael will present what has been achieved, how that has been verified, what innovations were introduced on the way and what is yet to be done. The presentation aims to share information that may be of assistance to other groups working on coast care activities that have a focus on terrestrial plant community restoration.

About the Presenter

Michael has been involved as a volunteer in landcare for over 40 years, initially conducting tree planting tree planting projects in regional areas then changing his focus 20 years ago to coast care and bush care projects in his local area. He is focussed on achieving lasting on-ground results, looking for best practice in restoring natural areas and educating others about the places he loves. He lives as sustainably as it can, and believes that is the biggest challenge for all of us in the Twenty First Century.

Mr Mick Davis - Working Together with Regional Officers

Mr Mick Davis, Peel-Harvey Catchment Council – Tour Presentation

Abstract

How can regional group's best support local environmental officers to combat the challenges of isolation and provide opportunities to truly collaborate with their community?

In a region that stretches from diverse Wheatbelt woodlands, through productive farming landscapes to the coast and Western Australia's largest regional city, helping environmental officers stay connected is critical for the success of all community NRM & Coastal project sin the Peel-Harvey Catchment.

Through the Regional Officers Group (ROG), the Peel-Harvey Catchment Council (PHCC) supports a strong network of environmental officers, community groups and individuals delivering environmental projects.

The PHCC's Regional Agriculture Landcare Facilitator is successfully connecting state & local government officers, community groups, not-for-profit organisations and landholders to support local workshops, on-ground community projects, and individual projects.

Meeting regularly (2-3times annually) the Regional Officers Group provides an opportunity for professional environmental officers, from Community Landcare Groups, Local Government, NRM organisations or State Agencies, across the region to share common ground, project information and maybe most important of all, a sense of fellowship and collaboration.

Following a period of hiatus from2020 –2022, the ROG was re-established in March 2022, with a view to increase the support available for local environmental officers in the Peel-Harvey.

Results from a survey of participants show that one of the highest values of the ROG is an increased feeling of support and the opportunity to spend time with other environmental professionals.

But it is also clear that these meetings, and the strong working partnerships that come from them, provide an excellent breeding ground for collaborative projects and knowledge sharing.

This presentation will show how working directly with local groups, supporting regional environmental officers, landcare groups, government and other service providers leads to outstanding on-grounds results, changes in resource condition and on-farm practices and helps to motivate and inspire NRM professionals.

About the Presenter

Mick Davis is PHCC's Regional Agriculture Landcare Facilitator (RALF), based in the Mandurah office and travelling extensively through the Peel-Harvey region.

He has a strong background in Landcare and farm extension work, having worked throughout the Wheatbelt, Peel-Harvey, Southwest, South Coast and Midwest over the last 20 years in NRM and government sectors. Mick has a degree in Environmental Biology and extensive training and experience in project management, community engagement, communications and landcare extension.

Mick's experience and interests means he brings a wealth of enthusiasm and experience to the RALF role where he works with and supports farmers, community groups and industry, to adopt new and innovative sustainable agriculture practices.

Mr Neil Carroll - Dealing with sea level rise – Evidence-based decision making

Mr Neil Carroll, City of Mandurah – Tour Presentation

Abstract

Mandurah's coastline consists mainly of sandy and limestone perched beaches and are highly valued by the community. The sandy beaches display an ongoing trend of erosion which is reducing the buffer between the ocean and adjacent infrastructure. We believe that improving our monitoring of daily shoreline characteristics, shoreline responses to storm events and beach responses to interventions such as sand renourishment or coastal infrastructure will greatly assist our day to day decision making. The natural corollary of this is a more refined and localised approach to coastal adaptation in response to predicted sea level rise.

About the Presenter

Neil Carroll has been working in Coastal Management for the past 20 years firstly as Director of the Surf Science and Technology degree at Edith Cowan University and secondly as Manager of Marina and Waterways at City of Mandurah.

Mr Neil Carroll - The Value of Coastal Monitoring in Responding to the Challenges of Sea Level Rise and Coastal Management

Mr Neil Carroll, City of Mandurah – Oral Presentation

Abstract

The City of Mandurah have adopted the following methods to monitor our beaches. All Waterways staff are encouraged to use personal observation at any opportunity as a primary surveillance tool. At a minimum, we undertake weekly photo monitoring of all of our beaches and archive these pictures with relevant tide and wave data. Cross-sectional beach surveys are undertaken monthly by our survey section. We obtain annual hydrographic survey data from Dept of Transport. We have recently installed a permanent camera at the Dawesville Surf Club which has software algorithms designed to estimate beach width and average wave height and direction. We receive daily shoreline photographs at disposal sites during the annual sand bypassing. We installed two AWACS and a directional swell buoy to assist us to collect wave and current data at a number of local beaches. Building a strong relationship with the Department of Transport and coastal engineers familiar with the local coastline is imperative in improving the sensitivity of future management strategies. Additionally, these relationships will improve technical knowledge within the organisation.

About the Presenter

Neil Carroll has been working in Coastal Management for the past 20 years firstly as Director of the Surf Science and Technology degree at Edith Cowan University and secondly as Manager of Marina and Waterways at City of Mandurah.

Ms Nicole Lincoln - You can't do it alone. Could local TV and film actor Myles Pollard be the missing jigsaw piece to behavioural change in our modern world?

Ms Nicole Lincoln, GeoCatch – Oral Presentation

Abstract

Local evidence shows that the greatest known causes of death to possums and wildlife in the Geographe Bay Catchment are cats, dogs, motor vehicles, and habitat loss. Busselton-Dunsborough area supports the last strong hold population of the critically endangered western ringtail possum, and they are currently at risk of becoming extinct in the wild if threatening process are not reversed.

Pets Away, Possums Play was launched in 2019 to remind pet owners that keeping pets (cats and dogs) contained reduces injury and death to the critically endangered western ringtail possum, and has the ripple effect of protecting other urban native wildlife.

Pets Away, Possums Play was developed using Community Based Social Marketing (CBSM) methodology developed by Canadian Social Scientist Doug McKenzie-Mohr and is being used as an alternative method to conventional awareness-raising campaigns as a way to bring about behavioural change in the South West.

GeoCatch has spent a large part of 2018–2019 developing this campaign in collaboration with community stakeholder workshops and spent 2019-2022 collaborating with key groups to help reach our target audience –the pet owner.

The campaign is supported by interventions designed to inspire, upskill and promote responsible pet ownership throughout the Geographe Bay Catchment. Pets Night In https://www.geocatch.asn.au/pets-night-in-pets-inside-saves-lives/hasbeen our most successful pet ownership interventions so far, providing pet owners with the confidence and expert knowledge on how to transition cats to living indoors, how to keep contained cats happy and healthy, what design features make a great catio (cat run) and how to train your dog to coexist with possums in your backyard.

I will convey the importance of collaboration and partnerships required to deliver a behavioural change project Pets Away, Possums Play in the Geographe Bay Catchment, and how further collaboration is required to continue fostering responsible pet ownership.

About the Presenter

Nicole Lincoln works part time as a Natural Resource Officer with GeoCatch delivering Pets Away, Possums Play a responsible pet ownership behavioural change project, while raising awareness of the critically endangered western ringtail possum in the Geographe Bay Catchment. Providing resources and coordinating events that help pet owners transition their cats to indoors or a catio helps me sleep well at night.

Dr Paul Raper - Groundwater trends and salinity risk assessment for the South-West of Western Australia

Dr Paul Raper, Department of Primary industries and Regional Development– Oral Presentation

Abstract
DPIRD monitors a network of salinity risk surveillance bores, mainly on cleared agricultural land, throughout the south-west of WA. From over 1400 surveillance bores, 900 not affected by treatments and with adequate observations were analysed for trends (rising, falling, stable), for two periods, 2012-21 and whole of record (mostly <1990- to present). Of the 900 bores, 47% had rising trends, 42% were stable and 11% were falling during 2012-21.

The results of this analysis were used to update a salinity risk assessment for the whole south-west (SW) agricultural region by mapping the bore trend in valley hazard areas, as defined by Caccetta et. al. (2010). The risk of salinity expansion in each of the 25 hydrozones that make up the south-west agricultural region was then determined by assessing the likelihood of expansion and its consequence. A risk matrix was used to assign a salinity risk classification to each hydrozone. Further spatial analyses, where groundwater trends were related to landscape position and proximity to existing salt land as mapped by Simons et al (2022), provided more precise indications of where future expansion of salinity might take place.

Groundwater models were developed for three catchments within the south-west agricultural region to assess how salinity risk may be expected to change in a drying climate. Catchments were chosen (East Perenjori, Kulin and Fitzgerald River) to represent the variability of the landscape-climate combinations found in the SW. The models were calibrated against historical groundwater data and scenarios representing wet, median and dry plausible future climates were then performed. Maps of predicted depth to groundwater were used to estimate the proportion of each catchment salt-affected under each climate scenario.

Groundwater trend data for rural town sites were analysed separately to farmland given the changed water balance. A similar process was then employed to draw conclusions about the salinity risk for each townsite for which groundwater data was available.

About the Presenter
Paul is a Research Scientist in the Agricultural Resource Management and Assessment Program within the Western Australian Department of Primary Industries and Regional Development. Based in Bunbury he is a member of the departments' water science group. He has thirty years of experience in agricultural hydrology and water resource assessment with DAFWA and DPIRD. Prior to that he worked for CSIRO, in the mining and consulting sectors and at the University of Newcastle, where he attained a PhD in hydrological modelling.

Mr Phil Steven - Mosquito Management in the Peel region

Mr Phil Steven, Shire of Murray – Tour Presentation

Abstract

The Peel region is a high risk mosquito area, predominantly because of its climate often being warm and wet, and impacted by tidal inundation. Tourists and residents are attracted to recreational activities on the coast and within the Peel-Harvey Estuary which is a key environmental asset in the region.

In the 1970s and 80s the Peel-Harvey Estuary became severely impacted by nutrients, and water quality significantly declined. A significant change to the environment by the Dawesville Cut in 1994, brought about frequent flushing of the Estuary, which improved water quality, but also spread the influence of tides, and increased mosquito breeding areas. This has led to hundreds of Ross River Virus cases in Peel residents every year.

During the 1990s, local governments in the Peel region, in conjunction with the Department of Health, development a program for mosquito treatment which monitors and treats mosquitoes, predominantly with mosquito larvicides and by helicopter. These larvicides are selective to mosquito larvae and not harmful to other organisms. Since the 1990s, it has been accepted that mosquitoes area whole of government issue. However over time, the trend has been for the Department of Planning and Department of Health to be the lead agencies for mosquito management.
Some mosquito management options are undesirable to the community, developers or the environment such as modification of wetlands and only permitting low density residential development close to wetlands.

This means that mosquito management predominantly by larvicides is the focus, until technology presents new options. Some promising possibilities include modification of mosquito gut flora which affects human disease transmission and biological treatments such as micro-crabs that digest mosquito eggs. The support of environmental agencies in the advancement of mosquito management is critical to protect the environment and human health in the Peel region in the coming years.

About the Presenter

Phil Steven has worked in local government for the last 20 years, focussing on Environmental Health, but working in the areas of Town Planning, Building Surveying and Emergency Management. He has a Bachelor of Science in Environmental Health, MBA and Master of Planning, as well as being a qualified Building Surveyor. He has worked as far south as Gnowangerup and as far north as Broome, and currently works as the Manager Environmental Health at the Shire of Murray.

Ms Rachel Austin - Seeds for Snapper: Community Powered Seagrass Restoration

Ms Rachel Austin, University of Western Australia – Lightning Presentation

Abstract

Seagrasses are critical to the ecological function and health of Cockburn Sound. They are nursery grounds for Pink Snapper and habitat for Blue Manna Crabs and Squid. They clean the water of sediment, pathogens, and pollutants. They reduce the power of ocean swell and waves to protect our beaches. However, between 1954 and 1978 seagrass coverage in Cockburn Sound plummeted from 4200ha to 900ha, primarily due to poor water quality (Cambridge and McComb 1984). While water quality has improved since then, the seagrasses have shown minimal recovery, and with other stressors increasing (e.g. climate change, coastal development) it is now imperative that seagrass restoration at ecologically relevant scales in conducted to prevent this system from collapsing. The easiest and most costeffective way to conduct large scale restoration is to use the propagules they naturally produced. In the case of Posidonia, a dominant seagrass species in Cockburn Sound, this is in the form of buoyant fruit that are released in Nov/Dec, dispersed by surface currents for a couple days, then split open to drop self-swimming seeds that can establish roots in as little as 24-hours. Seeds for Snapper uses scientific and community volunteer divers to collect this fruit in-situ prior to release by hand and net, it is then stored in circulating tanks from which the seeds are collected which are then they dispersed into restoration plots from boats. This simple methodology results in seedling densities of up to 45 per m2, compared to 0-2 per m2 in naturally seeded areas. By involving community divers, we have been able to increase our collections from ~250 000 fruit collected by a small team of university divers to over 1.18 million fruit collected by over 300 individual dives by the community, in the space of a couple years.

About the Presenter

Rachel Austin in a Research Officer at The University of Western Australia specialising in seagrass restoration. She helps coordinate, manage and analyse seagrass restoration research programs in Cockburn Sound and Shark Bay, working with community volunteers and Indigenous Rangers to help restore seagrass meadows at ecologically relevant scales.

Tania Douthwaite is a marine scientist, freedive instructor, ocean health advocate, creative visual artist, and the Founder of the not-for-profit grassroots Fremantle Underwater Film Festival. She is an active community event organizer, avid freediver and fisher, marine biodiversity conservationist, and specialist in marine safety for community freediving and scuba diving events. She gives her time and energy to her passion for human wellbeing, the ocean, marine education, sustainable fishing and protecting nature.

Steve Pursell is the Project Manager for the WA branch of Ozfish Unlimited. Steve oversees and coordinates fish habitat projects and events in city and regional areas. OzFish Unlimited is a nationwide not-for-profit charity that facilitates recreational fishers taking action for river, lake, estuarine and ocean health, primarily through habitat restoration.

Ms Rachel Austin and Ms Pat Oakley - Gathaagudu (Shark Bay) Seagrass Restoration: an alliance between indigenous culture and science

Ms Rachel Austin and Ms Pat Oakley, University of Western Australia – Lightning Presentation

Abstract

During the summer of 2010-2011 an extreme marine heatwave hit the West Australian coastline. In Shark Bay these high temperatures, combined with a flooding event, resulted in ~1310km2 of seagrass loss which caused significant ecological, economic, and cultural impacts. Since then, recovery has been observed in some areas, but with climate change set to increase the intensity and frequency of such events, restoration efforts will be critical in the long-term persistence and protection of seagrass. In response to this, The University of Western Australia and the Malgana Aboriginal Corporation formed a partnership with the goal to train Malgana Land and Sea Rangers in seagrass science, restoration, and monitoring so they live and work on country whilst protecting it, with assistance as necessary. Since then, 10 Malgana have signed up as rangers and participated in various field activities and educational workshops. In 2020 we set up a field experiment to determine how successful the transplanting of Posidonia australis and Amphibolis antarctica sprigs would be – two years later, more than 86% and 94% respectively of the transplants had survived, with substantial increases in the number of shoots present. In 2022 we set up a field trial of the newly developed 'seagrass snaggers' to determine if these sand-filled hessian bags would increase the number of Amphibolis antarctica seedlings that become established – over 100 bags were deployed and will be monitored by the rangers over the upcoming seedling season. Several workshops have been conducted, covering a range of topics including seagrass biology/ecology, restoration methods, monitoring techniques, field planning, scientific equipment, cultural integration, local indigenous knowledge, and community engagement. In 2021 the inaugural co-organised Wirriya Jalyanu (seagrass) Festival occurred in Denham which combined science, art and Malgana culture to educate and inspire the community about seagrass and Malgana culture.

About the Presenter

Rachel Austin in a Research Officer at The University of Western Australia specialising in seagrass restoration. She helps coordinate, manage and analyse seagrass restoration research programs in Cockburn Sound and Shark Bay, working with community volunteers and Indigenous Rangers to help restore seagrass meadows at ecologically relevant scales.

Pat Oakley is a descendant of the Malgana, saltwater people from Gathaaguda (Shark Bay). She is the Senior Ranger coordinator for the Malgana Aboriginal Corporation, Ranger Program. Pat and the Ranger team are fortunate to be well connected to their culture and community and are currently involved in several cultural heritage projects, to preserve and protect their natural and cultural heritage assets. Pat has embraced the opportunity to develop their team's knowledge of natural resource management and see this collaboration as a unique opportunity to combine scientific knowledge with Malgana traditional ecological knowledge in restoring seagrass (wirriya jalyanu) meadows.

Mr Ralph Talbot-Smith - Coordinating the best Coastal and Marine Mapping for Western Australia

Mr Ralph Talbot-Smith, Department of Transport – Oral Presentation

Abstract
Western Australia's Department of Transport (DoT) plays an integral part in collecting and coordinating spatial data for effective management of Western Australia's Coastal organisations. Western Australian has a coastline approximating 20,000 kilometres of marine & coastal environments of which only 25% has been surveyed and effectively mapped.

Today Ralph will be outlining some initiatives to map significant parts of the WA Coast to assist in the assessment of potential coastal inundation as a result of climate change and modelling of erosion hotspots and watchspots around the state.

Capture of this information will assist Local government, Emergency services and the whole marine and coastal community to model and educate the public on impact and mitigate risks to the community.

The presentation will also cover the AusSeabed, web portal and overview of Department of Transports Bathymetric Data.

About the Presenter
Ralph Talbot-Smith is the Manager Cartographic Services at Department of Transport, Fremantle, as well as a collaborator and coordinator for the Coastal and Marine communities.

With 40 years of experience in Land and Seabed Mapping and working in Defense, Private business, Planning, Water Corporation, BHP Engineering and Transport Marine he brings a wide range of experience to share. DoT Maritime Business Unit heads up the Coastal and seabed mapping for the Department of Transport where Ralph currently leads the cartographic team.

Ms Raphaela Raaber - Community Capacity Assessment 2021

Ms Raphaela Raaber, Perth NRM – Oral Presentation

Abstract

The 2021 Community Capacity Assessment (CCA) project seeks to understand the challenges facing natural resource management groups and volunteers in order to provide better support and planning.

The work of the Community Capacity Assessment 2021 (CCA2021) has been conducted with the adaptation of a bottom-up and collaborative approach. Namely, the project, was conducted with co-design workshops, interviews and open-ended question in the online survey that allowed for problem-solving suggestions and qualitative data collection.

To directly respond to one of the outcomes of the CCA2021 the Perth NRM Stakeholder Engagement Team took the initiative to host and initiated the Environmental Umbrella Group Collective(EUGC). This group seeks to address identified issues of the sector jointly and to enable a culture of collaborative practice, which consequently increases impact.

The final event 'Celebrating Community-Driven Conservation' was embedded in a 'Week of Action that marks the International Day for Biodiversity.' The Week of Action seeks to make Environmental Community Groups more visible in the community, including people from other interest groups and sectors and youth. The event was communicated through local community radio, newsletters, and networks.

At the event Celebrating Community-Driven Conservation at the WA Museum, survey outcomes were presented. Those include firstly the concern of aging environmental volunteering and the question of succession planning. Secondly, need for better relationships with the Aboriginal community and deeper understanding about aboriginal culture and traditional knowledge. Thirdly, the need for better collaboration and cross-sectoral engagement, in particular the question how to better cooperate to harness the benefits of environmental volunteering in the health and social sector. Lastly, the engagement and attraction of younger environmental volunteers.

To provide positive examples to the identified issues a set of Bright-Spot Case studies was presented at the Celebrating Community-Driven Conservation event, to illustrate positive projects and provide inspiration. The case studies specifically included stories of environmental education programs, Aboriginal Landcare, partnership projects between health and environmental organisations and other examples that illustrated how to attract and engage youth into environmental volunteering.

It is crucial to say that the voices of community groups and group representatives have been part of this project from the beginning, which helped make this project holistic, genuine, and beneficial to the sector.

About the Presenter

Raphaela Raaber works as a Community Engagement Project Officer at Perth NRM. Raphaela is skilled in Project Work, precisely in community engagement, capacity building, and

sustainability through creative strategies, with studies in Business Management, Social Work and Education, Community Development & International Aid and Development, and Sustainable Development. Raphaela has gained professional experience in a variety of roles. She has worked in a range of countries including islands in the Indian Ocean and the Pacific. Recently she supported the international organisation Global Island Partnership (GLISPA) on an Island Climate Change Adaptation Initiative, following her role as the Coordinator of YWCN, a sustainable and solidary organisation on the island Mayotte, in the Mozambique Channel. She is pleased to be part of the Perth NRM team as she believes that Perth NRM represents an excellent example of how to connect people and communities that are passionate about nature and sustainability, with government and NGO's, to better achieve common goals of conservation and sustainability and thrive together.

Ms Rebecca Palumbo - Building The Next Generation of Biodiversity Superheroes

Ms Rebecca Palumbo, Wheatbelt NRM – Poster Presentation

Abstract
Hotspot Heroes is a fun, family-friendly platform that engages the a wide Wheatbelt audience in natural resource management activities.

How does it do this? Introducing, Captain Numbat - a marsupial with superpowers who leads a band of Hotspot Heroes to help protect Wheatbelt biodiversity.

Hotspot Heroes uses a series of interactive tools to engage families with primary-school aged children in natural resource management activities.

Captain Numbat's toolkit includes:

- A Hero Initiation Kit containing a comic book, a packet of native flower seeds, personalised Hero ID, a certificate and a special welcome letter from Captain Numbat.
- Quarterly Hero Training Days during school holiday periods. Events are hosted where Hotspot Heroes can earn new skills in natural resource management
- Quarterly online comic containing a seasonal Captain Numbat adventure, information about Wheatbelt biodiversity, an Enviro-Story and more.
- An annual Biodiversity Challenge – where Hotspot Heroes put their superpowers to the test. The primary function of this activity is to raise awareness of the Wheatbelt's position as a Global Biodiversity Hotspot.

Hotspot Heroes was designed to be a 'slow burn', focusing on quality interactions rather than a mass-community approach. Launched in October 2021, the program has had more than 65 Hotspot Heroes join the program. In that time, two school holiday Training Days have been run with over 130 participants.

Although in its infancy, Hotspot Heroes is showing great potential as a strong community engagement vehicle. With each activity, the membership base grows and more young people are involved with Wheatbelt biodiversity.

About the Presenter
Rebecca Palumbo is the Operations Manager at Wheatbelt NRM. She is driven by a desire to positively influence the Wheatbelt community to work towards a healthy and unique environment with a sustainable and productive agriculture sector.

Mr Jermaine Davis, Mr Jermaine Davis Jnr, Mr Cale Moody - Building The Next Generation of Biodiversity Superheroes

Wheatbelt NRM – Oral Presentation

Abstract
It is well known that a key component of drought resilience is the retention, regeneration and diversification of native vegetation.

A major component of this is sourcing species that are endemic to the area and fit a diverse range of land uses. The Noongar Boodjar Rangers ancient local knowledge delivers bespoke, fit-for-purpose solutions.

The growth in demand for this type of local provenance has seen aligned growth in the Noongar Boodjar Rangers' seed collection capacity. Increased scientific knowledge, a broadening of the workforce and the purchase of specialist seed cleaning equipment has seen the Rangers reputation grow from a novel local offering to a full-service enterprise.

The seed collection component offered by the Noongar Boodjar Rangers covers the full revegetation spectrum from species identification through to seed collection, cleaning, processing and, eventually, planting.

A key achievement for Wheatbelt NRM's Noongar Boodjar Rangers is the rapid growth in the seed collection enterprise. What started as a pilot project in 2020 has growth substantially to a full-service offering in 2022 that contracts to a varied range of stakeholders. This has enabled it to become a self-sustaining initiative capable of increasing capacity and participation well into the future.

However, the greatest achievement has been the social impact to the local Aboriginal community. The enterprise engages up to 12 local Noongar Boodjar people at any one time who, through this initiative, are strengthening their connection to Country.

About the Presenter
TBC

Regenerative Agriculture Panel – KEYNOTE PRESENTATION

Abstract
Details coming soon

About the Presenter

Mr Rhys Bloxsidge - Preston Beach Dune Conversation & Restoration

Mr Rhys Bloxsidge, Shire of Waroona – Tour Presentation

Abstract

The Shire of Waroona is using drones to monitor the interior of the dune system and preserving the ongoing dune restoration work. The Shire of Waroona, in collaboration with the Preston Beach Progress Association and Preston Beach Volunteer Rangers, is working to repair and conservation the dune system. Resulting in being successful in securing funding from the Western Australian Coastwest program, for the Preston Beach Dune Restoration Project. The funding supports dune brushing and planting activities that assist in preventing 4WD access to the established foredunes, stabilising dune blowouts and reducing the impacts of erosion. Stockpiled native green waste is re-used as brushing to rehabilitate eroded dunes both north and south of the carpark. Since 2011, the success of the project has been attributed to the participation of key local community stakeholders and groups, support external funding.

About the Presenter

Rhys Bloxsidge is working in a senior capacity at the Shire of Waroona. Rhys is a skilled urban planner, cattle farmer and lover of the coast. Rhys grew up in Waroona and visited Preston Beach many times during his childhood – mainly to fish for tailor and herring with his Dad. Nowadays Rhys dives off the coast of Preston Beach for crayfish. He is a strong advocate for the protection of this part of the WA coastline and the restoration of the foredunes is particularly close to his heart.

Mr Richard Campbell - KEYNOTE SPEAKER

Customary knowledge and novel solutions for environmental and cultural benefits

Mr Richard Campbell, The Nature Conservancy – Keynote Presentation

Abstact

The marine environment, like its terrestrial counterpart, is facing ecological challenges, from the high seas to its coastal margins and estuaries. Habitat loss and environmental change is continuing apace with the loss of 90% of the historical shellfish reefs in temperate Australia representing one of the lesser realised impacts of colonial expansion and unsustainable resource use in the 19th and 20th centuries. Restoration of these ecological communities and their relevance to conservation management of the Peel-Harvey Estuary will be discussed in the context of contemporary environmental management and its deeper social and cultural context with the area's traditional owners, the Bindjareb Noongar people. We also present an overview of marine restoration programs across Australia and the opportunities for practitioner and traditional owner collaboration in facing these global threats.

About the presenter

A marine scientist with expertise in marine megafauna (sea lions, dugongs, turtles etc) who has worked across the government, university and consulting sectors. With many years of on-ground experience working with Traditional Owner and Indigenous Ranger groups in the Kimberley and Northern Territory, helping to develop and manage sea country plans, carbon abatement fire management plans and economic development initiatives. Richard also spent time working on a number of commercial fishery-related projects, including field stock assessment of abalone and scallops in Western Australia.

Mr Rory Ellyard - Quinns Beach Long Term Coastal Management

Mr Rory Ellyard, City of Wanneroo – Oral Presentation

Abstract

The Quinns Rocks coastline is an area of ongoing coastal erosion which has been actively managed by the City of Wanneroo (the City) since 1996, ensuring the ongoing protection of coastal assets including public and private infrastructure beach amenity and the natural dune environment. Historical coastal protection works include the construction of three rock groynes, a Geosynthetic Sand Container revetment, multiple beach renourishment activities and ongoing monitoring and maintenance. Despite these interventions, coastal erosion continued at a number of locations prompting the need for additional coastal management investigations and coastal protection works.

The Quinns Beach Coastal Management Study (2014-2017) included a detailed coastal processes assessment including collection of local metocean and geotechnical data and sediment transport modelling including storm induced erosion events using XBeach (Deltares) and long term longshore sediment transport modelling using LITPACK (DHI). This was followed by a coastal management options assessment and detailed design of the recommended option. Completion of the study greatly increased the understanding of local sediment transport along Quinns Beach enabling the prediction of short and long term responses to the recommended coastal protection works.

Construction works were staged over three years including:

- Stage 1 (2017/18) – Construction of Groyne 4, beach access ramp and beach renourishment;
- Stage 2 (2018/19) – Extension and upgrade of Groyne 2 and beach renourishment; and
- Stage 3 (2019/20) – Extension and upgrade of Groyne 3 and beach renourishment.

All works were completed successfully, within schedule and within budget, at a cost of approximately $7M, of which $600,000 was funded by the Department of Transport. These works are expected to reduce future coastal maintenance requirements including beach renourishment and groyne maintenance. The project was strongly supported by the local community and was instrumental in improving community perceptions of the City and its coastal management actions.

About the Presenter

Rory is a coastal engineer who joined the City of Wanneroo in 2014. Prior to this he worked for an engineering consultancy for 7 years as a coastal engineer and project manager. Rory's role at the City is Specialist Coastal Engineer and he is currently responsible for managing coastal engineering projects and operations.

Rory has actively managed coastal erosion issues and adaptation measures at Quinns Beach since 2014 which included construction of a GSC Revetment, numerous coastal engineering studies, four major groyne construction stages, ongoing annual beach renourishment works and extensive community consultation with a total expenditure of over $12M.

Ms Sally Clifton-Parks - It's not business as usual – water quality in the Geographe catchment

Ms Sally Clifton-Parks, Department of Water and Environmental Regulation – Oral Presentation

Abstract
Revitalising Geographe Waterways aims to improve water quality, waterway health and management of Geographe waterways.

Over the last 40 years water quality has declined substantially in important Geographe waterways including the Lower Vasse River, Toby Inlet and the Ramsar-listed Vasse Wonnerup wetlands.

Ongoing concerns of declining water quality led to a call for an Independent Review of Waterways Management in Geographe Catchment in 2014. The Review identified 14 recommendations, many of which have been incorporated into the RGW program.

Revitalising Geographe Waterways has taken a different approach to previous programs in a number of ways, including:

- Whole of government approach. Formation of the Vasse Taskforce (a Ministerial committee overseeing the program) and allocation of interim asset managers for priority waterways. Whole of catchment approach to water quality improvement. Reducing nutrients in rural and urban catchments, and in-situ waterway management.
- Science and monitoring informing management. A comprehensive program to inform and evaluate management actions undertaken in the program.
- Collaborative approach. Involvement of the community, industry and partners in decision making and the formation of management plans.

Results of the program have seen significant social benefits including improved liveability for residents adjacent to key estuaries through reduced algal blooms, smell and visual aesthetics of these waterways over summer. The program has also improved confidence in the community of government agencies working together to achieve water quality outcomes.

About the Presenter
Sally Clifton-Parks is a Senior Natural Resource Management Officer with DWER based in Busselton. She currently coordinates the Revitalising Geographe Waterways program. Sally has a background in environmental science and has been working for 20 years across various government agencies, NRM and grower groups. Sally has experience working in water and waterways management, NRM, agriculture and dryland salinity.

Mr Sam Bishopp - Towards a National Collaborative Approach to Managing Coastal Hazards in Australia

Mr Sam Bishopp, Department of Planning, Lands and Heritage – Oral Presentation

Abstract

As a result of advocation by Premier McGowan at the Council of Australian Governments on 9 August 2019 an intergovernmental Coastal Hazards Working Group (CHWG) was established. The role of the CHWG has been to collate existing information on coastal erosion and inundation hazard risk management to provide a national picture and recommend options for a more collaborative approach that will build resilience to coastal hazards.

Climate change is causing global sea levels to rise and will continue to exacerbate coastal hazards such as coastal erosion and inundation. Both the value of coastal assets at risk from these coastal hazards and the costs of adaptation measures to manage these hazards are substantial. Coastal erosion threats to public and private assets are being experienced in all states. While state, territory and local governments have a role to play, national leadership and improved coordination of response is needed.

This presentation will report of the findings and recommendations if the intergovernmental Coastal Hazards Working Group and outcomes so far.

About the Presenter

Sam Bishopp is a land use planning and policy professional with more 11 years specialist experience in coastal planning policy. He has a detailed understanding of the Western Australian coast developed as the Coordinator of the Coastal Management Plan Assistance Program. His key achievements include the development and adoption of the WA Coastal Zone Strategy (2017) and the intergovernmental Coastal Hazards Working Group's draft report 'Towards a National Collaborative Approach to Managing Coastal Hazards in Australia' (2022). Sam is well versed with the State Planning Policy 2.6 –State Coastal Planning Policy assisting in its implementation through providing advice on strategic and statutory land use development applications and plans.

Miss Sarah McCulloch - Automatic Detection of Coastal Vegetation Lines in Aerial Imagery using Deep Neural Networks

Miss Sarah McCulloch, City of Wanneroo – Oral Presentation

Abstract

The assessment of historic coastline movements is an important part of the coastal management and planning process. A method that is commonly utilised by coastal engineers and scientists to assess historic coastline movements is the mapping of historic coastal vegetation lines. Historically, vegetation lines have been mapped manually, which is a lengthy and time consuming process. In an attempt to improve efficiency of the process, the City has developed an automated process that identifies the vegetation line in aerial imagery through the use of deep neural network (DNN) techniques.

Georeferenced aerial images that were captured as part of the City's biannual coastal survey campaign were used to map vegetation lines. Images were classified so that the vegetation line could easily be lineated through automatic processes. The classification of images was undertaken using DNN techniques, which were derived based on the methodology developed by Abdollahi and Pradhan (2021) and the following spectral and spatial information was extracted from the raw aerial images.

- Gray Level Co-occurrence Matrix (GLCM) Mean;
- Hue;
- GLCM Homogeneity;
- GLCM Dissimilarity;
- Brightness;
- GLCM Standard; and
- Saturation.

The spectral and spatial information was then input into a DNN model that utilises each attribute and then ultimately classifies areas within the image as either 'rock', 'sand', 'water', 'vegetation' or 'background'. Once the images were classified, the vegetation lines were mapped via an automated process that identified the interface between the areas classified as 'vegetation' and areas classified as 'sand'.97

The aerial images used in this process had a distinct vegetation-sand interface and there was no requirement to define alternate vegetation lines. Moving forward, further assessment will be undertaken in coastal areas with limited vegetation, where the vegetation line can be classified as the interface between the water and other significant features such as rocky cliffs or engineered structures.

About the Presenter

Sarah McCulloch is a Coastal Engineer at the City of Wanneroo. She has over four years' experience in Coastal and Environmental Engineering and has been undertaking and developing coastal monitoring programs within Western Australia for the past four years. Sarah has a keen interest in remote sensing and is interested in developing and applying remote sensing techniques to coastal monitoring and management.

Mrs Shanika Harshani - Use of seed enhancements to rehabilitate Phytophthora dieback sites

Mrs Shanika Harshani, Murdoch University – Oral Presentation

Abstract

The plant dieback caused by *Phytophthora cinnamomi* is a major threat to Australian Biodiversity. More than a million hectares of native flora in Western Australia have been impacted. The permanent damage caused by *P. cinnamomi* leads to alteration of plant community structure and composition, reduction of primary production, extinction of floral species, and degradation of habitats of dependent flora and fauna.

Considerable effort has been put into controlling and managing, *P. cinnamomi* infestation, but it still persists in native forests. Complete eradication of the pathogen from infested sites is not possible. Therefore, attempts to rehabilitate dieback sites with P. *cinnamomi* tolerant native plant species, that can help to return ecosystem functions to the infested areas, are being made, and an innovative technique investigated for the emergence and establishment of such species.

Firstly, a vegetation survey of five, severely damaged reserves in Shire of Mundaring identified the species most affected. Seed enhancement techniques that reduce seed predation, improve germination and seedling emergence will be used to establish the native resistant species in these dieback sites. Extruded pellets were selected as the most suitable technique for reseeding. Experiments were initially carried out to determine the optimum pellet preparation method and percentages of dry ingredients required to produce pellets. Five different formulations were tested placing seeds of *Acacia acuminata, Calothamnus sanguineus, Hakea laurina* and *Melaleuca seriata* in the middle of the pellet. Next using the best pellet formulation, premade and field-deployed pellets were tested placing the seeds randomly across the pellet. 88% emergence of Acacia field-deployed pellets and 78%, 61% and 98% emergence of *Calothamnus, Hakea* and *Melaleuca* premade pellets demonstrate the feasibility of using pelleted seeds to rehabilitate dieback sites. Field trials using pelleted seeds to establish seedlings in dieback sites will be carried out in the Mundaring reserves in June 2022.

About the Presenter

Shanika Harshani is a PhD candidate at Murdoch University, Western Australia. Her research focuses on rehabilitating Phytophthora cinnamomi impacted forest sites using seed enhancement technologies. Science is her passion and she loves her research career.

Mrs Sharon McMullen - CoastWA

Mrs Sharon McMullen, Department Of Planning, Lands And Heritage – Poster Presentation

Abstract
CoastWA is the State Government's strategic response to the Assessment of Coastal Erosion Hotspots in Western Australia.

CoastWA supports planning, managing and adapting to the impacts of coastal hazards to ensure sustainable land use and development on the Western Australian coast for the long-term.

This poster explains what CoastWA is, its aim, objectives, program elements and outputs.

About the Presenter
Sharon is a coastal planning and management professional. She has more than 15 years experience having worked in roles within the Department of Planning, Lands and Heritage and the Department of Transport. She has worked on projects ranging from the Perth Coastal Planning Strategy, running the Coastal Planning and Management Plan Assistance Program, providing advice on statutory planning applications, and designing the biennial Coastal Awards for Excellence.

Dr Steve Lade - KEYNOTE SPEAKER

What is Resilience? A tour of resilience theory and practice

Dr Steve Lade, Stockholm Resilience Centre and Australian National University – Keynote Presentation

Abstract

Resilience is a slippery concept: we all have intuitive understandings about what it means, but it's hard to pin down exactly what it is. Similarly, it's easy to have the ambition of building resilience, but there's no recipe book for how to build resilience in practice. This talk us on a tour of important resilience concepts and tools from the last 50 years of resilience thinking.

This talk will present claims including: resilience is the capacity to deal with change, including the capacities to persist, adapt or transform when needed; resilience is about individuals and systems; resilience can be counter to short-term optimisation; resilience can be good or bad; resilience involves trial and error; resilience builds on multiple types of evidence; transformative change has at least three distinct phases; and seven principles can provide guidelines for building resilience.

About the Presenter

Dr Steven Lade is an ARC Future Fellow at the Australian National University, researcher at the Stockholm Resilience Centre at Stockholm University, and Science Lead at the Earth Commission Secretariat hosted by Future Earth Sweden. He uses modelling to study the resilience of social-ecological systems including fisheries, agriculture, water catchments, and the whole Earth system.

Mr Steve Pursell - Pimp My Jetty

Mr Steve Pursell, Ozfish Unlimited – Lightning Presentation

Abstract

OzFish Unlimited is a nationwide not-for-profit charity that facilitates recreational fishers taking action for river, lake, estuarine and ocean health, primarily through habitat restoration. The Pimp My Jetty project will be conducted by local Ozfish volunteers from the Peel-Harvey Chapter and will enhance private jetty habitats in the Mandurah canals with biodegradable mussel farms. Healthy mussel stocks are an essential part of aquatic food webs, but also filter pollutants and nutrients from the water, thus improving the overall health of the waterway.

Mandurah residents have noticed a decline in mussel populations over time, this is partly due to increased algal growth caused by excess nutrients. When algae covers much of the natural hard substances in the system, there are limited spaces left for mussels to settle and grow. The Peel-Harvey OzFish Chapter hopes to help out the blue mussels by increasing the surfaces available for them to grow on with the installation of biodegradable habitat structures.

Community volunteers will have an opportunity to participate by helping to construct the habitats and install them prior to next winter when the mussel spat will be seeking settlement sites. By the time of the WA State NRM and Coastal Conference we will have completed the early stages of the project, including habitat installations, and will report on the progress to date.

About the Presenter

Steve Pursell is the Program Manager for the WA branch of Ozfish Unlimited. Steve oversees and coordinates fish habitat projects and events in city and regional areas.

Dr Stuart Dawson - Feral pig control in the WA agricultural landscape

Dr Stuart Dawson, Department of Primary Industries and Regional Development
– Oral Presentation

Abstract
Feral pigs are a nationally significant vertebrate pest found in many regions throughout Australia. Feral pigs damage environmental and agricultural assets, as well as having a range of social and cultural impacts. The northern agricultural zone of WA experiences some of the highest densities of feral pigs in Western Australia, where they dig up and disturb native vegetation, foul waterways and dams, consume and trample crops, predate livestock, and damage fences. Since 2018, the Department of Primary Industries and Regional Development have monitored feral pig activity in the Northampton region using a network of 40 camera traps, and by deploying 47 GPS tracking collars, in order to assess the effect of annual aerial shooting operations. The population of feral pigs is heavily driven by food availability, with populations responding rapidly to productive years with bumper harvests. Feral pigs are sampled post-harvest each year, and more than 95% of food within stomachs of sampled pigs was representative of crops grown in the area; mainly wheat, lupin and canola. Feral pigs were not restricted to remnant native vegetation or reserves, but spent a significant proportion of their time moving through, grazing, and resting in paddocks. There was a detectable reduction in activity of feral pigs at camera monitoring sites following aerial control, however the high fecundity of feral pigs allows numbers to increase quickly. Our results indicate that effective feral pig control must be carried out year-round, and while annual bouts of intensive control (such as an aerial shoot) may be highly effective in the short term, they are insufficient to achieve lasting control. Similarly, effective management of feral pigs requires a nil-tenure approach, as they readily move between the agricultural and native vegetation matrix.

About the Presenter
Stuart Dawson is a wildlife management scientist with the Department of Primary Industries and Regional Development, working primarily on feral pigs and deer. Stuart has more than 10 years of experience in research and industry. Stuart has conducted research on management of wild dogs, kangaroos, and feral cats, as well as conservation of bilbies, freshwater turtles, and landscape management in the savannah of northern Australia.

Miss Tasmin Lancaster - Population persistence of *Hakea victoria* in a fire-prone landscape

Miss Tasmin Lancaster, Friends of the Fitzgerald River National Park – Oral Presentation

Abstract

The size and vigour of plant populations in fire-prone environments is dependent on the biological attributes associated with a species life stages, including time to maturation, seed production, and fruit and seed size. These attributes fundamentally influence the probability of a population's survival and/or recruitment following disturbance by fire. In this regard, the more we understand about plant age and each life stage of fire-sensitive vegetation the better we are able to predict a species response to changing fire regimes and guide fire management practices to protect our native flora. Hakea (160 spp.) is confined to the woody-fruited Proteaceae and forms a prominent element of fire-prone sclerophyll vegetation on nutrient-deprived soils of south-western Australia. *Hakea victoria* (Royal Hakea) is a highly serotinous non-resprouter (obligate seeder), which regenerates from seeds stored on the plant within woody fruits for release after fire. Most woody fruited Proteaceae retain their seed for an average of five or more years, progressively accumulating seed with successive reproductive events. High seed production is particularly important for nonresprouters, which rely solely on the survival of their seed for post-fire recovery. Seed-release is often caused by fire that results in plant death, with subsequent recruitment maximised when seed release follows fire. Consequently, fire frequency is likely to be a critical factor in determining the survival of *Hakea victoria*. Too frequent fire prevents plant maturation and therefore seed production, and very low fire frequency potentially limits recruitment opportunities and increases the risk of granivory. Relatively little is published on *Hakea victoria*, which reduces the likelihood that current land management practices (e.g., fire regimes) will be appropriate for the species. Although the species is currently noted on Florabase as 'not threatened', its restricted distribution greatly increases the risk of extinction. This project aims to identify the age (i.e., maturity) in which *Hakea victoria* populations have the highest probability of survival and/or recruitment following disturbance by fire by analysing life stages including seed production and seed viability over time.

About the Presenter

Recently graduated from the University of Notre Dame with a Bachelor of Environmental Science (Minor: Biology). Currently completing an Honours year while working full-time in the Environmental sector of the Shire of Murray.

Mr Tom Mansfield - Quendas lose habitat and forage less in Phytophthora Dieback infestations

Mr Tom Mansfield, Murdoch University – Oral Presentation

Abstract

Digging mammals play key roles in ecosystems, with their bioturbation enhancing ecosystem processes such as nutrient cycling, fungal community enhancement, and seed retention. Populations have been severely reduced in southwest Western Australia, resulting in marked impact on ecosystem health. The quenda is one of the few digging mammal species living outside of protected areas in WA, and populations are potentially threatened by habitat degradation and fragmentation. A major cause of vegetation loss in southwest Western Australia is *Phytophthora cinnamomi*. This introduced root pathogen has caused significant impact on the jarrah forest, an ecosystem that has recently been listed on the 2022 Intergovernmental Panel on Climate Change (IPCC) report as being at risk of collapse from climate change. There is a substantial knowledge gap regarding how these infestations affect wildlife, which may be hindering wildlife conservation efforts.104

We investigated how quendas are impacted by *Phytophthora cinnamomi* infestations by surveying habitat vegetation and seasonal quenda foraging activities on the Darling Scarp in the Shire of Mundaring. Although pathogen-affected forest is less suitable for quenda, they still use grasstrees that persist within infestations; evidenced by quenda tunnels in their downturned skirts. However, quenda-habitable grasstrees used for nesting were 45% lower ($p = 0.007$) in the presence of the pathogen, low-shrub plant cover used for movement and shelter was 46% lower ($p < 0.001$), and numbers of quenda diggings declined by 33% ($p < 0.001$). Reduced quenda activity would in turn influence ecosystem functions, including reduced water infiltration, seed retention and seedling recruitment, as well as reduced dispersal of important mycorrhizal fungi.

Phytophthora cinnamomi infestation is widespread, substantially overlapping with the quenda's geographic distribution. Decreased foraging resources for these ecosystem engineers may be causing further deterioration in ecosystem function, making research and management directed towards *Phytophthora cinnamomi*-mediated habitat degradation a priority for wildlife conservation

About the Presenter

Tom Mansfield is undertaking his final year of a PhD in ecology at Murdoch University. His research focuses on the effects of *Phytophthora* dieback on bandicoot habitats and fungal food sources. Tom is passionate about scientific communication, having presented at multiple conferences including the Ecological Society of Australia Conference and the Western Australia Biodiversity Conference. Through his research, Tom aims to improve understanding and awareness of native wildlife and fungi, and the important roles that they play within ecosystems.

Ms Yvette Caruso - Coastal Hazard Adaptation Concept Planning - Ocean Beach

Ms Yvette Caruso, Shire of Denmark – Lightning Presentation

Abstract

Ocean Beach is Denmark's primary beach, popular with locals and tourists, used all year round, with a very active community Surf Life Saving Club. Activities include swimming, surfing, boating & fishing with associated surf club, kiosk, public amenities, angling club, and boat ramp facilities.

Impacts from climate change, coastal erosion, rising sea levels and extreme sea level events coupled with increasing population demands and environmental pressures on coastal environments prompts the need for development and implementation of site concept planning that links adaptation and mitigation strategies.

Coastal hazard risk management and adaptation planning is an integral part of decision-making for sustainable development and land use in the coastal zone.

Focus is on coastal areas with current erosion trend, narrow foreshore reserves, low relief, inadequate coastal protection works – to assess distance required for buildings & structure placement to absorb erosion from ESL's, erosion and accretion.

About the Presenter

The Shire of Denmark's coastal reserves are highly valued by the community and represent a significant asset providing tourism and recreational opportunities as well as environmental conservation and socio-cultural values. The Shire recognises the ongoing need to protect our pristine coastal ecosystems, ensuring consideration of ever-increasing threats such as population pressures, visitor demands and impacts from coastal erosion, climate change and extreme weather events in future sustainable management planning consistent with community expectations. In her role as Sustainability Officer, Yvette is involved in strategic reserve management and coastal hazard planning. Adaptive management, planning policy and community engagement for the protection of our coastlines is imperative for the ongoing sustainable management of the Shire's coastal reserves.