

Scoping market-based opportunities for Indigenous provision of water quality services and associated conservation governance in the Northern Great Barrier Reef

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Interim Project Report and Discussion Paper

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Cover photograph: Photo 1: Kalan Rangers (Djinabugee Jaffer, Dylan Creek, Gabriel Creek, Peter Shaggy Clarmont, Warren and Terry Creek) with Justin Perry, CSIRO, conducting annual monitoring of wetlands. Photo 2: Stoney Creek, Eastern Cape York.

This report is available for download from the NESP Tropical Water Quality Hub website:
<http://www.nesptropical.edu.au>

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ACRONYMS AND ABBREVIATIONS

CSIRO	Commonwealth Scientific and Industrial Research Organisation
CYLC	Cape York Land Council
CYP	Cape York Peninsula
CYPAL	Cape York Peninsula Aboriginal Land Act
CYPS	Cape York Partnership
DOE	Department of the Environment
ERF	Emissions Reduction Fund
ES	Ecosystem Services
ICNRM	Indigenous Cultural and Natural Resource Management
JCU	James Cook University
GBR	Great Barrier Reef
LDN	Land Degradation Neutrality
NAER	Northern Australia Environmental Resources Hub
NAILSMA	Northern Australian Indigenous Land and Sea Management Alliance
NERP	National Environmental Research Program
NESP	National Environmental Science Programme
PES	Payment for Ecosystem Services
RRRC	Reef and Rainforest Research Centre Limited
TWQH	Tropical Water Quality Hub
UNCDD	United Nations Convention to Combat Desertification
WALFA	West Arnhem Land Fire Abatement
WQES	Water Quality Ecosystem Services

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EXECUTIVE SUMMARY

This report describes findings from year 1 of Project 2.3.3 of the Tropical Water Quality (TWQ) Hub of the National Environmental Science Programme (NESP). The project is entitled 'Building Indigenous livelihood and co-management opportunities in the northern Great Barrier Reef – ecosystem services and conservation governance for water quality.' The report also acts as a discussion paper for developing further information, concepts, and planned activities in Year 2 of the project. The wider work is focused on improving societal recognition of the ability of Indigenous Traditional Owners of eastern Cape York Peninsula (CYP) to contribute to water quality improvements necessary for the maintenance of the Great Barrier Reef (GBR), and to identify the associated governance, regulatory and market environments that may be required to secure these contributions. The project is a partnership between CSIRO, JCU, Cape York Partnerships (CYPS), and Kalan Enterprises. It is one of a suite of ongoing projects among these partners.

Project activities in Year 1 have consisted of:

- A review of key research literature focused on ecosystem services (ES) markets, products, and concepts, particularly as they relate to water
- A review of the policy and regulatory environment for the payment for ecosystem services (PES) and associated markets in Australia in general, and North Queensland in particular
- A series of project team meetings and workshops aimed at scoping and delivering project outcomes
- A field trip involving:
 - o scoping of the land and waterscapes from which watershed ES might be conceptualised and delivered;
 - o exploring key organisational governance and operational capabilities;
 - o building an understanding of current Kalan Enterprises water and conservation-related projects;
 - o building key communications messages and the preparation of preliminary video communications material; and
 - o planning for further field activity in the first half of 2017

Key findings from Year 1 of the project include an improved understanding that:

- Water quality related PES are more common outside Australia, where they are commonly known as markets that deliver watershed services or nutrient offsets;
- Water quality related PES are currently poorly conceptualised in the Australian context and specifically require further development in Indigenous domains;
- Eastern CYP represents a crucial confluence of interest in marine ecosystem and water quality outcomes and growing Indigenous tenure;
- Improving the stability of system governance and the appropriateness of legal, policy, and regulatory regimes is crucial to the success of PES initiatives;
- CYP governance regimes related to conservation and watershed management are dynamic, and will become increasingly significant in securing region-wide outcomes; and
- Indigenous natural and cultural resource base livelihoods can generate substantial existing benefits as part of a suite of activities undertaken by local development agencies such as Kalan Enterprises

Key areas for further work in Year 2 include:

- Further scoping of the key actors that need to be involved in the supporting network for PES developing, particularly PES investors/customers and their requirements;
- Identifying key risks and opportunities with respect to overall PES system governance, regulatory and market development environments;
- Improving monitoring and measurement of the human, infrastructure and environmental assets that can underpin prototype PES product design;
- Scoping and testing water-related ES product options; and
- Supporting the development of Indigenous-led strategies for improving the wider governance system and policy environment underpinning PES development.

1.0 INTRODUCTION

NESP TWQ Hub Project 2.3.3 focuses on scoping water-related ecosystem services (ES) market opportunities and products that are culturally, environmentally, economically, and politically suited to CYP catchments flowing into the northern Great Barrier Reef (GBR). These kinds of ES are often known internationally by terms such as 'nutrient offsets' and 'watershed ES', and the particular focus here is on potential water quality ES (WQES). The project also considers the importance of developing water-oriented services and products that might deliver a range of additional ecosystem services (e.g. biodiversity), cultural and socio-economic benefits. Multiple-benefit products and services have the value of being both more attractive in building Indigenous livelihoods, but also potentially deliver higher market value. The project is a collaboration between researchers at CSIRO and JCU, and staff at local (Kalan Enterprises) and regional Cape York Partnership (CYPs) Indigenous development agencies in CYP. It has been designed to underpin ES-based livelihood opportunities and the realisation of social co-benefits from Indigenous Cultural Resource and Natural Resource Management (ICNRM). This report is effectively a working paper that outlines key developments in the project thus far, and outlines next steps for the second year of the project.

In northern Australia, key risks to landscape conservation and associated water quality arise from pressures arising from climate change, feral animal damage, overgrazing, plant biosecurity, infrastructure and agricultural development and inappropriate fire and land use regimes. Key issues underpinning these landscape-scale challenges remain poorly understood and resources for investigation and subsequent management action are constrained. As mentioned, actions undertaken to address water quality outcomes may have additional and important biodiversity, carbon, and threatened or feral species management outcomes. Australia has made major progress on developing cohesive governance systems and government-run markets in water quality improvement, but has focused its efforts in developed catchments rather than landscapes that retain a high level of ecological integrity. Major water quality priorities in such landscapes have not yet been properly translated into either government or private sector ES markets or products regionally. The development of marine and water quality focused (and multi-benefit) ES products and associated markets have significant international precedents. In Australia, progress is limited and further development of this additional area of ES can enhance the long term sustainable resourcing of management, associated conservation-based livelihoods, and social and cultural co-benefits.

In terms of the focal area for this study, Eastern CYP and the associated northern GBR represent a crucial opportunity for the further development of water-quality focused ES in ways that can enhance Indigenous management capability, cultural integrity, and associated conservation-based livelihoods. The area represents a nationally significant confluence of conservation manager and ES investor interest in water quality associated with the GBR, and growing Indigenous control over the terrestrial drivers of key nutrient inputs due to ongoing land tenure changes on CYP. It is an ideal location for investigating market-based water quality opportunities. Such investigations can also highlight the potential ES tradeoffs involved in other new and emerging forms of development on CYP.



Figure 1: Mouth of Stoney Creek in remote north eastern Cape York

Project aims

The aim of the project was to foster the further diversification of country-based livelihoods for Indigenous people through steps to:

- 1) Evaluate international examples of water-related ES (particularly nutrient offsets and watershed ES).
- 2) Evaluate policy and regulatory frameworks associated with watershed ES
- 3) Scope potential market requirements and investor demand.
- 4) Scope the development of innovative water quality ES products suitable for northern GBR geographic, demographic, and market conditions.
- 5) Improve wetland protection, co-management, business, and governance capability as a foundation for ES product and market development.

In pursuing these aims, the project continues to build and widens an ongoing collaboration between the project partners. As ancillary goals, the project supports existing projects focused directly on catchment and wetland repair and the management of key species and habitats, and furthers knowledge and understanding of collaborative Indigenous-led management and co-management responses to key drivers of importance in determining water quality inputs to the northern GBR.

This first year of the project has involved the investigation of international and national examples of wider ES market systems and more specific watershed ES and nutrient offsets. This analysis has underpinned a broader scoping exercise designed to support the generation of locally fit-for-purpose ES products and potential markets suitable for Indigenous management contexts. In doing so, the project also aims to ensure the foundations are set for building governance, policy, livelihood, social co-benefit and regional business development opportunities as well as the expertise needed to inform the design of any new management protocols and of ES products and services in our focal area and beyond.

The projects' aims align with key NESP TWQ Hub research priorities to:

- 1) Support traditional co-management and build Indigenous Ranger capacity by linking with scientists/managers for estuarine/wetland repair, key species management, co-management/planning, and identifying key heritage sites.
- 2) Reduce water quality impacts by identifying and prioritising practical management actions capable of protecting and improving water quality in the GBR region. Sub-priorities of particular importance to this project include:
 - a. New methods for encouraging behaviour/practice change/improving compliance with Best Management Practice.
 - b. Comparing the ability of different social and/or economic levers to encourage practice change in different contexts.
- 3) Review policy and regulatory instruments to assess their effectiveness and appropriateness in promoting improved land and water management.

The development of robust ES markets in watershed products and services, particularly those with multiple benefits, can provide pathways for future environmental improvement *and* economic development across northern GBR catchments and the wider CYP. Lessons derived from market identification, novel ES product development, ES investor scoping, ES product monitoring and validation, and evaluation of the wider governance and policy context for ES market development can play a critical role in supporting improved environmental management across northern Australia and the development of ES management contexts in wider Indigenous Australia.

Project partners

The research project partners are CSIRO, JCU, Kalan Enterprises, and CYPs. CSIRO is the primary research agency of the Commonwealth government. JCU is the major research university for northern Queensland and a crucial contributor to research efforts across the wider tropical zone. CYPs is an Indigenous regional governance mechanism and development agency that has grown rapidly over the past decade and provides a range of governance, advocacy, program, policy and community services to Cape York Indigenous communities. Kalan Enterprises is a Coen-based traditional owner-based organisation specializing in delivering best-practice land management services to Indigenous landholder groups in the central CYP, services that also provide employment and wider social wellbeing outcomes to Indigenous communities. The specific project team includes members who focus on a range of relevant fields, including Indigenous water issues, wetland ecology, governance and policy, regional development, ES, and the assessment of the wider outcomes of natural and cultural resource management activities.

Project context

Market-based solutions and Payment for Ecosystem Services

The rise of market-based approaches (whether driven by governments or the private sector) has been a key feature of recent attempts to address major challenges and crises in environmental and natural resource management. Market-based approaches can be defined in a range of ways, but on a general level, they involve some combination of competition, auction, trading, and incentive mechanisms operating through a market to achieve

conservation outcomes. PES is a particularly prevalent form of market-based approach that relies on voluntary transactions where a purchaser buys a defined ecosystem function or service (or a use or action designed to achieve that function) from a provider. Existing ES for which such payments are already being made in the wider global context include voluntary carbon, biodiversity, water quality, and recreational amenity. To function effectively, PES markets require a stable overarching governance system and a consistent regulatory framework and a regime for monitoring the extent of the service being provided (or at least a shared understanding of the relationship of the action purchased to the desired ES function). The underlying principles, general and specific features and purposes and functions of ES are considered in greater detail below, particularly focusing on how they relate to the provision of water quality ES by Australian Indigenous Traditional Owners and managers.

The Great Barrier Reef

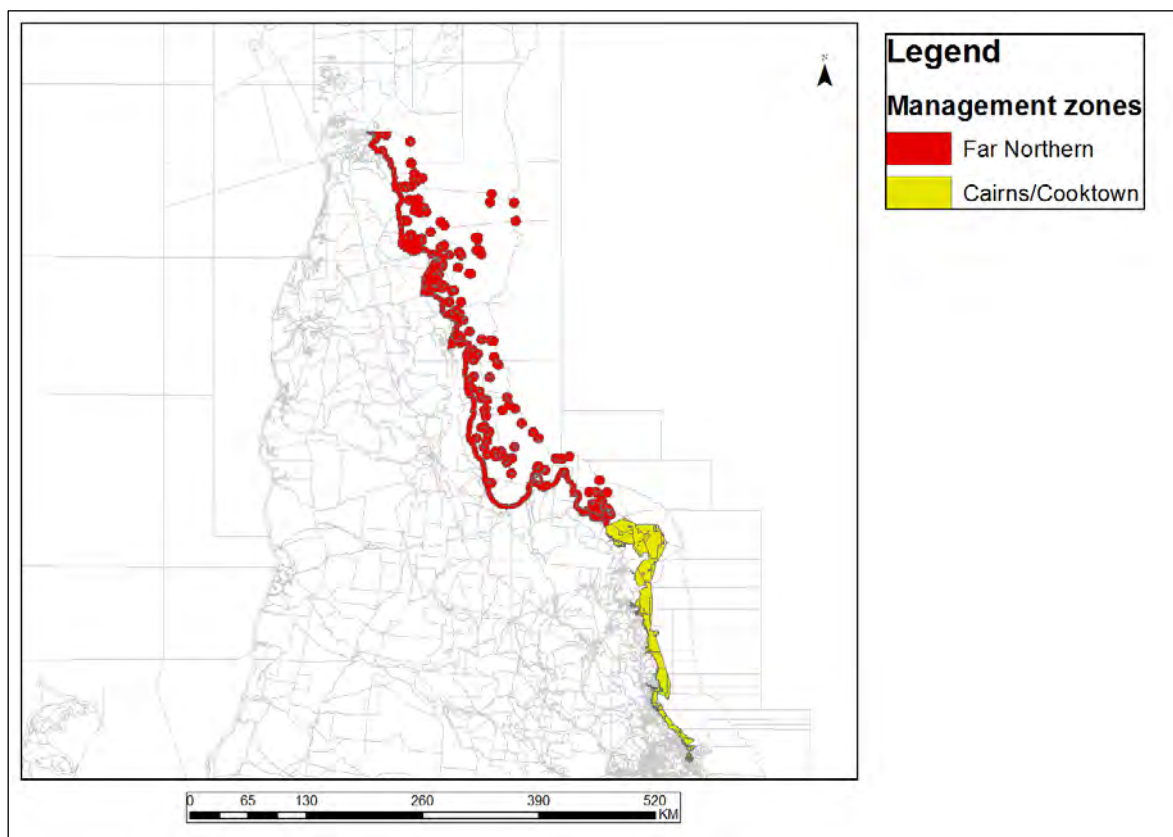


Figure 2: Far northern GBR management zone extent (red) (DNPSR 2009).

The GBR is a crucial natural, cultural, and economic asset for Australia. As such, it is the focus of major national conservation and management efforts. This includes effort on the GBR itself, but also the adjacent catchments that are critical drivers of reef water quality and associated productivity. Released in 2015, the Reef 2050 Plan provides an overarching framework for protecting and managing the Reef for the next 35 years, aiming to progressively improve on what the Plan terms the 'Outstanding Universal Value' of the GBR. A series of actions, targets, objectives, and outcomes are stated in the Plan, and initial investment in management action involves over \$2 billion over the next decade. Specifically, with respect to water quality, \$40 million has been provided to a new Reef Trust to target investment in improving water quality. Recently, the new Queensland government added \$100 million over 5 years to its existing \$35

million that is currently allocated to improve water quality.¹ Some \$1 billion in low interest loans are also now being offered by the Commonwealth government to support innovation in agricultural industries. This new funding will focus on scientific research, business transition, and environmental practices in primary production and fishing that can contribute to water quality improvements. There has been limited policy focus, however, on considering the role of Indigenous people in continuing to protect relatively intact natural landscapes in the northern GBR, while at the same time preserving their rights to control natural resource use.

This public investment in the management of the GBR, and in water quality specifically, is extremely important. However, recent analyses have demonstrated that it is insufficient to meet the expected requirements for maintaining the integrity and resilience of the GBR - further investment from non-government sources is going to be needed (Hughes et al. 2015, Alluvium Consulting Australia 2016). This will in turn will require structured pathways for that investment, and for validated results of the returns on that investment. Such returns may be in terms of water quality, but also in terms of the wider social, economic, and cultural co-benefits that may be derived from investments in environmental improvement and management. The primary government and non-government investment in the GBR to this point has been directed at the southern areas of the reef which are the sites of the largest human activity. However, the northern Reef adjacent to the CYP is assuming increasing importance, not least because it provides one pathway for mitigating both the impacts of climate change and growing threatening processes affecting the southern GBR. However, the kinds of management issues in the northern GBR, and the kind of investment pathways needed to address them, may differ in significant ways from the more heavily studied areas of the GBR further south. An issue of significance is that the mechanisms used to protect relatively intact landscapes in the northern GBR must recognise and accommodate the significant economic rights and interests of traditional owners within that landscape.

Historically, the northern GBR has been characterised by a relatively high ecological condition, less intense direct human development pressures, a lower level of terrestrial inputs, and a correspondingly lower level of active management (**Error! Reference source not found.**) than the reefs further south². Few government strategies have focused on continuing to support the active protection of those landscapes as well as improving and maintaining water quality within these catchments. Furthermore, despite the global significance of the region, there is very little data on water quality and what does exist is focused on the southern catchments of CYP (Moss and Howley 2016). However, increasing pressure for development, indicated by the White Paper on Developing Northern Australia (including Indigenous led development), as well as a major coral bleaching event in 2016, has heightened concerns about the status and management of the northern GBR.

The 2016 bleaching event had a disproportionate effect on the northern GBR, highlighting the vulnerability of the area to future climate change³. The precise causal chains and systemic mechanisms remain understudied, but the northern GBR is understood to play a crucial role in the wider health of the entire GBR. Significant temperature-induced effects on the northern

¹ <http://www.gbr.qld.gov.au/documents/gbrwst-finalreport-2016.pdf>

² <http://www.reefplan.qld.gov.au/measuring-success/report-cards/2015/assets/gbr-2015report-card-detailed-results.pdf>

³ <https://www.coralcoe.org.au/media-releases/life-and-death-after-great-barrier-reef-bleaching>

GBR are already likely because of the existing rate of global carbon emissions and associated warming. On one hand, protecting the intact nature of northern CYP landscape becomes more important, while diminishing water quality represents a crucial additional stressor that can be directly addressed through actions undertaken at the local and regional scale. Maintaining (and where possible, improving) the quality of water flowing onto the northern GBR can be enabled through better management of the eastern-flowing catchments of CYP.

Cape York Peninsula



Figure 3: Highland rainforest in eastern flowing catchments, Cape York

CYP is a region of international ecological and cultural importance, with ongoing discussions about nominating major areas of the CYP for World Heritage listing and other forms of statutory protection⁴. This designation derives from its existing natural and cultural values, but the region is also undergoing rapid social, political, and economic change. The majority Indigenous population is demographically young and expanding rapidly. Major mining and agricultural developments exist and more are proposed, while other industries, notably pastoralism, have experienced declines in profitability and associated sustainability. A combination of scale and diversification is crucial to a sustainable economic future for CYP. Maintaining current landscapes without intensive development will mean compensatory economic opportunities in ES development need to be fully explored.

⁴<http://statements.qld.gov.au/Statement/2016/6/17/cape-york-and-fraser-island-world-heritage-nominations-to-progress>

Perhaps the most significant trend in the social evolution of CYP in recent decades is the increase in the formalised recognition of Indigenous landholdings (Table 1) and/or associated resource rights (Figure 4), and the ongoing creation of Indigenous-led governance structures and processes to both secure and manage those rights. These enhanced Indigenous tenure and resource rights developments have occurred through multiple policy pathways, including the handing back of pastoral and other leases, the commercial purchase of pastoral leases and the resolution of native title claims. These processes are continuing, and the recently commenced and ongoing One Claim process in CYP (being progressed under the Commonwealth *Native Title Act 1993*), for example, draws together a wide array of CYP Indigenous claimants into a combined claim which encompasses both land and sea components. Further Indigenous tenure, management and co-management arrangements have been achieved through the *Cape York Peninsula Heritage Act 2007*. This act has enabled existing and proposed national parks and unallocated State Land to become Indigenous-owned land, provided it is dedicated and managed as a national park known as Cape York Peninsula Aboriginal Land (CYPAL). The resulting parks are then governed by a joint management arrangement between traditional owners (represented by a land trust) and State authorities. Indigenous people now control over 40% of CYP (DNRM 2016) and a recent calculation of the ES value provided by the peninsula was \$130 billion per year (Preece et al. 2016).

Table 1: Major tenure types and their percentage of the Cape York Peninsula bioregion

TENURE	% of CYP bioregion
Indigenous Freehold	40.28
Lands Lease	37.04
National Park	16.68
Mines Tenure	2.57
Reserve	2.13
State Land	1.14
Profit À Prendre	0.16
State Forest	0.01
Housing Land	<0.001

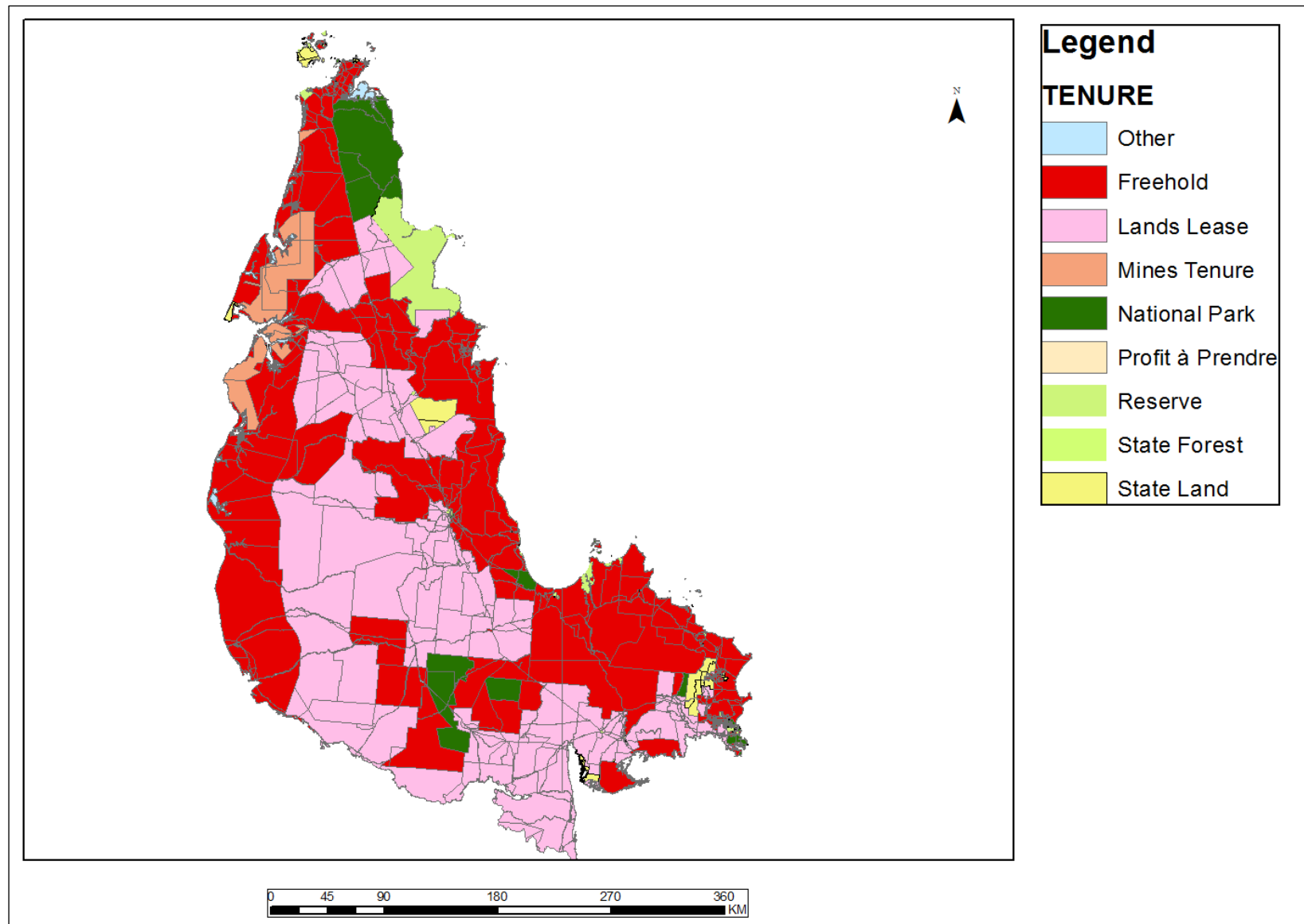


Figure 4: Land tenure on Cape York Peninsula.

The increasing extent of recognised Indigenous tenure in CYP combined with the demographically young and socio-economically impoverished status of Indigenous communities has highlighted the need to realise sustainable economic opportunities for local people from land and natural resource rights once they have been secured. The scoping of development pathways encompasses existing models of development and development sectors (pastoralism, mining, and agriculture), but also raises the potential for novel economic options - ecological and cultural tourism, and PES such as invasive animal and plant control, biodiversity conservation, and carbon emission reduction and mitigation. Importantly, in the development of PES concepts in this domain, equitable trade-offs need to be developed between historically important activities (such as mining and agriculture) and the continued protection of intact landscapes. In short, traditional owners can't be expected to forego their rights to more traditional forms of development without alternative economic options.

In addition to these socio-economic challenges and particularly the need for economic tradeoffs, key challenges to landscape conservation and associated water quality management arise from feral animal damage, overgrazing, weeds and inappropriate fire regimes. Novel and appropriate management responses continue to be developed, but key issues remain poorly understood and resources for investigation and subsequent management action are constrained. In addition, actions undertaken to address biodiversity, carbon, and threatened or feral species priorities may have important outcomes for other variables, such as water quality, that currently remain unvalued. Further understanding of these issues and relationships will assist the long term sustainable resourcing of natural and cultural resource management, associated conservation-based livelihoods, and social co-benefits on CYP.

Natural and cultural resource management on eastern Cape York: ecological asset protection and the mitigation of feral pig damage

This project functions as a stand-alone scoping of Indigenous-oriented watershed ES potential in the GBR, yet it is also part of a wider suite of related projects being undertaken by the same research partners. These wider projects, with implications across northern Australia, focus on novel techniques for local conservation action, emphasising critical and immediate management threats (including feral pig and grazing damage, fire regimes and carbon abatement, and wetland degradation). Previous projects of relevance have developed and refined practical techniques in feral animal management and greenhouse gas abatement, most notably the exclusion, through fencing, of feral pigs from key ecological (marine turtle nests) and aquatic (wetland and riparian zones) assets. A systematic planning process undertaken by Kalan Enterprises identified key priorities in the focal region, in particular water, turtle and dugong, and cassowaries. The focus on feral pigs emerged as a key means of addressing concerns about both water and marine turtles. The projects have also enabled the development of a preliminary monitoring framework that can demonstrate the impacts of environmental programs on biodiversity, particularly the management of fire and feral animals.



Figure 5: Kalan Rangers conducting annual monitoring of wetlands

The current project builds upon and extends the implications of the existing work by:

- 1) Improving the monitoring framework for wetland management by defining key ecological and cultural values to be measured and supporting the establishment of meaningful monitoring regimes for those values
- 2) Investigating feral pig exclusion as a case study of broader issues in the practical provision of watershed ES by Indigenous people in eastern CYP

Overall monitoring of landscape-scale change from activities such as feral pig exclusion may encompass a series of techniques. These include eco-genomic analysis of soil and water, traditional limnology, vertebrate surveys, the assessment of carbon emissions, cultural value surveys and very high resolution aerial photography using a paired design to develop a very robust understanding of the ecological values of the system. Further information on feral pig management and monitoring highlights the importance of metrics for success⁵ and further consideration of the opportunities created by alternative management regimes include the potential for commercial products, notably the conversion of culled pigs into fertilizer.⁶ The more specific watershed ES component involves scoping the income, wellbeing, and associated monitoring implications of generating payments from water quality improvements connected to feral animal exclusion. Independently of income generation, wetland repair and associated water quality improvements are key aspirations for Kalan Traditional Owners.

⁵<http://www.nespnorthern.edu.au/projects/nesp/defining-metrics-success-feral-animal-management-northern-australia/>

⁶<https://research.csiro.au/feraliser/>



Figure 6: Project team members Allan Dale (JCU), Rebecca Pearse (JCU), Justin Perry (CSIRO), and Bronte Everson (CSIRO) inspecting a wetland fenced off from pigs, Cape York Peninsula.

Links with other projects and NESP hubs

The current project builds upon the work of other key landscape scale conservation and management initiatives in northern Australia and connects with a range of past and existing research efforts through NESP. Some of these key developments include:

- The broader development of conservation-based approaches to landscape management developed with a sub-regional focus by regional Indigenous organisations during the Cape York Heads of Agreement and Cape York Land Use Strategy processes (Potts et al. 2015);
- Indigenous innovation in the development of approaches and methods in the establishment of PES associated with savanna burning in the Northern Territory;
- Longer term development in the progression of Indigenous-led concepts of co-management within extensive protected area estates in Queensland and Northern Territory; and
- More recent Indigenous led-reforms concerning community development and the negotiated reform of service delivery frameworks (e.g. Engaged Communities).

Several research processes in recent years have helped inform and shape these Indigenous led approaches to landscape management. Some key developments in the field are summarized in recent publications (Fitzsimons et al. 2012, Hill et al. 2012, van Oosterzee et al. 2012, James Cook University and CSIRO 2013, Russell-Smith et al. 2013, Dale 2014, Maclean et al. 2015, Robinson et al. 2016b).

Recent Commonwealth Government investments in this area of endeavor particularly have helped contribute to some of the critical knowledge required. With respect to the GBR, these include efforts funded under the NESP TWQ Hub:

- 1) NESP TWQ Project 3.9 - Indigenous capacity building and increased participation in management of Queensland sea country
- 2) NESP TWQ Project 3.11 – Monitoring and adaptively reducing system-wide governance risks facing the GBR

In relation to the NESP NAER Hub, specific project linkages include Project 10 - Incorporation of Indigenous Fire Knowledge into Fire Management Programs. This project also builds upon two projects funded through the precursor to NESP, the National Environmental Research Program (NERP). These were:

- 1) NERP Northern Australia Hub Project 2.1: Indigenous livelihoods – a multifaceted project assessed the wider co-benefits of Indigenous land management programs, governance models, and diversified funding regimes
- 2) NERP Northern Australia Hub Project 2.2: Research to support Indigenous NRM and Livelihoods – a project that combined on-country management activities, the development and use of a participatory planning and management framework, and the assessment of the multiple outcomes of environmental funding on Indigenous land.

Further practical projects funded by the Biodiversity Fund (Feral Pig project) and by Caring for Our Country and Working on Country initiatives also have provided significant foundations for the partnerships and research pathways being followed in the current project.

The current project has also indirectly been supported by funding through the CSIRO Lean Launch Pad program and Charles Darwin University's Northern Futures Collaborative Research Network (CRN). The Lean Launchpad program is part of the CSIRO ON Program – an innovation acceleration program that is designed to build business models and arm participants with the skills and relationships they need to validate their big science and technology ideas, not just in the lab, but in the marketplace. Several business ideas, focused on feral pig management and the marketing of environmental and social outcomes, were market tested through the formal 12 week program. During this period several promising markets emerged and the team has been accepted into the ON-Accelerate program to further develop the business opportunities⁷.

⁷ <http://oninnovation.com.au/Programs/ON-Accelerate>

2.0 METHODS

Introduction

The overall project involves a series of interrelated activities. These focus on: iteratively evaluating practical on-country management approaches; scoping novel ES market possibilities and products that leverage those approaches; identifying co-benefit and livelihood implications; enabling effective governance, both at the community and regional level, but also within the wider Australian and Queensland policy framework supporting (or limiting) the development of ES markets in CYP; and analysing relevant policy frameworks. These activities were pursued in Year 1 of the project through the following methods:

- 1) analysis of the research literature and online information about conservation governance and policy and program approaches supporting PES and ES market and product development concepts
- 2) Within eastern CYP, the scoping of potential:
 - a) ES market and product design
 - b) investor interest in PES that support Indigenous livelihoods
- 3) Within the CYP context, the scoping of:
 - a) the global, national and state governance and policy frameworks required to support PES
 - b) the regional and community level governance requirements within CYP that will be needed to foster effective PES development
- 4) Project team workshops held in 2016 in April (CYPS, Cairns), August (teleconference), September (JCU, Cairns) and November (Kalan Enterprises, Coen)
- 5) Improving understanding of the field context for PES.

These methods and activities are described in more detail below.



Figure 7: Marcus Barber (CSIRO) and Bronte Everson (CSIRO) listening to Dion Creek (Kalan Enterprises) briefing a project team planning workshop at Cape York Partnership, Cairns.

Indigenous engagement and research ethics

Project 2.3.3 meets the NESP TWQ Hub criteria for a Category One project with respect to Indigenous engagement. This means that it is undertaken in direct collaboration with an Indigenous community, organisation or group and is of direct benefit to Indigenous people. Through the involvement of Kalan Enterprises, the project provides opportunities for Indigenous engagement, employment, and skills transfer. It also meets the Category One requirement for a co-managed process for the generated knowledge, data and research results to be effectively shared, presented and communicated between Indigenous peoples, communities and organisations.

The project is being undertaken using free, prior, and informed consent principles. A full ethics application for the fieldwork component of the project was submitted to the CSIRO Social Science and Human Research Ethics Committee and ethics approval was granted in April 2016.

Literature review: PES and ES market development context

The main goal of the Year 1 literature review was to scope current governance systems, policies, methods and processes for generating PES systems and markets. The particular focus was on watershed services with multiple benefits and the provision of services by Indigenous people. This included analysis of regional attributes, social engagement issues, benefits and outcomes of systems implemented worldwide. Research materials were located by searching for key terms in a variety of sources and databases, and by cross-correlating results from those searches. Key databases accessed through the libraries of CSIRO, the University of Queensland, and JCU were examined. Google and Google Scholar were also searched to highlight key online and grey literature materials that may not appear in research institutional catalogues and databases. The search terms examined included:

- Conservation governance systems supporting PES development
- Payment(s) for Environmental/Ecosystem/Watershed Services
- Market(s) for Environmental/Ecosystem/Watershed Services
- PES in Australia
- Wetland Mitigation
- Indigenous Stewardship PES

The most highly sought publications were those directly influencing the Australian context, or those dealing specifically with watershed services. Variations in terminology meant that key word searches were essential for this first phase, and once some context within the literature had been established, the searches were refined by year, aiming for the most recent work, ultimately between 2005 and 2016. Highly cited literature reviews were prioritised for analysis. Papers located through keyword searches which met the criteria for relevance were also examined for the references they themselves cited. This iterative process provided both confirmation of the accuracy of the existing search regime, and additional information to augment it. Additional information was obtained through direct referrals from project team members, and in the course of attending external events, particularly a session of the Society for Conservation Biology 4th Oceania Congress in Brisbane, entitled 'Confronting threats to marine ecosystems through the use of biodiversity offsets.'

The review highlighted the need for a deeper and more extended analysis of origins, context, and wider development of PES schemes and market-based approaches. Some key aspects of this wider context are provided in this Year 1 report, but the substantive work is ongoing and will be reported on in Year 2 of the project. The emphasis of the Year 1 literature review was on reviewing recent material specifically oriented to scoping water quality and watershed ES, the Australian context for ES, and the provision of ES by Indigenous people in order to support field scoping and activities.

PES governance and policy requirements

The Year 1 governance and policy analysis associated with the literature review focused on the current national and regional policy frames that either support or hinder the emergence of landscape-scale ES markets in Cape York and the northern GBR, particularly in relation to novel watershed ES products. It provided foundations for the participatory field evaluations of CYP governance and policy as they relate to PES. Year 2 of the project will increasingly encompass further consideration of the implications of this case study for northern Australia more generally. The analysis provides foundations for assisting both State and Federal efforts to improve policy frameworks for ES markets

The wider benefits of Indigenous country-based livelihoods

It has been demonstrated that Indigenous livelihoods based on cultural and natural resource management have a range of social, cultural, political, economic, and health benefits sometimes known as co-benefits (Garnett et al. 2009, Greiner and Stanley 2013). Understanding the nature of these co-benefits, their drivers, and how they are derived from existing livelihood activities is important when introducing new forms of activity or income that may alter existing circumstances. Building on work from pre-existing NERP and NESP projects, preliminary Year 1 work for this project included the finalization of a review paper examining the contemporary co-benefit literature (Barber and Jackson accepted). This provided conceptual foundations for initial communication about livelihood activities and associated co-benefits in the field context.

Scoping of potential ES market interest and PES product design

The scoping of potential ES market interest and of PES market and product design was complementary to the process of literature review and supported by the wider suite of activities involving the same research partners and project team, particularly the CSIRO-funded Acceleration program. In terms of specific methods, through detailed literature review, Year 1 activity involved the identification of key requirements for CYP-specific innovative country-based and ES products, consideration of international precedents, informal discussions with potential PES investors and stakeholders, and planning for sourcing of regional and local Indigenous input regarding community aspirations and market compatibility early in 2017.

Project field activity

The field activity in the first year of the project comprised a 6 day trip in November 2016 focused on: scoping the field context; taking opportunities to complement, align with, and benefit from

other existing projects; and planning for subsequent project activity. During the field trip, the project team undertook:

- 1) Familiarisation with CYP landscapes where Kalan Enterprises operates, particularly aquatic and coastal habitats
- 2) Scoping of existing Kalan Enterprises projects, staffing, and collaborations
- 3) Preliminary investigation of the wider contemporary political, governance, economic, and tenure context for the focal area
- 4) Options for communication with multiple audiences about Kalan Enterprises initiatives in general and PES and water quality issues in particular
- 5) Scoping and coordination activities for on-country participatory workshops scheduled for March 2017 which would be focused on:
 - a. Assessment of the existing co-benefits of conservation-based livelihoods
 - b. Assessment of community human, infrastructure and environmental assets
 - c. Identifying overarching governance systems and requirements
 - d. Evaluation of PES market and product opportunities and risks
 - e. Monitoring and metrics options, capabilities and issues

Field location

The fieldwork focus of the project is the country of the southern Kaantju people in the Coen region. The main field partner Kalan Enterprises focuses its management efforts on a 500,000 hectare area of central and eastern CYP. This area of interest extends across the lowlands and western slopes of the Mcllwraith Ranges, the uplands of the Mcllwraith Ranges, and surrounding rangelands that take in the upper reaches of the Archer River catchment and lands extending to the east coast of CYP. It also includes more than 500,000 hectares of coastal waters within the Great Barrier Reef. The Kaantju people are signatories to the Pul Pul TUMRA for the Cape Sidmouth area of the northern GBR (Figure 9).



Figure 8: Allan Dale (JCU) and Justin Perry (CSIRO) hold scoping discussions with Gabriel Creek, Kalan Enterprises, Coen, Cape York Peninsula.

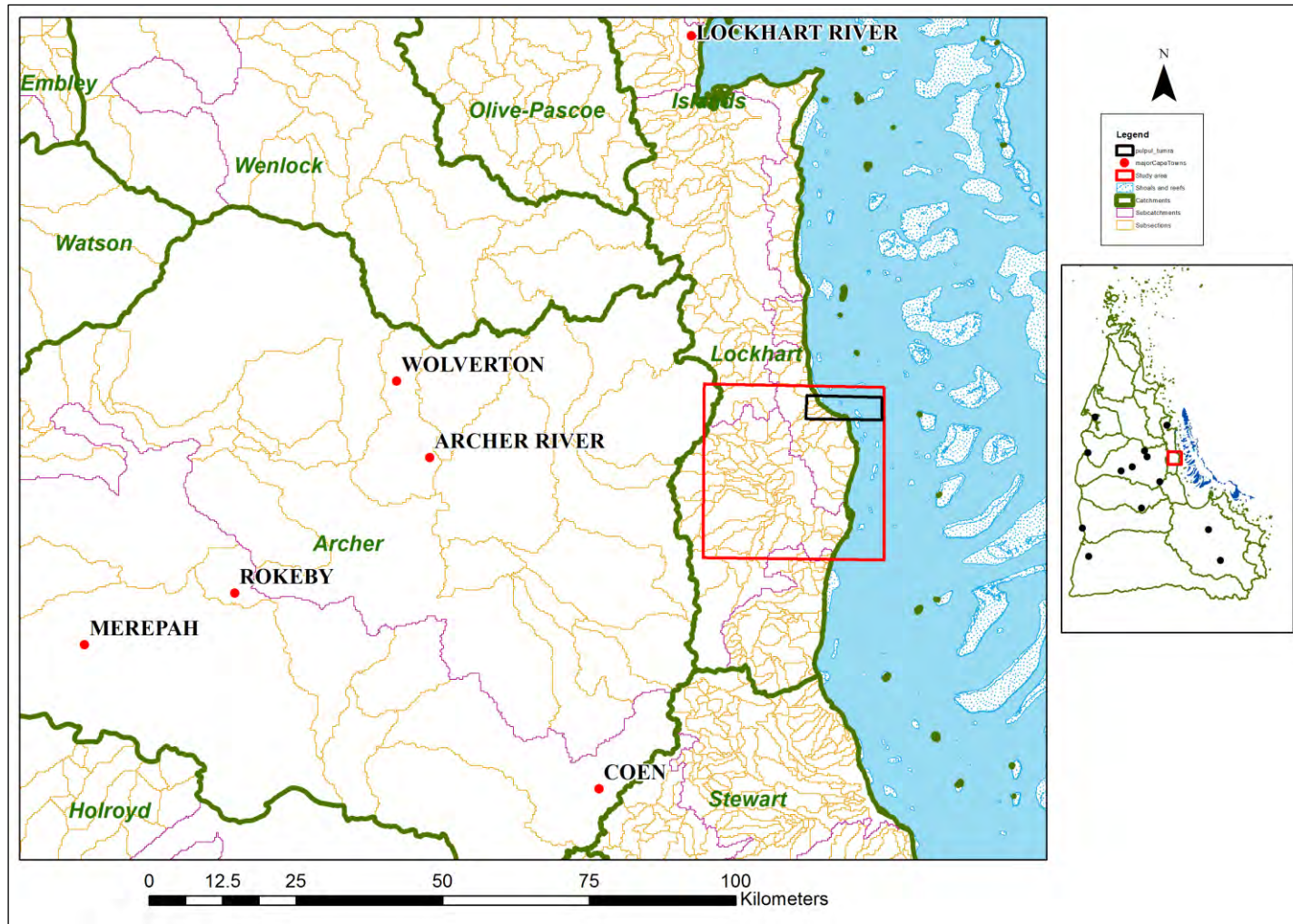


Figure 9: Map of study area.

Major catchments are shown by (green polygon), subcatchments (purple) and subsections (tan). Approximate location of the Pul Pul TUMRA shown with black rectangle in the study area box. Inset map shows location of the study area (red square) in the context of Cape York Peninsula.

3.0 PRELIMINARY RESULTS: ES MARKETS AND PES IN LITERATURE, POLICY AND PRACTICE

Introduction

This section of the report describes the results of the desktop and associated team workshop analysis of the existing context for PES development. It refers to the relevant research literature on PES markets, products, policy, and regulation, and discusses both the Australian PES and water quality/watershed PES domains.

As ecosystems are degraded globally due to increased population, climate change, development impacts and stresses on existing management regimes, the value of ecosystem benefits from biodiversity are similarly degraded (de Groot et al. (2012). Part of the response to this circumstance has been to consider alternative forms of ecosystem valuation. PES is a relatively recent approach to ensuring that ecosystems and the biodiversity within them are valued in terms of monetary and often social compensation, thereby assisting their protection.

Globally, bilateral and international donor agencies have endorsed PES practices for a range of reasons. This includes the perception that PES can aid local communities whilst ensuring continued ecosystem protection (Tacconi 2012), as often the most environmental destruction is occurring in regions of both high biodiversity and high poverty (Calvet-Mir et al. 2015). ES approaches can produce very substantial valuations for natural assets – one assessment calculated tropical reefs functioning at a ‘regular’ level to be worth up to 350,000 int\$/ year⁸ for a hectare (de Groot et al. 2012).

Historical background of PES development

The field of ES began with a “utilitarian framing of beneficial ecosystem functions as services in order to increase public interest in biodiversity conservation” (Gómez-Baggethun et al. 2010). Following this trend, the idea of ES as having major effects on the economic systems entered the mainstream literature (Costanza and Daly 1992). Costanza and Daly (1992) emphasised the importance of recognising global economic systems as being merely a part of the natural systems that support them, and the only way of reaching environmental sustainability was to include to a greater extent environmental and ecological economics. This was followed by an increased interest in the values that can be placed upon natural products and the systems that maintain them (Costanza et al. 1997).

A key turning point in the understanding and global recognition of the economic value of ES was the release of the Millennium Ecosystems Assessment (MEA) report (2005). The MEA was an impact assessment of the effects of human life on the environment of the planet. The assessment was in response to calls from the United Nations Secretary-General Kofi Annan in 2001 and involved four years of study into the changing nature of ecosystems worldwide due to human impact. The assessment found that human impact over the last fifty years has drastically modified the world’s ecosystems and ability to produce services necessary for

⁸ ‘Values were converted to a common set of units, namely 2007 ‘International’ \$/ha/year, i.e. translated into US\$ values on the basis of Purchasing Power Parity (PPP)’.

human survival, such as fresh air, clean water, and protection from other environmental factors (Millennium Ecosystem Assessment 2005, Wunder and Wertz-Kanounnikoff 2009). There was found to be a decline of 60% of the ecosystem services between 1960 and 2000 (Millennium Ecosystem Assessment 2005, Kumar et al. 2013). The MEA involved a great many authors from 95 countries worldwide, and substantially popularised ES as a term and as a framework (Figure 10). Following the release of the MEA, there was an exponential rise in the number of reports and research articles about ES and ES approaches (Gómez-Baggethun et al. 2010). This in turn provided great impetus for a rapid proliferation of PES schemes worldwide, as well as the support garnered by the Kyoto Protocol and the introduction of REDD+ (Fripp 2014).

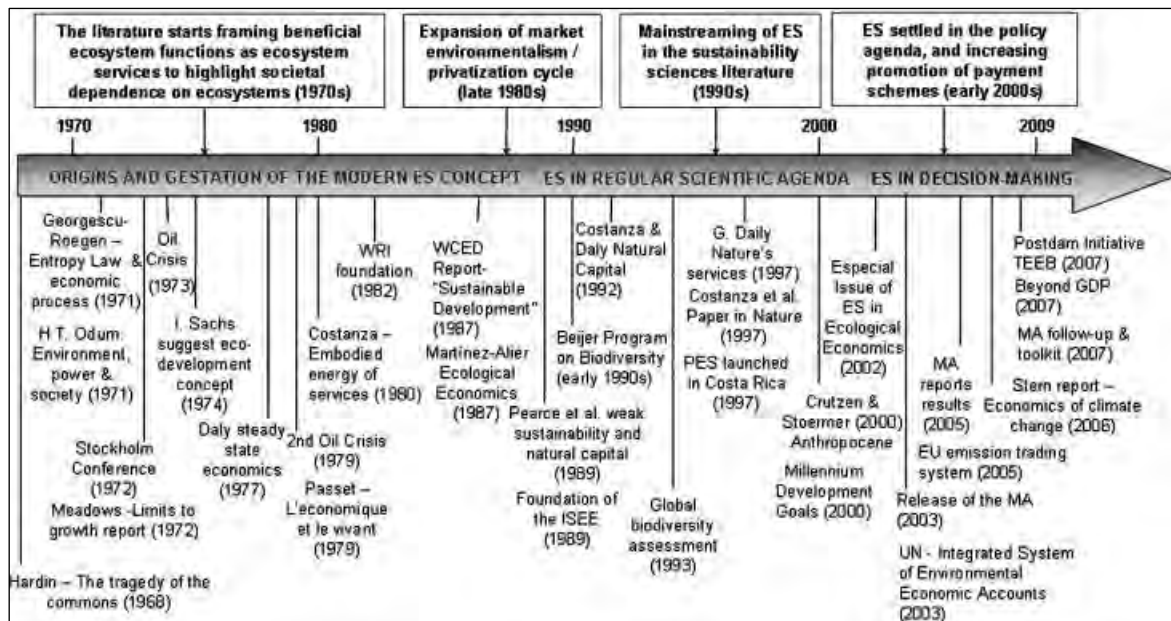


Figure 10: Stages in the modern history of ecosystem services (Gómez-Baggethun et al., 2010)

Key ES definitions, principles and categories

PES has been defined as the payments made by beneficiaries or users of ecosystem services to providers of these services (Fripp 2014). Often, frameworks involve an ecosystem product that is utilised for monetary gain, or a scheme is executed to mitigate, reduce, repair or offset the degradation caused by harmful or outmoded practices by the implementation of payment schemes or mitigation practices (Wunder 2005). PES schemes should seek the lowest possible cost for achieving environmental goals, and are often focused on discrete environmental services and simplified or larger scale ecosystems with relatively few owners in order to reduce transaction and monitoring costs (Mayrand and Paquin 2004). Definitions of PES in recent literature (Huang et al. 2009, Farley and Costanza 2010, Gómez-Baggethun et al. 2010) often derive from a formulation by Wunder (2005) that consists of five principles:

- 1) A voluntary transaction where
- 2) A well-defined ecosystem service (or a land use likely to secure that service)
- 3) Is "bought" by a (minimum of one) ecosystem service buyer
- 4) from a (minimum of one) ecosystem service provider; if and only if
- 5) The service provider secures ecosystem service provision (conditionality)

Wunder (2005) also goes on to describe the four main kinds of PES schemes, these being defined as:

- 1) Carbon sequestration and storage (e.g. a Northern electricity company paying farmers in the tropics for planting and maintaining additional trees);
- 2) Biodiversity protection (e.g. conservation donors paying local people for setting aside or naturally restoring areas to create a biological corridor);
- 3) Watershed protection (e.g. downstream water users paying upstream farmers for adopting land uses that limit deforestation, soil erosion, flooding risks, etc.);
- 4) Landscape beauty (e.g. a tourism operator paying a local community not to hunt in a forest being used for tourists' wildlife viewing).

These five principles and four environmental foci provide an initial framing for how PES function and the issues to which they are oriented. A further demarcation that is useful is to classify PES schemes by payment type. Initially proposed by Forest Trends, three types are defined – public, trading, and private (Table 2).

Table 2: PES classification by payment type adapted from (Solazzo et al. 2015)

	Main Purchasing Party	Example
Public PES schemes	Public institution Municipality, local or national government	Agri-environment scheme in which all farmers meet a minimum standard but may also obtain a stewardship payment if they farm in specified additional ways
PES trading schemes	Multiple parties and payment value correlates to demand	Cap and Trade model. A cap is established and permits allocated allowing trade between those who need more than their allocation and those who do not need all their permits
Private PES schemes	Agreement between two or more private parties e.g. companies or individuals	Parties negotiate and agree the services provided, how they are to be provided, the price, the length of the contract etc.

Necessary factors for the success of PES schemes have been reported to include the economic valuation and quantification of the impact on the ecosystem service, supporting legal and institutional frameworks that allow for the propagation of systems and finally the organization of stakeholders (Savy and Turpie 2004). An important addition to this list are the governance arrangements through which legal and institutional frameworks are enacted.

Governance, policy and regulatory features of ES markets

Having a seller and a buyer, and a definable environmental or ecosystem service, are crucial general features of PES schemes. However, critical to the viability of such schemes is the health of the systemic governance context within which such schemes operate. Thinking about Indigenous communities accessing such opportunities in CYP requires an assessment of the governance context within which such opportunities reside and the policy and delivery reforms required to make such schemes deliver social, economic and environmental outcomes of significance within communities. Hence, an assessment of the governance context (including policy and regulation) driving PES systems is crucial to these schemes operating effectively.

Although PES instruments have gained considerable leverage on the environmental policy agenda since the MEA, they are still not the dominant policy strategy for biodiversity

conservation and environmental protection. Additionally, as they are new concepts, many systemic governance problems limit the development of effective policies, programs and products. Pre-MEA environmental conservation focused on trade-offs between human economic development and conservation of ecosystems, advocating protected areas free of human activity. Post-MEA, with a focus on the utilitarian relationship between the benefits that people receive from ecosystems and the actors involved in the provision or degradation of these services, PES can facilitate the creation of novel partnerships between local communities, corporate entities and civil society organisations. The system of governance driving the capacity of these players and the relationships and linkages between them are fundamental to the success of PES (Muradian and Rival 2012).

From a broader policy perspective, the objective of the PES approach to environmental management is twofold. Firstly, the approach aims to relieve the tension between economic development, biodiversity conservation and Indigenous culture over the productive use of an ES or function. Secondly, PES concepts aim to influence the decisions made by the users of an ecosystem so that they are induced to change their land management practices to the benefit of recipients of an ecosystem service or function (Muradian and Rival 2012). In order to achieve this, PES schemes facilitate financial incentives to land owners and other stakeholders to implement environmental management practices designed to produce environmental benefits. These considerations particularly highlight the importance of PES arrangements becoming increasingly valuable in Indigenous domains where the current focus of economic development opportunity remain based on more extractive forms of natural resource use.

For benefits to flow, two broad policy objectives must be met. Firstly, governance systems driving sound PES development must 'acknowledge and communicate the dependency of economic processes on ecosystem function through quantified measurement' (Muradian and Rival 2012). Secondly, the linkages between the various actors involved in PES development, delivery, and reception must be made explicit; suggesting that purely top down or normative policy approaches will fail to deliver effective outcomes. In particular, beneficiaries of ecosystem services need to recognise the critical importance of those landholders whose territory provides ecosystem services, and the land managers involved in delivery and monitoring. Linkages between the various layers of stakeholders with a stake in the demand and supply of ES products, and in deriving benefit from the, need to deal with and enhance the complex social, cultural and economic interdependencies (multi-thematic). If poorly managed, the linkages among stakeholders could result in negative changes to the use or property rights of landholders who provide the ecosystem services being marketised.

Establishing governance systems that can effectively navigate these issues requires careful PES system design and economic valuation of the ES products. Economic valuation is facilitated through the identification of a tradeable commodity that is required for the operation of the market-based instrument. The creation of a tradeable commodity, or fungible product, requires compartmentalising the ES being used (e.g. the carbon sequestration, biodiversity conservation and/or water quality and/or quantity downstream). PES are inherently complex and any compartmentalisation or simplification creates risks that require careful management.

Risk of reducing complexity

The application of a PES approach requires simple and straightforward assumptions about the relationship between land use, ecological function and ES. This is in stark contrast to the real-life complexity of ecosystems. In addition, there is a lack of synchronicity between the timetable of markets and ecosystem functions, further complicating their commodification. Markets are generally designed for single products - in the case of PES, the identification of and commodification of a single ES such as a tonne of CO₂e, a biodiversity offset, a specific reduction in nitrate or sediment in water. This may involve trade-offs and result in changes to the functioning of the ecosystem, for example a market focused on carbon may distort the relationship between carbon and biodiversity in an ecosystem.

Transaction costs

Markets require information about the traded good and are more efficient and equitable when there is full and equal disclosure of information. For a market to function, it needs to identify what is being traded and verify that the services are contractually delivered. In order to facilitate commodification of an ecosystem service it is imperative to understand and predict the effects of changes to land use practices on ecosystem function and the ES provided. Despite the reduction in complexity discussed above, in the case of ecosystems this information is costly to acquire.

Developing appropriate governance models

Theoretically, PES are seen as a market solution to an environmental problem and consequently as an alternative to more command and control forms of governance such as environmental regulation (Muradian and Rival 2012). Muradian and Rival (2012) argue that hybrid governance regimes that include PES are more suitable than pure markets or hierarchies due to the challenges associated with the characteristics of ES. These characteristics are particularly their complexity and common good nature.

For these reasons, our study is suggesting that, in the development of PES product opportunities in CYP, it will be critically important that:

- 1) Indigenous communities, in partnership with others, drive the scoping and development of PES products and opportunities that deliver on their aspirations; and
- 2) Such efforts are supported by a strategic understanding of the governance reforms required at the community, regional and policy scales.

More detailed analysis and community consideration of such priority reforms will be undertaken during the second year of this project.

Conceptual issues and critiques of PES

The act of quantifying nature and natural ecosystem processes is not without challenges. The argument has been met on both sides, with belief that in order to create long term gains and changes in environmental sustainability, the primacy of ethics and aesthetics must be asserted in conservation (McCauley 2006). McCauley (2006) argues that there are fundamental flaws involved with utilising nature as market tools. Firstly, how can aspects of nature that are incongruous with human interest, such as wild animals detrimental to human and livestock, be handled, and how can the fluctuation of global markets in relation to ecosystems be dealt with?

Another argument is that the current framework of PES does not appropriately address the diversity of all dimensions of value, with ecologists taking an economists' worldview, and shutting off the possibilities to other social perspectives (Chan et al. 2012). Other work has suggested that the current structures of PES are not enough to prevent misuse of the system (Bos et al. 2014). Clear rules and global standards need to be created to ensure that targets are actually being met on the ground.

Another important consideration to make concerning PES systems is whether implementing a scheme improves environmental conditions more than 'business as usual' or that the program ensures through certain mechanisms that stress or environmental damage is not placed on other unprotected areas (Engel et al. 2008). Engel et al. (2008) highlight the potential outcomes of PES (Figure 11).

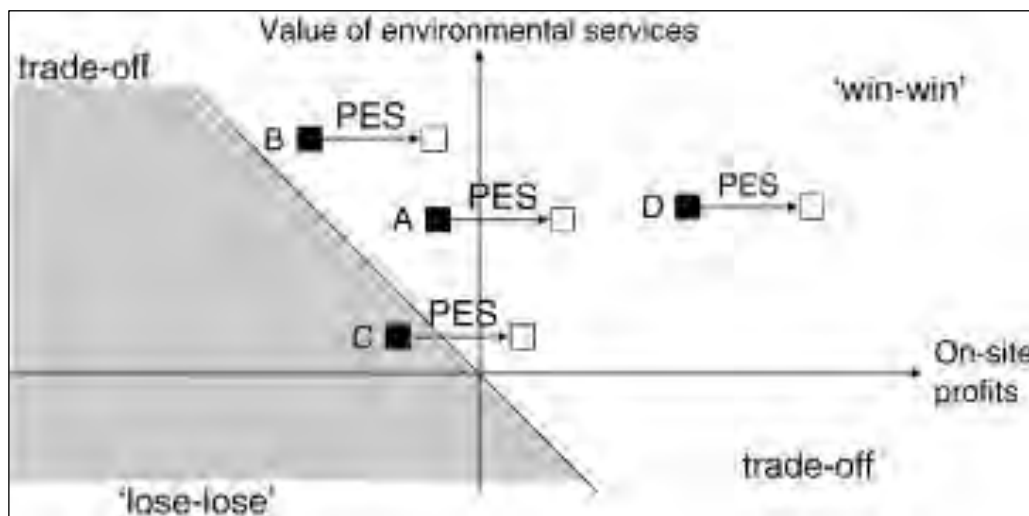


Figure 11: A The potential outcomes of PES systems (Engel et al. 2008).

The diagram shows:

- 1) Offering payments that are insufficient to induce adoption of socially-desirable land uses, thus causing socially-undesirable land uses to remain in use (case B).
- 2) Inducing the adoption of socially-undesirable land uses, that supply environmental services, but at a cost higher than the value of the services (case C).
- 3) Paying for adoption of practices that would have been adopted anyway (case D).
- 4) Case A demonstrates the ultimate goal of PES systems wherein privately unprofitable practices with socially beneficial outcomes become profitable.

The literature engaging with the philosophical and practical issues associated with PES is significant and growing. This project is focused on scoping innovative new PES opportunities. As such, the significance of the critical literature lies in its consequences for practical applications, and for its ability to inform novel applications, or applications in novel contexts.

International watershed PES

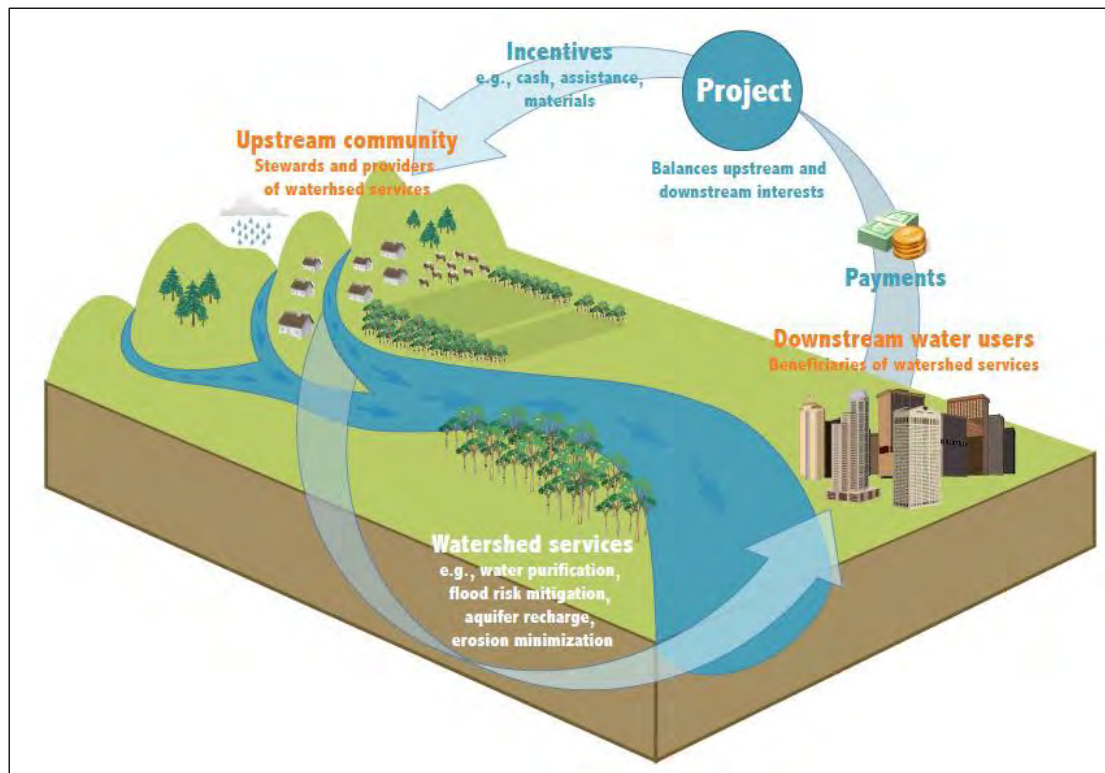


Figure 12: Function of payments for watershed ecosystem services (Smith et al. 2013).

Watersheds are seen to provide many ecosystem services that directly affect the quality of human life (Figure 12). Wetlands are particularly important providers, encompassing water purification and detoxification of wastes, climate regulation, mitigation of climate change, and the provision of fisheries which are instrumental in many poor and developing countries (Millennium Ecosystem Assessment 2005). Payment for Watershed Services (PWS) schemes have been being trialled in many Asian and South East-Asian countries (Huang et al. 2009, Leimona et al. 2015, Wang et al. 2016).

Australian Payment for Ecosystem Services

There is some existing engagement in both watershed and Indigenous domains in Australian PES initiatives. In Victoria, the Department of Primary Industries under the auspices of the Victorian State Government introduced several initiatives which involved a series of policy settings (State of Victoria 2016). The three programs introduced were known as BushBroker, BushTender and EcoTender. BushTender and EcoTender are economic instruments that can facilitate landowners to engage in conservation practices by assisting with management costs (Moon and Cocklin 2011). Around one million hectares of native bush remains on private land in the state of Victoria (Stoneham et al. 2003), BushTender was trialled as an auction-based approach to better managing native vegetation on private land (The State of Victoria 2016). In 2016, 32,000 hectares had been tendered under the BushTender scheme leading to 17.5 million dollars of PES payments. In a direct comparison with our study area, Kalan Enterprises could have secured around 273 million dollars for their 500,000ha of native vegetation. Similarly, the EcoTender pilot followed this design, hoping to demonstrate a linkage between the auction process and a Catchment Modelling Framework designed to work across multiple

environmental outcomes including terrestrial biodiversity, carbon, saline land area and aquatic function (Eigenraam et al. 2006). BushBroker provides a means for landowners to generate credits based on the ongoing preservation and management of native vegetation which can be used to assist clearing permit holders to offset to a third party site (The State of Victoria 2016). The purpose of the design was to provide an offset for any native vegetation destroyed in the process of land clearing (Nemes et al. 2008). A strong bias towards the application of PES in developed landscapes strongly suggests a more conceptual focus is needed in Indigenous domains where landscapes have not been heavily developed for agricultural, mining and urban development purposes.

Australian watershed PES

Australian watershed PES remains at a preliminary stage of development - major water quality priorities have not yet been translated into ES markets and products. Within Oceania more broadly, there were nine operational payment for watershed services, occupying a territory of 107,525 managed hectares and producing a value of \$103.0 million annually in 2013 (Bennett and Carroll 2014). The majority of that activity was in Australia, with the largest scheme (Restoring the Balance) being in the Murray Darling Basin. In 2015, the Murray Darling Basin Balanced Water Fund was introduced as a means to provide solutions for water scarcity within that region. Developed by The Nature Conservancy and executed in partnership with the Murray Darling Wetlands Working Group Ltd and Kilter Rural, the aim of the scheme is to invest in water in order to provide water for wetlands in wet seasons and allow farmers the option of water buy-backs in drier seasons⁹.

In Queensland, the government funded Reef Rescue Program provided financial support (\$130 million over 5 years) for landowners to decrease sediment, nutrient, and pesticide runoff. A new Commonwealth Reef Program has now replaced Reef Rescue. As well as government funding, private funding from WWF and Coca-Cola Foundation sponsored Project Catalyst, a Mackay-Whitsunday Initiative which works with local cane growers and conservation groups to demonstrate best-practice and limit agricultural runoff to the reef. The project provides financial, technical, and project extension assistance to farmers proposing new practices such as precision pesticide application and satellite controlled equipment. Monitoring shows that participants have reduced nutrient pollution by 60% and pesticide pollution by 95%. The driver for Coca-Cola's involvement is both supply chain (sustainably grown sugar) and part of their global replenishment strategy (Bennett and Carroll 2014).

There are also further initiatives emerging with implications for the GBR. Firstly, a nutrient trading scheme is being proposed to control nitrogen runoff from agricultural areas. Based on New Zealand's Lake Taupo program, it involves a fixed cap on emissions and a tradeable permit scheme among polluters (Smart et al. 2016). Secondly, Virgin Australia and Greening Australia have launched Reef Aid, an initiative focused on addressing soil erosion to improve water quality. It begins with a public appeal to raise \$10 million over the next three years for the first stage of the estimated \$100 million major restoration project, with the Australian Government Reef Trust to match private contributions dollar for dollar for up to \$2 million¹⁰. Another recent initiative is a partnership between Greencollar and the Queensland

⁹ <http://www.naturevesttnc.org/business-lines/water-markets/australian-balanced-water-fund/>

¹⁰ <https://www.greeningaustralia.org.au/news/we-join-with-virgin-australia-to-launch-reef-aid>

government. Initially focused on carbon credit opportunities associated with the Emissions Reduction Fund (ERF) the initiative is termed the Catchment Conservation Alliance and will focus on conservation projects in GBR catchments¹¹.

Australian Indigenous PES

The most prominent example of Australian Indigenous involvement in PES relates to carbon. Supporting approximately 10% of the world's population, tropical savannahs represent the most fire-prone vegetation on Earth (Russell-Smith et al. 2013) and Australia's northern savannahs cover approximately 1.9 million km². A combination of colonisation, depopulation, and access issues have resulted in much land being relatively unmanaged. The West Arnhem Land Fire abatement project (WALFA) is the highest profile example of a PES scheme designed to reverse this situation. A seventeen year agreement between ConocoPhillips sees AUD\$1 Million a year paid to secure the carbon credits created by early dry-season burning of savannahs, a practice which highly reduces the potential greenhouse gas emissions of wildfires in savannah ecosystems (Green and Minchin 2012). The success of the WALFA project fostered the rise of other schemes in northern Australia (Fitzsimons et al. 2012) as well as elsewhere in Australia and in savannah-rich countries overseas.

Indigenous involvement is seen as a particularly important aspect of PES within Australia (Robinson et al. 2016a, Robinson et al. 2016b). Willingness to pay studies have indicated that the Australian public sees value in enabling Indigenous people to remain on their country and to contribute to the protection of ecosystems, including management of feral animals, control of introduced plant species, maintaining recreational values and fire management (Zander and Garnett 2011). Insufficient attention, however, has been given to the consequent trade off in development rights required when traditional owners decide to focus their efforts on landscape-scale approaches to conservation (JCU and CSIRO 2013). While focussed on the provision of defined environmental services, PES schemes within the Australian Indigenous context have shown to be an important instrument in the recognition of traditional land and sea management practices, and within various locations Indigenous participants are using PES schemes in order to garner support for their land management practices (Robinson et al. 2016b).

Potential Australian watershed PES policy and regulatory issues

Based on the above analysis, the research has identified several significant governance and policy opportunities and constraints that will need to be further scoped and progressively taken advantage of, or resolved in the PES market and product development process. Key identified opportunities include:

- 1) International and national voluntary multi-benefit markets for PES;
- 2) International regulated multi-benefit markets for PES (e.g. formal carbon trading);
- 3) National Emissions Reduction Fund markets;
- 4) National government-led GBR protection markets;
- 5) International and national feral animal-based fertiliser markets;
- 6) National and State-based markets for regulated offsets;
- 7) State-based GBR protection markets; and
- 8) Strengths in local and regional systems of traditional owner governance.

¹¹ <http://greencollarclimate.com.au/news/3919/>

Key identified systemic governance risks for reform include:

- 1) A lack of cohesive National and State policy frameworks for shifting towards an ecosystem services-based economy – The literature shows that PES development requires a strong governance and policy context that is not particularly well developed in the national context and the northern Australian context in particular;
- 2) A lack of clear regionally-negotiated regional land use planning frameworks or policy frameworks addressing the trade-off between various Indigenous economic rights. This concern is particularly highlighted by JCU and CSIRO (2013) in that they suggest ongoing political conflict over resource use rights might constrain PES development;
- 3) A lack of any structured benchmark settlement between northern Australian traditional owners and the Australian government in relation to development and conservation. The literature has suggested that PES development in Indigenous domains in northern Australian might require some specific higher level policy frameworks that ensure the newly acquired land and resource use rights and interests of traditional owners are not negatively impacted by PES development concepts
- 4) A consistent National and State focus on regulatory approaches to environmental protection versus PES-based approaches to environmental governance. The literature on PES development often focusses on their application in developed landscapes, but focusses little on their application of intact landscapes in Indigenous domains; and
- 5) The need for continuous improvements in local and regional traditional owner governance systems to help facilitate economic participation and PES development. This focus has been particularly identified as important by Dale (2014).

An issue that PES systems must resolve is the need to demonstrate the ‘additionality’ of environmental value and or environmental action. This means that actions undertaken are additional (and therefore would not otherwise have been undertaken) relative to the current circumstances. It is a challenge to gain ES purchaser support for ES actions that a landholder is legally obliged to undertake anyway. Key domains where regulatory environmental protections often limit additionality include land clearing, water resource planning, and the designation of conservation or heritage status. From an Indigenous perspective, the creation of Indigenous Protected Areas (IPAs) has anecdotally resulted in some loss of donor interest in those areas - the declaration of IPAs, which is often interpreted by potential investors as ‘saved’, may have not resulted in the receipt of the resources required for ongoing maintenance. In practice, what strong regulatory support for new PES regimes may mean is enabling Indigenous landowners on CYP with the rights to clear land and to utilise it for other purposes such as agriculture, particularly high value land adjacent to rivers. This indirectly supports generating valuations of the existing land uses as ES. The declaration of an area as a conservation zone (for example World Heritage listing) without such rights may diminish or entirely remove the demand for PES investment.

Project field context

Further examination of the regional and local field context was undertaken during 2016, culminating in a 6 day trip to Coen and Kalan-managed lands in November 2016. The following section contains further information about the regional and local context to support the analysis that follows.



Figure 13: Coastal wetlands, Eastern Cape York Peninsula

Northern Great Barrier Reef

The major coral bleaching event that disproportionally affected the northern GBR in 2015/16 mobilised public attention and occurred against a backdrop of institutional moves and political issues, notably:

- the potential for the GBR to be placed on the World Heritage ‘in danger’ list, with consequent impacts on future tourism
- the report of the Reef Water Quality Taskforce
- the release of the Reef 2050 plan

The potential for an ‘in danger’ listing was averted in 2015, but one basis for that decision was commitments to monitor and improve water quality and in 2016, the Reef Water Quality Taskforce report was released. It had a strong emphasis on repairing existing degradation. There are potentially competing objectives and commitments with respect to water quality across government departments, notably to substantially increase agricultural output while at the same time significantly reducing nutrient loads. An ongoing governance project has identified a large number (40+) of activities and domains associated with the GBR that potentially impact on water quality, several of which are drivers of sufficient significance that changes may erase major gains attained in other areas (see Dale et al, 2016). This work helps frame the fact that a major consequence of the 2016 bleaching event was to highlight the existing infrastructure and capacity gaps that need to be filled to mobilise water quality action with respect to the northern part of the GBR.

The Reef 2050 Plan identifies a range of threats and issues with respect to water quality. Importantly from the perspective of the current project, the Plan was generated with relatively limited consultation with Indigenous traditional owners along the reef. This reflects the relative dearth of Indigenous representation across GBR representative structures as a whole. This situation both exacerbates and is exacerbated by the history of under-investment in the

northern part of the reef relative to the more densely populated and more heavily used areas further south.

Cape York Peninsula

The second half of 2016 highlighted the implications of wider political developments on field circumstances in CYP. As a response to the desire to protect the GBR, the new Queensland State Labor government attempted to pass significant new land clearing legislation containing tighter restrictions on that activity. Partly as a response to opposition in CYP, this initiative was defeated in the Parliament. One indirect consequence has been a significant amount of additional land clearing under the existing regime that will have consequences for Australia meeting targets associated with climate protocols and agreements as avoided land clearing was a significant component of those targets. This places further pressure on decisions about existing uncleared land and how it is valued, both in political debates and economically.

In 2016, the 56,000ha Springvale Station in the Normanby catchment of CYP was purchased by the State government. The government has reserved the station as a nature refuge and is proposing grazing land improvement and erosion mitigation measures to reduce substantial runoff to the reef. From the perspective of the current project, this suggests a government focus on improving heavily degraded areas on CYP rather than the maintenance or improvement of those in better condition. Further action with respect to CYP was also taken by the State government that suggests a relatively protectionist and regulatory approach to CYP catchments north of Cooktown in comparison with those further south. This included resourcing to progress World Heritage designation and to enable the creation of a 'Pristine Rivers' unit to assist in progress for associated legislation.

Water resource planning is also currently under way on Cape York Peninsula. This statutory planning process has the potential to consider and address Indigenous resource rights, a Strategic Indigenous Reserve, or cultural flows in the way that reflects previously articulated northern Indigenous goals and aspirations (NAILSMA Indigenous Water Policy Group 2012). Discussions about water planning issues was one topic of project team engagement with the Chairman of the Cape York Land Council (CYLC) during the November 2016 field trip. The Chairman was also involved in discussions about the project and wider CYLC perspectives regarding local organisational development, PES opportunities, and resource rights on CYP.

Kalan Enterprises



Figure 14: Kalan Enterprises staff and project team arriving to film on-location in the highlands.

Field scoping during the November 2016 field trip involved:

- 1) Vehicle and helicopter inspections to enable direct familiarisation with coastal CYP landscapes managed by Kalan Enterprises
- 2) Inspection of feral and aquatic ecological project monitoring sites and participation in monitoring activities
- 3) Discussions with Kalan Enterprises operational staff about programs and projects, staffing, the development of organisational capabilities, and the management of competing priorities, particularly the labour demands and opportunities associated with the upgrade of the Peninsula Development Road.
- 4) A briefing on the project to the CYLC Chairperson.
- 5) Consideration of options for communication of project concepts, activities and outcomes, and preparation of initial video material for a subsequent visual communication product focused on coastal catchment management and WQES opportunities.

This field scoping activity suggests that key issues for the organisation in terms of acting as Indigenous WQES providers include:

- 1) Operational stability in staffing, revenue, project management, and program governance.
- 2) Clarity and stability with respect to land tenure and land governance arrangements.
- 3) Greater diversification of revenue sources, particularly through non-government revenue.
- 4) The importance of revenue and associated benefits accruing locally.
- 5) The appropriateness of PES products to local landscapes and communities – land tenure, labour requirements, timing, investment required, potential risk, nature of the benefits and who derives them.
- 6) The importance of distinct but mutually supporting economic activities – Indigenous PES payments or more particularly WQES payments, may not be sufficient to provide stand-alone success, but may be effective if they are part of a matrix of income streams.
- 7) 'Provider readiness' – due diligence about product offerings, monitoring capability, etc.

- 8) Careful positioning of Cape York landscapes which balance the assertion of ecological value with countering the idea that the Cape is 'pristine' – that in fact poor condition in many places provides a substantial opportunity for accruing land management value.
- 9) Continuing resolution of tenure and resource rights, including the One Claim processes over both land and sea, and attention to the governance regimes that these should enable.



Figure 15: Allan Dale (JCU) filming preliminary footage for a communications video.

4.0 ANALYSIS

Introduction

Current project progress has been informed by a combination of literature and policy analysis, team workshops, and field scoping. Two primary interrelated pathways have been identified as being useful for further analysis of project data and for supporting understanding of the potential for future WQES products. The first is to consider the key actors in the provision of WQES and what is known about their existing capabilities and requirements. The second is to take the service provider, in this case Kalan Enterprises, and use an 'asset identification' approach to conceptualise how the organisation can position itself for success in the governance and implementation of PES provision. Field data collection has only commenced recently, and so these two approaches are outlined here in preliminary form with limited contextual data. However, they do inform the final component of the analysis section, which identifies WQES market and product features and considerations that are important in further progress during Year 2 of the project.

Scoping key actors for a novel WQES provisioning network in CYP

The diagram below identifies four primary categories of actor in a provisioning network - WQES providers, WQES customers, WQES regulators and (through improved health of the GBR) WQES beneficiaries. Further investigation may yield multiple subcategories within these primary categories. The diagram indicates the significance of regulators in underpinning providers and customers, and also that there is the potential for regulators to be involved in WQES provision or in WQES purchases. These identifications provide a starting point for defining the relationships and linkages required for ecosystem service payments and to assessing the implications, negative and positive, for local control, local benefits and local consistency. Some further comments on key categories are provided below.

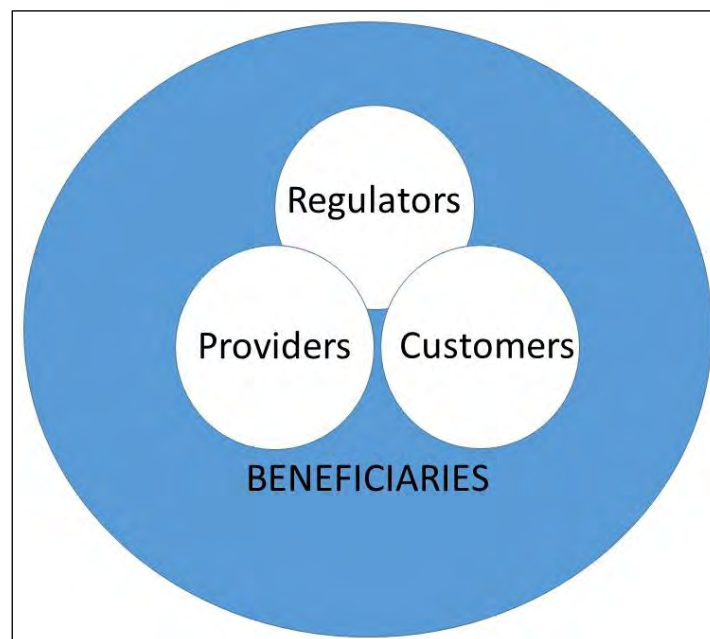


Figure 16: Key actors in watershed ES provisioning network.

Scoping WQES providers: Kalan Enterprises and Cape York Partnership

Ultimately, the WQES providers envisaged by this project are the landowners and/or land managers of eastern Cape York. The northern GBR catchments have comparatively fewer numbers of landowners and a higher proportion of Indigenous landowners than in more heavily developed areas further south. The existing socio-economic status of CYP Indigenous communities means that relatively small changes in income flows can have a significant effect. The complex nature of land tenure (both from an Indigenous perspective and from tenure boundaries recognised by the state) means that income streams derived from land (such as catchment-based WQES) can also require careful management. This project builds upon existing research relationships with Kalan Enterprises (and regional organisational partner Cape York Partnership) in order to test issues for WQES providers (explicitly understood to potentially include landowners, land managers, and potentially, regulators) that may apply to a wider set of Indigenous-driven WQES provision across CYP. An explicit goal in terms of project legacy is greater awareness across CYP of PES regimes in general, and water quality PES regimes in particular, and how they might apply to CYP in ways that underpin sustainable Indigenous livelihoods. Field evaluation with Kalan is providing information about the nature of one potential WQES provider as a pilot activity that enables other WQES opportunities across CYP.

Scoping WQES customers

The customers for WQES are those individuals or entities directly providing payments to providers for service provision. Such customers may also be direct beneficiaries, but need not necessarily be so, and may occupy more than one role in the network (as noted above, there is the potential for different entities in government to act as either a customer or a regulator). Identifying WQES customers represents a substantial challenge in the Australian context. What may be required is an ongoing, iterative process of market and product development and customer identification, as refinement and strengthening of potential markets and products in turn attracts new customers and investors. Project scoping involved identifying existing investors and funding pathways for ICNRM and water quality management, and potential new customers and funding pathways for WQES. Existing funding pathways for ICNRM on CYP include:

- 1) Direct policy influence and core government (perhaps bilateral) funding for ICNRM programs and organisations.
- 2) Project-based competitive grants derived under existing government policies.
- 3) Fee-for-service funding from both government and non-government sources.
- 4) Payments through existing regulated market-based environmental offset, mitigation, and rehabilitation schemes.
- 5) Corporate social responsibility initiatives via associated corporations.
- 6) Voluntary market mechanisms and philanthropic sources.

Many potential future investors are understandably cautious about being identified in advance of making significant investments. Across all of the above investor types, potential new thematically-oriented WQES funding pathways could be considered as including investors with an interest in:

- 1) World and nationally significant CYP conservation and rehabilitation.

- 2) GBR conservation and rehabilitation (particularly among those investors seeking outcomes for the northern GBR).
- 3) Indigenous livelihood and social justice outcomes.
- 4) Water consumption management (e.g. wholesale and retail).
- 5) Water polluters (e.g. corporations) and other entities whose existing activities (or future activities) may lead to significant pollution.

One recent international funding pathway opportunity of note has emerged through renewed emphasis on Sustainable Development Goal target 15.3 on Land Degradation Neutrality (LDN). The United Nations Convention to Combat Desertification (UNCCD) has carriage of the oversight and monitoring of this. While highlighting the significance of land degradation, the LDN does not advocate for market-based offset or compensation schemes. Rather it encourages policies, incentives and all efforts to minimize the impacts of land degradation through sustainable land management and ecosystem restoration. It is primarily focused on developing countries, but has particular implications for rangelands, as there is progress towards a global development fund to avoid savannah degradation. Northern Australia offers a relatively unusual combination of high reliability, an Indigenous domain that has livelihood and social and economic dimensions, and a functional landscape where the focus can be on protection rather than restoration. What will be required to access any future opportunities is a strong database of projects and pathways to enable an extended pipeline for investment, and a clear policy context to provide project direction (towards grazing, fire, etc.). There is currently \$50 million euros to be spent over 10 years¹². Kalan has been raised as an option as the program emphasises local grassroots development.

Scoping WQES beneficiaries

WQES customers may be primary beneficiaries of WQES, but the beneficiaries of water quality outcomes in the GBR also include a much wider network of people and institutions. While the direct benefit may be difficult to quantify, these beneficiaries effectively include all those who derive support from a healthier reef. A detailed investigation of all of the potential beneficiaries of the GBR is beyond the scope of this project. However, one planned activity for Year 2 is a systematic review of Reef stakeholders and users identified in other documents who may be particularly interested in the benefits derived from water quality outcomes. This review will also consider how they may be positioned in a wider network supporting a WQES market and products. Key categories of beneficiaries include reef-dependent industries (tourism, commercial fishing, scientific research, etc.), operational reef managers (e.g. GBRMPA) and Reef regulators (State and Federal governments).

An evaluative framework for WQES provider assets and governance

Past experience and desktop analysis has suggested that it will be important to develop a clear conceptual framework for the development of a WQES market that places Indigenous PES providers at the centre of the analysis. Such an approach needs to identify key assets and context in order to determine their capacity to provide. Figure 17 below shows the key components of this approach and how they are defined and conceptualised.

¹² <http://www.unccd.int/en/programmes/RioConventions/RioPlus20/Pages/LDNFAQ.aspx>.

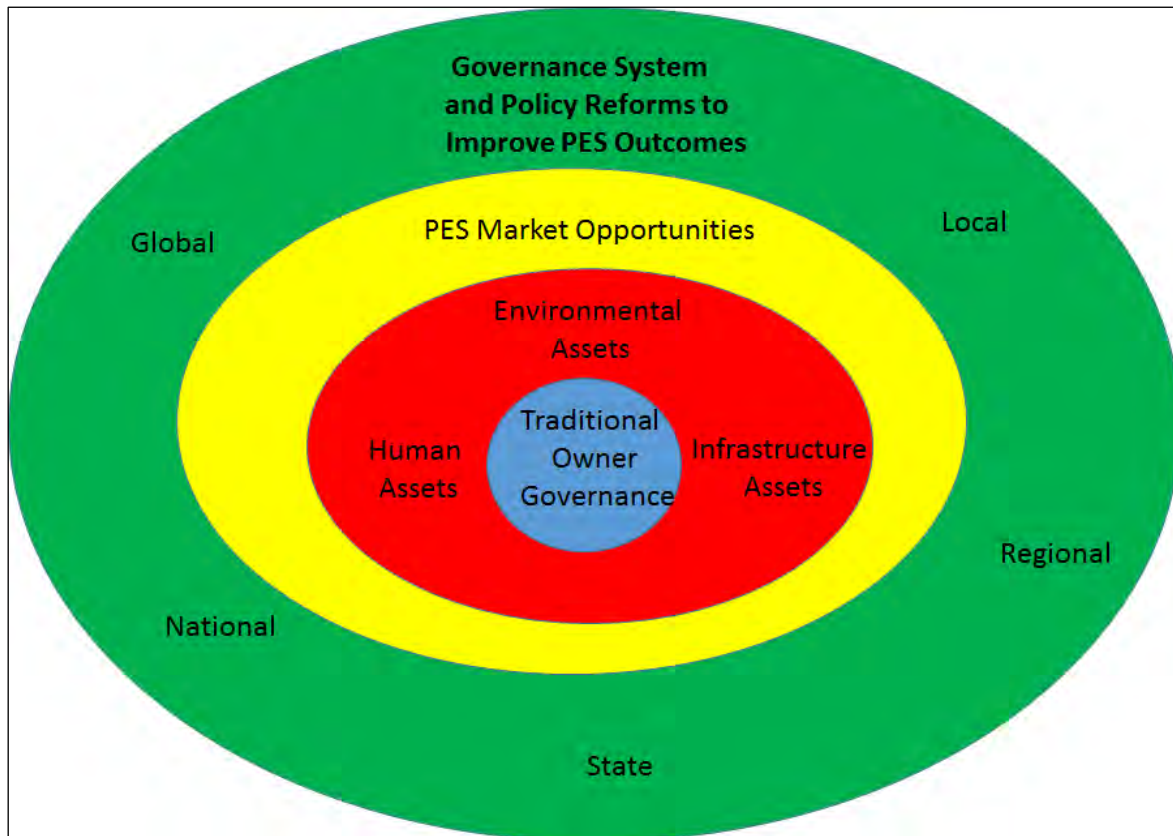


Figure 17: A conceptual approach to building Indigenous-led PES markets.

This approach starts with the appropriate traditional owner institution (in this case Kalan Enterprises). It highlights the strengths and weaknesses of core governance, enabling further consideration of the combined human, infrastructure and environmental assets that can be mobilised to identify, develop, market, implement and monitor PES. Working through this approach is critical to foundational product development, but also assists traditional owner groups interested in PES development to identify markets and to mobilise the governance, policy and programmatic changes needed to help secure and retain these opportunities.

WQES market and product features and issues

The key actor and key asset analyses outlined above helps to identify the potential WQES providers, markets and products that would be suitable for further field-based development and evaluation. Some key general points and features regarding the development of the most appropriate WQES products include considering:

- 1) ensuring that defined Indigenous resource use rights are protected and enhanced through PES development processes;
- 2) how best to secure payments for landscape protection and improvement rather than rehabilitation;
- 3) how best to secure reliable outcomes (i.e. to guarantee the product and protect the market);

- 4) how to secure PES value from the baseline as product delivery (and therefore ES condition) improves in order to avoid perverse incentives to limit the amount or effectiveness of action;
- 5) whether offsets are considered interchangeable (fungible) and whether that interchangeability is acceptable to both provider and purchaser; and
- 6) whether the creation of either a regulatory or voluntary market (or, even more simply, an individual provider-purchaser relationship) is a means for testing methods, and for identifying opportunities for additional value creation (e.g. Indigenous livelihoods, co-benefits, etc.).

Specifically with respect to the eastern CYP context, Kaantju country and Kalan Enterprises, key features requiring further evaluation include:

- 1) the local, regional, state, national and international policy issues that need to be resolved in improve the potential multi-benefit outcomes from PES development;
- 2) the nature of the water quality service that is currently provided and the improvement that can be generated and measured (e.g. nitrogen inputs are a problem further south, but not in the northern GBR);
- 3) the suite of drivers that are responsible for any improvement (large feral species such as cattle, horses, and pigs);
- 4) the nature of the opportunities that may be passed over in order to secure ongoing water quality (e.g. intensified grazing, agriculture, aquaculture) – effectively, the potential economic opportunity cost of WQES;
- 5) the geographic scale and context suitable for different types of WQES products, for example:
 - a) trial evaluation of existing baseline WQES provision at larger scales (e.g. Nesbitt River catchment)
 - b) trial evaluation of actions to generate measurable WQES improvements undertaken at smaller scales (e.g. Stony Creek catchment);
- 6) the potential beneficial water quality implications of activities that may be undertaken as part of related projects – e.g. strategic fencing may enable a pig cull to be avoided or to be spatially controlled in a way that minimises the number of rotting carcasses in the landscape, with further benefits to water quality beyond the initial exclusion effect; and
- 7) whether the production of new fertiliser (a key water quality issue) from feral pigs for export outside of Cape York creates a mixed message in terms of a suite of products offered by Kalan. It may be sufficient to highlight that it would be diverting biomass away from the northern GBR and/or to argue that the pig-based fertiliser is a soil conditioner that can increase carbon storage in soil and breaks down naturally in comparison with the nitrogen loads in chemical fertilizer.

5.0 IMPLICATIONS

Refinements to project scope

The results and analysis arising from the first year of project activity have some implications for project scope. The research highlighted the use of watershed ES overseas and within Australia – that it effectively already has demonstrated ‘proof of concept’ in these contexts. However, it also showed that the approach has not been extensively used in Australia. This has diverse implications – e.g. investor awareness, regulator experience, provider capability, etc. As a result, the research has already emphasised that:

- 1) Watershed ES (and their governing context) remain at a preliminary phase of awareness and associated development in the Australian context
- 2) Success in securing payments for watershed ES will require building capability and sophistication in a range of areas including:
 - a) governance systems, policy and regulatory frameworks
 - b) the protection and enhancement of Indigenous resource use rights
 - c) market creation, structure, and awareness
 - d) product type (existing service valuation, improvement)
 - e) geographic application – scale of catchment, provider, and/or product
 - f) customer depth and diversification
 - g) provider-based governance, planning, delivery, monitoring and marketing capacities
- 3) At the level of a local Indigenous provider, a further series of important factors need to be accounted for, including:
 - a) governance structures and processes affecting traditional owner institutions and their associated land and sea resources
 - b) land tenure and control over natural resources
 - c) clear understanding of the potential implications of distinctions between Indigenous landowning entities and land management agencies
 - d) management objectives and priorities
 - e) articulations and synergies with other project activities
 - f) relationship to wider livelihood benefits derived from existing activities
 - g) organisational resources for delivery and staff stability and capability

These issues and factors suggest the importance of due diligence about the introduction of novel watershed ES markets and products, and that an overly rapid introduction carries a high risk of failure. With respect to project scope, it suggests that the initial timeframe for product development may have been too rapid – that additional scoping and development is needed before identifying particular kinds of WQES market and product opportunities.

The current project does not intend to directly prove a connection between management actions on Kalan lands and water quality on the northern GBR, to guarantee investor interest in any new products scoped, or to provide specific information about how WQES products developed with Kalan can be applied to CYP and GBR Indigenous communities. The focus remains on the potential for WQES provision in a Kalan Enterprises context as a means to further secure livelihood benefits and to diversify the investor portfolio and associated resource streams underpinning Indigenous conservation management action. A further goal is to

communicate that investment potential to investors, beneficiaries, regulators, and to other possible future Indigenous providers on CYP. This involves building pathways for two-way knowledge exchange between community-based management actors, regional development and governance institutions, and wider State and Federal ES policy researchers.

Communication and knowledge brokering



Figure 18: Gabriel Creek from Kalan Enterprises prepares to speak on camera in the CYP highland rainforest about ICNRM livelihoods and water and catchment management.

The project is primarily an exploratory investigation of novel watershed ES market development and associated governance. In communication terms, two important priorities are two-way knowledge sharing with Indigenous communities, and improved profile for the current and potential future roles played by Cape York catchments and communities in the health of the northern GBR. Project outputs focus on the Kalan-managed region, but are and will be explicitly positioned to inform the development of watershed ES products across the wider Cape York Peninsula region and northern Australia more generally. One important step taken in 2016 was to plan, prepare, and shoot preliminary video material focused on communicating the importance of GBR catchments managed by Kalan Enterprises, and WQES as one potential future pathway for income generation in coastal Cape York. This material will be augmented in 2017 for use in future communication about both the project and about Kalan Enterprises activities. The research collaborators are also active participants in project-relevant activities and networks beyond the focal area, including:

- 1) existing TWQ Hub research projects
- 2) research projects in other NESP Hubs

- 3) research and management projects on related topics in other parts of CYP and the GBR
- 4) local and regional governance and management forums
- 5) policy and planning institutions and forums
- 6) engagement with potential large-scale ES investors
- 7) engagement with key staff in government departments

These ongoing networks and collaborations inform project activities and in turn provide a key means of securing wider outcomes and impacts from a project focused on Kalan lands.

Year 2 Project Plan

Key activities planned for the second year of the project include:

March 2017

On-country participatory workshops with Kalan Enterprises staff and Kaantju people focused on:

- 1) the benefits of existing conservation-based livelihoods
- 2) introduction to watershed ES pathways and WQES markets and products
- 3) governance and management
- 4) monitoring and metrics

June 2017

Publication of further literature review and analysis of ES markets, products, and regulation

September 2017

Completion of preliminary community-based ES product evaluation

December 2017

- 1) Completion of the Final Project Report detailing: outcomes of trial product scoping, development, and evaluation process and analysis of policy and governance regimes that support or hinder the emergence of landscape-scale ES markets in Cape York and the northern GBR, particularly in relation to novel watershed ES products.
- 2) Completion of a short promotional video focused on Kalan Enterprises activities and the potential for support for catchment management and water quality outcomes on CYP.
- 3) Completion of two draft research journal papers focused on: the application of ES frameworks and products to Eastern CYP and northern GBR; regional governance and policy implications of the expansion of ES markets across Cape York Peninsula.

Conclusion

The events of 2016, and particularly the major coral bleaching event, have highlighted the need for multiple independent but mutually supportive actions to secure the future health of the GBR. The work undertaken thus far on this project highlights both the existing value and future potential of Cape York landscapes and people to this process. As a framework, PES concepts have been subject to some critique, but they also provide an internationally recognized means for understanding value and for reflecting that through monetary support for those providing such services. The explicit focus here has been on potential WQES that contribute to the health of the GBR and that could act as one component of a suite of income streams which support sustainable local Indigenous livelihoods and as recognition of Indigenous tenure and resource

rights. These livelihoods, and the economic and cultural recognition that they entail, in turn have a range of beneficial effects, both locally and regionally. Such WQES can be envisaged as both a valuation of the rights and interests of traditional owners and the existing contribution of CYP landscapes and people, and as a recognition for specific actions undertaken in the landscape to further improve such contributions. However, also evident from the project so far is the crucial role that the overall governance and regulatory environment plays in any successful ES markets. Our findings to date suggest that considerable additional work is needed in this area to secure product value and to enable stable and sustainable market outcomes in an Australian and particularly the northern Australian context. These steps in turn are needed to locate and secure potential investors in any new WQES regime. Year 2 of the current project will continue to develop these key facets of work: product options and market structures; livelihood implications; governance and regulatory regimes; and potential investors in CYP landscapes and people.

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APPENDIX A: INFORMATION AND CONSENT FORMS

Community Information Sheet



National Environmental Science Programme

Valuing and supporting Indigenous water quality management

What is the project?

This project is a partnership between Kalan Enterprises, CSIRO, James Cook University, and Cape York Partnership. It is looking at a new pathway to support Indigenous wetland and river management on Cape York Peninsula. When people manage feral pigs, rivers and wetland country the right way, the water flowing downstream is good and clean. This benefits coastal country, coral reefs, and sea animals and plants. The Great Barrier Reef supports fishing, tourism, and many other businesses. Many people want it protected. Indigenous wetland management may get more support from these people if the right pathway for improving and monitoring water quality is there.

What will the project team do?

The team will find overseas examples of how water quality is measured, valued, and supported. Sometimes, this measuring and support for water quality management is called watershed ecosystem services. The research team will look at what might work in the Cape and see what might benefit the people and the country. Part of this job of finding out what might work will involve asking people what they think. This includes people who know about Kalan country, people who know about the Reef, and people with resources who might support this new pathway for Kalan water management. If the team finds a good pathway, this may mean more funding for Kalan Enterprises and Kalan people to manage their country in the long term. But there will be many important steps to take to build that pathway before it can be used. This project will find out what those steps are, and how they might be taken. Information from this project might also be used in future projects that are looking at ecosystem services funding pathways.

How long will it take?

The project team started in March 2016. They will visit the Cape during the dry season of 2016 and again during the dry season of 2017. The project will end in December 2017.

Do I have to take part?

The research team will follow a free, prior and informed consent process. People are free to choose to take part in the project. They can stop taking part at any time. Taking part in the research means talking to the project team about Indigenous water quality management and the benefits to people of programs that look after country. CSIRO Ethics approved this project and if you have ethics concerns about the research, you can contact CSIRO Ethics directly on 07 3833 5693 or via email at csshrec@csiro.au.



Photo: Justin Perry

Kalan Ranger, Terry Creek conducting soil sampling at a protected lagoon



Photo: Justin Perry

Wetland protection measures that will support improvements to water quality require significant investment in strategic feral animal control and asset protection via exclusion

How will I hear about the results?

The project team will hold workshops during the project and at the end to share with people what they are finding out. Near the end of the project, the team will also produce a short community report that gives the information in another way that people can keep. The research team will write a longer report for government and possible funders of Indigenous water quality management. The team will also write some research papers about the project for university journals.

Who is funding the project?

The project is funded by the National Environmental Science Programme through the Tropical Water Quality Hub. The research partners CSIRO, JCU, Kalan Enterprises, and Cape York Partnership are also providing support for the project.

How can I find out more?

You can find out more by talking with Kalan Enterprises staff on the project team, Dion Creek and Tim Jaffer. You can also contact the CSIRO researchers Marcus Barber and Justin Perry for more information using their contact details below.

Further information

See www.nesptropical.edu.au or contact:

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This project is supported through funding from the Australian Government's National Environmental Science Programme

Stakeholder Information Sheet



National Environmental Science Programme

Project 2.3.3 Building Indigenous livelihood and co-management opportunities in the northern Great Barrier Reef – ecosystem services and conservation governance for water quality

Project Summary

This project supports Indigenous co-management and livelihoods by scoping and developing culturally-appropriate ecosystem services (ES) products focused on water quality. Local and regional Indigenous development agencies in Cape York Peninsula (CYP) will collaborate with researchers with expertise in Indigenous water, co-benefits, ES, wetland ecology, and governance issues. The project will: i) evaluate international examples of what are often known as nutrient offsets and watershed ES; ii) scope investor demand and develop innovative water quality ES products suitable for Northern Great Barrier Reef (GBR) geographic, demographic, and market conditions; and iii) improve wetland protection, co-management, business, and governance capability. Key project objectives are to leverage existing ES-based livelihood opportunities and to realise social co-benefits.

Problem

Water quality is a critical issue for the protection of the Great Barrier Reef. Unlike climate change, it can be addressed by action on a national level, but the use of water quality ES markets and products in Australia remains under-developed. Actions undertaken to address biodiversity, carbon, and threatened or feral species priorities may have important water quality outcomes. Further development of this additional area of ES could enhance the long term sustainable resourcing of management, associated conservation-based livelihoods, and social co-benefits.

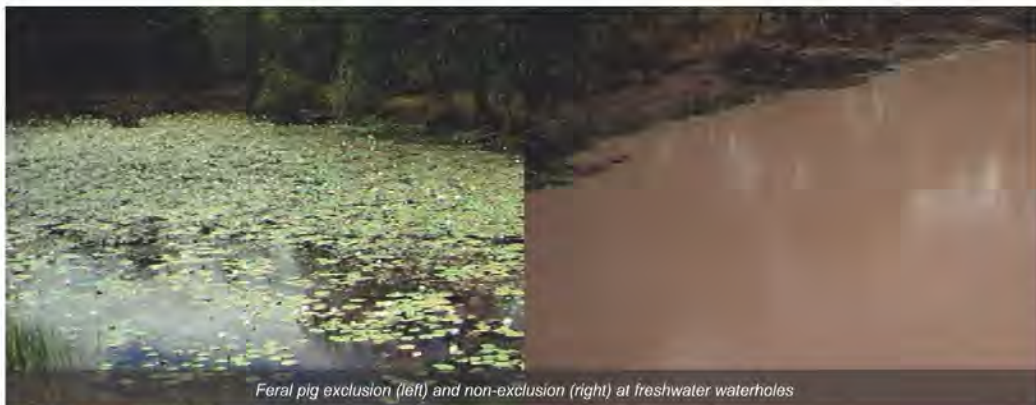
How Research Addresses Problem

Eastern CYP and the associated Northern GBR represents a nationally-significant confluence of two factors: i) conservation manager and ES investor interest in water quality associated with the GBR; and ii) growing Indigenous control over the terrestrial drivers of key nutrient inputs due to ongoing tenure changes. The research partnership between CSIRO, James Cook University, Cape York Partnership, and Kalan Enterprises examines the potential for financial returns to Indigenous people for delivering water-quality focused ES outcomes from successful land management.



Kalan Rangers and scientists collect water and soil samples from fenced and unfenced freshwater waterholes

Photo: Justin Perry



Feral pig exclusion (left) and non-exclusion (right) at freshwater waterholes

Key risks to landscape conservation and associated water quality in the Eastern CYP arise from feral animal damage, overgrazing, and inappropriate fire regimes. Appropriate management responses are being developed, but key issues remain poorly understood and resources for investigation and subsequent management action are constrained. Indigenous managers need more secure and sustainable income streams to deliver key management outcomes. Payments for Indigenous-generated water quality ES can potentially support conservation-based Indigenous livelihoods and also highlight some key tradeoffs involved in other forms of development. However, major water quality priorities have not yet been translated into ES markets and products in Australia.

As part of an ongoing research partnership, this project will:

- further widen a multi-project collaboration between researchers, regional governance agencies, and Indigenous people;
- support Indigenous participation, Indigenous citizen science, and Indigenous Knowledge;
- directly address issues of wetland repair and the management of key species and habitats;
- further knowledge and understanding of collaborative co-management responses to key drivers of water quality inputs to the northern GBR;
- draw on national and international examples to scope potential watershed and nutrient ES products and markets suitable for Indigenous management contexts; and
- ensure governance, policy, livelihood, social co-benefit and regional business development expertise informs the design of new management protocols and ES products and services.

Further information

See www.nesptropical.edu.au or contact:

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This project has CSIRO Ethics approval. For further information, see the contact details left.



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This project is supported through funding from the Australian Government's National Environmental Science Programme

Participant consent form

RESEARCH PROJECT INFORMED CONSENT FORM
Valuing and supporting Indigenous water quality management

Researcher 1	Researcher 2	Researcher 3
Marcus Barber CSIRO, Brisbane 07 3833 5519 (w) 0407 867 445 (m) Marcus.Barber@csiro.au	Justin Perry CSIRO, Townsville 07 4753 8554 (w) 0408 457 607 (m) Justin.Perry@csiro.au	Allan Dale James Cook University, Cairns 0418 736 422 Allan.Dale@jcu.edu.au

Kalan Enterprises, CSIRO, Cape York Partnerships, and James Cook University are research partners in a new project. This project is looking at a new pathway to support Indigenous wetland and river management on Cape York Peninsula. When people manage feral pigs, rivers and wetland country the right way, the water flowing downstream is good and clean. This benefits coastal country, coral reefs, and sea animals and plants. The Great Barrier Reef supports fishing, tourism, and many other businesses. Many people want it protected. Indigenous wetland management may get more support from these people if the right pathway for improving and monitoring water quality is there. Overseas, this supporting pathway is known as watershed ecosystem services.

One part of this project involves talking to people who might be able to help with this idea to see what they think. This includes people who know about Kalan country, people who know about the Reef, and people with resources who might support this new water quality pathway. If the team can find a good pathway, this may mean more funding for Kalan Enterprises and Kalan people to manage their country. Information from this project might also be used in future CSIRO and Kalan Enterprises projects that focus on these funding pathways (called ecosystem services) to support Indigenous land and water management. The project also looks at the benefits of having Indigenous land managers working on country.

Supported by Kalan Enterprises, researchers Marcus Barber, Justin Perry, and Allan Dale will be doing interviews and workshops about this idea between now and the end of 2017. The information from the research will be stored at CSIRO, as well as at Kalan Enterprises. The project has CSIRO Ethics approval and is funded by the Tropical Water Quality Hub of the National Environmental Science Program. The research team will write a report that goes to Kalan people, to the research participants, to government, and to possible funders of Indigenous water quality management. Later on, the research team might also write some research papers for university journals from the information collected during this study. If you sign this form, it shows you give your permission to be interviewed about the benefits of Indigenous land and water management and about the idea of improving and monitoring water quality to report to potential funders. It also gives the research team permission to use what you say in the reports and articles.

This study has been clearly explained to me and I understand what is needed. I understand that it is my choice to take part and that I can stop at any time. I understand that any information I give will not be shared without my permission.

Name: <i>(printed)</i>	
Signature:	Date:

You can choose if you want your name used in the public report. Sometimes it might be good to have your name next to important or unusual information. Sometimes you might want to leave your name out. If you are happy to use your name, tick the box below marked 'Yes'. If you do not want your name recorded in the public report, tick 'No'. This permission can be changed at any time until the report is published.

Yes, I give permission for my name to be recorded in the report.	☐
No, I do not want my name recorded next to my comments.	☐

Recording and Photograph Permission

Sometimes the research team might want to record the interview to make sure that they don't make mistakes understanding what you say. This will not happen without your permission. You can change your mind about recording during the interview or later on and the recording can be deleted. Otherwise, recordings will be stored securely at CSIRO in Brisbane and at Kalan Enterprises community facilities. It may help the research team if they can take photographs of you taking part in the project. This will only be done with your permission. Some photographs may be used in public reports or be put in an open public database called eAtlas. This is because the project funders support eAtlas. Photographs of you will only go into public reports and databases once you have been shown the final photograph and given your permission for the photograph to be made public.

I give my permission for (please tick):

Voice Recording	☐	Photographs	☐
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CSIRO Ethics Contact

Cathy Pitkin, Ecosciences Precinct Brisbane, Queensland, 07 3833 5693, csshrec@csiro.au



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