NATIONAL REWILDING FORUM 2016: OUTPUTS SUMMARY, DISCUSSION AND NEXT STEPS

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Table of Contents

Glossary of terms

Term	Meaning
Apex predator	Large predators at the top of a food chain not subject to predation
Assisted colonisation	Human-assisted movement of species beyond their present range
Compassion fatigue	Community apathy resulting from the volume of negative messaging
Critical Weight Range mammals	Mammals between 35g and 5500g considered vulnerable to extinction
De-extinction	Cloning or genetically engineering an individual of an extinct species
Ecological surrogates	Species introduced to fill a vacant ecological niche
Keystone species	Species with a disproportionately large influence on ecosystem function
Megafauna	Large or giant vertebrates
Mesopredator	Medium-sized mid trophic level predator subject to predation
New nature	Patterns of animal abundance, distribution and interactions resulting from human activities
Shifting baseline	The incremental change of ecosystem measurement benchmarks over time influencing assessments of conservation performance

Introduction

Rewilding as a conservation ethos has gained in prominence worldwide since its conception in 1998 (Soulé and Noss 1998) and more and more organisations are identifying as being involved in rewilding. The autumn 2016 issue of NPA's quarterly journal, *Nature NSW,* aimed to introduce different forms and interpretations of rewilding to NPA members and the general public more broadly. Feedback on the articles, as well as questions raised in ecological scientific literature (Seddon et al. 2014, Jørgensen 2015, Corlett 2016, Nogués-Bravo et al. 2016, Prior and Ward 2016) led to the idea of a rewilding forum where some of the outstanding issues surrounding rewilding in an Australian context could be discussed, with the intention of investigating whether there was common ground among conservation practitioners, advocates and academics as to what constitutes rewilding in Australia, what the goals of rewilding may be and how goals could be progressed.

Invites went to 116 individuals and organisations that were identified as being active or having an interest in rewilding programs in Australia. Forty five people attended the forum, as well as eight NPA staff to assist in capturing the outputs (Appendix 1). This document comprises a summary of the outputs generated by participants, a discussion of those outputs and suggestions on next steps.

The forum was funded by National Parks Association of NSW, Taronga Conservation Society, Conservation Volunteers Australia, and the FAUNA Research Alliance.

Session one: Scoping rewilding in Australia

Session one aimed to gather the views of participants as to what activities constitute rewilding and what should not be considered rewilding. The objective of this session was to identify areas of agreement and disagreement and problem elements for future discussion and progress.

The outputs from session one are contained in Table 1. Note that similar input from different groups has not been consolidated and therefore some ideas and activities appear more than once. This session also identified several question areas that were discussed further in the course of the forum.

Questions arising from session one:

1. The ocean: rewilding in the ocean requires a different approach as the borders are different and more difficult to define
2. What timescales are we aiming for with rewilding? Evolution is a dynamic process and should we aim forwards or backwards?
3. What is the role of feral / invasive species and their management in rewilding?
4. Defining baselines: shifting baselines means it is difficult to identify an ideal end state
5. How does rewilding integrate into connectivity conservation?
6. Fences: although fenced areas cannot be considered wild, they have a role in rewilding as a stepping stone to the goal of achieving broader landscape function.
7. The use of 'trump card' species: although some of these species may have important ecological function and can be used as a charismatic / flagship species, they can go wrong (example given of Oryx and disease) and the focus on charismatic species can be tokenistic
8. Australia is very different to Europe and has a major issue with introduced predators
9. Funding—where will it come from and how will it be sustained?
10. Are non-native ecological surrogates socially, ecologically or politically appropriate?
11. Australians need to learn to love wildlife: how can we achieve this?

Table 1: Activities and ideas that were identified as constituting rewilding and those identified as not rewilding

Rewilding is…	Rewilding is not…
• Optimising the biodiversity of an ecosystem • Giving control back to nature and changing the emphasis from holding what we have now – including in National Park management • Existing activities (e.g. reintroductions) conducted in a holistic context • Using the paleo record to see how things have changed and to inform rewilding under future climate • A means to restore ecosystem function, leading to better environmental health for flora and fauna and 'future proofing' landscapes • Restoring interactions between species, including predation and parasitism and ecological processes • Reducing the need for human control of pests species as natural processes take over • The reintroduction of species to areas of their former range • A complementary approach to other conservation initiatives—not a replacement • Using indigenous knowledge • Engaging the community in decision making • Restoring ecosystem resilience and adaptability using climate modelling and the paleo record • Restoring ecological processes that permit ecosystems to become self-sustaining • A 'total ecosystem' approach—i.e. considers ecosystems in their entirety and not components in isolation • Appreciating the role that predation plays and the necessity of predation in ecological systems • Adaptive, and should accommodate the 'new nature' • Restoring ecological processes and ecosystem function	• De-extinction (the creation of Jurrasic Park) • Recreating a given point in history or an idealised time period • Using non-native species as ecological surrogates • Threatened species recovery actions • A mammal-centric concept, it's an ecosystem approach • A complete lack of management intervention • De-extinction. This has potential to confuse the issue and divert funding • Restoring a perfect picture or ideal state of the past—extensive human settlement is in the picture now • Ruling out the use of ecologically important species because they are considered socially unacceptable • The use of animals as tools or quick fixes • Single species reintroductions solely to conserve that species (ecological function must accompany this)

Rewilding is…	Rewilding is not…
• A long-term vision • Applicable at multiple scales • Encompassing different types of landscapes • Connecting nature to people and communities • A focus on native wildlife • Restoration of ecological processes in the wider landscape • Increasing ecological resilience (including through genetic diversity) • Increasing biodiversity • Increasing connectivity on a landscape-scale • Beyond fences—fences are stepping stones to wider landscape outcomes in a staged process • Maximising genetic diversity • Achieving a social license for activities	

Session 2: Identifying common goals of rewilding in Australia

Following the scoping session, tables were asked to brainstorm the goals of rewilding in Australia and put forward their five main goals. Goals that addressed a common theme were clustered together as participants presented their goals to produce six overarching goal themes that would be workshopped in session 3. The six goal themes, and the goals that contributed to them, were:

Goal theme 1: Vision and strategy

Contributing goals:

1. We need to develop and articulate a vision and strategy for rewilding
2. A national rewilding network should be established
3. Rewilding can be a means to offer creative solutions to both inherited and novel problems (such as tackling introduced megafauna)
4. We need to be bold and take risks to restore ecosystems on a continental scale, and therefore NGOs are important drivers
5. We need action (get on with it!)

Goal theme 2: Ecosystem function

Contributing goals:

1. Secure critical weight range mammals via the restoration of apex predators
2. Increase ecosystem function and resilience in key landscapes
3. Actively restore ecosystem health
4. Restore functional ecosystems that are resilient to future challenges
5. Create self-sustaining ecosystems with fully functioning ecological processes at all trophic levels
6. Ensure outcomes are self-sustaining, both ecologically and economically

Goal theme 3: Scale and scope

Contributing goals:

1. Work on a continental scale considering connectivity and climate change
2. Rewilding goes beyond fences by promoting coexistence between native and introduced species via ecological interactions and co-evolution
3. Rewilding works across boundaries, including state boundaries, sector boundaries (i.e. government and non-government) and tenure boundaries (private and public land)
4. Rewilding applies to all ecosystems, including marine, freshwater wetlands and terrestrial

Goal theme 4: Community and social

Contributing goals:

1. Rewilding engages and inspires the community as to the intrinsic value of wildlife
2. The community is actively engaged and recognises the value of rewilding and its contribution to wellbeing
3. Rewilding incorporates indigenous knowledge to increase awareness of Australia's nature
4. Communication between urban and country communities helps drive social change to ensure rewilding can progress
5. Cooperation between indigenous and non-indigenous communities ensures empowerment, acknowledgement and cooperation
6. Sustainable economic benefits accrue to communities as well as ecological sustainability
7. Community values wildlife both intrinsically and economically
8. Rewilding achieves a high level social license

Goal theme 5: Research

Contributing goals:

1. Establish proof of concept for Australian rewilding
2. Establish an evidence base to support rewilding and it's values
3. Implement a strong research base and integrate into rewilding efforts
4. Identify research opportunities that support rewilding objectives

Goal theme 6: Policy

Contributing goals:

1. Influence policy and change policy paradigms
2. Resourcing of rewilding programs is sustainable and long-term
3. Institutional structures support rewilding (could apply to government and organisational structures)
4. Strengthen regional management for integrated programs of wildlife conservation and control of feral species across tenures
5. Remove barriers to rewilding (streamline approvals and policy settings)

Session 3: Success factors and obstacles to achieving goals

Having identified goals and grouped them into six goal themes, session three asked participants to each choose one of the six themes that they would work on to identify the critical success factors to achieving goals, and any obstacles that must be overcome along the way. The three most important factors were then identified and reported back to the forum.

Goal theme 1: Vision and strategy

This group chose the goal of articulating a vision and strategy for rewilding in Australia that was innovative and bold. The aim was to align people's thinking, inspire people and encourage participation.

Table 2: Success factors and obstacles to articulating a vision and strategy for Australia

Success Factors	Obstacles
• An inspirational vision (fresh ideas) • Multi-level strategy • Managed work load • Dedicated resources • Accountability • An independent lead author • Shared ownership • Value-adding to existing initiatives • Define the criteria for a rewilding network • Present vision in an accessible way • Multi-stakeholder (government, NGO, public) • Involve the public via website, maps • Provide a platform for debate and manage conflicting views • Persistence in a long process • Project / program focus rather than organisational	• Differing agendas and competing interests between organisations • Achieving cross government agency involvement • Adequate funding • A commitment to be genuine key players

Top three factors identified by the group:

1. An inspirational vision
2. An independent lead author that is trusted by groups
3. Overcome competing interests between organisations

Goal theme 2: Ecosystem function

Functional ecosystems were defined by this groups as those where representative trophic levels are resilient and healthy, and ecological processes are as close to self-sustaining as possible (meaning a reduced requirement for management). Feral plant and animal control and restoration of native species are valid considerations in the context of ethical welfare guidelines.

Table 3: Success factors and obstacles to restoring ecosystem function

Success factors	Obstacles
• Ensuring outcomes of pest animal control are adequately monitored • Prioritise native species • Keystone predators perform their ecological role • Ongoing management with a goal to self-sustaining ecosystems • Choose a strategic location with a high chance of success	• Public relations problems • Aligning community animal welfare concerns with realities of ecological processes • Introduced megafauna and a lack of tools to cope with these

Top three factors identified by the group:

1. Management intervention (of feral animals, weeds, water and terrestrial habitats) should be minimal after an 'initial push' (the push will differ depending on the habitat type)
2. Choose locations carefully as success is important (temperate fringe may be best start point as challenges of larger feral megafauna in the outback are difficult, and we have a reference ecosystem in Tasmania)
3. Solve the keystone predator issue (varies depending on location within Australia)

Goal Theme 3: Scale and scope

This group focussed on 'no boundaries'. This was defined as rewilding occurring on a large scale with multiple contributing stakeholders, but with regional management occurring through adequately funded organisations.

Table 4: Success factors and obstacles to overcoming boundaries and achieving large-scale rewilding

Success factors	Obstacles
• Consensus between stakeholders and the public (long term vision required) • Feral species managed permanently and on a large scale (e.g. Booderee National Park) • Definitions of success and means to measure • Work occurs across tenure	• Funding is inadequate for the scale of the problem • Fragmentation of effort when attempting to deliver national projects on a local level • Public opposition to 'no boundaries' • Large spatial scales • Staff turnover • Large time scales

• Strengthen regional Natural Resource Management capabilities • Coordination between organisations • Long-term vision and investment doesn't match current patterns (e.g. 5 year plans) • Regional engagement and ownership • NGOs have a role on private land

Top three factors identified by the group:

1. Consensus between stakeholders and the public and a long term vision
2. Feral species managed permanently and on a large scale
3. Definitions of success and a means to measure success

Goal Theme 4: Community and social

This group chose the goal of increasing community engagement, awareness and involvement in rewilding. In particular the group sought to develop a comprehensive understanding of the range of attitudes and perceptions regarding ecosystem function and the role of rewilding and to use that understanding to develop and deliver targeted community engagement and awareness strategies.

Table 5: Success factors and obstacles to increasing community engagement in rewilding

Success factors	Obstacles
• A skilled social research group • Best practice communication • Tapping into existing networks of landholders and indigenous groups • Good use of social media • Identifying champions for change • Identifying ambassadors / figureheads	• Compassion fatigue leading to reduced community engagement • Urbanisation and lost connections between the public and nature • Differing perceptions and values between groups • Heterogeneity of the community • Cultural values that don't accommodate nature • Lack of political support • Perceived conflict between conservation and production

Top three factors identified by the group:

1. Engage a good social research organisation to identify the key stakeholders, values and perceptions
2. Use best practice community engagement
3. Access existing knowledge—both indigenous and non-indigenous

Goal Theme 5: Integrated research

The goal of this group was to develop a research strategy to demonstrate to the public that rewilding leads to healthier ecosystems and a healthier economy.

Table 6: Success factors in designing and integrating research into rewilding efforts

Success factors	Obstacles
• Showing visible change (evidence) • Designing suitable trials for proof of concept • Maximising chances of success via targeted questions • Developing standards and protocols to guide rewilding	

Top three factors identified by the group:

1. Do a proof of concept that demonstrates change visible to non-specialists
2. Sell rewilding to the public choosing project that will maximise the chance of success (e.g. close to cities to get media and politicians involved)
3. Develop rewilding monitoring protocols to maximise learning opportunities and avoid re-inventing wheels (e.g. for monitoring before and after)

Goal Theme 6: Policy

The policy group aimed to articulate how and why rewilding should occur including the social, economic and environmental implications and stressed the need for a bold statement of intent such as 'Extinction Free Australia'.

Table 7: Success factors and obstacles to progressing policy to facilitate rewilding objectives

Success factors	Obstacles
• Look at past policy reforms and identify the catalyst • Changing mind sets • Pilot programs to demonstrate outcomes • A positive communication strategy and a positive message • Highlighting the benefits (economic, aesthetic, cultural and personal) • Federal government leadership role • A policy direction • Link to International Union for the Conservation of Nature (IUCN) and ACIUCN for international guidance on translocations and best practice	• Risks of introducing predators • Clarifying the problem and vision (what are we trying to achieve?) • Developing a clear policy objective • Developing a holistic focus (wildlife, ecosystems and economy) • Identifying the next steps to fencing • Flora and habitat have become a surrogate and fauna less important • A lack of partnerships and community engagement • Losing the fundamental meaning of rewilding (diluting the message) • Amount of funding and the necessary timeframes

Top three factors identified by the group:

1. Establish a steering committee to develop a national conference
2. Host a national forum to facilitate and policy paper and communication strategy for rewilding that could be tabled to government for policy development
3. Clarify the obstacles and key issues as to why we should pursue rewilding

Session 4: Progressing the goals and next steps

The final session sought to progress the goals and identify potential projects and initiatives. Participants were asked to develop ideas for any of the six goals, describe these in more detail and outline key steps, resources and owners. The resulting initiatives are listed in the table on the following page.

Table 8: Project initiatives produced by forum participants to progress rewilding including expected outcomes and the necessary steps and resources

Project name	Description	Outcomes	Key steps	Resources required	Owners
Fences down	Removal of boundary fences to share issues with the community and lead to community feral animal control, improved networks enhanced connectivity and cooperation	1. Enhanced connectivity 2. Natural fauna movement 3. Removal of social boundaries 4. Enhanced community ownership	1. Identify trial location (farm, dingo fence, emu fence) 2. Engage local community 3. Identify species to monitor 4. Establish reverse fencing or invisible fencing 5. Monitor 6. Communicate findings	1. Community 2. Landholders 3. Researchers (academics, NGOs) 4. Community support network 5. Media 6. Education program and resources 7. Identified zones	Phil Palmer (Bush Heritage)
Community behaviour change	Everyone is Australia has a role in rewilding and the urban majority become aware of the diversity of urban wildlife and alter pet ownership behaviour as a result	1. New behaviour becomes the norm 2. Easy to follow actions 3. Clearly communicated and easily explained	1. Local government involvement 2. Local community group involvement 3. 'Sustainable schools' model 4. Vegetation mapping (identify habitats and gaps)	1. A national toolkit that is flexible enough to be applied locally across Australia 2. Citizen science apps 3. Volunteer wildlife groups (e.g. WIRES)	Gary Fry (Taronga Zoo); Diane Latta (NPA)
De-fencing Australia	Experimental removal of fences and investigation of alternatives to fencing on farms to restore habitat connectivity on a large scale	1. Enhanced connectivity 2. Information on alternatives to fencing (bio-fencing, guardian animals) 3. Enhanced ecosystem function	1. Identify the threats driving fencing (dingoes, macropods or grazers, weeds) 2. Achieve stakeholder support (incentives may be required) 3. Communicate proof of concept 4. Remove the 'scare factor' 5. Staged approach with early adopters in areas with and without threats	1. Funding (to provide incentives) 2. Community support 3. Political will 4. Stakeholder buy-in 5. Human resources (research	Kellie Leigh (S4W); Hayley Bates (UNSW); Madeline Lalor (Uni Newcastle); Cathy Merchant (NPA)

			6. Monitor small mammal communities and ecosystem function		
Tasmanian devils on the mainland	Tasmanian devils evolved on mainland Australia. They play a significant role in ecosystem function in Tasmania suggesting a function has been lost on the mainland	By 2020 a population of Tasmanian devils is secure on the mainland where their impacts on feral animals in regards competition, predation and altered behaviour can be tested	1. Identify literature that supports the concept 2. Define the experimental design and monitoring 3. Resource the reintroduction 4. Community consultation (preliminary and ongoing) 5. Understand baseline ecology of release site	1. Political will 2. Cross government and agency cooperation 3. Funding 4. NGOs to assist in coordination and community engagement	Madeline Lalor (Uni Newcastle); Rob Brewster (Rewilding Australia)
Dingo reintroduction	Relocating the dingo fence so that Sturt National Park is moved north of the fence	The trophic influence of dingoes is tested via a before and after experiment	1. Develop a clear narrative (costs and benefits) 2. Address community concerns and opposition 3. Communicate 4. Ensure means to address potential dingo predation / hyperpredation	1. Social science support 2. Government support	Tom Newsome (UNSW); Andy Sharp (SA DEWNR); Lachlan Howell (Uni Newcastle)
Rewilding supports regional economies	Prove through targeted trials that rewilding can help diversify regional and local economies	Rewilding initiatives are a win for communities and a win for biodiversity so communities achieve ownership and appreciate the benefits	1. Incorporate social and cultural values of community in project design 2. Identify and support community champions 3. Build local partnerships 4. Community and practitioners work together to plan, implement and manage rewilding efforts 5. Communicate (social media, youth programs) 6. Monitor and market success	1. Secure government funding 2. Secure non-government funding 3. Human resources (related to above)	Kevin Evans (NPA)

Devils v foxes	Tasmanian devils are reintroduced into at least two sites (Barrington Tops and Orange) to test their impact on foxes	Information gathered on the nature of devil / fox interactions and whether devils can play a keystone role	1. Fenced enclosure as first release	1. Political will	Helen Smith (NPA); Mike Letnic (UNSW); Menna Jones (UTAS)
Embedding disease risk assessment in translocations and reintroductions	Identify potential disease risks and establish processes to manage risk	1. Human intervention does not increase the risk for wildlife disease 2. Translocated and wild populations are healthy	1. Gather existing information on disease 2. Identify knowledge gaps and how to fill them 3. Prioritise diseases for investigation 4. Test, quarantine and treat animals prior to translocation 5. Monitor populations 6. Develop a national database and sample archive	1. Technical expertise 2. Guidelines 3. National policy	Andrea Reiss (ZAA)
Devils in south-west Victoria	A single-sex trial reintroduction of Tasmanian devils into a 60,000ha reserve subject to >10 years of intensive fox baiting	1. Test the efficacy of devils as a top-down tool to manage mainland temperate ecosystems 2. Determine whether observed perverse outcomes from baiting can be reversed 3. Subject to 1, test a self-sustaining wild population 4. Pave the way for reintroductions of other lost species	1. Community consultation 2. Develop experimental design 3. Obtain approvals and source devils 4. Implement and monitor 5. Review, refine and progress goals 6. Conduct trials elsewhere	1. Lead NGO 2. Partner organisation 3. Research partner 4. Funding (staff) 5. Permits (scientific and ethics) 6. Devils 7. Equipment	Mark Bachmann (Nature Glenelg Trust)

		using Tasmania as a reference site			
Process driven vision and strategy for Australia	Identify ecological processes that have been altered by invasive species, lost predators and ecosystem engineers and put in place bold solutions	Improved ecosystem health	1. Manipulate processes (e.g. via Tasmanian devil reintroduction to Barrington tops, cats in midland Tasmania) 2. Address public and political misunderstandings and fear 3. Provide a space for researchers and NGOs to collaborate to ensure risk is spread	1. Locations 2. Funding 3. NGO partner (AWC?) to help overcome public and political hurdles 4. Meetings 5. Online fora 6. Websites (Rewilding Australia?)	Mike Letnic (UNSW); Menna Jones (UTAS)
Establishing priority areas for rewilding in Australia	Priority areas should be in locations where actions are feasible, with high connectivity, high value for eco-tourism, high conservation value, a receptive community, and be of a sufficient size	1. A tool to help guide stakeholder decision making for rewilding initiatives for use by NGOs, landholders and government	1. Develop a steering group of land managers, experts (research, NGOs), traditional owners and politicians 2. Identify willing landholders and regional organisations 3. Raise money 4. Develop a criteria (tool) to decide on priority areas	1. GIS mapping expertise 2. Community and landholder surveys 3. Communication strategy 4. Collaborate with Atlas of Living Australia	Bob Debus; Leah Kemp (AWC); Mark Anscombe (WWF); Vince Scoleri (UTAS); Margot Law (NPA)
Rewilding data capture	To analyse the results of past reintroductions, and ensure future reintroductions provide release data (who, what, where, when, sex ratio etc) to regulator, ALA, museum	1. Compare extant animals with reintroduced to see whether reintroductions have influenced Area of Occupancy / Extent of Occurrence	1. Share data 2. Monitor reintroductions closely	1. Student + supervisor	Peter Mawson

		2. Improved reintroduction protocols 3. Reintroduction handbook and/or template			
Identifying metrics for baseline monitoring	Identifying ecologically meaningful, practical indices to measure before, during and after rewilding	1. Indices identified (e.g. ecological engineers) 2. Response variables identified (e.g. soil health, water quality, vegetation quality) 3. Means of monitoring identified (e.g. teabag index)	1. Establish protocols 2. Identify key sites 3. Share data	1. Academic researchers 2. Volunteers to undertake monitoring 3. Conservation Volunteers Australia	Ben Holmes (CVA); Dave Watson (CSU)

Other brainstormed ideas not developed due to lack of time included:

1. $100 million funding for Rewilding Australia
2. National summit to engage policy makers and stakeholders and develop a rewilding policy paper
3. Link revegetation with reintroductions
4. Mosaic burning to minimise the risks of predation on critical weight range mammals
5. Prepare a manual for rewilding reintroduction handbook (although referenced above)
6. Persuade a small number of landholders to start rewilding to get a snowball effect
7. Rewilding Yorke project (300,000 hectares)
8. Pooling experience to understand the role of rewilding
9. Rewilding Shane's Park project

Discussion

Despite being attended by a wide range of organisations with diverse interests and focal areas, the forum provided useful insights into perceptions and priorities in relation to rewilding and identified a substantial amount of common ground. There were people and organisations who were not represented and who would have added value to the forum (Appendix 2), but nonetheless it was surprising how easily the forum participants identified common goals (the themes in Session 3) and how different stakeholders identified similar potential projects in Session 4. There were several themes that recurred throughout and which are discussed in more detail.

Ecosystem function

The goal of restoring ecosystem function—including ecological processes and interactions between species and trophic levels—to promote self-sustaining ecosystems that are resilient to environmental change is clearly a priority goal of rewilding and was identified repeatedly by participants (Table 1). In fact, reintroductions of single species for the purpose of conservation of that species in the absence of broader ecosystem considerations were considered not to fit the definition of rewilding.

There are some instances where restoring ecosystem function could be relatively easily achieved in Australia, for example by restoring flooding regimes leading to wetland recovery or removing logging to permit forest aging and hollow formation. Ocean rewilding was highlighted as requiring a different approach, as management regimes and tools differ in marine ecosystems. Nonetheless the importance of restoration of ecosystem function, from primary producers to apex predators, is no less urgent in these ecosystems. Further work is required to scope and progress rewilding in the marine context. However, on land, the problem of population declines of critical weight range (CWR) mammals via predation by introduced mesopredators (cats and foxes) was raised on multiple occasions.

Keystone predators were identified in Session 3 as a critical success factor in achieving the goal of enhancing ecosystem function. Several of the ideas in Session 4 addressed this problem by urging the use of native (or, in the case of the dingo, long-established) predators to exert top-down control of invasive mesopredators and enable coexistence of native CWR mammals and introduced mesopredators. Three groups outlined ideas (Table 8) for trial reintroductions of Tasmanian devils on the mainland in various locations, including areas that have been baited for long periods for foxes (Lower Glenelg National Park and Booderee National Park) and which therefore may provide a good starting point for experimental reintroductions. The need to urgently consider a devil trial is highlighted by recent evidence from Tasmania suggesting that devils perform a keystone role and that their population decline has led to simultaneous declines in native CWR mammals and an increase in cats and rats (Hollings et al. 2014, 2016), and evidence that perverse outcomes—a decline in CWR mammals—are accruing in Glenelg National Park after a decade of fox baiting (M. Bachmann unpublished data). The experiment to relocate the dingo fence south of Sturt National Park is a further means to test the influence of an apex predator (the dingo) on CWR mammal populations (Newsome et al. 2015).

Fences

Central to the discussions on ecosystem function were discussions on the role of fences in rewilding. Large fenced enclosures are currently the main tool used to remove the threat of invasive mesopredators on CWR mammals, and have been very successfully used (particularly, but not exclusively, by the Australian Wildlife Conservancy) to protect threatened species and increase their

populations. However, fences are ultimately inconsistent with the identified rewilding goal of promoting self-sustaining ecosystems due to the maintenance requirements of fences and the potential problems that arise with growing animal populations contained within fences (Hayward and Kerley 2009).

Participants clearly identified a need for fences, but also the need for a long-term vision and action to move rewilding beyond fences. One group suggested fences are on a rewilding continuum and are therefore a stepping stone towards rewilding—perhaps via novel means such as learned predator avoidance. This concept of a continuum is consistent with the approach of Rewilding Europe which uses a scale (1-10) to quantify the degree of rewilding, with any move up the scale positive progress. The need to investigate alternatives to physical fences was also raised, such as bio-fences (e.g. scent) and guardian animals.

Non-native species and ecological surrogates

Participants clearly communicated that rewilding efforts in Australia should focus on native species, yet non-native ecological surrogates are being used in projects around the world (see *Nature NSW Rewilding Special Edition*). Although not discussed at length, this forum cautiously supported the use of surrogates but highlighted they should be native species. However, the problem of finding native ecological solutions to regulate populations of introduced herbivorous megafauna such as camels and buffalo was also raised as an obstacle to successfully restoring ecosystem function: there is no native terrestrial species capable of regulating populations of such large animals. Whether radical measures, such as introducing lions, should be considered at some point in future was only briefly discussed and this topic would benefit from more discussion—although there is some way to go before such measures could be considered in Australia due to societal concerns about predators.

The example of lions raises another issue that did not receive direct attention, that of deliberate translocations of threatened species to achieve conservation outcomes, also called ‘assisted colonisation’ (Seddon et al. 2014). This already occurs in New Zealand where animals have been introduced outside their natural range (often to islands), and the introduction of Tasmanian devils to Maria Island is an Australian example, as would be the introduction of devils to mainland Australia. The fact that devil reintroductions were repeatedly suggested implies support for assisted colonisation on native species. But assisted colonisation of non-native animals has also been proposed as a global conservation tool (Bradshaw et al. 2006) and the Australian Rhino Project is currently seeking to bring black and white rhinos to Australia to assist conservation efforts for those species. Further discussion is needed to place these initiatives in the context of rewilding.

Timeframe

There was a high degree of agreement that rewilding does not involve de-extinction, and does not seek to reproduce a past, idealised, ecosystem. Rather rewilding should encompass contemporary patterns, including widespread human settlement, and the ‘new nature’ whereby human activities influence the abundance and distribution of species. Some participants suggested that the paleo record could be useful in determining the past impacts of climate change and therefore inform rewilding efforts today, but the identified goals and ideas suggest that rewilding is a future-focussed conservation activity that provides a complementary tool to ‘standard’ conservation mechanisms and offers novel solutions to new and inherited problems. The oft-repeated need to focus on ecological processes may be one mechanism to overcome the problem of identifying a time period: a process focus means that success would be measured not by a comparison to an ideal, but rather by the degree to which efforts resulted in the restoration of desired processes.

Scale and location

Participants felt that rewilding could occur on multiple scales and that rewilding efforts should ignore the human-delimited boundaries of state and local government areas. Although continental-scale connectivity was identified as being part of rewilding efforts, engaging the urban population was also identified as being important to rewilding outcomes (by promoting a love of nature and altering behaviour) and therefore small-scale programs suitable for urban areas are likely to be important. Furthermore, regional management by adequately funded organisations was identified as being an important component of rewilding efforts. This is the model used by Rewilding Europe, where multiple partner organisations in the rewilding zone undertake the day to day activities while Rewilding Europe operates at a higher level across multiple zones.

Identifying pilot projects, priority rewilding areas and key landscapes for rewilding was an approach suggested in the forum. This is an important consideration as some areas and landscapes will be more suitable than others—both ecologically and socially. Identifying areas where early rewilding initiatives have a good chance of success, and where economic benefits can accrue (for example through tourism) may be a good starting point to prove proof of concept and raise the profile of rewilding. The presence of existing relationships established by ongoing conservation efforts is likely to be important an important factor in determining an areas suitability for rewilding.

One group suggested that the temperate coastal fringe of Australia is the best starting point as the challenges of introduced megafauna (camels, buffalo) do not exist and the problems are therefore more tractable than in other parts of the continent. However other rewilding techniques, such as the restoration of hydrological processes, are not bound by these problems and could occur anywhere.

Research

The need to establish proof of concept and demonstrate change as a result of rewilding activities was identified as important. Further identified roles for academics were to identify which elements of the ecosystem should be monitored to demonstrate change (i.e. what do we measure), to develop the evidence-base to prosecute the need for rewilding and to undertake experimental design. Addressing the problem of shifting baselines is another highlighted problem that academics are best placed to deal with.

Several project ideas included a science partner as a key resource which highlights the need for cross-sector cooperation when developing rewilding projects. The lack of evidence supporting rewilding has been identified by researchers who urge caution in enthusiastically embracing rewilding (Nogués-Bravo et al. 2016), so the identified need and willingness to integrate research into rewilding programs is encouraging.

Projects and action

A need for on-ground action was an overriding sentiment of the forum. Several groups identified the important of ‘getting on with it’ and being bolder in making things happen. However, in terms of maximising resource effectiveness and positive outcomes of rewilding, action should occur in the context of an over-arching vision and strategy. The proposed rewilding network, with associated knowledge sharing and inter-organisation cooperation, could play an important part in this.

Community, social and policy

More of the identified goals in Session 2 related to community and social elements than any other theme. This clearly illustrates the importance of engaging communities, both indigenous and non-indigenous, in providing input and decision making to facilitate the ecological goals of rewilding. Particularly important in this regard is the issue of predators: restoring native apex predators was

identified as a key goal of rewilding, yet this is likely to be (at least initially) vigorously opposed by sections of the community. Community engagement will therefore be very important to explain the importance of predation in ecological systems, to overcome fear of predators and to develop an understanding and acceptance of predators. This is the case in both terrestrial and marine systems. All sectors (government, non-government and academic) have a role to play in this regard and the importance of cooperation between sectors in rewilding programs was repeatedly identified.

The idea of integrating rewilding programs with social and cultural values of communities and ensuring that rewilding results in cultural benefits and / or economic gain for local communities (Table 8) is likely to be an important mechanism to progress rewilding. Incorporating economic gain is a key pillar of the approach used by Rewilding Europe, where low interest loans are available to individuals or businesses to build business opportunities (such as wildlife watching) around the rewilding program.

Identified social considerations that could potentially hinder rewilding efforts were compassion fatigue and a lack of connection of Australia's population to its native wildlife. One of the successful elements of rewilding elsewhere (e.g. Europe and North America) is that people have become more engaged with nature—likely as a result of demonstrated positive outcomes—and therefore rewilding and its focus on action positive change may also achieve such impacts in Australia.

Interestingly, many of the success factors and obstacles identified in Session 3 were similar between community and policy goals. This is perhaps not surprising as politicians are part of the community, but it highlights that achieving one goal will go some way to achieving the other. Given political action often lags behind community sentiment, a focus on community support and achieving some initial success may lead to faster outcomes than focussing on changing policy—although engaging with policy in regards ethics and scientific permits are unavoidable, and the need for policy changes to facilitate rewilding was highlighted.

Lessons from Rewilding Europe

Although the differences between Australia and Europe are ecologically profound, particularly in regards the influence of non-native mesopredators on CWR mammals in Australia, there are some striking similarities between Rewilding Europe's approach and the Australian goals identified in the forum. So, although Australian rewilding will not be able to simply replicate the European approach due to the different ecological problems, the European experience has some valuable lessons for Australia.

In particular, the focus on ecosystem processes and ecosystem function resulting in enhanced resilience is consistent between the continents, as is the forward-looking, optimistic approach. Although the invasive mesopredator issue does not exist in Europe, Rewilding Europe also recognises the importance of large apex predators and the need for 'trophic upgrading' and has a focus on 'historically indigenous' species for introductions. The focus on people and goal of developing links (both emotional and economic) between people and nature is also a key similarity, as is the identification of zones (termed 'key landscapes' in the forum). Finally, the use of a scale (or continuum) of wildness is applied in Europe to measure progress in rewilding, and this was identified as being potentially applicable in Australia also.

The approach taken by Rewilding Europe has been to prioritise on-ground action and project work, demonstrate outcomes and to allow policy to catch up, rather than attempt to change policy first. Importantly, Rewilding Europe uses a bottom-up approach where partner organisations nominate a

rewilding zone. This increases the likelihood of success as local conservation organisations lead the process.

Next steps

The forum clearly demonstrated strong support and alignment to progress the rewilding agenda in Australia. Although there are already lots of activities currently occurring that contribute to the goals of rewilding, but they do not occur under a shared vision. To maximise the chance of such projects contributing to the broader goals of rewilding, a vision or policy statement describing aims and guiding principles of rewilding in an Australian context is necessary. Not all participants or organisations will be willing or able to sign a vision statement (e.g. government agencies) and therefore non-government organisations are best placed to lead the development of such a statement in consultation with academics and the broader community. The development of a vision should occur alongside on-ground action as it is likely to take some time.

More on-ground action that highlights the positive possibilities of rewilding is a high priority. A starting point could be to establish rewilding projects either in or close to urban centres to maximise exposure and to build community awareness of rewilding. Engaging community via citizen science in such projects is also likely to help build support. However, given the strong focus on restoring populations of predators, efforts should also begin to identify and design projects to progress this. Several suggestions were made at the forum as to key landscapes (or rewilding zones) that could be targeted for rewilding projects of this type, and researchers have suggested approaches such as predator-friendly farming schemes to progress ecological restoration that would fit the goals of rewilding (Johnson and Wallach 2016).

Ongoing communication between groups that attended the forum (and others that did not attend) is important, and developing a means for communication (e.g. a rewilding network) is a key step. This may involve the creation of a new website, the hosting of a website by an organisation and the development of an email rewilding group.

Several participants identified the need for a further event: some a conference-style event where there is more opportunity to present past or present projects relevant to rewilding, others supported a round table format where participants analyse current projects and suggests improvements or alternative approaches. One potential approach to progress the higher level aims of rewilding could be:

1. A rewilding network is established to maintain communication between rewilding practitioners within and outside Australia
2. A rewilding vision or policy statement comprising a number of action points, concepts or guiding principles is developed. There are a number of potential means for this to occur but in all cases a vision statement could be refined and formally accepted at a subsequent conference:
    - A working group of willing organisations could be established to progress a vision statement
    - A survey could be used to identify elements of a vision statement, synthesised by a lead organisation or facilitator
    - A lead organisation or facilitator could undertake to draft a vision statement on the basis of the outputs of the forum
3. A two day conference is organised where one day comprises presentations of current and past rewilding projects and the second a round-table (or breakout) format where groups can

workshop ideas and projects and share experiences. The vision statement could be ratified at this conference.

This summary of forum outputs will also be circulated to those groups and individuals that were absent from the forum but identified as potentially important contributors to rewilding (Appendix 2).

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Appendix 1: List of attendees to the National Rewilding Forum and their institutions

Name	Organisation
Andrea Reiss	Zoo and Aquarium Association / Wildlife Health Australia
Andy Sharp	South Australian Department of Environment Water and Natural Resources
Andrew Elphinstone	Taronga Conservation Society
Anne Reeves	National Parks Association of NSW
Ben Holmes	Conservation Volunteers Australia
Bob Debus	FAUNA Research Alliance
Cameron Kerr	Taronga Conservation Society
Cathy Merchant	NPA NSW
Cecilia Myers	FAUNA Research Alliance
Dave Watson	FAUNA Research Alliance
Diane Latta	National Parks Association of NSW
Frans Schepers	Rewilding Europe
Gary Fry	Taronga Conservation Society
Geeta Ortac	National Parks Association of NSW
Gilly Llewellyn	Worldwide Fund for Nature
Hayley Bates	University of New South Wales
Ian Walker	Conservation Volunteers Australia
Jeff Bell	Natural Resources Commission
John Rodger	FAUNA Research Alliance
John Turnbull	National Parks Association of NSW (Facilitator)
Kellie Leigh	Science for Wildlife
Kevin Evans	National Parks Association of NSW
Kiran Charles	National Parks Association of NSW
Lachlan Howell	University of Newcastle
Leah Kemp	Australian Wildlife Conservancy
Linda Bell	Office of Environment and Heritage NSW
Madeline Lalor	University of Newcastle
Maggie Watson	Charles Sturt University
Mandy Paterson	Royal Society for the Prevention of Cruelty to Animals Queensland
Margot Law	National Parks Association of NSW
Mark Anscombe	Worldwide Fund for Nature
Mark Bachmann	Nature Glenelg Trust
Matthew Taylor	Bush Heritage
Menna Jones	University of Tasmania
Mike Archer	University of New South Wales
Mike Letnic	University of New South Wales
Monique Van Sluys	Taronga Conservation Society
Nardi Simpson	Taronga Conservation Society
Oisín Sweeney	National Parks Association of NSW
Pete Ridgeway	Greater Sydney Local Land Services
Peter Mawson	FAUNA Research Alliance / Perth Zoo
Phil Palmer	Bush Heritage
Renae Hockey	Conservation Volunteers Australia
Rob Brewster	Rewilding Australia
Rob Quirke	National Parks and Wildlife Service NSW
Rod Kavanagh	Australian Wildlife Conservancy
Ryan Witt	University of Newcastle
Scott Ryan	Australian Reptile Park
Simon Clulow	FAUNA Research Alliance
Suzanne Hand	University of New South Wales
Tim Faulkner	Devil Ark / Australian Reptile Park
Tom Newsome	University of New South Wales
Vince Scoleri	University of Tasmania

Appendix 2: who was not at the forum who should have been?

Name	Organisation
Gregory Andrews	Threatened Species Commissioner
Josh Frydenberg	Federal Environment Minister
Caroline Lees	Conservation Breeding Specialist Group
Adrian Manning	Australian National University (ANU)
Marc Fisher	South Australian Department of Environment Water and Natural Resources
Jodie Gates	South Australian Department of Environment Water and Natural Resources
Dan Rogers	South Australian Department of Environment Water and Natural Resources
Vicki-Jo Russell	Trees For Life SA
Craig Lawrence	WA Department of Fisheries
Paul Smith	Victorian Department of Environment Land Water and Planning
Rachel Lowry	Zoos Victoria
	Natural Resource Management groups
	ANU habitat restoration
	Local Government Associations
	Northern Territory Department of Land Resource Management
	South Australian Nature Foundation
	Water Managers (Murray-Darling)
	Main roads groups
	Native plant associations
	Town planners
	Botanic gardens
	Australian Council of the International Union for the Conservation of Nature
	Corporate sector
	Tourism and ecotourism sectors
	Traditional owners (Land Councils)
	Education department
	Farmers' Federation
	State and territory policy advisors