

# The Uunguu Monitoring and Evaluation Committee: Intercultural Governance of a Land and Sea Management Programme in the Kimberley, Australia

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**Summary** The importance of Indigenous peoples' and their ancestral estates for the maintenance and protection of biodiversity, ecosystem function, threatened species and cultural diversity is clear. Due to their nature, processes and tools to measure the impact of intercultural Indigenous land and sea management partnerships need to be innovative and adaptable. In 2015, the Wunambal Gaambera Healthy Country Plan reached its mid-point, which triggered an evaluation to enable adaptive management through the assessment of effectiveness. The evaluation was used to appraise the need for adaptation, contribute to the evidence base for healthy Country, and to report on achievements. The Uunguu Monitoring and Evaluation Committee, an innovative, intercultural and interdisciplinary body, and their collaborators adopted a multiple evidence-based approach to enable an enriched picture. This committee has successfully integrated western scientific and local Indigenous knowledge for adaptive management by embodying the principles of co-production. The Uunguu Monitoring and Evaluation Committee model outlines a way of doing knowledge integration from the bottom up which, given the significance of the cultural and natural diversity of the Indigenous estate, makes a valuable contribution to the global community of practitioners attempting to use diverse knowledges for better management of biodiversity, ecosystems, threatened species and cultural traditions.

**Key words:** evaluation, indigenous people, Kimberley, management effectiveness, planning.

## Introduction

The importance of Indigenous peoples to the maintenance and protection of biodiversity, ecosystem function and threatened species is clear (Convention on Biological Diversity 2011; Gorenflo *et al.* 2012; Maffi & Woodley 2012; Porter-Bolland *et al.* 2012; Gomez-Baggethun *et al.* 2013; Kothari *et al.* 2013; Poe *et al.* 2014; Smyth 2015). In Australia, although Indigenous peoples' aspirations for looking after Country often align with or complement non-Indigenous interests, the

motivations and means of the two interests can vary (Verran 2002; Howitt & Suchet-Pearson 2006; Muller 2014). Indigenous peoples have been innovative in developing equitable partnerships to achieve diverse intercultural outcomes (Howitt *et al.* 2013; Muller 2014). As such, processes and tools to monitor and evaluate (M&E) the impact of Indigenous land and sea management (ILSM) need to be equally innovative. Several authors have outlined useful intercultural processes and techniques for conducting planning and monitoring (e.g. Ansell & Koenig 2011; Ens

*et al.* 2012a,b; Hoffmann *et al.* 2012; Australian Government 2013; Hill *et al.* 2013; Jackson *et al.* 2015). Building on this work, we here present a novel approach to using multiple lines of evidence to assess the effectiveness of an ILSM programme. It is intended that our approach can be adapted to other local contexts to assist ILSM practitioners to report on achievements, strengthen partnerships with investors and achieve results for both people and Country.

The Wunambal Gaambera people have lived on Uunguu (their ancestral estate) in

the Kimberley region of Western Australia since the creator beings first made the lands, seas, plants, animals and human beings (WGAC 2010). Since this time, the Wunambal Gaambera people have maintained a continuous connection to their ancestral estates (also known locally as Country) (Map 1).

In the past few decades, the Wunambal Gaambera people have helped pioneer the ILSM movement in Australia (e.g. Moorcroft *et al.* 2012). ILSM is a relatively recent term (c. 1990s-present; see Hill *et al.* 2013) that can be used to describe the multiple ways in which Indigenous peoples in Australia have taken advantage of opportunities to undertake natural resource management. Currently over 40% of Australia's National Reserve System (NRS) is on Aboriginal land (Godden & Cowell 2016). This includes a significant proportion of Australia's savannah, arid lands and coasts that are considered some of the most intact in the world (Woinarski *et al.* 2013).

In 2010, the Wunambal Gaambera people shaped Healthy Country Plan (HCP) (WGAC 2010; Moorcroft *et al.* 2012) based on The Nature Conservancy's

Conservation Action Planning (CAP) approach. This planning took place over 2 years involving numerous workshops with all 12 traditional owner groups, the Wunambal Gaambera Aboriginal Corporation (the auspicing body; WGAC), investors, partners and participatory planning facilitators (Moorcroft *et al.* 2012). The HCP approach is now used across the Australian Indigenous estate with, to the best of the authors' knowledge, a total of 32 Indigenous groups employing the process covering ~65 million hectares of the continent.

In 2015, the Wunambal Gaambera Healthy Country Plan reached its mid-point. Embedded in the plan, and part of the healthy Country work, was the commitment to ongoing review and a mid-term evaluation to enable adaptive management through the assessment of the effectiveness of the HCP's strategies (WGAC 2010, pp. 45–46). Other motives for evaluation were to appraise the need for adaptation due to any major shifts in context (e.g. fluctuations in financing, changes in government policy and new threats to values), contribute to the

evidence base concerning Wunambal Gaambera Country and report on achievements to both traditional owners and external stakeholders.

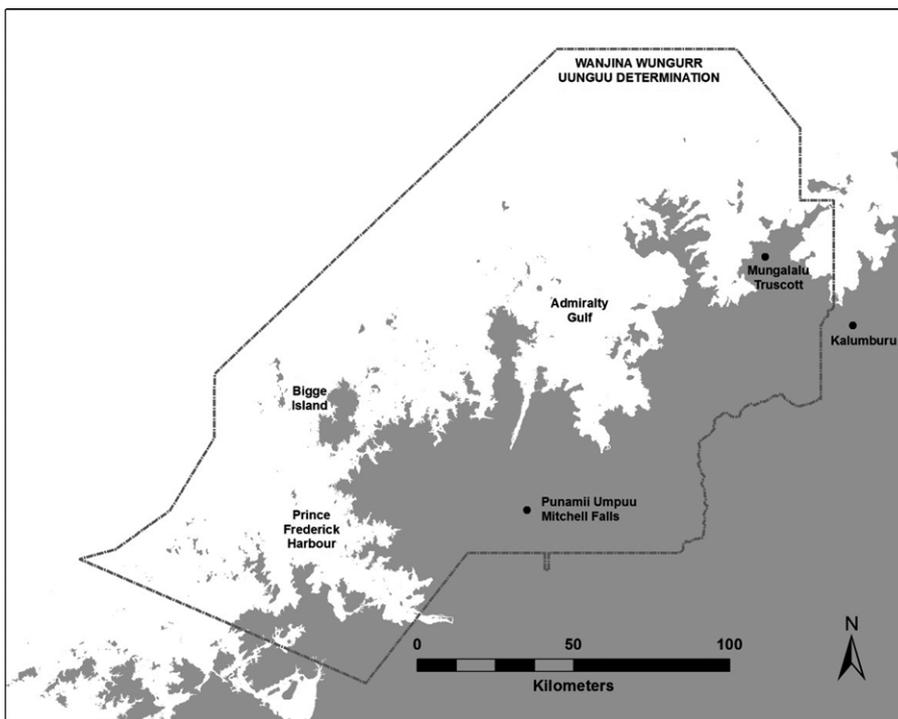
## Methods

This evaluation was designed using a working group with representatives from WGAC, Bush Heritage Australia, Charles Darwin University, and two experienced consultant experts. A multiple evidence-based approach (Tengo *et al.* 2014) was adopted to enable an enriched picture of the progress of the healthy Country work. Four sources of data/information were provided to support the evaluation: (i) work plan and monitoring reports from the healthy Country team (i.e. the Uunguu Rangers and Wunambal Gaambera traditional owners); (ii) a traditional owner evaluation; (iii) an independent review; and (iv) an internal self-assessment conducted within the Uunguu Monitoring and Evaluation Committee (UMEC) (Box 1). Each of these evaluation activities was designed to assess the effectiveness of both the process and the work (see Table 1). The data/information generated from the evaluation informed a synthesis workshop conducted by the UMEC, which then generated recommendations for the directors of the WGAC.

## Healthy country team annual reporting

Healthy Country work is organised into 10 operations with clear work programmes:

- Right Way Fire;
- Pest Species Management;
- Visitor Management;
- Culture Programmes;
- Monitoring, Evaluation, Research and Information Management;
- Partnership and Communications;
- Sustainable Finances;
- Workforce and Training;
- Living on Country; and
- Planning for Country



**Map 1.** Wunambal Gaambera Country as defined by the Wanjina Wungurr Uunguu Native Title Determination.

## Box 1. Unguu Monitoring and Evaluation Committee

The Wunambal Gaambera people have established an innovative, possibly unique, intercultural committee to provide strategic advice on operational, M&E and governance matters concerning the Wunambal Gaambera HCP. Known as the Unguu Monitoring and Evaluation Committee (UMEC), this panel of experts enhances the capacity of Wunambal Gaambera Traditional Owners to make decisions about Country, without undermining their authority, by integrating knowledge to construct an 'enriched picture' of the status and trends of HCP targets and work. UMEC representation consists of a subcommittee of the WGAC Directors and the Head Unguu Ranger, as well as non-Indigenous ecologists, anthropologists and planning experts, plus key investors in the HCP. The UMEC has been meeting on Wunambal Gaambera Country bi-annually since 2012. The UMEC reviews and recommends to the WGAC if the HCP is:

- being used for management of Wunambal Gaambera Country;
- working to achieve the Wunambal Gaambera vision;
- using the best Traditional and Western Knowledge and practice in implementation and monitoring; and
- is being effectively reported on to WGAC.

The UMEC workshops themselves have undertaken important Healthy Country Planning tasks such as target and threat review and developing results chains to assist in the implementation of objectives and strategies.

**Table 1.** Wunambal gaambera healthy country plan evaluation evidence base

Key stakeholders	Process: Is the implementation of the plan following a good process?	Plan: Is target health improving?
Unguu Rangers	Annual progress reports	Annual progress reports
Traditional owners	Survey	Participatory ranking
Wunambal Gaambera partners	Independent peer review	Independent peer review
UMEC	Self-assessment	Self-assessment

The healthy Country team reports annually to UMEC providing evidence of progress against objectives (% complete), strategies (complete/on track/minor issues/major issues/abandoned) and actions. Operations are based on result chains that describe the actions required to be able to produce particular desirable outcomes (see: The Nature Conservancy 2011; CMP 2015; and Appendix S1 for more detail). In this sense, progress against objectives is able to be measured to give an indication of performance/effectiveness. This alone would not be sufficient for reporting on outcomes,

however, when combined with the other streams of evidence employed to conduct the evaluation (as described), it is a powerful way of detecting whether interventions are effectively working towards outcomes, thus supporting the adaptive management cycle.

Reports are provided by an Unguu Ranger at the annual UMEC workshop and is supported by written reports provided to each UMEC member. Similar reporting was provided for the evaluation with evidence presented across 5 years of work. Where available, evidence was provided about the change in health of targets

and threats based on the results of monitoring and research (WGAC 2010; Moorcroft *et al.* 2012).

### Traditional owner evaluation

A participatory evaluation approach (Chouinard 2013) was used for the traditional owner evaluation for three primary reasons: (i) the Wunambal Gaambera HCP is governed by Wunambal Gaambera traditional owners; (ii) local people have extensive 'useable knowledge' regarding outcomes, impacts and changes to Country and people; and (iii) building the research and evaluation skills of Wunambal Gaambera people strengthens governance and creates potential for local employment in research.

Sixteen Wunambal Gaambera people were trained in participatory evaluation by research partners from Charles Darwin University (approved by the University's Human Research Ethics Committee). The training included practical experience of evaluation tools used by other Indigenous researchers in northern Australia (e.g. ARPNet 2012) or others modified and/or borrowed from other participatory evaluators (see Chambers 2002; IDS (online); Participate (Online)).

A research team was put together after training that consisted of 11 Wunambal Gaambera traditional owners (six male and five female between 18 and 50 years of age) and one facilitator from Charles Darwin University. The team proposed two tools: first, an interview instrument with open-ended questions to ascertain traditional owners' satisfaction with the Unguu Rangers and WGAC in implementing the Healthy Country Plan. Plain English was used to guide the interview; however, researchers were encouraged to use their own words. Fifty (50) traditional owners participated in the surveys.

The second tool was a matrix ranking instrument used to rate the health of Country over time (ARPNet 2012). Although there are 10 targets in the Healthy Country Plan, for the evaluation we reduced this to five overarching targets to simplify the process and avoid burdening traditional owners with an overly lengthy exercise (see Table 2). Under Healthy Country Plan, a 'Target' is defined

**Table 2.** Overarching target categories used for evaluation in relation to HCP targets (WGAC 2010)

Overarching target	Healthy country targets
Law and culture	Target 1: Wanjina Wunggurr Law – our culture.
Right Way Fire	Target 2: Right Way Fire
Freshwater Things	Target 3: Aamba (kangaroo and wallabies) and other meat foods
	Target 4: Wulo (rainforests)
	Target 5: Yawal (water sources)
	Target 6: Bush plants
Cultural Sites	Target 7: Rock art
	Target 8: Cultural places on islands
Saltwater things	Target 9: Fish and other seafoods
	Target 10: Mangguru (marine turtle) and Balguja (dugong)

as 'An element of the project site, which can be biophysical, cultural, social or well-being that a project has chosen to focus on. All targets at a site should collectively represent the critical values of concern at the site'. (Conservation Measures Partnership 2015, online). The nature of each of the targets is familiar to traditional owners who contributed to their definition in the original construction of the plan. However, while conducting the matrix ranking exercise, the research team consciously confirmed participant comprehension of the activity at hand. This is part of effective participatory research practice – that is ensuring effective participation from both researcher and research participant. The times used were the following:

- Old People Time (pre-1930s);
- Mission period (1930s to 1970s)
- When Aboriginal community corporations were established independent of missions (1970s);
- Start of the 'healthy Country work' (1990s);
- Now (2015).

Although the Healthy Country Plan was only implemented in 2010, many traditional owners now associate all of the work conducted by the rangers and WGAC as 'Healthy Country Work', irrespective of whether the work occurred before or after 2010. This means that the focus was on the totality of healthy Country work since the inception of the ranger programme in the 1990s.

A total of 38 traditional owners participated in the matrix ranking exercise. The evaluation took place in two stages: in the township of Kalumburu immediately

following the researcher training and several months later in Derby and Mowanjumb.

### External evaluation

An independent consultant who has decades of international experience in conservation planning but had not worked with Wunambal Gaambera people previously, Nautilus Impact Investing (NII), was tasked with undertaking a review of key external partners involved in the healthy Country work to date. Ten (10) key informant, semi-structured interviews were undertaken. Participants were from government (3), environmental nongovernment organisations (3), research organisations (2) and regional Indigenous representative bodies (2). Each was designed to: (i) elicit an understanding of the informant's relationship with the project; (ii) develop insights into their perspectives on, and engagement with, the planning process; and (iii) seek their feedback on the results from project implementation and monitoring efforts to date. Each interview was tailored to the specific interests and knowledge of each respondent. The interviews were conducted with anonymity as a condition, particularly given the commercial in-confidence nature of the content discussed.

### Self-assessment

The CAP approach provides scope for teams to evaluate themselves on the development and implementation of their plan against a set of ideal criteria (Conservation Measures Partnership 2015). The self-assessment focuses on whether the team have followed good practice in terms of CAP, and helps identify areas of improvement (The Nature Conservancy 2011).

The self-assessment is conducted by working through a simple questionnaire and ranking matrix providing a simple rating on the progress with each step in CAP. This was adapted to the HCP context and completed by the UMEC with the support of an independent facilitator.

### Condition review

The target viability table in the plan is an assessment, by the UMEC members, of the health of targets based on the best available information at the time. The goal of the plan is that effective implementation will result in improved target health. Ideally target health is informed by a monitoring programme and local expert opinion. For the purpose of this evaluation, the UMEC used information presented by the healthy Country team on monitoring results and operations, as well as their own expert opinion (community, expert, partners, stakeholders), to provide a rapid assessment of whether each Targets' health had increased, decreased or stayed the same after 5 years of HCP implementation.

## Results

The results of this evaluation are presented in the six sections below that summarise the data/information supplied to the October 2015 UMEC workshop. Contextual, historical and local knowledge-based detail has been omitted from this paper. Where appropriate, it will be made publicly available through a subsequent publication.

### Healthy country team report

In the healthy Country team report to UMEC (see Table 3), right way fire was shown to have achieved a high degree of implementation with annual fire operations being conducted across the full extent of Wunambal Gaambera Country and a significant reduction in wildfires achieved. Work conducted under the right way fire target had enabled traditional owners to make decisions and participate in fire operations (with 32 participants in 2015). A carbon abatement project had been registered that generated carbon credits through fire operations.

Other healthy Country work had achieved some degree of implementation, but further work was required. Significantly, cultural programmes relating to cultural education had not reached capacity, and land-use planning was identified as having major issues relating to the need to negotiate with the State Government.

**Traditional owner evaluation: healthy country plan process**

Wunambal Gaambera traditional owners responded positively regarding the planning process and implementation of the healthy Country work (Table 2). Most interviewees said that either they or their families were involved in development of the plan

and believed that its implementation was progressing well, the rangers are doing a good job and there was no need for significant change. Most people felt part of the healthy Country work as traditional owners of the Country and/or had been involved in some of the activities. However, two specific areas of improvement requiring relatively urgent attention were identified:

**Table 3.** Healthy country team report

Operation	Objective	% Progress	Status of strategies	Threat reduction results
Right Way Fire	By 2015, we will be managing fire on Wunambal Gaambera Country	90	On Track	Traditional owners are decision-makers for fire. Wildfires no longer dominate the fire regime. Some evidence that Target species are getting healthier.
Pest Species Management	By 2015, we will be managing and controlling pest species on Wunambal Gaambera Country and by 2020 pest species will have a smaller impact.	30	On Track	Weed populations contained. Feral cattle have been fenced out of key sites.
Visitor Management	By 2014, we will be managing visitors to Wunambal Gaambera Country and promoting respect for our country in accordance with Wanjina Wunggurr Law	30	Minor Issues	Not yet achieved
Culture Programmes	By 2012, the old peoples' traditional knowledge on plants, animals, our country and how these relate to each other, will be recorded, saved and made accessible to Wunambal Gaambera people, especially the young people.	50	Minor Issues	Wunambal Gaambera knowledge is captured and alive – not yet achieved.
	By 2014, we will be looking after ten important cultural sites according to Wanjina Wunggurr Law, and by 2020 all culturally important sites will be looked after in this way.	80	Minor Issues	
	By 2015, we will be running an ongoing Wanjina Wunggurr cultural education programme for Wunambal Gaambera people.	30	Minor Issues	
Monitoring, Evaluation, Research, Information Management	By 2020, our country will still be healthy with no plants, animals, fish or diigu (birds) or their habitats that are here today, being lost.	50	On Track	Targets are Healthier due to operations – monitoring still being established
	By 2015, we will have figured out and starting using ways to reduce the problems that climate change might have on our targets, on us and on Wunambal Gaambera Country, and ways to make sure our actions don't make the carbon problem worse.	50	On Track	Country has increased rigour to adjust to climate change – to be determined
Partnerships & Communications	By 2015, WGAC will have agreements with key Healthy Country partners, and stakeholder groups will be supportive of healthy Country work.	60	On Track	More capacity for Land & Sea Management Being secure on Country
Sustainable finances	By 2020, Uunguu Land and Sea Management Limited will have sustainable financial capacity to manage healthy country.	50	On Track	
Workforce & Training	By 2015, ten Uunguu Land and Sea Management rangers will have the capacity to look after our country using traditional and Western knowledge, and by 2020 the ranger service will be managed by a Wunambal Gaambera person.	60	On Track	
Getting back to Country	By 2015, five Wunambal Gaambera families will have the opportunity to live and/or visit their traditional country and by 2020 all families will have this opportunity.	60	On Track	People living on country More capacity for Land & Sea Management
Land-use planning	By 2020, land and water title and tenure will be secure and healthy country principles will inform land-use planning	50	Major Issues	Sustainable industries exist for Traditional owners Impact of Bauxite mining minimised

- Improved communication about when and what specific work is taking place and
- A need for more young people to be involved.

The remaining survey questions attempted to elicit more in-depth responses regarding positive aspects of the project thus far, along with suggested changes. Five key themes emerged identifying that the healthy Country work had:

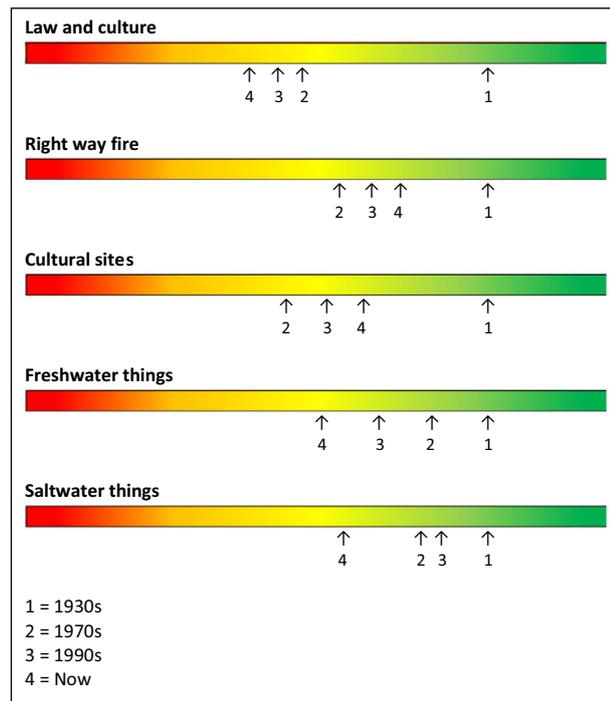
- 1 Increased the capacity of traditional owners to exercise authority over their Country;
- 2 Allowed Wunambal Gaambera people to work together in a more coordinated and collaborative way;
- 3 Facilitated the use of natural resources through hunting and gathering and protection of cultural sites;
- 4 Provided opportunities for employment and skills development; and
- 5 Increased the visibility and recognition of the often undervalued work of looking after Country properly.

Participants were also asked about improvements that could be made to the way the plan has been implemented. Four key themes suggest that ongoing healthy Country work must:

- 1 Continue to increase access to Country, including permanent livelihoods on Country;
- 2 Strengthen traditional owner governance of the plan (e.g. strengthen two-way communication between rangers and traditional owners);
- 3 Increase the number of ranger jobs; and
- 4 Increase the involvement of young people.

### Traditional owner evaluation: target health

The second component of the traditional owner evaluation involved an assessment of target health and the impact of healthy Country work (Fig. 1). Note that while the ranking of each target is reported



**Figure 1.** Traditional owner ranking of target health over time. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

separately, from local peoples' perspectives, all of the targets are inextricably intertwined in Country.

All of the participants said that for Old People Time (pre-1930s), all five targets were 'Too strong' (literally, very strong), 'Healthy', 'How they're meant to be', 'Perfect'. This seems a useful starting point in terms of tracking change and determining trends.

The most significant impact on the health of Wunambal Gaambera people and Country occurred from the 1930s to the 1970s where the effect of colonisation was most acutely felt. During this time, access to Country was severely limited and the practice of law, ceremony and language was actively discouraged. This had severe impacts on three of the five targets: Law and culture was actively discouraged, and right way fire and cultural sites obligations became neglected. Freshwater and saltwater things remained relatively healthy.

From the 1970s to the 1990s, the rate of degradation of HCP targets decreased with the establishment of communities independent of missions. However, the capacity to visit Country was still significantly limited. Lack of access to Country meant that there

was still much work to be done to re-establish Healthy Country.

As the WGAC's management capacity has grown, perception of target health, such as right way fire and cultural sites, has increased dramatically. Of most concern for the Wunambal Gaambera traditional owners is the steady decline in the practice of law and culture, the primary threats being a lack of access to Country for autonomously Indigenous purposes and the education of new generations of traditional owners who have largely grown-up away from Country.

### External evaluation

Overall, external informants were enthusiastic about the approach and direction of the plan process. There was consistent appreciation of the planning process, described by several as 'the gold standard' (government-based participants) for Indigenous Protected Area (IPA) management planning, particularly the high level of community engagement. Equally notable, there was strong support for the partnership between a nongovernment organisation (Bush Heritage Australia), government agencies and regional

organisations such as the Kimberley Land Council and the way they collectively engage the community.

Informants observed that the major achievements of the WGHCP are:

- It is a 'sophisticated' and 'inspiring' (research-based participant) plan with dual emphasis on cultural and ecological targets which is relatively new and necessary;
- Rangers are effective agents of change on Country, performing a wide range of stewardship roles, education and managerial tasks; and
- The establishment of UMEC – the ability to detect change (positive or negative) is critical to long-term programme success. The UMEC plays a key role in bringing information to decision-makers and helps them adjust strategies and priorities.

The primary areas for improvement mentioned by informants included:

- Communications – keeping stakeholders informed about progress;
- Sustainable funding – the lack of sustained, predictable and diverse funding may limit capacity to progress plan objectives and threaten implementation of the plan over the longer term.
- Priority setting – a more focused set of priorities for action, including monitoring efforts, was recommended. Interviewees were concerned that the plan and range of activities to be undertaken in the WGHCP was too ambitious.
- Working relationship with WA State Government – the last 5 years has coincided with a period of policy challenges with WA state government such as the need to negotiate Indigenous land-use agreements.

**Self-assessment**

Self-assessment was carried out by the UMEC by looking at the elements of the plan completed over the 5 years from the start of the planning process to the mid-term evaluation. Two smaller groups went through the evaluation independently and then peer-reviewed each

**Table 4.** UMEC Target viability self-assessment

	Viability change		Viability status	
	Trend	Confidence	2010	2015
Law & Culture	↗	2	FAIR	FAIR
Right Way Fire	↗	3	FAIR	GOOD
Aamba & meat foods	↗	2	GOOD	GOOD
Wulo (rainforest)	↗	2	GOOD	GOOD
Yawal (waterholes)	→	1	GOOD	GOOD
Bush Plants	↗	2	GOOD	GOOD
Rock Art	↗	2	POOR	POOR
Cultural Islands	→	3	POOR	POOR
Fish & Seafood	?	2	GOOD	GOOD
Mangguru & Balguja	→	2	GOOD	GOOD

Confidence (in reliability of self-assessment):

- 1 – Low confidence
- 2 – Medium confidence
- 3 – High confidence

Viability Status:

- Very Good – Desirable status; requires little intervention for maintenance.
- Good – Indicator within acceptable range of variation; some intervention required for maintenance.
- Fair – Outside acceptable range of variation; requires human intervention.
- Poor – Restoration increasingly difficult; may result in extirpation of target.

**Table 5.** Traditional owner's responses to HCP process-related questions

Question	Yes/ Good	No/Needs Improvement
Have you seen this Healthy Country Plan before and do you know what is in it?	41	9
Do you know about the Unguu Rangers and the work they do?	47	3
Do you remember the first meetings when this Healthy Country Plan was being put together, was your family there?	47	3
It has been 5 years since this plan started, how do you think it is going?	46	4
Do you feel like you are part of Wunambal Gaambera healthy Country work?	44	6

other's results (shown in Table 4). There was substantial agreement between the two groups and a positive view of most stages of the process as being either 'complete' or 'on track' with respect to progress along result chains, with the differences between the groups being of interpretation.

Interestingly, the key areas requiring further development are those that the UMEC is primarily tasked with: result chains (or theory of change); measures;

and work plans. The critical issues were the following:

- The concepts and language used in the plan and work can be highly technocratic and, while valuable, requires additional interpretation and adaptation;
- The UMEC focus on measures has made the group more aware of the requirements of a robust and feasible approach;

**Table 6.** Progress towards meeting targets

Step	Group 1	Group 2
Pre-planning	Complete	Complete
Vision/Dream	Complete	Complete
Assess health of targets	On-Track	On-Track
Critical threats	Complete	Complete
Conduct situation analysis	On-Track	On-Track
Goals and strategies	Complete	On-Track
Results chains	?	On-Track
Establish measures	Minor Issues	Minor Issues
Work Plans	On-Track	Minor Issues
Implement	On-Track	On-Track
Review the plan	Complete	On-Track
Learn and share	On-Track	On-Track

- A number of action areas require additional focus, particularly communications.

In each case, these observations illustrate the value of both UMEC and self-assessment for process improvement.

### UMEC assessment of target health

The results of the UMEC Target health assessment are presented in Table 4. Most targets were found to be increasing in health but the trend after 5 years was not significant enough to suggest a change in status in the plan's target viability table. The exception was 'right way fire' which was deemed to have changed its health from fair to good (Tables 5 and 6).

## Discussion

The role of UMEC as an intercultural committee for integrating Western scientific and local Indigenous knowledge for adaptive management is highly innovative and embodies the principles of 'co-motion' and 'co-production' (Howitt *et al.* 2013; Muller 2014). UMEC members adhere to terms of reference and mode of practice that was drafted collaboratively at the first meeting of UMEC in 2011. This allows for synthesis of the diverse knowledge and experience of Indigenous and non-Indigenous experts in a noncolonising way through four key mechanisms. First, UMEC does not 'capture' and communicate any specific Indigenous knowledge-practices-beliefs that belong in the autonomous Indigenous domain, but creates space for the input of 'meta-level' data

from traditional owners. The participatory approach is key, affording traditional owner-generated knowledge equal legitimacy to that of Western science. A process of 'participatory triangulation' is then engaged in by committee members to reach positions.

Second, by only offering recommendations for consideration by the WGAC, UMEC does not undermine traditional owner authority to make decisions about Country. Recommendations can be used, ignored and/or reinterpreted. The nature of these recommendations and the reports produced by UMEC are all documented and stored on the records of the Wunambal Gaambera Aboriginal Corporation.

Third, the measurement and communication of 'intangible' targets and/or other aspects of integrated and intercultural natural resource management is a challenge faced by Indigenous peoples and local communities throughout the world. We have demonstrated that the use of participatory action research can go some way to resolving this problem as it does not require disclosure of sensitive and sacred knowledge, stories or practices, but relies on local peoples' self-assessment of the relative status and trend of such social, cultural and spiritual 'assets' (e.g. law and culture). This mitigates the potential for further colonisation of peoples' private lives through bureaucratic participation (Fache 2014) while providing useful feedback on the progress of the healthy Country work. For Wunambal Gaambera people, this evaluation has been the first experiment in reporting on their

achievements and requires some refinement. However, it may hold potential for strengthening local control of the process and informing adaptive management of Country.

Finally, through dialogue within UMEC, data/information can be interpreted by members based on their unique experiences and expertise. Local Indigenous knowledge holders, traditional owners, Indigenous rangers, ecologists, anthropologists, funders and planners all bring unique worldviews and techniques for interpreting M&E data. UMEC workshops function to facilitate 'double participation' in 'two-way' integrated M&E work that produces not only an enriched picture of Country, but innovative solutions to remedy intercultural capacity deficits (Howitt *et al.* 2013; Muller 2014).

Uunguu Monitoring and Evaluation Committee is the result of patient investment over many years. The Wunambal Gaambera people and their partners have been successful in completing and documenting an adaptive management cycle – a feat which is seldom achieved, most often due to time, resource and technical constraints (Hockings *et al.* 2009). UMEC has enabled WGAC to become disciplined in its monitoring and evaluation, and annual UMEC meetings have helped institutionalise that progress. WGAC directors are proud of what they have been able to achieve through UMEC and of the positive feedback they have been given by their partners. 'Our UMEC is going strong and we all work together as one unit, scientists and us' – Desmond Williams, WGAC Director.

The UMEC model provides a useful case study for other traditional owner groups to learn about growing and implementing a locally owned, participatory and integrated approach to measuring the effectiveness of their ILSM. UMEC has demonstrated the potential for, and value of, incorporating local knowledge and opinions through participatory methods of evaluating ILSM. Over time, the emergence of a local Indigenous research (Rigney 2006) capacity has the potential to strengthen and diversify the knowledge-base on which UMEC

deliberations and Wunambal Gaambera directors make their decisions.

The integration of Indigenous peoples' and local communities' knowledge with Western science has significant potential to improve the capacity of institutions to strategise and manage natural resources for sustainability (Hill *et al.* 2013; Tengo *et al.* 2014; Jackson *et al.* 2015). The UMEC model outlines a way of *doing* knowledge integration at the local level to produce an 'enriched picture' of the Wunambal Gaambera HCP and Country. Given the popularity of HCPs and their relevance to similar approaches in Australia (Hill *et al.* 2013), the WGAC evaluation can also offer some insight to the global community of practitioners (Danielsen *et al.* 2005; Díaz *et al.* 2015). Similar initiatives to integrated diverse knowledge for better management of biodiversity can learn from our bottom-up approach.

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## Supporting Information

Additional Supporting Information may be found in the online version of this article: **Appendix S1**. Translating the healthy country plan to healthy country work.