SCOPING REMOTE NORTH AUSTRALIAN COMMUNITY RESILIENCE AND DEVELOPING GOVERNANCE MODELS THROUGH ACTION RESEARCH

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EXECUTIVE SUMMARY

The '*Scoping remote northern Australia resilience*' project is part of a larger suite of Bushfire and Natural Hazards CRC projects being undertaken through Charles Darwin University. Collectively, these projects aim to promote enhanced understanding of the special circumstances concerning resilience issues in remote Indigenous communities, and identify culturally appropriate governance arrangements and enterprise opportunities that can contribute to enhancing community development and resilience.

This report addresses two sets of project activities:
(a) community-based studies undertaken in association with remote Indigenous communities in Arnhem Land
(b) over-arching activities addressing broader stakeholder and community engagement

(a) Community-based studies

(1) in-depth consultations undertaken by the Aboriginal Research Practitioners Network (ARPNet—a collective of Indigenous community researchers) addressing bushfire and natural hazard threats and issues at two large (>1000 persons) remote Arnhem Land communities, Gunbalanya and Ngukurr;

(2) major desk-top assessments undertaken by the North Australian Land & Sea Management Alliance (NAILSMA) addressing (a) mapping of 'hard' and 'soft' infrastructure assets at Gunbalanya and Ngukurr, (b) a literature review of our current understanding of remote community resilience in northern Australia;

(3) ongoing assessment of appropriate Indigenous community governance expectations and developments at the Galiwinku community (Elcho Island), in the aftermath of Cyclones Lam and Nathan in early 2015

(4) preliminary assessments of the value of ecosystem services (ES), and derived payment for environmental services (PES) opportunities, at Gunbalanya and Ngukurr, and more broadly on the Indigenous estate in northern Australia.

(b) Stakeholder and community engagement

(1) initiation of discussions with emergency management agencies, particularly those concerned with addressing Indigenous resilience issues and arrangements across northern Australia

(2) substantial work undertaken towards the development of a book addressing north Australian Indigenous resilience and sustainability issues, due for publication in 2017.

In respective sections addressing what the project has been up to, the report also describes proposed activities for the year ahead.

ELEVATOR PITCH

The problem:

Remote north Australian communities are susceptible to cyclones, floods and bushfires. Cultural and socio-economic factors combine with the challenges of remote service delivery (cost, low levels of infrastructure, and distance from the urban centres which host key service delivery organisations) to create situations where communities can be highly vulnerable to natural hazard events. In this context, it is important to understand how these variables can be navigated to enhance community resilience. This task requires a detailed understanding of current capacities, preparation and response strategies, communication pathways and local governance structures.

Additionally, a critical challenge for enhancing community resilience is to developing culturally appropriate, environmentally sustainable economic opportunities. The lack of wealth generation at the local level impedes community capacity to develop infrastructure, build human capital through training and experience of the workplace.   As a consequence most policy initiatives seek to address 'subsistence' level issues, failing to prioritise preparation for BNH events. The ability of these communities to respond in a coordinated way at an appropriate scale is largely non-existent.

Why it is important:

The existing body of academic literature on resilience contains limited material which deals with remote Australia. By and large, this literature raises the need to foster greater community engagement and empowerment, and implement better communication and awareness strategies addressing preparedness and response in emergency management. This work however provides limited examples of current arrangements or how such goals can be realised, including the implementation of (1) culturally appropriate governance models, supported by (2) responsive, well-informed policy settings, and (3) culturally relevant, novel climate mitigation and related ecosystem / environmental services economies.

Addressing the problem: As part of the broader suite of projects addressing *Building community resilience in northern Australia*, this project comprises two complementary programmes which respectively address:

(a) Scoping resilience issues in remote Indigenous communities: This component comprises three research strands.

- The Aboriginal Research Practitioners Network (ARPNet) consists of Indigenous researchers trained in Participatory Action Research. They have worked initially in two Northern Territory communities (Ngukurr and Gunbalanya) to document community understandings of natural hazards, risks, current response strategies and community capacity.
- At these same study sites, the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) has mapped the hard, institutional and cultural assets which underpin local capacity and the delivery of emergency services (and which are at risk during a hazard).

- The Research Institute for Environment and Livelihoods (RIEL) at CDU will work with community members and end users to explore the challenges faced by agencies in the delivery of emergency services to remote communities.

The project team will then work collaboratively to identify where community and agency understandings/expectations converge and diverge, and areas of community capacity which can be built on to enhance community safety.

(b) Developing economic resilience through payments for environmental services projects:

- articulating key contemporary terrestrial land use management, institutional, and policy challenges facing Indigenous people and local communities in north Australian savanna regions
- exploring opportunities afforded through emerging economies related to climate change mitigation, carbon trading, and ecosystem services to help address identified challenges
- undertaking rigorous valuation of Ecosystem Services (ES) to be derived from savanna landscapes of northern Australia, and associated scenario modelling of Payment for Environmental Service (PES) benefits which can be derived from emerging land-use options (e.g. savanna burning, carbon sequestration, diversified / mixed pastoral management activities, environmental stewardship arrangements)
- identifying beneficial culturally appropriate institutional / governance arrangements which can effectively support community development and resilience aspirations providing authoritative analysis of above findings to help inform Indigenous community policy development and community resilience outcomes in northern Australia

END USER STATEMENT

Suellen Flint, Director Community Engagement, Department of Fire and Emergency Services, WA.

The 'scoping remote northern Australia resilience' project involves three complementary sub projects that collectively aim to promote an enhanced understanding of resilience issues in remote Indigenous communities and identify culturally appropriate governance and economic opportunities that lead to enhanced community development and resilience.

Over the last year the project team has increased the opportunity for engagement and collaboration with participants from Queensland, Northern Territory and Western Australia.

This conversation extended to the recent Research Advisory Forum in Hobart was connections were formed with key stakeholders driving the national resilience agenda, with engagement resulting in a deeper understanding and commitment to supporting the project.

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INTRODUCTION AND PROJECT BACKGROUND

A first distinguishing, if often overlooked, demographic feature of the northern savannas is that, outside of the cities and towns, most northern savanna residents are Indigenous and, although 'land rich', are impoverished—and these trends are projected to exacerbate over coming decades. Nearly 45% of the north Australian community are Indigenous and the majority of these live in remote communities which are susceptible to major cyclones, floods and bushfires. Despite this, most are ill-served by existing emergency services. While these communities have significant Indigenous and local knowledge allowing them to understand and interact with their traditional estate, poor health, under-investment in infrastructure, restricted communication services and flawed governance models heighten vulnerability to the (increasing) array of natural hazards extant across the region. Current government services appear ill equipped to deal effectively with BNH events now and there is no clear path for improvement in the foreseeable future.

At the same time it will be prohibitively expensive to attempt to replicate the urban service model in remote communities. More importantly, such an attempt may not match the needs, capabilities and expectations of remote Indigenous communities: north Australia is replete with examples of development projects in remote communities that have failed due to poor communication in the planning phase, a failure to consult to achieve culturally sustainable outcomes and the mismatch of resources to requirements. A key question then is what service models can be employed to facilitate greater resilience in the context of Australia's remote Indigenous north?

Resilience is broadly seen as a capacity to respond to and 'bounce back' from a major natural hazard. Remote communities are generally seen as 'vulnerable' because of poverty, poor health, low education levels, and the lack of services and infrastructure associated with their isolation from major urban centres. Remoteness, and cultural and linguistic diversity, compound the issue of poor communication between communities and the structures of political representation, resource allocation, and service provision which are centred in the city.

Current Australian policy positions resilience as "the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals". It describes "a disaster resilient community" as "one that works together to understand and manage the risks that it confronts" (National Strategy for Disaster Resilience, COAG, p iii). In a remote Indigenous setting, the risks which need to be managed are different to those affecting other locales, as are the capacities of local communities. 'Working together' in such settings requires different kinds of partnerships and response structures. This unique context underpins the rationale for the *Scoping Resilience* project.

Community resilience among Indigenous communities in remote areas is a complex and challenging concept. An appreciation of the complex nature of Aboriginal circumstance, lifestyle and history is crucial for the project. For example, initial discussions at a focus group meeting to plan for the project elicited such as *"them mob government worrying for natural hazards when being in a community is hazardous itself"*, suggesting complexities inherent to how Indigenous people view natural hazards vis a vis the hazards they face in daily life. The notion that hazards may be punishments from ancestors for people because they failed to look after country or are not living on country is also very strong. The belief that hazards can be minimised, stopped or averted with good natural resource management presents an interesting dimension to this work, and may represent an emerging space for developing mitigation and preparation/response strategies which bring both Indigenous and Western knowledge systems together. While approaches to 'resilience' often emphasise such contextual dynamics, little research exists which un-packs these complexities in detail, as they play out in remote Indigenous Australian communities.

A second set of issues addressed by this project is to explore the extent to which remote community resilience can be enhanced through development of culturally appropriate, environmentally sustainable, land and sea management economic opportunities. While it is apparent that some Indigenous savanna residents, especially those with educational and training qualifications, may take up mainstream employment opportunities (e.g. in mining, tourism, service, defence, and pastoral sectors), many others exercise other priorities including, in remote communities especially, cultural responsibilities to country. The reality is that for many Indigenous savanna residents the Gap will remain. Indigenous land owners are massive and ongoing investors of in-kind services to land and socio-cultural management. Building on this and substantial investment in more formalised Indigenous land and sea management programs (e.g. Working on Country's ranger program, Indigenous Protected Areas, the ILC's pastoral employment programs), an evident challenge for building resilience in regional and remote Indigenous communities is to support ongoing development of Indigenous environmental services enterprises.

Currently, however, there is a major mis-match between these development requirements for building sustainable communities and associated enterprises and contemporary political aspirations for the region. Thus, at the last federal election, both the Coalition and Labor parties made policy pledges to 'develop the north', and specifically to develop 'the northern food bowl'. Following their election victory, the Coalition have begun to implement that pledge through the establishment of a joint parliamentary enquiry into northern Australia and the possible establishment of a Cooperative Research Centre (CRC) focusing specifically on developing northern agriculture or, perhaps more broadly, northern development.

While recognising that development of northern Australia does indeed face many challenges (see below), the aspiration for a northern food bowl and associated agricultural development was first comprehensively addressed, and

dismissed, in the 1960s by BR Davidson in his critical analysis of *The Northern Myth*, and again as recently as 2009 in the final report of the Northern Land and Water Taskforce (NLWT), *Sustainable development of northern Australia.* These and other recent authoritative studies consistently demonstrate that economically and ecologically sustainable opportunities for agricultural development in the north are very limited—rather than a prospective 'food bowl', potentially the most viable agricultural crops concern the restricted growing of sugarcane and cotton. Even on the Ord scheme in the East Kimberley, the major growth crop is sandalwood.

The reality of the north is vastly different from the food bowl and related agrciultural devleopment aspirations. The NLWT suggests that as much as 90% of the northern savannas are used ostensibly for (beef cattle) pastoralism—very substantially under extensive (as opposed to intensive, irrigated or grain fed) production systems. Industry reports show that, given low fertility soils, seasonal access issues, distant and volatile markets, most northern pastoral enterprises are either economically marginal or unsustainable if confined to pastoral production alone.

Conversely, those very same marginal lands are recognised internationally for their biodiversity (although increasingly stressed), carbon storage, and ecosystem services values—in turn, affording innovative diversified natural resource management enterprise opportunities in regions, or on parts of properties, with limited / no pastoral production potential. Recent discussions with key agricultural sector pastoral industry players indicate a growing recognition that diversified non-pastoral land management opportunities must be considered as part of the marketing and enterprise mix.

In sum, this project aims to:

First, using an action research approach involving local Indigenous researchers—
- document BNH threats and issues identifield by northern remote communities, and
- explore mutually appropriate and effective emergency management governance arrangements that involve local communities in partnership with external agencies

Second, for the purposes of exploring culturally appropriate land and sea management economic opportunities to help underpin local community capacity, autonomy and resilience—
- undertake local and regional evaluations of ecosystem services and derived opportunities for developing environmental services enterprises

And third, in conjunction with allied projects being delivered through the Bushfire and Natural Hazards CRC—
- Present an authoritative report in Year 4 of the project which provides a robust assessment of the challenges and opportunities facing the development of resilience in remote north Australian communities.

WHAT THE PROJECT HAS BEEN UP TO

Key activities for the 2015 -16 reporting period are provided below.

(1) INAUGURAL NORTH AUSTRALIAN WORKSHOP ON UNDERSTANDING RESILIENCE IN REMOTE NORTH AUSTRALIAN COMMUNITIES

An inaugural workshop with key WA, NT, QLD agency and other institutional end-users was held in Darwin on 17th Feb, to discuss collaborative partnership arrangements concerning 'resilience issues in north Australian remote Indigenous communities'. The meeting discussed current institutional structural arrangements in respective jurisdictions, and opportunities afforded by the current Bushfire and Natural Hazards CRC project to develop informed Indigenous perspectives on resilience issues and governance arrangements in remote communities. A key interest expressed by participants was the need for a set of 'engagement protocols' that agencies and communities could use developing improved and more effective emergency management communication.

Subsequently, follow up meetings are being planned for Brisbane in September 2016 following the AFAC and Bushfire and Natural Hazards CRC conference, and for Perth in late October as part of a WA DFES initiative.

(2) ACTION RESEARCH FIELD PROGRAM AT GUNBALANYA AND NGUKURR—UNDERTAKEN BY ARPNET

Following the major field assessment program undertaken by ARPNet as reported on in the 2014-15 annual report, follow-up work has essentially involved the undertaking of feedback activities and the preparation of associated reports and papers.

Community feedback activities were scheduled for June but have been postponed to early September because of 'sorry business' in both communities. For example, Ngukurr experienced the deaths of two senior people within a short time and some of the ARPNet researchers will be involved in the ceremonies prior and during sorry business. As part of the feedback process, ARPNet has agreed to deliver 3 reports for each community as follows:
1.   Community report [detailed report presenting the data and the analysis]
2.   Community feedback report [brief synopsis of main results]
3.   Community field report [report describing the process of gathering the data in each community]

We have scheduled meetings with traditional owners and key end users and information drop offs to key members of the community during this period.

Ideas for follow-up work

1. *Post cyclone assessments and reviews*

ARPNet has been very keen to document people's post cyclone experiences and views in Ramangining and around Gunbalanya. There is much interest among the community and also from the community based researchers to conduct this work. We believe this knowledge would provide real learning experiences for building resilience among remote communities. Even though some time has passed, we are still keen to undertake post cyclone assessment work in collaboration with NAILSMA. We have discussed possibilities and opportunities for undertaking such work in Ramingining and Milingimbi, mostly because the ARPNet members in these communities are keen to talk to people about their experiences.

2. *Effective community engagement and ground up emergency management*

The ARPNet paper on protocols has identified some of the challenges and opportunities for greater engagement within the emergency management framework. How much engagement is enough engagement for people to participate, own and know what is in their plan? We know from the scoping study that current engagement models barely address the expectations and need for deeper and more effective engagement. More crucially, the need to engage with and incorporate the currently latent Bininj governance structures is highlighted. Calls for an approach that would see protocols and practices respected and "message sticks" getting passed on from one stakeholder group to the next and the whole community acting in concert and drawing on each other strengths seems fanciful but worth exploring further. Clearly more clarity is needed on what this type of engagement might look like and how we might facilitate better integration of existing local knowledge, lore and practice.

3. *Communications about hazards*

Following the discussions at Yellow water, ARPNet has continued to talk about grassroots action, about getting people to become more aware of the natural hazards. The scoping study underscored the importance of people receiving timely information and also acting on that information. Addressing pre-conceived ideas about safety in some remote areas (the belief that we are touchable) and complacency is much needed. Innovative approaches to address this challenge are coming from some of the ARPNet researchers. For example, following these discussions, Otto Campion on his own initiative with some people in his community in Ramingining have developed a video now showing on Youtube and ITV [https://vimeo.com/156786718 (password: Tamara] which underscores the importance of understanding cultural experience of hazards as well as showcasing some of the actions community members can implement. In Ngukurr, the importance of the songs for advocacy and communication by the Lonely boys (a local band) was emphasised. We noted the importance of engagement through different communication mediums to get attention especially of the young people. More importantly we noted the importance of harnessing local talent and creating spaces within projects for them to communicate some of the results.

4. *Tactical Leadership during emergency situations*

Following on discussions from Yellow water about the importance of getting the governance of the emergency management right at the grassroots, ARPNet

has been engaged in a series of workshops and focused group discussions with senior men from Arnhem land through funding from Steve Sutton on his Bushfire and Natural Hazards CRC/HEPPP project. The work sought to clarify what the preferred governance model for emergency management would look like and how planning would occur if such a model was put in place. At the recent focus group at Blyth River, we explored some of the institutional experiences at ground level in emergency management focusing on Maningrida, Gunbalanya, Ramingining and Ngukurr. We noted the variance between communities in terms of institutional roles, interactions and dynamics.

- We agreed to co-author a paper to present some of the discussions that would be led by Steve Sutton.
- We agreed to develop a joint proposal with Steve Sutton and Dave Campbell to develop a bottom up emergency management model in selected communities as proof of concept.

5. *Emergency relief and support*

One of the big findings of the scoping study is that families are placed under a tremendous amount of strain during times when hazards are expected or predicted. Lack of and in some cases inadequate timely information and especially among those families living in outstations force them to come into communities earlier than needed and stay longer than expected. In these communities and for some families 'the burden of obligation' can become too much and create its own challenges. It is important to make the plight of outstations people more 'visible'. ARPNet researchers are keen to explore this further and understand the real cost of hazards especially in social cultural terms.

- We agreed at the ARPNet AGM to develop a proposal to explore the 'real impacts of outstations people" moving into the community during emergency situations.

(3) ONGOING STUDIES UNDERTAKEN BY NAILSMA

Community Resilience projects brief

NAILSMA's sub-contract with CDU under the Bushfire and Natural Hazards CRC to undertake research on community resilience began with a desk top assessment of assets in the two communities of Gunbalanya and Ngukurr and a review of literature around resilience and vulnerability factors in remote Indigenous communities. The former considered a broad spectrum of built, social, economic and cultural capital attempting to capture local Indigenous perspectives on 'value', threats and strengths – with the benefit of (partnered) ARPNet research. Similarly, the Literature review sourced a wide cross cultural and interdisciplinary range of materials to give effect to localised Indigenous perspectives in complex remote cross cultural settings.

A second component of community resilience research took the form of Yolngu-run action research at Galiwin'ku Island in NE Arnhem Land – the Burrumalala project. This bottom up research began as an inquiry into local views on the impacts of cyclones Lam and Nathan (striking in early 2015). With Yolngu conducting the research in Yolngu Matha (local language) the nuance

and value of the exercise deepened to capture views about resilience in the general context of the community and the effect of this on cyclone response. A further and significant development was the (ideal) feel of local ownership in the research and a sense that it could contribute to local initiatives for practical change. Though not novel in Galiwin'ku history the timely invigoration of this discussion and the idea of Yolngu creating an interface for engagement with government agencies and others has a significant chance of gaining traction.

This research has been collaborative and complementary to the work being undertaken by the NT emergency management and response people, Australian Red Cross and others, and considers longer term advancement of Yolngu governance interests and efficacy in relationships with multifarious government and other instrumental agencies. The opportunity to further this with action research is there with the next period of the Bushfire and Natural Hazards CRC in collaboration with the EM and Office of Aboriginal Affairs under NT Chief Minister's department. The investment of independent time and social capital from Yolngu will be substantial, demanding co-commitment from supporting agencies to garner trust and effective action.

This research is of most value to the Bushfire and Natural Hazards CRC in its scalability. The potential is evident in the Galiwin'ku work and in the ARPNet research undertaken at Gunbalunya and Ngukurr noted above. Each community will require nuanced work to develop the mechanics for better governance of community/government relations but a general framework of principles and approach could be developed to guide work across north Australia geographies. It is suggested that work to mirror that from Galiwin'ku be undertaken by ARPNet at Milingimbi and Ramingining, and that the model of Indigenous community researchers be explored from learnings here in other State jurisdictions. Several publications, including the desk top papers, E-News bulletins for Yolngu community (and broader) and Yolngu led collaborative articles on the progress and prospects of their governance work will illustrate the value of Bushfire and Natural Hazards CRC and collaborative investment in this community resilience research.

(4) VALUATION OF ECOSYSTEM SERVICES (ES) AND PAYMENTS FOR ENVIRONMENTAL SERVICES (PES)—UNDERTAKEN BY DCBR / CDU

The PES project componnet, in collaboration with Indigenous communities, NAILSMA and ARPNet, aims to assess land management-based economic opportunities for remote Indigenous communities in northern Australia. These economic opportunities include ES-based employment options and set-up of local community governance structures to start local land/sea services businesses that will empower and enhance resilience of Indigenous communities and deliver better environmental outcomes for the broader Australian society.

Major activities undertaken over the period July 2015 – June 2016

Major report covering ES and PES project activities—a book currently entitled "Towards a sustainable and resilient future for North Australia":

1. Three workshops addressing book development were held over the past year—in December 2015, and again in April and June 2016
2. The December workshop, held over 2 days, involved detailed discussions amongst all contributing authors along with relevant experts and Aboriginal people from different parts of northern Australia. The active discussions, especially among the experts/lead authors led to develop a shared vision and a defined outline of the book. Traditional Owners (TOs) from Ngukurr and Borroloola actively participated in the workshop, and suggested some key topics of their concern which added significant value to book's outline.
3. A detailed analysis of Ecosystem Services (ES) Valuation Concepts and Techniques was presented to all the participants. The workshop offered a great platform to share ideas and to directly ask the TOs about their understanding of the ES concepts. This led to discussions on how the valuation concepts and techniques are relevant to local Indigenous communities and how these could be applied in a northern context. One of the main outcomes of these group discussions was that the PES project needed to be focused on ES valuations in a way that is relevant and credible for the northern region.
4. This workshop also helped us to redefine some ES-based terminologies i.e. ES equating to Caring for Country and PES equating to Investing in Caring for Country, which may be more pertinent and easy to understand for the local Indigenous people.
5. The second workshop, held in April in Cairns, involved the participation of lead authors addressing Indigenous dispossession and land rights, governance and ES-based economic opportunities, and chapters dealing separately with aspects of 'bottom up' and 'top down' governance.
6. A third major book workshop was organised in Darwin in June 2016 where governance and ES chapter authors, and other invited expertise, met for two days. For the PES project, a detailed situational analysis was presented to initiate open discussions among all the experts. For this ecological-economic assessment, the PES project took an exploratory approach to assessing the economic and ecological performance of the major

pastoral land use sector in northern Australia. We conducted several meetings with the pastoral scientists in the NT and Qld (in person/by phone), analysed data and sought expert opinions. We came up with improved and integrated datasets and maps on pasture land capability, land degradation, soil erosion and related economic returns. The main points that emerged from this analysis were:

i. Majority of the pastoral businesses in northern Australia, particularly up to 600mm rainfall isohyet zone of the region across the NT, Qld and WA, are financially unsustainable.

ii. The ecological costs associated with pastoral land use in terms of damage to the natural systems and processes largely remain un-accounted for.

iii. When the total costs of land degradation and associated loss in cattle production, soil erosion and Earnings After Interest but Before Tax were considered, the net returns of typical pastoral enterprises are negative.

iv. A detailed local case study on Gulf will be conducted as a part of the ES-book chapter. The initial work to collect relevant data has commenced. We met the Indigenous rangers in Borroloola in April 2016 to seek their opinion on pastoral capability maps that were produced using land systems, and on cattle numbers, fisheries etc. More meetings will be planned in the future to conduct a situational analysis and to propose some feasible alternatives in consultation with people. In the mean time, an ES valuation study was conducted for an average pastoral property in the northern savannas – Fish River Station, applying various local, regional and global valuation techniques. This report was submitted to the Bushfire and Natural Hazards CRC in Feb 2016.

7. The book manuscript is due to be completed early 2017 for publication later that year through Magabala Press—and Indigenous publisher based in Broome.

Other key outputs:

8. *Ngukurr and Gunbalanya case study*—a paper summarising ARPNet, NAILSMA, and the PES components addressing resilience and PES opportunities in these Top End communities is is now ready for submission in an international journal.

9. *Valuation of ES and PES opportunities from Fish River Station*—An ES valuation study was conducted for an Indigenously owned typical pastoral property in the northern savannas – Fish River Station, applying various local, regional and global valuation techniques. This was submitted as a report to the Bushfire and Natural Hazards CRC in Feb 2016, and will be soon submitted for publication in an international journal.

10. Other contributions:

i. A presentation on 'the economic benefits of being on country', presented at the National Native Titles Conference held in Darwin from 1-3 June, 2016.

ii. A talk on 'transitioning to a diversified and sustainable land sector economy in north Australia', presented at the Developing Northern Australia Conference held in Darwin from 20-22 June, 2016.

iii. A talk on 'Transforming Indigenous Economies: ES-based enterprise opportunities for northern Indigenous Australians', was presented at the International Society of Ecological Economics conference held in Washington DC, US. This conference travel was further followed by learning and developing a MIMES model (Multi-scale Integrated Model of Ecosystem Services), specifically for northern Australia. It is an on-going work at this stage.

Tasks for the next 6 months:

1. To conduct a Gulf region ES and PES case study as a component of the ES book chapter, including data collection from local and regional organisations, meetings with the Indigenous stakeholders to seek and validate information on current land/sea uses, environmental impacts, benefits or losses of current land uses, and peoples' suggestions on alternative scenarios including ES-based economic opportunities.
2. To assess the costs of land degradation, soil erosion and biodiversity losses that occur due to grazing in northern Australia.
3. To assess the value of the conservation estate across northern Australia.
4. To develop a MIMES model on integrating ES, ecological impacts of current land uses, economic returns and community wellbeing (resilience), using current and future landscape management scenarios.

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PUBLICATIONS LIST

Journal articles- submitted

- Sangha K, Sithole B, Hunter Xenie H, Yibarbuk D, Daniels C, James G, Michael C, Gould J, Edwards AC, Russell-Smith J. 2016. Empowering the resilience of remote indigenous communities in Northern Australia. Submitted to *International Journal of Mass Emergencies and Disasters*.

- Kamaljit Sangha, Jeremy Russell-Smith, Scott Morrison, Robert Costanza, Andrew Edwards. 2016. Ecosystem services valuation methods for 'country' benefits from an Indigenous estate in northern Australia. Submitted to *Ecosystem Services*.

Book- under preparation

- Russell-Smith J, Pedersen H, James G (eds). 2017. *Towards a sustainable and resilient future for North Australia.* Magabala Press: Broome, Western Australia.

Book chapter- under preparation

- Russell-Smith J, Sangha K, Costanza R, Kubizewski I, Edwards A, Lynch D. 2017. Developing a diversified land sector economy. In: *Towards a sustainable and resilient future for North Australia* (eds Russell-Smith J, Pedersen H, James G). Magabala Press: Broome, Western Australia.

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- Sithole B, Hunter-Xenie H, Yibarbuk D, Daniels C, Daniels G, Campion OB, Namarnyilk S, Narorroga E, Dann O, Dirdi K, Nayilibibj G, Phillips E, Daniels K, Daniels A, Daniels G, Turner H, Daniels C.A, Daniels T, Thomas P, Thomas D, Rami T, Brown C. 2016. Living with *Widditjth* - Protocols for building community resilience. In: *Disaster resilience: an integrated approach* (eds Paton D, Johnston D). Charles C Thomas: Springfield, Illinois.
- Buergelt, P., D. Paton, B. Sithole, K. Sangha, L. Maypilama, O. B. Campion, & J. Campion. 2016. (Re)learning from indigenous people: living in harmony with nature – the key adaptive capacity. . In: Disaster resilience: an integrated approach (eds Paton D, Johnston D). Charles C Thomas: Springfield, Illinois.

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- ARPNet. 2016. *Gunbalanya Community Feedback Report*. Scoping Resilience of Remote Communities in northern Australia, ARPNet and CDU, Darwin.

- ARPNet. 2016. *Ngukurr Community Feedback Report*. Scoping Resilience of Remote Communities in northern Australia, ARPNet and CDU, Darwin.

- NAILSMA. 2016. Scoping Community Resilience Project: Community Asset Mapping Report. North Australian Land and Sea Management Alliance, Darwin.

- NAILSMA 2016. Literature Review on Community Resilience in Remote North Australia. North Australian Land and Sea Management Alliance, Darwin.

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