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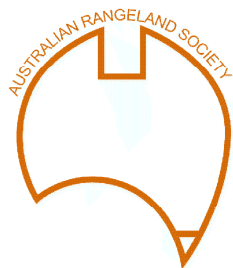
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Strengthening scientific research and management across northern Australia through Indigenous rangers and community collaboration

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Abstract

Sustainable natural resource management (NRM) requires research and planning to be complemented by strong community engagement and input. This is especially true in northern Australia where the Indigenous and community level values may not directly align with national, state or regional NRM objectives or priorities. The Waterways Education Program (WEP) provides opportunities for enhancing local community knowledge and participation in NRM, by training Indigenous rangers in remediation actions and monitoring techniques for rivers and wetlands. The program has increased the capacity of Indigenous rangers to monitor and manage their water resources as part of a broader approach to landscape scale conservation and management focusing on the impacts of weeds, ferals and changing fire regimes. We present two WEP case studies highlighting the benefits of increasing the capacity of local communities to input and engage in NRM. This collaborative approach provides a template for future initiatives and programs, aiming to strengthen community engagement.

Background

The Kimberley region of Australia is amongst the last in the world to contain rivers and wetlands in their almost pristine state. Water resource development, escalating land use (agriculture and mining), invasive species and climate change represent significant risks to the region that require ongoing monitoring, management and research (Close *et al* 2012, Pusey *et al* 2011).

In recent decades, the benefits of community input to NRM have been better recognised. In Australia, good water management requires government planning and scientific research to be complemented by community involvement, with the National Water Initiative (NWI) highlighting the need for increased community capacity. Within the Kimberley region Indigenous people comprise over 50% of the population with a unique set of social cultural and traditional natural resource values (Jackson *et al.* 2005). Indigenous people in northern Australia manage large tracts of land for which they have custodial responsibility and hence they are major stakeholders in the management and protection of natural and cultural resources (Wohling, 2009). It is therefore critical that Indigenous values are included in the development and delivery of any research or monitoring and evaluation program.

To achieve this requires effective communication between traditional Indigenous knowledge and western science. The capacity of local communities to engage in research initiatives and monitor and evaluate river and wetland ecosystems is a key challenge facing NRM in northern Australia. In this paper, we describe a program aimed at providing opportunities for local participation in NRM and identify key aspects of the successful application of the program in the Kimberley region of Western Australia. We provide two case study appraisals of the WEP and identify the benefits of increasing Indigenous

capacity for the management and research of natural resources and lessons learnt from the program.

The Waterways Education Program (WEP)

The WEP was developed in 2009 to help build the capacity of local and regional communities to i) interpret environmental management issues affecting local values, ii) implement western science research and monitoring techniques typically used in NRM and iii) engage with broader scale management and research (Dobbs and Cossart, 2010).

The WEP is a partnership between government, research and community groups involved in regional NRM. The University of Western Australia and the Department of Water (Kununurra) together initiated the program, and partner with communities and Indigenous ranger groups. Many of these groups have been established through the Kimberley Land Council and Working on Country (WOC) Indigenous ranger program, or are those groups responsible, through Native Title, for joint land management with the Department of Environment and Conservation.

The program was developed following extensive community consultation and recognised the importance of both contemporary and traditional water knowledge. The program employs a flexible implementation plan coupled with a “learning-by-doing” approach to deliver interactive on-ground demonstrations of how freshwater ecosystems function. During field discussions, freshwater systems are disassembled into biological components (fish, macroinvertebrates, water quality and vegetation) and standard monitoring techniques for each of these components are demonstrated and applied.

Through discussion, these components and the data collected are reassembled, providing ranger groups with an understanding of how the components interact and can be influenced by broader catchment pressures (i.e. weeds, ferals and changing fire regimes). Indigenous knowledge of historical change, local environmental issues and values are then used to identify appropriate indicators for Rangers to monitor local aquatic health. This approach also highlights appropriate management actions for sustainable landscape management and conservation.

Guided by the concerns and priorities of local people and tailoring its activities to local conditions, WEP has worked most closely with Indigenous ranger groups to monitor and manage, and conduct research on, environmental threats such as feral pigs, fish parasites and weeds (Dobbs and Cossart, 2011). The two WEP case studies presented here are both located in Fitzroy River catchment of Western Australia. Significant outcomes and benefits of these case study programs are highlighted below.

Case Study 1 Wunggurr Rangers

Collaboration through the WEP focused on developing a monitoring program on the impact of pigs on the Fitzroy River, complementing the Wunggurr Ranger feral pig eradication program (Dobbs *et al* 2011). The WEP supported Ranger employment through the Tropical Rivers and Coastal Knowledge Program (TRaCK) and industry placement with DoW. Capacity building resulted in active participation in research initiatives with the UWA Centre of Excellence in Natural Resource Management (CENRM) and DoW through participation in the Northern Australia Water Futures Assessment (NAWFA).

KEY OUTCOMES; Identification, active management and monitoring of key NRM

issues (feral pigs), funding, collaborative research, input to national research program

Case study 2 Bayulu Rangers

Through partnership with the WEP the Bayulu rangers were involved in the TRaCK trials of the Framework for the Assessment of River and Wetland Health (FARWH) in northern Australia. The rangers were able to describe the aquatic ecology of their waterways, and through involvement with TRaCK, implement a monitoring program to assess changes and impacts. This has been complemented by work with pastoralists to maintain fencing for the protection of waterholes

KEY OUTCOMES; input to nationally important research programs (TRaCK FARWH), collaborative research, environmental issue identification, ongoing remediation

Broader program implications and outcomes

In addition to the local benefits described above, increasing Indigenous community capacity through the WEP program allows;

- *more efficient on-ground response (identify and monitoring) to emerging environmental issues and high priority risks in appropriate time scales;*
- *Increased collaboration and knowledge exchange between management, research and community allowing indigenous values to be represented and supported within NRM objectives and targets.*
- *Through collaboration (e.g. research and management agencies) strengthened linkages between local, state and federal levels.*
- *Knowledge exchange (scientific and indigenous) on values, priorities and research and management activities*
- *overseeing the monitoring programs in their own localities,*

Integrating these broad outcomes is a critical part of a broader approach to landscape scale conservation and management. Lessons from the Kimberley WEP can be applied to other programs and highlights how an education program can assist with community monitoring through its ground up approach. Important features contributing to the program's success include:

- *An appreciation for the value of information exchange between western science and Indigenous knowledge.*
- *Building upon existing programs, relationships and initiatives which reduces development costs and increases the time spent on ground whilst also ensuring that with changes in funding opportunities, the program maintains longevity;*
- *Flexibility to allow different objectives to be achieved from participants including language, mentorship and accreditation for TAFE courses (also ensuring enhanced uptake and longevity of the program) and;*
- *The provision of embedded scientists and managers (facilitating community access to research and management an important strategy in a large, remote region).*

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