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Title: Using participatory based mapping to identify links between special places 'on country' and Indigenous well-being: a case study of the Mullunburra-Yidinji people.

Authors:

Aurélie Delisle with the assistance of the Mullunburra-Yidinji Elders

## **Title**

# **Using participatory based mapping to identify links between special places 'on country' and Indigenous well-being: a case study of the Mullunburra-Yidinji people.**

## **Abstract**

The standard way of reporting used by the Australian Bureau of Statistics does not accurately take into consideration all the aspects that contribute to Indigenous well-being, specifically environmental goods and services derived from the use of "country". Using participatory mapping and an economics approach to measuring utility, this qualitative work provides information on the contribution which ecological factors make to the well-being of the Mullunburra-Yidinji people. Results show a link between the use of 'country' and well-being. These results are relevant to land use planners and highlight that indicators of well-being directly related to the environment should be included to measure Aboriginal well-being adequately.

## **1 Introduction**

Statistics on the well-being of Indigenous Australians highlight the current disadvantage faced by Indigenous people in comparison with the wider Australian community. The Indigenous population rates poorly in all the Australian Bureau of Statistics indicators especially wealth, health, unemployment and education (Adams, 2002, Australian Bureau of Statistics, 2004, Duncan, 2003, Edwards & Madden, 2002, Trewin & Madden, 2003). In response to those statistics, successive governments have tried to implement various reforms that, amongst other things, aim to increase the socio-economic status of Indigenous Australians. However, recent analyses reveal that the situation has been slow to improve (or may have even stagnated) (Altman & Hunter, 2003); and that the well-being of Indigenous people in remote and regional Australia is the lowest of all Australians (Hunter, 2004). Given the minimal, if any, improvement in the socio-economic status (and associated well-being) of Indigenous people in Australia, one could ask if the concepts and indicators used to measure the well-being of Indigenous Australians are relevant with regards to their culture and concepts of well-being. This question is important. If the concepts and indicators used by policy makers are not relevant, then policy may be misdirected or may not focus on aspects of well-being that are critical to this part of the population.

In Aboriginal culture, a special link exists between "country" and well-being; both at the community and individual level. Rose (1996) states that country is "multidimensional – it consists of people, animals, plants; dreaming, underground, earth, soil, mineral and waters,

air...People talk about country in the same way that they would talk about a person: they speak to country, sing to country, visit country, worry about country, feel sorry for country, and long for country." Thus, in this paper, we argue that the standard way of reporting used by the Australian Bureau of Statistics does not accurately take into consideration all the aspects that contribute to Indigenous well-being, specifically environmental goods and services derived from the use of "country" (traditional land of an Indigenous community). It is hypothesized that "country" provides different services that are directly linked to Aboriginal well-being and the primary goal of this project is to test the existence of, to assess and to better understand the linkages between human well-being and wild resources at the local level, as perceived by an Aboriginal community.

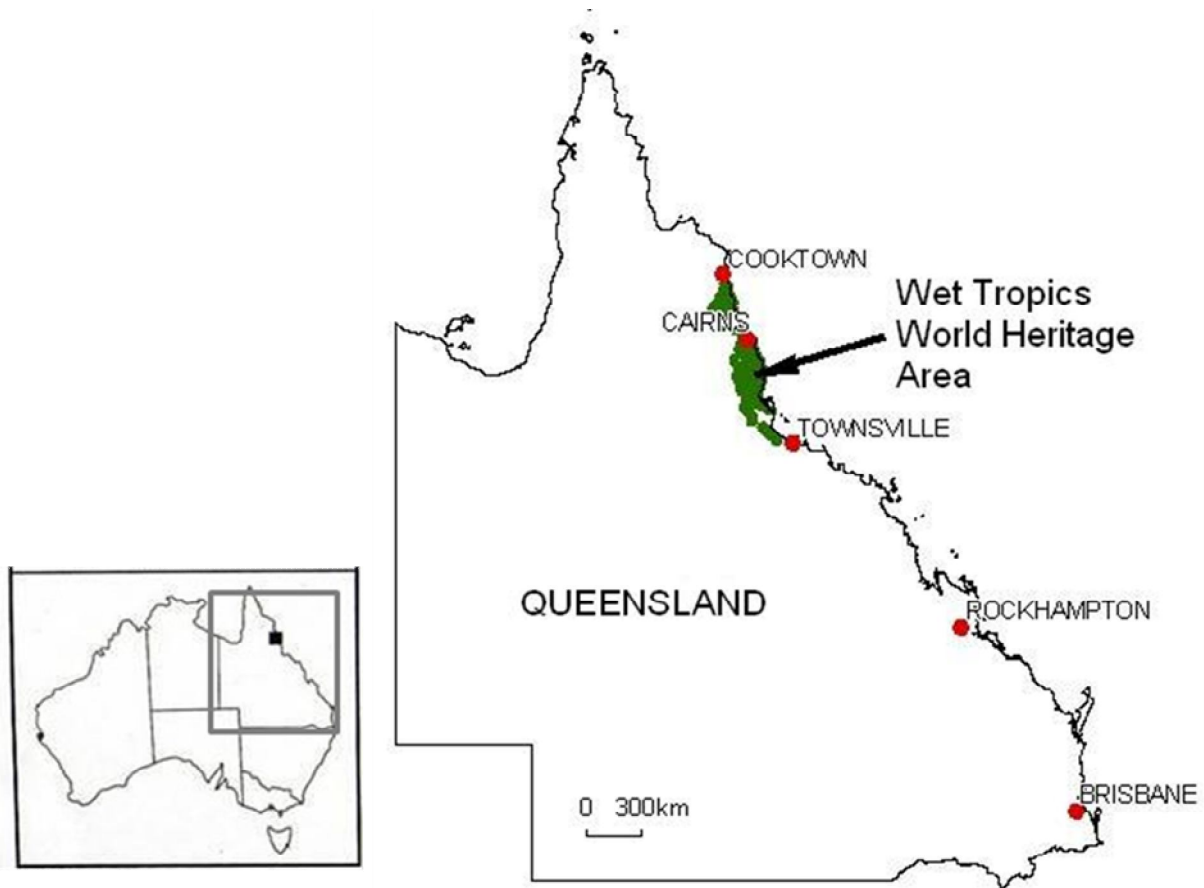
Specifically, this paper uses participatory value-based mapping to assess the spatial link between well-being and wild resources in the Mullunburra-Yidinji community in the Wet Tropics World Heritage Area. We asked questions about: well-being; "country"; resources from "country"; and the relative importance of different wild resource uses to individual well-being, to provide insights into the importance of different wild resources areas and the importance of different constituents of well-being to the Mullunburra-Yidinji community.

The paper is structured as follows. Sections 2.1 and 2.2 provide a brief overview of the study area and participants. Following that, section 2.3 provides a rationale for the methodological approaches used in this research, whilst section 2.4 describes the way in which data were collected. Results are presented in section 3, and the concluding section discusses those results - identifying areas for future research; discussing ways in which the methodology and findings could be used to for land-use planning and natural resource management and noting some possible policy conclusions which can be drawn from this work.

## **2 Methods**

### **2.1 Study area**

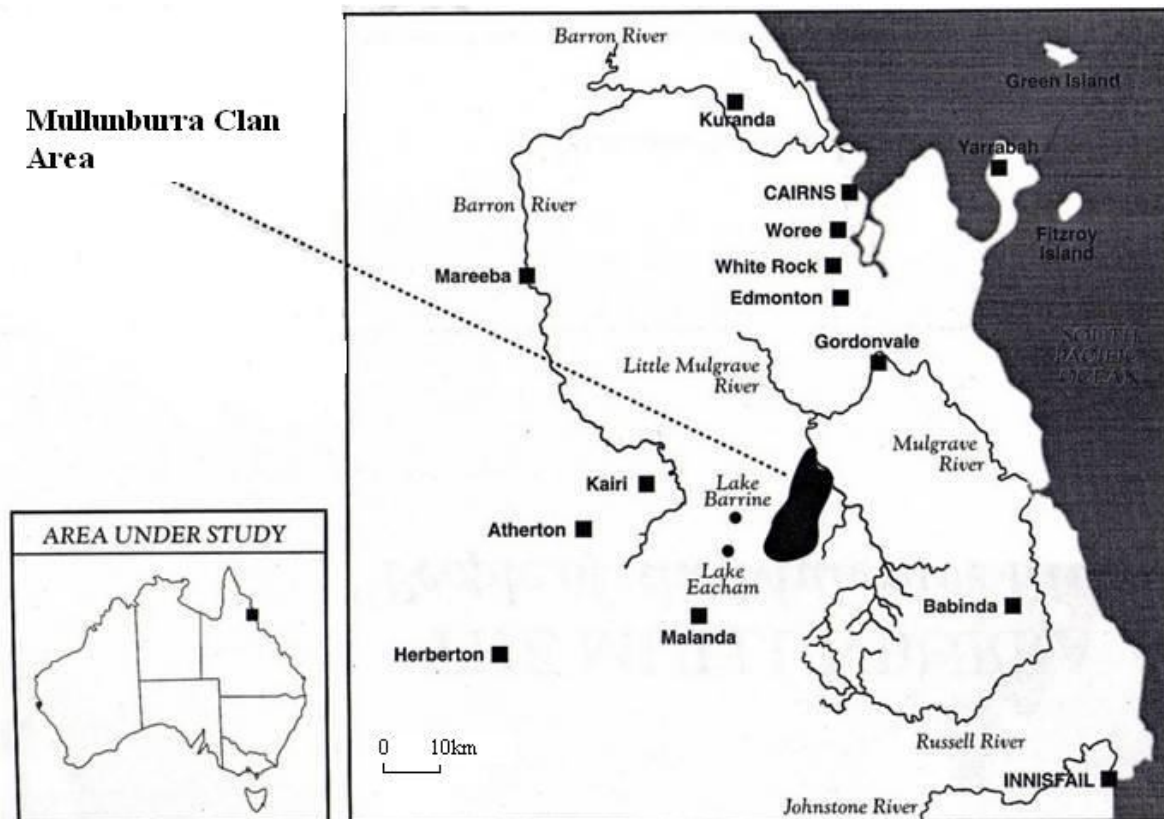
The study took place in Little Mulgrave (17°08'15"S 145°43'27"E) near Gordonvale, 25 kms south of Cairns in the Wet Tropics of north-east Queensland, Australia. The Wet Tropics area was listed as world heritage in 1988 (IUCN, 1988) because of its unique environment and its unique Indigenous culture linked to that environment. The Wet Tropics World Heritage Area covers 894,420 hectares between Townsville and Cooktown (Figure 1). It includes the largest area of tropical rainforest and associated habitats on the Australian continent (WTMA, 2006).



**Figure 1. Wet Tropics World Heritage Area**      **Source: WTMA website**

## **2.2 Participants**

The Wet Tropics World Heritage Area is recognised as a series of living cultural landscapes that are the homelands of rainforest Aboriginal people (WTMA, 1998). There are a total of 18 Aboriginal tribal groups representing around 50 clans in the Wet Tropics World Heritage Area, with approximately 20 000 Aboriginal people living in the region (WTMA, 2006). Members of the Mullunburra-Yidinji clan agreed to participate in this study. The Yidinji tribe has traditional lands that extend from the Cairns area to around the mouth of the Mulgrave and Russell Rivers and areas of the Atherton Tableland (Nungabana Davis, 2001). The Mullunburra – “*people of the river bed*” – are a clan group of the Yidinji tribe and are attached to the State Forest at Kearney’s flat in the Goldsborough Valley (Lee Long, 1991). The main campsites of the Mullunburra people were at the lower end of the Goldsborough valley opposite Toohey’s Creek and on the Tableland at Warrama Bora grounds south-east of Lake Eacham (Figure 2) (Nungabana Davis, 2001).



**Figure 2. Traditional lands of the Mullunburra-Yidinji clan (Source: Nungabana Davis, 2001)**

Currently, there are approximately a total of 400-500 people who belong to the Mullunburra-Yidinji clan and who live in north-east Queensland around Cairns, Gordonvale and Atherton (Alison Halliday; pers. comm.). Most members of the Mullunburra-Yidinji clan do not live on their traditional lands. However, their connection with "*country*" is foremost and going on "*country*" to perform rituals and ceremonies is an important part of their identity (Alison Halliday, pers. comm.).

### 2.3 Methodological rationale

Place-based approaches to natural resource planning are attracting increased attention in many parts of the world, especially in the context of ecosystem management (Brown, 2005, Williams & Patterson, 1996, Williams & Stewart, 1998). In effect, the emergence of ecosystem management has required a new way of valuing natural resources (Manzo, 2003) that accounts for the values people associate with places or landscapes (Brown, 2005, Williams & Patterson, 1996), and the personal bonds people form with them (Williams & Vaske, 2003). Sense of place has been the focus of studies in the geographical sciences (Kaltenborn & Williams, 2002) and refers to the attachment or emotional bond that people have with place (Altman & Low, 1992, Williams & Stewart, 1998) or the meaning they attribute to such areas (Fishwick & Vining, 1992, Kaltenborn, 1998, Stedman, 2003). According to Williams and Vaske (2003), place attachment is the environmental

psychologist's equivalent of the geographer's sense of place. When used broadly, this attachment refers to the positive emotional bonds that develop between individuals and their environment (Altman & Low, 1992, Moore & Graefe, 1994, Williams, *et al.*, 1992).

Williams and Vaske (2003) suggest that place bonds can be systematically identified and measured using a two-dimensional structure of place attachment based on place identity and place dependence. Place identity refers to the mixture of feelings about specific physical settings and types of settings (Proshansky, *et al.*, 1983) and how these settings provide meaning and purpose to life (Giuliani & Feldman, 1993, Shamai, 1991). Conversely, place dependence refers to connections based specifically on activities that take place in a setting, reflecting the importance of a place in providing conditions that support an intended use (Schreyer, *et al.*, 1981), such as timber harvesting or horse-riding, as well as the ability for the area to adequately provide for that use (Jacob & Schreyer, 1981).

While this information is useful in predicting resource conflicts, there is a need to better integrate public consultation into land use planning processes. Brown (2005) developed a quantitative and systematic approach to soliciting expressed landscape values, special places and development preferences in a survey research methodology. Respondents are asked to map landscape values and special places in a planning region using a landscape values' typology provided with the survey and comprising 12 pre-defined categories (aesthetic, economic, recreation, life sustaining, learning, biological diversity, spiritual, intrinsic, historic, future, subsistence, therapeutic, cultural as defined by Brown and Reed 2003). The mapped spatial locations provide a rational basis on which to determine whether proposed development and/or conservation activities are consistent with publicly held values for the planning area. The methodology has been called 'values suitability analysis' (Reed & Brown, 2003) and describes the general process of determining the consistency of public values with proposed management alternatives. This method has been applied in four resource management applications in Alaska (Brown, 2003, Brown & Alessa, 2005, Brown, *et al.*, 2004, Reed & Brown, 2003) and two in Australia (Brown & Hale, 2004, Brown & Raymond, 2006).

However, this approach has some methodological limitations. First, the values are already pre-defined by the 12 categories developed by Brown and Reed (2003). This situation prevents the respondent from giving his or her own perception of the value of a place and perhaps limits our understanding of the rationale behind the valuation. Second, a place which is identified can be classified for one value only whereas some people may value a specific place for more than one reason. Third, the use of a mail-out survey can also be challenging for certain people who may have low rates of literacy. Finally, the method is inherently individualistic and could be inadequate if applied to people who come from a strong group culture, like Indigenous Australians.

In this paper, the potential use of participatory value-based mapping to identify and integrate Indigenous peoples' values into natural resource management policy was tested at the local level as perceived by an Aboriginal community. This methodological framework of the 'values suitability analysis' was modified to better suit the characteristics of working in an Indigenous environment and went further into assessing the potential link between the benefits provided by "country" and constituents of well-being.

When attempting to assess the importance of wild resources to Indigenous well-being, we used a subjective approach to measuring utility, where utility is a function of goods and services. Here, goods and services are assumed to be comprised of a variety of social, economic and ecological variables represented by the symbols a, b, c and d in equation 1.

$$U = F(a, b, c, d) \quad (1)$$

Recognising that people are the best judges of their overall well-being (Frey & Stutzer, 2002), it is assumed that the factors contributing to each utility (variable a, b, c or d) are chosen by individuals to maximise utility. Here, we focus on wild resources with the aim of exploring the extent to which the 'wild resources' which Indigenous people access whilst 'on country' affects utility. It is, therefore, as if this study focuses on only one aspect (say, 'd') of the utility function. To the extent that wild resources serve as a proxy for ecosystem services and the benefits received from those services, this research thus helps to improve our understanding of the way in which ecosystem services affect the well-being (or utility) in an Indigenous community.

## 2.4 Data collection

We selected focus groups over the mail-out survey approach used by Reed and Brown (2003). Focus groups are non-intrusive, do not rely heavily on literacy, and are close to the Indigenous concept of research, i.e. a "two-way exchange exercise", rather than the traditional Western research practice of "intensive direct questioning" (Mommott, 2002). This methodology has been widely used in other studies in an Indigenous context both overseas (Bartlett 2005; Salmon 2006) and in Australia (Tsey, *et al.*, 2002). Focus groups are particularly useful when the views of a group (rather than of an individual) are of interest and when people are interested in the degree of consensus on a given topic (Morgan & Krueger, 1993). Focus groups also seem to be the most relevant methodology to use in an Indigenous Australian context because Indigenous Australians express community values to be more important than individualistic values (Fogarty & White, 1994).

The single focus group and small number of participants in the study are not a representative sample of the Mullunburra-Yidinji community. However, discussions on the project were held long before the collection of data to give the community ample time to decide on the persons who could best represent the views of the community and be their representatives. At the beginning of the process, the community representatives considered



that Elders should be consulted first in the community as a form of respect. The Elders who participated in the community were also the custodians of the non-sensitive cultural knowledge that was explored during the focus group session. Hence, the focus group cannot be considered as “statistically” representative but is, nonetheless, both culturally appropriate and culturally representative.

As recommended by Krueger and Casey (2000), questions were asked in a sequence from the most general to the most specific. Transcripts of the session were analysed qualitatively for the occurrence of themes. Moreover, as suggested by Tsey and Every (2000), statements from the group were categorised into themes during the group session and participants were asked if they agreed with the classification to ensure quality control of the research by the community itself.

Furthermore, a value-based participatory mapping exercise with 10 Elders (5 men and 5 women) of the Mullunburra-Yidindi community was also undertaken as part of a focus group that was organised to clarify links with local area use and well-being. The mapping exercises helped identify linkages and areas of high priority that people value. During these exercises, men and women decided to be separated and each gender-based group was given a map which was made from a collage of eighteen 1/25000 aerial pictures from the DigitalScape CD-ROM; representing the traditional lands of the Mullunburra-Yidindi clan. Participants were also provided with a set of 90 colour stickers to place on the map to record the location of each significant place for wild resources use. Participants were subsequently asked to identify the benefits they received from each place as a way of explaining why they valued those specific areas of “country”. They were also asked to rank places according to their contribution to well-being as well as ranking each of the benefits from those place in terms of the importance of their contribution to personal well-being.

### **3 Results and analysis**

#### **3.1 General well-being function**

The most general questions asked during the focus group session aimed to validate the hypothesis that “country” influences the well-being of an Indigenous community.

The participants defined their well-being using themes similar to those found in other standard models such as health (*“be healthy”*); security (*“not to worry”*); recreation (*“have time to do what I want”*); and good relationships with family (*“I like spending time with my grandchildren”*) and friends (*“spend time with the other ladies”*). “Freedom” was also an important element of the discussion especially when it came to the freedom to manage one’s own country.

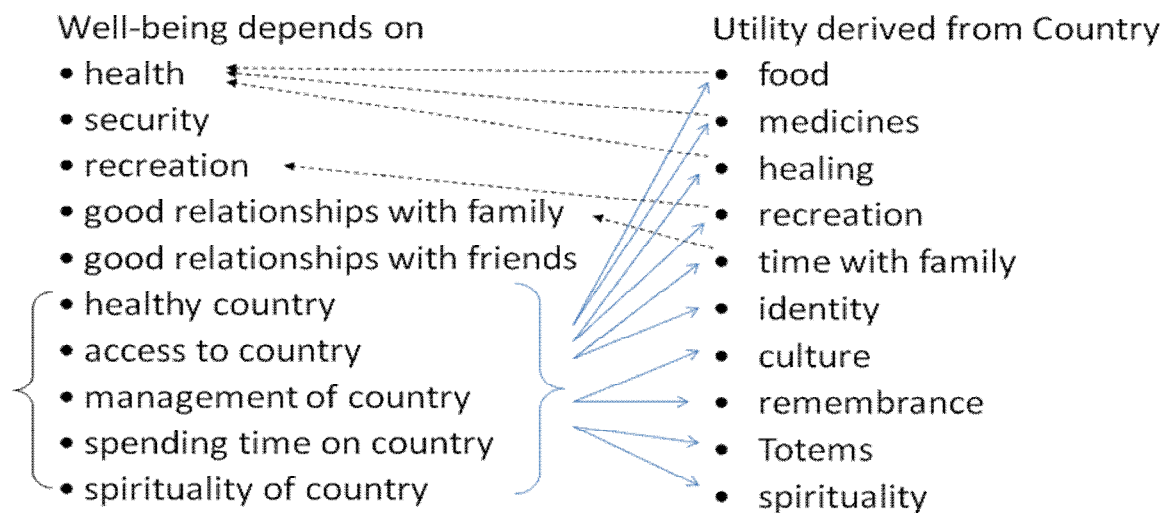
Participants also defined their well-being using themes related to “country”: “healthy country” (“if country is sick...we are sick”), “access to country” (“*want to be free to go on country*”, “spending time on country”, “management of country” (“*want to manage country and my ancestor’s country*”) and “spirituality of country” (“*could dream,..., remember things or people*”). These dimensions were important components of well-being for the community participants. These several domains related to “country” (healthy country, access, management, time and spirituality) thus constitute a benchmark that, if met, will enable Aboriginal people to derive utility associated with the “use of country”.

### 3.2 Ecological factors of the utility function

Considering that the foregoing general conditions are met, these responses indicate that “country”, through its use, provides several goods and services. These goods and services specific to the use of country thus provide information about the contribution that country makes to one component (say “d”) of the community utility function in equation 1.

The answers given by the Mullunburra-Yidinji Elders during the focus group session suggest that “country” is specifically associated with the following goods and services: food, medicines, healing, spirituality, time with family, identity, culture, recreation, remembrance and totems. We argue that the utility which the Mullunburra-Yidinji Elders derive from “country” is a function of these factors. This conclusion does not rule out, for example, food and other goods and services, which are obtained from other places, being part of the well-being function of the Mullunburra-Yidinji.

Figure 3 highlights the inter-relations between general elements of well-being and utility derived from the use of “country” by the Mullunburra-Yidinji. As mentioned in the previous section, the well-being of Mullunburra-Yidinji Elders depends on several general dimensions that include specific elements of the use of “country” (left column). When the conditions are met to enjoy the utility provided by “country”, then Mullunburra-Yidinji Elders derive a certain number of goods and services (right column). In return, those goods and services provide elements from the general well-being function of the Mullunburra-Yidinji (dotted arrows).



**Figure 3. Inter-relationships between well-being and utility derived from the use of "country"**

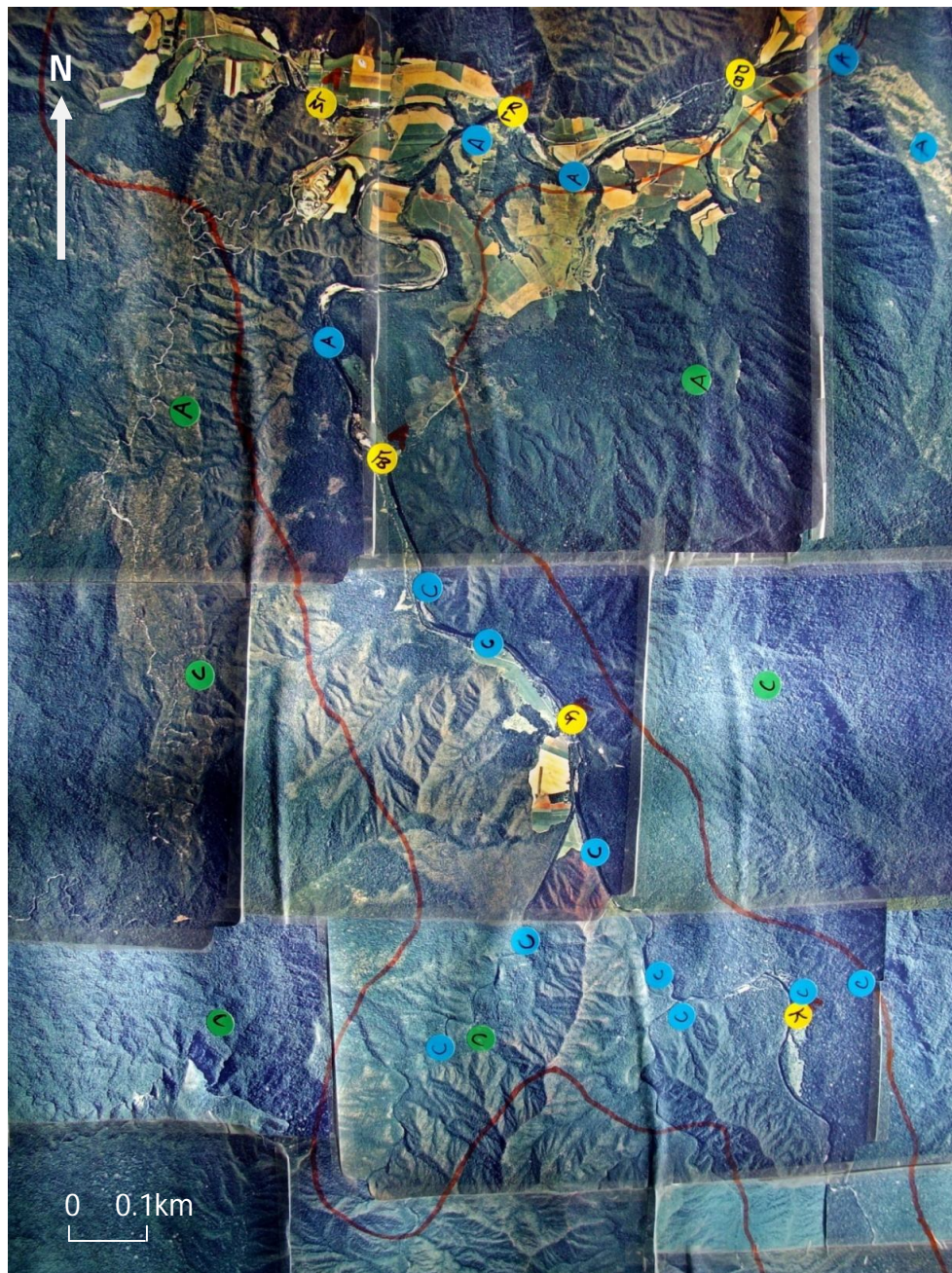
### 3.3 Value-based mapping

Participatory value-based mapping was used to identify particular parts of country providing specific resources that yield utility. During the focus group discussion participants were asked to talk about specific benefits which they derived from use of particular areas of 'country', identifying those areas on a map.

Participants decided that questions about the specific benefits which they derive from particular areas of 'country' should be answered in two separate groups (men and women) as some places are for "men's business" and other places are for "women's business". As a result, we obtain information about two different utility functions based on gender.

#### 3.3.1 Responses from the men's group

The exercise was a success with around 70 significant sites located on the men's map. Figure 4 shows a snapshot of the map constructed by the Mullunburra-Yidindi men. In this map, each coloured dot represents a significant place for wild resource use except for 'burial areas' which are represented by a buffer zone as the precise location of those places is culturally sensitive information. Only a small portion of the entire map can be shown and some elements have been removed because the data remain the intellectual property of the Mullunburra-Yidindi community (for example, the colour code of the corresponding category cannot be given). But the map clearly demonstrates that different areas of 'country' provide different types of benefit.



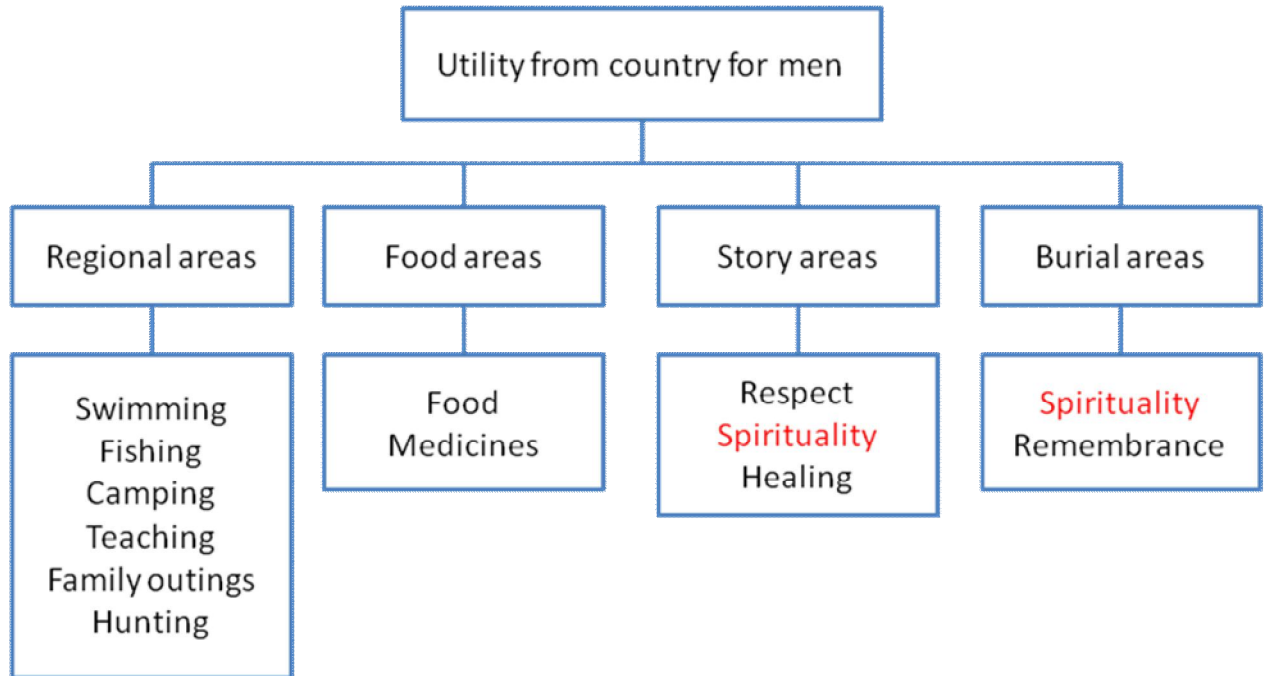
**Figure 4. A smaller area of the map realised by Mullunburra-Yidinji men depicting significant places for wild resource use**

As indicated by the different coloured 'dots' on the map, the group of men divided all the places into categories according to the benefits that each site provided. Although they were ready to divide the places into multiple categories, they felt limited by the small choice of coloured stickers, and therefore settled on four main categories as depicted in figure 5.

- Regional areas providing: swimming, fishing, camping, teaching, family outings and hunting;
- Story places: respect areas providing spiritual and healing services;



- Food areas providing: food, healthy life, medicine and bartering with other tribes;
- Burial areas: (no-go zones where only certain people are allowed to go) providing spiritual, remembrance services and are considered as cultural sites of significance.



**Figure 5. The different components of the utility provided by country for Mullunburra-Yidinji men**

This result clearly indicates that the utility which men derive from “country” is various. Different areas of “country” provide different benefits (or goods and services) to the Mullunburra-Yidinji men, and are therefore key components of their utility function. Hence, we can substitute some of the symbols used in equation 1 with specific factors that are known to impact upon Indigenous well-being. In other words, the utility function of Mullunburra-Yidinji men can be more formally specified in equation 2 as:

$$U_{\text{men}} = F(a, b, c, \dots, \text{swimming, fishing, camping, teaching, family outings, hunting, respect, spirituality, healing, food, medicines, spirituality, remembrance}) \quad (2)$$

Where: a, b and c represent ‘other’ important determinants of utility not considered here.

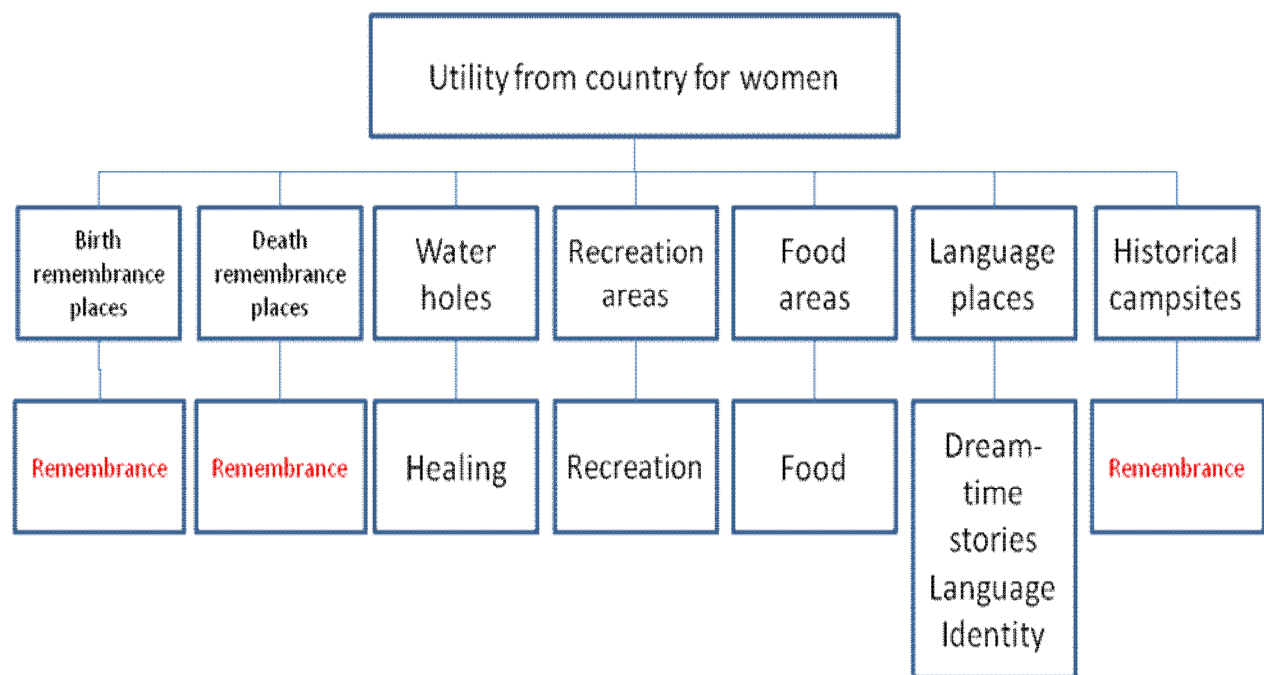
Different places provide Mullunburra-Yidinji men with similar types of benefits, for example – “spirituality”. Yet, it is not clear if the “spirituality” associated with story areas is the same as that associated with burial areas. Furthermore, it is not clear whether each type of area on the map (i.e. story areas) provides all the goods and services from the areas of their categories (respect, spirituality and healing), or just a single one, or a combination of them. This stands as an important area for further research and is linked to the previous

acknowledgement that men could have been more precise in dividing areas of their “country” if given more time.

### 3.3.2 Responses from the women’s group

Mullunburra-Yidinji women also derive different benefits (or goods and services) from their different areas of “country” (Figure 6). However, women were less specific when it came to describe the benefits associated with the use of different places. The use of aerial pictures as a tool during the exercise may have influenced the number of areas that women could locate and as such talk about. Only fourteen sites were talked about during the women’s exercise. During the activity, women noted that most knowledge regarding significant places was “men’s business”. Women traditionally collect food around main campsites (Mullunburra-Yidinji Elder, *pers. comm.*). This lack of knowledge combined with the difficulties which the group had when working with aerial pictures explained why the number of significant places is low for women compared to men. It would be interesting to monitor if the same answers were gathered using a more familiar medium such as topographic maps (as suggested by several Mullunburra-Yidinji women).

Nevertheless, the women were able to identify key locations on the map; and to discuss the “benefits” they were able to derive from those areas (Figure 6).



**Figure 6. The different components of the utility provided by country for Mullunburra-Yidinji women**

Using this information, it is possible to explicitly identify the contribution that wild resources make to the utility function of Mullunburra-Yidindi women (equation 3):

$$\text{Uwomen} = (\text{a, b, c..., remembrance, healing, recreation, food, dream-time stories, language, identity}) \quad (3)$$

Interestingly, although men and women located identical areas as being important to well-being on the map, these areas were sometimes identified as contributing different types of benefits by the two groups. This difference may be due to some specific gender-related areas of significance. At times, the two gender groups also classified wild resource areas differently, indicating that men and women do not derive the same goods and services from parts of "country". This result indicates that both men and women should be consulted when it comes to their well-being since it will not be appropriate to generate conclusions based on one group only.

During this exercise, some of the goods and services which were identified as being provided by "country" during the first part of the focus group discussions (section 3.2) were not mentioned in these later deliberations, specifically: culture and time with family. However, some goods and services are clearly related to one another; e.g. recreational areas provide opportunities to spend time with family. Hence, respondents may consider these goods and services to be included here, albeit indirectly. Nevertheless, this aspect will need to be investigated further.

### **3.4 Ranking exercises**

#### **3.4.1 Areas of country**

Participants were asked if they could rank, as a group, the areas of "country" previously identified on the map from lowest to highest in terms of the importance of their contribution to personal well-being. Different places could be ranked equally and participants could also use medium/high as well as medium/low as potential ranks. Once again, men and women asked to be separated when answering this question.

**Table 1. Ranking of significant places by Mullunburra-Yidinji men**

Low	Medium/High	High
Public recreational areas	Walking tracks	Story places
Public tracks and roads	Fish traps	Burial sites
	Teaching areas	Initiation areas
	Camping grounds	Ceremonial places
		Food areas
		Fire places
		Hunting areas
		Areas for Tools materials
		Extinction areas

**Table 2. Ranking of significant places by Mullunburra-Yidinji women**

Low	Medium/High	High
Recreation areas	Walking tracks	Story places
	Fish traps	Burial sites
	Hunting areas	Initiation areas
		Healing places
		Medicine areas
		Camping grounds

Not all the places located on the maps could be ranked; as a result men and women ranked places according to their purpose. Sites were naturally divided into categories by the Elders according to their main usage as a wild resource. Amongst all the sites located, some sites were assigned an identical purpose by both groups (Tables 1 & 2). Both women and men ranked places that had an important spiritual connection (like remembrance places; including burial, massacre and birth places; respect places and story places) very highly. Other areas receiving the highest ranks were food areas, medicine areas, healing places, recreation places and historical campsites. Men pointed out that they could define sub-categories - an interesting topic for future research - although ranking each place would be very time consuming so the use of categories as in this study could be a viable alternative. Furthermore, it would be interesting to investigate if each site is valued identically or differently within each category or sub-category.



### 3.4.2 Benefits from areas of country

The second part of the ranking exercises concentrated on weighting the different components of the utility function derived from wild resources (Tables 3 & 4).

**Table 3. Ranking of well-being benefits by Mullunburra-Yidinji men**

Low	Medium/High	High
Recreation	Food	Spiritual
	Medicine	language
		Identity
		Tools
		Remembrance
		Respect

**Table 4. Ranking of well-being benefits by Mullunburra- Yidinji women**

Low	Medium/High	High
Recreation	Food	Spiritual
	Fishing/hunting	language
	Gathering with family	Identity, keeping the culture
		Transfer of knowledge

Men and women both ranked spiritual, language, culture and identity as high; food as medium/high and recreation benefits as low. However, women also placed a high value on transfer of knowledge while men valued places that provide materials for tools very highly.

These ranking exercises indicate that there are strong links between “areas of country” and “benefits of country”. Both ranking exercises visibly highlight that the spiritual aspects of “country” is very important.

## 4 Discussion

Participatory value-based mapping is a valuable technique for recording Indigenous peoples’ perceptions if applied at a community level and in a group setting so as to take into consideration the collective nature of their decision-making. Our results suggest that the recording of single values in the ‘values suitability analysis’ approach (Brown, 2005) misses important information about the potential multi-criteria nature of place attachment. If people are asked to provide one value for one place, there is the possibility that they have already made a choice in their valuation. Although this choice may reflect the highest benefit

people recognize from a place, it does not allow people for valuing a place for a variety of reasons as shown by this study. When coupled with questions related to well-being, the participatory value-based mapping method can also provide valuable information on the links between specific places and elements of people's well-being.

Our research helps improve our understanding of the links between wild resources and Indigenous well-being, highlighting the fact that "country" plays an important role in the well-being of Indigenous people. Our results clearly indicate that the Mullunburra-Yidinji people consider that gaining access to and managing their own land is vitally important to their well-being. Consequently policy makers who are genuinely interested in improving the well-being of Indigenous people should continue to explore ways of re-establishing the connections of Indigenous people with their traditional land, and improving Indigenous access to "country".

This study clearly established the existence of links between the services provided by wild resource areas and constituents of well-being, showing that Mullunburra-Yidinji people make judgments about the relative importance of places and the benefits associated with the use of such places. The ranking exercise highlighted that Mullunburra-Yidinji Elders value places of their country differently, as they also recognise that different factors associated with "country" make different contributions to their well-being. These contributions can be ranked. Values also differ between men and women. However, we did not investigate as part of this study if areas of high importance are highly valued because they provide services that are linked to highly ranked constituents of well-being or because they provide a number of services linked to several elements of well-being. This matter could be a topic of further investigation.

We can reasonably assume that a decrease in access to locations of low rank would do less harm than a decrease in access to locations of high rank. Indeed a decrease in access to areas of country with a low rank in conjunction with a simultaneous increase in access to places of high rank may increase utility; although this conclusion requires more careful examination and could only be verified if it were possible to derive a Social Welfare Function of a collective society which could be analysed. Such an exercise would take many years (if indeed it could be done at all). In the mean time, it may be possible to use approaches such as that used here to aid policy makers. In particular, it is clear that 'country places' that are highly ranked should receive particular attention when dealing with land use planning as any impacts on those areas will most likely impact on the well-being of Mullunburra-Yidinji Elders. Maps and ranking exercises also appear to be useful tools to gain access to this type of information.

Assuming that wild resources areas are a reasonable proxy for ecosystem services and that these areas are linked to elements of well-being, we argue that those highly ranked

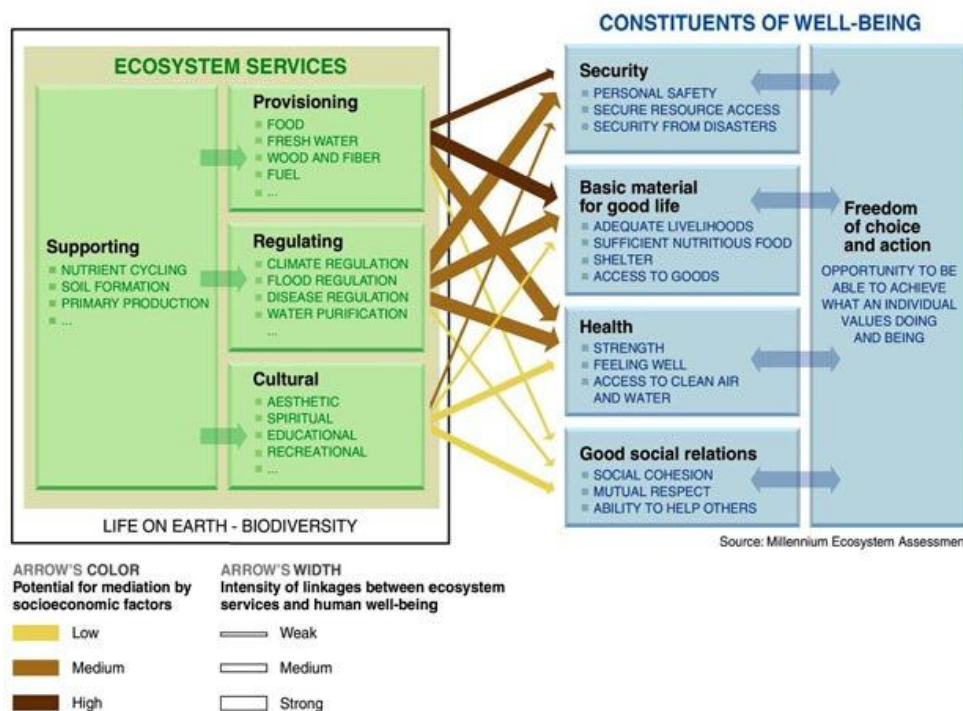
“country” places can be used to define high “well-being” places that need to receive special attention, especially in land use planning. The type of maps developed during this study could also be used as useful negotiation tools by governmental institutions interested in land use planning. This approach could provide a template of areas of particularly high importance that deserve special attention.

Despite the limitations of this research (e.g. single focus group, consultation with Elders only), the project’s methodological approach is potentially useful in other contexts despite differences in customs among different Aboriginal groups. Nonetheless the results provided here cannot automatically be expanded to all Aboriginal communities even in the Wet Tropics. Further research is needed to determine the transferability of the results of this research to other communities.

Participatory value-based mapping seems to be a good tool for identifying areas of high concern that could be the target of management plans. In the same way as ecologists use a system of protected areas to conserve biological diversity, this approach could be used to identify policies or a management system that protects areas of high (well-being) value to Indigenous people. Indigenous people could use such maps to describe areas of high value to their well-being and could also define areas where “country” is sick and where action is needed. In return, policy makers could use such information to design plans to employ Indigenous people to work on country to remedy on the cause of country sickness. This approach could help Indigenous people in two-ways, increasing their well-being through an active participation in the management of country and through helping country recovery.

Most areas of Indigenous “country” are now also used by non-Indigenous stakeholders. Conflicts over the use of resources inevitably occur. This participatory value-based mapping of well-being areas could be overlaid with a current spatial representation of land uses, thereby identifying where conflict is the most likely to occur.

This study clearly highlights the fact that the Australian Bureau of Statistics measures of well-being do not adequately capture all aspects of Aboriginal well-being since they fail to include measures that capture the importance of “country”. Although, we did not attempt to derive well-being indicators in the course of this study, our results show the very strong link between “country” and its provision of spiritual services. This result contrasts with the Millennium Ecosystem Assessment framework (Figure 7). Although the Millennium Ecosystem Assessment framework expressly lists different ecosystem services that the environment can provide (MEA, 2003) while this study focused only on wild resources, it is nevertheless possible to draw some parallels between the two frameworks.



**Figure 7. Relation between ecosystem services and constituents of well-being (Source MEA, 2003)**

Comparing the different country areas and focusing on the “ecosystem services” they provide (as per the Millennium Ecosystem Assessment framework), it becomes apparent that the Mullunburra-Yidinji Elders have divided their country into areas that supply provisioning services and areas that supply cultural services. No mention was made of areas that supply either regulating or supporting services - an area worthy of future investigation. It could be that “healthy country”, one of the conditions from the general well-being function of Mullunburra-Yidinji people explored in section 3.1 is only something that can occur if the regulating or support services occur as well.

According to the Millennium Ecosystem Assessment framework, the width of the arrows represents the intensity of the link existing between ecosystem services and well-being. In the Millennium Ecosystem Assessment framework, cultural arrows are all narrow, which is somewhat at odds with the views of the Mullunburra-Yidinji where cultural links are clearly very strong.

Finally, this research suggests that the Australian Bureau of Statistics measures of Aboriginal well-being should not only look at including biophysical indicators of “country” but also spiritual/cultural and “access to country” measurements.

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