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RESEARCH ARTICLE

A well-being framework for cross-cultural assessment of development scenarios: A case study from North-Western Australia

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Abstract

1. In Western-democratic countries, it is widely accepted that affected communities should be involved in natural resource planning and decisions. This is especially so when the well-being of diverse communities is directly involved, and where alternative future options are being considered. Although there is an agreement that 'values' and 'well-being', in some form, guide decisions, there is no consensus on the well-being framework(s) that might be used in participatory planning.
2. To assist a multicultural group in assessing alternative future development scenarios for the Martuwarra (Fitzroy River) in Western Australia, we developed a well-being framework that culturally diverse communities could share and use to discuss and assess scenarios. In this paper, we aim to evaluate the effectiveness of the well-being framework used to assess the potential impacts of scenarios by (i) analysing how effectively participants used the well-being framework; (ii) verifying whether the well-being framework was sensitive to the cultural diversity of participants and (iii) direct evaluation by workshop participants.
3. Our analysis shows that participants effectively applied most well-being categories, and the framework was sensitive to the cross-cultural context of the application by capturing Aboriginal cultural elements. However, the approach can be improved by including principles of behaviour; producing a more complete system model; and reviewing and amending the well-being categories in more extensive community consultation.
4. We conclude that the interaction among different worldviews generated valuable knowledge and that, with further adaptation, the framework shows promise for applications involving similar tasks in culturally diverse contexts.

KEYWORDS
diverse ontologies, multiple knowledge systems, participatory planning, transdisciplinary, well-being

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1 | INTRODUCTION

In a comprehensive review of public participation in environmental assessment and decision-making, the U.S. National Research Council (2008) identified three major themes in the literature based on (i) Jurgen Habermas' work on deliberative, political processes; (ii) tasks emphasising conflict resolution and (iii) governments seeking public input to environmental decisions. More recently, participatory modelling (Voinov et al., 2016), co-production (Wyborn et al., 2019), social learning and working with multiple knowledge systems have also emerged as significant themes in such public participation (McKelvey et al., 2021). All these themes are represented in the Martuwarra (Fitzroy River) catchment[1] in Western Australia (Figure 1), where governments and diverse communities, including Aboriginal groups holding cultural rights and interests, are discussing development plans and their potential impacts on the catchment's rich and globally significant biocultural landscapes (Douglas et al., 2019). Assessing the potential impacts of development on the well-being of such culturally diverse groups requires an overarching well-being framework that provides a common set of well-being categories to support discussions, while allowing for different cultural interpretations of how well-being is achieved. The research reported in this paper complements two other research outputs from a scenario-planning project examining alternative development trajectories for the catchment, the first of which describes the overall participatory scenario planning (PSP) approach (Álvarez-Romero et al., 2021), and the second, the assessment of the scenarios (Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams, et al., 2021). Here, we focus on the development and usefulness of customised well-being categories to discuss and assess the potential effects of alternative future development scenarios (hereafter 'scenarios') in a culturally diverse context (Figure 1).

It is increasingly recognised that public participation on matters relevant to Indigenous peoples should account for their cultural authority and governance systems, worldviews and leadership roles (Díaz et al., 2018; Hill et al., 2020; Latulippe & Klenk, 2020). However, two recent literature reviews on participatory processes found that nearly all the publications examined processes occurring in western[2] democratic contexts, and therefore great care would be required to translate findings into cross-cultural settings (Ernst, 2019; Jager et al., 2020). Tailoring assessment to adequately include Indigenous peoples' perspectives is highly relevant to the work reported here since Aboriginal Australians represent over 65%

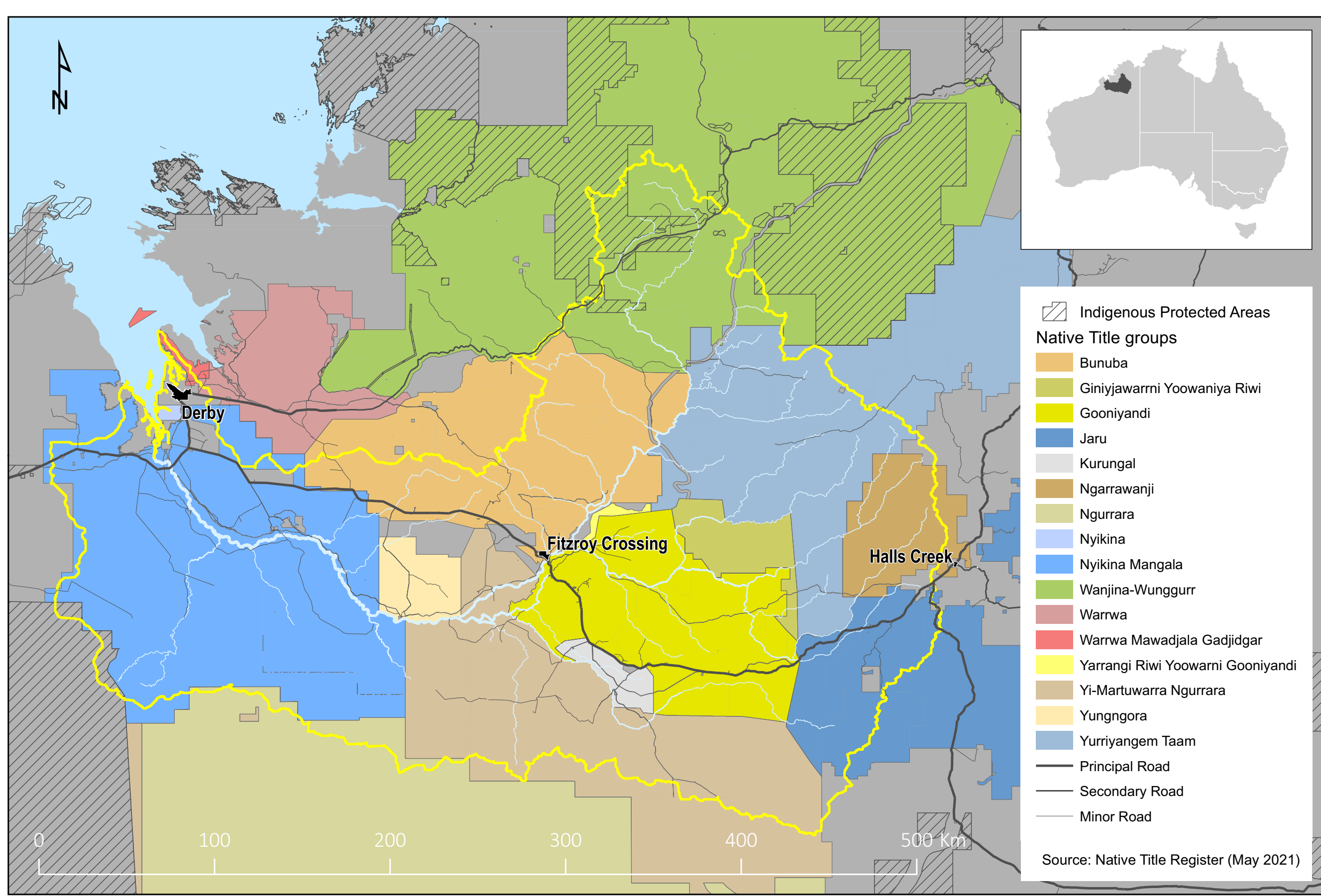

FIGURE 1 Location of the Martuwarra (Fitzroy River) catchment in the Kimberley region of North-Western Australia. The map shows the land boundaries of the traditional owner groups of the Martuwarra with recognised native titles. Most of the catchment (98%) is subject to native title rights and interests (including 3% within registered native title claims) under the Australian Commonwealth's native title act 1993. Within this area, Traditional Owners hold exclusive (i.e. possession of an area to the exclusion of others) and non-exclusive (e.g. access and use the land for fishing, ceremony or camping) rights over 32% and 63% of the catchment, respectively.

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of the population in the Fitzroy catchment (ABS, 2016), and 98% of the catchment area is subject to Indigenous Native Title rights and interests under the Australian Commonwealth's *Native Title Act 1993* (NNTT, 2021; Figure 1).

In western cultural worldviews, 'values' and 'well-being' are widely used concepts for planning the conservation and use of natural resources (e.g. Alcamo & Bennett, 2003; Chan et al., 2012; Dasgupta, 2001; Heink & Jax, 2019; Pascual et al., 2017). At the same time, other authors underline that concepts such as values (or some equivalent) and well-being (taken here to be broadly synonymous with terms such as quality of life, welfare and human development) are also meaningful in non-western cultures (Abunge et al., 2013; Larson et al., 2019; Lau et al., 2019; Narayan-Parker, 2000; Sen, 2001). This provides potential common ground for developing a cross-cultural well-being framework. However, even within western worldviews, there is little consensus on the definition, explanation or application of either 'values' or 'well-being' (e.g. Heink & Jax, 2019; Tadaki et al., 2017; Wallace et al., 2020, 2021). Thus, although values and well-being are, potentially, unifying concepts across cultures, the challenge remains that a universal 'standard' framework for exploring well-being has proved elusive. Nonetheless, the potential for building task-specific frameworks is much more promising (Wallace et al., 2020).

However, developing a well-being framework that works in a cross-cultural assessment context is challenging. As described by Kitcher (2012), the way one views and classifies the environment depends on the task at hand and the situation, which includes the social context. The Fitzroy catchment involves various interest groups typical of western democracies (e.g. government interests, conservationists, miners, tourists, pastoralists, Indigenous groups). However, the Indigenous rights-holders (henceforth 'Traditional Owners') are the largest group, being themselves multicultural (Figure 1), as reflected in the nine Aboriginal languages still spoken in the catchment (McGregor, 2004). Traditional Owners hold a distinctive knowledge of, and perspectives about, the catchment environment and its relationships with people (Milgin et al., 2020; RiverOfLife et al., 2020). They also tend to be disproportionately affected by development (Poelina et al., 2021), as other Indigenous peoples (Ulloa, 2017).

In the context of high cultural diversity, priority values are likely to differ notably among groups, and divergent worldviews could generate different interpretations of their shared situation. This divergence may be revealed, for example, in marked differences among cultures in how they classify the things that exist in a system, including their features and the relationships among them (i.e. their ontologies[3]). Atran and Medin (2008) note that distinct cultural groups living similar lifestyles in the same region may conceptualise nature quite differently, and that these differences can affect environmental decisions and explain conflicts over natural resources. This point is reflected in the work of Descola (2014a, p 433), who notes that different cultural groups:

> (...) will not see the "same things" in their environment because the ontological furniture of their worlds will be composed of very different "things."

The ontological furniture referred to by Descola comprises all environmental 'things' including both tangible (e.g. natural and built capital) and intangible entities, as well as the processes and relationships within and among them. Establishing or adopting some 'ontological furniture' provides the basis for developing one's view of the world and sets of values (Descola, 2014b). That Indigenous Australians hold ontologies and worldviews divergent from western cultures has been well-documented (e.g. Bawaka Country et al., 2014; Milgin et al., 2020; Moreton-Robinson, 2013; Rose, 1996; RiverOfLife et al., 2020; Stanner, 2010). In brief, the main cultural perspectives within the catchment differ in terms of 'the things that exist' and the relationships among these things. Thus, even though there is ostensibly a language in common (i.e. Australian-English), there is not necessarily a common understanding of words and concepts. Furthermore, Australian English is spoken with varying proficiency levels across the catchment, often as an additional language. Kimberley Kriol, not English, is the common language spoken among Traditional Owners.

Participatory scenario planning is suitable to demonstrate the use of a cross-cultural well-being framework in participatory processes, since it is a type of research that can support environmental decision-making by capturing diverse views, resolving conflict and social learning (Cork, 2016; Freeth & Drimie, 2016; Oteros-Rozas et al., 2015). Furthermore, while the PSP literature recognises the link between ecosystem services and well-being (Cork et al., 2005), the assessments of scenarios' outcomes commonly focus on changes in the provision of ecosystem services as an indirect measure of well-being (e.g. Bohensky et al., 2011; Kubiszewski et al., 2017). Additionally, cultural barriers have hindered the engagement of Indigenous groups in some PSP exercises (Oteros-Rozas et al., 2015), while other initiatives have successfully involved Indigenous groups but in settings of relatively low cultural diversity (Falardeau et al., 2019).

The context of this scenario-planning project, examining alternative development trajectories in the Fitzroy catchment, required a well-being framework that culturally diverse communities could share, and use to discuss and assess the hypothesised scenarios. In this paper, we aim to evaluate the effectiveness of the well-being framework that we adapted to this context. We first describe the research setting and the steps taken to adapt an existing well-being framework to support cross-cultural communication and the assessment of development scenarios for the Fitzroy catchment. We then present our evaluation methods before reporting on our assessment of the usefulness of the well-being framework.

2 | RESEARCH SETTING AND ADAPTATION OF THE WELL-BEING FRAMEWORK TO THE CONTEXT

The research described in this paper was part of a PSP process in the Fitzroy catchment including participants from key interest groups in the region (the PSP process, including participant selection, is described in Álvarez-Romero et al., 2021). Figure 2 depicts how this study fits within the larger PSP process (Output 1 in the

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Output 1 - Participatory scenario planning exercise in the Fitzroy River Basin
(described in Álvarez-Romero et al. 2021)

Describes and analyses participant selection and recruitment, collaborative production of scenarios (which are described in Appendix 1), scenario assessment (Output 2), and dissemination.

Output 2 - Assessment of scenarios
(described in Kiatkoski Kim et al. 2021)

Describes the scenario assessment method (including the wellbeing framework – Output 3), and its implementation during two workshops to assess the potential impacts of alternative development scenarios on people's wellbeing.

Output 3 - Development and evaluation of the wellbeing framework
(this study)

Describes the development of the wellbeing framework (Figure 3) and assesses the usefulness of the wellbeing categories by: (i) analysing how accurately participants allocated items to the wellbeing categories; (ii) verifying whether the wellbeing framework was sensitive to the cultural diversity of participants; and (iii) analysing the evaluation of the wellbeing categories by the workshop participants.

FIGURE 2 Diagram describing the relationship between the participatory scenario planning exercise in the Fitzroy catchment, the assessment of scenarios, and the development and evaluation of the well-being framework described in this study.

figure). Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams et al. (2021) provide participants' overall assessment of the scenarios (Output 2), while this paper focuses on the well-being framework used within the scenario assessment process, evaluating its effectiveness and usefulness within this context (Output 3).

The PSP generated four scenarios (Appendix S1). Then, project participants assessed the potential impacts of scenarios on people's well-being (described in Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams, et al., 2021). Here, we cover only the development of the well-being framework used in the assessment of scenarios, and evaluate its usefulness in supporting such assessment. The steps taken to develop the well-being framework were guided by ethical standards (James Cook University Human Research Ethics approval number H6773, and The University of Western Australia approval number RA/4/1/9235) and outlined in Figure 3.

In this section, we explain how an existing well-being framework was adapted (Section 2.1), and describe the application of the framework in the PSP assessment workshops (Section 2.2).

2.1 | Adapting a well-being framework for the broader PSP project

The well-being framework used in the broader PSP project (Outputs 1 and 2, Figure 2) includes a definition of well-being and a set of well-being categories. It is based on ideas described in a recent set of papers (Wallace et al., 2020, 2021; Wallace & Jago, 2017). In turn, this work was built on an extensive literature search and prior operational, planning and research experience (Wallace et al., 2020).

We next describe objectives guiding the adaptation of the existing well-being framework (Section 2.1.1), and then describe principles and criteria taken from the original work and how this was adapted (Sections 2.1.2–2.1.4).

2.1.1 | Objectives of the well-being framework

Two objectives guided the development of the framework: (1) to provide a shared structure and 'language' for the cross-cultural groups involved in the PSP assessment workshops and (2) to support cross-cultural engagement and knowledge sharing among groups.[4] Despite excellent work on well-being within a range of Indigenous communities (e.g. Abunge et al., 2013; Chaigneau et al., 2019; Larson et al., 2019; Lau et al., 2019), such research focuses on describing well-being content from the perspective of Indigenous communities. In contrast, in the work described here, the definition of well-being and its content had to be explained in a classification of well-being categories that supported multicultural engagement, including both multicultural communities of interest among settler society and multi-lingual Traditional Owner groups.

The well-being categories developed for the scenario assessment needed to be of equivalent types (comparable) and quantifiable.[5] In turn, this entailed the categories being exhaustive, additive and non-substitutable (Wallace et al., 2020). Although the framework developed in this work lends itself to quantification, this does not mean that outputs must be either quantified or monetised.

In summary, developing a well-being framework for the broader PSP project involved three inter-related steps: (i) defining well-being, and well-being categories; (ii) describing the constituents of well-being to support cross-cultural knowledge exchange and scenario assessments; and (iii) adapting well-being categories for the specific task. Each of these three steps is discussed next.

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Stage 1 – Developing the wellbeing framework

(a) Research team discussions
(2017-2019)

The research team discussed how to adapt the existing wellbeing framework (from Wallace et al. 2020, 2021) to the scenario assessment

(b) Cultural translation
(Jun 2018)

The research team met with two key informants on the cultural perspectives of diverse Aboriginal groups in the study area, including an Aboriginal Interpreter, to culturally translate the framework

(c) Feedback
(2018-2019)

Researchers presented the wellbeing framework:

- In conferences
- To project participants
- In a workshop with four key informants on Aboriginal culture and interests

Stage 2 – Utilizing and evaluating the wellbeing framework

(a) Traditional Owners' Workshop
(September 2019)

Who: Aboriginal groups

What:

- Assess scenarios (utilizing the wellbeing framework)
- Evaluate the use of the wellbeing framework

(b) Multi-stakeholder Workshop
(October 2019)

Who: multi-stakeholder group

What:

- Assess scenarios (utilizing the wellbeing framework)
- Evaluate the use of the wellbeing framework

FIGURE 3 Steps taken during the participatory scenario planning (PSP) assessment process to develop the well-being framework. Arrows show how information from consultation and experience was used to adapt the framework and its implementation during the PSP assessment workshops. The research team was composed of social and environmental scientists. Key informants on aboriginal cultural perspectives in stages 1b and c included aboriginal and non-aboriginal people.

2.1.2 | Defining well-being and well-being categories

Wallace et al. (2021, p. 6) explored the well-being literature and derived a general definition of well-being as:

> a state of life that is, overall, consistently believed to be good for a person or group of people, all things considered. It comprises the various activities and preferred end states that are believed to constitute a good form of life.

This definition describes the general content of well-being, which often includes, for example, enough food and water, strong family and community relationships, meaningful work, safety and security, and inner peace (the 'preferred end states' in the well-being definition). Particular forms of behaviour (the 'various activities' of the definition) may also be included, such as notions of justice, autonomy, acting in good faith and tolerance. Specification of activities and end states, and the priorities among them, are either decided by individuals or are the socio-political decisions of the relevant group. Well-being for our task could relate to that of an individual human (i.e. personal, subjective well-being); a group of humans (e.g. family, community, nation); or, where humans are viewed as spiritually or physically continuous with one or more components of the Fitzroy catchment system, it may relate to one or more (including all) of those components (Bawaka Country et al., 2014; Milgin et al., 2020; RiverOfLife et al., 2020). In the assessment workshops, participants were asked to nominate (anonymously or not, as decided by the participant) the viewpoint represented in their well-being ratings.

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2.1.3 | Defining well-being constituents for cross-cultural tasks

Values can be defined as 'beliefs about what is right and wrong and what is important in life' (OED (Oxford English Dictionary), 2022). Following such definition, the foundational work (Wallace et al., 2020, 2021) develops two aspects of well-being: values as desired 'ends' (end-state values, here termed 'well-being categories'), defined as 'enduring beliefs concerning the preferred end states of human existence, including those required for survival and reproductive success, which taken together determine human well-being', and 'principles' (enduring beliefs concerning the preferred ethical properties of human behaviour). Both values and principles may occur universally across human societies, but their content, relative importance and the methods used to achieve them are diverse and depend on the individual or group, their culture and their situation (IPBES, 2022; Pascual et al., 2017). In this study, only the first component of diversity in aspects of well-being was addressed. There was insufficient time to include 'principles' in the assessment of scenarios (the workshops lasted for 3 days to address the original task, and longer workshops were not feasible).

Wallace et al. (2020) describe and explain the logic underpinning nine categories of well-being which formed the basis for those adapted as outlined in Section 2.1.4. Some features of this classification contribute to its suitability for planning in pluralistic cross-cultural settings. For example, the 'end-state values' drew on concept of fundamental human needs, which have long been explored in diverse cultural contexts as a means for documenting and analysing human well-being (e.g. Alcamo & Bennett, 2003; Alkire, 2002; Breslow et al., 2017; Doyal & Gough, 1991; Narayan-Parker, 2000) and make the values potentially relevant to a broad range of people. Additionally, the classifications drew on cross-cultural research such as the large, cross-cultural sample described in the work of Narayan-Parker (2000).

Finally, we emphasise that using a well-constructed definition of well-being and its constituents is crucial for cross-cultural purposes and essential to avoid multiple problems within western-democratic approaches. These issues include comparability failures, such as mixing means and ends in environmental decisions, mixing entities in classificatory schemes, and ongoing colonisation and suppression of diverse ways of knowing and understanding the world (Wallace & Jago, 2017; Whyte, 2018). Also, the use of clearly stated definitions and criteria helps to establish the boundaries of categories as an effort to assist communication in pluralistic valuation processes.

2.1.4 | Adaptation of well-being categories for Traditional Owners

Although Australian-English is widely used in the Fitzroy catchment, together with Kimberley Kriol, the English language and western concepts are not sufficient for all participants to express their concerns and values. Furthermore, effective group deliberations should recognise and consider multiple ways of knowing (Ingold, 2011; Tengö et al., 2017). The original well-being framework (Wallace et al., 2020, 2021) was developed based on predominantly western well-being definitions and applied in western cultural settings (Wallace et al., 2016). It was thus considered competent in identifying western ways to fulfil the well-being categories but requiring adaptation to capture Traditional Owners' responses to scenarios. This process involved three steps:

a. Ms Olive Knight, an Aboriginal Australian interpreter from the Fitzroy catchment with a wide knowledge of local languages, worked with members of the research team to re-write the original descriptions and definitions of the nine categories described in Wallace et al. (2020) (Figure 3, stage 1b). This formed the basis for the categories and definitions in Table 1. The Traditional Owners workshop (Figure 3) also employed an interpreter (Kimberley Kriol-English) to ensure that participants with English as second language could engage in the discussions.
b. During a preliminary workshop (Figure 3, stage 1c) involving four people representing Aboriginal Australian perspectives (three of them Aboriginal), the categories and definitions developed in (a) were re-worked, and questions to stimulate workshop discussion were added as shown in Table 1. The definitions in Table 1 were used at both scenario assessment workshops. Questions were adapted to the participants of each workshop (see Section 2.2).

It was agreed at the same workshop that the concept of well-being is broadly equivalent to the Traditional Owners' concept of 'Liyan', widely used in the Kimberley region. Yu (2014) cites Patrick Dodson as follows articulating the concept of Liyan:

> Liyan relates to Yawuru and other Aboriginal peoples' view of their wellbeing. [It is about the] way they feel about themselves and their relationships with their community and the wider world.
>
> The Western economic model looks at financial security and consumerism as a fundamental measure of wellbeing … Liyan is much broader than that. It is about relationships, family, community and what gives meaning to people's lives. Yawuru people's connection to Country[6] and [the] joy of celebrations [of] our culture and society is fundamental to having good liyan.

'When we feel disrespected or abused our liyan is bad, which can be insidious and corrosive for both the individual and community. When our liyan is good our wellbeing and everything else is in a good place'. (Patrick Dodson, chairman, Yawuru Native Title Holders Aboriginal Corporation RNTBC, cited in Yu (2014).)

a. In workshops, the well-being categories were illustrated using photographic material (Appendix S2). Selecting suitable photographs involved considerable consultation to ensure information was culturally appropriate. The photographs were selected in

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TABLE 1 Definitions of the well-being categories for the scenario assessment. Adapted from Wallace et al. (2020) as described in Section 2.1.4). Headings inside square brackets in the left-hand column are the category descriptions from the original work of Wallace et al. (2020) before adaptation for the Fitzroy catchment workshops. Workshop elicitation questions are listed in the right-hand column inside parenthesis. TO and MS refer to the questions asked during the Traditional Owners' workshop and the multi-stakeholder workshop, respectively. Not all participants of the multi-stakeholder workshop resided in the catchment

Categories include having	Description and example
1. *Enough food and water to drink* [Adequate resources]	Having enough food and drinking water. Having wood or power to cook food. Includes beef, fish, bushfood, and food from the supermarket. (TO: How do you get your food and water today?) (MS: How do people get food and water from the catchment today?)
2. *Satisfying work* [Meaningful occupation]	Work that makes you feel good. Includes paid, unpaid, full time, part time and casual work. (TO: What are your opportunities for meaningful work today?) (MS: What are the opportunities in the catchment for meaningful work today?)
3. *Knowledge of Country and culture* [Knowledge-heritage fulfilment]	Knowledge that comes from Country/nature and knowledge that comes from special places, such as dreamtime places, water places and historic sites such as station homesteads, cattle yards and rock art. (TO: What ways can you connect to your Country and culture today?) (MS: The catchment is a library of knowledge and heritage. In what ways do people connect to this important resource today?)
4. *Safety/security* [Protection from other organisms]	1. Living in Country where you are safe from: • Disease and injury • Feral animals, mosquitoes and their diseases • Poisonous and other dangerous plants and animals 2. Living in Country where you are safe from people with altered behaviour (e.g. people affected by drugs and alcohol). (TO: What are the things that make you feel safe or not safe on your Country today?) (What are the living things that make people feel safe or not safe in the catchment today?)
5. *Healthy Country and river* [Benign physical environment]	Having a good, comfortable environment where you are not too hot, not too cold. An environment where you are not affected by heavy dust, fire/smoke or poisons like pesticides. Includes wood for warmth, clothes to wear, good houses and air conditioning, and shade from trees. (TO: What are the things that are healthy and unhealthy about your Country today?) (MS: What are the things that are healthy and unhealthy about the physical environment of the catchment today?)
6. *Fun—recreation, leisure* [Recreational satisfaction]	The happiness you get from having a good time. Includes recreation such as camping, fishing, boating, having a picnic. (TO: What sorts of things do you do to have fun today?) (MS: What sorts of things do people do to have fun/recreate in the catchment today?)
7. *Strong family and community relationships* [Social fulfilment]	Family fulfilment (contentment): includes belonging to a family (e.g. a kinship or skin group) that provides: • Harmonious and supportive relationships • Sense of family belonging • Some close friendships, not necessarily within the immediate kinship group. Community fulfilment (contentment): includes belonging to a group, or groups, that provide harmonious and supportive relationships at a group level. Leads to a sense of social belonging and influences self-respect and dignity. (TO: What are the ways that you connect to your family and community today?) (MS: What are the ways that people connect to their families and communities today? What is it about the catchment that helps these relationships?)
8. *Places and things that make you feel good* [Aesthetically pleasing environment]	Having places or things that are beautiful; that you will never get sick of looking at; that you can look at day in and day out and you still like it. Affects all the senses—touch, taste, smell, hearing, seeing. Examples include a beautiful landscape, boomerang, painting; or the smell of plants and the ground after rain. (TO: Are there special places and things that make you feel good when you see, touch, taste, smell or feel them?) (MS: Are there special places and things that make you feel good when you see, touch, taste, smell or feel them?)
9. *Inner peace, spiritual fulfilment* [Spiritual-philosophical fulfilment]	The peace you get from living a life that is in harmony with your beliefs and having a strong spiritual connection with your environment. (TO: How do you keep your Liyan strong today?) (MS: How do people find inner peace and spiritual fulfilment in the catchment today?)

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collaboration with other researchers working with Traditional Owners to describe different aspects of well-being in the catchment (Larson et al., 2019). Furthermore, we shared and discussed the proposed photographs with key informants prior to the workshops and holding conversations to assess whether the photographs were appropriate and helped to convey the intended meaning of the well-being category.

In summary, where aiming to bridge divergent worldviews, building on fundamental human needs is a logical, initial starting point for generating a cross-cultural well-being framework for assessing scenarios (see, e.g. the work of Doyal & Gough, 1991 on universal needs; or the work in South America of Max-Neef et al., 1989). As applied here, this approach assumes that 'principles' (examples in Table 2) are satisfactorily covered, for the PSP process, under inner peace/spiritual fulfilment, an issue discussed below (see Wallace et al., 2021 for a more detailed discussion of the relationship between principles and well-being categories represented by end-state values).

2.2 | Conduct of workshops to apply the well-being framework

The definition and categories constituting well-being outlined above were used to assess alternative scenarios in two workshops. The first was held at Fitzroy Crossing, WA (Figure 3, stage 2a), and involved 22 Traditional Owners representing nine distinct groups in the catchment selected with the help of a cultural broker (hereafter 'Traditional Owners' workshop'); the second was held in Broome (Figure 3, stage 2b) and involved 18 participants from the scenario planning team, which represents diverse interest groups,[7] including some Traditional Owners (hereafter 'multi-stakeholder workshop'). At the start of the workshops, participants received written and verbal information regarding the research project, including on confidentiality of the information provided and intellectual property. They had the opportunity to clarify any questions and provided written consent.

Details of these workshops are described in Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams et al. (2021). In brief, at both workshops, the well-being categories (Table 1) were explained and then discussed in breakout groups where participants joined a table with five to seven other participants and a researcher who facilitated the task and took notes. The breakout groups generated lists of items for each well-being category using the guiding questions in Table 1. These lists of items represented how the well-being of people was met (or not) in the catchment at that time—that is, the current situation—and this description was taken as the baseline for assessing alternative scenarios. The full output can be found at Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Douglas et al. (2021) and Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, and Pressey (2021).

The procedure differed slightly between workshops: first, in the Traditional Owners' workshop, in accordance with their expressed preferences to work in a way that allowed for plenty of time, each breakout group discussed and listed items for two unique categories, which were then presented and discussed with all workshop participants. In the multi-stakeholder workshop, each breakout group discussed and listed items for all well-being categories, before presenting their outputs to all workshop participants. Second, the questions used in the Traditional Owners' workshop focused on how each respondent satisfied their well-being categories (since most respondents lived in the catchment). In contrast, the questions in the multi-stakeholder workshop focused on how 'people' satisfied their well-being categories in the catchment (since not all respondents lived in the catchment; Table 1). Third, the questions used in the Traditional Owners' workshop refer to 'Country' following advice from key informants during the preparatory meetings, rather than 'catchment' since the former is more relevant to that group.

Participants scored each well-being category under respective development scenarios, relative to the current situation. A score of −5 represented 'much worse'; '0' represented 'no change'; and +5 represented 'much better', compared to the current situation. While the outputs from the two workshops may be compared in a general sense, statistical comparisons would not be valid since a purposeful rather than probabilistic sampling method was used to select participants (Tong et al., 2007). Moreover, the different size and participant composition of the workshops required adjusting the tasks, as described above (Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams, et al., 2021).

TABLE 2 Examples of principles (ethical properties of behaviour). All describe the ethical behaviour of humans towards each other except for the final item. (Table adapted from Wallace et al., 2020)

Principle	Proposed short definition
Care	Concern for the welfare of others
Fairness	Treating people with justice, includes the concepts of proportionality (rewards to each based on their contribution) and reciprocity
Respect for earned authority	Applying authority with due responsibility as a leader of people, and respect for authority that is so used
Sanctity	Managing bodies and relationships in accord with society's mores and with a sense of the sacred (where appropriate)
Care for non-human organisms	Concern for the welfare of non-human organisms—noting that in some cultures inanimate 'things' from a western worldview may be considered animate in other cultures

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3 | METHODS: EVALUATING THE USEFULNESS OF WELL-BEING CATEGORIES

To meet the primary aim of this paper, three different methods were used to assess the usefulness of the well-being categories. These involved the following: (i) analysing how accurately participants allocated items to the well-being categories in Table 1 (Section 2.3.1); (ii) verifying whether the well-being framework was sensitive to the cultural diversity of participants (Section 2.3.2) and (iii) direct evaluation of the system of well-being categories by the workshop participants (Section 2.3.3).

3.1 | Allocation of items to well-being categories

If the categories in Table 1 are useful for assessing changes in well-being, then one would expect that the allocation of items to well-being categories describing the current situation is consistent with the definitions in Table 1. Allocation difficulties could result from, for example: inadequate definition of a category, poor explanation of a category, and/or that the category is not relevant to the task and situation. Researchers emphasised that any single activity, such as fishing, may contribute to more than one well-being category (e.g. fishing may contribute to one or more of 'having enough food and water', developing 'strong family and community relationships'). We analysed for allocation accuracy by subjectively assessing whether participants' allocation of items, as a group, was consistent with the definitions in Table 1. Three co-authors checked the allocation of all items, and differing assessments were resolved by consensus (Appendix S3).

3.2 | Cross-cultural sensitivity of the well-being framework

The original framework was adapted to Traditional Owner groups (Section 2.1.4). This should support the ability of the framework to capture relevant ways through which Traditional Owners satisfy their well-being needs in the Fitzroy catchment, thus reflecting salient aspects of those groups' ontologies. As a result, the items allocated to well-being categories should include Traditional Owners' (Aboriginal) cultural elements, thus reflecting the cross-cultural nature of the workshop participants.

The lists of items provided by participants to each well-being category for both workshops were analysed using the NVivo software. We identified, for each well-being category in each workshop, the proportion of keywords generally associated with Aboriginal cultures (classified as 'Aboriginal', e.g. rainbow serpent, traditional law, Native Title), and keywords that could be attributed to both Aboriginal and non-Aboriginal cultures and lifestyles (classified as 'undefined', e.g. camping, hunting, storytelling). Then, we identified the main themes associated with Aboriginal keywords (Thomas, 2006).

3.3 | Evaluation by workshop participants

At the end of each workshop, participants discussed in their workshop breakout groups the following set of three standard questions on the usefulness of the well-being categories:

1. Are there any views/aspects of well-being–Liyan that are not covered in our categories?
2. In assessing the scenarios, which categories of well-being–Liyan did you not find useful?
3. Any other suggestions to improve the assessment?

Researchers acting as table facilitators participated in breakout group discussions and captured responses to these questions. The responses most relevant to the well-being framework assessment were selected (Tables 5 and 6) and organised by themes. Such themes are discussed in Section 5.

4 | RESULTS

In Section 4.1, we describe the key outputs from the framework development process (Sections 2.1.1–2.1.4). The outputs from the assessment methods listed in Section 3 are then explored in Section 4.2.

4.1 | Accuracy of item allocation to categories

The responses to questions in Table 1 concerning the 'current situation' (henceforth 'items') were collected, collated and submitted by breakout group facilitators, and then analysed for allocation accuracy (Appendix S3, summarised in Table 3). The allocation of items was consistent with category definitions in nearly all cases at the multi-stakeholder workshop. Three items were incorrectly allocated to category 4 (Safety/security), which refers to 'living things' that make people feel safe or unsafe. Participants mentioned 'poisons—DDT', 'increased traffic reduces safety' and 'unsafe weather'. Such items would be best placed in the 'Healthy Country and river' category, which deals with the physical environment. These incorrect allocations are not uncommon given the similarity between the categories and were likely due to insufficient emphasis on their differences when explaining these categories.

At the Traditional Owners' workshop, no items were recorded for 'Places and things that make you feel good'. Nevertheless, when discussing this category with a researcher during the Traditional Owners' workshop, a Traditional Owner said '*The Country looks beautiful*'. Also, none of the items for 'Fun, recreation/leisure' were consistent with the category definition, which focused on the western concept of recreation. The items listed in this category were instead focused on connection to Country and, to a lesser extent, maintenance of culture.

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4.2 | Sensitivity to the cross-cultural context

All participants in the TOs workshop were Aboriginal, as compared to 42% of self-identified Aboriginal participants in the multi-stakeholder workshop. Accordingly, there was a higher proportion of items identified as 'Aboriginal' in all categories of the Traditional Owners' workshop (Table 4), suggesting that the well-being framework was sensitive to the cross-cultural context of application by capturing Aboriginal cultural elements (and a higher proportion of those in the Traditional Owners' workshop). The categories with the largest differences between the workshops were 'fun-leisure', 'healthy Country and river' and 'enough food and water'. The categories with the lowest difference of the proportion of Aboriginal keywords between workshops were 'satisfying work', 'knowledge of Country and culture' and 'inner peace'.

The most frequent Aboriginal keywords, and the main themes associated with them, are listed in Appendix S4. They included the following: bush tucker; ceremony; Country; culture, language and traditional knowledge; dance; elders and ancestors; living waters; native title; sacred sites; and key Indigenous groups and organisations. Two central keywords associated with multiple well-being categories were 'Country' (52 references) and 'culture, language and traditional knowledge' (37 references). The latter were bundled because they are strongly related and often appeared together. These keywords were important because they also often appeared in the themes associated with other keywords, for example, the keyword 'dance' was described as '*A way of connecting with Country*'; and 'elders' (another keyword) as playing a role in transmitting traditional knowledge.

The links between place and other key elements of Aboriginal culture meant that 'Country' was the most prominent keyword in the descriptions of how the catchment contributed to the well-being of Aboriginal people, not only in terms of the number of references but also in its appearance in all well-being categories in the Traditional Owner's workshops. 'Country' was also linked with most of the other keywords listed in Appendix S4. The themes associated with 'Country' were subdivided between: people's actions in relation to Country; its properties, or what Country gives to people; people's feelings about Country; and a number of issues affecting the above. Culture, language and traditional practices were also important keywords. The themes associated with them reflected the absolute need for cultural maintenance and transmission, and issues affecting it.

The expression of the themes listed in Appendix S4 is another indicator that the framework was useful for assessing scenarios in this cross-cultural context. Even though this framework did not intend to be a complete description of these groups' ontologies, it helped to describe essential aspects associated with their connection with the

TABLE 3 Number of unique items participants recorded in each well-being category, and number (in brackets) considered not to meet the definition for that category. Numbers in bold highlight items that either did not meet the category definition or categories that resulted in no items

Well-being category	Traditional Owners' workshop, number of items (number not fitting category)	Multi-stakeholder workshop, number of items (number not fitting category)
1. Enough food and water to drink	14 (0)	21 (0)
2. Satisfying work	17 (0)	22 (0)
3. Knowledge of Country and culture	28 (0)	35 (0)
4. Safety/security	23 (0)	**25 (3)**
5. Healthy Country and river	5 (0)	33 (0)
6. Fun—recreation, leisure	**5 (5)**	24 (0)
7. Strong family and community relationships	8 (0)	25 (0)
8. Places and things that make you feel good	**0 (0)**	27 (0)
9. Inner peace, spiritual fulfilment	14 (0)	20 (0)

TABLE 4 Percentages of aboriginal keywords in each workshop

Well-being categories	Traditional Owners' workshop (%)	Multi-stakeholder workshop (%)
1. Enough food and water to drink	63	27
2. Satisfying work	62	55
3. Knowledge of Country and culture	67	47
4. Safety/security	64	33
5. Healthy Country and river	60	18
6. Fun—recreation, leisure	100	25
7. Strong family and community relationships	83	48
8. Places and things that make you feel good	N/A (zero items)	25
9. Inner peace, spiritual fulfilment	65	47

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TABLE 5 Traditional Owners evaluation of well-being framework. The authors summarise these points from the notes supplied by table facilitators

Workshop question	Summary of participant comments—Traditional owners workshop
1. Are there any views/aspects of well-being–Liyan that are not covered in our categories?	Missing aspects raised by the groups included: a. Customary law b. Relationships c. Skin relationships d. Sawfish dead in the gorge e. Need to focus on culture in 50 years, cultural alternatives need to be more obvious in the options—what is being gained or lost in culture? f. Water quality g. Relationships among all the living things in the ecosystem and that affects Liyan h. Revival, survival, maintenance and management of all nature's creation alongside people i. Housing
2. In assessing the scenarios, which categories of well-being–Liyan did you not find useful?	None of the categories were considered a problem, although there was a suggestion that 'safety' was too broad and should be split or made clearer. There were comments again concerning the failure to deal with the whole ecosystem and relationships with the Rainbow Serpent. Holistic concepts of how it all fits together are missing. The approach is not holistic until we are able to establish a comprehensive analysis of the ecosystems, including their role in the marine environment/ecosystems
3. Any other suggestions to improve the assessment or workshop?	Range of general points mentioned including: a. Billabongs [waterholes], used to be more water, climate change and change in general need to be discussed, as do risks with agriculture such as poisons b. Agent Orange issues c. Many useful comments about improving the workshop process—for example, more pictorial presentations and focus on group discussions, better explanation of scenarios
4. General comments added by participants not directly related to questions.	Also, a range of valuable general comments including: a. Need to protect special and unique ecosystems, strong need to maintain ecosystems b. Intergenerational equity is an issue, young people need an opportunity to participate

catchment and its contributions to their well-being (which could be affected by future changes, as described in Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams et al. (2021)).

4.3 | Evaluation by workshop participants

At the end of the workshop, participants had the opportunity to comment on the usefulness of the well-being categories (Table 1) and suggest changes to improve the workshops and well-being framework. Responses to the standard questions relevant to this paper have been summarised in Tables 5 (Traditional Owners) and 6 (multi-stakeholder group).

A wealth of valuable information on the well-being framework used in the workshop was shared by participants. The main themes identified in their responses include (a) missing aspects of well-being; (b) systems model lacking and (c) technical issues with categories. These are discussed in Section 5 below.

5 | DISCUSSION

The key contribution of this paper is to assess the usefulness of a particular well-being framework in a participatory scenario-planning process involving participants from diverse cultural backgrounds. We started by defining well-being and a set of well-being categories, proceeded to apply the framework within a project evaluating different development trajectories in the Fitzroy River catchment of Western Australia, leading to our analysis of the usefulness of the framework based on three criteria, each considered below.

(i) How accurately participants allocated items to the well-being categories in Table 1.

As discussed in Section 3.2, the allocation of items was consistent with category definitions in nearly all cases at the multi-stakeholder workshop. In contrast, at the Traditional Owners' workshop, no items were recorded for 'Places and things that make you feel good', and none of the items for 'Fun, recreation/leisure' were consistent with the category definition. Notably, it was difficult to culturally translate the category 'Places and things that make you feel good' during the first revision of the category definitions by Ms Knight (Section 2.1.4a).

In reviewing seven alternative classifications of well-being categories, Wallace et al. (2020) found that four of the seven did not have a category equivalent to 'Places and things that make you feel good' (i.e. an aesthetically pleasing environment). In contrast, all but one of the seven alternative classifications reference leisure or recreation in some form, although Wallace et al. (2020, Supplementary Material p 8) summarise the relevant findings of Narayan-Parker's (2000) extensive and global survey of poor people as follows:

TABLE 6 Scenario planning team evaluation of well-being framework. Summaries of the notes supplied by table facilitators. Information in square brackets is facilitator-authors' interpretation

Workshop question	Summary of participant comments—Multi-stakeholder workshop
1. Are there any views/aspects of well-being–Liyan that are not covered in our categories?	a. Climate change—place in the world. Breadth of connections. b. Liyan—does the spiritual category capture it all? [Acknowledges affective component.] c. Strong interconnections. d. Values from our end captured. e. Health—linked to food but not explicit. f. Mental well-being—you can have most of those categories met and still have depression, anxiety. g. Illbeing—well-being not being met. [Relates to solastalgia and it was suggested that Traditional Owners should be compensated for this phenomenon.] h. Wealth, wealth-being to encompass all aspects of well-being.
2. In assessing the scenarios, which categories of well-being–Liyan did you not find useful?	a. Useful: Inner peace, Knowledge of Country and culture, Community relationships, Healthy Country. b. Not useful: Food and water. Too wide. c. Some harder to quantify because personal, for example, last two—inner peace, and places that make you feel good. Even more difficult when assessing on behalf of a group. d. Hard to measure in scenarios. (i) Enough food and water—hard to judge whether improving (ii) Used access to Country as a surrogate or irrigated ag > water quality [probably relates to 'enough food and water'] (iii) Goanna vs McDonalds (iv) Satisfying work—hard to speak for others what is satisfying to them (v) Could do research on these. e. For example, safety and security—scenario did not go into enough detail to be able to score effectively. Places that make you feel good felt superfluous—comes into healthy Country.
3. Any other suggestions to improve the assessment or workshop?	a. Could have got some info on employment + hunting (Indigenous) made available. b. People focussed on projects—pride taken in doing well, for example, crops, falls under satisfying work category. c. Compensated/compensation related to illbeing via negative impacts from development.

> …reference to Recreational satisfaction is very low key. A search of the document for 'leisure' and 'recreation' shows that these aspects are very occasionally listed as important to people, but they have not been covered in the classification…except passingly in item (5). In contrast, the terms 'aesthetic(s)' and 'beauty' are not listed in the document at all…

This emphasises that the relevance of well-being categories may vary with circumstances and the perspective of those providing ratings.

One potential explanation for these results is that the aesthetics and fun-leisure categories may not be relevant for all communities in the Fitzroy catchment. The evaluation comment that 'Places that make you feel good felt superfluous—comes into healthy Country' (Table 6) supports this conclusion.

However, both categories were used by respondents, including Traditional Owners, to score the changes in people's well-being during the scenario assessment workshops (Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams, et al., 2021), thus suggesting some relevance. An alternative explanation is that the categories could potentially be relevant to Traditional Owners pending further revision. The direct or indirect responses of Traditional Owners to these categories (Section 3.2.1) referring to Country and culture are consistent with the main Aboriginal themes in Appendix S4, suggesting that there could be a culturally relevant way to interpret those categories.

(i) Whether the well-being framework was sensitive to the cultural diversity of participants.

The framework was developed and tested under a western cultural background (Wallace et al., 2016, 2020, 2021). Hence, it was competent in capturing important ways in which non-Aboriginal participants fulfilled key well-being components in the Fitzroy River catchment (e.g. through camping, socialising, working, practicing religion). The higher proportion of Aboriginal keywords in the items describing how people fulfil the well-being categories in the catchment in the Traditional Owners' workshop (as compared with the multi-stakeholder workshop—Table 4) confirms the framework also captures non-western cultural elements. The keywords and themes described in Appendix S4 further validate the usefulness of the framework in capturing culturally significant ways in which the catchment (e.g. through, or as, 'Country') contributes to Traditional Owners' well-being, and issues that can affect such contributions. Traditional Owners also discussed such issues when assessing the changes associated with scenarios (Kiatkoski Kim, Álvarez-Romero, Wallace, Pannell, Hill, Adams, et al., 2021). The themes in Appendix S4 are also consistent with Aboriginal well-being frameworks (Butler et al., 2019; Kingsley et al., 2013).

Nevertheless, the fact that the (collectively developed) scenarios are ontologically western may have contributed to some Traditional Owners feeling that none of these scenarios expressed their views of desirable futures (Kiatkoski Kim, Álvarez-Romero, Wallace,

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Pannell, Hill, Adams, et al., 2021). Developing scenarios based on the ontologies of the local Traditional Owner groups was not identified as priority in the research needs analysis preceding this study (Hill et al., 2016). However, their participation in this study contributed to their interest in creating building blocks towards a better future (see Hill et al., 2022 fig. 4).

(i) Direct evaluation of the system of well-being categories by the workshop participants.

The evaluation comments from both workshops are broadly supportive of the well-being framework. Participants' comments broadly fell into three groupings.

5.1 | Missing aspects of well-being

If aspects of well-being are missing, then this suggests that the classification is not exhaustive. In this regard, 'customary law' was identified as one important aspect missing from the well-being framework. As noted in Section 2.1.3, although Wallace et al. (2020, 2021) identify 'principles' (Table 2), the ethical properties of behaviour, as an essential component of values leading to well-being, were not examined further given time constraints. Although the satisfactory meeting of principles over time was assumed to be covered by the well-being category of inner peace/spiritual fulfilment (as explained in Wallace et al., 2021), this proved to be a significant omission, mainly because the principles adopted in a situation affect how relationships unfold in practice and thus, for example, whether people are granted 'dignity' and 'respect'. In a cross-cultural situation, it may be practicable to explain at least some aspects of customary law and kinship relationships through adapting (as with well-being categories), a set of principles such as those exemplified in Table 2. For example, customary law could have major implications for how items such as 'care', 'fairness' (including reciprocity), 'sanctity', 'respect for authority' and 'care for non-human organisms' (including living water) unfold in practice. Or it may require a completely separate set of principles. Irrespective, the evaluation by participants underlines that this is a failing that should be addressed in any future applications of the framework where this is task-appropriate—provided resources allow.

Health and mental well-being were also suggested as missing aspects. However, these are ambiguous and multidimensional concepts (e.g. see Ereshefsky (2009)) on the definition of health and disease), and both are affected by the nine categories of well-being used in the workshops. Additionally, physical and mental health also link to matters of personality, which affect, but are not properly the topic of group deliberative processes (Wallace et al., 2021). Matters of financial and other capitals would be encompassed in a more detailed planning process (see, e.g. Wallace et al., 2021, Figure 3).

Finally, some well-being research discusses 'illbeing' (Narayan-Parker, 2000), or the related concept of solastalgia, referring to the loss of critical environmental components (Albrecht et al., 2007). The workshop participants raised these issues. However, for both concepts, the point of reference (state of affairs) will either be some past or potential future state, and a well-being framework such as that outlined above may be used to capture and quantify the difference between the current situation and the reference state of affairs. That is, notions of illbeing or solastalgia do not inherently require an additional well-being framework for analysis or quantification, including for cases where some form of reparation of past injustices might be required (Table 6, item 3c).

5.2 | Systems model lacking

The comments concerning connections and relationships are highly relevant. As discussed in Section 1, understanding worldviews and associated values requires knowing the ontology being applied. Such knowledge depends on being clear about what exists (in our case, the 'things' that are of interest in the catchment), the characteristics of those things and the relationships among them. There is considerable scope for more explicitly defining the 'things' in system and emphasising the relationships among the system constituents. Ideally, the relevant ontologies and associated catchment model(s) would be developed in conjunction with workshop participants. This model could be embedded or linked to more comprehensive system models describing the relationships among key entities of the catchment (including spiritual entities) and extended into the marine zone (e.g. Álvarez-Romero et al., 2015; Barber et al., 2015).

Notably, several comments in Table 6[8] highlight the need to model the holistic relationships among all system elements, a point further supported by the items listed in the current situation by Traditional Owners. In this regard, the inextricably tight relationships for Aboriginal Australians with all the natural and spiritual elements of their 'Country', in this case the catchment, is well documented in references above and in Appendix S4. Future research should consider the issues emerging from integrating Indigenous and non-Indigenous knowledge into these models (Barber et al., 2014; Barber & Jackson, 2015). In contrast, people holding western worldviews seem to partition their lives more readily into its components—such as work, leisure, aesthetic art, etc.—and might not see them as related to 'Country' as Aboriginal Australians (Kingsley et al., 2013). It would be productive to investigate whether this explains the ease with which the categories of well-being were applied to assess the current situation in the Broome workshop, which consisted of mostly Anglo-Australians. Perhaps even more importantly, whether compartmentalisation of their lives leads those holding a western worldview to ignore the system consequences of their actions is an important consideration. An important output of workshops such as those reported here should be to highlight different worldviews, particularly where it generates new knowledge and approaches. In this regard, the tension between different worldviews may be very positive.

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5.3 | Technical issues with categories

Some comments reflected technical issues with the categories or information supplied. For example, both 'food and water' and 'safety' were considered by some to be too broad as categories and, in some cases, it was thought that additional scenario descriptive information would have helped guide the assessment process.

6 | CONCLUSION

The well-being framework developed for the Fitzroy catchment achieved its objectives of providing a framework for multicultural discussion and scenario assessment by diverse communities. The approach also demonstrated that it could be used to quantify well-being assessments. This is a significant addition to the PSP toolbox, and arguably to other participatory processes, where the need for methods to engage with culturally diverse communities by carefully considering diverse ontologies has been identified (Falardeau et al., 2019; Flynn et al., 2018; Oteros-Rozas et al., 2015).

However, there is scope to improve the approach, especially by including principles in the assessment process; producing a more complete model of the system elements and relationships in the catchment; and reviewing and amending the well-being categories in more extensive consultation with the communities involved. Further consideration of the equivalence between 'Liyan' and 'well-being', and whether there are other more suitable terms, is also worthwhile. Also, explanation of some categories—especially those relating to 'leisure' and 'places and things that make you feel good' need to be investigated to ensure that they are relevant and clearly explained.

Notwithstanding these limitations, our overall experience in applying the well-being framework is that it supported a structured, systematic and transparent approach that enhanced the participatory scenario-planning process. It helped researchers and participants alike to unpack the reasons for preferences for or against particular scenarios, and it contributed to enhanced communication between the culturally diverse groups within the participants.

AUTHOR CONTRIBUTIONS

Kenneth Wallace, Milena Kiatkoski Kim, Jorge G. Álvarez-Romero, Rosemary Hill and David Pannell conceived the ideas and designed the methodology; Melissa Marshall was part of a panel who critically reviewed the methodology. Kenneth Wallace, Jorge G. Álvarez-Romero, Rosemary Hill and David Pannell collected the data; Kenneth Wallace and Milena Kiatkoski Kim analysed the data; Kenneth Wallace and Milena Kiatkoski Kim led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

CONFLICT OF INTEREST

No conflict of interest to declare.

DATA AVAILABILITY STATEMENT

Data are available at The University of Western Australia's Research Repository https://doi.org/10.26182/caae-e992.

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ENDNOTES

[1] 'River catchment' is the Australian equivalent to 'river basin'.

[2] In this article, we refer to 'western' as the culture and practices derived from western Europe, which reached much of the world through colonisation and globalisation (Britannica, 2022).

[3] The task of ontology within metaphysics is to 'say what there is, what exists…[and to]… say what the most general features and relations of these things are' (Hofweber, 2018).

[4] Note that these were objectives for the framework within the broader PSP project. They are not the objectives for this paper, for which the aim is to evaluate the effectiveness of the well-being framework that we adapted to this context.

[5] We use 'quantifiable' here in the sense that the framework used had to allow workshop participants to score the degree to which each well-being category, considered independently, is affected compared with a business-as-usual scenario.

[6] 'Country is the term often used by Aboriginal peoples to describe the lands, waterways and seas to which they are connected. The term contains complex ideas about law, place, custom, language, spiritual belief, cultural practice, material sustenance, family and identity' (AIATSIS, 2022).

[7] The scenario planning team, which included Traditional Owners, government, environmental groups, and the agriculture, mining, and tourism industries, worked with researchers to develop the scenarios assessed at the workshops.

[8] For example, among the 'missing' comments were: 'Relationships among all the living things in the ecosystem and that affects Liyan'; 'Revival, survival, maintenance and management of all nature's creation alongside people'; as well as the comments focussed on relationships.

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