Final Report
Landscapes and Policy Hub
2011-2015

Compiled by:
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Purpose of Report

The Landscapes and Policy Research Hub Final Report is a contractual requirement of the Australian Government’s National Environmental Research Program. The report provides an executive summary of achievements, as well as detailed reporting of the hub activities, outputs and publications. It also includes administrative and resourcing details, as well as a financial summary. Audited accounts are not included in this report as they are a separate contractual requirement due 60 business days after the final hub activity. This administrative report complements the multi-media, interactive web-based final report ‘Life at Large’, which is ‘home’ to all our research outputs for public accessibility: www.lifeatlarge.edu.au

Please cite the report as follows:


About the Authors

Suzie Gaynor from the University of Tasmania was the hub’s Senior Communications Manager. Suzie worked closely with researchers and research–users to foster science that delivers practical solutions to on–ground land management challenge

Professor Ted Lefroy from the University of Tasmania was the Hub Director. Ted led the Communication and Knowledge Brokering Project Team that integrated the research and facilitated the delivery of the research outputs to people involved in biodiversity conservation.

Acknowledgements

The authors are grateful for the opportunity to lead such an exemplary team of researchers through the challenges of transdisciplinary research. We acknowledge the trust the researchers placed in our facilitation and integration methods that has taken their science from the academia to policymakers and end–users. The hub’s achievements as included in this report are by and large credited to the researchers’ willingness to participate with passion and engage genuinely with end–users.

We owe a debt of gratitude to our conservation partners, collaborators and research friends, for their willingness to participate in hub activities and their contributions that have shaped the research outputs. Their generosity to give their time and share their information, coupled with their frank and fearless feedback, has resulted in fruitful collaborations delivering the tools, techniques and policy pathways with such practical purposes.

To our steering committee led by Professor Barbara Norman, we thank you for your willingness to participate, especially given your high-level of involvement in many organisations. The diversity of perspectives that the members brought to the table, presented challenging questions and critique that motivated us to strive for better outcomes and continuous improvement. Thank you.

We are also grateful to the authors of two evaluation reports for agreeing to extracts from their reports being included in this report:


Section 1a: Executive Summary

Executive Summary

In 2011, the Landscapes and Policy Hub set out to answer the question ‘How do we take a regional scale view of biodiversity?’

The trigger for this question was the Hawke review of the Environment Protection and Biodiversity Conservation Act 1999. One of the questions facing the review was why, after 10 years of the Act being in operation, had the list of threatened and endangered species grown steadily to over 1,750 with precious few coming off that list. One of the review’s recommendations was to consider biodiversity at the scale of landscapes and whole regions as well as species and communities in order to understand and manage the underlying causes of decline.

In consultation with the federal Department of the Environment, the hub applied a big picture view to two regions, the Australian Alps and the Tasmanian Midlands. The choice was partly because both regions were home to several listed plant communities plus a whole suite of threatened and endangered species, and partly because of their differences. One a privately owned valley, the other a publicly managed mountain range. One largely intact but under threat from invasive species and more frequent fires. The other a highly fragmented landscape, and the second region in Australia to be farmed following European settlement.

The first step in the research process was to take the 36 researchers in a bus and visit the two regions. By talking to residents, landowners, managers and local experts the researchers had the opportunity to see the issues first hand. They then went to work in seven research teams specialising in social and institutional issues, climate change, biogeography, economics, wildlife, fire and freshwater ecology. An eighth team, communication and integration, took on the task of keeping the researchers in touch with each other and their wider audiences.

Every six months the researchers met to swap notes. In February 2015, they launched the website Life at Large to describe the six step process that emerged from their case studies (see www.lifeatlarge.edu.au).

The Life at Large Six-Step Process

…for taking a regional scale view of biodiversity

1. Describe the social context
2. Consult the biodiversity checklist
3. Develop regional scenarios
4. Map processes and threats
5. Model species and communities
6. Set priorities
Four things we learned about regional scale assessment of biodiversity

Finding 1. Understand the social context. Building a social profile of a region from ABS and other survey data provides a picture of who lives there, what they do, what they value, their impact on natural values and their capacity to support conservation given that success will rely on local participation and commitment over the long term.

Finding 2. Embrace a broad definition of natural values. At regional scale it’s necessary to include functional as well as compositional attributes of biodiversity and natural values of local and cultural significance (see the biodiversity checklist under step 2 on the website).

Finding 3. Incorporate climate change scenarios into species distribution modelling. To identify locations likely to be important for conservation in the future, it’s necessary to consider plausible shifts in the distributions of species, communities and ecosystem processes.

Finding 4. Represent results in ways that enable stakeholder participation in decision making. For example, dynamic visual methods can be used to represent scenarios for likely locations of high value for species, communities and other iconic features under different combinations of threatening processes.

What have we learned about interdisciplinary research?

In an attempt to strike a balance between individual freedom and creativity on the one hand, and collective effort on the other, we:

1. Encouraged freedom and creativity to explore in small teams by:
   a) Allocating a budget to each team for the duration of the hub with additional funds available based on the strength of proposals with high potential impact and strong stakeholder involvement
   b) Encouraging small teams to identify specific research topics and questions in participation with research users and then leaving them to get on with it.

2. Encouraged collective effort and collaboration between teams by:
   a) Facilitating meetings between researchers and research users at the beginning of each major activity to scope problems and define research questions
   b) Bringing all researchers together twice a year (The Researchers Roundtables)
   c) Having three-minute speed talks at these six-monthly meetings to give researchers an overview of all activity across the hub and to develop their communications skills.

Using these three-minute overviews, we collectively identified common themes, emerging knowledge and where possible, integrative solutions.
Section 1b: Research Highlights

We developed a range of tools, techniques and policy pathways to help planners and environmental managers make decisions. These tools are designed to help managers consider the multiple impacts of human and natural influences on biodiversity over entire regions, and identify where managers can most effectively intervene to protect and improve natural values.

To ensure the tools were practical and relevant, we worked closely with staff and land managers from state governments and non–government organisations in Tasmania, Victoria, NSW and the ACT. We believe that we learned and have developed is applicable to landscapes and regions anywhere.

Thank-you so much for delivering such a fantastic program of applied, collaborative research. I have really valued and enjoyed the opportunity to work with you over the life of the Hub. Your approach of engaging with and really listening to we “end-user” folks, and incorporating our questions and issues into your research program is to be commended and is a model for others to follow.

Likewise, your on-going collaboration, regular workshops and feedback, as well as the Hub Happenings” newsletter have made it so easy to keep in touch with projects. The “Life At Large” products are a wonderful legacy of your work. I look forward to seeing the tools you have developed incorporated into the way we work in Parks Victoria, not only in the alps landscape, but elsewhere across our estate.

John Wright, Parks Victoria

The research highlights are presented below in the form of the six–step process the hub developed for assessing natural values at a regional scale. These highlights were published in our final twelve-page research highlights (February 2015).

Step 1. Describe the Social Context

➢ Socio-economic profiling

We compiled socio–economic profiles for the Tasmanian Midlands and the Australian Alps as background to an assessment of the status and needs of biodiversity. A socio–economic analysis brings together information on the social characteristics of a region. It considers the capacity of a region by assessing the human capital, the human–produced economic capital, and the social and institutional capital. A socio–economic profile informs the identification of potential futures and helps shape options for institutional, planning and management arrangements directed towards improving biodiversity outcomes. The profiles informed the development of policy reform options for biodiversity conservation.

➢ Reflecting community values in regional planning

We used a map–based mail survey of rural and urban residents to identify particular places valued by each group. Surveys in the Lower Hunter Valley were conducted to generate maps of community values to biodiversity, and preferences for conservation and development. Spatial tools for integrating social, ecological and economic values in regional planning were demonstrated to staff from the Department of the Environment, planning practitioners and researchers from the University of Melbourne, University of Tasmania, RMIT University and Charles Sturt University.
Understanding institutions

We examined the ways in which rules, regulations and other institutional arrangements influence biodiversity conservation as a guide to future reform. Using an ‘institutional grammar tool’, we analysed the principles and processes contained in policies, revealing how people might interpret them. PhD student Sarah Clement developed a set of criteria for the design of institutions that can deal with the challenges of landscape–scale biodiversity conservation. Based on a review of literature of organisational theory, political science, institutional theory, resilience and adaptive governance, the framework covers four major attributes of institutions relevant to biodiversity conservation: capacity, practices, fit and politics. Using the framework and an institutional grammar tool, Sarah analysed current policies to find out if the language of legislation or a new policy matches the intention of policymakers.

Review of biodiversity planning and assessment

We compared the likely effectiveness of environment impact assessment, strategic assessment and bioregional planning in determining the status and planning needs of biodiversity. We compared strategic assessment, bioregional planning and environmental impact assessment as approaches to assessing and planning of biodiversity from the perspectives of governance, ecology and implementation. A strength of bioregional planning over the other approaches was that the boundaries of the plan can be defined to ensure coherence between ecological, social and governance issues. This was identified as a means of addressing a weakness in strategic assessment which has no requirement for the area subject to the plan to have economical or social coherence.

Sensitivity of market based instruments to selection criteria

We reviewed a decade of experience in the Tasmanian Midlands to determine which criteria in markets for conservation funding had the most influence on the outcome. We conducted an analysis of all tenders held for conservation services on private land in the Tasmanian Midlands. Two important findings were that 1) selection criteria favoured agreements with longer durations over agreements that focused on site quality, and 2) as total available funding increases, the conservation value secured per dollar declines. While the second outcome is largely unavoidable, valuing longevity over quality may not be the most effective strategy. Where regulatory regimes are likely to change, such as species being formally listed as threatened or endangered, securing high quality sites for shorter periods is likely to provide a greater guarantee of protecting valuable habitat into the future.

Step 2. Consult Biodiversity Checklist

Biodiversity assessment checklist

Before starting a regional–scale analysis of biodiversity and its conservation needs, it is first necessary to carry out a stocktake of natural values, including the biological, physical and social processes that support and threaten species and communities. Biodiversity takes many forms and is valued for many different reasons. The biodiversity checklist is a systematic guide to identifying the attributes of biodiversity importance in any large–scale assessment. Thirty two different attributes are identified under six major categories. The six categories are the different types of species and communities that are valued in a
region; the physical fabric of the landscape that supports life; those areas that serve as refuges against drought, fire, climate change and other threats; processes that threaten biodiversity such as invasive plants and animals, diseases and climate change; and areas that serve as connections between habitat patches, and the quality of habitat.

**Step 3. Develop Regional Scenarios**

- **Using scenario planning to test biodiversity governance**

  We explored the application of conceptual modelling and scenario planning as tools to assist biodiversity policy and decision-making. In a series of workshops and focus groups involving more than 100 land managers, policymakers, landholders and interest groups, we tested a range of alternative governance options for biodiversity conservation. The governance options were developed using a combination of scenario planning, analysis of legislation, policies and plans using the Institutional Grammar Tool and key informant interviews. The alternative governance options in both case study areas, the Australian Alps and the Tasmanian Midlands, covered the spectrum from public to private ownership. In the Australian Alps for example, the preferred options, ‘One Park One Plan’ and ‘Development of a Transboundary Authority’, both involved greater cooperation between jurisdictions and devolution of responsibility to regional managers.

- **Climate futures in the Australian Alps**

  We produced fine-scale regional climate projections for the Australian Alps which enable researchers, planners and managers to explore the likely implications of climate change over the region. By the end of the century, the projections show an increase in mean annual temperature of 4 °C – 5 °C; reductions in annual precipitation of approximately 20%; and declines in annual snow cover of up to 80%. This is likely to impact sensitive alpine and subalpine ecological communities and threatened species, increase future fire danger, and affect alpine tourism and water availability in the Murray–Darling Basin.

**Step 4. Map Processes and Threats**

- **Mapping vegetation productivity**

  Using satellite data, we tested a novel method for identifying areas likely to function as refuges against drought and climate change. We developed an index of vegetation productivity for the Tasmanian Midlands that can be used to identify potential refuges. This assumes that locations where vegetation productivity remains relatively high and stable during drought may act as refuges, as they are likely to provide a more reliable supply of habitat resources for a wide range of species. We found a stronger relationship between remotely sensed data and ground measurements of productivity in White Gum (Eucalyptus viminalis) woodland than Kangaroo Grass (Themeda triandra) communities. The method has potential for remotely assessing the productivity of many types of land use.

- **Remote detection of habitat condition**

  Wild horses have been shown to have negative impacts on the composition and structure of vegetation in the Australian Alps, and subsequently on landscape structure and ecological processes. In the alps landscape, monitoring the impact
of horses on vegetation is difficult and expensive due to remoteness, terrain and harsh weather. To assist park managers track the impacts of wild horse populations and gauge the effectiveness of management strategies, we developed a monitoring method based on freely available data from the MODIS satellite and tested it using field observations of vegetation condition at sites where horses were known to be present and absent. The method has been tested by rangers from Parks Victoria and the NSW National Parks and Wildlife Service.

*Temperature the big threat to freshwater biodiversity*

We used linked hydrologic, climate and ecological models to explore the effects of changing rainfall, temperature and water use on the state of rivers in the Tasmanian Midlands. The health or condition of aquatic ecosystems is a combined result of processes occurring within the ecosystem and in the surrounding catchment. Making decisions about how to manage aquatic ecosystems in a changing climate is therefore challenging. The hub used climate simulations from the Australian Government funded Climate Futures for Tasmania project to project responses of invertebrates, fish and riparian vegetation using a suite of connected models. The results indicate that changes in temperature are likely to have a greater influence on the aquatic biota than changes in stream flow.

*Fire hazard mapping in real time*

Our online fire hazard mapping tool provides real–time maps of fire danger in Tasmania, with a version being developed for Victoria. Hosted by the Tasmanian Fire Service on their website and also available as a smart phone app, the tool shows maps of MacArthur’s Forest Fire Danger Index (FFDI) and serves as a guide to the current fire danger. The map is updated every 15 minutes using data from weather stations, including temperature, wind speed, humidity and rainfall, plus a seasonal drought factor calculated by the Bureau of Meteorology. We developed this tool and other online resources, such as regional fire histories for Tasmania, in cooperation with land management and emergency service agencies.

*Fire reshaping landscapes*

Fire is restructuring the Australian Alps landscape. The fires during the last decade are ‘game changing’ events. Forests dominated by Alpine Ash (Eucalyptus delegatensis), a species that does not re–sprout after fire but reproduces from seed, have been burnt two and three times in a decade. After fires in 2013, areas of *Eucalyptus delegatensis* were reseeded. However, reseeding these forests may not be an option in the future if the area affected by repeat fires increases. Without re–seeding, there is likely to be a change in forest type to mixed eucalypts and acacias, as Alpine Ash takes 20 years to mature and produce seed. More frequent fires may also result in a change from snow gum woodlands to shrublands or a high–altitude form of mallee vegetation. This study considered questions faced by policymakers and managers; when to reseed and when to accept the landscape transformation?

*Does grazing reduce fire intensity?*

Grazing in the Victorian high country is commonly argued to reduce fire risk. We carried out the first landscape–wide analysis of historic data to test this claim. A retrospective study of the impacts of grazing in the Victorian Alps found that a
history of grazing did not influence fire intensity during large-scale fires. We reviewed Landsat satellite-derived data for two fires (2003/2007) to assess the impact of cattle grazing in a national park on fire severity in woodlands and forest vegetation. Our research revealed no difference in fire intensity between 5,000 randomly selected, paired sites, half located inside grazing leases and half located outside. This suggests that cattle grazing has little impact on fuel loads or fire severity in alpine forests.

- **Future fire danger**

We now have fine-scale fire danger projections for Tasmania to 2100 and they indicate a steady increase in fire danger, a lengthening of fire season, at some locations, more days at the highest danger ratings. Fire danger has increased in recent decades, and is projected to increase further with climate change. We assessed the regional changes in fire danger that are projected to occur in Tasmania through to 2100 under a high emissions scenario. In contrast with previous continental-scale studies which show little change in Tasmanian fire danger, our results indicate an overall increase in fire danger, especially in spring, with more days per year likely to require total fire bans.

- **Designing corridors for threatened species**

We developed a modelling tool to aid large-scale planning of wildlife corridors for the Department of the Environment. The tool was developed in a pilot study in the Lower Hunter Valley in NSW and is now being rolled out in the Tasmanian Midlands. The GIS-based decision support tool is called GAP CLoSR (General Approach to Planning Connectivity from Local Scales to Regional) and runs on a regular desk-top computer. The tool enables planners to see the landscape through the eyes of the species they are trying to conserve by simulating their patterns of movement, such as the greatest distance of open ground they will cross and the longest distance they will move between connected patches. The tool is helping planners to compare the impacts of different development plans or conservation proposals on connectivity at regional scale. This helps planners pinpoint critical bottlenecks and gaps in the corridor network under different planning proposals, and to identify where wildlife corridors would have greatest impact.

- **A new tool to help manage invasive animals**

We worked with Parks Victoria, NSW National Parks and Wildlife Service and the ACT Parks and Conservation Service to develop a new tool to assist cost-effective decision-making in the management of invasive species.

The SPADE tool (Spatial Population Abundance Dynamics Engine) is a spatially-specific model that predicts the spread of invasive species based on an understanding of habitat suitability, the biology of the species, and estimates of current population size. The tool runs on a standard desk-top computer or laptop. It can incorporate different target densities in different landscape zones, and compare the costs and benefits of alternative management methods. Its ability to model the movement of animals and diseases over large areas provides managers with a powerful means of exploring the likely outcome of management interventions, decades into the future. We initially used the tool to examine the likely distribution and density of wild horses in the Australian Alps and fallow deer in Tasmania, and have explored its potential to model the invasive plant species, Hawkweed.
Engineering bettongs

We set out to test the hypothesis that declining numbers of native animals is changing the turnover of soil and leaf litter, with implications for ecosystem processes. This PhD study asks ‘Can bettongs engineer a better future for biodiversity conservation?’ These small nocturnal marsupials turn over tonnes of soil each year in search of truffles, the fruiting bodies of native fungi. This study examines the role that digging might play in ecosystem function through improved water infiltration, incorporation of organic matter and improved seed germination. Working closely with the Tasmanian Department of Primary Industries, Parks, Water and Environment, this research is also examining planned fuel reduction burns and unplanned wildfires like those in January 2013 to understand if and how the diggings of small animals like bettongs interacts with fire and post-fire regeneration.

Designing market based instruments for corridors

We used experimental economics to find out how to achieve collaboration between landholders when establishing wildlife corridors while avoiding collusion on price. We used economic experiments with students, policymakers and landholders to refine the design of Market Based Instruments (MBIs). The focus was on market based instruments that encourage collaboration between landholders to establish wildlife corridors, without resulting in collusion that can drive up the price. We demonstrated the application of experimental economics principles to the design of incentive schemes in a policymakers’ workshop attended by staff from the Department of the Environment in Terrestrial and Marine Offsets, Water Markets, Conservation Incentives, Economic Capacity, Environmental Stewardships, Strategic Assessments and Regional Sustainability Planning teams.

Bioeconomic modelling of water use

We have developed a bioeconomic model of water use for the Tasmanian Midlands to explore the potential impacts of landuse and climate change on the regional economy. With the commissioning of the new Midlands Water Scheme, land use is expected to change. We built a bioeconomic model to explore and compare future scenarios of water use, land use, environmental values and climate change. The model enables the user to examine how these factors influence economic returns at a sub–regional scale. We also identified the management tools most likely to promote collaboration among irrigators in meeting cease–to–take targets and sharing a common resource. Together, our findings provide a means for irrigators, water managers and policymakers to explore the economic consequences of irrigation and conservation scenarios.

Planning for an uncertain future

Climate projections are useful for assessing the likely responses of species and communities to climate change. However, the lack of integration between ecology and climate science means a limited understanding of available climate data and its appropriate use. Three sources of uncertainty when modelling future habitat are the choice of climate model, emissions scenario, and modelling inputs such as environmental and climatic variables. Different combinations of these choices can result in a wide range in the projected fate of some species, from maintaining their current distribution to extinction. Major questions for policymakers are, 1) have researchers clearly justified their modelling choices? and if so, 2) where are the priority areas for...
When the target species are on the move?

- **A framework to identify future invasive plant species**

  The interaction between climate change and invasions is likely to present an ongoing threat to biodiversity into the future. We developed a framework to identify species likely to be invasive in the Australian Alps under future climate. The framework includes attributes of invader species and biogeography, in combination with projections of future climate. We focused on species identified by alps managers as being of most immediate concern; broom and hawkweed. We modelled current and future climate suitability for species currently present in the alps; related species that are present in the broader region; and related species that are found in parts of the world where the current climate matches the future alps climate. Our results show that changing climatic conditions may reduce the suitability for current invasive species but improve it for other, related species. This knowledge will help prioritise management responses.

- **Species and communities on the move**

  The effective conservation of threatened ecological communities into the future requires knowledge of where climatically suitable habitat is likely to persist under changing climatic conditions. Species distribution models for the Tasmanian Lowland Native Grassland Community suggest that very little area will remain suitable by the end of the century under a high emissions scenario. This raises fundamental questions about current approaches to biodiversity conservation, which tend to rely on a static view of ecosystems. Management options that enable the diversity, structure and function of ecosystems to be maintained will need to be identified, rather than attempting to preserve current species composition.

**Step 5. Model Species and Communities**

- **Climate–niche modelling**

  Working in collaboration with biodiversity conservation practitioners, we developed a modelling tool to aid large-scale planning of wildlife in the Tasmanian Midlands. Over the past two centuries, habitat destruction, changed fire regimes and introduced pests have led to widespread extinctions of animal and plant species in Australia. For some species, conditions are set to worsen with climate change. We have produced climate–niche models for all the terrestrial vertebrates across Tasmania (about 230 species) and show how suitable climate–niche space may change over the next 100 years. The modelling tool can generate maps for the 230 species in any given year, from 1950–2100, in the form of shape files (or a format that can be converted to shape files). These maps can be directly used in other analyses, or intersected with other layers (for example, land cover types) for more refined estimation of realised distributions of taxa of interest.

**Step 6. Set Priorities**

- **Combining spatial datasets to aid conservation decisions**

  We pioneered the use of MCAS–S (Multi–Criteria Analysis Shell for Spatial Decision Support) to combine maps of biodiversity values and threats to help managers explore options and prioritise actions over large scales. The MCAS–S tool helps managers pinpoint areas of highest value under different types and levels of threat, and decide where to allocate resources for greatest impact. MCAS–S can generate maps to show natural values and threats,
helping people from different backgrounds, and different levels of technical and scientific expertise, to participate in conservation decisions. We have assembled a wide range of biodiversity values and threatening processes into datapacks for the case study regions, to provide examples of how the MCAS–S tool can be used in conservation planning. The maps can be generated on a laptop and projected at meetings and workshops, helping managers communicate decisions to broader audiences.

Managing threats to alpine bogs

In collaboration with the Australian Alps national parks Cooperative Management Program, we reviewed the system used to classify bogs and developed a consistent method of identifying areas under greatest threat across the agencies that manage the alps in Victoria, NSW and the ACT. There are more than 11,000 individual alpine bogs and wetlands. These are highly sensitive areas providing habitat for several endangered species, including the Northern and Southern Corroboree Frogs, the Baw Baw Frog, the Booroolong Frog and the Alpine Water Skink. A review of the current classification system was used to develop a series of maps that helps managers prioritise bogs according to their vulnerability to climate change, fire, weeds and the presence of feral animals. By mapping the areas where different threats coincide, managers can quickly assess which particular bogs are most vulnerable to particular threats, and which are most likely to respond to intervention.

Taking a landscape-scale view of the alps

Protected area managers, policymakers and stakeholders now have a guide to management decisions that extends across landscapes and borders. We developed an alps–wide strategic approach to understanding the natural values of the region and the threats it faces. To do this, we developed the first alps–wide vegetation classification system, and identified seven iconic landscape features and nine key threats. We show how information about biodiversity values and threats can be combined to explore their intersection and prioritise actions over large scales. We used the MCAS–S decision–support tool to combine maps of the iconic features and their threats to pinpoint areas of high–natural value under high and low levels of threat.

River refuges

We used the MCAS–S tool (Multi–Criteria Analysis Shell for Spatial Decision Support) to develop a model to identify potential climate refuges in the freshwater streams of the Tasmanian Midlands. Features that act to buffer river temperature, such as shading by streamside vegetation and steep slopes, can potentially provide refuge for native fish and invertebrates during summer. We mapped the location of these different features in the Tasmanian Midlands and developed an MCAS–S datapack to integrate these maps. Users can integrate geographic information on topographical features, groundwater, tree cover, solar radiation and enhanced flows associated with climate change or irrigation so that they can be recognised as potential refuges for aquatic species during peak summer temperatures.

Managing endangered species with spatial multi-criteria analysis

We used the MCAS–S tool (Multi–Criteria Analysis Shell for Spatial Decision Support) to map potential refuges from predation and climate change. Using the endangered swift-parrot as a case study, we considered their requirements for
nesting habitat and modelled habitat suitability using future climate projections. We also modelled the likely distribution of the swift parrot’s major threats, sugar gliders and habitat loss due to climate change. By overlaying maps of suitable habitat and likely threats, we demonstrated how managers can use MCAS-S to pinpoint areas that are least-threatened and therefore may act as refuges or sanctuaries from predation, climate change and other threatening processes.

**Additional studies**

- **Sustainable tourism in Tasmania**
  
  We surveyed community attitudes to nature–based tourism with a focus on Tasmania’s World Heritage and other protected areas. The research team interviewed tourist operators, administrators, visitors and communities living near environmentally sensitive areas to learn about their attitudes to different styles of tourism development. We used the innovative approach called ‘Q Sort’ that asks people to rank their personal preferences using photos in a thought provoking and fun way; a departure from traditional survey methods. There was a wide range of opinions among Tasmanian stakeholders over preferred styles of tourism development within and between the three groups surveyed, yet strong agreement among tourists.

- **Adaptive project management**
  
  We applied the principles of adaptive management to the design of the application, selection and monitoring processes used in environmental funding programs. We developed an eight–step model for the application process used in environmental funding programs based on the adaptive management cycle. The eight steps are: identify the goals, identify the threats to each goal, identify interventions capable of managing the threats, identify relevant indicators and metrics, design a statistically robust monitoring framework, attribute change between alternative causes, measure the impact, review and revise the previous steps and report. The model was tested against a selection of the original applications submitted for completed projects considered by the Department of the Environment as successful.

- **Reflecting community values in regional planning**

  We used a map–based mail survey of rural and urban residents to identify particular places valued by each group. Surveys in the Lower Hunter Valley were conducted to generate maps of community values to biodiversity, and preferences for conservation and development. Spatial tools for integrating social, ecological and economic values in regional planning were demonstrated to staff from the Department of the Environment, planning practitioners and researchers from the University of Melbourne, University of Tasmania, RMIT University and Charles Sturt University.

- **Designing corridors for threatened species**

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The GIS–based decision support tool is called GAP CLoSR (General Approach to Planning Connectivity from Local Scales to Regional) and runs on a regular desk–top computer. The tool enables planners to see the landscape through the eyes of the species they are trying to conserve by simulating their patterns of movement, such as the greatest distance of open ground they will cross and the longest distance they will move between connected patches. The tool is helping planners to compare the impacts of different development plans or conservation proposals on connectivity at regional scale. This helps planners pinpoint critical bottlenecks and gaps in the corridor network under different planning proposals, and to identify where wildlife corridors would have greatest impact.

**National award for climate change information**

Fine–scale climate projections are needed to understand the likely implications of changes in rainfall and temperature and the distribution of plants and animals at regional scales. The 2012 Resilient Australia Award for Education, Training and Research was awarded to the Climate Futures team. The Climate Futures for Tasmania project (funded by the Australian Government’s CERF program, 2008–2011), generated new future climate information at a level of detail never before done for Australia. The fine–scaled information provided an increased understanding of the possibilities of climate change in Tasmania. The hub used this information to explore the implications of climate change for a wide range of aquatic and terrestrial species and communities.

**Landscape logic: integrating science for landscape management**

Evaluating the effectiveness of environmental programs requires a nested series of investigations at landscape, property and site scale using a combination of ecological and social research methods. The book summarises the work of the previous Commonwealth Environment Research Facilities (CERF) hub, Landscape Logic (2006–2010). The findings were that three integrated levels of inquiry are required to evaluate the effectiveness of environmental programs: landscape–scale pattern analysis, property–level social research and site–level ecological modelling. The book includes five chapters authored by Landscapes and Policy Hub researchers and one chapter co–authored with Environmental Decisions Hub researcher Brendan Wintle.

‘The wealth of data is outstanding already and has delivered sound results. The accumulation data may benefit much future research.’

*Landowner*, feedback from Launceston Launch

‘Fantastic research tools available to future researchers.’

*Landowner*, feedback from Launceston Launch
### Section 1c: Activity Highlights

#### Policy Interactions and Key Relationships

The hub's researchers worked in collaboration with conservation practitioners, land managers, conservation organisations and natural resource management agencies at all levels of government with responsibility for 'Matters of National Environmental Significance'. Initially, the primary stakeholders were the federal Department of the Environment (in 2011 known as the Department of Sustainability, Environment, Water, Population and Communities), the Australian Alps national parks Program, the Australian Alps Liaison Committee, the Tasmanian Department of Primary Industries, Parks, Water and Environment, Tasmanian Land Conservancy, NRM North, Parks Victoria and the NSW Office of Environment and Heritage (NPWS). By the hub’s conclusion, the list of groups we had collaborated and/or connected with had expanded to include more than 100 (see Appendix D).

In the first six months of operating, the hub held two key engagements with primary stakeholders: bus tours of our case study regions for our researchers and Steering Committee (one in the Tasmanian Midlands and one in the Australian Alps) and the departmental policy roundtables. These engagements were key to the researchers gaining an understanding of stakeholders’ operating environments. During these processes, we learnt about information needs, knowledge gaps, management priorities and preferred methods of communication. Our weekly email bulletin, the Hub Happenings, emerged from these discussions as a key means of communicating progress. The conversations with policymakers broke down barriers and helped researchers see the world through research-users eyes. Research activities were moulded, amended and redirected as a result of these conversations, and they fostered relationships of support and interaction that lasted the life of the hub.

*The induction tours were invaluable. I gained a lot from the one-on-one conversations with researchers, and it broke down barriers between policy people and researchers.*  

**Allison Woolley**, Steering Committee Member and Tasmanian Department of Primary Industries, Parks, Water and Environment policymaker

*I have really grown with the hub and its researchers, they are undertaking very relevant and important work that relates directly to my area in the Australian Government.*  

**Kären Watson**, Department of the Environment

A key relationship we forged that resulted in opportunities for the hub to deliver additional information to policymakers, was the relationship through Carolyn Cameron and the Regional Sustainability Planning teams within the Strategic Approaches group. With an established relationship, we were on hand to provide timely information to departmental officers as policy issues arose.

*The added benefit were the questions raised in the Regional Sustainability Planning program. How the hub responded was fabulous — dial a scientist — that was really smart! The additional studies that we could engage through the hub were important, timely outputs for the department.*  

**Carolyn Cameron**, Steering Committee Member and Department of the Environment

In the alps case study area, our single most important, successful and influential relationship was through the Australian Alps national parks Program and its Australian Alps Liaison Committee. Working closely with program coordinators, initially Anthony Evans from NSW National Parks and Wildlife Service and
latterly Andrew Nixon from Parks Victoria, their connections with the cross-jurisdictional network of alps managers and practitioners enabled the right managers to talk to the right researchers at the right time, so that the right information was collected, used, communicated, researched and developed. The reference groups and committees established under the auspices of the Australian Alps national parks Program meant that the hub’s 36 researchers had ready-made and appropriate introductions to alps practitioners, and were able to work effectively and collaboratively with alps managers to develop the tools and techniques.

One of the most successful aspects of the hub was its effort to identify who the agencies they need to engage with, learn about their issues, then respond by working out how the researchers can help develop tools to deal with those issues. So while this has not yet translated across to all those working in the field, the tools have certainly helped at the strategic planning level, and the tools are focused on real management problems. I had every confidence that the tools will help later at the field level.”

John Wright, Parks Victoria

In the Tasmanian Midlands, it was relationships we built with key players in the public and private biodiversity conservation sectors that were most significant in shaping our research and building connections to research users. The tools we developed to support biodiversity conservation in Tasmania achieved the level of uptake they have as a result of bringing these people to the table through numerous facilitated meetings. The GAP CLoSR wildlife connectivity tool and the species distribution modelling tools (SPADE and Climate Niche Modelling) are examples of tools that were made more relevant and effective through collaboration with key local biodiversity conservation practitioners. This included input from the Tasmanian Department of Primary Industries, Parks, Water and Environment, the Tasmanian Land Conservancy, Bush Heritage, Greening Australia and the three Tasmanian natural resource management (NRM) groups.

‘Close involvement in the development of the GAP CLoSR tool means that I know the best local information was used, our needs were understood by the researchers and the tool’s mechanics were explained well enough for me to have confidence in its application for our circumstances. GAP CLoSR has filled a burning need for biodiversity conservation in the Midlands and I believe that it has very wide application in other regions.’

Daniel Sprod, Tasmanian Land Conservancy

Significant Engagements and Key Events

From the 25 communication tools and techniques that we proposed in our initial Science Communications Plan, six are described below that were believe were particularly effective. These activities underpinned our success in engagement, participatory research and communication.

Researchers Roundtables and Research Forums

The Researchers’ Roundtable was one of our most successful communication and engagement initiatives. Initially meeting quarterly, and then half yearly as needs changed once research was initiated, the post docs, post grads and technical staff, referred to as our ‘100–percenters’ as they essentially dedicated 100% of their time to hub activities, discussed research collaborations and shared results and analytical methods in a face-to-face intimate forum that fostered better understanding across disciplines and projects and facilitated integration. This forum increased connections between the eight projects and developed a solid basis for research integration.
Study Area Bus Tours

While the bus tours of the two study areas were major investments, the grounding that they provided researchers was invaluable. The tours were a critical element in building the team and research relationships, progressing their thoughts and promoting their thinking from parallel research streams to transdisciplinary research collaborations.

Knowledge Brokers

The single most influential factor in our engagement activities was the appointment of the two study area knowledge brokers in February 2012, the acknowledgement of an official NERP Liaison Officer in Adam Cowell in 2012 and appointment of a departmental knowledge integrator, Ross Rowe, appointed in March 2013. Gill Anderson (Australian Alps Knowledge Broker) and Louise Gilfedder (Tasmanian Midlands Knowledge Broker) made a significant strategic difference to introducing our researchers to existing networks and key people in the respective study areas. They fostered many engagements and supported processes that advanced the research in ways and at a pace that could not be achieved otherwise. With the frequent restructuring and changing roles in the Department of the Environment, the NERP Liaison Officer and Departmental Knowledge Integrator were crucial for us keeping us informed and connected with the right people in the department.

Australian Alps Science Management Forums

In 2011, the Australian Alps Liaison Committee formed a strategic partnership with the Landscapes and Policy Hub to assist in the research aims to develop tools and policy options to better integrate biodiversity into landscape scale planning. We brought researchers and alps mangers together in a forum at Jindabyne (NSW) in November 2012. At the forum, collaborative teams of alps managers and researchers focused on key issues and threats to landscape scale management of biodiversity in the Australian Alps.

The forum was a unique opportunity for alps managers to collaborate with researchers on topics of direct relevance to management. For hub researchers, the forum was a rare opportunity to refine research questions, gain access to data and design research method with the research-user in mind. The forum fostered collaborative partnerships that worked together on applied research topics that produced tools and techniques directly applicable to on-ground management. In March 2013 in Bright (Victoria), the researchers returned to the Alps Science Management Forum to present the tools and techniques developed as a response to the first forum.

Policy Roundtables and Departmental Briefings

The targeted meetings with key research-users and policymakers shaped our communications planning, especially the on-going and final delivery of research outputs. Through our policy roundtables and interactions with research-users, we understood the value of multiple access points and products to communicate our research and improve uptake. Our final synthesis website includes a high-level executive summary of the background, purpose and context in which the research was conducted (http://www.lifeatlarge.edu.au/guided-tour), links to published papers, summaries for policymakers, technical reports and how-to manuals, and three minute videos of the researchers explaining their work.
**Final Delivery Forums**

To acknowledge the continuous engagement we enjoyed with research-users throughout the hub’s life, we made a special effort at the end of the project to travel to our research-users to present the full suite of tools and techniques we had developed and provide additional training in the tools and techniques.

The four major delivery forums (in Hobart, Canberra, Launceston and Melbourne) were complemented by 21 workshops and targeted briefings to provide quality time with researchers and effective interaction and hand over. (10 workshops in Hobart; 7 workshops/seminars in Canberra; 2 workshops in Launceston and 2 workshop/seminar in Melbourne). These forums were attended by 60 organisations and 345 practitioners and policymakers). The positive and engaging audiences at these events are testament to the reach and penetration we achieved into multiple organisations charged with the responsibility of biodiversity conservation.

> ‘I commend the hub for its consultation process and its ability to translate very complex information into language, materials and products that are readily accessible. The hub is a shining light in taking the next step in engaging and communicating complex information. Thank you for going the extra mile and coming to us to have that ‘Melbourne’ conversation.’

**Tony Varcoe**, Manager, Science and Management Effectiveness, Parks Victoria

**Science Collaborations and Communications**

As a transdisciplinary project relying on strong research-user involvement and collaborations were an imperative and key to successful outcomes. As a result of the study area induction tours, our researchers built working relationships with research-users very early and involved research-users throughout the research process. The regular researcher roundtables built good working relationships across the eight project areas, and fostered collaborative teams that produced additional outcomes, papers and perspectives that any one project could not have achieved. To date there have been 11 papers published, with a further 20 submitted or in preparation, that include multiple authors from three or more discipline-based projects or research institutions, plus authors from research–user organisations.

> ‘Well done NERP, LaP and the Australian Alps Liaison Committee. I know of no other place, other than perhaps Kruger National Park in South Africa, where this partnership of science and management is actively working together so well.’

**Graeme Worboys**, Protected Areas Management Specialist, Co-Vice Chair IUCN

> ‘Involvement with the LaP Hub has been one of the highlights of my time in the Alps – a wonderful Science/Management collaboration; so much valuable research and sharing of knowledge.’

**Charlie Pascoe**, Parks Victoria

**Integration: Six Steps for Regional Biodiversity Assessment**

Our primary integration and synthesis product is the six–step process for regional biodiversity assessment, the organising principle for the Life at Large website. This was developed as a result of a review of research activity across the hub conducted in August 2013 (See Appendix I for notes from the Integration Exercise). As we collectively reflected on more than 60 individual research activities over the following year, we identified six distinct types of research that had been undertaken in order to achieve our brief of developing ‘tools, techniques and policy pathways for regional assessment of biodiversity’. The
website was designed around these six steps, providing examples from each of our case study areas and profiles of 30 tools and techniques developed along the way.

**Monitoring and Evaluation**

An important part of our monitoring and evaluation strategy was always seeking feedback after engagement events. Formal feedback sheets were completed for more than 50 events. The feedback was constructive and the information used to shape subsequent events. We listened and we responded to stakeholders’ feedback. We were regularly congratulated for our communications, engagement and collaboration. A full list of testimonials is included in Appendix E.

‘This morning in Canberra the Threatened Species Commissioner launched the final report of the Landscapes & Policy Hub funded through Australia’s National Environmental Research Program. It was led by Prof Ted Lefroy at the University of Tasmania and it is a fantastic example of science synthesis and communication. If you are interested in the Australian Alps or the Tasmanian Midlands in particular, you will find a rich treasure trove here. Guided Tour | Life at Large’

Andrew Campbell, Director, Research Institute for Environment and Livelihoods,
Charles Darwin University

‘The wealth of data is outstanding already and has delivered sound results. The accumulation of data may benefit much future research.’

Anonymous Landowner, feedback from Launceston Life at Large Launch

**Hub Evaluation**

In today’s complex world with apparently intractable environmental problems, interdisciplinary research is regarded as an important way of finding and implementing solutions. A core commitment of this research hub was interdisciplinary research undertaken with research–users as partners. From our evaluative feedback session, we identified key elements to achieving effective interdisciplinary research.

<table>
<thead>
<tr>
<th>Recommendations for Transdisciplinary Research</th>
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<tbody>
<tr>
<td>1. Provide funding for the appointment of communications staff and knowledge brokers who are committed to facilitating and ensuring communication among researchers and with research users.</td>
</tr>
<tr>
<td>2. Organise and support face-to-face meetings of researchers and research users to define and investigate research issues of importance to research users, ensuring research users can benefit from relevant expertise of researchers, and vice versa.</td>
</tr>
<tr>
<td>3. Engage research users early and often through a variety of means.</td>
</tr>
<tr>
<td>4. Ensure flexibility in the allocation and expenditure of research funds.</td>
</tr>
<tr>
<td>5. Continue to emphasise the importance of long term research funding for addressing the long term, complex, intractable and ‘wicked’ problems facing biodiversity conservation in Australia and globally.</td>
</tr>
<tr>
<td>6. Continue to proactively pursue the integration of social science in interdisciplinary research addressing environmental problems such as biodiversity conservation.</td>
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Extract from a report on the hub’s final evaluation exercise conducted by Sue Moore
Publications, Awards and Media

To ensure that our publications are discoverable and easily accessible publicly and to our researcher users in perpetuity, we developed a multi-media, interactive web-based final report; www.lifeatlarge.edu.au as a ‘home’ for all our research outputs. We expect that the Life at Large website will be our most powerful and persistent legacy that will live on well beyond the conclusion of hub activities and the last contracted activity date.

The Life at Large website frames the research outputs in an easy to follow and visualise six–step process

‘Life at Large is the best product that I have seen out of a 3-4 year program, as it In provides relevant information on many levels, for many audiences with multiple access points to locate the right information for the audiences circumstances. In doing so, have produced a suite of scientists that are great communicators, which is an enduring legacy of the project.’

Allison Woolley, Tasmanian Department of Primary Industries, Parks, Water and Environment

As at the 31 March 2015, hub researchers led or contributed to 46 published refereed journal articles directly related to hub outputs, this includes papers that have been accepted and are in the final throes of layout and proofing for publishing. Additionally, hub researchers contributed to 84 published papers related to concurrent research not directly related to hub outputs. There are 25 research papers under preparation for submission to refereed journals. They are expected to be completed and submitted during 2015.

Due to the lag time between submitting, acceptance and publishing, there were 16 papers published by hub researchers involved in the preceding CERF funded projects, including Climate Futures for Tasmania, and the Landscape Logic hub.

The hub published 38 technical reports, all freely available on the hub’s website: www.nerplandscapes.edu.au.

Conscious of the multiple levels of understanding and research–user requirements, we generated 41 ‘Summaries for Policymakers’ to complement published papers and provided a plain language interpretations of the journal papers that eluded to the policy implications of the findings. The knowledge brokers played an important role in framing the research findings in a context for the policymakers to relate.

‘The ‘Life at Large’ site is exquisite communication of complex, layered ideas.’

Rosemary Grant, ABC Local Radio, Northern Tasmania

In support of science communications, we published 175 editions of the Hub Happenings, 24 information/research profile sheets, 17 event/seminar fliers, and several templates to support meeting processes (including PowerPoint presentations and evaluation forms).

In terms of media, there were 8 interviews on TV, 30 radio interviews, 6 media releases, 9 newspaper articles, 9 articles in stakeholders’ newsletter, 5 posts to social media, 6 on-line articles and 59 articles in The Conversation (59).

During the course of the hub, we celebrated 27 awards of recognition or achievement. This included 12 national honours and one international honour. Details are included in Appendix C.
Resourcing and Staff

Over the four-year life of the hub (01 March 2011 – 1 April 2015), a total of 76 staff were salaried or contracted to contribute to the research process. Our core structure had 36 staff, made up of 9 project leaders, 9 postdoctoral research fellow, 3 PhD students, 2 masters students and 2 honours students. The communication and knowledge brokering team consisted of two full time and eight part time staff sub-contracted to provide support for science communications. The full staff list is in Appendix B and an organisational chart on page 25.

We also contracted additional people to support hub researchers and contribute specialised skills/tasks that could not be achieved internally within contracted timeframes. There were 15 additional subcontractors; one third of these sub-contractors enabled the hub to complete the additional studies for the Regional Sustainability Planning studies.
**Report Contents**

**Hub name:** NERP Landscapes and Policy Hub  
**Host organisation:** University of Tasmania  
**Hub director:** Professor Ted Lefroy  
**Contact number:** (03) 6226 2626  
**Email address:** Ted.Lefroy@utas.edu.au  
**Milestone:** #11  
**Report number:** Final (#8 in the reporting series)  
**Reporting period:** 1 January 2011 – 31 March 2015

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### Section 2: Report Contents

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Appendix A: Contracts

Contracted Partners and Research Contributors
Subcontractors

Appendix B: Staff

Appendix C: Staff Awards & Achievements

Appendix D: Stakeholders & Collaborative Research – Users

Australian Government Partners, Collaborators and Research–Users
Other Partners, Collaborators and Research–Users
Other Partners, Collaborators and Research–Users, cont.,
Other Partners, Collaborators and Research–Users, cont.,

Appendix E: Testimonials - what the stakeholders said

Appendix F: Publications

A. Books (1)
B. Book Chapters (8)
C. Peer Reviewed Journal Articles (46) – NERP funded
D. Peer Reviewed Journal Articles (16) – CERF funded
E. Conferences Papers, Posters & Presentations (49)
F. Reports and Occasional Papers (38)
G. Other Publications (>400)

Appendix G: Management Tools and Models

Appendix H: Media Engagements

Appendix I: Hub Integration Exercise

Appendix J: Hub Evaluation

Appendix K: Individual Project outputs and outcomes (Jul-Dec 2014)

Acknowledgements
Section 3: About the Hub

Hub Overview

The Landscapes and Policy Hub was a research collaboration that focused on integrating biophysical and social sciences to provide guidance for policymakers on planning and management of biodiversity at a regional scale.

Concentrating on two contrasting landscapes of the Tasmanian Midlands and the Australian Alps, the research hub developed tools, techniques and policy pathways to integrate biodiversity into regional scale planning.

The interdisciplinary research placed particular emphasis on landscape-scale management of species and communities listed under the under Australia’s primary conservation legislation: Environment Protection and Biodiversity Conservation Act 1999. This includes ‘Matters of National Environment Significance’, like the Tasmanian Midlands Lowland Grasslands communities and the unique alpine wetlands in the Australian Alps.

The multi-disciplinary research collaboration, known as the ‘Landscapes and Policy Hub’, was hosted by the University of Tasmania and was one of five national research hubs funded to study biodiversity conservation by the National Environmental Research Program (NERP) for four years (2011-2014).

A review in 2009 of Australia’s key piece of environmental legislation, the Environment Protection and Biodiversity Conservation Act 1999 (EPBC), recommended that we need to lift the scale at which we manage Australia’s biological diversity from that of species and communities to whole landscapes and ecosystems.

The review recommended that the Australian Government ‘streamline approvals through early engagement in planning processes and provide for effective and greater reliance on strategic assessments and bioregional planning.’

Research Collaborators

Our researchers were based at the University of Tasmania (UTAS), The Australian National University (ANU), Griffith University, Murdoch University and the Antarctic Climate & Ecosystems Cooperative Research Centre (ACE CRC).

Specialising in varying disciplines, the researchers were from several schools within these organisations including; UTAS Centre for Environment; UTAS School of Geography and Environmental Studies; UTAS School of Economics and Finance; the Griffith Climate Change Response Program at Griffith University; Murdoch University School of Environmental Science; ANU Fenner School of Environment & Society; ACE CRC Climate Futures; UTAS School of Zoology and UTAS School of Plant Science Environmental Change Biology Group.

Our 36 researchers worked in collaboration with conservation practitioners and land managers, conservation organisations and natural resource management departments at all levels of government who focus on 'Matters of National Environmental Significance'. Initially, the primary stakeholders were the federal Department of the environment (formerly the Department of Sustainability, Environment, Water, Population and Communities), the Australian Alps national parks Program, the Australian Alps Liaison...
Committee, the Tasmanian Department of Primary Industries, Parks, Water and Environment, Tasmanian Land Conservancy, NRM North, Parks Victoria and the NSW Office of Environment and Heritage (NPWS). By the hub’s conclusion, this list had expanded to include more than 100 stakeholders (see Appendix D).

**Geographic location (case study areas)**

*The Tasmanian Midlands* - Biophysical research will occur over the whole of Tasmania while the integrated social-ecological assessment was done within a subset centred on the Northern Midlands Bioregion. The Tasmanian Midlands is a largely privately owned valley which is a highly fragmented landscape that has been farmed since the earliest days of European settlement.

*The Australian Alps* - The Local Government Areas (plus the ACT) that include parts of the Australian Alps bioregion, total area 8.8 million hectares. Biophysical research will occur over the whole study area while social, economic and institutional research will be carried out within a subset to be determined. The Australian Alps is a publicly managed mountain range that is largely intact but under threat from invasive species and more frequent fires.

**Project Objectives**

The research hub is reviewing a range of planning processes, policies and institutional arrangements related to fire risk, water yield, carbon sequestration, and human social and economic well-being. These will be assessed using ecological analysis, modelling, experimental economics and social and institutional research.

**Organisational Structure**

The researchers collaborated closely between eight core research areas to explore the likely implications of different scenarios of changing climate, land use and management, demographics, infrastructure development and other human and natural influences on ecosystem services and habitat suitability for selected species of mammals, reptiles, birds, amphibians and plants.

The research team is supported by a Communications and Knowledge Brokering Group that facilitates links between researchers and policy-makers.

In the organisational chart that follows, the colour coding is:

- **Green Boxes** – hub people
- **Orange Boxes** – people employed under additional contracts
- **Greyed out names** – people who have left the hub as at December 2014
Hub Organisational Structure

Showing contributors across the four years of operation
## Contracted Research Output Tables (from MYRP)

### Project level outputs for 2011/12

<table>
<thead>
<tr>
<th>THEME/PROJECT # (Project Leader)</th>
<th>Outputs as contracted in Multi-Year Research Plan (Table 2. Project level outputs for 2011/12, from Multi-Year Research Plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEME 1 1. Communications and Knowledge Brokering (Prof Ted Lefroy)</td>
<td>Head agreement contractual outputs, including progress reporting, financial reporting, science communication plan, and monitoring and evaluation plan, and final report.</td>
</tr>
<tr>
<td>THEME 2 2. Social and Institutional Futures (Dr Michael Lockwood &amp; Prof Sue Moore)</td>
<td>1. Evaluation of current institutional, social and economic policies and instruments applied to biodiversity conservation in the two case study regions based on available ABS data and targeted surveys</td>
</tr>
<tr>
<td>3. Economic Futures (Prof John Tisdell)</td>
<td>2. Development of a conceptual landscape bio-economic model and associated experimental economics platform to evaluate the likely effectiveness of policy options with a focus on MBIs</td>
</tr>
<tr>
<td>THEME 3 4. Bioregional Futures (Prof Brendan Mackey)</td>
<td>3. Spatial and temporal representation of land systems in contrasting study regions, including (i) stocks and flows of energy, water and nutrients; (ii) habitat resources; (iii) patterns of diversity, distribution and abundance of species and communities; (iv) patterns of tenure, land use and land management. (v) effective environmental conditions. (i.e. representation of the fundamental characteristics of biodiversity in time and space).</td>
</tr>
<tr>
<td>5. Climate Futures (Prof Nathan Bindoff)</td>
<td>4. Fine scale climate projections (10 km grid cells) from the Climate Futures Tasmania project applied to conservation planning in the public and NGO sectors in the Tasmanian Midlands bioregion case study, with specific ecosystem indices and simulations determined according to the needs of the other Hub projects and partners.</td>
</tr>
<tr>
<td>6. Wildlife (Prof Chris Johnson)</td>
<td>5. Workshops completed on the application of existing fine scale climate simulations to conservation planning.</td>
</tr>
<tr>
<td>7. Vegetation and Fire (Prof David Bowman)</td>
<td>6. Regional scale climate projections initiated for the Greater Alps case study region including design of experiments, feasibility of simulations, and potential for collaborative modelling over a larger area of SE Australia</td>
</tr>
<tr>
<td>8. Freshwater Ecosystems (Prof Peter Davies)</td>
<td>7. Distribution models for vertebrates, with complete coverage for terrestrial groups (selected spp. of reptiles, amphibian, birds, mammals) plus selected freshwater species, using meta-analysis to map patterns of vertebrate richness, local endemism and assemblage structure in the 2 case study regions, plus correlative distribution models &amp; mechanistic niche models for selected species</td>
</tr>
<tr>
<td>PROJECT</td>
<td>Outputs as contracted in Multi-Year Research Plan</td>
</tr>
<tr>
<td>Project Leader</td>
<td>Table 3. Project level outputs for 2012/13, from Multi-Year Research Plan</td>
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<td>----------------</td>
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</tbody>
</table>
| 2. Social and Institutional Futures  
(Dr Michael Lockwood & Prof Sue Moore) | 10. Specification of current institutional, social and economic conditions relevant to biodiversity conservation in the two study regions (completed)  
11. Evaluation of current policy, governance and planning regimes in terms of likely outcomes for the key biodiversity features and dependent social and economic conditions (underway, to be completed June 2014) |
| 3. Economic Futures  
(Prof John Tisdell) | 12. Tests of the landscape bio-economic model using characteristics of the two case study regions.  
13. Design of MBIs associated with hypothesised trajectories for biodiversity emerging from the 5 biophysical projects for both case study regions. |
| 4. Bioregional Futures  
(Prof Brendan Mackey) | 14. Modelled and field tested techniques for identifying refugia (against drought, fire and climate change) for selected species, communities and MNES, determined in collaboration with the Climate Futures, Wildlife, Vegetation and Fire and Freshwater Systems projects and partner organisations.  
16. The conservation status of landscapes, ecosystems and focal species and associated degrading and threatening processes identified for contrasting study regions. |
| 5. Climate Futures  
(Prof Nathan Bindoff) | 17. Regional scale climate projections for SE Australia with a focus on the greater Alps case study area using the A2 emissions scenario and a range of GCM models (up to 6 to be selected).  
18. Develop ecosystem indices based on those generated in collaboration with the other 4 biophysical projects, determined according to the needs of the other Hub projects and partners. |
| 6. Wildlife  
(Prof Chris Johnson) | 19. Refined species distribution models that include the effects of weather-induced local scale variability.  
20. Fine-scale mapping of stable refugia based on historical weather variability.  
| 7. Vegetation and Fire  
(Prof David Bowman) | 22. Analysis of the likely implications of fine scaled climate projections on fire frequency and intensity for the whole of Tasmania.  
23. Analysis of ‘at risk’ plant communities in the Tasmanian Midlands case study area.  
| 8. Freshwater Ecosystems  
(Prof Peter Davies) | 25. a) Preliminary analysis of relationships between past interventions, ecosystems process and the distribution and abundance of selected species and b) relationships established between past interventions, ecosystems process and the distribution and abundance of selected species based on modelling recent historical changes to water and land management in the Tasmanian Midlands and Greater Alps case study areas. |
<table>
<thead>
<tr>
<th>THEME (Leader)</th>
<th>Outputs as contracted in Multi-Year Research Plan (Table 4. Theme level outputs for 2013/14, from Multi-Year Research Plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 2 Social and Institutional Futures (Dr Michael Lockwood)</td>
<td>26. <em>(in collaboration with P3)</em> Evaluation of different scenario of institutional, policy and planning reform in terms of (i) likely efficacy of achieving desired conservation trajectories (ii) institutional and social acceptability (iii) economic costs and benefits associated with achieving conservation trajectories and (iv) pilot testing MBI interventions in subsets of the two study regions.</td>
</tr>
<tr>
<td>Theme 3 Bioregional Futures (Prof Brendan Mackey)</td>
<td>27 <em>(in collaboration with P2)</em> Conservation management options identified for landscapes, ecosystems and focal species with respect to refugia, connectivity and degrading and threatening processes.</td>
</tr>
<tr>
<td></td>
<td>28 <em>(in collaboration with P5)</em> Evaluation of the potential impacts of projected climate change on the conservation management options identified in output 26.</td>
</tr>
<tr>
<td></td>
<td>29 <em>(in collaboration with P5)</em> Evaluation of climate change impacts on (i) W (climatic water balance index); (ii) Net Ecosystem Exchange (GPP, respiration).</td>
</tr>
<tr>
<td></td>
<td>30 <em>(in collaboration with P7)</em> Modelled potential impacts of climate change on fire regimes in Tasmania and the Greater Alps and consequences for vegetation, habitat resources and focal species.</td>
</tr>
<tr>
<td></td>
<td>31 <em>(in collaboration with P7)</em> Comparative analysis of fire activity in mainland temperate forests to understand the climate, topographic vegetation and land management factors that cause mega fires and relate this knowledge to Tasmania and the Alps to generate plausible fire risk scenarios.</td>
</tr>
<tr>
<td></td>
<td>32 <em>(in collaboration with P6)</em> Comparative analysis of projected threats to persistence of vertebrates in the 2 case study regions under future spatial patterns of climate change and climate variability, including likely changes in land use and invasive exotic species.</td>
</tr>
<tr>
<td></td>
<td>33 <em>(in collaboration with P8)</em> The likely impacts of climate change on freshwater ecosystems in the 2 case study regions based on fine scale regional projections applied to the results of natural experiments from output 21.</td>
</tr>
<tr>
<td></td>
<td>34 A systematic approach for identifying refugia likely to be effective against multiple threats for multiple species developed from the synthesis of outputs 27 to 33.</td>
</tr>
<tr>
<td></td>
<td>35 Systematic processes for identifying priority locations for protection, enhancement, connection, acquisition and remediation developed from the synthesis of outputs 27 to 33.</td>
</tr>
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<thead>
<tr>
<th>THEME (Leader)</th>
<th>Outputs as contracted in Multi-Year Research Plan (Table 5. Hub level outputs for 2014 (Third and Fourth Quarter), from MYRP)</th>
</tr>
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<tbody>
<tr>
<td>THEME 1, 2 &amp; 3 Integrated Ecological, Social and Economic Futures (Ted Lefroy)</td>
<td>36 The likely effectiveness of alternative institutional, policy and planning reforms in achieving societal preferences for biodiversity under likely scenarios of environmental and social change based on (i) ecosystem dynamics and the conservation status of selected species and communities, (ii) human wellbeing and the sustainability of regional communities.</td>
</tr>
<tr>
<td></td>
<td>37 Descriptions of the tools and methods used to achieve output</td>
</tr>
<tr>
<td></td>
<td>38 Indicators for monitoring the effectiveness of institutional, policy and planning reforms.</td>
</tr>
</tbody>
</table>
### Detailed Additional Study Hub Objectives (as contracted)

<table>
<thead>
<tr>
<th>Additional Study</th>
<th>Objectives as contracted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RSP A: Community Values</strong></td>
<td>1. Maps indicating values assigned by multiple community types to natural features in the Lower Hunter region.</td>
</tr>
<tr>
<td>(Dr Chris Raymond)</td>
<td>2. A methodology for eliciting community values assigned to natural features applicable in multiple regional planning contexts</td>
</tr>
<tr>
<td><em>(Delivered July 2013)</em></td>
<td>3. Policy recommendations which can be used to inform the Lower Hunter regional strategy, including a reliability check of sites tagged for conservation and regional development.</td>
</tr>
<tr>
<td><strong>RSP B: Knowledge Integration</strong></td>
<td>1. Two to three workshops completed each year for Regional Sustainability and Strategic Assessments staff and external audiences as appropriate (contractors, consultants, state and local government) to:</td>
</tr>
<tr>
<td>(Prof Ted Lefroy)</td>
<td>a) Familiarise the RSP teams and others with NERP research of direct relevance <em>(2013)</em></td>
</tr>
<tr>
<td><em>(Final Delivery May 2015)</em></td>
<td>b) Train RSP teams in the application of specific research outputs as appropriate <em>(2014)</em></td>
</tr>
<tr>
<td><strong>RSP C: Wildlife Corridors</strong></td>
<td>1. A decision framework to guide planners through the process of identifying the most appropriate locations for wildlife corridors based on the principles in the National Wildlife Corridors Plan, including but not limited to an analysis of:</td>
</tr>
<tr>
<td>(Prof Ted Lefroy)</td>
<td>a) The biodiversity conservation goals</td>
</tr>
<tr>
<td><em>(Delivered January 2015)</em></td>
<td>b) The environmental, social and economic context (areas of high natural values; existing corridor plans at community, local, regional, state and national level; analysis of the likely social and economic impact),</td>
</tr>
<tr>
<td><strong>RSP D: Sustainable Tourism</strong></td>
<td>1. To develop a thorough understanding of stakeholders’ attitudes towards sustainable tourism development in areas recognised for the presence of MNES across Tasmania (the particular MNES featured in the research to be determined in consultation with the Department.)</td>
</tr>
<tr>
<td>for Tasmania</td>
<td>2. To determine the social acceptability of development by assessing stakeholders’ attitudes to a range of plausible single-area and multiple-area development scenarios in areas recognised for the presence of MNES.</td>
</tr>
<tr>
<td>(Dr Anne Hardy)</td>
<td>3. To assess the likely economic impacts of differing development scenarios on visitation, and where possible on expenditure, in areas recognised for the presence of MNES in Tasmania.</td>
</tr>
<tr>
<td><em>(Delivered December 2014)</em></td>
<td>4. To produce a series of recommendations for acceptable tourism development scenarios that can inform local and regional planning frameworks in Tasmania.</td>
</tr>
<tr>
<td><strong>BF/CfoC: Biodiversity Fund</strong></td>
<td>1. To increase the likelihood that publicly funded environmental projects will achieve measurable outputs and outcomes in line with the overall goals of their respective programs.</td>
</tr>
<tr>
<td>&amp; Caring for our Country</td>
<td>2. To provide clear guidelines to applicants based on the adaptive management cycle</td>
</tr>
<tr>
<td>Management Model</td>
<td>3. To provide criteria to Department of the Environment staff for project selection based on the Adaptive Management cycle</td>
</tr>
<tr>
<td>(Prof Allan Curtis)</td>
<td>4. To improve the ability of publicly funded environmental programs to monitor, evaluate and report on the achievement of their goals, objectives and outcomes.</td>
</tr>
<tr>
<td><em>(Delivered December 2013)</em></td>
<td></td>
</tr>
</tbody>
</table>
Communications and Engagement Approach

From the outset, we considered the involvement of stakeholders and research–users as critical to the hub’s success. Therefore, we set out with a communications and engagement strategy to deliver information in ways directly relevant to and useable by a range of stakeholders and research–users.

The hub’s Communication and Engagement Plan established a program of early consultation and engagement with key stakeholders, and on-going consultation and opportunities for review throughout the research process. Early engagement activities included the case study area induction bus tours, the policy roundtables and targeted briefings. Early engagement secured important relationships with stakeholders and raised the researchers’ understanding of the stakeholders’ interests, issues and influences.

The early engagement also meant that we identified our stakeholders’ preferred methods of communication and established a process for managing communication, involvement and expectations during the life of the hub.

Our communications were collaborative, consultative and co-designed. Our communication mission was to deliver the right information, to the right person, at the right time.

We:

- Established effective internal communications that fostered cross-disciplinary engagement so that our researchers integrated to contributed world-class research to help understand, manage and conserve Australia’s unique biodiversity.
- Engaged with stakeholders responsible for, having influence over, are impacted by or are interested in ‘Matters of National Significance’ to ensure our research contributed knowledge in a way that is applicable and used.
- Consulted with stakeholders in a coordinated way and incorporated their biodiversity conservation issues, policy frameworks and operational implications in our assessment.
- Delivered results and outcomes in a way that reflects the world-class nature of the research, and ensured the research is accessible and meaningful to our stakeholders.
- Monitored our progress to evaluate our effectiveness at achieving our objectives.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity</th>
<th>Output</th>
<th>statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Effective Internal Communications</td>
<td>Communication Team (100) Management Committee (10) Researchers’ Roundtable (11) Steering Committee (10)</td>
<td>Weekly Internal E-Bulletin✓ Cross-Disciplinary Gatherings✓ Case Study Tours ✓ Intranet ✓</td>
<td>175 editions Hub Happenings &gt; 200 gatherings 2 bus tours 1 intranet</td>
</tr>
<tr>
<td>2. Engagement with Stakeholders</td>
<td>Stakeholder Analysis✓ Targeted Stakeholder Engagements✓ Regular Liaisons✓</td>
<td>Policy Roundtables✓ Briefings/Workshops/Presentations✓ Research–User collaborations✓</td>
<td>30 &gt; 300 &gt; 65 studies/outputs</td>
</tr>
<tr>
<td>3. Coordinated Consultation &amp; communications with stakeholders</td>
<td>Tailored Communication Products✓ Theme &amp; Project Information Sheets ✓</td>
<td>Activities Register✓ Project level communication plans Project Profile Sheets Frequently Asked Questions (FAQs) Articles in Stakeholders’ Newsletters✓ NERP Seminars/Fliers✓</td>
<td>&gt; 2500 entries &gt; 25 products 9 project profile sheets 3 FAQs 15 articles 12 Seminars/Fliers</td>
</tr>
</tbody>
</table>
Table 1: Tools & Techniques For Engaging and Communicating the Science

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity</th>
<th>Output</th>
<th>statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Accessible and Meaningful Products</td>
<td>NERP Branding✓</td>
<td>Style Guide &amp; Templates✓</td>
<td>&gt; 80 templates</td>
</tr>
<tr>
<td></td>
<td>Tailored Communication Products✓</td>
<td>Hub Website &amp; Life at Large✓</td>
<td>2 web presences</td>
</tr>
<tr>
<td></td>
<td>Key Messages✓</td>
<td>Research Papers✓</td>
<td>46 journal papers</td>
</tr>
<tr>
<td></td>
<td>Information Management Systems ✓</td>
<td>Summaries for Policy Makers✓</td>
<td>34 summaries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Final Delivery Forums✓</td>
<td>4 forums/20 targeted briefings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metadata Register✓</td>
<td>Metadata collected</td>
</tr>
<tr>
<td>5. Monitoring &amp; Evaluation</td>
<td>Review &amp; Improve✓</td>
<td>Progress Reports✓</td>
<td>8 progress reports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meeting/Event Feedback✓</td>
<td>50 feedback sheets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hub &amp; NERP Evaluation✓</td>
<td>2 completed</td>
</tr>
</tbody>
</table>

Monitoring and Evaluation Approach

The hub’s monitoring and evaluation plan was driven largely by our commitment to deliver outputs relevant to stakeholders and research–users needs. We regularly sort feedback, both formally and informally at all hub engagements. We used specified performance indicators to monitor and improve its effectiveness, reporting biannually in seven progress reports. Together with the information reported by the researchers for the Jul-Dec 2014 period (see Appendix I), this final report collates the achievements, highlights and statistics.

The department provided three categories of key performance indicators for reporting. A summary of statistics and achievements is included in Section 4.

The three indicator categories were:

- **Systems establishment phase** – assesses how well each hub has implemented the systems required to successfully deliver on the NERP hub Multi-Year Research Plan. These indicators will become redundant during the first year of funding.

- **Outputs delivery phase** – provides confidence that the hub is delivering research outputs intended for input into the policy development process.

- **Project impact phase** – will reveal how well the hub has delivered outcomes – that is, demonstrate that hub research has had a positive effect on the policy issues managed by the department and the other Australian Government agencies specified in hub work plans. It is recognised that many, but not all research outcomes occur after programs have been completed.

NERP Evaluation

The hub researchers participated and contributed to the 2013 NERP Evaluation conducted by Vista Advisory. The evaluation assessed how well the program was meeting its objectives in relation to informing environment portfolio research–users. This evaluation found that NERP has been effective in meeting its objective in several key areas, most notably in informing national park planning and operations, and also across several high profile Environment Protection and Biodiversity Conservation Act 1999 responsibilities.
The Landscapes and Policy Hub was cited as an exemplary example of supporting effective engagement with decision makers.

**Tools and Knowledge for park managers to protect biodiversity**

The important role of the EPBC Act listed Alpine wetlands and sphagnum bogs in the hydrology of major river systems in SE Australia is under multiple threats, including fire, climate change, weeds and wild horses. The Landscapes and Policy (LaP) Hub is providing tools for managers to prioritise threats and identify management solutions. These tools support effective engagement with decision makers by providing robust policy and funding options. For example, a NERP-funded LaP model (‘SPADE’) is being used to answer specific questions for NSW and Victorian parks managers on the likely range and abundance of wild horses and will help to identify the most cost effective management options in their jurisdictional management plans for this invasive species whose population has grown at its biological maximum growth rate of 20 per cent per annum following fires over the last decade that have opened up vegetative cover in the Alps.

Park managers in these jurisdictions highly value the support they have received through NERP for addressing these priority management issues and consider that the model will be incredibly useful for other species and landscapes\textsuperscript{48}. These jurisdictional park managers praised the relevance, timeliness and quality of other NERP projects, including the research into the impact of cattle grazing on bushfires (which found that cattle grazing does not contribute to a reduction of fire intensity) and monitoring the re-seeding of Alpine Ash forests that were devastated in recurrent fires over the last decade. The results of these research projects, which are already being used in direct management actions by jurisdictional parks managers, and for which the Commonwealth has an EPBC Act responsibility, will be integrated with other socio-economic studies that are occurring within the LaP Hub. All projects are informing the development of a 6-step process that takes a landscape management approach to biodiversity conservation, rather than managing individual species and habitats. This will assist the department to deliver on the 2009 Hawke Review’s recommendation for a broader approach to EPBC actions, providing an approach that takes account of the socio-economic values as well as the ecological aspects of a landscape.

*Extract from the Evaluation of the National Environmental Research Program (NERP) Report by Vista Advisory (2014), Case Study from page 24*

The Landscapes and Policy Hub was also cited for its role in timely capacity building of departmental officers to effectively implement strategic assessments and sustainable regional development program regions.

### Strategic assessments and sustainable regional development program

The Landscapes and Policy Hub was engaged in mapping community values for regional sustainability in the Hunter Region of NSW. The project assisted in informing the response of local communities to the Lower Hunter Regional Plan. NERP-funded research has provided Commonwealth, state and local government representatives with information on biodiversity features and conservation priorities together with spatial data on species distributions and an impact assessment of proposed development plans on biodiversity. NERP research provided the community with the information to discuss the merits of different development preferences and conservation values for the region.

In addition, the Landscapes and Policy Hub has focused on integrating ecology and social science to provide guidance for policy makers on planning and management of biodiversity at a regional scale. Focusing on two contrasting landscapes, the Tasmanian Midlands and the Australian Alps, the Hub is developing tools, techniques and policy options to integrate biodiversity into regional scale planning. The interdisciplinary research is placing particular emphasis on landscape-scale management of species and communities listed under the EPBC Act. This approach is still to be completed but has assisted in the Strategic Assessment of the Tasmanian Midlands Water Scheme—a major investment in irrigated agricultural production with rare grassland communities.

*Extract from the Evaluation of the National Environmental Research Program (NERP) Report Vista Advisory (2014), Case Study from page 28*

### Final Delivery Forums

The Landscapes and Policy Hub enjoyed continuous engagement with research–users throughout the duration of hub’s funding. However, a special effort was made at the conclusion to travel to our major research–users to present an overview of the hub’s research outputs and offer training in specific tool and techniques. These final workshops proved to be very effective in ‘closing the loop’ with our research–users. The feedback collected at these forums suggests that the legacy of the hub will live on through our end–users as they take up the tools and techniques and use them in their organisations.

At the four major delivery forums conducted in Canberra, Melbourne, Hobart and Launceston we presented our research outputs and final report.

<table>
<thead>
<tr>
<th>Main Event</th>
<th>Complementary Events</th>
<th>Organisations represented</th>
<th>Individuals (including workshops)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hobart</td>
<td>10</td>
<td>23 + landholders</td>
<td>75</td>
</tr>
<tr>
<td>Canberra</td>
<td>7</td>
<td>16</td>
<td>140</td>
</tr>
<tr>
<td>Launceston</td>
<td>2</td>
<td>10 + landholders</td>
<td>30</td>
</tr>
<tr>
<td>Melbourne</td>
<td>2</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21</td>
<td>60 organisations</td>
<td>345 individuals</td>
</tr>
</tbody>
</table>

These main events were complemented by 21 workshops and targeted briefings to provide quality time with researchers and interaction for effective handover. This included 10 workshops in Hobart; 7 workshops/seminars in Canberra; 2 workshops in Launceston and, a workshop and seminar in Melbourne.
These engagements were attended by more than 345 practitioners and policymakers, representing 60 organisations. In Tasmania, this included individual landholders and rural media. The diverse and engaging audiences at the final delivery forums is testament to the reach and penetration we achieved with multiple organisations, and at all levels of government and land management charged with the responsibility of biodiversity conservation.

‘I commend the hub for its consultation process and its ability to translate very complex information into language, materials and products that are readily accessible. The hub is a shining light in taking the next step in engaging and communicating complex information. Thank you for going the extra mile and coming to us to have that ‘Melbourne’ conversation.’

Tony Varcoe, Manager, Science and Management Effectiveness, Parks Victoria

Conscious that one size doesn’t fit all, we tailored the agendas for each forum to reflect the research–users’ needs and their levels of participation in the tools development. We selected from the suite of presentation styles that we trained our researchers to communicate in. This included the high-level executive presentations in the three-minute speed talks; the 10-minute presentation followed by 20–minute facilitated policy implication discussion; the one-hour demonstration workshop for gaining a greater understanding of a tool’s potential; and the half day or full day tutorial of hands-on training to use the tool in their workplace.

‘One of the most successful aspects of the hub was its effort to identify who the agencies they need to engage with, learn about their issues, then respond by working out how the researchers can help develop tools to deal with those issues. So while this has not yet translated across to all those working in the field, the tools have certainly helped at the strategic planning level, and the tools are focused on real management problems. I had every confidence that the tools will help later at the field level.’

John Wright, Parks Victoria

The most important element of our final delivery forums was the way we presented our approach to assessing regional scale biodiversity conservation through the interactive multi-media, web site Life at Large

www.lifeatlarge.edu.au

‘Life at Large is the best product that I have seen out of a 3-4 year program, as it provides relevant information on many levels, for many audiences with multiple access points to locate the right information for the audiences circumstances. In doing so, you have produced a suite of scientists that are great communicators, which is an enduring legacy of the project.’

Allison Woolley, Tasmanian Department of Primary Industries, Parks, Water and Environment

‘...the way the research is woven together and presented, with the wheel, and in multiple ways of the case study areas, the steps and the tools, is really useful. It is accessible in a modern electronic world, as opposed to a final report with a dusty cover that we put on a shelf unused. This final report has potential to have much greater reach with a legacy that goes far beyond these researchers and this bit of work. Life at Large sets a context of Australia doing world class, integrated research.’

Carolyn Cameron, federal Department of the Environment

The relationships forged with research–users fostered additional opportunities to advance research understanding and for the hub to support research–users with policy questions and development. With
an established relationship, we were on hand to provide timely information to departmental officers as policy issues arose. One of the key relationships was with Carolyn Cameron’s the Regional Sustainability Planning teams within the Strategic Approaches group.

‘The added benefit were the questions raised in the Regional Sustainability Planning program. How the hub responded was fabulous — dial a scientist — that was really smart! The additional studies that we could engage through the hub were important, timely outputs for the department.’

Carolyn Cameron, Steering Committee Member and Department of the Environment

Beyond the life of the hub, we expect these trusted relationships will continue with individual researchers. There are already several engagements contracted with researchers and research–users to extend the hub’s research and undertake new research. The option for policymakers to continue ‘dialling–a–scientist’ will be additional legacy of the hub’s engagement efforts.

‘Well done NERP, LaP and the Australian Alps Liaison Committee. I know of no other place, other than perhaps Kruger National Park in South Africa, where this partnership of science and management actively working together is occurring so well.’

Graeme Worboys, Protected Areas Management Specialist, Co-Vice Chair IUCN

Hub Evaluation

In today’s complex world with apparently intractable environmental problems, interdisciplinary research is regarded as an important way of finding and implementing solutions. A core commitment of this research hub was interdisciplinary research undertaken with research–users as partners. In the recommendations, we distinguish between the terms interdisciplinary (research involving a number of disciplines working together) and transdisciplinary (interdisciplinary research conducted in partnership with research–users).

In December 2014 at the final meeting of researchers, the hub undertook a half-day reflection on the processes used in the hub’s life to encourage collaboration and integration across research disciplines and organisations, and their effectiveness. We identified those strategies that best supported interdisciplinary and transdisciplinary research. We also reflected on the various approaches we used to engage and involve research–users.

The evaluation focused on the:

1) Effectiveness of strategies employed to overcome barriers to interdisciplinary research;
2) Extent to which the hub adopted processes enabling interdisciplinary research; and
3) Overall outcomes of the hub.

The barriers to and processes enabling interdisciplinary research were identified from experiences of the Landscapes and Policy Hub predecessor, Landscape Logic, as well as a broader body of work over the last decade investigating barriers to integrative research and how to overcome them.

All questions used a five–point scale, with respondents able to choose ‘Ineffective’; ‘Somewhat Effective; ‘Effective’; ‘Very Effective’ or ‘Extremely Effective’ for each of the strategies employed by the hub. For the other strategies that may have been adopted, respondents were given statements they could ‘Strongly Disagree’; ‘Disagree’; ‘Neither Agree or Disagree’; ‘Agree’ or ‘Strongly Agree’. Overall, outcomes were evaluated in terms of being ‘Not at All’ met; ‘Somewhat’ met; ‘Mostly’ met; ‘Completely’
met; or ‘My Expectations were Exceeded’.

The TurningPoint program was used to gather responses and enable real-time display of results. Respondents use a hand-held key pad to provide their responses which are instantly conveyed to a computer that displays the results as part of a PowerPoint display. The program also stores the quantitative data as collected from respondents for future analysis. The immediate display of results enabled respondents to discuss, clarify and/or explain their responses, and notes were taken of these discussions.

Those involved in the evaluation include project leaders, other researchers, postgraduate researchers, and communications staff. More than half of each of these cohorts was included in this evaluation.

Results analysis included:

1) Identifying questions with a broad consensus in response and those with divergent responses, with further investigation of divergent responses to identify if there were any explanatory trends in how different cohorts responded;
2) Compiling responses to present aggregate data for each question (as shown in the results table presented as an appendix to this report); and
3) Consideration of additional themes arising from the notes taken of discussion arising out of the presentation of the results to each question.

Key results were then further categorised into themes from which the following recommendations were identified.

**Key lessons learned about conducting effective interdisciplinary research**

The following recommendations are from evaluative feedback provided by hub researchers through a facilitated workshop in late 2014. All of these recommendations are directed towards the achievement of effective interdisciplinary research.

**Recommendation 1.** Provide funding for the appointment of communications staff and knowledge brokers who are committed to facilitating and ensuring communication among researchers and with research users.

Dedicated engagement of communications staff and knowledge brokers working closely with a project leader with specific skills and experience in building interdisciplinary teams enabled the use of key strategies supporting interdisciplinary research. Particularly effective, and made possible with the design and guidance of these staff, were regular meetings of researchers in a common location (twice a year in Hobart), bus tours of study sites (once each to the Tasmanian Midlands and Australian Alps over the four-year project), ad hoc cross-project meetings (>300 over the life of the hub), and a weekly web-based newsletter for researchers and research users (Hub Happenings). Face to face meetings and the newsletter were particularly effective in overcoming the ‘tyranny’ of distance that often detracts from the effectiveness of interdisciplinary research where those involved are physically separated from each other.

**Recommendation 2.** Organise and support face-to-face meetings of researchers and research users to define and investigate research issues of importance to research users, ensuring research users can benefit from relevant expertise of researchers, and vice versa.
Face-to-face meetings were vitally important for ensuring effective interdisciplinary research with research users, helping to overcome the barrier of differences in institutional culture between participating organisations. Particular efforts were made to communicate across projects to build understanding and possibilities for cross-project synergies. Researchers regarded the ad hoc meetings and ad hoc exchanges associated with the formal meetings as just as valuable (if not more so) than the formal meetings themselves. These targeted meetings also helped improve the pursuit of fundamental, high quality and publishable research with practical applied outcomes.

**Recommendation 3. Engage research users early and often through a variety of means.**

Research users were engaged by multiple means including guidance throughout the life of the hub by: a Steering Committee with research user membership; knowledge brokers associated with three key research user agencies (Department of Primary Industries, Parks, Water and Environment, Australian Alps Liaison Committee & Department of the Environment); two forums between researchers and Australian Alps managers to identify research objectives and evaluate outcomes; and targeted interaction on specific projects, as detailed below. Guidance by research users was provided on selection of the case study regions, the choice of issues (for example, fire management in the alps), and on the tools that would be helpful for managers (for example, a method for evaluating stream health in the Tasmanian Midlands). Other strategies employed and regarded as highly effective were targeted cross-project meetings (for example, meetings on vegetation condition in the Tasmanian Midlands grasslands) and forums held with Australian Alps managers to design and undertake research (for example, on bogs, wild horses). Bus tours attended by researchers and research users were also identified as highly effective. Collectively, these activities resulted in researchers feeling accountable to research users in the way they conducted their research and reported their findings. Again, these strategies were enabled by communication staff.

**Recommendation 4. Ensure flexibility in the allocation and expenditure of research funds.**

Providing flexibility in how funds are allocated and expended allowed issues that emerged through working with research users to be addressed. This ensured a continued focus on issues of concern to research users, ensuring the relevance of research to research users, and commitment by all to the uptake of research findings. An essential accompaniment to flexibility in expenditure is being able to modify and/or add research outcomes and associated performance criteria as part of accountability and reporting arrangements.

**Recommendation 5. Continue to emphasise the importance of long term research funding for addressing the long term, complex, intractable and ‘wicked’ problems facing biodiversity conservation in Australia and globally.**

Researchers identified the short term funding cycle for environmental research (that is, four years of funding for this hub and then its termination) as problematic for addressing concerns such as biodiversity loss. Short-term funding cycles result in the loss of knowledge as researchers move institutions and even countries to find new research opportunities. These short cycles also terminate productive relationships between researchers and research users, where real world problems are defined, researched and solutions developed.
Recommendation 6. Continue to proactively pursue the integration of social science in interdisciplinary research addressing environmental problems such as biodiversity conservation.

Integration of the social sciences in the broader research activities of the hub was identified as problematic in the evaluation feedback from researchers. In the hub, two of the seven major research projects were social science based (that is, human geography, economics). A possible explanation for this perceived gap is the late appointment of staff and staff turnover in both of these projects that potentially impeded building relationships with researchers in other projects. Another possible explanation is the dominance of quantitative modelling and spatial analyses in the research activities of this hub, methodologies that require additional expertise to accommodate social science data. Partway through the life of the hub, a re-focusing of social science activities on possible spatial analyses was a response to this concern. In future, appointing additional social scientists with spatial expertise could help in interdisciplinary efforts where modelling and spatial analyses are critically important methodologies for integration purposes.
Progress Against Contracted Hub Outputs

Section 4: Contracted Outputs and Key Performance Indicators

A. Additional Project Milestones (as contracted and reported using the traffic light progress notation)

Additional Departmental Studies

- RSP A: Community Values
- RSP B: Knowledge Integration
- RSP C: Wildlife Cranials
- RSP D: Sustainable Tourism
- BF/CfG: Funding Management Model

Progress Key:
- Completed
- Good progress
- Catching up
- Behind schedule
- Complete by Jan 2015
- Did not proceed
Section 5: Outcomes and Impacts

Outcomes, Uptake and Impacts against Objectives

Output 1. Evaluation of current institutional, social and economic policies and instruments applied to biodiversity conservation in the two case study regions based on available ABS data and targeted surveys

OUTCOME: The social surveys, compiled partly from ABS data at the statistical division level and partly from purpose designed mail out surveys, provided a basis for the development of regional scenarios for the two case study regions (see also outcomes 10 and 36). While the scenarios themselves have been acknowledged by our research users as a useful aid to planning, the supporting social surveys have also been recognised as valuable sources of information for future conservation planning, in particular by DPIPWE senior staff for their value in understanding conservation capacity within a region.

Output 2. Development of a conceptual landscape bio-economic model and associated experimental economics platform to evaluate the likely effectiveness of policy options with a focus on MBIs.

OUTCOME: As a result of discussion with our research user organisations in the Tasmanian Midlands, the bio-economic model was developed specifically to examine the contribution of irrigation water from various schemes to the regional economy, and the costs of meeting the conservation needs of freshwater systems within the region as determined by the Freshwater Ecosystems project (see also outcome 12).

Output 3. Spatial and temporal representation of land systems in contrasting study regions, including (i) stocks and flows of energy, water and nutrients; (ii) habitat resources; (iii) patterns of diversity, distribution and abundance of species and communities; (iv) patterns of tenure, land use and land management. (v) effective environmental conditions. (i.e. representation of the fundamental characteristics of biodiversity in time and space).

OUTCOME: This research contributed to the development of the ‘framework for regional biodiversity assessment’ described in outcome 27 below.

Output 4. Fine scale climate projections (10 km grid cells) from the Climate Futures Tasmania project applied to conservation planning in the public and NGO sectors in the Tasmanian Midlands bioregion case study, with specific ecosystem indices and simulations determined according to the needs of the other Hub projects and partners.

OUTCOME: This research resulted in the generation of 30 environmental indices that were subsequently applied to studies of the distribution of over 230 endemic Tasmanian plants, animals and communities, included the grassland communities listed under commonwealth legislation (see outcomes 19, 22, 23, 30, 32 and 33).

Output 5. Workshops completed on the application of existing fine scale climate simulations to conservation planning.

OUTCOME: This series of workshops established the form of outputs for modelled distributions of plant and animals species under climate change as required by our collaborating partners. The outcome of this activity was to ensure the subsequent species distribution modelling was being carried out on species and communities of interest to our research users and that the format is which the research delivered was the most appropriate to its use.
Output 6. Regional scale climate projections initiated for the Greater Alps case study region including design of experiments, feasibility of simulations, and potential for collaborative modelling over a larger area of SE Australia.

OUTCOME: This activity was the preliminary step that led ultimately to outcome 17, the highest resolution climate projections for the Australian Alps. The projections (temperature increases of 5–6 °C, decline in total precipitation of 20–40% and a decrease in snow volume by 80% by 2100) have considerably revised the forecasts for climate in the Australian Alps and are set to have a major impact on planning and decision making in fire and emergency services management and biodiversity conservation.

Output 7. Distribution models for vertebrates, with complete coverage for terrestrial groups (selected species of reptiles, amphibian, birds, mammals) plus selected freshwater species, using meta-analysis to map patterns of vertebrate richness, local endemism and assemblage structure in the two case study regions, plus correlative distribution models and mechanistic niche models for selected species.

OUTCOME: This modelling, which was eventually carried out for all of Tasmania’s endemic vertebrates, represents the most comprehensive modelling of the future distributions of Tasmania’s fauna under climate change and is already being used in conservation planning by DPIPWE and Tasmanian environmental non-government organisations.

Output 8. Interactive web-based maps of Tasmania's fire history developed from interpretation of historical air photos and satellite imagery.

OUTCOME: This website is the first of its kind for any jurisdiction in Australia, giving users the ability to examine fire history for a particular location back to 1940. It is currently being used by the Tasmanian Parks and Wildlife Service and the Tasmania Fire Service.

Output 9. Design of natural experiments to test key biophysical assumptions and management interventions underpinning large scale multi-species conservation efforts for rivers and wetlands in the Tasmanian Midlands and the Greater Alps case study region.

OUTCOME: The outcome of this exploratory research were the decisions in consultation with Tasmanian and Alps stakeholders to, in the first case concentrate on the Greater Esk Basin (the North and South Esk rivers, the Macquarie, the Meander and Brumby’s Creek), and in the second case concentrate research effort on the approximately 11,000 mapped sphagnum bogs and wetlands across the Australian Alps bioregions. This in turn resulted in the research outcomes described under outcomes 33 and 34.

Output 10. Specification of current institutional, social and economic conditions relevant to biodiversity conservation in the two study regions

OUTCOME: The systems analysis models of the drivers of biodiversity in each case study region and the social surveys have both been influential in helping the responsible authorities take a landscape view of conservation priorities and strategies. The Australian Alps Liaison Committee has recommended this research to its members and DPIPWE in Tasmania asked for additional briefings for senior managers on both the method and the findings of this research in the Tasmanian Midlands.

Output 11. Valuation of current policy, governance and planning regimes in terms of likely outcomes for the key biodiversity features and dependent social and economic conditions
OUTCOME: The development of alternative governance options for the Australian Alps in particular has attracted a great deal of interest from the Australian Alps Liaison Committee, and the range of options this research produced is seen as very relevant to the Committees discussions on the future planning and governance of the Australian Alps national parks.

Output 12. Tests of the landscape bio-economic model using characteristics of the two case study regions.

OUTCOME: In discussion with the Australian Alps agencies, it was decided that the most relevant economic modelling would be in the area of winter tourism under the influence of climate change, rather than whole of landscape bio-economic modelling. In the case of the Midlands, the bio-economic model of the value of irrigation water developed by the hub has filled an important knowledge gap by enabling the relevant agencies to discriminate between the contribution of new and existing water sources to the regional economy.

Output 13. Design of MBIs associated with hypothesised trajectories for biodiversity emerging from the biophysical projects for both case study regions.

OUTCOME: The review of past MBIs in the Tasmanian Midlands identified several features inherent in the design of those programs which had influenced site selection in ways that were not immediately obvious. Notably, longevity was rated more highly than site quality, whereas later changes in legislation and regulation (as occurred in the case of the listing of the Tasmanian Grassland Communities) could have secured vulnerable high quality sites, making the longevity of covenants and other agreements less relevant. These and other findings are influencing the design of future conservation programs.

Output 14. Modelled and field tested techniques for identifying refugia (against drought, fire and climate change) for selected species, communities and MNES, determined in collaboration with the Climate Futures, Wildlife, Vegetation and Fire and Freshwater Systems projects and partner organisations.

OUTCOME: The novel method that we proposed as a means of identifying potential refugia from archived satellite data on vegetation productivity proved to be reliable in predicting productivity of patches of woodland vegetation down to a scale of 250 x 250 m when ground-truthed, but less reliable in grassland. The reason for the lower reliability in grasslands is that small changes in the woody cover within the definition of grasslands had a disproportionate influence on productivity, and thereby mask the influence of grassland productivity.


OUTCOME: The GAP CLoSR connectivity model has proven to be the single most successful research output in terms of its uptake and impact based on the number of hits to the hub website, the number of people trained in its use and the evaluation surveys of our communication and training events. This model is now being used in three local government areas in NSW in the Hunter Region plus three environmental NGOs in Tasmania.

Output 16. The conservation status of landscapes, ecosystems and focal species and associated degrading and threatening processes identified for contrasting study regions.

OUTCOME: The ‘Alps Icons and Threats’ mapping exercise carried out with the Australian Alps Liaison Committee has been very well received by all three state and territory management agencies as the first example of a process designed to identify conservation objectives, threats and priorities at a landscape scale over the entire bioregion. This is regarded by the AALC as a precedent to ‘whole of region’ conservation planning
Output 17. Regional scale climate projections for SE Australia with a focus on the greater Alps case study area using the A2 emissions scenario and a range of GCM models (up to 6 to be selected).

OUTCOME: The climate projections for SE Australia produced by the hub, centred on the Alps, has produced the finest scale regional forecasts yet developed in Australia. As a result these projections have considerably revised the forecasts for changes in temperature (+5-6 °C), precipitation (-20-40%) and snow volume (-80%) by 2100.

Output 18. Develop ecosystem indices based on those generated in collaboration with the other 4 biophysical projects, determined according to the needs of the other Hub projects and partners.

OUTCOME: Over 30 environmental indices were generated by this project for use in species distribution modelling across the hub, and were as a result instrumental in research into the likely future distribution of over 250 different species and communities, information that is now available to conservation agencies and NGOs to inform their future conservation planning, reserve management and conservation agreements.

Output 19. Refined species distribution models that include the effects of weather-induced local scale variability.

OUTCOME: This project resulted in the production of 235 species distribution models covering all of Tasmania's endemic vertebrates and is proving to be one of the most valuable and sought after datasets produced by the hub given its value in conservation planning, management and legislation.

Output 20. Fine-scale mapping of stable refugia based on historical weather variability.

OUTCOME: This mapping is a by-product of the outputs described above and is similarly much sought after and likely to be much used as an aid to conservation planning and management in the future.


OUTCOME: See above outcome.

Output 22. Analysis of the likely implications of fine scaled climate projections on fire frequency and intensity for the whole of Tasmania.

OUTCOME: Research into future fire danger has identified expected changes in the number of extreme fire weather days, the fire season, and opportunities for prescribed burning that is being incorporated into fire planning and management by the Tasmanian Fire Service, especially the recently implemented roll out of the state wide fuel reduction burning policy.

Output 23. Analysis of ‘at risk’ plant communities in the Tasmanian Midlands case study area.

OUTCOMES: One of the novel areas of research undertaken by the hub was to model the likely future distributions of plant communities, including the two listed Tasmanian grassland communities as well as the individual species that make up those communities. This research has shown very different likely future distributions for listed communities as opposed to their component species, and is being used to revise conservation plans, programs and incentive schemes for these threatened communities.


OUTCOME: The Online Tasmanian Fire History Map merged records held by the Parks and Wildlife Service and the Tasmanian Fire Service dating back to the 1940s, augmented with satellite data to more accurately
map the boundaries of individual recent fires, to produce this unique resource which is already being used by fire managers and conservation planners in a range of state agencies.

Output 25. a) Preliminary analysis of relationships between past interventions, ecosystems process and the distribution and abundance of selected species and b) relationships established between past interventions, ecosystems process and the distribution and abundance of selected species based on modelling recent historical changes to water and land management in the Tasmanian Midlands and Greater Alps case study areas.

OUTCOMES: This objective was met by developing several examples of whole of landscape spatial multi-criteria analyses of key natural assets in each case study region using MCAS-S (Multi Criteria Analysis Shell for Spatial Decision Support). These analyses made use of individual studies from other research listed above of climate change, species distributions, fire frequency and intensity and projected spread of invasive animals and plants. Based on hits to the hub website and feedback from event evaluation, this area of research rated second in terms of uptake and impact after the GAP CLoSR connectivity modelling.

Output 26. (in collaboration with P3) Evaluation of different scenario of institutional, policy and planning reform in terms of (i) likely efficacy of achieving desired conservation trajectories (ii) institutional and social acceptability (iii) economic costs and benefits associated with achieving conservation trajectories and (iv) pilot testing MBI interventions in subsets of the two study regions.

OUTCOME: This research combined the regional social-ecological systems analysis, scenario development, and alternative governance options. As a measure of the uptake and impact of this research, the Victorian regional manager for the East Alps region passed the published paper on this research to all of his staff with his endorsement as valuable information for the agencies future conservation planning.

Output 27. 27 (in collaboration with P2) Conservation management options identified for landscapes, ecosystems and focal species with respect to refugia, connectivity and degrading and threatening processes.

OUTCOME: This research resulted in a ‘framework for regional biodiversity assessment’ that extended conventional frameworks and checklists by including aquatic, paleo, fire, drought, thermal, weed & disease refugia; vegetation, hydrological and cultural connectivity; and habitat quality using newly available remote sensing techniques.


OUTCOME: See outcome 25.

Output 29. (in collaboration with P5) Evaluation of climate change impacts on (i) \( W \) (climatic water balance index); (ii) Net Ecosystem Exchange (GPP, respiration).

OUTCOME: This objective was not pursued as these high level indicators of ecosystem processes were seen as being of less value than more specific examples of the impacts of changes in processes on specific high value assets such as bogs and wetlands in the Australian Alps, freshwater refugia in the Tasmanian Midlands, and individual threatened species.

Output 30. (in collaboration with P7) Modelled potential impacts of climate change on fire regimes in Tasmania and the Greater Alps and consequences for vegetation, habitat resources and focal species.
OUTCOME: This research resulted in projections of future fire danger, including the likely number of extreme fire weather days by 2050 and 2100, the timing and length of the fire season, and likely number of days suitable for prescribed burning or fuel reduction burns. These research outputs are currently being used by the Tasmanian Fire Service and the parks agencies in the Australian Alps.

Output 31. (in collaboration with P7) Comparative analysis of fire activity in mainland temperate forests to understand the climate, topographic vegetation and land management factors that cause mega fires and relate this knowledge to Tasmania and the Alps to generate plausible fire risk scenarios.

OUTCOMES: This research has produced new insights into the vulnerability of certain forest types in the Australian Alps and woodland ecosystems in Tasmania and the likely shifts in tree cover and species composition that are likely to occur under changes to fire regimes in response to climate. These research outputs are currently being used by the Tasmanian Fire Service and the parks agencies in the Australian Alps.

Output 32. (in collaboration with P6) Comparative analysis of projected threats to persistence of vertebrates in the 2 case study regions under future spatial patterns of climate change and climate variability, including likely changes in land use and invasive exotic species.

OUTCOME: This research has resulted in a framework for identifying potential new invasive plant species in the Australian Alps based on their presence in Australia, their distribution in their centres of origin under current climate, and their distribution overseas in areas with climate likely to be similar to that projected for the Australian Alps later this century. Within Tasmania, modelling of the likely distribution of over 230 vertebrate species has produced likely trends in future distributions of birds, mammals and reptiles and within those broad groups, identified ‘winners’ and ‘losers’ in the sense of those whose distributions are likely to expand and those likely to shrink. This information is the most detailed of its type in Australia and is in the early stages of being used by state agencies and environmental NGOs to test the robustness of their current conservation plans and strategies for target species.

Output 33. (in collaboration with P8) The likely impacts of climate change on freshwater ecosystems in the 2 case study regions based on fine scale regional projections applied to the results of natural experiments from output 21.

OUTCOME: This research produced a worked example in MCAS-S of the likely location of freshwater refugia in the Tasmanian Midlands. The associated MCAS-S data pack and users guide is one of the most highly rated outputs by our state agency and NGO partners based on responses to evaluation surveys conducted following communication and training event conducted over the last six months.

Output 34. A systematic approach for identifying refugia likely to be effective against multiple threats for multiple species developed from the synthesis of outputs 27 to 33.

OUTCOME: This research resulted in an alps wide assessment of the threats to over 11,000 individually mapped alpine bogs and wetlands using the spatial multi-criteria analysis software MCAS-S. The project has generated examples of maps showing relative threats faced from water supply, fire, invasive plants and invasive animals and supporting material in the form of a spatial data pack and a user guide. This approach has since been adopted by Parks Victoria and this research is currently being applied to identifying those bogs and wetlands at greatest risk from fire, and based on the contributing factors, strategies for their protection.

Output 35. Systematic processes for identifying priority locations for protection, enhancement, connection, acquisition and remediation developed from the synthesis of outputs 27 to 33.
OUTCOME: The outcome of this research activity was the development of the six step process for regional biodiversity assessment that forms the basic structure of the Life at Large website.

Output 36. The likely effectiveness of alternative institutional, policy and planning reforms in achieving societal preferences for biodiversity under likely scenarios of environmental and social change based on (i) ecosystem dynamics and the conservation status of selected species and communities, (ii) human wellbeing and the sustainability of regional communities.

OUTCOME: This research combined the regional social-ecological systems analysis, scenario development, and alternative governance options. As a measure of the uptake and impact of this research in the Alps, the Victorian regional manager for the East Alps region passed the published paper on this research to all of his staff with his endorsement that this was a valuable source of information for the agencies future conservation planning. In Tasmania, the published assessment of the likely effectiveness of alternative governance regimes under each of the Midlands regional scenarios has attracted interest from both the state agency responsible for conservation and the peak body representing agriculture, the Tasmanian Farmers and Graziers Association for its value in fore-sighting and medium to long term planning.

Output 37. Descriptions of the tools and methods used to achieve output:

OUTCOME: A 12 page summary document has been produced, available on the website under ‘Tools’, that describes 30 tools and techniques developed by the hub and sources of further information on each including refereed journal papers, technical reports, models, data packs and users manuals.

Output 38. 38 Indicators for monitoring the effectiveness of institutional, policy and planning reforms.

OUTCOME: This activity did not proceed. This output was originally developed on the assumption that the institutional, policy and planning reforms identified by Project 2 would, to some extent and in some form, be implemented by key governing agencies and stakeholders in the two study areas during the course of the hubs research. The indicators could then be developed and used to track the effectiveness of these implementation actions. In the event, discussions with key governing agencies and stakeholders in the two study areas indicated that implementation was unlikely to occur in the short to medium term. This is primarily due to the prevailing institutional and political circumstances and the absence of a window of opportunity to progress the proposed reforms. Under these circumstances, it was determined that it was not possible to develop meaningful indicators for monitoring effectiveness.
### Statistical Summary of Key Performance Indicators

#### A. Systems Establishment Phase

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### B. Outputs Delivery Phase

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## C. Project Impact Phase

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Table Key: Description of demonstrated impacts achieved on departmental policy or decision making

Ref 1. **Community Values Mapping**: The technique of combining geographic information systems (GIS) with social surveys to spatially represent community preferences for development and conservation was trialled in the Lower Hunter Region and has been very favourably received by state and local government partners in the RSP process in that region. Two well attended workshops on this technique were held in Canberra and one in Newcastle, suggesting it may have further application in regional planning.

Ref 2. **Reforming Australia’s Environmental Management Regime**: Following the hub director’s briefing with the Minister for the Environment in 2012, additional information was provided on request to the Minister’s office on improving Australia’s system of Cooperative Environmental Federalism.
Ref 3. **Social–Ecological Systems Analysis:** Social Ecological Systems analysis is a systematic approach being used by hub researchers to describe the full range of interacting, interrelated, and interdependent social, institutional and biophysical components of our case study areas. The exchange of information between hub researchers and Regional Sustainability Planning (RSP) teams in the department on the application and value of this approach helped to inform the practice of regional sustainability planning within the department.

Ref 4. **Scenario Planning:** The use of scenario planning in the hub’s two case study regions provided the opportunity for staff within the Department to examine at first hand a technique for applying virtual tests to the robustness of alternative policies, plans and programs. Scenario planning was used by the hub to examine the likely impact of alternative policies, plans and programs on a range of plausible futures developed in collaboration with stakeholders.

Ref 5. **Adaptive Governance:** PhD student Sarah Clement developed a set of criteria to accommodate the challenges of landscape-scale biodiversity conservation. Based on organisational theory, political science, institutional theory, resilience and adaptive governance, the framework covers four major attributes of institutions: capacity, practices, fit and politics. Sarah used the criteria in semi-structured interviews with staff to refine this into a framework to inform biodiversity policy.

Ref 6. **Ecosystem Greenspots –identifying prospective habitat refuges:** The hub tested a novel method for identifying areas that may function as refuges for multiple species in response to drought, climate change and fire using time series satellite data. Focusing initially on the Tasmanian Midlands, this approach uses MODIS satellite data of vegetation growth over a decade long time series to identify sites with the high and consistent growth on the assumption that they will offer more reliable habitat resources for a whole range of species. This approach attracted attention within the department as a potential contributor to state of environment reporting.

Ref 7. **Spatial Multi-Criteria Analysis:** The Multi-Criteria Analysis Shell for Spatial Decision Support (MCAS-S) software was used by the hub as a way of identifying priority areas for conservation in partnership with stakeholders. The hub funded development of version 3 of this tool, originally developed by ABARES, to improve its use in interactive planning, expand its capacity to incorporate disparate datasets and include the ability to generate reports. Demonstrations of its application to biodiversity conservation planning were made to Strategic Approaches branch in 2011 and 2013. This tool was further used by the hub in 2014 to explore options for biodiversity conservation in the face of a wide range of environmental, social and economic values and threats identified within individual projects, resulting in four worked examples with accompanying data sets that are available on the Life at Large website (Alps Icons and Threats; Alpine Bogs Threat Analysis; Swift Parrot Nesting Habitat; Aquatic Refuges in the Tasmanian Midlands). The Tasmanian Department of Primary Industries, Parks, Water and the Environment and the states three NRM regions, also explored the potential for using MCAS-S as a conservation decision support tool through a number of training workshops hosted by the hub. The Australian Alps Liaison Committee has endorsed the use of MCAS-S for guiding management of natural values in the Australian Alps. IUCN Protected Area Management Specialist and Co-Vice Chair of the IUCN, Graeme Worboys commented in his feedback after a demonstration of the hubs tools "Well done NERP, LaP and the Australian Alps Liaison..."
Committee. I know of no other place, other than perhaps Kruger National Park in South Africa, where this partnership of science and management actively working together is occurring so well.’

Ref 8. **Markets for Wildlife Corridors:** The Economic Futures Project ran a well-attended workshop for departmental staff in Canberra on the application of experimental economics to the design of market-based instruments. One particular application is the design of market-based instruments for wildlife corridors that that encourage collaboration between private landholders to achieve public good environmental outcomes while avoiding collusion that would otherwise drive up the price and lower the efficiency and effectiveness of public investment.

Ref 9. **Alpine Grazing and Fire:** A study undertaken by the hub’s Vegetation and Fire Project has demonstrated that there is no relationship between areas that have been historically grazed under licence in the Alps and the intensity of fire in the 2002/3 and 2006/7 fires. The comparison was made by examining the statistical relationship between fire intensity as measured using Landsat satellite data and areas under grazing leases. This is the first landscape-scale study of the relationship between fire and grazing, and complements site based studies which came to the same conclusion.

Ref 10. **Remote Detection of Vegetation Condition Change:** A new method for detecting change in vegetation condition using satellite data was tested in collaboration with Parks Victoria and NSW National Parks Service staff. The method was tested against transect-based surveys conducted by park rangers in wetlands and bogs in area with and without the presence of wild horses. It has great potential to be used to assess the effectiveness of strategies for control of wild horse populations in order to protect sensitive ecosystems.

Ref 11. **SPADE: modelling the spread of invasive species:** The SPADE model (Spatial Population Animal Dynamics Engine) was developed in partnership with members of the Australia Alps Liaison Committee’s feral horse group to assist park managers develop cost effective intervention strategies. The managers’ contribution has been essential to the design and testing of the model, and provision of input data on horse range and abundance. Staff from Parks Victoria have been trained in its use and SPADE is now being used to compare the likely costs and effectiveness of alternative management strategies. It has also been applied to model the spread of fallow deer and orange Hawkweed in Tasmania.

Ref 12. **The Effects of Frequent Fire on Alpine Ash Forests:** A study by the Vegetation and Fire Project of mountain ash (Eucalyptus delegatensis) forest burnt three times in the last decade has found evidence that the structure of these forests is changing. *E. delegatensis*, the dominant tree species, regenerates primarily from seed but requires longer periods for flowering and seed set than the return time of recent fires has allowed. This research helped to inform aerial seeding trials conducted by Parks Victoria in 2013.

Ref 13. **Modelling Fallow Deer Range and Abundance in Tasmania:** The SPADE model described above has been used to estimate the potential population size of fallow deer in Tasmania under different intervention scenarios. The results suggest a potential population increase from 25,000 to 60,000 in the next decade without any change in policy or management strategies, and a potential carrying capacity based on climate suitability alone of over a million. This
research has influenced the debate about the status of fallow deer as a protected game species in Tasmania and their management in the face of anecdotal evidence of increasing levels of damage to remnant vegetation caused by deer.

Ref 14. **Project-Level Adaptive Management Model:** This project involved developing an oach to the design of environmental project application forms and assessment process based on the adaptive management model. It influenced the design of new environmental programs within the department, in particular, the level of information required by applicants concerning their perceived relationships between conservation goals, threatening processes and interventions.

Ref 15. **Wildlife Connectivity Tool:** The GAP CLoSR modelling tool to aid regional scale planning of wildlife corridors is being used in the Hunter Valley by staff from three local government areas as well as staff in the Office of Environment and Heritage and the Department of Planning. Following consultation with staff from the Tasmanian Land Conservancy, Greening Australia and Bush heritage Australia, the tool was refined for use in the Tasmanian Midlands including the added feature of identifying guilds or groups of animals with similar dispersal behaviour to enable connectivity to be modelled for multiple species simultaneously. Four training workshops have been conducted for conservation managers in the Hunter Region and Tasmania.

Ref 16. **Sustainable Tourism:** Throughout this one-year study into sustainable tourism in and near sensitive areas in Tasmania, the research team liaised closely with departmental officers to refine the research questions. Coinciding with the delivery of the draft final report (15 July 2014), the team delivered a departmental seminar (22 July 2014) and a workshop on the particular social research method used (Q-sort) (23 July 2014), supported by a plain language four page summary. In Tasmania, the results have been provided and discussed with Tourism Tasmania, the Tourism Industry Council, the Planning for Sustainable Tourism Project and the Break O’ Day Council.

Ref 17. **Real-Time Fire Hazard Mapping:** The hub developed an online fire hazard mapping that tool provides real–time maps of fire danger in Tasmania, with a version being developed for the whole of Australia. Hosted by the Tasmanian Fire Service on their website and also available as a smart phone app, the tool shows maps of MacArthur’s Forest Fire Danger Index (FFDI) and serves as a guide to the current fire danger. The map is updated every 15 minutes using data from weather stations, including temperature, wind speed, humidity and rainfall, plus a seasonal drought factor calculated by the Bureau of Meteorology. We developed this tool and other online resources, such as regional fire histories for Tasmania, in cooperation with land management and emergency service agencies. Weblink: [https://www.fire.tas.gov.au/Show?pageId=intracolFfdiIndex](https://www.fire.tas.gov.au/Show?pageId=intracolFfdiIndex)

Ref 18. **Species Distribution under Future Climate:** Working in collaboration with biodiversity conservation practitioners, the hub developed a modelling tool to aid large–scale planning for wildlife conservation in the Tasmanian Midlands. This dataset comprises climate–niche models for all of Tasmania’s terrestrial vertebrates (about 230 species) and shows how suitable their climate–niche space may change over the next 100 years. The modelling tool can generate maps for the 230 species in any given year, from 1950–2100, in the form of shape files (or a format that can be converted to shape files). These maps represent the most comprehensive
set of projected fauna distributions in any jurisdiction. There is great interest in this data set amongst conservation planners in the public and private sector as the data can be used in other analyses, or combined with other spatial data such as land cover maps for more refined estimation of likely future distributions of taxa of interest.

Section 6: Management and Legacy

Strengths and Weaknesses

A particular challenge in a large interdisciplinary research group such as this is to strike a balance between the freedom and creativity that individuals teams have to pursue their research on the one hand, and the collective and collaborative effort required to integrate information across disparate disciplines on the other.

In order to achieve this balance, we instigated several strategies that helped to achieve these twin objectives.

1. Encouraged freedom and creativity to explore in small teams by:
   a) Allocating a budget to each team for the duration of the hub with additional funds available based on the strength of proposals with high potential impact and strong stakeholder involvement
   b) Encouraging small teams to identify specific research topics and questions in participation with research users and then leaving them to get on with it.

2. Encouraged collective effort and collaboration between teams by:
   a) Facilitating meetings between researchers and research users at the beginning of each major activity to scope problems and define research questions
   b) Bringing all researchers together twice a year (The Researchers Roundtables)
   c) Having three-minute speed talks at these six-monthly meetings to give researchers an overview of all activity across the hub and to develop their communications skills.

Using these three-minute overviews, we collectively identified common themes, emerging knowledge and where possible, integrative solutions.

We also pursued other strategies, which we later learned through a half day evaluation session at the conclusion of the hub, were not regarded by our researchers as contributing to improved understanding or integration of data.

- **Collaborative conceptual modelling:** We ran several training sessions in this technique led by Dr Barry Newell from ANU. The methods which provides a basis for including knowledge and data from very different disciplines in a unified conceptual model of a complex system, including positive and negative feedback to determine the relative influence of different drivers. The reason that it was considered to be ineffective appeared to be that we introduced this method before there was sufficient data produced by the hub, meaning that it was introduced in an abstract form using examples form previous interdisciplinary and transdisciplinary research. This reduced the apparent utility of the method in the eyes of our researchers and may have been more useful if introduced at a later stage.

- **Researchers Roundtable and Biannual Research Forum meetings in 2012 and early 2013:** at these initial meetings, we chose to highlight a few selected research projects at each meeting. It was only at the second meeting in 2013 and subsequent meetings in 2014 that we introduced the
format of three–minute speed talks that enabled us to profile all research projects and give our full complement of researchers a complete overview of the hub’s research.

Following the early meetings, researchers often commented that on one hand, too much scrutiny was being placed on a few projects and on the other, researchers were struggling to gain some perspective of the entire effort. In future, we would run all meetings with speed talks, as even though there was a lot of resistance to this format, in retrospect it was almost universally agreed to be the best way to prepare a group such as this for the challenge of integration.

Objectives/Outputs not completed

The majority (95%) of the 38 initially contracted research outputs, plus the 16 outputs associated with the additional Regional Sustainability Projects were delivered by the end of the project activity on 31 March 2015. There were only two outputs that were not completed, rather they did not proceed after consultation with stakeholders and research–users. There was one output not 100% complete as at 31 March (Output 32) and one output related to the additional RSP studies that isn’t due for completion until May 2015 – the final report of the departmental knowledge broker. Researchers have committed to complete these in 2015. Despite the PhD studies not being complete at 31 March, their studies will continue as planned through 2015. However their studies contributed significantly to hub outputs and their respective project analysis.

Output 17 - delayed

Delivery of Australian Alps climate projections was delayed by 12 months, with finally delivered in July 2014. These projections were to be incorporated into analyses of species distributions, vegetation cover change, river flow and other ecosystem processes to contribute to an integrated analysis of likely trends in natural values in the Australian Alps. Given the delay in the availability of the climate data, it was decided to concentrate on those environmental indices with widest application for analysis of likely range shifts in species and communities and trends in threatening processes rather than broader indices of ecosystem condition. Consequently, Output #29 was considered to be a lower priority than the development of environmental indices with more general application to other studies.

Outputs relying on Output 17

With the delay of the final value-added information from the Australian Alps projections (the bias-adjusted datasets) some analyses was completed as far as possible using other datasets. As Bec Harris remains employed with ACE CRC, there is the intention to complete as much of this value added interpretative analysis as possible. This includes the workshop on ecological impacts in the alps planned for April/May 2015. The MCAS-S Alpine Bogs Datapack is also reliant on the bias-adjusted data, but has used interim data to develop and demonstrate the tool. When the bias adjustment data is available, the layer will be replaced (easily). Preliminary checks suggest that the bias-adjustment dataset is unlikely to change MCAS-S outcomes significantly.

Output 29 – did not proceed

Output 29 did not proceed as effort went instead into generating environmental indices from climate projections including for use in modelled distribution of individual species and communities. Specifically, we focused our attention on the use of remotely sensed fPAR time series to analyse ecosystem
productivity and grassland taxonomic composition (the Ecosystem Greenspot method).

**Output 32 – delayed delivery (due for completion in 2015)**

The wildlife species distribution modelling undertaken by Chris Johnson (Project 6) was also unable to complete analyses by 31 March, however, Professor Johnson has given his commitment to complete the analyses in collaboration with Jeremy Vanderwal from James Cook University. They continue to work with Tasmanian stakeholders to deliver the output.

The output is not quite complete, for a number of reasons:

- The large amount of interest from external stakeholders has meant that much of our emphasis is on making the data easily accessible and interpretable for them, in order for them to complete their own analyses.
- The large datasets used to complete outputs 19–21 and some issues experienced by our collaborators have meant that we are experiencing delays and awaiting a new version of the outputs for final results.
- Work on modelling for invasive exotic species has continued for the previous two years as an additional output. The modelling tool has now developed to the point that it is useful not only for evaluating scenarios of population change and management of particular invasive species (and has been used in this way for feral horses in the Australian Alps, deer in Tasmania, and orange hawkweed in both regions) but also as a general tool for external use.

**Output 38 – did not proceed**

Following discussions with other project leaders and stakeholders, this output was abandoned. This output was developed on the assumption that the institutional, policy and planning reforms identified by Project 2 would, to some extent and in some form, be implemented by key governing agencies and stakeholders in the two study areas. The indicators would then be used to track the effectiveness of these implementation actions. In the event, discussions with key governing agencies and stakeholders in the two study areas show that implementation will not occur in the short to medium term. This is primarily due to the prevailing institutional and political circumstances and the absence of a window of opportunity to progress the proposed reforms. Under these circumstances, there is little value in developing indicators for monitoring effectiveness.

**Outputs relating to PhD studies – scheduled for completion by Dec 2015**

While the three PhD scholars have not yet completed their studies (Sarah Clement (Project 2 – Social and Institutional Futures), Gareth Davies (Project 6 – Wildlife) and Louise Romanin (Project 7 – Vegetation and Fire) they expect to complete them by December 2015. It was always known that the PhD studies would finish after the conclusion of the hub, given that their timeframes out lived the hub, and all three students had delays in their starts and some in their progress. However, they made significant contributions to the research process through supporting their respective post-doctoral research fellows and through completing chapters and papers as part of their PhD studies.
Additional Outputs Delivered

The outputs not completed are significantly off-set by additional studies that arose during the course of the project. These included five additional studies commissioned by the Regional Sustainability Planning group and studies that were identified by end-users along the way as a priority. Six additional outputs of particular note based on their uptake to date and/or their potential longer term impact are:

- **Real Time Forest Fire Danger Index:** This research activity, while not originally planned, resulted in a web-based tool and smart phone app that displays McArthur’s Fire Danger Index every 15 minutes generated from weather data and a modelled drought factor to predict fuel dryness. The website is now hosted by the Tasmanian Fire Service, and the geographic extent is being extended to cover the whole of Australia in 2015.

- **Spatial modelling of the spread of invasive species:** This activity arose out of the Jindabyne Science Management Forum held jointly with the Australia Alps Liaison Committee. While not identified in the original research proposal for Multi Year Research Plan, the SPADE (Spatial Population Abundance Engine) model has proven to be the third ranked research output of the hub in based on responses to evaluation surveys conducted at communication and training event over the past six months. The SPADE model is now being used by Parks Victoria as an aid to development of its feral horse management strategy.

- **The effects of repeat fires on Alpine Ash forests:** This opportunistic research was undertaken following the Harrietville fires in the Australian Alps that resulted in some sensitive forest areas being burnt three times in a decade which limited their ability to regenerate and raised the possibility of shifts in forest type. This research resulted in a very productive relationship between our research group and Parks Victoria, several refereed journal papers, and data on which to base policy on fire management and post fire regeneration and restoration.

- **Reflecting community values in regional Planning:** This research was commissioned by the Regional Sustainability Planning teams within the Department of the Environment. It resulted in a map of values placed by rural and urban residents on a range of conservation targets. Spatial tools for integrating social, ecological and economic values in regional planning have been demonstrated to staff from the Department of the Environment, planning practitioners and researchers from the University of Melbourne, University of Tasmania, RMIT University and Charles Sturt University.

- **Remote detection of change in vegetation condition:** To assist park managers track the impacts of wild horse populations and gauge the effectiveness of management strategies, we developed a monitoring method based on freely available data from the MODIS satellite and tested it using field observations of vegetation condition at sites where horses were known to be present and absent. The method has been tested by rangers from Parks Victoria and the NSW National Parks and Wildlife Service. This research used field surveys of horse impacts conducted by rangers to ground truth this new remote technique. Wild horses have been shown to have negative impacts on the composition and structure of vegetation in the Australian Alps, and subsequently on landscape structure and ecological processes. However, monitoring the impact of horses on vegetation is difficult and expensive in the alps landscape due to remoteness, terrain and harsh
weather.

- **Does grazing reduce blazing?** Grazing in the Victorian high country is commonly argued to reduce fire risk. We carried out the first landscape–wide analysis of historic data to test this claim as a result of discussions between fire ecologists and rangers at the Jindabyne Science Management Forum which identified long term data sets on grazing history that could be compared to independent data on fire intensity. This retrospective study of the impacts of grazing in the Victorian Alps found that a history of grazing did not influence fire intensity during large–scale fires. The researchers used Landsat satellite–derived data for two fires (2003/2007) to assess the impact of cattle grazing in licensed areas of national parks on fire severity in woodlands and forest vegetation. The research revealed no difference in fire intensity between 5,000 randomly selected, paired sites, half located inside grazing leases and half located outside. This suggests that cattle grazing has little impact on fuel loads or fire severity in alpine forests.

**Continuing Collaborations and New Projects**

From the excellent relationships and collaborations we developed with key stakeholders, several researchers are in discussions to conduct new research or continue research as a direct result of the hub’s research.

- **Australian Alps Liaison Committee (Andrew Nixon) – ongoing discussions regarding potential further research (P2 Social and Institutional Futures – Michael Lockwood)**
- **Tasmanian Land Conservancy - to evaluate alternative land conservation contract options (P3 Economic Futures – John Tisdell).**
- **Tasmanian Department of Primary Industries, Parks, Water and Environment - to evaluate alternative land conservation contract options (P3 Economic Futures – John Tisdell).**
- **Tasmanian Department of Primary Industries, Parks, Water and Environment (Water Assessment Branch) - Development of the bioeconomic model of the midlands (P3 Economic Futures – John Tisdell).**
- **Tasmania Irrigation - Development of the bioeconomic model of the midlands (P3 Economic Futures – John Tisdell).**
- **NSW Office of Environment and Heritage (Tom Barrett) - ongoing discussions with about the use our MCAS-S data packs and tutorials (P4 Bioregional Futures – Brendan Mackey).**
- **Australian Alps Climate Change Reference Group (Andrew Nixon) – expressed interest in ongoing work using the climate projections (P5 Climate Futures – Nathan Bindoff).**
- **People in Nature (Gill Anderson and Peter Jacobs) – expressed interest in Ecological Impacts Workshop (P5 Climate Futures – Nathan Bindoff).**
- **Parks Victoria/Australian Alps Liaison Committee –Future Fire Danger (P5 Climate Futures – Nathan Bindoff).**
- **Australian Alps Liaison Committee and their Feral Horse Working Group (Andrew Nixon). We particularly plan to continue working with colleagues from Parks Victoria to finalise some of the work that has been put together over the last couple of years. There is also the possibility to complete some exploratory work on orange hawkweed from experts in both Tasmania and the Australian Alps.**
(P6 Wildlife – Chris Johnson)

Parks Victoria/Australian Alps Liaison Committee – Real time Fire Hazard Mapping (P7 Vegetation and Fire – Grant Williamson)

Parks Victoria (Andrew Nixon) - collaboration on fire in alpine bogs (P8 Freshwater Ecosystems – Regina Magierowski)

Tasmanian Department of Primary Industries, Parks, Water and Environment (Water Branch) – integration of Tasmanian Midlands aquatic conservation scenario scoping outcomes into state water management planning bogs (P8 Freshwater Ecosystems – Regina Magierowski)

Legacy Issues

With such great relationships developed between researchers and stakeholders, the departure of staff to new positions and projects is the greatest challenge in terms of on-going communication, further research and support to research-users of the tools and techniques. Fortunately, all the project leaders are continuing on in their respective positions and will remain key contacts for the hub’s research. This includes the hub director, Ted Lefroy, whose contract at the University of Tasmania continues for another three years. Only a handful of the researchers have been retained or engaged on a casual basis by their respective organisations to continue for a short time (up to six months) to continue analysis and journal paper preparation (Bec Harris, Michael Mitchell and Nick Beeton). Other researchers are committed to continue writing and supporting the tools that have developed and some have gained short-term contracts with hub stakeholders to continue some parts of the research (see list below).

The most important and challenging legacy issue is securing our web presence, beyond the life, funds and staff resources of the hub. This includes uploading journal papers that are published after the conclusion of the hub. In order to maintain the Life at Large website as the primary repository of the hub’s research outputs during the next five years, we have secured the maintenance and support of UTAS Web. Similarly, we have contracted Eighty Options to host and maintain the original hub website for a period of 2 years. Priority will be given to updating and maintaining the synthesis website (Life at Large), however the original website will remain functional in its static state as at 31 March 2015.

Availability of some research outputs, notably refereed journal papers, is in the hands of external publishers and their review processes and these will continue to become available over the next 12 months or so, and be progressively added to the website. At present, on the Life at Large website, there are 42 research papers, 59 summaries for policy makers and technical reports (including some from the CERF project Climate Futures for Tasmania) and 43 by three minute videos describing the 60 separate research activities initiated over the life of the hub, with more research papers and summaries to follow.
Section 7: Financial Management

Please make a statement as to whether the hub’s operations are proceeding within the budget, and if not, an explanation of why the hub’s budget is not being met and the action you propose to take to address this (actual variances of more than 20% from budget for the period and program to date should be explained).

The period July to December 2014 was overspent by 79.2% against budget, or $578,248 in dollar terms. This overspend has been easily absorbed by funds carried over from previous periods. It is a much higher overspend than the previous period, which overspent by $207,494.

In this financial period, spending remained at about the same level as the previous period (Jan-Jul 2014) however as the budgeted expenditure was lower, the result was an overspend against budget. Consulting fees were the biggest change in budgeted costs as we contracted science writers, a web developer, a graphic designer and a content developer to work on the Life at Large website. In the areas of travel, operating and personnel we have seen no significant changes or unexpected expenses.

The current balance of funds is $513,677. This balance can be attributed to two factors:

1) Income has been received from NERP over the life of the project at a different rate to our planned expenditure (income was higher at the beginning of the hub and lower at the end, while expenditure was the reverse)

2) Interest earned on our balance of funds has totalled $128,774 for the project life-to-date.

Note that the balance of funds has decreased against the previous period, when it was $1.1m. Our budgeted expenditure for the remainder of the hub through to 31 March 2015 was $224,840 however we expect to exceed this by about 100% in the period January to March 2015 as we wind up the hub. We therefore do not expect to end the project with a significant surplus. Our planned costs include further consulting fees relating to the final report, casual support for postdocs, and workshops, seminars and training sessions associated with the conclusion of the hub. In addition we have held four major events to launch the website and our research products in Hobart, Canberra, Launceston and Melbourne. We have also extended the employment contracts for a number of postdocs through to 31 March 2015, which will absorb approximately an extra $150k that had not previously been included in the budgeted expenditure.

We are confident that the hub will wind up with a balance at or very close to zero.
Section 8: Budget Summary

NB: This information must be prepared by a Qualified Accountant and include an explicit statement of the Qualified Accountant’s name and qualifications

a. Provide a statement on the amount and use of any Activity Generated Income for this reporting period.

$4,477.90

b. Is the Activity proceeding within Budget? If it is not, provide an explanation of why the Budget is not being met and the action the Recipient/Contractor/Research Organisation proposes to take to address this.

Yes

c. Please complete the following asset schedule.

<table>
<thead>
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<th>Asset number</th>
<th>Description of Asset</th>
<th>Creation, acquisition or total lease cost</th>
<th>Date of creation, acquisition or lease</th>
<th>Term of lease or other arrangement</th>
<th>Location of Asset</th>
<th>Method of, and date, which Asset was written off or Disposed of</th>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Provide a statement as to how this asset schedule compares with the Budget.

As at 31 December 2014, no assets had been acquired by the hub.

d. (Should the department request) Provide a list, and amounts, of debtors and creditors (if the financial statements are prepared on a cash basis) or the amount of accruals and pre-payments (if the financial statements are prepared on an accrual basis) in respect of the Activity.

Not requested for this period.

e. (Should the department request) Provide quarterly completed business activity statements as required by the Australian Taxation Office.

Not requested for this period.

f. Please complete the Microsoft Excel separate document provided by the Department: Income and Expenditure & Account Balances.

g. Has all Funding, Other Contributions and Recipient Contributions been spent for the purpose of the Activity and in accordance with the Agreement? If not, please provide an explanation.

Yes

h. Have all salaries and allowances paid to persons involved in the Activity been in accordance with applicable awards or agreements in force under any relevant law on industrial or workplace relations? If not, please provide an explanation.

Yes
i. Where any portion of the Funding received remains unspent, please confirm that it is available for use within the next reporting period. If it is not, please provide an explanation.

Yes

j. Where any Asset has been created or acquired with the Funding, have the applicable provisions of the Agreement been complied with in respect to the Asset? If not, please provide an explanation.

Not applicable

k. At the time this Report is prepared, is the Recipient/Contractor able to pay all its debts as and when they fall due and does the Recipient/Contractor have sufficient resources to discharge all its debts at the end of the current Financial Year? If not, please provide an explanation.

Yes

Section 9: Signature

Endorsed with amendments by the Steering Committee: 1 April 2015

Certification of Confirmation (Part A) signed by hub director: (in a separate document) 1 April 2015

Certification of Confirmation (Part B) signed by chair, Peter Jacobs: (in a separate document) 1 April 2015

Signature: \[signature\] 1 April 2015
Position: Landscapes and Policy Hub Director

Name: Professor Ted Lefroy
Appendix A: Contracts

Contracted Partners and Research Contributors:

Antarctic Climate and Ecosystems CRC (start-up partner)
Charles Sturt University (signed May 2012)
Griffith University (signed up Dec 2012)
Murdoch University (start-up partner)
The Australian National University (start-up partner)

Subcontractors

1. Australian Bureau of Agricultural and Resource Economics Sciences (MCAS-S Improvements)
2. Bernard Lloyd (Life at Large Website)
3. Brincamos – Penny Davidson (RSP Study, Sustainable Tourism)
4. Charles Sturt University (RSP Study, Sustainable Tourism)
6. Department of Primary Industries, Parks, Water and Environment – Louise Gilfedder (Midlands Knowledge Broker)
7. Econnect Communications (Life at Large Website)
8. Environmental Dynamics - Steven Carter (Freshwater Ecosystems Project)
9. ENVision Environmental Consulting – Nicki Mazur (RSP Study Adaptive Project Management)
10. Natural Resource Planning Pty Ltd - Rod Knight (Freshwater Ecosystems Project)
12. People in Nature – Peter Jacobs (Alps Icon, threats and Vegetation Mapping)
13. Takeflight (Life at Large Website)
14. University of Canberra – Leonie Pearson (RSP Study, Sustainable Tourism)
15. University of Melbourne - Brett Murphy (Fire and Vegetation Project)
# Appendix B: Staff

<table>
<thead>
<tr>
<th>Ref</th>
<th>Title</th>
<th>Name</th>
<th>Role</th>
<th>Project/Association</th>
<th>Start</th>
<th>Finish</th>
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<tbody>
<tr>
<td>1</td>
<td>Dr</td>
<td>Alex Lechner</td>
<td>Postdoctoral Research Fellow</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>1-Mar-13</td>
<td>16-Jan-15</td>
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<tr>
<td>2</td>
<td>Ms</td>
<td>Felicity Faulkner</td>
<td>Spatial Analyst (DPIPWE)</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>1-Jul-13</td>
<td>1-Apr-15</td>
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<tr>
<td>3</td>
<td>Ms</td>
<td>Gill Anderson</td>
<td>Aust Alps Knowledge Broker</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>15-Feb-12</td>
<td>1-Apr-15</td>
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<tr>
<td>4</td>
<td>Ms</td>
<td>Lisa Febey</td>
<td>Support Officer (Maternity Relief)</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>31-Aug-11</td>
<td>27-Feb-12</td>
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<tr>
<td>5</td>
<td>Ms</td>
<td>Louise Gilfedder</td>
<td>Steering Committee/Tas Midlands Knowledge Broker</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>24-May-11</td>
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<td>6</td>
<td>Prof</td>
<td>Martha Groom</td>
<td>Visiting Scholar</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>1-Jan-14</td>
<td>6-Jun-14</td>
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<td>7</td>
<td>Mr</td>
<td>Michael Lacey</td>
<td>GIS Specialist</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>1-Jul-14</td>
<td>31-Dec-14</td>
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<td>8</td>
<td>Mr</td>
<td>Oberon Carter</td>
<td>Refuges Spatial Advisor (DPIPWE)</td>
<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>1-Jul-13</td>
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<td>Ms</td>
<td>Rhiannon Glover</td>
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<td>10</td>
<td>Dr</td>
<td>Ross Rowe</td>
<td>Departmental Knowledge Broker</td>
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<td>11</td>
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<td>Stuart Morse</td>
<td>Business Manager (Maternity Relief)</td>
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<td>12</td>
<td>Ms</td>
<td>Suzie Gaynor</td>
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<td>13</td>
<td>Prof</td>
<td>Ted Lefroy</td>
<td>Hub &amp; Project Leader</td>
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<td>16</td>
<td>Dr</td>
<td>Chris Harrington</td>
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<td>P1 - Communication &amp; Knowledge Brokering</td>
<td>15-Aug-11</td>
<td>1-Jun-12</td>
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<td>17</td>
<td>Mr</td>
<td>Colin Hughes</td>
<td>Consultant - Indigenous Engagement</td>
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<td>25-Feb-13</td>
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<tr>
<td>18</td>
<td>Ms</td>
<td>Janice Miller</td>
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<td>Assoc Prof</td>
<td>Michael Lockwood</td>
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<td>20</td>
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<td>Michael Mitchell</td>
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<td>21</td>
<td>Ms</td>
<td>Samantha Gadsby</td>
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<td>22</td>
<td>Ms</td>
<td>Sarah Clement</td>
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<td>Ms</td>
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<td>24</td>
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<td>Sue Moore</td>
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<td>31-Mar-15</td>
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<tr>
<td>25</td>
<td>Mr</td>
<td>Angus Scheibner</td>
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<td>P1 - Economic Futures</td>
<td>1-Dec-12</td>
<td>30-Nov-13</td>
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<tr>
<td>26</td>
<td>Dr</td>
<td>Danielle Warfe</td>
<td>Research Analyst</td>
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<td>27</td>
<td>Mr</td>
<td>Jarryd Klein</td>
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<td>28</td>
<td>Prof</td>
<td>John Tisdell</td>
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<td>29</td>
<td>Ms</td>
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<td>30</td>
<td>Dr</td>
<td>Sayed Iftekhar</td>
<td>Environmental Economist</td>
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<tr>
<td>31</td>
<td>Prof</td>
<td>Brendan Mackey</td>
<td>Project Leader (Griffith University)</td>
<td>P4 - Bioregional Futures</td>
<td>1-Mar-11</td>
<td>31-Mar-15</td>
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<tr>
<td>32</td>
<td>Ms</td>
<td>Lauren Carter</td>
<td>GIS Analyst (ANU)</td>
<td>P4 - Bioregional Futures</td>
<td>1-Aug-11</td>
<td>31-Mar-15</td>
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<tr>
<td>33</td>
<td>Ms</td>
<td>Luciana Porfrio</td>
<td>Postdoctoral Research Fellow</td>
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<td>34</td>
<td>Ms</td>
<td>Sonia Hugh</td>
<td>GIS Analyst (ANU)</td>
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<td>35</td>
<td>Dr</td>
<td>Sue Gould</td>
<td>Field Ecologist (Griffith University)</td>
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<tr>
<td>36</td>
<td>Dr</td>
<td>Greg Lee</td>
<td>Climate Modeller (ACE CRC)</td>
<td>P5 - Climate Futures</td>
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<td>37</td>
<td>Dr</td>
<td>Michael Grose</td>
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<td>38</td>
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<td>Nathan Bindoff</td>
<td>Project Leader (ACE CRC)</td>
<td>P5 - Climate Futures</td>
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<td>39</td>
<td>Mr</td>
<td>Paul Fox-Hughes</td>
<td>Bushfire Weather Analyst</td>
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<td>41</td>
<td>Dr</td>
<td>Tom Remenyi</td>
<td>Climate Analyst (ACE CRC)</td>
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<td>Project Leader</td>
<td>P6 - Wildlife</td>
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<td>43</td>
<td>Mr</td>
<td>Gareth Davies</td>
<td>PhD Student</td>
<td>P6 - Wildlife</td>
<td>15-May-12</td>
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<td>44</td>
<td>Dr</td>
<td>Nick Beeton</td>
<td>Wildlife Distribution Modeller</td>
<td>P6 - Wildlife</td>
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<tr>
<td>45</td>
<td>Mr</td>
<td>Ben French</td>
<td>Honours Student</td>
<td>P7 - Vegetation &amp; Fire</td>
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<td>46</td>
<td>Dr</td>
<td>Brett Murphy</td>
<td>Postdoctoral Research Fellow (Melbourne University)</td>
<td>P7 - Vegetation &amp; Fire</td>
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<td>48</td>
<td>Mr</td>
<td>Dominic Neyland</td>
<td>Field Assistant</td>
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<td>49</td>
<td>Dr</td>
<td>Grant Williamson</td>
<td>Eco-Spatial Analyst</td>
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<td>50</td>
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<td>51</td>
<td>Dr</td>
<td>Lynda Prior</td>
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<td>52</td>
<td>Dr</td>
<td>Anita Wild</td>
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<td>Peter Davies</td>
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<td>Regina Magierowski</td>
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<td>Ms</td>
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<td>Andy Bodsworth</td>
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<td>RSP Study - Adaptive Project Management</td>
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<td>17-Dec-13</td>
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<td>Allan Curtis</td>
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<td>RSP Study - Community Values</td>
<td>12-Jun-12</td>
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<td>59</td>
<td>Dr</td>
<td>Christopher Raymond</td>
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<td>RSP Study - Community Values</td>
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<td>Dr</td>
<td>Anne Hardy</td>
<td>Project Leader</td>
<td>RSP Study - Sustainable Tourism</td>
<td>3-Jun-13</td>
<td>21-Jan-15</td>
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<td>61</td>
<td>Dr</td>
<td>Leonie Pearson</td>
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<td>RSP Study - Sustainable Tourism</td>
<td>3-Jun-13</td>
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<td>62</td>
<td>Dr</td>
<td>Lorne Kriwoken</td>
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<td>Steering Committee</td>
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<td>Department of the Environment</td>
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<td>Ms</td>
<td>Allison Woolley</td>
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<td>Andrew Campbell</td>
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<td>Barbara Norman</td>
<td>University of Canberra</td>
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<td>Ms</td>
<td>Pam Green</td>
<td>Southern Rivers Catchment Management Authority</td>
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<td>73</td>
<td>Mr</td>
<td>Peter Jacobs</td>
<td>Parks Victoria/People in Nature</td>
<td>Steering Committee</td>
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<td>74</td>
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<td>Adam Cowell</td>
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<td>Mr</td>
<td>Dave Johnson</td>
<td>NERP Program Director</td>
<td>Steering Committee &amp; NERP Team</td>
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<td>76</td>
<td>Ms</td>
<td>Naomi Dwyer</td>
<td>LaP NERP Liaison Officer</td>
<td>Steering Committee &amp; NERP Team</td>
<td>24-May-11</td>
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## Appendix C: Staff Awards & Achievements

<table>
<thead>
<tr>
<th>Recipient</th>
<th>Award/Prize</th>
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</thead>
</table>
| **Professor Peter Davies**  
(Project Leader) | **Member of the Order of Australia (AM) - Australia Day Medal (2012)**  
Peter Davies was honoured for a 30-year contribution to freshwater ecology and contribution and service to conservation and the environment as a highly regarded scientist who has “contributed to national water policy development and through research of Australia's rivers and waterways** |
| **Louise Gilfedder**  
(Knowledge Broker) | **Medal (OAM) of the Order of Australia - Queen's Birthday Honours (2012)**  
Awarded the medal for Louise Gilfedder's service to conservation and the environment, particularly in Tasmania. |
| **Dr Sayed Iftekhar**  
(Postdoctoral Fellow) | **Best AARES PhD thesis in 2011**  
Awarded to Sayed Iftekhar by the Australian Agricultural and Resource Economics Society (AARES). This is a prestigious award and is highly sort by students across Australia and New Zealand. |
| **Associate Professor Sue Moore**  
(Project Leader) | **Murdoch University’s VC Award for Excellence in Research**  
(outstanding Research Development)**  
The award recognises Sue Moore's talent and expertise in bringing the social and natural sciences together, and using social and political theories to help solve environmental problems. |
| **Dr Regina Magierowski**  
(Postdoctoral Fellow) | **UTAS Teaching Merit Certificate**  
Awarded a Teaching Merit Certificate in recognition of Regina Magierowski’s contribution to teaching at the University of Tasmania. |
| **Professor David Bowman**  
(Project Leader) | **Member of the Australian Research Council (ARC) College**  
Prof David Bowman (Vegetation and Fire project) was appointment as a member of the Australian Research Council (ARC) College. ARC College members are Australian experts of international standing who assess and rank ARC grant applications. |
| **Professor Chris Johnson**  
(Project Leader) | **2012 Australian Ecology Research Award (AERA)**  
Professor Chris Johnson (Wildlife Project) delivered the 2012 Australian Ecology Research Award (AERA) Lecture ‘Australian mammals: extinctions ancient and modern’ at the Annual Conference of the Ecological Society of Australia (Melbourne). |
| **Professor Nathan Bindoff**  
(Project Leader)  
**Suzie Gaynor**  
(Communications Manager) | **National 2012 Resilient Australia Award for Education, Training and Research**  
Prof Nathan Bindoff (Climate Futures Project) and Suzie Gaynor (Communications) receive the national award on behalf of the Climate Futures for Tasmania project (CERF/ACE CRC 2008-2011). The 2012 Resilient Australia Award for Education, Training and Research was awarded to the team in recognition of their innovative practices and achievements that are making communities safer, stronger, more resilient and better prepared to manage any emergency situation. Climate Futures for Tasmania generated future climate information at a level of detail never before done in Australia. |
| **Luciana Porfirio**  
(Postdoctoral Fellow) | **Highly Commended – Annual Conference Ecological Society of Australia Photographic Competition**  
Luciana Porfirio received a Highly Commended in the ESA photographic competition for a photo taken on the hub’s Australian Alps Tour. The photo was taken at Mt Beauty and was of Andrew Campbell (Steering Committee). The category was ‘Out Standing in the field – Ecologists in Action’. |
<table>
<thead>
<tr>
<th>Recipient</th>
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<tbody>
<tr>
<td><strong>Bookend Trust</strong>&lt;br&gt;<strong>Dr Regina Magierowski</strong>&lt;br&gt;(Postdoctoral Fellow)</td>
<td><strong>2012 Banksia Environmental Foundation Award</strong>&lt;br&gt;The ‘Bookend Trust’ were awarded the 2012 Banksia Environmental Foundation's special GPT Group Community Grant of $10,000. The award tops a year of awards for the UTAS based education initiative, taking the Bookend Trust’s tally to five!</td>
</tr>
<tr>
<td><strong>Bookend Trust</strong>&lt;br&gt;<strong>Dr Regina Magierowski</strong>&lt;br&gt;(Postdoctoral Fellow)</td>
<td><strong>2012 Australian Geographic Society ‘Conservationist of the Year Award’</strong>&lt;br&gt;The University of Tasmania (UTAS) based Bookend Trust Team (which includes Dr Reg Magierowski) was awarded the Australian Geographic Society ‘Conservationist of the Year Award’.</td>
</tr>
<tr>
<td><strong>Bookend Trust</strong>&lt;br&gt;<strong>Dr Regina Magierowski</strong>&lt;br&gt;(Postdoctoral Fellow)</td>
<td><strong>2012 University of Tasmania TAS Vice-Chancellor's Award</strong>&lt;br&gt;The University of Tasmania (UTAS) based Bookend Trust Team (which includes Dr Reg Magierowski) were recognised for their not-for-profit education initiative that inspires students worldwide, by winning the 2012 UTAS Vice-Chancellor's award for outstanding community engagement.</td>
</tr>
<tr>
<td><strong>Dr Nick Beeton</strong>&lt;br&gt;(Postdoctoral Fellow)</td>
<td><strong>2011 Southwood Prize</strong>&lt;br&gt;The British Ecological Society annual prize to the best paper by a young author in the <em>Journal of Applied Ecology</em>. Awarded to Nick Beeton for his co-paper titled ‘Models predict that culling is not a feasible strategy to prevent extinction of Tasmanian devils from facial tumour disease’ (<em>Journal of Applied Ecology, Volume 48</em> issue 6, pp.1315-1323). Nick was presented the award at the 2012 British Ecological Society Conference (England) in December 2013, where he also presented his research in a conference presentation.</td>
</tr>
<tr>
<td><strong>Dr Nick Beeton</strong>&lt;br&gt;(Postdoctoral Fellow)</td>
<td><strong>Graduation - Doctorate of Philosophy</strong>&lt;br&gt;Nick Beeton (Wildlife Project) was awarded his Doctorate of Philosophy from the University of Tasmania. Nick's PhD studies focused on Population and disease modelling in the Tasmanian devil.</td>
</tr>
<tr>
<td><strong>Dr Rebecca Harris</strong>&lt;br&gt;(Postdoctoral Fellow)</td>
<td><strong>Graduation - Doctorate of Philosophy</strong>&lt;br&gt;Bec Harris (Climate Futures Project) was awarded her Doctorate of Philosophy from the University of Tasmania. Bec investigated potential climate change impacts on insects, focusing on the thermal biology of the wingless grasshopper.</td>
</tr>
<tr>
<td><strong>Angus Scheibner</strong>&lt;br&gt;(Honours Student)</td>
<td><strong>Governor’s Environment Scholarship</strong>&lt;br&gt;Economic Futures honours student, Angus Scheibner received the Governor’s Environment Scholarship 2013 at a formal ceremony on 7 May, 2013, attended by the Tasmanian Governor, the UTAS VC and government officials. Angus is developing a model of wildlife corridor formation. Under laboratory conditions using experimental economics, he will use the model to explore how landholders could coordinate their actions to maximise wildlife corridor formation at least cost. This research will provide insight into methods used to combat the negative impact of landscape fragmentation in Tasmania.</td>
</tr>
<tr>
<td><strong>Professor Chris Johnson</strong>&lt;br&gt;(Project Leader)</td>
<td><strong>Eureka Prize Finalist</strong>&lt;br&gt;Chris Johnson (Wildlife) and one of his research teams are finalists for a Eureka Prize for Research and Innovation in environmental research. Chris leads research that shows how the dingo helps sustain biodiversity in Australian ecosystems. It points the way to improved environmental management in which the dingo could be used to aid the recovery of degraded lands and therefore help protect threatened species. The winners are announced at the ‘Oscars of Australia Science’ at a gala presentation on 4 September in Sydney.</td>
</tr>
<tr>
<td>Recipient</td>
<td>Award/Prize</td>
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<td>------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tbody>
</table>
| **Professor David Bowman** (Project Leader)  | Faculty of Science, Engineering and Technology Annual Award for excellence in publishing with high citation impact for:  
|                                                 | Bowman et al, (2009) [Fire in the earth system, Science](https://www.sciencemag.org/content/316/5830/1372)  
| **Professor David Bowman** (Project Leader)  | Australian Research Council (ARC) grant recipient for Bushfires, smoke, and people: assessing the risks and benefits from planned burning on the urban-rural interface.  
| **Professor Chris Johnson** (Project Leader)  | Australian Research Council (ARC) grant recipient for restoring resilience in wildlife populations project  
| **Dr Luciana Porfirio** (Postdoctoral Fellow)  | Awarded her Doctor of Philosophy at ANU for her research in to spatial models for the quantification of ecosystem services across the Australian Capital Region  
| **Climate Futures for Tasmania Project**      | July 2014 National Climate Change Adaptation Research Facility (NCCARF) exemplar case study in adaptation – one of 16 projects awarded the title at the 2013 NCCARF Conference, ‘Climate Change Adaptation Good Practice’.  
| **Professor Sue Moore** (Project Leader)      | Promoted to Professor of Environmental Science at Murdoch University, recognising Sue’s research leadership in the sustainable use of natural areas for tourism (January 2014)  
| **Dr Regina Magierowski** (Postdoctoral Fellow) | September 2014: Awarded a University of Tasmania Teaching Merit Certificate (with co-lecturers Ashley Edwards and Scott Carver) in recognition of her contributions teaching first year Zoology students.  
| **Centre for Environment**                    | September 2014: University of Tasmania science faculty award for research excellence (host to the Landscapes and Policy Hub).  
| **Associate Professor Michael Lockwood**      | December 2015: Promoted to Associate Professor  
| **Professor Ted Lefroy** (Hub and Project Leaders) | January 2015: Professor Ted Lefroy was awarded a 2015 Fulbright Scholarship. Ted will spend three months at the University of Washington in 2015 doing research for an illustrated book ‘The Myths of Nature and the Rise of Ecology’. Ted’s host at the University of Washington is Prof Martha Groom, who spent three months as a visitor at the UTAS Centre for Environment producing the fourth edition of her text book ‘Principles of Conservation Biology’.  

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1 April 2015  
Landscapes and Policy Hub Final Report  
FINAL submitted to NERP 01 April 2015
Appendix D: Stakeholders & Collaborative Research–Users

Australian Government Partners, Collaborators and Research–Users

Antarctic Climate and Ecosystems Cooperative Research Centre
Australian Alps Liaison Committee
Australian Alps Liaison Committee Reference Groups: Natural Resource Management; Feral Horse Subgroup; Water and Catchments Sub-Committee; Climate Change Committee; Australian Alps Traditional Owners Reference Group (AATORG)
Australian Alps national parks Program
Australian Bureau of Agriculture, Resource Economics and Science
Australian National Botanical Gardens
Bureau of Meteorology
Bush Heritage Australia
CSIRO
Department of Agriculture, Fisheries and Forestry (federal)
Environmental Consultants: Roger Good, Jenny Pope (Integral Sustainability), Fiona Coates (Woods to Water), Anita Wild (Wild Ecology), Rod Knight (Natural Resources Planning), Steve Carter (Environmental Dynamics), Stuart Cowell (private consultant/CEO of Karrkad-Kanjdji Trust), Owen Bassett (Forest Solutions)
Department of the Environment (federal) — Office of Environmental Science and Economics; Biodiversity Conservation Division; Climate Change and Renewal Energy Division; Parks Australia Division; Wildlife Heritage and Marine Division; Regulatory Reform Taskforce; Caring for our Country; Commonwealth Environmental Water Office; Environment Assessment and Compliance Division, Environmental Information and Monitoring; EPBC Act Assessments; Environmental Resources and Information Network (ERIN); Heritage Management; Indigenous Policy; Regional Sustainability Planning; State of Environment reporting; Strategic Assessments; Sustainability Policy; Water for our Future Program;
Geoscience Australia;
Greening Australia
IUCN WCPA
Murray-Darling Basin Authority
NERP Environmental Decisions Hub
Parks Australia

Other Partners, Collaborators and Research–Users

ACT Environment and Sustainable Development
ACT Parks and Conservation
Alpine Resorts Coordinating Council
Alpine Shire Council
Antarctic Climate and Ecosystems Cooperative Research Centre
Arthur Rylah Institute of Environmental Research
Aurora Energy
Other Partners, Collaborators and Research–Users, cont.,

Australian National University ANU Fenner School of Environment and Society
Bureau of Meteorology
Bush Heritage
Charles Sturt University
Conservation Landholders Tasmania
CSIRO
Falls Creek Alpine Resort
Fenner
Forest Practices Authority
Forestry Tasmania
Griffith University
Healthy Landscapes Group
Hunter and Central Coast Regional Environmental Management Strategy
Hydro Tasmania
Indigenous groups (Aboriginal Heritage Tasmania, Tasmanian Aboriginal Centre, Australian Alps
  Traditional Owners Reference Group, Victorian Alps & East Gippsland Traditional Owners
  Reference Group)
James Cook University
La Trobe University
Lake Macquarie Council
Landcare – Tasmania
Macquarie University
MONA – Museum of Old and New Art
Mt Buller/Mt Stirling Resort
Murdoch University
National Parks Associations (NSW and Vic)
North-East CMA
Northern Midlands Council
NRM and catchment groups
NSW Department of Planning and Infrastructure
NSW National Parks Association
NSW Office of Environment and Heritage (NPWS & Hunter Central Coast Region)
Parks Victoria
Protected Areas Learning Centre
RMIT University
Snowy River Shire Council (NSW)
Southern Midlands Council
Southern Slopes Climate Change Adaptation Research Partnership (SCARP) project
State Fire Management Council (Tasmania)
Other Partners, Collaborators and Research–Users, cont.,

Tasmania Fire Service
Tasmania Tourism Council
Tasmanian based NRM groups: NRM North, NRM South, Cradle Coast Authority, Tamar NRM (Tas)
Tasmania Climate Change Office
Tasmanian Department of Premier and Cabinet (emergency coordination unit)
Tasmanian Department of Primary Industries, Parks, Water and Environment (Water Assessments, Sustainable Landscapes, Agricultural Policy, Land Conservation Branch, World Heritage Area)
Tasmanian Farmers and Graziers Association
Tasmanian Healthy Landscapes Group
Tasmanian Inland Fisheries Service
Tasmanian Institute of Agriculture
Tasmanian Irrigation
Tasmanian Land Conservancy
Tasmanian Midlands Coordination Group
Tasmanian Midlands Landholders
Tasmanian Planning Commission
Tasmanian Rangelands Group
Tasmanian Tourism Council
University of Melbourne
University of Tasmania
University of Western Australia
University of Wollongong
Victorian Alps & East Gippsland Traditional Owners Reference Group
Victorian Department of Environment and Primary Industries
Victorian Department of Environment, Land, Water and Planning
Victorian National Parks Association
### Appendix E: Testimonials - what the stakeholders said

‘Well done NERP, LaP and the Australian Alps Liaison Committee. I know of no other place, other than perhaps Kruger National Park in South Africa, where this partnership of science and management actively working together is occurring so well.’

**Graeme Worboys**, Protected Areas Management Specialist, Co-Vice Chair IUCN

‘I have really grown with the hub and its researchers, they are undertaking very relevant and important work that relates directly to my area in the Australian Government.’

**Karen Watson**, Department of the Environment

‘Please express my sincere appreciation to all the researchers and capacity builders as I think the work the hub has undertaken over the past four years is exemplary. What a legacy you have all created…’

**Carolyn Cameron**, Department of the Environment

‘Great program for the alps.’

**Charlie Pascoe**, Parks Victoria

‘One of the most successful aspects of the hub was its effort to identify who the agencies they need to engage with, learn about their issues, then respond by working out how the researchers can help develop tools to deal with those issues. So while this has not yet translated across to all those working in the field, the tools have certainly helped at the strategic planning level, and the tools are focused on real management problems. I have every confidence that the tools will help later at the field level.’

**John Wright**, Parks Victoria

‘Great forum - well worth it for the connections and the discussions, thanks.’

**Anonymous** Alps Manager

‘A great approach bringing researchers and management together with a focus on future use and management.’

**Anonymous** Alps Manager

‘It was great to have an opportunity to talk to the researchers about their work.’

**Anonymous**, Alps Manager

‘I would like to take this opportunity to thank you all for considering my opinion and I look forward to investigating all the great information that this project has provided for guiding on ground works.’

**Monique Case**, Northern Midlands Council

‘Involvement with the LaP Hub has been one of the highlights of my time in the alps – a wonderful Science/Management collaboration; so much valuable research and sharing of knowledge.’

**Charlie Pascoe**, Parks Victoria

‘Thank-you so much for delivering such a fantastic program of applied, collaborative research. I have really valued and enjoyed the opportunity to work with you over the life of the hub. Your approach of engaging...’
with and really listening to we ‘end-user’ folks, and incorporating our questions and issues into your research program is to be commended and is a model for others to follow. Likewise, your on-going collaboration, regular workshops and feedback, as well as the ‘Hub Happenings’ newsletter have made it so easy to keep in touch with projects. The ‘Life At Large’ products are a wonderful legacy of your work. I look forward to seeing the tools you have developed incorporated into the way we work in Parks Victoria, not only in the alps landscape, but elsewhere across our estate.

As is always the case when a team of highly-motivated and capable people like yours works together, there is always unfinished business. Hence, although the many outputs you have produced are very helpful to us now, they also present a wonderful opportunity to build on what has been done and make an even greater contribution to conservation and land management in future. I hope that collectively we can find ways to continue with the good work that has been done and to collaborate further. Thank-you once again and best wishes to everyone with your future endeavours.’

John Wright, Parks Victoria

‘At Lake Macquarie City Council, we have benefited from a Regional Sustainability Planning Grant from the Department of the Environment. This has enabled us to undertake the Lake Macquarie Corridor Refinement Project. For this project we chose to use the GAP CLoSR tool for a range of reasons. The support provided by Alex Lechner and his associates was critical in this process. In reflection, the local tutorial was an invaluable part of this process.’

Robbie Economos, Lake Macquarie City Council

‘Life at Large is the best product that I have seen out of a 3-4 year program, as it provides relevant information on many levels, for many audiences with multiple access points to locate the right information for the audiences circumstances. In doing so, you have produced a suite of scientists that are great communicators, which is an enduring legacy of the project.’

Allison Woolley, Tasmanian Department of Primary Industries, Parks, Water and Environment

‘... the way the research is woven together and presented, with the wheel, and in multiple ways of the case study areas, the steps and the tools, is really useful. It is accessible in a modern electronic world, as opposed to a final report with a dusty cover that we put on a shelf unused, this final report has potential to have much greater reach with a legacy that goes far beyond these researchers and this bit of work. Life at Large sets a context of Australia doing world class, integrated research.’

Carolyn Cameron, federal Department of the Environment

‘The Landscapes and Policy hub is by far the best in terms of integration across the work. All along, the hub felt like a ‘hub with a plan’, and that’s not easy to achieve across such a big consortium of researchers. What the hub has produced has consolidated the integrated nature of the work well and is unique in the way it has synthesised the research. It’s incredibly impressive, especially in the way it has trained young (and old), experienced and inexperienced people to connect with policy in a really meaningful way and answer real questions... the products set a new standard and aspirations for other hubs— the other hubs should aim to integrate what they have done in such a coherent and compelling way. Congratulations on an amazing effort.’

Brendan Wintle, Environmental Decisions Hub, University of Melbourne
‘The unique element of the hub, was the leading edge approach to integrating the raft of research and knitting it together... it was a complex matter to manage a vast array of researchers, and it was a massive undertaking... well done, you've done a fantastic job.’

Pam Green, former chairperson, Southern Rivers Catchment Management Authority

‘Brilliant communications for a lay audience. So important (when selling policy).’

Anonymous, feedback from Canberra Launch

‘Congratulations Ted, Suzie and Research team on a great contribution to looking after the environment of our country.’

Graeme Worboys, IUCN Protected Areas Consultant

‘Well done on bringing together all these outputs. The Life at Large site looks great!’

Chris Raymond, Enviroconnect

‘Thanks. The seminars were excellent. Very sorry you did not have a packed house as is deserved for such important work and investment.’

Ian Pulsford, Environment, Protected Area and Linking Landscapes Specialist

‘The ‘Life at Large’ site is exquisite communication of complex, layered ideas.’

Rosemary Grant, ABC Local Radio, Northern Tasmania

‘Congrats on ‘Life at Large’. It looks great.’

David Salt, Environmental Decisions NERP Hub

‘Congratulations, the website looks great! So nice and clean and simple and the intro video is awesome!’

Juanita Watters, NERP Team

‘This looks really great, Suzie. Well done to you and your team! The ‘Life at Large’ website is wonderful.’

Alison Binney, Econnect Communication

‘On first glance, the website is clearly well structured, accessible and eye-catching. An important tool to inform decision-makers and community.’

Anonymous, feedback from Canberra Launch

‘The hub always comes up with interesting and creative ideas – that’s a very novel approach to ensuring that we keep the outputs from LaP alive and a positive way to help us find opportunities to share links to the website and tools into the future. I’ve mentioned the Life at Large website in a number of different forums, as a really good example of communicating research outputs, as well as promoting the tools and research that you’ve done. You should continue to be very proud of the work that you’ve done and the way you’ve communicated it.’

Dave Johnson, Director, National Environmental Research Program

‘The induction tours were invaluable. I gained a lot from the one-on-one conversations with researchers, and it broke down barriers between policy people and researchers.’

Allison Woolley, Steering Committee Member and Tasmanian Department of Primary Industries, Parks, Water and Environment policymaker
‘The added benefit were the questions raised in the Regional Sustainability Planning program. How the hub responded was fabulous — dial a scientist — that was really smart! The additional studies that we could engage through the hub were important, timely outputs for the department.’

Carolyn Cameron, Steering Committee Member and Department of the Environment

‘I commend the hub for its consultation process and its ability to translate very complex information into language, materials and products that are readily accessible. The hub is a shining light in taking the next step in engaging and communicating complex information. Thank you for going the extra mile and coming to us to have that ‘Melbourne’ conversation.’

Tony Varcoe, Manager, Science and Management Effectiveness, Parks Victoria

‘I will use GAP CloSR to assist staff, especially in Assessments Branch and Strategic Approaches to make more informed decisions in impacts of development on species, especially in the context of dispersal ability or lack thereof.’

Anonymous, feedback from GAP CloSR tutorial

‘Plenty of useful tools. The website videos are excellent snapshots.’

Biodiversity Conservation Practitioner, feedback from Launceston Launch

‘The wealth of data is outstanding already and has delivered sound results. The accumulation data may benefit much future research.’

Landowner, feedback from Launceston Launch

‘Great website and great communications.’

Anonymous, feedback from Launceston Launch

‘Very comprehensive and in a language easy to understand for all stakeholders, that is great science communications.’

Environmental Consultant, feedback from Launceston Launch

‘Fantastic research tools available to future researchers.’

Landowner, feedback from Launceston Launch

‘Thanks for encouraging me to view Ted's introduction. It led to numerous other documents and a couple of subject areas of great interest to me… with Ted & Co's research there it makes it easier for policymakers to access the information.’

Anonymous, Tasmanian Midlands Landholder

‘As an on-ground manager, much of these tools will have potential, and indirect use, depending on uptake by Parks Victoria.’

Anonymous, Alps Manager, feedback from Melbourne Launch

‘Life at Large is very visually appealing. Well-formatted for public/lay audiences/access.’

Anonymous, Alps Manager, feedback from Melbourne Launch

‘It’s good to have different products for different needs.’
‘Great to have the mix. The videos of researchers explain their work are brilliant.’

Anonymous, Alps Manager, feedback from Melbourne Launch

‘The bogs datapack is fantastic.’

Anonymous, Alps Manager, feedback from Melbourne Launch

LinkedIn via the group: APEN (Australasia-Pacific Extension Network) – 426 members

Landscapes and Policy: great science communication

Andrew Campbell - Director, Research Institute for Environment and Livelihoods, Charles Darwin University

‘This morning in Canberra the Threatened Species Commissioner launched the final report of the Landscapes & Policy Hub funded through Australia’s National Environmental Research Program. It was led by Prof Ted Lefroy at the University of Tasmania and it is a fantastic example of science synthesis and communication. If you are interested in the Australian Alps or the Tasmanian Midlands in particular, you will find a rich treasure trove here. Guided Tour | Life at Large’

Chris Rinehart - Facilitator, Trainer, Researcher - Rinehart Consulting

‘Totally agree, Andrew. So well set out and user friendly. Guided tour especially good. Will be great learning resource for my NRM students at UQ.’

Terry Parminter - Managing Director, PACT Consulting

‘I do like the video approach. They have encompassed a wide range of material to introduce the topic but maintained continuity through the commentator being in every frame - technically very smart. I like the way that the material has been broken up so that no video is over 5 minutes - audience smart. Well done.’
Appendix F: Publications

The following list of publications has NERP hub researchers in bold, CERF funded researchers underlined.

Where CERF funded publications are included in a list, they are designated with a # (for example in the Books and Book Chapter lists), but are listed separated for other categories of publications given the quantities.

A. Books (1)

NB: The book is the synthesis product from the CERF funded Landscape Logic Hub


B. Book Chapters (8)

NB: 7 chapters are from Landscape Logic denoted with a #


C. Peer Reviewed Journal Articles (46) – NERP funded

NB: there are a further 25 papers submitted and in review


Gould SF, Hugh S, Porfirieo LL & Mackey BG (2014) Ecosystems greenspots pass the first test. Landscape Ecology. DOI: 10.1007/s10980-014-0112-1


D. Peer Reviewed Journal Articles (16) – CERF funded


### E. Conferences Papers, Posters & Presentations (49)

**Beeton N** (2013) Devil in the details: mechanistic modelling for conservation and public health presented at the InDiMo Workshop for Infectious Disease Modelling, Newcastle.

**Beeton NJ** (2012) British Ecological Society Conference (Nick Beeton, 12 Dec 2012) Models predict that culling is not a feasible strategy to prevent extinction of Tasmanian devils from facial tumour disease

**Clement S** (2013) Misfits, institutions and biodiversity conservation. Poster presented at Murdoch University's School of Veterinary and Life Sciences poster day, 8 November 2013. Murdoch, WA.


**Gilfedder L** (2012) Ecological Society of Australia Conference, Melbourne (Louise Gilfedder, 3 Dec 2012), *Do refugia provide the key to resilient landscapes?*
Gilfedder L (2013) Can we secure climate-adapted sanctuaries for the future as a key adaptation strategy? Presented to EcoTas13 Conference, 5th joint conference of the New Zealand Ecological Society and the Ecological Society of Australia is on in Auckland, New Zealand


Johnson C (2013) The extinction of Australia’s Pleistocene mega-herbivores and its ecological consequences, presented to the 11th International Mammalogical Congress (Belfast, 11-16 August). He was co-author on two other presentations with University of Tasmania based researchers, Menna Jones and Bronwyn Fancourt.

Lechner AM (2014) ESA conference paper (Sacramento) Oral presentation at the American Ecological Society meeting, Sacramento, August, 2014


Magierowski R (2013) Could irrigation development counter the effects of climate change in rivers in the Tasmanian Midlands? Presentation to the 52nd Congress of the Australian Society for Limnology, Dec 2013, the University of Canberra.

Magierowski R (2013) Pattern recognition tools using small datasets to infer landscapes-scale impacts is based on her Landscape Logic research into the drivers of water quality on Tasmanian rivers, presented at the Third Biennial Symposium of the International Society for River Science, Beijing Normal University (5-9 August 2013).


Raymond C (2013) · Public participation GIS and inclusive conservation planning: Insights from 8 years of empirical research. Presented to EcoTas13 Conference, 5th joint conference of the New Zealand Ecological Society and the Ecological Society of Australia is on in Auckland, New Zealand

Scheibner A (2013) Optimising the Provision of Conservation Incentive Payments Over Interconnected Landscape Networks, presented at the Faculty of Economics Honours Seminar, School of Economics and Finance, University of Tasmania, 10 May, 2013, Hobart, Australia.


F. Reports and Occasional Papers (38)


Gadsby S (2012) Identifying drivers and outcomes of biodiversity change on private land in the Northern Midlands, Tasmania: a social-ecological systems approach


Lechner AM & Lefroy EC (2015) General Approach to Planning Connectivity from Local Scales to Regional: combining multi-criteria analysis and connectivity science to enhance conservation outcomes at regional scale in the Tasmanian Midlands University of Tasmania, Hobart, Tasmania.


Lockwood M, Raymond, C (2014) Helping Farm, Land and Native Vegetation Management in the Tasmanian Midlands Summary of Survey Results, Landscapes and Policy Hub, University of Tasmania, Hobart.


Scheibner A (2013 unpublished) 'Title unknown' University of Tasmania

G. Other Publications (>400)

NB: includes 175 Hub Happenings, 6 research highlights for policymakers; 4 websites; 41 Summaries for policymakers; 21 information sheets/project profiles; 28 infographics/key conceptual diagrams; 17 fliers for events/seminars; 33 evaluations; 2 conference packs; 12 branding and badging items; 38 induction kits; >100 templates; 5 databases.

175 Hub Happenings sent to more than 165 collaborators, researchers and stakeholders

6 Research Highlights (classified as summaries for policymakers and included below)

4 Websites

UTAS Faculty of Science, Engineering and Technology Project Profile webpage (17 April 2012)


Hub Intranet (available 1 Oct 2012)

Hub Website www.nerplandscapes.edu.au (launched 14 Feb 2013)

Life at Large Synthesis Website: www.wwelifeatlarge@edu.au (launched 11 Feb 2015)

41 Summaries for Policymakers


24 Information Sheets (2 and 4 pages)

- Acronym List - information sheet for researchers. Gaynor SM (2011)
- Climate Niche Modelling Workshop Information Sheet (Workshop Participants). Johnson CN, Gilfedder L & Gaynor SM (2014)
- Experimental Economics (Project Profile) - Tisdell JG, Iftekhar MS & Gaynor SM (2012)
- Feral Horses & Vegetation Decline in Alps (Project Profile). Porfirio LL & Gaynor SM (2013)
Glossary of Terms - information sheet for researchers. Gaynor SM (2011)
Governance Interviewee Information Sheet – Australian Alps - information sheet for interview participants
Landscapes and Policy Hub - information sheet for research users. Gaynor SM & Lefroy EC (2011)
MCAS-S Stakeholder Workshop - information for workshop participants. Porfirio LL & Gaynor SM (2013)
Modelling and prioritising options for Matters of National Environmental Significance (Hunter Valley General Managers' Information Sheet Series) Gaynor SM (2013)
Planning for Green Open Spaces (Hunter Valley General Managers' Information Sheet Series). Gaynor SM (2013)
SPADE – a model to aid invasive species management (Project Profile). Beeton NJ & Gaynor SM (2012)
Sustainable Tourism Study (Project Profile) Hardy A, Pearson L, Davidson P, Kriwoken L, Gaynor SM & Lefroy EC (2014)
Using MCAS-S for Biodiversity Conservation - information sheet for research users. Porfirio LL & Gaynor SM (2014)
Wild Horses in the Alps - information sheet for research users. Porfirio LL & Gaynor SM (2013)
Wildlife Corridor Planning (Hunter Valley General Managers' Information Sheet Series). Lechner AM, Lefroy EC & Gaynor SM (2013)

**Infographics/Key Diagrams/Map (28)**

- Pre-approved Logo Block (for use on all publications)
- Organisation Chart
- Hub Family Photo Album
- Integration Diagram
- 2 x Generic Study Area Maps (uploaded to intranet) plus 9 tailored variations for journal papers and special reports including IBRA area maps
- 20 x Community Values Maps (separately produced for NSW Office of Environment and Heritage)
- 2 Scenario Snapshots (Tas Midlands and Australian Alps)
- 15 Conceptual Collaborative Modelling Vensim diagrams
Event Programs/ Seminar Fliers (17)
Chris Raymond’s Seminar, 13 May 2013
Brendan Mackey NERP Seminar 11 July 2013
David Bowman NERP Seminar 22 Aug 2013
Barry Brook UTAS Seminar 18 Sept 2013
Sarah Clement NERP Seminar 25 Nov 2013
Nick Beeton NERP Briefing 15 Jan 2014
Sustainable Tourism Workshop (Canberra) 17 Jan 2014
Sarah Clement Fenner School Seminar 27 Mar 2014
Sustainable Tourism NERP Seminar July 2014
GAP CloSR NERP Seminar July 2014
GAP CloSR Tutorial (Hobart, December 2014)
GAP CloSR Tutorial (Canberra, December 2014)
Climate Futures for the Australian Alps Melbourne University Seminar 24 March 2015
Tas Forum Program (10 Dec 2014)
Canberra Launch Program (11 Feb 2015)
Launceston Forum Program (10 Mar 2015)
Melbourne Forum Program (23 Mar 2015)

Evaluation s (>33)
11 Researchers Roundtables
4 Biannual Research Forum
8 NERP Seminars
10 Stakeholder Workshops/Tutorials

Conference/Workshop Participant Packs (2)
Fire Masterclass Information Pack (program, certificates, tour maps, evaluation, PPT Templates)
Fifth Annual Conference of the Australasian Bayesian Network Modelling Society (Hobart)

Badging and Branding (12)
2 Hub Display Banners
1 Project Banner/Signage (Sustainable Tourism Study)
1 presentation folder
4 years (8 designs) Christmas Cards
1 Life at Large business card (for post hub promotions) and business holder
1 Life at Large postcard (for post hub promotions) and Bookmarks

38 Induction Kits for new staff/contributors
>100 x meeting templates (including meeting records, agendas, PPTs, name tags, placecards etc)

Databases (5)
Activities Database
Publications Database
Metadata Database
Staff Contact Database (76 hub contributors)
LaP Study Database (tracking 65 individual studies)
Appendix G: Management Tools and Models

**Tools: decision support tools developed for specific issues**

1. MCAS_S Data Packs to support conservation planning in the Australian Alps and Tasmanian Midlands
2. SPADE (Spatial Population Dynamics Engine): A new tool to assist management of invasive animals
3. GAP CLoSR (General Approach to Planning Connectivity from Local Scales to Regional): A modelling framework for planning the location of wildlife corridors
4. Environmental indices derived from fine scale climate projections
5. Real Time Forest Fire Danger Index
6. Online fire history of Tasmania
7. Threat analysis framework for Alpine bogs and wetlands
8. FEAT (Freshwater ecosystem Assessment Tool) for the Tasmania Midlands
9. A spatial bio-economic model of the Tasmanian Midlands irrigation scheme
10. Tasmanian State Fire Management Council prescribed burning scenario simulator

**Techniques: approaches for use in regional scale biodiversity conservation**

11. Generating alternative governance options for biodiversity using social-ecological systems analysis, scenario planning and institutional analysis
12. Tracking change in vegetation condition using MODIS satellite data and propensity score matching
13. Assessing the impacts of land use and land management on fire intensity using historical archives of remotely sensed data
14. Representing uncertainty in species distribution modelling under future climate
15. Modelling woodland productivity from remotely sensed data
16. Identifying freshwater refugia at regional scale from multiple lines of evidence

**Strategies: specific policies or sets of actions**

17. Including functional attributes of biodiversity in regional scale analysis: threatening processes, refugia and refuges
18. Prioritising interventions using spatial multi-criteria analysis
19. Spatially representing landholder capacity, intentions and interests derived from social surveys as an indicator of conservation opportunity
20. Designing market based instruments for conservation and connectivity using experimental economics

**Pathways: general guidance on regional scale biodiversity conservation**

21. Protocols for incorporating climate change into species distribution modelling
22. A guide to accommodating uncertainty in spatially represented social data
23. Protocols for monitoring alpine wetlands
24. A natural icons approach to bioregional conservation planning illustrated with a case study in the Australian Alps.

Appendix H: Media Engagements
**Social TV**

April 2015

<table>
<thead>
<tr>
<th>Date</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-Nov-12</td>
<td>ABC TV - Tas Stateline (16 Nov 2012) Peter Davies interviewed on the win for scientists in bringing one species back from the brink of extinction, the story of the Pedder Galaxias</td>
</tr>
<tr>
<td>16-Nov-12</td>
<td>ABC TV - Tas Stateline (16 Nov 2012) David Bowman interviewed on the season’s bushfire risk in Tasmania.</td>
</tr>
<tr>
<td>9-Sep-13</td>
<td>Bowman D (2013) Suburban Fire Threat, ABC TV Stateline Tasmania,</td>
</tr>
<tr>
<td>9-Nov-13</td>
<td>Bowman D (2013) Suburban Fire Threat, ABC TV Stateline Tasmania,</td>
</tr>
<tr>
<td>1-Jun-14</td>
<td>David Bowman (June 2014) ABC TV Catalyst Special: Earth on Fire. ABC Catalyst Special Report</td>
</tr>
<tr>
<td>1-Jun-14</td>
<td>Peter Jacobs (June 2014) ABC TV Catalyst Special: Earth on Fire. ABC Catalyst Special Report</td>
</tr>
<tr>
<td>12 Nov 2014</td>
<td>SBS News: Chris Johnson, Tassie Devils may be moved to mainland Australia</td>
</tr>
</tbody>
</table>

**Radio – Ted’s regular slot**

13 Interviews

Hub Director, Ted Lefroy secured a monthly, extended interview slot on the ABC Radio 936 Breakfast program discussing various environmental issues.

**ABC Radio 936 – Breakfast Radio with Ryk Goddard (Producer: Jo Spargo)**

2014 Interviews

- 3 February 2014 (Ted Lefroy) – ‘Modelling Bushfires’
- 10 March 2014 (Ted Lefroy) – ‘Managing invasive species’ (no audio available)
- 7 April 2014 (Ted Lefroy) – ‘Peak Baby’
- 5 May 2014 (David Bowman) – ‘Megafires’ (no audio available)
- 2 June 2014 (Ted Lefroy) – ‘Why societies collapse? – Will it all end in tears?’
- 14 July 2014 (Ted Lefroy) – ‘Tragedy of the commons’
- 4 August 2014 (Ted Lefroy) ‘Survival of the Fittest’
- 1 September 2014 (Ted Lefroy) ‘The Balance of Nature’
- 6 October 2014 (Ted Lefroy) ‘Should we fear a feral future?’ (no audio available)
- 10 November 2014 (Ted Lefroy) ‘Perennial Agriculture’
- 1 December 2014 (Ted Lefroy) ‘When is science good enough?’

2015 Interviews

- 02 February 2015 (Ted Lefroy) – ‘Save nature or save ourselves?’
- 02 March 2015 (Ted Lefroy) – ‘Does evolution always result in progress?’
### Radio Interviews – others

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-Jul-11</td>
<td>11 Jul 2011 (Nathan Bindoff) ABC National Science Show &quot;Climate Futures for Tasmania&quot;</td>
</tr>
<tr>
<td>6-Feb-12</td>
<td>ABC Radio - Country Hour (6 Feb 2012) Sue Gould 'A study of the rehabilitation of bauxite mine sites near Weipa on Cape York'</td>
</tr>
<tr>
<td>2-May-12</td>
<td>ABC Radio - Bush Telegraph (2 May 2012) - Chris Johnson - discussing farmers using guardian dogs to protect livestock from devastating predator attacks from wild dogs. Hear the interview at: <a href="http://www.abc.net.au/rural/telegraph/content/2012/53494638.htm">http://www.abc.net.au/rural/telegraph/content/2012/53494638.htm</a></td>
</tr>
<tr>
<td>7-May-12</td>
<td>ABC Radio Big Ideas (7 May 2012) Barbara Norman 'interviewed at last week’s Engineers Australia 2012 Conference on Practical Responses to Climate Change where she was a keynote speaker. Hear her interview on-line 'Planning for Climate Uncertainty'</td>
</tr>
<tr>
<td>21-May-12</td>
<td>Community Broadcasters Association of Australia Radio (21 May 2012) Ted Lefroy - DSEWPaC public affairs team created an informative Biodiversity Narrative with the Community Broadcasters Association of Australian the hope to improve the public’s understanding of the importance of protecting Australia’s biodiversity. It will also serve as an opportunity to share some of the work which the department is investing time and resources in to achieve this aim</td>
</tr>
<tr>
<td>6-Jun-12</td>
<td>ABC Radio country Hour (6 Jun 2012) interview with Ted Lefroy on World Environment day, Tuesday 5 June. Reporter Rose Grant attended the launch of the Landscape Logic book in Launceston and had some follow up questions on just how Australia’s approach co-operative environmental federalism works and why it has been difficult to see evidence of improvement in the state of the environment after 20 years of Landcare and other environmental programs. Listen again at: <a href="http://www.abc.net.au/rural/tas/content/2012/06/s3518709.htm">http://www.abc.net.au/rural/tas/content/2012/06/s3518709.htm</a></td>
</tr>
<tr>
<td>10-Jul-12</td>
<td>ABC Rural Report (10 Jul 2012) - International Conference on Climate Adaptation Tucson, Arizona (Louise Gilfedder)</td>
</tr>
<tr>
<td>13-Aug-12</td>
<td>Finland TV News (13 Aug 2012) Sue Moore Sue Moore (Social and Institutional Project Leader) was a keynote speaker in Finland last week at a seminar on wildlife tourism, speaking on &quot;Developing and managing wildlife tourism for sustainability&quot;. Sue was also interviewed and appeared on Finnish national television and radio, speaking on the importance of expanding bear watching tourism beyond a sole focus on the bears as an iconic species, to other ecosystem components and interests. <a href="http://www.kajak.fi/loader.aspx?id=a47b2276-68f8-4627-8e7f-df1e90917004">http://www.kajak.fi/loader.aspx?id=a47b2276-68f8-4627-8e7f-df1e90917004</a> Outdoors Finland Wildlife Tourism Seminar 13th-14th August 2012 in Kuhmo. The seminar is organized by Visit Finland in cooperation with Kajaani University of Applied Sciences.</td>
</tr>
<tr>
<td>28-Nov-12</td>
<td>ABC Radio Breakfast (28 Nov 2012) Climate Change Research Strategy for Primary Industries Conference (Suzie Gaynor)</td>
</tr>
<tr>
<td>12-Dec-12</td>
<td>ABC Radio Country Hour (12 Dec 2012) - National Resilience Award to Climate Futures for Tasmania (Suzie Gaynor)</td>
</tr>
</tbody>
</table>
### Radio Interviews – others

<table>
<thead>
<tr>
<th>Date</th>
<th>Interview Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Nov-13</td>
<td>Anne Hardy, Sustainable Tourism Study Field Work – interview with ABC Radio Mornings program with Leon Compton.</td>
</tr>
<tr>
<td>29 Jan-14</td>
<td>Anne Hardy, Sustainable Tourism Study Field Work – interview with ABC Radio Mornings program with Leon Compton.</td>
</tr>
</tbody>
</table>

### Media Releases

<table>
<thead>
<tr>
<th>Date</th>
<th>Release Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-Apr-12</td>
<td>CSU Media Release: Has government funding improved the environment? (Landscapes Logic Book Release)</td>
</tr>
<tr>
<td>7-May-12</td>
<td>UTAS Media Release: <a href="#">New book on managing Tasmanian landscapes</a> (Landscapes Logic Book Release)</td>
</tr>
<tr>
<td>1-Feb-13</td>
<td>LaP Public statements for scenario workshops - Tasmanian Midlands</td>
</tr>
<tr>
<td>1-Mar-13</td>
<td>LaP Public statements for scenario workshops - Australian Alps</td>
</tr>
<tr>
<td>3 Oct 2013</td>
<td>UTAS Media Release - Sustainable Tourism Study Field Work North West residents’ opinions sought for tourism study in Regional Tasmania resulting in three interviews to date with project leader Anne Hardy (Nov 2013, Jan 2014 and Feb 2014) on the ABC Radio Mornings program with Leon Compton.</td>
</tr>
<tr>
<td>10-Mar-15</td>
<td>UTAS Media Release: Taking a big picture view of the Tasmanian Midlands (Launceston Launch)</td>
</tr>
</tbody>
</table>

### Newspaper

<table>
<thead>
<tr>
<th>Date</th>
<th>Article Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Aug-11</td>
<td>The Land Newspaper (Stuart Corney) How to model climate change</td>
</tr>
<tr>
<td>26-Jan-12</td>
<td>The Mercury (26 Jan 2012) Australia Day Award to Peter Davies</td>
</tr>
<tr>
<td>17-Feb-13</td>
<td><a href="#">The Sunday Tasmanian, (17 February 2013), pp 60-61 Time to tackle burning issues. (Bowman DMJS)</a></td>
</tr>
<tr>
<td>17-Feb-13</td>
<td>Sunday Tasmania (17 Feb 2013) David Bowman - Time to tackle burning issues says Professor David Bowman in his article in the Sunday Tasmanian newspaper. In his opinion piece, David suggests that Tasmanians face tough decisions if they are to survive in their highly flammable landscape. Read the article on our website: <a href="http://www.nerplandscapes.edu.au/publication/time-tackle-burning-issues">http://www.nerplandscapes.edu.au/publication/time-tackle-burning-issues</a>. David’s also had another article published in The Conversation (4 Feb 2013): The Tasmanian microcosm – a post-resource test bed for sustainability</td>
</tr>
<tr>
<td>14-Aug-13</td>
<td>The Australian – High Education Supplement (14 August 2013) Collaboration means users have a say as well, (Luciana Porfirio and Barbara Norman).</td>
</tr>
</tbody>
</table>
**Newspaper**
9 Articles

<table>
<thead>
<tr>
<th>Date</th>
<th>Article</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-Jan-14</td>
<td>Mercury Newspaper (14 Jan 2014) David Bowman in Peter Boyer's Climate Change column</td>
</tr>
<tr>
<td>20-Apr-14</td>
<td><strong>David Bowman</strong> (20 April 2014) Moonscape, <em>The Sunday Tasmanian,</em></td>
</tr>
<tr>
<td>23-Oct-14</td>
<td>The Advocate Newspaper, Problems seen in fuel (David Bowman) - opinion piece</td>
</tr>
<tr>
<td>1-Nov-14</td>
<td>The Mercury Newspaper 'Don't risk the fire home heartache' (David Bowman)- opinion piece</td>
</tr>
</tbody>
</table>

**Newsletters (Stakeholders)**
9 Articles

<table>
<thead>
<tr>
<th>Date</th>
<th>Article</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Mar-12</td>
<td>Edition 14, 2012 - UTAS research newsletter ‘Research to Reality’ Hub Profile (Ted Lefroy)</td>
</tr>
<tr>
<td>1-Jun-13</td>
<td>News in the Alps #44, p8 (June 2013) The Hub (Gill Anderson)</td>
</tr>
<tr>
<td>1-Jun-13</td>
<td>Running Postman – Issue #15, pp 6-7 (June 2013), Connecting landholders with researchers (Suzie Gaynor) [The Tasmanian DPIPWE Newsletter sent to all covenantees]</td>
</tr>
<tr>
<td>3-Nov-14</td>
<td>Article in Australian Alps Program newsletter “News from the Alps” Issue 46, p. 20 “Networking for biodiversity: a snapshot” based on interview with Michael Mitchell about the 2nd Scenario Planning Workshop on the Future of Biodiversity in the Australian Alps</td>
</tr>
<tr>
<td>10-Mar-15</td>
<td>The Mercury Newspaper (Hobart) University of Tasmania experts reveal big-picture view of Midlands’ future. by Bruce Mounster. (syndicated to Perth Sunday Times)</td>
</tr>
</tbody>
</table>

**Social Media**
5 posts

<table>
<thead>
<tr>
<th>Date</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-Feb-15</td>
<td>Blog - Andrew Campbell LinkedIn post - to APEN (Australasia-Pacific Extension Network) Group – 426 members. Landscapes and Policy; great science communication</td>
</tr>
<tr>
<td>10-Mar-15</td>
<td>Tweet - Life at Large Launch - Threatened Species Commissioner - Tweet in support of Launceston Launch</td>
</tr>
<tr>
<td>10-Mar-15</td>
<td>Facebook - Life at Large Launch - Threatened Species Commissioner - Facebook Post in support of Launceston Launch</td>
</tr>
<tr>
<td>23-Mar-15</td>
<td>Tweet - Life at Large Launch - Threatened Species Commissioner - Tweet in support of Victorian Launch</td>
</tr>
<tr>
<td>23-Mar-15</td>
<td>Facebook - Life at Large Launch - Threatened Species Commissioner - Facebook Post in support of Victorian Launch</td>
</tr>
</tbody>
</table>
On-line Media Articles
6 articles

<table>
<thead>
<tr>
<th>Date</th>
<th>Author/Title</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Dec-13</td>
<td>The Guardian Australia (2013) Victoria to consider reintroduction of alpine cattle grazing, (Grant Williamson Interview)</td>
<td><a href="http://www.theguardian.com/environment/2013/dec/05/victoria-to-consider-reintroduction-of-alpine-cattle-grazing">http://www.theguardian.com/environment/2013/dec/05/victoria-to-consider-reintroduction-of-alpine-cattle-grazing</a></td>
</tr>
<tr>
<td>1-Jun-14</td>
<td>Chris Johnson (June 2014) ABC Environment on-line: Little marsupial diggers may hold key to preventing bushfires.</td>
<td></td>
</tr>
<tr>
<td>20-Aug-14</td>
<td>Luciana Porfirio was interviewed by The Guardian journalist Gabrielle Chan for a special on-line Guardian feature on horses in the alps.</td>
<td></td>
</tr>
<tr>
<td>5 Nov 2015</td>
<td>ABC TV Landline, Killer Cats, Chris Johnson talks about the threat of feral cats and explains the disastrous effects of the disease carried by cats, toxoplasmosis.</td>
<td></td>
</tr>
<tr>
<td>4 Mar 2015</td>
<td>ABC Environment Online (Chris Johnson) 'Inappropriate' back-burns could drive species extinct Chris Johnson</td>
<td></td>
</tr>
</tbody>
</table>

THE CONVERSATION
Author (Date published) Article title with link
59 Articles

Chris Johnson (24 March 2015) Tasmania’s fox hunt was worth it, even if there were no foxes
Brendan Mackey (29 January 2015) Explainer: wilderness, and why it matters
Anne Hardy (16 January 2015) Paradise gained – how tourism could help Tasmania’s wilderness.
David Bowman (8 January 2015) Ship Australia’s wildlife out to sea to save it from extinction
David Bowman (4 Sept 2014) Tasmania scraps ‘peace deal’ that protects native forests
David Bowman (8 Aug 2014) Explainer: back burning and fuel reduction
Andrew Campbell (20 May 2014) Another broken promise: budget switches Landcare for Green Army
David Bowman (16 May 2014) Tasmanian forestry plans a revival beyond World Heritage
Andrew Campbell (19 Feb 2014) A wet warning from Australia’s Top End on rising sea levels
Ted Lefroy (29 Jan 2014) Bushfires: what we can learn from Hobart’s near miss
David Bowman (15 January 2014) Our deadly bushfire gamble: risk your life or bet your house.
Chris Johnson (10 Jan 2014) Marsupial extinctions: don’t blame the dingoes
David Bowman (9 December 2013) Restoration won’t work: a new way to fix old mines
Grant Williamson (26 November 2013) New research shows alpine grazing does not reduce blazing
David Bowman (30 October 2013) Did fire kill off Australia’s megafauna?
David Bowman (18 October 2013) Tasmanian bushfires: should we have trusted the models?
David Bowman (21 August 2013) Are Australian national parks becoming empty churches?
Andrew Campbell (13 August 2013) We need a smarter debate on developing northern Australia
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Date Published</th>
<th>Article Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Bowman</td>
<td>10 August 2013</td>
<td>Saving the world with cows: why the simple ideas don’t work</td>
</tr>
<tr>
<td>Sue Moore</td>
<td>07 August 2013</td>
<td>Our national parks need visitors to survive.</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>18 Jul 2013</td>
<td>Revegetation helps fix climate, but Australia would rather clear land</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>13 Jul 2013</td>
<td>Thinking corporately: getting national parks on national balance sheets</td>
</tr>
<tr>
<td>Fay Johnson &amp; David Bowman</td>
<td>27 Jun 2013</td>
<td>Southeast Asian smoke warns of never-ending fires</td>
</tr>
<tr>
<td>David Bowman</td>
<td>18 June 2013</td>
<td>Bad bushfire planning burns money</td>
</tr>
<tr>
<td>Chris Johnson</td>
<td>2 May 2013</td>
<td>Australian endangered species: Northern Hairy-nosed Wombat</td>
</tr>
<tr>
<td>Jason Alexandra &amp; Andrew Campbell</td>
<td>05 Apr 2013</td>
<td>Can we resolve the ‘peak everything’ problem?</td>
</tr>
<tr>
<td>David Bowman</td>
<td>08 Mar 2013</td>
<td>We need to think about fire in Tasmania’s forests</td>
</tr>
<tr>
<td>David Bowman</td>
<td>02 Mar 2013</td>
<td>Winning the climate debate by adapting</td>
</tr>
<tr>
<td>Chris Johnson</td>
<td>13 Feb 2013</td>
<td>Is it too late to bring the red fox under control?</td>
</tr>
<tr>
<td>David Bowman</td>
<td>05 Feb 2013</td>
<td>The Tasmanian microcosm – a post-resource test bed for sustainability</td>
</tr>
<tr>
<td>Brett Murphy</td>
<td>20 Dec 2012</td>
<td>Scientists and national park managers are failing northern Australia’s vanishing mammals</td>
</tr>
<tr>
<td>David Bowman</td>
<td>29 Nov 2012</td>
<td>Biodiversity crisis demands bolder thinking than bagging national parks</td>
</tr>
<tr>
<td>Barbara Norman</td>
<td>20 Nov 2012</td>
<td>World Bank calls for greater climate preparedness – in Australia, planning unravels</td>
</tr>
<tr>
<td>Chris Johnson</td>
<td>12 Nov 2012</td>
<td>Hunting or climate change? Megafauna extinction debate narrows</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>13 Nov 2012</td>
<td>Coal seam gas: just another land use in a big country</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>18 Oct 2012</td>
<td>Australia and the global scramble for natural resources</td>
</tr>
<tr>
<td>David Bowman</td>
<td>27 Sept 2012</td>
<td>Hot issue – bushfires, powerlines and climate change</td>
</tr>
<tr>
<td>David Bowman</td>
<td>23 Aug 2012</td>
<td>Christine Milne: the economy must serve people and nature, not vice-versa</td>
</tr>
<tr>
<td>David Bowman</td>
<td>8 Aug 2012</td>
<td>Hoorah for Mars, but why not more curiosity about life on Earth?</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>8 Aug 2012</td>
<td>Part two: running dry – the worrying repercussions of running down irrigation research</td>
</tr>
<tr>
<td>Graham Harris</td>
<td>6 Aug 2012</td>
<td>Apocalypse Not: doomsday thinkers of Oz should get out more</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>3 Aug 2012</td>
<td>Part One: Irrigation R&amp;D drying up – a looming weakness for Australia</td>
</tr>
<tr>
<td>Andrew Campbell</td>
<td>13 Jul 2012</td>
<td>Thinking corporately: getting national parks on national balance sheets</td>
</tr>
<tr>
<td>Allan Curtis</td>
<td>13 Jul 2012</td>
<td>Australia’s place in the global food chain: time to wise up</td>
</tr>
<tr>
<td>Graham Harris</td>
<td>28 Jun 2012</td>
<td>Ecology is failing and needs to be freed from our limitations</td>
</tr>
<tr>
<td>Barbara Norman</td>
<td>20 Jun 2012</td>
<td>Rio+20 puts the case for more sustainable cities – is Australia ready?</td>
</tr>
<tr>
<td>David Bowman</td>
<td>13 June 2012</td>
<td>UN produces another boring global environmental warning; world continues not caring</td>
</tr>
<tr>
<td>Chris Johnson</td>
<td>08 May 2012</td>
<td>Watching over livestock: our guardian animals</td>
</tr>
<tr>
<td>Graham Harris</td>
<td>30 Apr 2012</td>
<td>Science’s stagnant thinking: our rivers need a revolution</td>
</tr>
</tbody>
</table>
59 Articles

Justin Norrie writes about [Chris Johnson's 'Science' journal article (23 Mar 2012)](Hunters, not climate change, killed giant beasts 40,000 years ago)

David Bowman (10 Feb 2012) [Elephants on grass: only lively debate can save Australia’s environment](Elephants on grass: only lively debate can save Australia’s environment)

David Bowman (02 Feb 2012) [Elephants may reduce bush fire risk](Elephants may reduce bush fire risk)

David Bowman (23 Jan 2012) [Will climate change increase bushfires? Not knowing is no excuse for not talking](Will climate change increase bushfires? Not knowing is no excuse for not talking)

David Bowman (08 Nov 2011) [Are national parks the best way to conserve nature?](Are national parks the best way to conserve nature?)

David Bowman (31 Oct 2011) [Are national parks the best way to conserve?](Are national parks the best way to conserve?)

Nick Beeton (19 Oct 2011) [Saving the Tasmanian devil: if not by selective culling, then how?](Saving the Tasmanian devil: if not by selective culling, then how?)

Brendan Wintle (20 Sept 2011) [Spending to save: what’s the best use of our conservation dollar?](Spending to save: what’s the best use of our conservation dollar?)

David Bowman (19 Sept 2011) [Playing with fire - life on our flammable planet is about to get hotter](Playing with fire - life on our flammable planet is about to get hotter)
Appendix I: Hub Integration Exercise

At the August 2013 Researchers Roundtable, we conducted an integration exercise which was the first step toward the six-step process, Life at Large.

We started with the following integration proposal. Working in groups, the researchers were asked to fit their research studies into the bigger picture of integration. We used flash cards and 100 word summaries to fit the studies into the bigger picture, so that we could visualise the connections, cross overs and integration opportunities. The researchers worked in groups. The groups were asked to consider four questions (as outlined below).

Figure: Integration: between studies

Integration Workshop Questions:
1. Can you find your studies in the list?
2. Can you map them to the integration diagram?
3. If not, how could we vary the integration diagram?
4. What activities would best achieve the outcomes in Box 5?
**Working Group A Output**

**Question 4 response:** What activities would best achieve the outcomes in Box 5?

- MCAS-S – integrate all studies – social and biophysical – using multi-criteria analysis eg, identification of conservation priorities
- MCCP – integrate all studies using connectivity planning tool, eg identification of conservation priorities
- Both MCAS-S and MCCP above driven by workshop with stakeholders and experts
- Workshops - with departmental people
  - How to incorporate data into EIS
  - Show and tell to stakeholders of research outputs
  - Recommendations?
- Social summary database
- Designing interactive website/tool?
  - So data/tools are used and understood
  - Metadata
  - Reports
- Summary from each researcher – what are the implications of research?
- Workshop o social Scenarios – road map to using MCAS-S, with case studies

**Steps:**
1) describe scenarios (social science)
2) import relevant data layers into MCAS-S (biophysical)
3) Analyse and discuss (prioritise)
4) Save as example project in MCAS-S for distribution

**Key Learnings/observations:**
- Parallel/not linked ecological and social parts

**Mapping Studies to the Integration Diagram**

*one group’s contribution to the mapping exercise held in August 2013*
### Appendix J: Hub Evaluation


**PART 1. Effectiveness of strategies employed to overcome barriers to and create opportunities for Interdisciplinary and transdisciplinary research**

**Table 1. Strategies to overcome barriers to **interdisciplinary** research**

<table>
<thead>
<tr>
<th>Strategies to overcome barriers to interdisciplinary research</th>
<th>Hobart Research Meetings</th>
<th>Collaborative Conceptual Modelling</th>
<th>Scientific Writing Course</th>
<th>Targeted Cross-Project Meetings</th>
<th>Bus Tours</th>
<th>Targeted Stakeholder Meetings</th>
<th>Hub Happenings</th>
<th>Hub Website</th>
<th>Hub Intranet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Overcoming differences in disciplinary language and culture</td>
<td>72*</td>
<td>54</td>
<td>36</td>
<td>72</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Q2. Overcoming differences in research methods and rules of evidence between disciplines</td>
<td>46</td>
<td>18</td>
<td>43</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Q3. Overcoming the constraint, particularly for early career researchers, of the pressure and need to publish in single discipline, peer-reviewed journals</td>
<td>30</td>
<td>39</td>
<td>–</td>
<td>69</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Q4. Overcoming the geographic separation of the hub researchers</td>
<td>96</td>
<td>–</td>
<td>–</td>
<td>94</td>
<td>100</td>
<td>90</td>
<td>75</td>
<td>17</td>
<td>0</td>
</tr>
</tbody>
</table>

* % of respondents recorded as identified this strategy as effective, very effective or extremely effective in overcoming the barrier. Cells with grey fill are those where >2/3 of respondents judged the strategy as effective.
Table 2. Strategies to overcome barriers to transdisciplinary research

<table>
<thead>
<tr>
<th>Strategies to overcome barriers to transdisciplinary research</th>
<th>Hobart Research Meetings</th>
<th>Targeted Cross-Project Meetings</th>
<th>Bus Tours</th>
<th>Targeted Stakeholder Meetings</th>
<th>Alps Science-Management Forums</th>
<th>Hub Happenings</th>
<th>Hub Website</th>
<th>Contingency Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5. Overcoming differences in institutional cultures between participating organisations</td>
<td>71*</td>
<td>60</td>
<td>93</td>
<td>86</td>
<td>100**</td>
<td>40</td>
<td>9</td>
<td>–</td>
</tr>
<tr>
<td>Q6. Overcoming inflexibility in structure, funding and operations</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>90</td>
</tr>
</tbody>
</table>

* % of respondents recorded as identified this strategy as effective, very effective or extremely effective in overcoming the barrier. Cells with grey fill are those where >2/3 of respondents judged the strategy as effective.

**43% Extremely Effective
PART 2. Effectiveness of processes facilitated by the hub

Table 3. Evaluation of the perceptions of researchers regarding the extent to which processes were employed to facilitate interdisciplinary and transdisciplinary research

<table>
<thead>
<tr>
<th>Statement</th>
<th>% of Respondents who Agreed or Strongly Agreed with the Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q7. I felt I received adequate mentoring and support from Hub staff to undertake ID/TD research</td>
<td>84</td>
</tr>
<tr>
<td>Q8. By the end of this Hub I have a good knowledge of where different disciplines can contribute to landscape level conservation of biodiversity</td>
<td>92</td>
</tr>
<tr>
<td>Q9. High trust and respect between disciplines was a characteristic of this Hub</td>
<td>25</td>
</tr>
<tr>
<td>Q10. Sufficient time was allocated, as a Hub, to an early joint problem definition stage with research users and other researchers</td>
<td>33</td>
</tr>
<tr>
<td>Q11. It was challenging for me to undertake research with research users as my professional rewards are based on publishing in high impact peer reviewed journals</td>
<td>38</td>
</tr>
<tr>
<td>Q12. I felt the hub supported me to be accountable to research users in the way I conducted my research and reported my research findings</td>
<td>89</td>
</tr>
<tr>
<td>Q13. Activities with research users including briefings, workshops, training sessions and manuals helped me undertake transdisciplinary research</td>
<td>88</td>
</tr>
</tbody>
</table>

PART 3. Expectations and outcomes from the hub

Table 4. Evaluation of the extent to which the expectations of researchers were met regarding the outputs and outcomes from the hub

<table>
<thead>
<tr>
<th>Q14. Outputs/outcomes from the hub</th>
<th>% of Respondents noted their Expectations as being mostly or Completely Met, or Exceeded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity and quality of research outputs</td>
<td>71</td>
</tr>
<tr>
<td>Acquisition of new knowledge and skills</td>
<td>83</td>
</tr>
<tr>
<td>Overall level of personal and professional satisfaction</td>
<td>78</td>
</tr>
<tr>
<td>Your research making a difference to biodiversity conservation</td>
<td>30</td>
</tr>
<tr>
<td>The hub creating new opportunities for future research</td>
<td>62</td>
</tr>
</tbody>
</table>
Appendix K: Individual Project outputs and outcomes (Jul-Dec 2014)

Red - There are significant difficulties or risks emerging which may compromise the project. Immediate remediation is required.

Amber - There are real or potential difficulties and risks which should be brought to the attention of the Department and other stakeholders even if the project is being well managed.

Green - Project is on track or only requires minor refinement; there are no significant difficulties and/or risks emerging.

Blue - Task has been completed

Theme 1: Communication

PROJECT 1: Communication & Knowledge Broking - (Prof Ted Lefroy)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output A. Deliver Milestone #10</strong></td>
<td>STATUS – Complete</td>
</tr>
<tr>
<td>i. Progress Report #7 (Jan-Jul 14)</td>
<td>a) Hub Milestone #10 - lodged 01 October 2014</td>
</tr>
<tr>
<td>ii. Financial Statements</td>
<td>i. The Progress Report #7 (Jan-Jul 14) - submitted &amp; accepted</td>
</tr>
<tr>
<td><strong>Output B: Milestone #11 – the Final Report (Due 1 Apr 2014)</strong></td>
<td>ii. The signed Financial Statements - submitted &amp; accepted</td>
</tr>
<tr>
<td><strong>Research Highlights</strong></td>
<td>PROGRESS AGAINST REMAINING OUTPUTS:</td>
</tr>
<tr>
<td>Milestone #11 – due 01 April 2015</td>
<td>Draft table of contents and executive summary presented to Steering Committee for endorsement on 11 Feb. Auditors engaged and on notice to complete financial audit by due date (10 August 2015)</td>
</tr>
<tr>
<td></td>
<td>We are well progressed in developing a final report that presents the hub’s research outputs in the form of a web-based interactive book describing the steps involved in carrying out an integrated assessment of biodiversity. The web site draws on examples from our two case study areas, the Tasmanian Midlands and the Australian Alps, illustrating each stage in carrying out a regional scale assessment using still images, video, audio, information sheets, reports and journal papers. The draft version of the website was tested by researchers at their final forum in December 2014. The website, was then populated, stress tested, cross-checked ready for final release on 11 Feb 2015.</td>
</tr>
<tr>
<td></td>
<td>As part of the final report executive summary, we generated a 12-page research highlights summary that captures 29 of our top tools and techniques, with a one page insert that summarises two CERF funded achievements and four additional studies funded through the Regional Sustainability Planning group.</td>
</tr>
</tbody>
</table>
### Theme 1: Communication

**PROJECT 1: Communication & Knowledge Broking - (Prof Ted Lefroy)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
</table>

**Engagement, Department of the Environment and other partners:**
- Tasmania Stakeholder Forum (10 Dec) including 10 tool demonstration workshops
- Canberra Research - User and Policymakers Forum (11 Feb) including 7 targeted briefings/workshops:
  - ACT Parks MCAS-S Briefing; GAP CloSR Tutorial; Climate Futures in the Australian Alps Seminar; ERIN Spatial Dataset Briefing; Improving Governance for conservation through Systems Planning Alps Seminar; Climate Change and Invasive Species in the Australian Alps Briefing; Species Distribution Modelling & Uncertainty Briefing
- Launceston based Research - Users Forum (10 Mar), including 2 demonstration workshops: SPADE Tool Demonstration and GAP CloSR Tool demonstration
- Melbourne Research - User and Policymakers Forum (23 Mar), including 2 targeted briefings/workshops: Climate Futures in the Australian Alps Seminar; Alpine Bogs Classification and Risks: using spatial multi-criteria analysis to identify bogs under threat

**Policy Interactions, Impact and Influence:**
- Threatened Species Commission Briefings (17 Jul/16 Sept) - Ted
- Swift Parrot MCAS-S datapack briefing (27 Mar) – Ted and Louise
- NRM South CEO Research Briefing (18 Jul) – Ted
- GAP CloSR Briefing at DPIPWE (1 Aug) – Alex Lechner
- Tasmanian Land Conservancy Briefing – Ted Lefroy (27 Jan)
- Tas Fire Service and State Fire Council Briefings – Ted Lefroy (10 Dec)

**Cross-disciplinary & Integration:**
- August Researchers Roundtable Forum (13-15 Aug)
- December Forum (8-9 Dec), including the end of hub evaluation session
- Project 1 Strategy Meetings (2) & Communication Weekly Meetings (8)
- Steering Committee Meeting (29 Aug and 11 Feb 2015)
- NERP Central and Hub Communicators Teleconferences (2)

**Presentation/briefings:**
- SPADE Seminar at DPIPWE – Nick Beeton (31 Jul)
- GAP CloSR Seminar at DPIPWE – Alex Lechner (1 Aug)
- Land Institute Conference, Colorado USA (29/30 Oct)
### Theme 1: Communication

**PROJECT 1: Communication & Knowledge Broking - (Prof Ted Lefroy)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRM Workshop and presentation – Ted Lefroy (5 Nov)</td>
<td></td>
</tr>
<tr>
<td>World Parks Congress – Ted and Louise (13 Nov)</td>
<td></td>
</tr>
<tr>
<td>Conservation friends of Parliament – Ted (24 Nov)</td>
<td></td>
</tr>
<tr>
<td>Fauna Modelling Workshop – Hobart – (27 Nov)</td>
<td></td>
</tr>
<tr>
<td>DPIPWE Senior Executive Briefing (2 Dec)</td>
<td></td>
</tr>
<tr>
<td>Healthy Landscapes Meeting – presentation and launch of Life at Large – Ted Lefroy (13 Feb)</td>
<td></td>
</tr>
<tr>
<td>Alps Heads of Agency Meeting/Briefing – presentation by Ted Lefroy/VIP information packs (16 Mar)</td>
<td></td>
</tr>
</tbody>
</table>

### Theme 2: Social and Economic Futures

**PROJECT 2: Social and Institutional Futures - (Prof Michael Lockwood & Prof Sue Moore)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 10b.</strong> Evaluation of current policy, governance and planning regimes in terms of likely outcomes for the key biodiversity features and dependent social and economic conditions</td>
<td>STATUS: complete</td>
</tr>
<tr>
<td><strong>Output 11.</strong> Evaluation of current policy, governance and planning regimes in terms of likely outcomes for the key biodiversity features and dependent social and economic conditions. Draft evaluations completed for both study areas; currently being finalised following consultations with Hub project leaders</td>
<td></td>
</tr>
<tr>
<td><strong>Output 26 (i) - (iv) complete</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Output 27 - complete</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Output 36 – complete</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Output 37 – complete</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Output 36 – not complete</strong></td>
<td></td>
</tr>
</tbody>
</table>

 STATUS: complete
**Output 10a** - complete
**Output 10b** – complete
**Output 11** – complete

Following discussions with other project leaders and stakeholders, this output has been abandoned. This output was developed on the assumption that the institutional, policy and planning reforms identified by Project 2 would, to some extent and in some form, be implemented by key governing agencies and stakeholders in the two study areas. The indicators would then be used to track the effectiveness of these implementation actions. In the event, discussions with key governing agencies and stakeholders in the two study areas show that implementation will not occur in the short to medium term. This is primarily due to the prevailing institutional and political circumstances and
### Theme 2: Social and Economic Futures

#### PROJECT 2: Social and Institutional Futures - (Prof Michael Lockwood & Prof Sue Moore)

<table>
<thead>
<tr>
<th>Milestones Identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 26. (in collaboration with P3)</strong> Evaluation of different scenario of institutional, policy and planning reform in terms of (i) likely efficacy of achieving desired conservation trajectories (ii) institutional and social acceptability (iii) economic costs and benefits associated with achieving conservation trajectories and (iv) pilot testing MBI interventions in subsets of the two study regions.</td>
<td>the absence of a window of opportunity to progress the proposed reforms. Under these circumstances, there is little value in developing indicators for monitoring effectiveness. Additional Outputs: Evaluation of the Hub's attempts to foster trans-disciplinary research. Estimated delivery in April 2015, of a report to government and a journal article.</td>
</tr>
<tr>
<td><strong>Output 27. (in collaboration with P4)</strong> Conservation management options identified for landscapes, ecosystems and focal species with respect to refugia, connectivity and degrading and threatening processes.</td>
<td></td>
</tr>
<tr>
<td><strong>Output 36. (in collaboration with others)</strong> The likely effectiveness of alternative institutional, policy and planning reforms in achieving societal preferences for biodiversity under likely scenarios of environmental and social change.</td>
<td></td>
</tr>
</tbody>
</table>

#### External collaborations – other stakeholders, agencies
- Tasmania Stakeholder Forum (10 Dec) with research users on guidebook material on tools and techniques we have developed for systems approaches to improved planning and for improving governance, and to discuss follow-up research opportunities. Michael Mitchell attended a meeting at CSU Albury 2 September 2014 to discuss proposal for ARC Linkage grant application focused on deer impacts in the Australian Alps.

#### NERP Cross Disciplinary Meetings/Workshops (within our hub or with other NERP Hubs)
- August Forum (13-15 Aug)
- December Forum (8-9 Dec)

#### Activities for the Department of the Environment or contracted hub partners
- Tasmania Stakeholder Forum (10 Dec)

#### Presentations/Conferences
- IUCN World Parks Congress 2014, November 12-19, Sydney, Australia
Theme 2: Social and Economic Futures

PROJECT 2: Social and Institutional Futures - (Prof Michael Lockwood & Prof Sue Moore)

Milestones identified in AWP | Progress against milestone
--- | ---
Clement, S. (2013) Misfits, institutions and biodiversity conservation. Poster presented at Murdoch University’s School of Veterinary and Life Sciences poster day, 8 November 2013. Murdoch, WA.

Other Publications
### Theme 2: Social and Economic Futures

#### PROJECT 2: Social and Institutional Futures - (Prof Michael Lockwood & Prof Sue Moore)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
</table>

#### Media


#### Metadata completed for the following datasets

- Tasmanian Midlands historical timeline interviews
- Tasmanian Midlands scenario planning workshop 2013
- Australian Alps scenario planning workshop 2013
- Tasmanian Midlands scenario planning workshop 2014 - testing governance reform options
- Australian Alps scenario planning workshop 2014 - testing governance reform options
- Landholder survey: Helping Farm, Land and Native Vegetation Management in the Tasmanian Midlands
- Institutional Diagnostic interviews - Tasmanian Midlands
- Institutional Diagnostic interviews - Australian Alps
- Governance Reform Focus Groups - Tasmanian Midlands
- Governance Reform Focus Groups - Australian Alps
- Institutional Grammar Tool Analysis - Tasmanian Midlands
- Institutional Grammar Tool Analysis - Australian Alps
### Theme 2: Social and Economic Futures

#### PROJECT 3: Economic Futures - (Prof John Tisdell)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 12.</strong> (variation) Analysis of tourism using Alpine bio-economic models</td>
<td><strong>STATUS</strong> – Completed <strong>Output 12</strong> - the initial intention was to develop a bioeconomic model of the value of water originating in the Australian Alps. This work had already been undertaken and reported in the Worboys catchment report. Hence, in the opinion of our partners and agencies, the more pressing interest was the impact of climate change on tourism. As a result, this output is now a relationship between natural and artificial snow fall, visitor numbers and visitor days in Victoria for use, and will be reported to the Alpine Resorts Coordinating Committee.</td>
</tr>
<tr>
<td><strong>Output 13.</strong> (variation) Design of MBIs associated with hypothesised trajectories for biodiversity in the Midlans of Tasmania</td>
<td><strong>V-Output 13:</strong> Complete - Analysis of market based incentive programs for biodiversity in the Tasmanian Midlands was completed in collaboration with staff from DPIPWE and the Tas Land Conservancy.</td>
</tr>
</tbody>
</table>
| **Output 26.** *(in collaboration with P3)* Evaluation of different scenario of institutional, policy and planning reform in terms of (i) likely efficacy of achieving desired conservation trajectories (ii) institutional and social acceptability (iii) economic costs and benefits associated with achieving conservation trajectories and (iv) pilot testing MBI interventions in subsets of the two study | **PROGRESS AGAINST REMAINING OUTPUTS:**
  - **Output 26.**
  - (i) and (ii) complete
  - (iii) complete- the bioeconomic model of the Tasmanian Midlands has been built and verified, and the economic costs and benefits associated with achieving conservation trajectories have been modelled and quantified. This was achieved with collaboration with P2: estimates of current enterprises in the Midlands were supplemented with data from P2 surveys.
  - (iv) complete

**Additional Outputs:**
Linked MCAS-S/GAMS models were explored for selected catchments in the Tasmanian Midlands to allow the bioeconomic model to be used by research-users; this was an additional output in Progress Report #7. However, these were unable to be built within the project’s time-frame due to the differences in each modelling platform (MCAS-S uses static data overlays, GAMS conducts dynamic modelling). Conducted a series of economics experiments exploring group behaviour around the use of a shared resource. This was based on irrigation in the Tasmanian Midlands and tested the use of existing tools used by water managers in promoting resource-sharing.

We will explore building the regional bioeconomic model in the open-source programming environment R with the aim of being able to provide the model, not just the outputs, to research-users. If this is possible, the model will be available by 31 March.
## Theme 2: Social and Economic Futures

### PROJECT 3: Economic Futures - *(Prof John Tisdell)*

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contracted Hub Partners and Department of the Environment staff</strong></td>
<td>Collaboration with Project 8 in incorporating spatial refugia dataset into the bioeconomic model of the Tasmanian Midlands. Collaboration with Project 2 in acquiring landholder-survey data from the Tasmanian Midlands on farm enterprise mix.</td>
</tr>
<tr>
<td><strong>External collaborations – other stakeholders, agencies</strong></td>
<td>Collaboration with DPIPWE (Land Conservation) in using Enterprise Suitability Mapping data from the Tasmanian Midlands. Collaboration with DPIPWE (Water Management) to ensure research questions associated with the bioeconomic modelling align with their research needs. Collaboration with Tasmanian Irrigation in acquiring water allocation data of irrigators in the Midlands Water Scheme.</td>
</tr>
<tr>
<td><strong>Presentations/Conferences</strong></td>
<td>Geography and Spatial Sciences Conference (UTAS, 25-26 Nov); presented results of economics experiments on group behaviour in using a shared resource. Australian Agricultural and Resource Economics Society conference, Rotorua, New Zealand, 10-13 February 2015</td>
</tr>
<tr>
<td><strong>NERP Cross Disciplinary Meetings/Workshops (within our hub or with other NERP Hubs)</strong></td>
<td>The August Forum (13-15 Aug)</td>
</tr>
<tr>
<td><strong>Activities for the Department of the Environment or contracted hub partners</strong></td>
<td>Presentation to the ARCC Co-operation Committee Meeting, 20 November 2014</td>
</tr>
<tr>
<td><strong>Activities for other stakeholders – meetings/workshops organised/attended</strong></td>
<td>Tasmania Stakeholder Forum (10 Dec); presented preliminary findings of bioeconomic modelling and economics experiments. DPIPWE Land Conservation (4 Nov); see above DPIPWE Water Management (15 Sep); see above Tasmanian Irrigation (4 Nov); see above</td>
</tr>
<tr>
<td><strong>Management Tools and Models provided</strong></td>
<td>Midlands Bioeconomic model will be available by March 2015.</td>
</tr>
<tr>
<td><strong>Datasets provided (with whom) or made public</strong></td>
<td></td>
</tr>
</tbody>
</table>
Theme 2: Social and Economic Futures

**PROJECT 3: Economic Futures - (Prof John Tisdell)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dataset of economic experiments on group behaviour using shared resource.</td>
</tr>
<tr>
<td></td>
<td>Dataset of property land-use in the Tasmanian Midlands provided to DPIPWE Land Conservation (excluding landholder identification)</td>
</tr>
</tbody>
</table>

**Metadata completed for the following datasets**

- Economics experiments (“Group behaviour among irrigators”)
- Tasmanian Midlands regional bioeconomic model
- Tasmanian Midlands property land and water use dataset
- Regional bioeconomic model of the Tasmanian Midlands.
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 14</strong>: Modelled and field tested techniques for identifying refugia (against drought, fire and climate change) for selected species, communities and MNES, determined in collaboration with the Climate Futures, Wildlife, Vegetation and Fire and Freshwater Systems projects and partner organisations.</td>
<td>STATUS: Complete</td>
</tr>
<tr>
<td><strong>Output 15</strong>: Mapped current connectivity gaps for focal species, determined in collaboration with Project 5.</td>
<td><strong>PROGRESS AGAINST REMAINING OUTPUTS:</strong></td>
</tr>
<tr>
<td><strong>Output 16</strong>: The conservation status of landscapes, ecosystems and focal species and associated degrading and threatening processes identified for contrasting study regions.</td>
<td><strong>Output 14</strong>: complete</td>
</tr>
<tr>
<td><strong>Output 27 (in collaboration with P5)</strong> Evaluation of the potential impacts of projected climate change on the conservation management options identified in output 26.</td>
<td><strong>Output 15</strong>: complete</td>
</tr>
<tr>
<td><strong>Output 28 (in collaboration with P5)</strong> Evaluation of climate change impacts on (i) W (climatic water</td>
<td><strong>Output 16</strong>: complete</td>
</tr>
</tbody>
</table>
| **Output 29 (in collaboration with P5)** Evaluation of climate change impacts on (i) W (climatic water | **Output 27**: complete (in association with Project 2)
| | complete (in association with Project 3) |
| | **Output 28**: complete (in association with Project 5) - Modelled distribution of species and communities under climate change, including three papers on methods and approaches to managing sources of uncertainty in projecting plausible future distributions. |
| | **Output 29**: incomplete (in association with Project 5) This output did not proceed as effort went instead into generating environmental indices from climate projections including for use in modelled distribution of individual species and communities. Specifically, we focussed our attention on the use of remotely sensed FPAR time series to analyse ecosystem productivity and grassland taxonomic composition. |
| | **Output 30**: complete (in association with Project 7) |
| | **Output 31**: complete (in association with Project 7) |
| | **Output 32**: complete (in association with Project 6) |
| | **Output 33**: complete (in association with Project 8) |
| | **Output 34 & 35**: complete These two outputs were met through development of (1) a new comprehensive ‘biodiversity assessment framework’ and (2) an MCASS-S methodology and case studies. Together, these two tools provide the means to systematically, on a spatially explicit basis, identify refugia, threats and management options and identify priorities for conservation action. Case studies have been undertaken for both Tasmania/midlands and the Australian Alps. |
| | **Additional Outputs:** |
| | Alps Icons and Threats Modelling (MCAS-S Datapack) |
| | Australian Alps wide vegetation classification system |
| | Thermal refugia model for Alps |
| | Grassland condition model |
| | **Engagement, Department of the Environment and other partners:** |
### Theme 3: Ecological Futures

#### PROJECT 4: Bioregional Futures - (Prof Brendan Mackey)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
</table>
| Output 30 (in collaboration with P7) | **External Collaborations**  
Modelled potential impacts of climate change on fire regimes in Tasmania and the Greater Alps and consequences for vegetation, habitat resources and focal species.  
Ross Rowe (Australia DoE); Oberon Carter, Louise Gilfedder, Felicity Faulkner (DPIPWE)  
Daniel Sprod (TLC), Lucy Randall and Jasmine Rickards (ABARES), Tom Barrett (Senior Scientist, Knowledge Facilitation/Delivery, NSW Office of Environment and Heritage); Frazer Muir and Duane Shawcross (NSW NPWS); Dan Brown, Dave Appleton and Roger Fenwick (Parks Victoria); Stephen Hughes, Shelley Swain and Ben Stevenson (ACT Parks and Conservation Service); Andrew Nixon (Australia Alps Liaison Committee); Jeremy Grove and Monica Kuppelwieser (Department of the Environment).  
NERP Cross Disciplinary Meetings/Workshops (within our hub or with other NERP Hubs)  
The August Forum (13-15 Aug)  
Led workshop on biodiversity assessment framework and MCAS-S datapack development: (17-18 July, Griffith University) Sue Gould, Willow H, Alex Lechner, Oberon Carter, Brendan Mackey, Sonia Hugh, Luciana Porfirio and Peter Jacobs (after lunch day, full on day 2). On the telephone day 1: Daniel Sprod  
Presentations/Conferences  
- Ecological Society of Australia Conference 2014  
Activities for other stakeholders – meetings/workshops organised/attended  
Tasmania Stakeholder Forum (10 Dec)  
Workshop on MCAS-S spatial decision support tool for Alps managers (20 October)  
Led workshop to discuss the use of greenspot measures of habitat quality with conservation prioritisation approaches used by governments and NGOs in Tasmania. Participants included P4 members and Daniel Sprod (TLC)  
Conference Papers, Presentations & Posters  
Luciana Porfirio, presentation at Ecological Society of Australia Conference 2014, ‘Noah’s Ark conservation will not preserve threatened ecological communities under climate change’  
Media  
Luciana Porfirio was interviewed by The Guardian journalist Gabrielle Chan for a special on-line Guardian feature on horses in the alps.  
Management Tools and Models provided  
MCAS-S tutorials for (1) Alps: Icons and Threats and (2) Swift Parrot nesting-habitat – provided to stakeholders at workshop on 20 October 2014  
Grasslands condition model  
Thermal refugia model |
| Output 31 (in collaboration with P7) | Output 32 (in collaboration with P6)  
Comparative analysis of fire activity in mainland temperate forests to understand the climate, topographic vegetation and land management factors that cause mega fires and relate this knowledge to Tasmania and the Alps to generate plausible fire risk scenarios.  
Comparative analysis of projected threats to persistence of vertebrates in the 2 case study regions under future spatial patterns of climate change and climate variability, including likely changes in land use and invasive exotic species.  
Output 33 (in collaboration with P8) The likely impacts of climate change on freshwater ecosystems (GPP, Collaborations respiration).  
Peter Jacobs lunch day, full on day 2). On the telephone day 1: Daniel Sprod  
Activities for other stakeholders – meetings/workshops organised/attended  
Tasmania Stakeholder Forum (10 Dec)  
Workshop on MCAS-S spatial decision support tool for Alps managers (20 October)  
Led workshop to discuss the use of greenspot measures of habitat quality with conservation prioritisation approaches used by governments and NGOs in Tasmania. Participants included P4 members and Daniel Sprod (TLC)  
Conference Papers, Presentations & Posters  
Luciana Porfirio, presentation at Ecological Society of Australia Conference 2014, ‘Noah’s Ark conservation will not preserve threatened ecological communities under climate change’  
Media  
Luciana Porfirio was interviewed by The Guardian journalist Gabrielle Chan for a special on-line Guardian feature on horses in the alps.  
Management Tools and Models provided  
MCAS-S tutorials for (1) Alps: Icons and Threats and (2) Swift Parrot nesting-habitat – provided to stakeholders at workshop on 20 October 2014  
Grasslands condition model  
Thermal refugia model |

*1 April 2015*
### Theme 3: Ecological Futures

#### PROJECT 4: Bioregional Futures - (Prof Brendan Mackey)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>ecosystems in the 2 case study regions based on fine scale regional projections applied to the results of natural experiments from output 21.</td>
<td><strong>Datasets provided (with whom) or made public</strong></td>
</tr>
<tr>
<td><strong>Output 34</strong> A systematic approach for identifying refugia likely to be effective against multiple threats for multiple species developed from the synthesis of outputs 27 to 33.</td>
<td><strong>Metadata completed for the following datasets</strong></td>
</tr>
<tr>
<td><strong>Output 35</strong> Systematic processes for identifying priority locations for protection, enhancement, connection, acquisition and remediation developed from the synthesis of outputs 27 to 33.</td>
<td>All P4 datasets completed – to be stored in terranova repository</td>
</tr>
</tbody>
</table>

MCAS-S data packs for Alps and Tasmania – to be stored in terranova repository
Theme 3: Ecological Futures

**PROJECT 5: Climate Futures – (Prof Nathan Bindoff)**

<table>
<thead>
<tr>
<th>Milestone identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 17: Regional scale climate projections for SE Australia with a focus on the greater Alps case study area using the A2 emissions scenario and a range of GCM models (up to 6 to be selected).</td>
<td>STATUS: Complete</td>
</tr>
<tr>
<td>Output 17: Complete</td>
<td></td>
</tr>
<tr>
<td>Output 18: Develop ecosystem indices based on those generated in collaboration with the other 4 biophysical projects, determined according to the needs of the other Hub projects and partners.</td>
<td></td>
</tr>
<tr>
<td>Output 17: Complete</td>
<td></td>
</tr>
<tr>
<td>Output 18: ongoing</td>
<td></td>
</tr>
<tr>
<td>Ecological indices currently being calculated. Expected completion March 31 2015</td>
<td></td>
</tr>
<tr>
<td>1. Forest Fire Danger Index for the Australian Alps</td>
<td></td>
</tr>
<tr>
<td>2. Soil Dryness index</td>
<td></td>
</tr>
<tr>
<td>3. Drought Factor</td>
<td></td>
</tr>
<tr>
<td>4. Water availability</td>
<td></td>
</tr>
<tr>
<td>5. Growing Degree Days</td>
<td></td>
</tr>
<tr>
<td>6. Future climate suitability for a range of invasive species in the Alps</td>
<td></td>
</tr>
<tr>
<td>Distribution models for species for Tasmanian refugia completed (eucalypt species, grassland framework species and communities</td>
<td></td>
</tr>
<tr>
<td>Output 28: Complete</td>
<td></td>
</tr>
<tr>
<td>Output 29: Will be complete and delivered March 31 2015</td>
<td></td>
</tr>
<tr>
<td>Development of interpolated products (1 km monthly and bioclim variables) and available at TPAC CFA thredds server (<a href="http://cfa0.rdsi.tpac.org.au/thredds/catalog.html">http://cfa0.rdsi.tpac.org.au/thredds/catalog.html</a>) and (<a href="http://cfa1.rdsi.tpac.org.au/repository.html">http://cfa1.rdsi.tpac.org.au/repository.html</a>) along with all the other products available there.</td>
<td></td>
</tr>
<tr>
<td>Additional outputs:</td>
<td></td>
</tr>
<tr>
<td>Collaboration with P2, analysis of adaptive capacity in the Midlands and the implications of changing grassland distribution (complete)</td>
<td></td>
</tr>
<tr>
<td>Alps ecological impacts workshop (being discussed with Parks Victoria and AALC, but likely to be after 31 March 2015)</td>
<td></td>
</tr>
</tbody>
</table>

**Contracted Hub Partners and Department of the Environment staff**

Alex Lechner – connectivity modelling workshops
Lu Porfirio, Sonia Hugh, Brendan Mackey, Lauren Carter, Sue Gould (SDMs, uncertainty, MCAS-S, metadata)
Michael Lockwood, Chris Raymond, Alex Lechner (policy implications of grassland modelling; adaptive capacity in the Midlands)
Nick Beeton, Chris Johnson (vertebrate species modelling)
Louise Gilfedder, Oberon Carter (grassland modelling)
Reg Magierowski, Dan Warfe (freshwater and climate change)
Ross Rowe (application of species distribution modelling)
### Theme 3: Ecological Futures

#### PROJECT 5: Climate Futures – (Prof Nathan Bindoff)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
</table>
| **External collaborations** – other stakeholders, agencies | Department of Premier and Cabinet, Climate Change Office  
SCARP (Kerry Bridle, Peat Leith, Andrew Harwood)  
Michael Grose, CSIRO  
Tasmanian Land Conservancy (Daniel Sprod) – identifying refugia in Tasmania  
DPIPWE (Felicity Faulkner – community modelling; Rhys Stickler, Matt Webb- enterprise suitability mapping; Jayne Balmer – vegetation responses to fire)  
NRM groups (Andrew Baldwin, Luke Diddams, Ernst Kemmerer)  
Jeremy Vanderwal (vertebrate species modelling)  
Darren Kriticos, CSIRO (CLIMEX modelling) |
| **Presentations/Conferences** | American Ecological Society Meeting, Sacramento (10-16 Aug)  
The 2014 Australian Academy of Science Theo Murphy Think Tank (23-25 Jul)  
Presentation of Climate Futures for the Australian Alps results to the Australian Alps Climate Change Reference group meeting (12 Nov)  
Tasmania Stakeholder Forum (10 Dec)  
| **NERP Cross Disciplinary Meetings/Workshops** (within our hub or with other NERP Hubs) | Midlands connectivity meeting (28 Jul)  
The August Forum (13-15 Aug) |
### Theme 3: Ecological Futures

#### PROJECT 5: Climate Futures – (Prof Nathan Bindoff)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata completed for the following datasets</td>
<td></td>
</tr>
<tr>
<td>Productivity Indices for current and future climate conditions in Tasmania (10/07/2014)</td>
<td></td>
</tr>
<tr>
<td>Current and Future Climate Suitability Maps for the Tasmanian Lowland Grassland Communities (10/07/2014)</td>
<td></td>
</tr>
<tr>
<td>Climate Futures for the Australian Alps. Downscaled regional climate data at 5km resolution (31/10/2014)</td>
<td></td>
</tr>
<tr>
<td>Ptunarra Brown Butterfly Species Distribution Models (with P4) (05/12/2014)</td>
<td></td>
</tr>
<tr>
<td>King Billy Pine Species Distribution Models (with P4) (05/12/2014)</td>
<td></td>
</tr>
</tbody>
</table>
### Theme 3: Ecological Futures

#### PROJECT 6: Wildlife - (Prof Chris Johnson)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 19</strong></td>
<td>Refined species distribution models that include the effects of weather-induced local scale variability.</td>
</tr>
<tr>
<td><strong>Output 20</strong></td>
<td>Fine-scale mapping of stable refugia based on historical weather variability.</td>
</tr>
<tr>
<td><strong>Output 21</strong></td>
<td>Projection of locations of refugia under future climate and weather scenarios.</td>
</tr>
<tr>
<td><strong>Output 32 (in collaboration with P4)</strong></td>
<td>Comparative analysis of projected threats to persistence of vertebrates in the 2 case study regions under future spatial patterns of climate change and climate variability, including likely changes in land use and invasive exotic species.</td>
</tr>
</tbody>
</table>

**STATUS:** not quite complete, but good progress made towards completion, with a commitment to complete after the conclusion of the hub.

**Output 19 and 20.** complete

**Output 21.** complete

**Output 32:** Incomplete - Work is continuing on these analyses with assistance from outputs 19–21 which are ongoing, due to some necessary updates to the current versions. Work has been done and demonstrated for a number of vertebrates, particularly mammals and skinks, and collaborations are ongoing with external stakeholders to ensure that they are also able to complete their own analyses for conservation management purposes. A paper on part of this work (modelling variation in the climate niche of the eastern bettong) is in review with the journal Biological Conservation. We are planning an analysis of trends in trophic structure of Tasmanian vertebrates in relation to environmental productivity (NPP) and other climatic and landscape factors, as an extension of our species distribution models. Work has started on this project, which should be completed by the end of 2014.

The output is not quite complete, for a number of reasons:

- The large amount of interest from external stakeholders has meant that much of our emphasis is on making the data easily accessible and interpretable for them, in order for them to complete their own analyses.
- The large datasets used to complete outputs 19–21 and some issues experienced by our collaborators have meant that we are experiencing delays and awaiting a new version of the outputs for final results.

Work on modelling for invasive exotic species has continued for the previous two years as an additional output. The modelling tool has now developed to the point that it is useful not only for evaluating scenarios of population change and management of particular invasive species (and has been used in this way for feral horses in the Australian Alps, deer in Tasmania, and orange hawkweed in both regions) but also as a general tool for external use.

**Additional Outputs Completed:**

**Modelling of future growth in abundance and distribution of fallow deer in Tasmania:** This paper has been accepted and published in Wildlife Research, and a talk given on the topic at the 10th Australasian Plant Conservation Conference in Hobart, November 2014.
### Theme 3: Ecological Futures

**PROJECT 6: Wildlife - (Prof Chris Johnson)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modelling Invasive species</strong>: A paper demonstrating the use of SPADE as a general tool for modelling the spatial spread and management of invasive animals (see above) is currently under review with <em>Methods in Ecology and Evolution</em>. The editors have issued an apology for delays in the review process, and feedback is expected within the next month.</td>
<td></td>
</tr>
<tr>
<td><strong>Errors in SDM paper</strong>: This paper has now been accepted and published in <em>Ecology and Evolution</em>.</td>
<td></td>
</tr>
<tr>
<td><strong>Distribution modelling of skinks</strong>: Though this paper is still waiting on co-authors for submission, a related work has been accepted and is currently in press with <em>Proceedings of the Royal Society B</em> regarding adaptive incubation of skinks.</td>
<td></td>
</tr>
<tr>
<td><strong>Mechanistic modelling of skink distribution</strong>: This project is now almost complete and should be finished by 31 March 2015.</td>
<td></td>
</tr>
<tr>
<td><strong>Epidemiological modelling of Ross River virus</strong>: Funding has been acquired, work has begun, and will be completed in the coming months.</td>
<td></td>
</tr>
<tr>
<td><strong>Marsupials as ecosystem engineers PhD study</strong>: This work is progressing well but is not complete, as the PhD student suspended candidature from Sep-Dec 2014 for family reasons. Field work should be completed in mid-2015, and papers prepared for publication during 2015, and thesis submission – Sept 2015.</td>
<td></td>
</tr>
<tr>
<td><strong>Optimal monitoring for presence-only Species Distribution Models</strong>: Preliminary results have been prepared and a manuscript should be submitted by end of March.</td>
<td></td>
</tr>
</tbody>
</table>
| **Engagement with Department of the Environment and other partners**  
  Department of Environment (Karen Watson, Jeremy Groves) |
| **External collaborations – other stakeholders, agencies**  
  Australian Alps Liaison Committee  
  Forest Practices Authority (Amy Koch, Sarah Munks)  
  Forestry Tasmania (Marie Yee)  
  Natural Resource Planning (Rod Knight)  
  Bush Heritage (Matthew Appleby)  
  Department of Primary Industries, Parks, Water and Environment, TAS (Karen Richards, Clare Hawkins, Matthew Pauza, David Pemberton, Felicity Faulkner, Sophia Callander, Shannon Troy, Greg Hocking, David Leguis, Michael Driessen, Naomi Lawrence)  
  Parks Victoria (Charlie Pascoe, Dan Brown, Dale Appleton, Roger Fenwick)  
  Environment NSW (Duane Shawcross) |
Theme 3: Ecological Futures

**PROJECT 6: Wildlife - (Prof Chris Johnson)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment ACT (Oliver Orgill, Stephen Hughes, Shelley Swain, Ben Stevenson)</td>
<td></td>
</tr>
<tr>
<td>Tasmanian Land Conservancy (Sally Bryant)</td>
<td></td>
</tr>
<tr>
<td><strong>NERP Cross Disciplinary Meetings/Workshops</strong> (within our hub or with other NERP Hubs)</td>
<td></td>
</tr>
<tr>
<td>The August Forum (13-15 Aug)</td>
<td></td>
</tr>
<tr>
<td>Australian Alps / NERP LaP Hub briefing (20 Oct)</td>
<td></td>
</tr>
<tr>
<td><strong>Activities for other stakeholders</strong> – meetings/workshops organised/attended</td>
<td></td>
</tr>
<tr>
<td>Tasmania Stakeholder Forum (10 Dec)</td>
<td></td>
</tr>
<tr>
<td><strong>Presentation/Briefing/Conferences:</strong></td>
<td></td>
</tr>
<tr>
<td>A SPADE demonstration on 31 Jul to the Department of Primary Industries, Parks, Water and Environment.</td>
<td></td>
</tr>
<tr>
<td><em>Predicting the future range and abundance of fallow deer in Tasmania, Australasian Plant Conservation Conference (12 Nov)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Management Tools and Models provided</strong></td>
<td></td>
</tr>
<tr>
<td>SDM uncertainty model, published with <em>Ecology and Evolution</em> paper above</td>
<td></td>
</tr>
<tr>
<td>Development versions of SPADE provided to various individuals within agencies</td>
<td></td>
</tr>
</tbody>
</table>
### Theme 3: Ecological Futures

#### PROJECT 7: Vegetation and Fire – (Prof David Bowman)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 22:</strong> Analysis of the likely implications of fine scaled climate projections on fire frequency and intensity for the whole of Tasmania.</td>
<td>STATUS: Complete</td>
</tr>
<tr>
<td><strong>Output 23:</strong> Analysis of 'at risk' plant communities in the Tasmanian Midlands case study area.</td>
<td>Output 22: Complete - produced by the Climate Futures team (Paul Fox-Hughes) with input from us – completed and published.</td>
</tr>
<tr>
<td><strong>Output 24:</strong> A summary map product for fire management prioritisation based on outputs 22 and 23 and web delivery tool.</td>
<td>Output 23: Complete - Analysis of climate projections on eucalypt cover completed and published.</td>
</tr>
<tr>
<td><strong>Output 30: (in collaboration with P4)</strong> Modelled potential impacts of climate change on fire regimes in Tasmania and the Greater Alps and consequences for vegetation, habitat resources and focal species.</td>
<td>Output 24: Completed in collaboration with the State Fire Management Council</td>
</tr>
<tr>
<td><strong>Output 30: (in collaboration with P4)</strong> Comparative analysis of fire activity in mainland temperate forests to understand the climate, topographic vegetation and land management factors that cause mega fires and relate this knowledge to Tasmania and the Alps to generate plausible fire risk scenarios.</td>
<td>Output 30 – mostly complete</td>
</tr>
</tbody>
</table>

Three papers as part of Louise Romanin’s PhD are incomplete. They will be completed by December 2015. They have been delayed as drafting is more difficult than anticipated. All data is collected, one paper is near completion, the second is part drafted, the third will be the focus of 2015.

The midlands work has not been as productive as the alps work yet, with much of it hinging on Louise Romanin’s PhD (that has been extremely well supported by NERP – field research and lab work).

Realistically, Louise will get one paper submitted before the end of the NERP program but Lynda and I will soldier on to get the last remaining two paper from there thesis completed (pollen and charcoal showing land cover change c. pre and post 1800, and demographic changes to trees in response to land use history).

Because it was obvious Louise was struggling, Lynda and I organise a separate field program in 2013 and we will produce a paper on the effect of fire on tree demography and fuels in forest fragments before NERP ends.

<table>
<thead>
<tr>
<th>Output 31 – complete</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>There is one more paper to come from our alps work. This will be led by Brett Murphy.</td>
<td></td>
</tr>
<tr>
<td>We have sourced a very fine scaled meteorological/fire weather data set and land use history to study how the 2003 and 2007 alpine fires varied in response to weather and land use and their interaction. I have explained to Brett this must be completed by March 31. This is the fourth of our alps series.</td>
<td></td>
</tr>
</tbody>
</table>

**Additional outputs completed:**

**NASA**

At the outset there has been some crossover between the NASA and NERP projects. We have a series of papers queued up and expect one to be completed before the end of NERP on continental patterns in flammability. Last year we produced a precursor paper based on a colleagues data written before he passed away from cancer. We made that deadline, just.

**SW Tasmania and Clarke Island**
### Theme 3: Ecological Futures

**PROJECT 7: Vegetation and Fire – (Prof David Bowman)**

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>NERP has generously supported two of my Hons students.</td>
<td>Ben French did a nice honours project on the impact of the 2013 fire and we plan to write this up before June 2015.</td>
</tr>
<tr>
<td>Aine Nicholson is doing an honours project on the severe fire on Clarke Island /lungatalan.</td>
<td></td>
</tr>
</tbody>
</table>

**Outputs to be complete by Dec 2015**
Papers as part of Louise Romanin’s PhD, for submission before Dec 2015:
- Trajectory of land cover and above ground carbon stocks following the transition from hunter-gatherer estates to a Neo-European agricultural landscape in the Midlands of Tasmania, Australia
- Vegetation and fire regime change in the Midlands over the last 400 years.
- Land use history and its impacts on the demographics of remnant vegetation in the Midlands.

**Cross-disciplinary & Integration**
The August Forum (13-15 Aug)

**Presentation/briefings**
- Ecological Society of Australia (ESA) Conference, Alice Springs. Poster

**Media**
- David Bowman reports that he has done a lot of media on all these projects but can’t keep track of all of it.
### Theme 3: Ecological Futures

#### PROJECT 8: Freshwater Ecosystems – (Prof Peter Davies)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output 25:</strong></td>
<td>STATUS: Complete</td>
</tr>
<tr>
<td>a) Preliminary analysis of</td>
<td>Midlands freshwater</td>
</tr>
<tr>
<td>relationships between past</td>
<td>conservation prioritisation</td>
</tr>
<tr>
<td>interventions, ecosystems</td>
<td>modelling completed</td>
</tr>
<tr>
<td>process and the distribution</td>
<td>and results analysed.</td>
</tr>
<tr>
<td>and abundance of selected</td>
<td>Adaptation actions scoped.</td>
</tr>
<tr>
<td>species and</td>
<td>Paper draft started.</td>
</tr>
<tr>
<td>b) relationships established</td>
<td>Midlands MCAS-S model for</td>
</tr>
<tr>
<td>between past interventions,</td>
<td>freshwater refugia and</td>
</tr>
<tr>
<td>ecosystems process and the</td>
<td>technical report covering</td>
</tr>
<tr>
<td>distribution and abundance</td>
<td>how to use the model</td>
</tr>
<tr>
<td>of selected species on</td>
<td>(MCAS-S Freshwater refuge</td>
</tr>
<tr>
<td>modelling recent historical</td>
<td>Datapack) are complete.</td>
</tr>
<tr>
<td>changes to water and land</td>
<td>Alpine bogs MCAS-S model</td>
</tr>
<tr>
<td>management in the Tasmanian</td>
<td>and technical report</td>
</tr>
<tr>
<td>Midlands and Greater Alps</td>
<td>covering how to use the</td>
</tr>
<tr>
<td>case study areas.</td>
<td>model (MCAS-S Alpine bogs</td>
</tr>
<tr>
<td></td>
<td>Datapack) are complete.</td>
</tr>
<tr>
<td></td>
<td>However, we are waiting</td>
</tr>
<tr>
<td></td>
<td>on a single data layer</td>
</tr>
<tr>
<td></td>
<td>from the Climate Futures</td>
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<tr>
<td></td>
<td>team before finalising the</td>
</tr>
<tr>
<td></td>
<td>documentation</td>
</tr>
<tr>
<td></td>
<td>The project conducted for</td>
</tr>
<tr>
<td></td>
<td>the Australian Alps Liaison</td>
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<tr>
<td></td>
<td>Committee has been</td>
</tr>
<tr>
<td></td>
<td>completed and results</td>
</tr>
<tr>
<td></td>
<td>were presented at a</td>
</tr>
<tr>
<td></td>
<td>workshop in Canberra for</td>
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<tr>
<td></td>
<td>DoE and ACT &amp; NSW Parks.</td>
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<tr>
<td></td>
<td>A second presentation is</td>
</tr>
<tr>
<td></td>
<td>planned for Parks Victoria</td>
</tr>
<tr>
<td></td>
<td>staff in 23 Mar 2015 to</td>
</tr>
<tr>
<td></td>
<td>present the final report.</td>
</tr>
<tr>
<td></td>
<td>2 datasets and metadata</td>
</tr>
<tr>
<td></td>
<td>records have been submitted</td>
</tr>
<tr>
<td></td>
<td>to the AEKOS data portal.</td>
</tr>
<tr>
<td></td>
<td>One has been accepted and</td>
</tr>
<tr>
<td></td>
<td>published (although there</td>
</tr>
<tr>
<td></td>
<td>is an embargo on the data</td>
</tr>
<tr>
<td></td>
<td>until our PLOS ONE paper</td>
</tr>
<tr>
<td></td>
<td>is accepted) and the second</td>
</tr>
<tr>
<td></td>
<td>is still under review.</td>
</tr>
<tr>
<td></td>
<td>31 datasets and metadata</td>
</tr>
<tr>
<td></td>
<td>records for MCAS-S data</td>
</tr>
<tr>
<td></td>
<td>layers have been prepared</td>
</tr>
<tr>
<td></td>
<td>and will be submitted to</td>
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<tr>
<td></td>
<td>the LaP office for</td>
</tr>
<tr>
<td></td>
<td>review once we have</td>
</tr>
<tr>
<td></td>
<td>received the last layer</td>
</tr>
<tr>
<td></td>
<td>needed from the Climate</td>
</tr>
<tr>
<td></td>
<td>Futures team (bias-corrected</td>
</tr>
<tr>
<td></td>
<td>radiation data).</td>
</tr>
<tr>
<td></td>
<td>(Jan 2015)</td>
</tr>
<tr>
<td>**Additional outputs</td>
<td></td>
</tr>
<tr>
<td>completed:**</td>
<td></td>
</tr>
<tr>
<td>LaP hub summary documents</td>
<td>on Bayesian Network</td>
</tr>
<tr>
<td>on Midlands conservation</td>
<td>validation (#27) and MCAS-S</td>
</tr>
<tr>
<td>prioritisation and</td>
<td>for ecologists.</td>
</tr>
<tr>
<td>management implications.</td>
<td>2 LaP hub summary documents</td>
</tr>
<tr>
<td></td>
<td>freshwater refuges (#33)</td>
</tr>
<tr>
<td></td>
<td>and alpine bogs.</td>
</tr>
</tbody>
</table>

**External collaborations** – other stakeholders, agencies
- DPIPWE Tasmania Water Branch hydrological modelling and water management planning (Bryce Graham, Martin Read)
- Australian Alps Liaison Committee including the Water & Catchments and Climate Change committees
- Alpine Bog Recovery Plan Steering Committee (led by Karen Watson)
- Parks Victoria (Dan Brown, Andrew Nixon, Elaine Thomas & Tamara Boyd)
- NSW National Parks and Wildlife Service (Genevieve Wright, Geoff Hope)
- ACT government (Lisa Evans)
- DPIPWE Tas – MCAS-S workshop, Midlands modelling, Hydrology modelling
- Australian Ocean Data Network metadata specialist (Natalia Atkins)
### Project 8: Freshwater Ecosystems – (Prof Peter Davies)

#### Milestones identified in AWP

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presentations/Conferences</strong></td>
<td>Ecological Society of Australia poster presentation at annual conference (Oct 2014)</td>
</tr>
</tbody>
</table>
| **NERP Cross Disciplinary Meetings/Workshops** (within our hub or with other NERP Hubs) | The August Forum (13-15 Aug)  
Multiple meetings with Danielle Warfe and John Tisdell who has used outputs from the conservation prioritisation and freshwater refuge modelling in her economic models.  
David Bowman, Ben French and Grant Williamson – alpine bogs and fire projects (August and Dec 2014)  
Tom Remenyi – Climate Futures projections for the alps. |
| **Activities for the Department of the Environment or contracted hub partners** | Birrigai, Canberra presentation Alpine bogs MCAS-S datapack (14 Oct 2014). |
| **Activities for other stakeholders** – meetings/workshops organised/attended | Tasmania Stakeholder Forum (10 Dec)  
Birrigai, Canberra presentation Alpine bogs MCAS-S datapack (14 Oct 2014). |
| **Management Tools and Models provided** | 2 MCAS-S datapacks complete with manuals, datafiles and worked examples for alpine bogs and freshwater refuges in the Tasmanian midlands. |
| **Datasets provided (with whom) or made public** | Biological and physical data collected from river sites selected across a gradient of catchment area under grazing in northern Tasmania (2015) \[http://portal.aekos.org.au/dataset/179429\]  
Results from a stream mesocosm experiment designed to distinguish the influence of fine sediment loads and nutrient concentrations on benthic macroinvertebrate and algal communities (submitted) to Aekos. |
| **Metadata completed for the following datasets** | Biological and physical data collected from river sites selected across a gradient of catchment area under grazing in northern Tasmania (2015) \[http://portal.aekos.org.au/dataset/179429\]  
Results from a stream mesocosm experiment designed to distinguish the influence of fine sediment loads and nutrient concentrations on benthic macroinvertebrate and algal communities (submitted) to Aekos. |
Additional Studies: Regional Sustainability Planning

### Study RSP A: Community Values - (Prof Allan Curtis)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STATUS: Study completed September 2013</td>
</tr>
</tbody>
</table>

### Study RSP B: Knowledge Manager - (Prof Ted Lefroy)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Milestone #8: Workshop #5</strong></td>
<td>STATUS: Complete</td>
</tr>
<tr>
<td><strong>Milestone #9</strong> – draft synthesis report (due Mar 2015)</td>
<td>Milestone #8 - Workshop 5 - Sustainable Tourism Seminar and Q Sort methodology (23/24 July 2014) by Anne Hardy</td>
</tr>
<tr>
<td><strong>Milestone #10</strong> – Final Synthesis report (due May 2015)</td>
<td>Additional Workshops: GAP CloSR - seminar/meetings with staff of 24 Nov 2014 and tutorial on 10 Feb</td>
</tr>
<tr>
<td></td>
<td>Draft synthesis report – making good progress for submission for review.</td>
</tr>
</tbody>
</table>

### Additional Studies: Regional Sustainability Planning

### Study RSP C: Wildlife Corridors - (Prof Ted Lefroy)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Milestone #7:</strong> Draft protocol report on Tasmanian Midlands due September 2014</td>
<td>STATUS: Progressing well due to deliver final report, manuals and documentation delivered Jan 2015</td>
</tr>
<tr>
<td><strong>Milestone #8</strong> - final report presented to steering committee (due 15 Nov 2014)</td>
<td>Milestone #7 – draft report on the application of the wildlife corridor protocol to the Tasmanian Midlands delivered Jan 2015</td>
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<td>Milestone #8 - final report presented to steering committee (due 15 Nov 2014) – delivered</td>
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</table>

**PROGRESS AGAINST OUTPUTS:**

Research users meeting (29 July) and departmental seminar (31 Jul) for the Tasmanian Department of Primary Industries, Parks, Water and Environment on the GAP-CloSR modelling framework for regional scale connectivity analysis.

A meeting in Newcastle to assist the Hunter and Central Coast Regional Environmental Management group develop their ‘Regional Conservation Assessment, and Regional Biodiversity Conservation Strategy and Implementation Plan for the Hunter, Central and Lower North Coast Region’. A key focus is integrating the outputs of the connectivity analysis of the
Additional Studies: Regional Sustainability Planning

Study RSP C: Wildlife Corridors - (Prof Ted Lefroy)

<table>
<thead>
<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
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<td>Hunter using the GAP CloSR connectivity model with the biodiversity priorities identified by researchers Environmental Decisions Hub researchers (Amy Whitehead and Heini Kujala) using the zonation systematic conservation planning tool. (6 August 2014) A paper on GAP CloSR was presented to the American Ecological Society Meeting in August 2014: ‘A connectivity modelling approach for land use planners applied to regional conservation planning in the Lower Hunter, Australia’ Development of a ‘GUI’ for the GAP CloSR connectivity model (developed with Michael Lacey – UTAS). A GUI is a graphical user interface that helps people unfamiliar with geographic information systems and spatial statistics to operate the connectivity model on desktop computers. The GUI helps it run on a standard desktop computer using readily available GIS software and spatial data. Presented the final results of the GAP CloSR modelling to the Tasmanian end–user working group (29 October 2014). Presented the final results for the Tasmanian Midlands connectivity analysis using GAP CloSR in Canberra to the study’s advisory committee and also met with the Environmental Resources Information Network (ERIN)) to discuss the potential for the GAP CloSR tool to be used by this group for conservation planning (24 November 2015). Presented a NERP Seminar in Canberra attended by 25 people (25 November 2014). Liaised with Environmental Decisions Hub researchers, Heini kujala and Amy Whitehead at Melbourne University to develop a technique for combining Zonation (a systematic conservation planning software) and GAP CloSR for identifying priority areas for conservation. Alex also liaised with Pia Lentini (also from the ED Hub) at Melbourne University to work on integrating GAP CloSR outputs within a Population Viability Analysis for the Southern Brown Bandicoot in the Greater Melbourne region (26-27 Nov 2015). Delivered a Gap CloSR tutorial for Tasmanian based stakeholders (12 December 2014.) Delivered the final report Jan 2015</td>
</tr>
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Study RSP D: Sustainable Tourism - (Dr Anne Hardy)

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<tr>
<th>Milestones identified in AWP</th>
<th>Progress against milestone</th>
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<tr>
<td>Milestone #6: Final report (delivered Jul ‘14)</td>
<td>STATUS: 100% complete Milestone #6: Final report (due June 2014 – delivered draft 22 July 2014, online January 2015) PROGRESS AGAINST OUTPUTS:</td>
</tr>
</tbody>
</table>
### Additional Studies: Regional Sustainability Planning

#### Study RSP D: Sustainable Tourism - (Dr Anne Hardy)

<table>
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<tr>
<th>Milestones identified in AWP</th>
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<tr>
<td>Draft final report lodged (15 Jul 2014)</td>
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<tr>
<td>Final Briefing to Steering Committee (22 Jul 2014)</td>
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<tr>
<td>Departmental Seminar and methods workshop (23 Jul) – four page summary prepared to support events.</td>
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<tr>
<td>Communication and Distribution Plan drafted and approved (December 2014).</td>
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<tr>
<td>Report available online – (24 Dec 2014)</td>
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<tr>
<td>Post-review changes completed (Dec 2014)</td>
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<tr>
<td>Four-page summary updated (January 2015)</td>
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<td>Printed copies distributed (January 2015)</td>
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<tr>
<td>Radio Interview with ABC local radio (Hobart 936) (January 2015)</td>
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<tr>
<td>Submission of two research articles to Annals of Tourism Research and Journal of Sustainable Tourism (December 2014)</td>
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<tr>
<td>Presentation of research to 2015 CAUTHE Conference, Gold Coast (February 2105)</td>
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#### Study RSP E: Adaptive Project Management - (Dr Nikki Mazur)

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<tr>
<th>Milestones identified in AWP</th>
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<tr>
<td>STATUS: Study completed December 2013</td>
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Hub Acknowledgements

The Landscapes and Policy Research Hub was supported through funding from the Australian Government’s National Environmental Research Program. Hosted by the University of Tasmania, it involved researchers from the University of Tasmania (UTAS), The Australian National University (ANU), Murdoch University and the Antarctic Climate & Ecosystems Cooperative Research Centre (ACE CRC), Griffith University and Charles Sturt University (CSU).

Scientific leadership and contributions were from a consortium of schools from these organisations, including: UTAS Centre for Environment, UTAS School of Geography and Environmental Studies, UTAS School of Economics and Finance, Murdoch University School of Veterinary and Life Sciences, The ANU Fenner School of Environment & Society, ACE CRC Climate Futures, UTAS School of Zoology, UTAS School of Plant Science - Environmental Change Biology Group, Griffith University Griffith Climate Change Response Program and CSU Institute for Land and Water Society.

www.nerplandscapes.edu.au

Enduring Hub Contact:
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