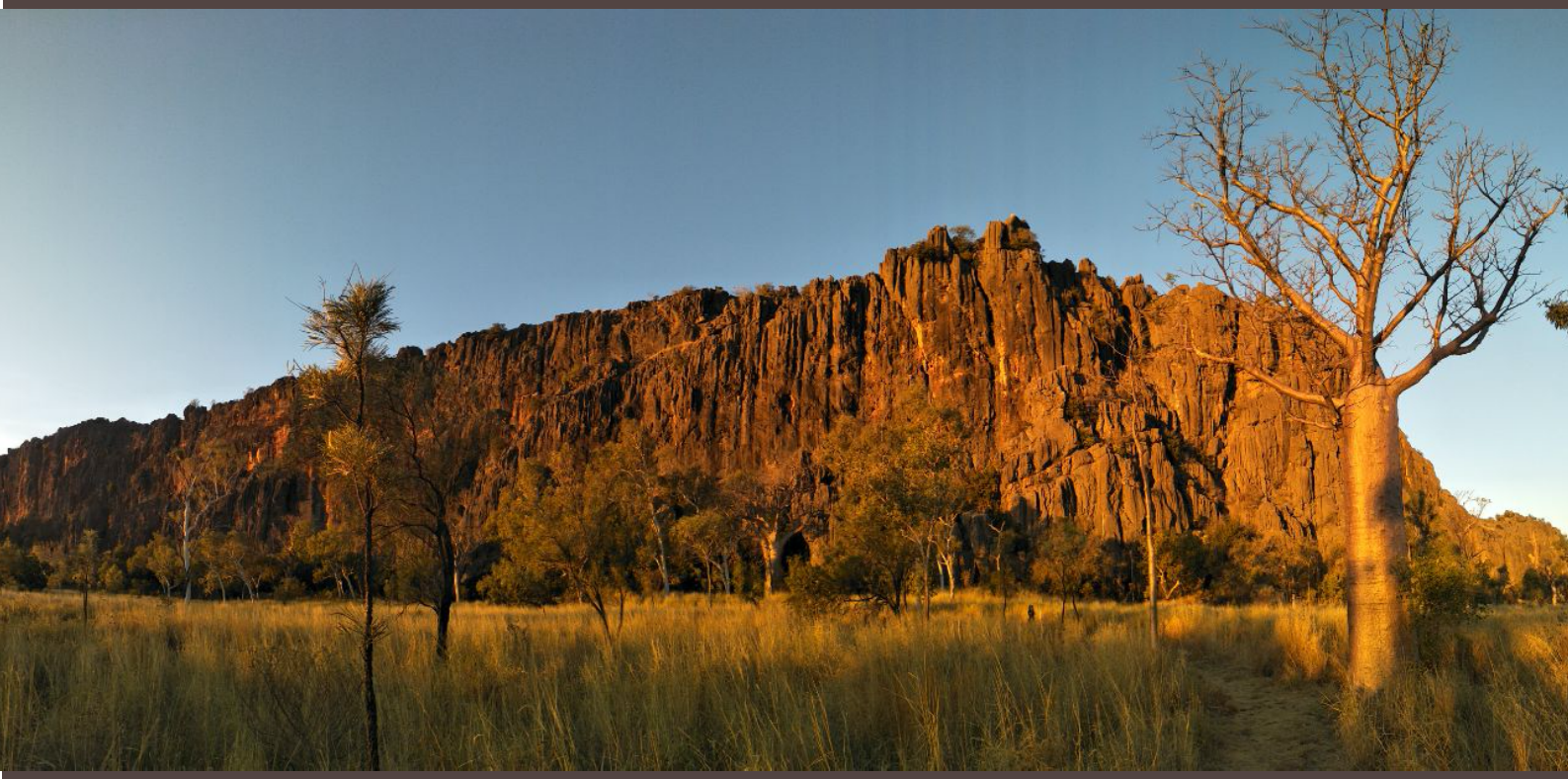
Northern Australia Environmental Resources Hub

National Environmental Science Programme



Assessment of the potential changes in wellbeing of key interest groups in the Fitzroy River catchment under alternative development scenarios: Scenario team's workshop 3, Broome, Western Australia, 15–16 October

Report

Milena Kiatkoski Kim, Jorge Álvarez-Romero, Ken Wallace, David Pannell, Michael Douglas and Robert Pressey

THE UNIVERSITY OF WESTERN AUSTRALIA

JAMES COOK UNIVERSITY AUSTRALIA

This report should be cited as:

Kiatkoski Kim, M.,[1] Alvarez-Romero, J.,[2] Wallace, K.,[1] Pannell, D.,[1] Douglas, M.[1] and Pressey, R.[2] 2021. *Assessment of the potential changes in wellbeing of key interest groups in the Fitzroy River catchment under alternative development scenarios: Scenario team's workshop 3, Broome, Western Australia, 15–16 October*. The University of Western Australia, Perth.

1. The University of Western Australia
2. James Cook University

Cover photograph: Section of the 350 million-year-old Balili (Devonian reef) system, within the Devonian Reef Conservation Park, West Kimberley. © Jorge G. Álvarez-Romero.

This report is available for download from the Northern Australia Environmental Resources (NAER) Hub website at nespnorthern.edu.au

The Hub is supported through funding from the Australian Government's National Environmental Science Program (NESP). The NESP NAER Hub is hosted by Charles Darwin University.

DOI 10.26182/z9cd-2m61

June 2021

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Acknowledgements

The research team acknowledges the Bunuba, Gooniyandi, Nyikina Mangala, Yi-Martuwarra, Wanjina-Wunggurr, Yungngora, Jaru, Kija, Tiya Tiya, and Warrwa peoples on whose land this project is conducted. We thank their Native Title Prescribed Bodies Corporate who are our research partners. We are also grateful to the continuous support, time, and intellectual contributions of the scenario team, which have been invaluable to undertake this project. This project is supported through funding from the Australian Government's National Environmental Science Program (NESP) and James Cook University, The University of Western Australia, Griffith University, the Commonwealth Science and Industrial Research Organisation (CSIRO), and The University of Tasmania. We thank, Rosemary Hill, Olive Knight, Vanessa Adams, Natalie Stoeckl, and Pia Harkness for their valuable feedback on the method and/or data collection.

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Summary

This report presents the preliminary results of a workshop held on 15 and 16 October 2019 in Broome, aiming to develop a way to identify and assess the likely positive and negative effects of different future development scenarios on the wellbeing of key interest groups in the Fitzroy River catchment. Participants discussed how several categories of wellbeing are currently satisfied in the Fitzroy catchment and then assessed a set of future scenarios against those categories. Participants' ratings followed a similar pattern, with scenarios 1A, 1B and 2 (strong policies) being rated positively by the majority of participants, and scenarios 3 and 4 (weak policies) being rated mostly negatively. The common pattern reflects a recurrent theme in participants' comments regarding the need for good governance, strong policies, and regulation of economic activities so that residents can benefit from such new development initiatives. Conversely, in weak policy scenarios, there could be negative social and environmental impacts that would affect residents and the eventual economic benefits could be reaped by fewer locals, or by non-residents (e.g. corporations and temporary workers).

1. Introduction

The National Environmental Science Program (NESP) Northern Australia Environmental Resources Hub's project on multi-objective planning aims to help participants to collaboratively construct and assess the outcomes of alternative development scenarios (henceforth 'future scenarios'). The future scenarios used in this workshop were developed collaboratively by the scenario team (see list of participants in Appendix 1) in two workshops including key groups with interests in the region.

During the first workshop (July 2018, Figure 1), the scenario team shared understandings of what is happening in the region that could shape the future development of the Fitzroy River catchment. This included a discussion about the diverse views on development. Before exploring the future, the group looked back into the past. They jointly created a timeline for the Fitzroy, identifying the events and forces that have shaped how the catchment looks today and could drive development in the future. A key activity of the workshop was to identify the main driving forces of land use change and development initiatives proposed for the catchment.

Figure 1. Participants and dates of each project workshop. The workshop reported here (workshop 3) is highlighted in red.

During the second workshop (November 2018), the scenario team ranked the drivers listed during the first workshop to identify those with the highest potential to cause major land use changes in the region (i.e. most influential) and those that participants were most uncertain in terms of how they could shift development in the future (i.e. most uncertain). The group chose the six most influential and uncertain drivers to build the scenarios, using the top two, policies and markets (primary drivers), to describe the main differences among scenarios.

Exploratory scenario development exercises, like this one, generally include four scenarios constructed along two primary drivers described as opposite poles. Therefore, the group agreed to use the primary drivers to build the logic of scenarios (Figure 2) and use the secondary drivers to describe further variations (see definitions of selected drivers in

Appendix 2). Due to differences in the scope and interpretation of the driver related to markets, the research team proposed a revised naming and definition for this driver (Appendix 2 and Figure 2), which the scenario team agreed to use in subsequent stages of the process. The outputs from the first two workshops were used by the research team to create, for each future scenario, maps and a narrative describing changes in land and water use, as well as selected biophysical and socioeconomic indicators (described below).

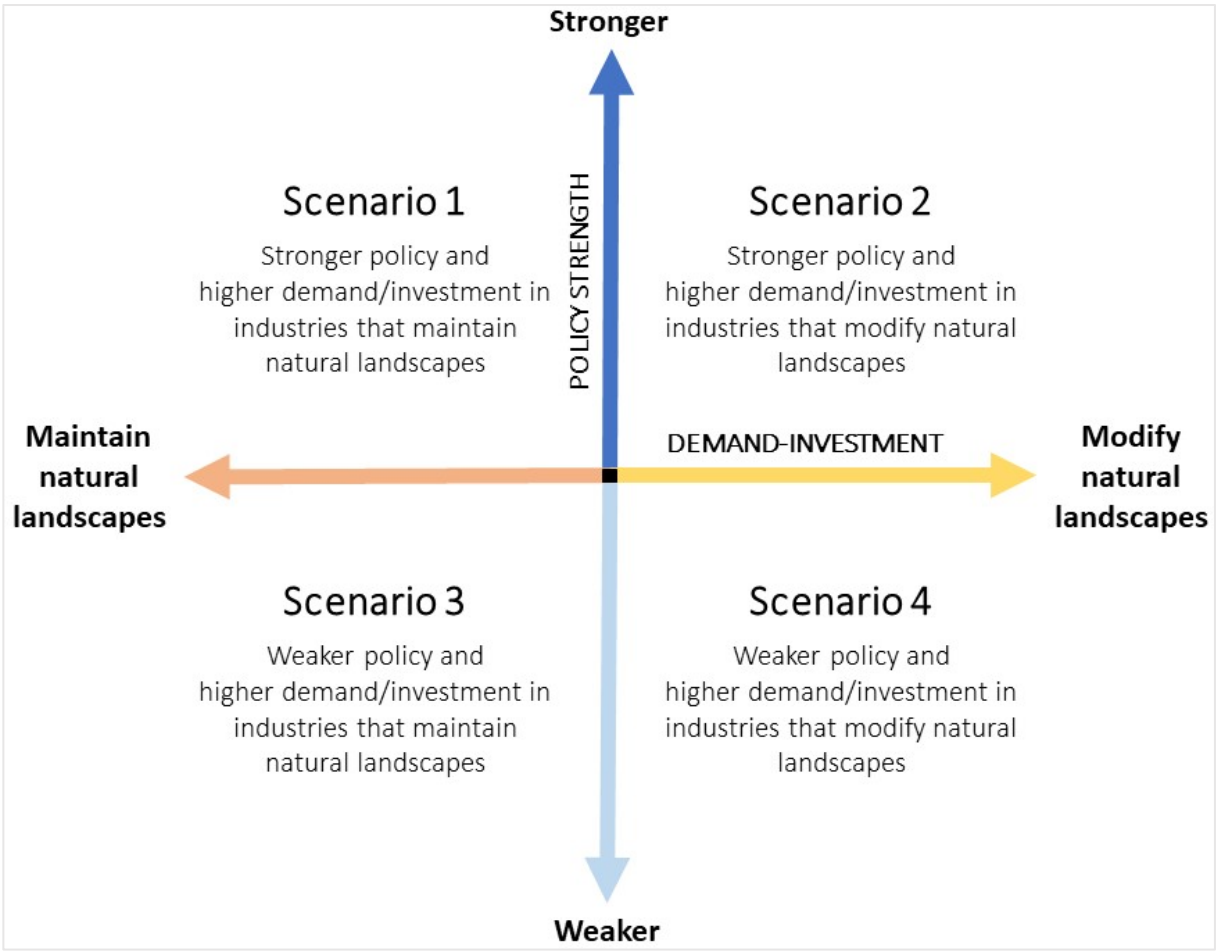

Figure 2. Four scenarios defined based on the two primary drivers.

1.1 Aim of the scenario team workshop 3

A third workshop with the scenario team was held on 15 and 16 October 2019 in Broome (workshop 3, Figure 1). The broad aim of the workshop was to develop a way to identify and assess the potential positive and negative effects of different future scenarios on the wellbeing of different social groups with interests in the Fitzroy catchment. The question guiding the assessment of scenarios is:

How could changes associated with future scenarios affect (positively or negatively) the wellbeing of people who live in or have significant interests in the Fitzroy River catchment?

The specific goals of the workshop were to:

1. Develop a common language around wellbeing that can be used by different groups in the Fitzroy catchment. This can help, for example, future negotiations, planning and decision-making processes related to future land and water uses in the region.
2. Develop shared understandings among participants about the ways in which people's wellbeing may be satisfied from the catchment today. Note that 'understanding' in this context does not mean 'agreement'.
3. Document, for each future scenario, the views of participants on how changes could affect the wellbeing of different interest groups.
4. Building on the above goals and the evaluations from participants, recommend a method to identify and assess the potential effects of alternative development pathways on the wellbeing of different social groups, as part of the 'toolkit' being developed through this project.

At the start of the workshop, the following points about *'scenarios and the scope of the scenario assessment'* were reiterated for participants:

- Scenarios are not about what should happen, they are about what could happen
- Scenarios do not represent the plans of any particular organisation/group; they combine ideas from everyone
- Scenarios are not alternative plans that we need to compare and choose from
- Scenario assessment is not about agreeing on which is the best or worse scenario
- Scenario assessment is not a social or environmental impact assessment
- This and previous workshops are not *de facto* consultation for current and future planning initiatives in the region

2. Context

There are around 7,000 people living in the Fitzroy catchment. The following were identified as key interest groups in the region (in alphabetical order):

- Aboriginal Australians (hereafter Traditional Owners)
- federal, state and local governments
- environmental interests
- mining
- pastoralists
- tourism.

During workshop 3, the scenario team aimed to assess the future scenarios based on the perspectives of different interest groups. Thus, it included experts in a range of areas relevant to the groups noted above. In this project, Traditional Owners (TOs) and pastoralists residing in the catchment were considered primary stakeholders because they are the groups whose interests and wellbeing will likely be most affected by future land/water use changes in the catchment. We also acknowledge that Traditional Owners are subject to structural disadvantage, amplifying impacts of any changes in their wellbeing. For this reason, as well as workshop 3, a specific workshop to assess future scenarios was held with TOs (September 2019 in Fitzroy Crossing). A workshop with pastoralists was planned for 2020 but it was cancelled due to travel restrictions associated with the COVID-19 pandemic.

3. Method

The assessment method has adapted elements of different participatory scenario development and evaluation methodologies, including Daw et al. (2015), Liswanti et al. (2017), Mitchell et al. (2016), and Wallace et al. (2016). Developing the method took over a year of intense collaboration between the research team and other NESP researchers.[1] This included work with an Aboriginal interpreter, Ms Olive Knight, to culturally translate the wellbeing factors used in the assessment. Four project participants, all related to Traditional Owners' interests, also provided feedback on the method at a preliminary workshop (Derby, August 2019). Below we describe the steps we took in the assessment.

3.1 Introduction and presentation on the catchment today

The workshop began with presentations on (1) the aim of the assessment, an overview of activities and outputs of the workshop; and (2) how the scenarios were developed, including a description of the current situation in the catchment.

The descriptions of the current catchment situation included a summary of the overall land use (main industries) and broad socioeconomic conditions (e.g. in terms of policies and collaboration). The presentation used supporting information, with a map representing the current distribution of land uses, and broad selected biophysical and socioeconomic indicators describing key features of industries (e.g. type of development, used land surface, gross value, estimated direct employment for Indigenous/non-Indigenous people, surface and groundwater use). This description of the current situation specified the baseline for scenario comparisons. It also provided the basis for exploring the definitions of the wellbeing categories (Table 1).

3.2 Definition of wellbeing categories and description of wellbeing from the catchment today

The wellbeing categories (Wallace et al. 2020; Table 1) were presented using pictures and practical examples. The wellbeing categories provided a guiding structure to the assessment and allowed for comparison of the positive and negative effects of future scenarios among different groups of people.

[1] The development of the method was led by Milena Kim in collaboration with Ken Wallace, Jorge Álvarez-Romero and David Pannell. Ro Hill, Natalie Stoeckl, Vanessa Adams and Karen Dayman provided invaluable feedback on the method. Michael Douglas contributed to the implementation stage.

Table 1. Definitions of the wellbeing categories for the scenario assessment. Adapted from Wallace et al. (2020) with detailed re-wording and interpretation by Olive Knight (Aboriginal interpreter from the study region) and the Derby preliminary workshop participants.

Categories include having:	Description and example
Enough food and water to drink	Having enough food and drinking water. Having wood or power to cook food. Includes beef, fish, bushfood, and food from the supermarket.
Satisfying work	Work that makes you feel good. Includes paid, unpaid, full time, part time, and casual work.
Knowledge of country and culture	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.
Safety/security	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).
Healthy country and river	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.
Fun – recreation, leisure	The happiness you get from having a good time. Includes recreation such as camping, fishing, boating, having a picnic.
Strong family and community relationships	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.
Places and things that make you feel good	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.
Inner peace, spiritual 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.

After the presentation of the wellbeing categories, participants allocated themselves to tables with a researcher, to discuss a series of questions (Table 3) about how people satisfy their wellbeing from the catchment today. The groups discussed all the wellbeing categories in relation to the elicitation questions, followed by a managed plenary session in which groups provided examples for each wellbeing category, and these examples were captured in writing and displayed on butcher's paper. There was no rating of the current situation, only a narrative description of the above. The session was audio recorded with the consent of participants. The information from groups on the wellbeing categories remained on display throughout the workshop to allow participants to use or refer to the knowledge generated by the group during the evaluation of scenarios.

3.3 Rating of wellbeing changes in future scenarios

Participants were asked to select the groups of people and the places or general areas (hereafter 'places') they were thinking about when assessing the scenarios (to which they were given a series of options; Appendix 3).

Then, participants rated each scenario in terms of the potential positive and negative changes in each wellbeing category compared with the current situation in the catchment. The process followed for each scenario assessed was the following:

a. The scenario was described in a presentation that included maps, diagrams, and a description of key indicators (described above). A hard copy description summarising each scenario (including a summary table with key indicators; Appendix 4Appendix 4) and a large-format map depicting a possible configuration of land uses was given to groups for their use during assessments.
b. The question addressed for each wellbeing category was: '*if this scenario happens, compared to the way things are now, you/your group's wellbeing for each of the following categories will be…*' (see Figure 3 for how responses were recorded). Participants discussed, in their tables, the wellbeing changes they thought could happen if the given scenario became true.
c. Participants were asked to rate changes from 'much worse' to 'much better' with the option of 'no change' in comparison with the current situation using Figure 3.

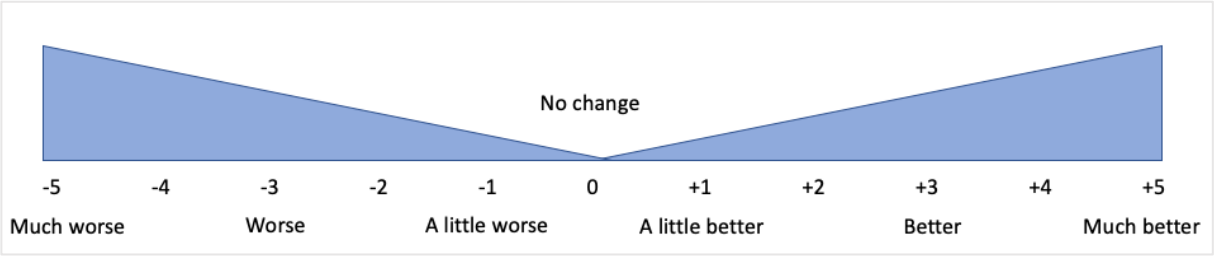

Figure 3: The 10-point scale used to rate the changes in each of the nine wellbeing categories for each scenario.

Participants could choose to remain anonymous when completing the worksheet. The discussion in step (b) was audio-recorded with the consent of participants. Researchers took notes of the discussion. Participants could also include written notes in the worksheet explaining the rationale behind their ratings.

3.4 Statistical analyses of participants' ratings

To provide a broad overview of the participants' ratings, the scores for each participant for each scenario were summed, taking into consideration whether the score was positive or negative. The scores for each participant were then added for each scenario – again taking into consideration whether the scores were positive or negative. The following calculations were then made:

a. total scores for each scenario across all individuals' ratings
b. mean score per participant per scenario
c. median, standard deviation and range of scores for each scenario across all individuals' ratings.

It is worth noting that, when answering the question about each scenario and wellbeing changes in section 3.3 (letter b and Figure 3 above), participants may have implicitly attributed different weights to different wellbeing categories. However, we did not attribute further weightings to different categories when calculating the aggregate values, i.e. all categories were weighted equally at that stage. These calculations provide a useful, overall sense of participants' ratings and the variability among participants. However, the quantitative results cannot be generalised as a representative sample of key interest groups in the catchment. Therefore, the summary statistics should be taken as a broad indication of the whole group's responses and need to be used and interpreted together with the additional, qualitative information presented in the results. Together, the numerical and qualitative information provide an overview of the potential impacts on people's wellbeing associated with the land- and water-use changes associated with each future scenario. This overview is based on the knowledge of participants, who were selected based on their expertise and lived experience of such matters.

4. Results

4.1 General workshop information

The workshop was attended by 18 people from 15 organisations, across all key interest groups, including government agencies, pastoral industry, mining, environmental groups, and representatives from Bunuba, Nyikina Mangala, and Wanjina-Wunggurr peoples (for a full list of participants see Appendix 1).

There were two professional facilitators, (Elizabeth Brown and David Munday), who facilitated workshops 1 and 2 (Figure 1). There were also five NAERH researchers (Jorge Álvarez-Romero, Michael Douglas, Pia Harkness, David Pannell, and Ken Wallace), supported by the NESP Regional Coordinator (Karen Dayman).

4.2 People and places

Participants identified between 1 and 6 groups of people that they would be thinking about when assessing scenarios. The most frequently selected groups were ‘all TOs in the catchment’ (selected by 12 participants), the ‘Fitzroy catchment community’ (9), and the pastoral industry (6) (Table 2). The participant’s TO group was selected by 5 participants, and the agricultural industry by 3 participants. Eight participants lived in the catchment, 8 did not live in the catchment, 1 lived part-time and 1 did not respond this question.

Regarding the places participants were thinking about when assessing scenarios, they identified between 1 and 4 places per individual. Most (14 participants) thought about the river and its total catchment, while 6 selected ‘river country’ and 6 referred to specific communities or towns where they lived (Table 2).

Table 2. 'People' and 'place' selected by the multi-stakeholder workshop participants. Participants could select more than one group of people and place.

People	Total
All Traditional Owners in the catchment	12
Fitzroy catchment community	9
Pastoral industry	6
Your Traditional Owner group(s)	5
Family group	5
Agricultural industry	3
Community group	3
As an individual	3
Australia government and/or people of Australia	2
State government and/or WA people	2
Global community	1
Mining industry	1
Place	**Total**
River and its total catchment	14
River country	6
Community group area(s)	6
Particular station(s)	4
Hill Country	2
Desert Country	1

4.3 Current situation

Researchers presented an overview of the current state of the catchment, including the broad socioeconomic conditions and main industries (Box 1). Appendix 4 includes a map representing the current distribution of land uses and selected indicators describing key features of industries. As noted above, the group used the current situation to explore the definitions of the wellbeing categories and as the baseline to assess scenarios.

Box 1. Summary of current situation of the Fitzroy River catchment.

- Native title exists over 96% of the catchment, but there are some problems in access to country, including for recreation, subsistence, and cultural activities
- Overall, the regional visioning and objective setting in the catchment is fragmented among stakeholders, but there are opportunities for improved collaborative leadership and strengthening of Indigenous governance
- Existing policies protect local and national values (including those of national and international significance)
- Most enterprises in the catchment are based on industries that maintain natural vegetation
- Negotiations around development are not always seen as fair or taking place under equal conditions

- Land use dominated by grazing natural vegetation
- Cattle can access some sensitive areas and there is some level of overgrazing in others
- Some problems in access to country, including for recreation, subsistence, and cultural activities
- Some interest in investment in carbon farming using savanna burning (one new project registered)
- Parks, IPAs and private reserves of variable size, mainly in northern catchment (10% protected)
- Some cultural- and nature-based tourism on existing national/state Parks and private conservation areas
- No commercial aquaculture developments
- Small-scale resource extraction (low impact)
- Irrigated fodder within beef enterprises uses surface water extraction (6 GL, 0.12% of median discharge), small areas w/groundwater

The description of how the wellbeing factors are currently satisfied in the catchment (i.e. the current situation) by participants is important because (1) it provides concrete meaning for each wellbeing factor used when assessing future scenarios, and (2) all the scenarios are compared with the current situation during the assessment, that is, the scores for each scenario may be directly compared given that they are all rated against a consistent baseline. In addition, discussions among the workshop group should encourage sharing of information and ideas, thus contributing to group knowledge as a whole. Ideally, this leads to more informed assessments and a valuable learning experience for all involved, whether as participants or facilitators/researchers.

During the workshop the participants allocated themselves to tables for group discussion. The resulting three tables had between 5 and 7 people from different interest groups. The full outputs from the workshop tables, with redundancies removed, are detailed in Appendix 5. The main topics raised by participants are summarised in Table 5. Generally, the topics have been separated into those that relate to the benefits derived from the catchment, and impediments to those benefits being achieved.

Table 3. Wellbeing categories, questions addressed by the group and summary of participants' responses to the questions in the left column. This is based on the information captured in the group discussions.

Wellbeing category and question addressed	Summary of matters raised by participants
1. Enough food and water How do people get food and water from the catchment today?	Food sources Fishing and hunting, other bush food Purchased food (e.g. roadhouses, supermarkets, restaurants) Hospitality (e.g. from the community) Own vegetable garden Domestic and introduced animals Sharing and reciprocity Water sources Bore water – public or private supplier Supermarket or shops generally Surface water (e.g. river, springs, soaks, dams) Issues with food and water Bore water – public or private supplier – quality and volumes can be concerns Deliveries of food, e.g. trucking can be impacted by weather Water quality can be an issue – nitrates, arsenic, salinity - filtration/processing plants may be a solution
2. Satisfying work, meaningful work What are the opportunities in the catchment for meaningful work today?	Types of work: Domestic work, child rearing; Volunteer work including cultural leadership and mentorship; Pastoral/agricultural industry; Rangers; Tourism (including cultural tours); Arts and culture e.g. dance; Supplying bush tucker, bush medicine; Providing cultural immersion, cultural awareness courses; Mining and exploration; Land management, Natural Resource Management, weed management; Support roles for main industries, e.g. pastoralism, tourism, agriculture; Human services and administration, e.g. health, education, and related Types of employers: Industry; Government (local, State, Australian); Aboriginal corporations – PBC Issues Does the training and education available help people to get meaningful work? Access to business development opportunities?
3. Knowledge of country and culture The catchment is a library of knowledge and heritage. In what ways do people connect to this	Place of belonging, defines identity Language and culture passed on by family and community, knowledge from elders Western education Most knowledge gained by experience, observation, and relationships, shared experience Knowledge is safety Knowledge of food, timing of flowering and fruiting, seasonal calendar Communal knowledge

important resource today?	Knowledge gives people authority Underpins everyone's wellbeing Continuing connection – native title and ILUAs Gives access to practice tradition and culture Ranger programs – transmission of cultural knowledge, generating and sharing knowledge, cultural tourism Research from outside – connections – aligning multiple knowledge systems Recent strong history / knowledge of pastoral, prospecting – European and Aboriginal Learn from history – apply this to future development Language centres record history – written and verbal Documentation of culture, stories and connection to the past in videos, books, arts, music Dance / ceremony Visual landmarks – if destroyed, knowledge gone Plants and animals and place in landscape Legal process – native title TOs have to give assent / knowledge on applications – heritage clearances Google, Information bays/boards Kimberley knowledge and cultural centre KALACC – cultural blocs, opportunities to demonstrate and practice knowledge, through ceremonies for example keep knowledge strong Long term (intergenerational) relationships with Fitzroy River as a life force, food source, identity <u>Issues</u> Partnering with TOs – they have an openness to share knowledge, sharing knowledge through collaborations Challenge as TOs get older that younger people have the same knowledge
4. A feeling of safety [safety, feeling safe and secure] What are the living things that make people feel safe or not safe in the catchment today?	<u>Being safe plus some thoughts</u> Knowledge provides safety Distinguish: Physical safety versus emotional safety Food abundance River as a living thing > feeling of safety, 'Living water' = safe to drink Community and family make you feel safe – if you know your community, e.g. people will stop if you break down on the side of the road, linked to harsh conditions because consequences of being stuck in remote areas can be dire <u>Not being safe</u> Poisoned water (e.g. DDT) or depleted water Unsafe weather – harsh conditions, cyclones, etc Drugs, alcohol, crime Poisonous plants and animals Animals on roads – stock Pigs and other feral species including cane toads Crocodile

	Mosquito borne disease: Japanese encephalitis; Ross River Fever Some solutions Building relationships – getting to know one another: Investing in opportunities to talk; Creating empathy across worldviews Access to country Meaningful work for young people to feel safe and secure Healthy land provides a sense of safety and security – if not healthy – feel unsafe Using animals for safety: e.g. pea hens around the homestead to keep snakes away; Sentinel donkeys with flocks Access to medical services – know help is available if needed – ambulances
5. Fun – recreation, leisure How do people have fun/recreate in the catchment today?	Outdoors activities: Fishing and boating; Hunting; Tracking; Swimming; Bird watching; Camping; Bushwalking; Exploring; Sightseeing, including scenic flights; Kids playing, e.g. in the river; Volunteering – conservation Arts and interpretation: including storytelling (e.g. Jandamarra story); dance (e.g. Junpa – dance ceremony); and music Social events and socialising in general: Family socialising; visiting people and places; Talking; barbecues, other eating, drinking; Events/festivals, horse races Other activities: Cooking; Football; Sitting around – relaxing; Photography; Astronomy/star gazing; Work – pleasure derived at work; Just being there
6. Strong family and community relationships How do people connect to their families and communities today? What is it about the catchment that helps these relationships?	Connecting to country Catchment helps us connect as a family, teaches empathy for the country and boundaries for different family responsibilities; one law for the whole of the river that connects all the groups along the river including desert people Inclusiveness and having a shared right and responsibility to pass on knowledge and experience, responsibility to care for and improve country. The river is a sacred ancestral living being and we have a duty to look after the river It's like a magnet that draws us back. A drawcard. Feeling of belonging. Catchment itself is an important entity for activities which foster strong communities and relationships Recreation sites and family connection to places Native title recognised – family and community connection Community and group activities that also bond families and larger groups Hunting and fishing having something to catch; Sport; Service culture – volunteering; Bands – family bands; Rodeos – 3 day event at Fitzroy Crossing Other ways to connect Traditional kinship systems; Storytelling; Facebook – social media digital communication; Community noticeboard; Colleagues – strong for people outside of catchment or who live there short term; Associations / boards /corporations (KPCA, PGA, NRM, PBCs); Schools / community centres/ art centres; Partnerships between industry / groups Issues Some social organisations are floundering, e.g. country fire association struggling for new members Social media having a negative impact because people are inside on their phones all the time and don't use spare time connecting with family and community Community leaders who create opportunities: Transience brings new people into communities with new energies to drive things; Conversely good thing can stop when people leave

	Issues preventing wellbeing, such as grog (i.e. alcohol), drugs, and violence lead to isolation and poor connection to community and family
7. Healthy country, healthy river What are the things that are healthy and unhealthy about the physical environment of the catchment today?	<u>Healthy country</u> Clean up after activities (litter, nets, etc.) The country is healthy if we work together Good access to the river (where it is well managed) Cultural sites in good condition (in some cases, not all) Connection to healthy marine environment Natural/cultural flows of water are essential for the land, river and people Catchment biodiversity, fish, birds, etc. Catchment is nationally important and protects unique species such as the sawfish. There are no feral fish species but need to maintain water for biodiversity. Cyclones and harsh weather conditions, brings rain to dry part of the country <u>Issues</u> Thallium (pollution) in the groundwater and historical chemical use issues Fracking Good design of road crossings to limit erosion. Otherwise get tidal intrusions and scouring Degradation and salinity, pollution from arsenic, nitrates; pollution killing fish Leaking oil from old machinery River pools filling in with sediment Lowering of groundwater through pumping Wild/hot fires before wet season resulting in silting when storms come Abandoned mine – leaking into environment Emus and wallabies still missing from the landscape after massive culls in 1960s Variable condition of pastoral land – some degraded – some not, some overgrazing and land management is key, e.g. rotate stock. Some weed and feral animal issues Cyclones and harsh weather conditions cause destruction Fires can affect transportation of foods and other essentials Climate change affects food and water scarcity through seasonality and impact on rainfall, more extreme weather (e.g. temperatures) will affect biodiversity
8. Places and things that make you feel good [aesthetics] Are there special places and things that make people feel good when they see, touch, taste, smell, or feel them?	Memory and experience – shared experience Living waters versus normal water Some places are significant. Others, anybody can go there. Rainfall, viewing the river flowing and in flood. Remoteness, untouched land, big landscapes, river and gorges, Devonian reef Colours – moon and soils, etc Sweet smell (after rain) Sense of story

	Green grass grow – cattle fed Boab trees Spectacular natural events, e.g. storms and lightning, tides Sense of age and cultural continuity Clean air Stars Wildlife, birdsong Uninterrupted natural sound e.g. wind sounds – no sirens… Mouth of the river and tidal change It's not about picking out the little bits. It's a whole entity. <u>Issues</u> Things that make you feel sad, e.g. scars on the landscape (solastalgia) – e.g. disused dam
9. Inner peace, spiritual fulfilment How do people find inner peace and spiritual fulfillment in the catchment today?	All the above Do all those things (family, connection to country, caring for country) and you'll get inner peace. People gain inner peace and spiritual fulfilment from the river, connection to the river and nature, practicing ceremonies and culture Getting back to half-decent seasons – green grass / water flow When pressure increases get out on country and relax – come back refreshed Cultural flows – TOs special places and traditions Story telling – getting back to history – feeling grounded When outside of catchment – can carry it with you through language and stories Watching Aboriginal artists connect through art – long history Seeing the stars even the space between the stars – no pollution see into space Having meaningful work e.g. rangers managing country and elders watching and knowing next generation can carry on Dual/multi religious beliefs Tension between wanting what the rest of the world has – as seen on the internet etc, and valuing what we have in the Fitzroy. Church/religion Peace and quiet sitting by yourself next to the river People and sense of wellbeing when other people are at leave you find your own peace – peace in relationships Moments, e.g. sunsets and sunrises Ethics of care Practicing culture, but there can also be scary aspects of practicing traditional culture and spiritualism Knowing that you can see the stars (compared with city, even if you don't go outside to look at them) Having spiritual activities in your communities, or activities that have spiritual component, e.g. yoga or community groups with spiritual aspects People gain inner peace and spiritual fulfilment from the river, connection to the river, practicing ceremonies and culture

4.4 Scenario assessment

Scenarios 3, 1A, 1B, 2, and 4 were assessed, in that order (see sections 4.4.1 to 4.4.5). Scenario 3 was assessed on the first day as this was considered to best fit the time available given it implied the least amount of changes compared with the current situation. However, the order in which scenarios are assessed does not affect the rating process because each is compared with the baseline (current) situation and not against each other.

Table 4 summarises participants' ratings across all wellbeing categories for each future scenario. This information provides an aggregated view of scenarios and helps identify which scenarios were perceived by most participants as having generally positive or negative ratings across most categories. Overall, the fact that the great majority of participants scored all scenarios and effectively used the wellbeing categories suggest that the assessment process has been well understood and managed by the participants despite their comparatively brief exposure to the underlying concepts and approach.

There are notable differences between participants within each scenario, as indicated by the range and standard deviations (Table 4). The results in Table 4 are taken as only broadly indicative of the aggregated views across multiple interest groups in the catchment. However, they do indicate that there were clear differences between the scoring of the scenarios, with scenario 1A having the highest aggregated score (not far ahead of scenario 1B), and scenario 4 the lowest. If we accept the simple method for aggregating ratings across wellbeing categories, with no weighting of categories by researchers, then scenarios 1A, 1B and 2 were assessed by most participants as representing potential improvement across most wellbeing categories compared to the current situation, while scenarios 3 and 4 were generally see as having potential to worsen wellbeing (but see Figure 4 for exceptions to this pattern).

Table 4. Summary statistics of participants' ratings across all wellbeing categories for each future scenario.

	Scenario 1A	Scenario 1B	Scenario 2	Scenario 3	Scenario 4
Total score	377	323.5	206	-56	-245.5
No. participants	18	18	17	18	17
Mean/participant	20.94	17.97	12.12	-3.11	-14.44
Median	21.5	21.5	15	-2	-13
Std deviation	10.46	17.41	15.75	14.73	22.16
Range	3 to 45	-27 to 45	-24 to36	-40 to 18	-45 to 45

Figure 4 shows participants' most highly scored scenario. The most highly scored scenario of each individual was identified by aggregating the scores of each wellbeing category per scenario. Scenarios 1A and 1B were the most highly scored by five participants each, and two participants scored 1A and 1B equally high. Scenario 2 was scored most highly by three participants, and scenarios 3 and 4 by one participant each.

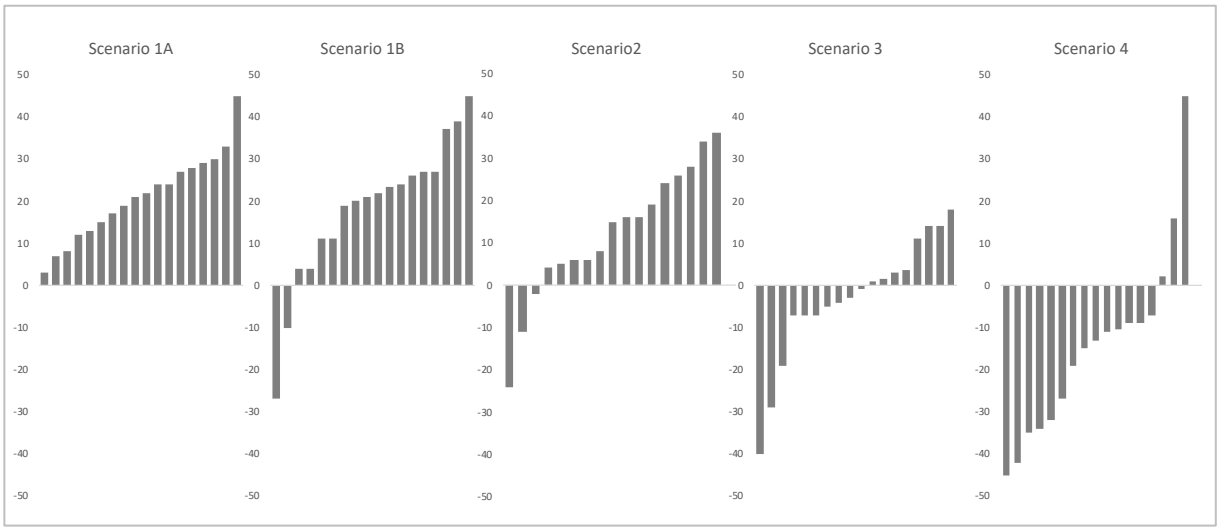

Figure 4. Scoring patterns of participants per scenario, from scenario 1B to 1A, 2, 3 and 4. Each column represents the sum of the scores for all wellbeing categories in one scenario by one participant.

Figure 5 shows the aggregate scores for each individual for each scenario. Most participants scored scenarios in a similar way, including positive ratings for scenarios 1A, 1B and 2 (strong policies), negative scores for scenario and 4 (weak policies) and a mix of positive and negative scores for scenario 3 (weak policies). This graph also highlights that, despite some general agreement, there is a diversity of views including some distinctly different viewpoints, particularly about scenarios 1B, 2 and 4.

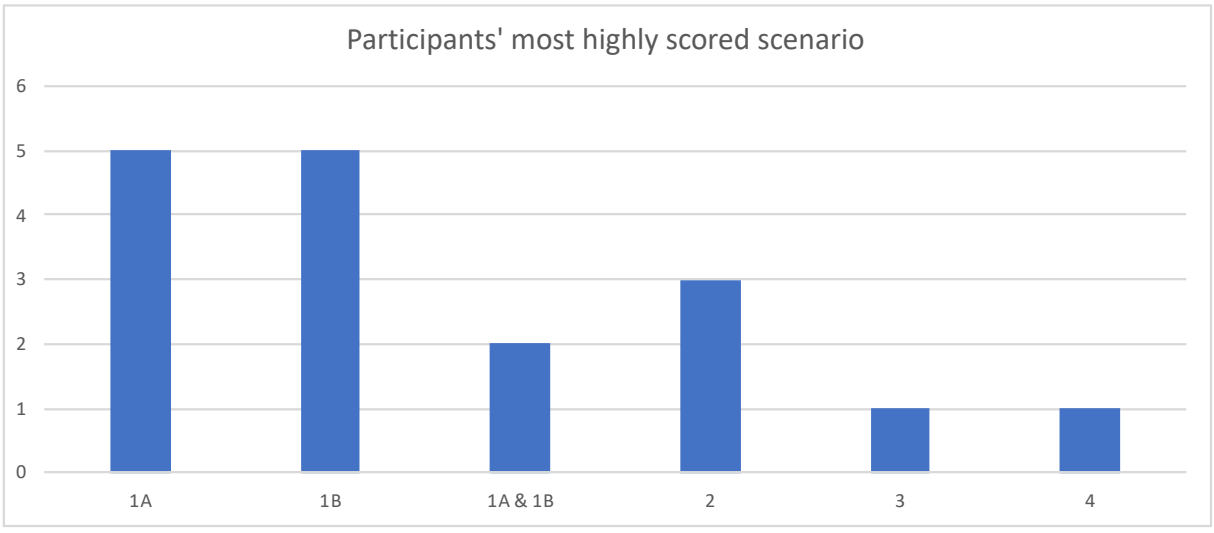

Figure 5. Number of participants that scored each scenario the highest, based on the aggregate scores for each individual, for each scenario. Scenarios 1A and 1B are variations of scenario 1 and are thus aggregated under the latter. Column '1A & 1B' means that two participants scored scenarios 1A and 1B equally as their highest scored scenarios.

Table 5. Wellbeing categories that showed the greatest change per scenario relative to the baseline (current situation), and summary of associated comments.

Scenarios	1A	1B	2	3	4
Wellbeing categories most likely improved	Satisfying work: - higher Indigenous workforce participation in resource sector, as rangers, and in tourism - new jobs which could help addressing social issues	Knowledge of country and culture: - enhanced by people working on country (and thus spending more time on country)	Satisfying work: - jobs in cultural tourism, and as rangers managing country	Satisfying work: (no positive comments)	Satisfying work: (no positive comments)
	Knowledge of country and culture: (no comments)	Healthy river country: - the increase in the conservation estate could improve the health of the country - maybe less threats to the river, but not necessarily a healthier river	Safety: - increased employment could stabilise families and contribute to food security	Having fun: (no comments)	Enough food and water, knowledge of country and culture, safety: (no positive comments)
	Healthy river country: - maintaining the health of the river would depend on irrigated agriculture being well regulated and monitored	Satisfying work: - higher Indigenous employment in carbon farming and tourism	Strong family and community: - Access to country, Indigenous enterprises, and increased household income and security	Not applicable	Not applicable
Wellbeing categories most likely to become worse	Not applicable	Enough food and water: - increase in woody weeds affecting the availability of bushfoods	Healthy river country: - withdrawing water from the river could affect its health	Healthy river country: - limited reduction of grazing - limited consultation and joint management - low funding for conservation - water extraction - limited threat management	Healthy river country: - poorer environmental management and regulations leading to environmental impacts
	Not applicable	Safety, strong family and community, and inner peace, spiritual fulfilment: - insufficient jobs leading to social issues	Places and things that make you feel good: (no comments)	Safety: - limited threat management	Inner peace, spiritual fulfilment: (no comments)
	Not applicable	Not applicable	Having fun: (no comments)	Enough food and water: - water extraction - limited access to country, less access to bushfoods, less traditional uses of the land	Knowledge of country and culture: (no comments)

The categories in Table 5 were the ones with the highest sum of all positive (i.e. most likely to improve) or negative scores (most likely to become worse) by all participants, per scenario. The qualitative information in the sections below, and summarised in Table 5, was sourced mainly from researchers' notes and participants' written comments in the worksheets generated during the workshop.

4.4.1 Scenario 1A

Researchers presented an overview of scenario 1A, including the broad socioeconomic conditions and main industries (Box 2). This scenario is based on strong policies protecting local and national values, and a higher demand and investment in development initiatives that maintain natural and cultural landscapes. Appendix 4 includes a map representing one potential configuration of land uses in 2050 and selected indicators describing key features of industries.

Scenario 1A had only positive and 'no change' ratings from participants. All participants considered that there would be at least some wellbeing improvements if this scenario came true, while two participants, both from a Traditional Owner perspective, rated most categories as 'no change' when compared with today.

The categories with the highest improvement were 'satisfying work', 'knowledge of country and culture', and 'healthy river country' (Figure 6). One participant, working for government, commented on the potential for higher Indigenous workforce participation in the resources sector, more rangers working on country, and new tourism enterprises. Another participant from government stated that he hoped that the current government planning initiatives could create new jobs that could help address the social issues in the catchment.

Box 2. Summary of the potential conditions in the Fitzroy River catchment under scenario 1A.

- Stronger policies protect local and national values (including those of national and international significance) and give certainty; also, strong collaborative leadership (coordinated decisions) and strong Indigenous governance (Indigenous empowerment and participation, recognized by other stakeholders) enable better planning and management
- Higher demand and investment in development initiatives that maintain natural-cultural landscapes
- Negotiations around development are more fair and take place under equal conditions
- Evidence-based decisions and monitoring allow identifying changes and adjusting uses accordingly

- Land use dominated by grazing natural vegetation
- Better land and water management, including cattle control and reduced overgrazing
- Better access to country, including for recreation, subsistence, and cultural activities
- Good investment and extensive carbon farming using savanna burning (less large & hot fires)
- Large increase in the number and extent of new conservation areas (17%), managed through joint management
- Large increase (+100%) in cultural- and nature-based tourism (85% Indigenous businesses)
- One new small-scale coastal barramundi farm
- Similar level of resource extraction (low impact)
- Six new medium-scale irrigated agriculture based on groundwater (100 GL, 2.9% of recharge)

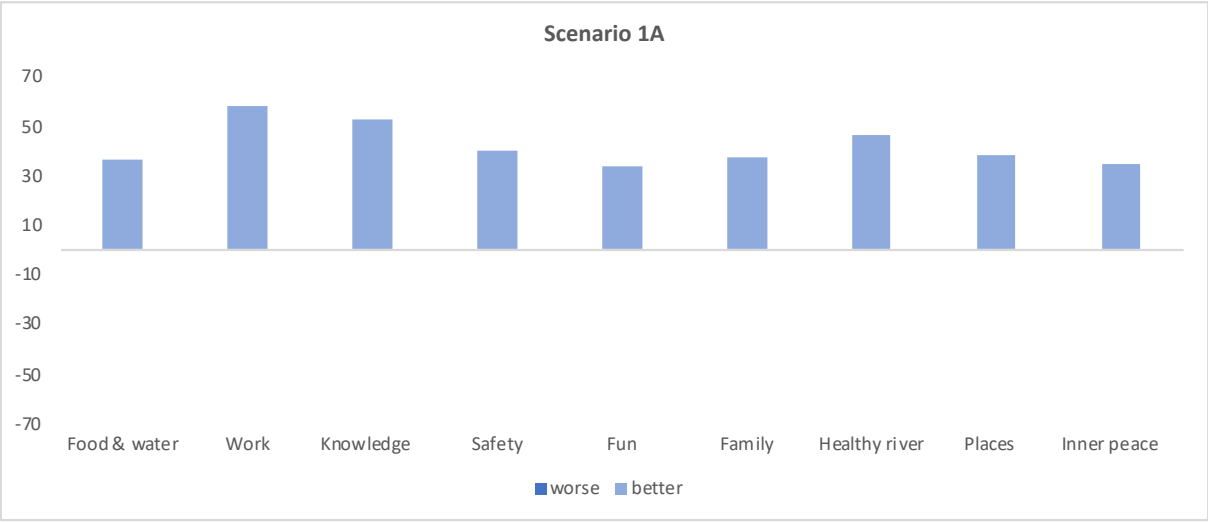

Figure 6. Scenario 1A. Sum of the positive ('better') and negative ('worse') ratings per wellbeing category. Comparisons are with the current situation.

Although there were no negative ratings, one participant, speaking from a Traditional Owner's perspective, was concerned that

'more work more $, may result in more alcohol, drugs, etc'

Another participant, working for government, stated that maintaining the health of the river in scenario 1A depended on irrigated agriculture being well regulated and monitored. This would prevent water extraction during years of low flows, which would affect recharge. On the other hand, a participant working in the pastoral and agriculture industry rated this category positively but noted concerns regarding the likelihood that groundwater extraction opportunities could be limited to a few properties.

4.4.2 Scenario 1B

Researchers presented an overview of scenario 1B, including the broad socioeconomic conditions and main industries (Box 3). This scenario is also based on strong policies protecting local and national values, and a higher demand and investment in development initiatives that maintain natural and cultural landscapes, but it assumes increment in irrigated agriculture will be negligible. Appendix 4 includes a map representing one potential configuration of land uses in 2050 and selected indicators describing key features of industries.

Scenario 1B had mostly positive and 'no change' ratings; all the negative ratings came from two participants, who scored most categories as worsening. The categories with highest improvement were 'knowledge of country and culture', 'healthy river country', and 'satisfying work' (Figure 7). Participants generally agreed that spending more time on country, by working on parks, tourism and land management, would increase the knowledge of country and culture. Some considered that the increase in the conservation estate could improve the health of the country; while others thought that there would be less threats to the river in this scenario, but this would not necessarily improve its current state.

Participants discussed the potential for carbon farming and tourism in the catchment. Some participants perceived that work in those industries, as well as the increased opportunities for joint management, could lead to higher Indigenous employment. However, participants who rated this scenario negatively thought that the picture presented in the scenario 'is going backwards' and there would be insufficient employment, which could lead to an aggravation of social problems.

Box 3. Summary of the potential conditions in the Fitzroy River catchment under scenario 1B.

- Stronger policies protect local and national values (including those of national and international significance) and give certainty; also, strong collaborative leadership (coordinated decisions) and strong Indigenous governance (Indigenous empowerment and participation, recognized by other stakeholders) enable better planning and management
- Higher demand and investment in development initiatives that maintain natural-cultural landscapes
- Negotiations around development are more fair and take place under equal conditions
- Evidence-based decisions and monitoring allow identifying changes and adjusting uses accordingly

- Land use dominated by grazing natural vegetation
- Better land and water management, including cattle control and reduced overgrazing
- Better access to country, including for recreation, subsistence, and cultural activities
- Good investment and extensive carbon farming using savanna burning (lower large & hot fires)
- Large increase in the number and extent of new conservation areas (17%), managed through joint management
- Large increase (+100%) in cultural- and nature-based tourism (85% indigenous businesses)
- One new small-scale coastal barramundi farm
- Similar level of resource extraction (low impact)
- No new irrigated agriculture developments

The wellbeing categories with the highest negative ratings were ‘enough food and water’ (which was also the category with the highest number of ‘no change’ ratings); and ‘safety’, ‘strong family and community’, and ‘inner peace, spiritual fulfilment’ (all tied). The rationale presented by a participant for those ratings was that the insufficiency of jobs would lead to further social problems, and an increase in woody weeds would affect the availability of bushfoods. Inner peace would be affected because it is *‘Depressing thinking things will not improve for [the] majority of population’.*

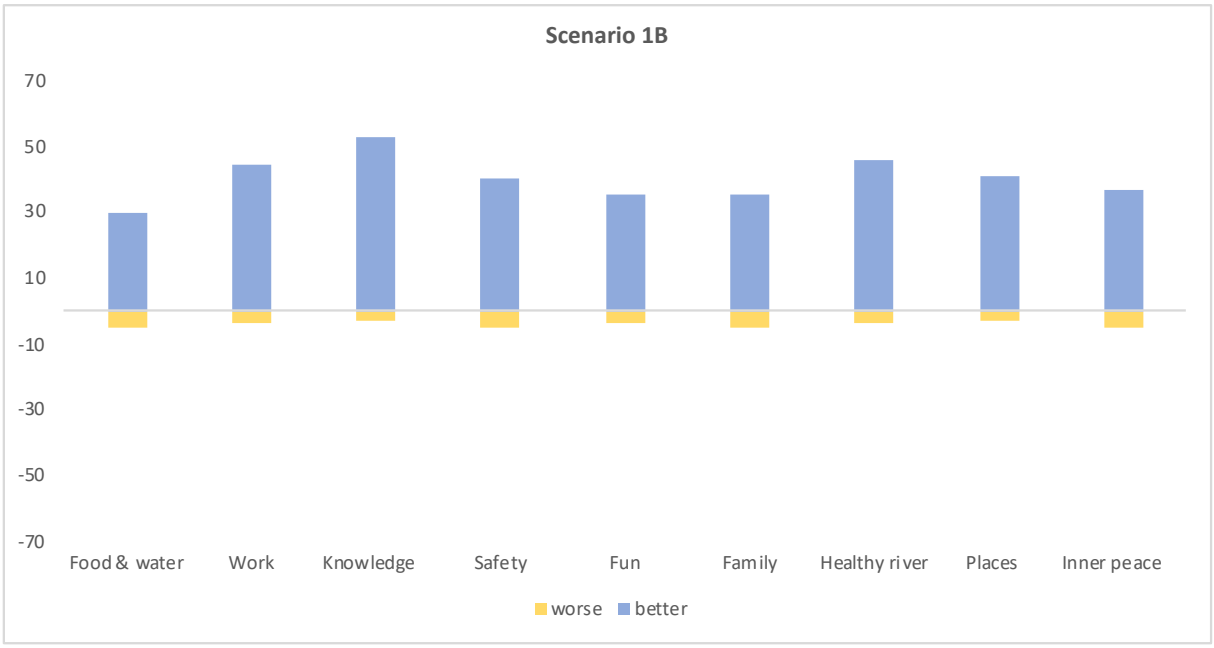

Figure 7. Scenario 1B. Sum of the positive ('better') and negative ('worse') ratings per wellbeing category. Comparisons are with the current situation.

4.4.3 Scenario 2

Researchers presented an overview of scenario 2, including the broad socioeconomic conditions and main industries (Box 4). This scenario is based on strong policies protecting local and national values, and a higher demand and investment in development initiatives that modify natural and cultural landscapes. Appendix 4 includes a map representing one potential configuration of land uses in 2050 and selected indicators describing key features of industries.

The categories with most positive ratings were 'satisfying work', 'safety', and 'strong family and community' (Figure 8). 'Satisfying work' was possibly influenced by the higher number of jobs than the previous scenario, but one participant from government viewed positively the jobs in cultural tourism, and as rangers managing country. One participant, from an agricultural-pastoral perspective stated that safety would improve under this scenario because the increased employment could stabilise families and contribute to food security. Another participant perceived that increased land and fire management could contribute to better safety. Access to country, Indigenous enterprises, and increased household income and security would contribute to 'strong family and community'.

Box 4. Summary of the potential conditions in the Fitzroy River catchment under scenario 2

- Stronger policies protect local and national values (including those of national and international significance) and give certainty; also, strong collaborative leadership (coordinated decisions) and strong Indigenous governance (Indigenous empowerment and participation, recognized by other stakeholders) enable better planning and management
- Higher demand and investment in development initiatives that modify natural-cultural landscapes
- Negotiations around development are more fair and take place under equal conditions
- Evidence-based decisions and monitoring allow identifying changes and adjusting uses accordingly

- Land use dominated by grazing natural vegetation
- Better land and water management, including cattle control and reduced overgrazing
- Better access to country, including for recreation, subsistence, and cultural activities
- Medium-level investment in carbon farming using savanna burning (moderate reduction in fires)
- Medium increase in the number and extent of new conservation areas (13%), incl. joint management
- Medium increase (+50%) in cultural- and nature-based tourism (75% indigenous businesses)
- Two new small-scale coastal barramundi farms
- Medium increase in resource extraction (low impact)
- 12,000 ha of irrigated rotation system (groundwater: 120 GL, 3.4% of recharge) + 18,000 ha of Rhodes grass (300 GL, 6.1% of median discharge)

The level of negative ratings in this scenario was slightly higher than in scenario 1B. The categories with the most negative impacts on wellbeing were ‘healthy river country’, ‘places and things that make you feel good’, and ‘having fun’ (which also had the most ‘no change’ ratings). One participant from government was concerned about the potential environmental impacts:

> *‘Predicated on that strong governance, which I am very sceptical of, because I cannot see human nature changing in 30 years… But predicated that everybody has a wonderful epiphany tomorrow morning and we all start changing, then… I am very concerned about the river and drawing water off the river, but I think we are smart enough people to bring some agriculture in and get it right, not destroy everything. But we have to be very firm and strict about what are our environmental priorities, identify them and mark them as untouchable. (…) [Unfortunately] there is an overlap between some of the most valuable environmental assets and the most suitable country for agriculture. But those assets need to be protected.’*

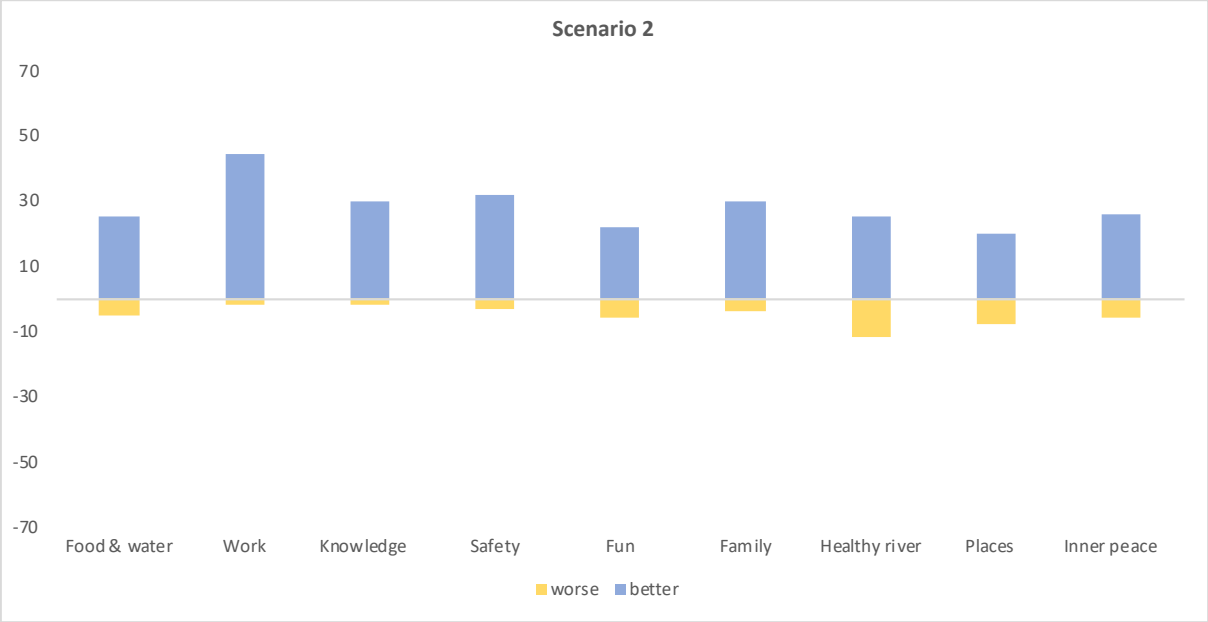

Figure 8. Scenario 2. Sum of the positive ('better') and negative ('worse') ratings per wellbeing category. Comparisons are with the current situation.

4.4.4 Scenario 3

Researchers presented an overview of scenario 3, including the broad socioeconomic conditions and main industries (Box 3). This scenario is based on weak policies that favour interests external to the catchment, and a higher demand and investment in development initiatives that maintain natural and cultural landscapes. Appendix 4 includes a map representing one potential configuration of land uses in 2050 and selected indicators describing key features of industries.

Scenario 3 received the highest amount of 'no change' ratings. This is explained by participants' comments that this is the closest to a 'business as usual' scenario, and that it '*seems like where we are heading if nothing changes*'. A key feature of this scenario is poor governance and weak policies. Negative ratings may have been associated with participants' perceptions that weak policies leave things open to contention, and that ultimately '*everything comes down to governance*'.

The categories most contributing to wellbeing improvements were 'satisfying work' and 'having fun' (Figure 9). However, several participants considered that the region would not achieve its potential for job generation due to poor governance, planning and management. The lack of joint management would likely result in low participation of Indigenous people in the workforce, and all these factors could lead to unsatisfying work. A participant explained that, for example, some types of jobs may take people so far away from their family that they may be better off not taking those jobs.

Box 5. Summary of the potential conditions in the Fitzroy River catchment under scenario 3.

- Weaker policies that favor external interests and result in uncertainty; based on weak individualistic leadership (uncoordinated decisions) and weak Indigenous governance (less Indigenous empowerment and participation) that result in poor planning and management
- Higher demand and investment in development initiatives that maintain natural-cultural landscapes
- Negotiations around development are less fair and take place under unequal conditions
- Decisions are not always evidence-based and monitoring of environmental impacts is limited

- Land use dominated by grazing natural vegetation
- Land and water management, including cattle control and reduced overgrazing does not improve
- Access to country remains limited, including for recreation, subsistence, cultural activities
- Moderate investment in carbon farming using savanna burning (some reduction of fires)
- Moderate increase in the number and extent of conservation areas (14%), with limited joint management with TOs
- Small increase (+10%) in cultural- and nature-based tourism (65% Indigenous)
- No coastal barramundi farms
- Similar level of resource extraction (some impacts)
- Six 1000-ha stand & graze farms (6000 ha) based on groundwater (110 GL, 3.1% of recharge)

The categories most negatively impacted were ‘healthy river country’, ‘safety’ and ‘enough food and water’ (which also received the most ‘no change’ ratings). A participant stated that the health of the river country would be compromised by several factors, such as

> *‘Limited reduction of grazing, limited consultation, low funding for conservation, impacts of water extraction unknown, limited joint management.’*

It was perceived that the limited funding to manage threats (e.g. fire, weeds, pests) could affect both the health of the river and feelings of safety. The extraction of water could also impact the health of the river, and the availability of drinking water and food. Further, the limited access to country could result in less access to bushfoods and hinder the traditional uses of the land.

Figure 9. Scenario 3. Sum of the positive ('better') and negative ('worse') ratings per wellbeing category. Comparisons are with the current situation.

4.4.5 Scenario 4

Researchers presented an overview of scenario 4, including the broad socioeconomic conditions and main industries (Box 6). This scenario is based on weak policies that favour interests external to the catchment, and a higher demand and investment in development initiatives that modify natural and cultural landscapes. Appendix 4 includes a map representing one potential configuration of land uses in 2050 and selected indicators describing key features of industries.

This scenario had the highest negative ratings. Nevertheless, two participants rated it positively. Some participants considered that scenario 4 is not very different from the current situation:

> *'This is pretty much how we have done things in this country. The people with the money going out and taking what they want.'*

Others considered that the scenario portrayed is worse than now, and '*not a picture anyone would want to see*'.

Box 6. Summary of the potential conditions in the Fitzroy River catchment under scenario 4

- Weaker policies that favor external interests and result in uncertainty; based on weak individualistic leadership (uncoordinated decisions) and weak Indigenous governance (less Indigenous empowerment and participation) that result in poor planning and management
- Higher demand and investment in development initiatives that modify natural-cultural landscapes
- Negotiations around development are less fair and take place under unequal conditions
- Decisions are not always evidence-based and monitoring of environmental impacts is limited

- Land use dominated by grazing natural vegetation
- Land and water management, including cattle control and reduced overgrazing does not improve
- Access to country remains limited, including for recreation, subsistence, and cultural activities
- Small-scale investment in carbon farming using savanna burning (little improvement in fire mgmt.)
- Low increase in number and extent of conservation areas (12%), limited joint management with TOs
- Modest increase (+25%) in cultural- and nature-based tourism (65% Indigenous)
- One new small-scale coastal barramundi farm
- High increase of resource extraction (higher impact)
- 6,000 ha of groundwater (110 GL, 3.1% of recharge) and 18,000 ha off-stream (360 GL, 7.3% of median discharge) irrigated Rhodes grass

The categories with the most positive ratings were ‘satisfying work’; and ‘enough food and water’, ‘knowledge of country and culture’, and ‘safety’ (all tied). The most negatively impacted categories were ‘healthy river country’, ‘inner peace, spiritual fulfilment’, and ‘knowledge of country and culture’ (Figure 10). Some participants considered that poor governance could mean lower emphasis on ensuring benefits from development are accrued locally, e.g. more ‘fly-in-fly-out’ workers, jobs for tourists or backpackers, and seasonal jobs. Poor governance would also mean poorer environmental management and regulations, leading, for example, to impacts of chemicals and nutrients into the river. These points could converge, meaning that the local community would bear the consequences of poor environmental management, lack of regulations and compliance on food security and water quality. However, the industries causing those issues would not necessarily benefit the local community.

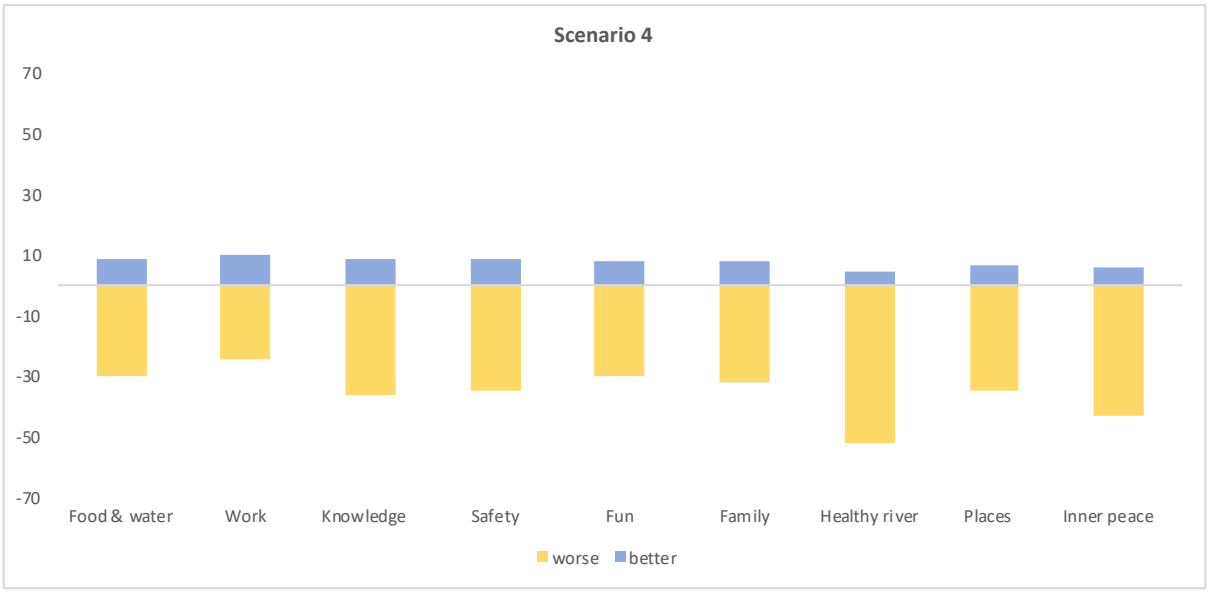

Figure 10. Scenario 4. Sum of the positive ('better') and negative ('worse') ratings per wellbeing category. Comparisons are with the current situation.

5. Discussion and conclusion

5.1 Goals 1 and 2

1. developing a common language around wellbeing
2. developing shared knowledge of wellbeing today.

The workshop achieved the goal of developing a framework that allowed participants from different cultures and representing different interests to discuss the potential changes in wellbeing associated with alternative futures for the catchment. Overall, participants were able to relate to most wellbeing categories. They were comfortable in using these categories to discuss key aspects of wellbeing and in using them to assess the effects of future scenarios.

During the initial discussion on the current situation in the catchment and on how people satisfy the wellbeing categories, items have been allocated to categories in a way that is largely consistent with the definitions. The workshop produced a very comprehensive set of data that encompasses not only ways in which wellbeing is fulfilled, but also some of the major concerns of the group. Based on participants' ratings of the scenarios, the different categories of wellbeing are all positively or negatively affected by change, and, on that basis and the group evaluation, are relevant. However, the quantitative assessments highlighted 'healthy river country', 'satisfying work' and 'knowledge of culture and country' as those categories of wellbeing that contribute most to the assessment of change in this region.

Appendix 6 documents a range of participant comments on the wellbeing categories that are generally supportive of the approach used, plus a number of suggestions to improve the method. A number of the suggestions, e.g. those relating to the capitals (particularly financial), and physical and mental health, would be clarified with a more complete set of definitions and more time to explain the complete systems approach that underlies the wellbeing classification used in the methodology. The detailed participant comments also capture important cross-cutting themes concerning relationships to country and culture, and including issues such as solastalgia.[2] The research team plans to analyse these in more detail, including a summary of the threatening processes identified.

5.2 Goals 3 and 4

3. document participants' views on changes in wellbeing under alternative scenarios
4. recommend a way to assess future changes on the wellbeing of different social groups.

The workshop achieved the goal of assessing changes in wellbeing associated with future scenarios. All scenarios were assessed. Participants' ratings followed a broadly similar pattern, with scenarios 1A, 1B and 2 (strong policies) being rated positively by the majority of participants across most categories, and scenarios 3 and 4 (weak policies) being rated

[2] Solastalgia describes a form of emotional or existential distress caused by environmental change. It is best described as the lived experience of negatively perceived environmental change. (source: https://en.wikipedia.org/wiki/Solastalgia). Aboriginal Australians feel particularly distressed by such changes (e.g. https://theconversation.com/strength-from-perpetual-grief-how-aboriginal-people-experience-the-bushfire-crisis-129448).

mostly negatively. There were a few exceptions to these patterns (Figure 5). This pattern reflects a common theme in participants' comments, including statements made during the workshop, regarding the need for good governance, strong policies, and regulation of economic activities so that residents can benefit from such activities. Conversely, in weak-policy scenarios there could be negative social and environmental impacts that would affect residents and communities; and the eventual economic benefits could be reaped by a few locals, or by non-residents (e.g. temporary workers and corporations).

'Satisfying work' improved in all scenarios, but especially in scenarios 1A, 1B and 2; and 'knowledge of country and culture' improved in scenarios 1A and 1B, possibly linked to improved access to country and employment that could allow people to spend time on country. Conversely, 'healthy river country' worsened in scenarios 2, 3 and 4, possibly linked to the larger potential expansion of irrigated agriculture and associated potential impacts from, for example, the extraction of water and the use of pesticides.

The workshop successfully achieved all goals. Nevertheless, there were several areas of improvement suggested by participants in regards to the use of the wellbeing categories (see Appendix 6). Overall, this workshop was an important step towards developing a way to assess future changes in the wellbeing of different interest groups (goal 4). Importantly, it allows identifying which areas of people's wellbeing can be more/less affected (either positively or negatively) under different scenarios. This is important to allow a more nuanced assessment of the potential trade-offs associated with ongoing land/water use decisions. Another key lesson is that having a common language around wellbeing that allows for discussions between different groups interested in the Fitzroy River catchment is critical and can facilitate discussions and negotiations regarding ongoing and future planning. Moreover, most participants liked the fact that conversations went beyond the potential of new jobs and monetary benefits towards understanding how future development can affect various aspects of wellbeing.

This indicates the importance of undertaking more comprehensive assessments (like the one developed under this project) to facilitate meaningful discussions and negotiations around land and water use in the catchment (including as part of the ongoing planning initiatives). This way to talk about what could happen in the future and how it affects people's wellbeing may assist organisations and individuals to discuss important matters that could be affected by future land- and water-use decisions. Last, we recommend that future research could explore aspirational scenarios since there seemed to be an interest in that approach to future scenario development by workshop participants.

6. Next steps

Whilst we emphasise results cannot be generalised as being a representative sample of interest groups in the catchment, they provide an indication of important aspects of wellbeing that could be affected (positively or negatively) under alternative development scenarios and their associated changes in land and water uses. The assessment thus provides valuable information for Traditional Owners, pastoralists, government agencies, and other organisations with interests in the future of the region to identify key aspects that need further discussion and consideration during ongoing and future land and water use planning initiatives. In this sense, we encourage research partners to build on the proposed assessment approach and results to further explore these aspects. Additionally, groups and organisations can use the broad structure of scenarios to create alternative scenarios (e.g. as part of aspirational planning led by interested organisations) and include other development initiatives (e.g. bush foods and renewable energy), which we were unable to incorporate due to data and time constraints.

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Appendix 1: List of participants

Ben Drew

Damien Parriman

Dickie Bedford

Gayle Williams

Grey Mackay

Ian Perdrisat

James Hay-Hendry

Justin King

Kathy Eyles

Liam Bedford

Lloyd Nulgit

Meghan Barnes

Penelope Purdie

Philip Hams

Richard Patterson

Russel Shaw

Shannon Shaw

Tim Nicol

Appendix 2: Definitions of the drivers used to build the logic of scenarios

Variations of the primary and secondary drivers

During workshop 2, participants worked in tables with facilitators rotating across tables to describe the range of possible variations of the primary and secondary drivers. The description included defining at least the two end states (opposite poles, e.g. low and high). For each driver, the group wrote brief texts describing how each end state might look like in the future. Following concerns regarding the framing of the markets' driver, researchers proposed alternative descriptions for this driver. Several options were considered and a revised framing was adopted; these options and a summary of discussions are described in the brief of workshop 2. The description of the possible variations of drivers (**Table 1**) was adjusted and enriched following conversations with scenario team members and used to describe the four scenarios.

***Table 1**. Broad description of the variations (opposite poles) for the primary and secondary drivers. The table describes the 'end states' identified by participants for each of the six drivers, which were used to describe and build each of the four scenarios.*

Drivers		Summary of drivers' end states (opposite poles)
PRIMARY	Markets[3]	*Higher[4] demand/investment[5] in development initiatives that modify natural landscapes[6]*: dominant demand and investment in markets that focus on development initiatives (industries) associated with relatively higher modification of natural landscapes. *Higher demand/investment in development initiatives that maintain natural landscapes[7]*: dominant demand and investment in markets that focus on development initiatives (industries) based on the use, management, and/or restoration of natural and largely undisturbed landscapes.
	Policies	*Strong policy*: in a strong-policy end state, policy is developed and implemented in a way that protects things valued by the local community and provides certainty and clarity for everyone living in the region. *Weak policy*: in a weak-policy end state, policy is divisive and does not support the protection of things valued by the local community, resulting in uncertainty for everyone in the region.

[3] The definition and description of variations for the 'markets' driver was refined by the research team following discussions during the workshop. Other aspects will shape how actors will respond to external markets, for example in terms of whether local people will invest or allow others to invest on their land. Ultimately, the outcomes in terms of the type of investments (and developments) will derive from the combination of all drivers, not only markets.

[4] In this context, higher is not relative to the current situation (today), but to the opposite pole.

[5] Including investment implies that, under a higher demand scenario, people may choose to invest or allow others to invest.

[6] Examples of initiatives could include intensification of pastoral enterprises based on higher stocking rates and/or introduced exotic grasses, broad acre irrigated agriculture, bush food monoculture plantations, mining, unconventional gas, mass tourism, and solar farms (generally grouped with initiatives that fall within state 2, these initiatives fit better here because they involve vegetation clearing). Initiatives supported or promoted under this state are not necessarily associated with large-scale footprints (e.g. a mining project could modify a very small surface area of the catchment).

[7] Examples of initiatives could include extensive low-stocking rate pastoralism aiming to maintain, restore and/or protect natural landscapes, carbon abatement through savanna burning, wild bushfood collection, recreational fishing, bush food enrichment, nature and cultural tourism, and conservation stewardship.

SECONDARY	Leadership	*Strong leadership*: leaders at all levels (local, regional, national) willing to work collaboratively to achieve an inclusive vision for the catchment; these passionate and motivated leaders are representative of the region and ensure positive outcomes for everyone. *Weak leadership*: characterised by a single actor unwilling to collaborate and making self-interested decisions; in a weak leadership end state, leaders are appointed based on nepotism and focus on conflicts, which polarises people living in the catchment.
	Indigenous governance[8]	*Strong*: strong governance reflects the empowerment of Indigenous peoples and groups; this would result in equivalent strong social (e.g. employment, heath) outcomes for Indigenous peoples. *Weak*: low power of Indigenous people and groups; this would result in equivalent weak social (e.g. employment, heath) outcomes for Indigenous peoples.
	Technology	*Higher access to technology*: means improved access to telecommunication, infrastructure (roads, energy), and monitoring systems (remote sensing and GIS). It could support existing industries (agriculture, mining), increasing the efficiency of natural resource use and reducing their footprint; and new industries would benefit from better access to markets and micro processing of niche products. *Lower access to technology*: means limited access to telecommunication, infrastructure, and monitoring systems. It could result in lower economic competitiveness and lower participation in global trade. It could also mean less modification of natural environment and enhance attractiveness to certain tourism markets (e.g. nature-based tourism).
	Tenure reform	*Higher*: tenure reform is well thought out, transparent, straightforward and communicated to all stakeholders – which generates broad community understanding; it provides a flexible streamlined approach for approvals and certainty around land use planning. *Lower*: tenure reform is slow and unwieldy and a politicised non-transparent process; the process lends itself to inconsistency and reform is imposed with limited community engagement.

The driver related to markets (external demand[9]) and associated investments (local supply) is described in terms of their potential to influence land use change (which was the focus of discussions during the workshop), specifically regarding the level of modification of natural landscapes. This framing focuses on external markets, but includes how external and local responses (in the form of investments) could shape development. The examples of development initiatives that could be associated with either end state help to illustrate the model of development that we could expect; these emerged from further discussions with most members of the scenario team when researchers fleshed out the scenarios. Examples also illustrate how the end states can help identify the model of development (e.g. mass

[8] The driver is about empowerment and is linked with other drivers such as employment and health (as outcomes of Indigenous governance).
[9] Discussions on this driver during the first workshop were around external markets demand, hence this proposal is faithful to the original intent.

tourism developments vs. small-scale cultural and nature-based tourism), rather than the presence/absence of development initiatives.

Similar to the description of other drivers (**Table 1**), impact is not implicit in the definition of the driver related to markets, and neither pole represents 'good' or 'bad' end states or paths to development, simply different possibilities. Development initiatives in either side of the spectrum could have small or large environmental and/or socioeconomic impacts, which are determined based on the combination of location, footprint, risks, and approach of the development initiatives.

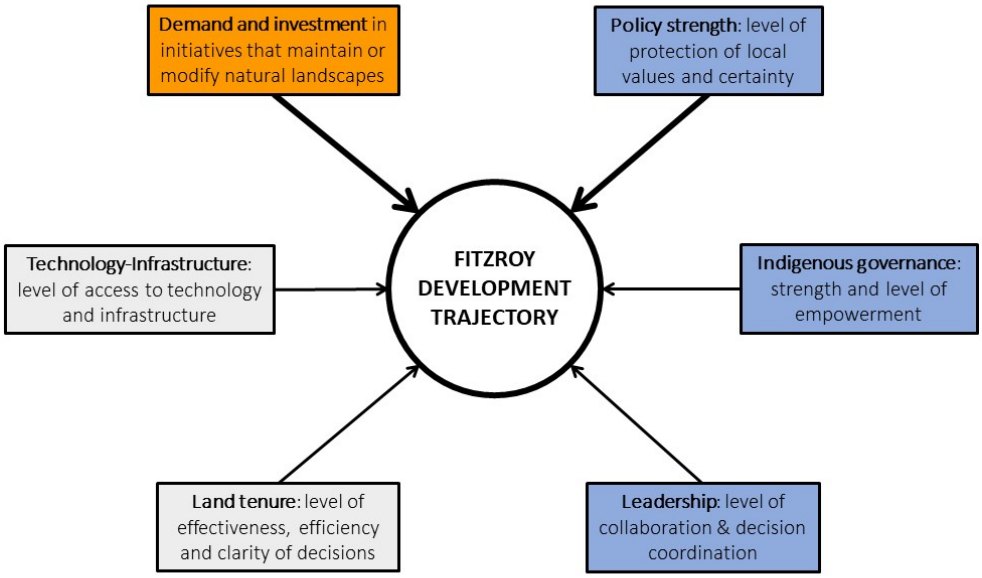


Figure 1. *Primary and secondary drivers selected to build scenarios.*

Three drivers (policies, leadership and Indigenous governance) are effectively in lock step, which means that when one is strong, they all will be, and vice versa, independently of the other drivers (**Figure 2**). While this may not be always the case, given we only have four scenarios, it is a reasonable assumption and simplification.

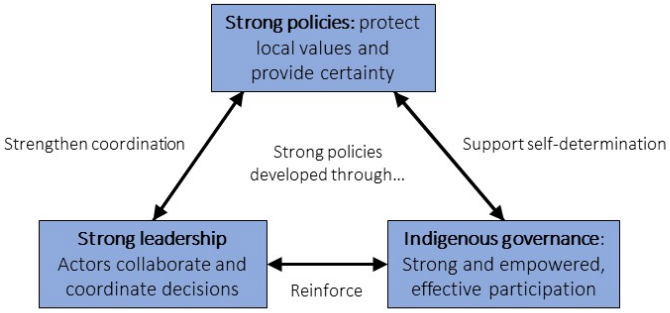


Figure 2. *Bundle of three closely-related drivers*

Under the assumption that policies, leadership and Indigenous governance operate as bundle, we can expect there will be strong policies that protect local values and provide certainty if these are developed through strong and collaborative leadership at local, regional and state levels. In turn, these policies will facilitate and strengthen collaboration between actors at all levels and result in coordinated decision-making. At the same time, it is safe to assume that this arrangement is in lock step with Indigenous governance, where stronger governance contributes to developing strong policies and these in turn can support self-determination. Finally, we expect that collaborative leadership and strong Indigenous governance will be mutually reinforcing. The outcomes of this situation include strong institutions of governance and regulation, including rule of law. We could also expect that under this situation honesty, care, justice, respect and tolerance would be followed by the different stakeholders involved in decision making.

Regarding tenure reform, three features can help differentiate between stronger/weaker land tenure reform and its implementation (including in relation to Native Title): (a) Effective: appropriate approvals processes and mechanisms for decision-making and negotiation/agreement making are in place and complied with; this facilitates access to opportunities; under this state, decisions safeguard and take account of cultural protocols, cultural institutions and community interests; (b) Efficient: decision making and approval processes are more efficient (including Free Prior Informed Consent) and have lower transaction costs, but not through weakening Indigenous land owners' and native title holders' procedural rights (i.e. steps taken to enforce legal rights); and (c) Clear: terms and implications of land use agreements are clear to communities, developers, landholders and others involved.

For scenarios with strong Policy-Leadership-Governance bundle, we assume there would be a link to the approach to tenure reform/system. First, land use approval processes would likely support Indigenous land owners and native title holders to be proponents or partners in economic development on their land, not just part of a 'tick a box' in approval processes. Second, we expect more effective and efficient decision-making and approvals through increased ability of Indigenous land holder and PBCs to respond to land use applications.

Scenarios built based on the proposed drivers focus on describing the overall balance and how different industries could play out on either end state, but not whether certain initiatives are excluded from a given scenario. Thus, dominance in one state does not mean absence

of initiatives that are more prominent in an alternate state, and *vice versa*. Instead, it implies that the interest and investment in those initiatives could be lower, thus they would be relatively less prevalent across the catchment in terms of frequency and total extent. For instance, under a scenario under the first state, there could be higher demand and investment in extensive broad acre agriculture developments (which could be associated with damming and high use of agrochemicals), while scenarios under the second state could have more investments in small-scale and low-input agricultural developments (e.g. wild harvest, mosaic small farms). Likewise, under the second state, scenarios can include mining developments, but these probably would not be as extensive across the region.

Appendix 3: People and place form

Planning Group – Workshop Sheet 1: Group, People, Place

Participant No._____ Name: _____

Date_____ Facilitator:_____

1. When we assess the changes in wellbeing-liyan associated with different scenarios, which group(s) of people will you mainly be thinking about? Mark all that apply:

( ) Agricultural industry

( ) Australian government and/or the people of Australia

( ) Fitzroy catchment community

( ) Global community

( ) Mining industry

( ) NGO

( ) Pastoral industry

( ) State government and/or the people of Western Australia

( ) All Traditional Owners in the catchment

( ) Your Traditional Owner group(s)

( ) Community Group

( ) Family Group

( ) As an individual

( ) Other(s), please specify: _____

2. When we assess the changes in wellbeing-liyan associated with different scenarios, which part of the catchment will you be mostly thinking about? Mark all that apply:

( ) The river and its total catchment

( ) Community Group area(s), which is/are called _____

( ) Particular station(s), which is/are called_____

( ) Desert country

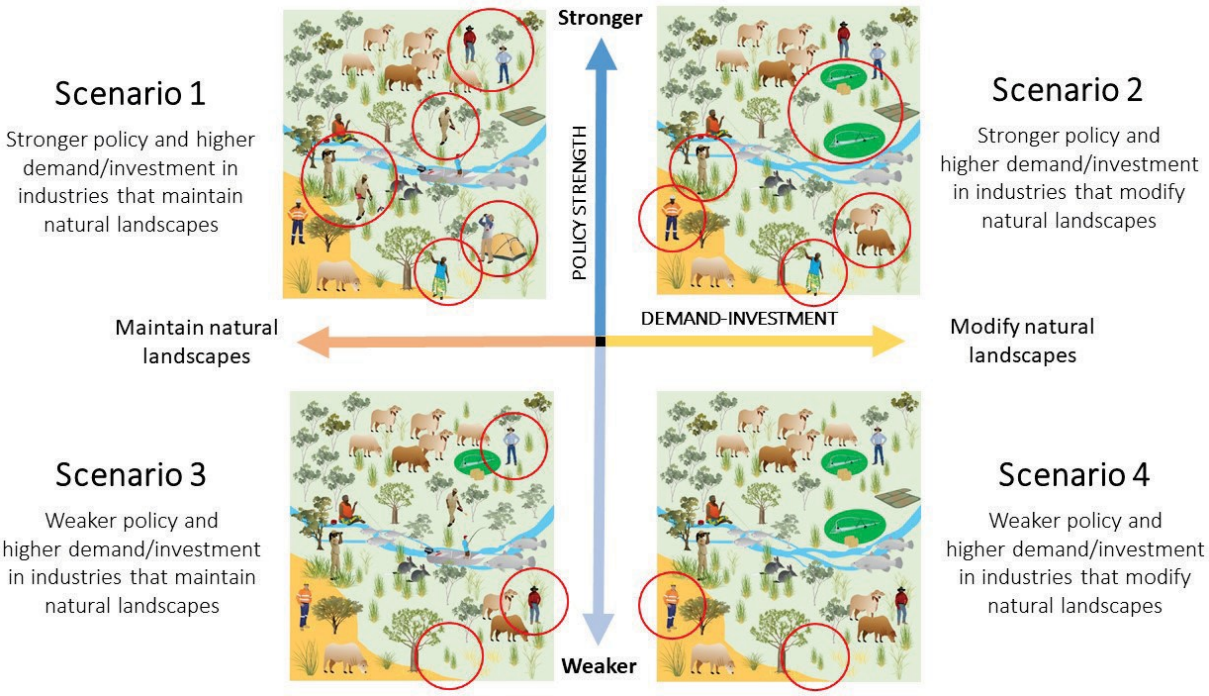
( ) River Country

( ) Hill Country

( ) Other(s), please specify: _____

Appendix 4: Supporting information for current situation and scenarios

Researchers summarised key points regarding the current situation of the catchment and the main differences under the alternative scenarios. They also provided a summary (below) regarding the key considerations and assumptions used to build the scenarios, as well as main information used to inform their analysis.



Baseline

- Agriculture: 4,900 ha cleared; includes irrigated fodder within beef enterprises using surface water (6 GL, 0.12% median discharge), small areas using groundwater (~10 FTE)
- Aquaculture: no commercial aquaculture developments
- Carbon farming: three savanna burning registered projects (northern catchment); one operating including 1,586 km2 of the catchment within IPA (~5 FTE)
- Conservation areas: Parks, IPAs and private reserves of variable size, mainly in northern catchment covering 10,215 km2, 10% of catchment protected (<50 rangers)
- Tourism: combination of cultural- and nature-based tourism, mostly focused on existing national/state Parks and private conservation areas (~284 FTE)
- Pastoral: Extensive grazing of native vegetation, mostly to live trade market (~152 FTE)
- Resource extraction: scattered and small-scale resource extraction (low impact)

Irrigated agriculture

- Potential crops are many and vary significantly in their extent and use of water, so these are hypothetical examples of possible developments based on available information
- Scenarios were constructed based on variations of two options under consideration: a mosaic of irrigated cotton–mungbean–forage sorghum rotation (groundwater) and irrigated forage Rhodes grass, both integrated into existing beef enterprises
- Rhodes grass has a high gross margin and there is an established market for cotton. We assume enterprises within exclusive would be owned by Indigenous organisations
- Mosaic option assumes third-party investment to build a cotton gin in Kununurra
- Scale based on suggested Based on best estimates of water use for relevant crops
- Distribution based on land suitability, development costs (infrastructure, access), available water options, risk (flooding), avoidance of areas of high conservation value
- Used information from NAWRA, Mowanjum, PEW, literature, researchers, team expertise

Aquaculture

- Aquaculture enterprises could generate an internal rate of return >7% despite remoteness of the catchment, assuming efficient operations, infrastructure and investment
- Considers barramundi aquaculture farms (earthen lined ponds, using local water supply) located near Derby
- Well-established land-based culture practices and markets for harvested products
- Long history of farming in northern Australia, commercial success largely due to tolerance of fresh or saltwater, high stocking densities, fast growth, market demand
- Water use based on best available information
- Distribution based on land suitability, proximity to town, coast (water source), and river (discharge), risks (e.g. flooding), and avoidance of areas of high conservation value
- Data mainly from NAWRA (comparable to NT Barramundi farming handbook)

Carbon farming

- Management regimes that make extensive use of strategic early dry season burning, with fires deliberately lit at times of mild fire weather, and in parts of the landscape where burnt areas will be most effective as firebreaks
- Such burning is likely to reduce the occurrence of large/severe late dry season fires
- Scenarios with more extensive savanna burning will likely have additional benefits for pastoral industry by reducing loss of grass and infrastructure to wildfires
- Well-established practices and growing market, particularly for northern Australia
- Revenue estimates are conservative and only based on abatement, but new carbon abatement and sequestration methods could mean higher revenue
- FTEs and carbon costs based on best-available information
- Scale and distribution based on fire history, costs (access), types of vegetation
- Used information from wide literature, existing projects (e.g. WALFA) and other researchers

Conservation areas

- We assume a combination of national parks, IPAs, private reserves (incl. partial exclusion and management of cattle to minimise impact) funded by various funding sources
- Location determined based on representation of features of conservation interest based on their rarity and vulnerability (varying across scenarios):
  - Bioregions
  - Species (plants, fish, amphibians, reptiles, birds, mammals, invertebrates)
  - Ecosystems (vegetation types, land systems, aquatic systems)
  - Water bodies (dry season pools, billabongs, wetlands, etc.)
  - Vegetation cover and structure
- National Heritage listing: preference given to protecting values within its boundaries
- Based on best estimates of FTEs from own comprehensive dataset and literature
- Used information from wide sources, including own models, models developed together with other NESP projects, available databases, literature review and experts

Cultural and nature-based tourism

- Enterprises may vary in their focus, but we assume most would incorporate a combination of cultural- and nature-based tourism aspects and, due to its nature, new enterprises would be predominantly lead and managed by an Indigenous organisations
- Hypothetical increase in tourism visitation (and corresponding number and size of new enterprises) based on extrapolating from current trends and reported possible values, assuming limited supply (no market cap in terms of demand)
- Direct expenditure based on average values for stay and spend
- Max level of development assumes twice visitation numbers (KDC suggests 300% increase), under the same level of expenditure, but higher international visitors higher expenditure
- Variations in enterprise development also consider possible variations in investment in infrastructure and capacity building, which will enable or constrain opportunities for growth
- Conservative values for direct expenditure based on Based on TRA (2016) average stay and average spend, Kimberley Blueprint, PEW Study, Shires' publications, and team's expertise

Resource extraction

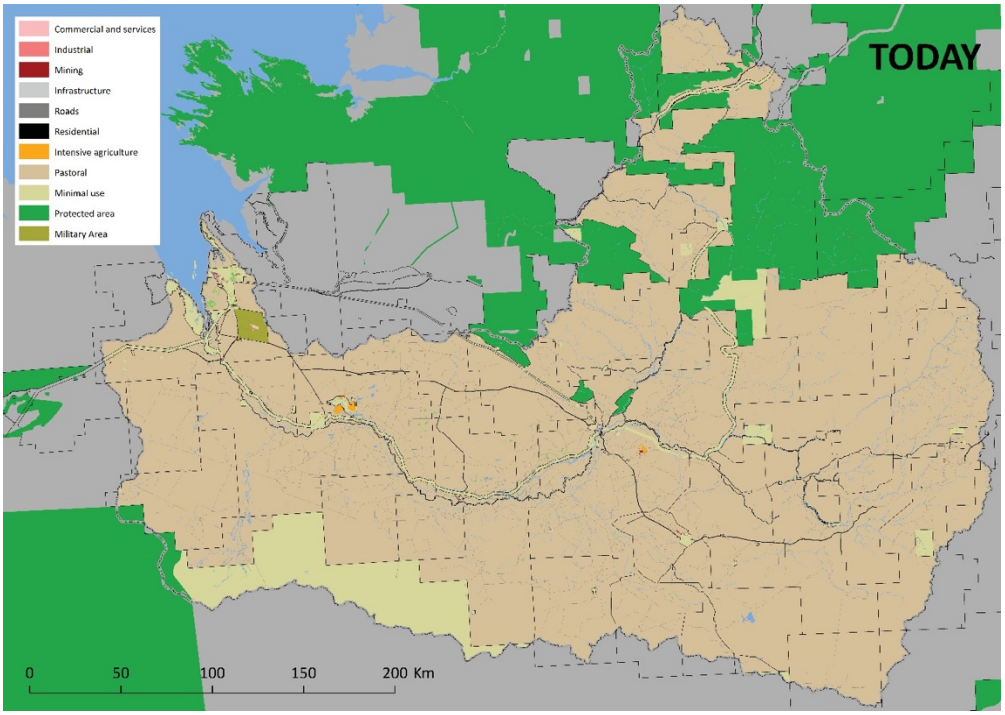
- To estimate the likelihood of resource extraction taking place within the catchment, we collated all available data on current and proposed mining leases and exploration permits (petroleum, minerals, coal, infrastructure and known mineral occurrences)
- Linear features (e.g. pipelines) and points (e.g. drill holes, mineral occurrences) were represented by buffering to 250 m
- The data from each source was split into five categories in order of likelihood (high low):
  - Currently active mine sites
  - Proposed mines and applications for mining leases

    - Current exploration permits
    - Known resource presences
    - Applications for exploration permits and areas advertised for exploration
- The impact of resource extraction on the environment depends on projects following policy, best practice, and environmental impact guidelines and cannot be estimated reliably.

Today

- Native title exists over 96% of the catchment, but there are some problems in access to country, including for recreation, subsistence, and cultural activities
- Overall, the regional visioning and objective setting in the catchment is fragmented among stakeholders, but there are opportunities for improved collaborative leadership and strengthening of Indigenous governance
- Existing policies protect local and national values (including those of national and international significance)
- Most enterprises in the catchment are based on industries that maintain natural vegetation
- Negotiations around development are not always seen as fair or taking place under equal conditions

- land use dominated by grazing natural vegetation
- cattle can access some sensitive areas and there is some level of overgrazing in others
- some problems in access to country, including for recreation, subsistence, and cultural activities
- some interest in investment in carbon farming using savanna burning (one new project registered)
- parks, IPAs and private reserves of variable size, mainly in northern catchment (10% protected)
- some cultural- and nature-based tourism on existing national/state parks and private conservation areas
- no commercial aquaculture developments
- small-scale resource extraction (low impact)
- irrigated fodder within beef enterprises uses surface water extraction (6 GL, 0.12% of median discharge),small areas w/ groundwater.

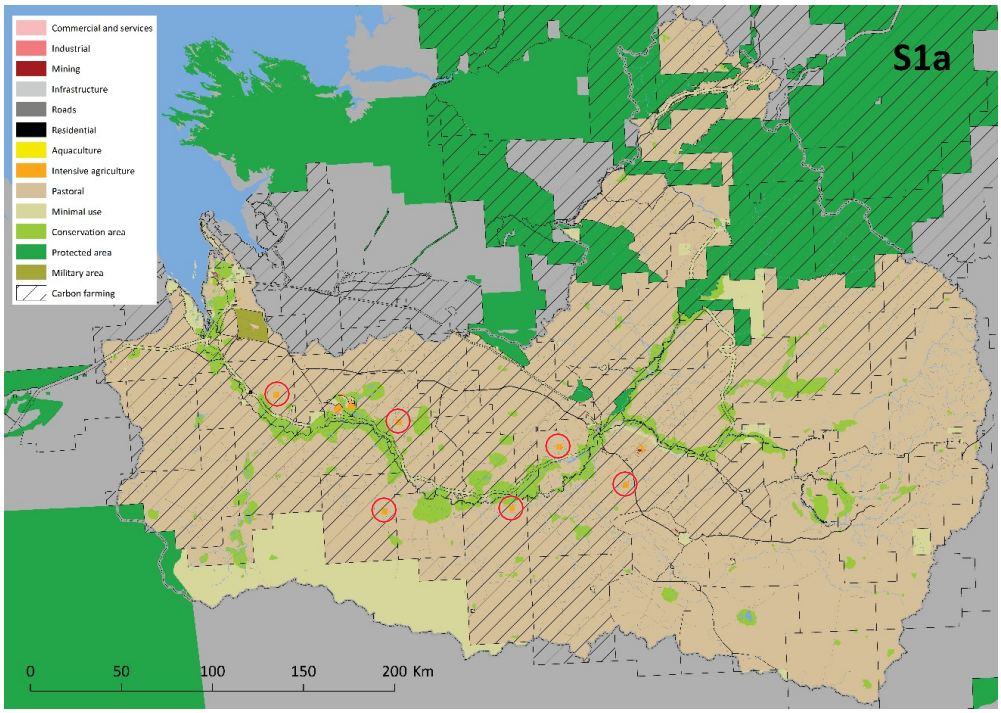


	Description & value	Distribution	Employment	Other
Irrigated agriculture	Irrigated fodder within beef enterprises; mostly surface water extraction, small areas w/groundwater Value: **$2.4 million**	4,900-ha developed land (2.7% of usable land), large portion (94%) in 2 main developments (Liveringa, Gogo), 6% within Indigenous stations	Mainly non-Indigenous enterprises; unknown actual FTEs, but possibly ~10 FTEs including some Indigenous (seasonal) workers	Small development with some consideration of local values Surface: 6 GL/year (0.12% of median discharge) Groundwater : 6.4 GL/year (0.18% of median recharge)
Aquaculture	N/A	N/A	N/A	N/A
Carbon farming	**Small-scale** carbon farming area using savanna burning (aerial + ground activities) Value: **< $0.1 million**	Three registered projects in the north, but only one operating covering 1,586 km^2 (within the catchment) of Indigenous land (**100%)**	**5 FTE (Indigenous rangers)**, project led and managed by Indigenous organisations in IPA; good coordination in the area	Little abatement effort leads to **low carbon price** ($15) and still limited support for enterprises
Conservation estate	Variable size parks, two partial overlapping with catchment; total area: 10,215 km^2 (10% of the catchment)	Protect key values, but not yet comprehensive; some level of residual reservation (i.e. avoid areas of very-high production potential); moderately connected	State and private management of most areas (with some joint management). Unequal distribution of costs/benefits across TO groups Estimate: **~40 rangers**	Collaborative planning and limited funding to manage and monitor threats (e.g. fire, weeds, pests) **Some traditional uses**
Tourism	Some cultural- and nature- based tourism Domestic: 86,700 visitors International: 10,000 visitors Value: **$67 million**	Mostly focused on Shire of Derby-West Kimberley, some in Halls Creek; bush walking and visiting national/state parks and private conservation areas	**284 FTE** across 17 businesses (5-20 each, 17 average); most operate from main towns and some employ local guides	Limited supply; low investment in marketing and product development, infrastructure, and capacity building of Indigenous organisations
Pastoral	Extensive grazing of native vegetation, mostly to live trade market (71%) Value: **$74 million**	Average size of 230,129 ha (15,919 - 403,189) and herd of 8,200 AE (629 - 21,860), sum ~331,000 AE (208,600 head)	**152 FTE** on-farm worker for the pastoral land portion within the catchment; **58** Indigenous (15% Indigenous, Kimberley average)	Some problems with access; variable control of grazing in sensitive areas (exclusion from few areas) and some areas are being overgrazed
Resource extraction	Resources in the catchment include coal, diamonds, precious metals, oil and gas, and quarrying Value: **$500 million**	Proposed: 147 km^2 (0.15%) Exploring: 26,986 km^2 (27.32%) Known: 183 km^2 (0.19%) Applications: 7,987 km^2 (8.09%)	Highly variable; e.g. 266 people were employed in 2011, compared to 32 in 2016	A major contributor to the economy, but variable and significant downturn in mining in the last few years, with a number of mine closures

Scenario 1(a)

- Stronger policies protect local and national values (including those of national and international significance) and give certainty; also, strong collaborative leadership (coordinated decisions) and strong Indigenous governance (Indigenous empowerment and participation, recognised by other stakeholders) enable better planning and management
- Higher demand and investment in development initiatives that maintain natural-cultural landscapes
- Negotiations around development are more fair and take place under equal conditions
- Evidence-based decisions and monitoring allow identifying changes and adjusting uses accordingly

- land use dominated by grazing natural vegetation
- better land and water management, including cattle control and reduced overgrazing
- better access to country, including for recreation, subsistence, and cultural activities
- good investment and extensive carbon farming using savanna burning (less large & hot fires)
- large increase in the number and extent of new conservation areas (17%), managed through joint management
- large increase (+100%) in cultural- and nature-based tourism (85% Indigenous businesses)
- one new small-scale coastal barramundi farm
- similar level of resource extraction (low impact)
- six new medium-scale irrigated agriculture based on groundwater (100 GL, 2.9% of recharge).

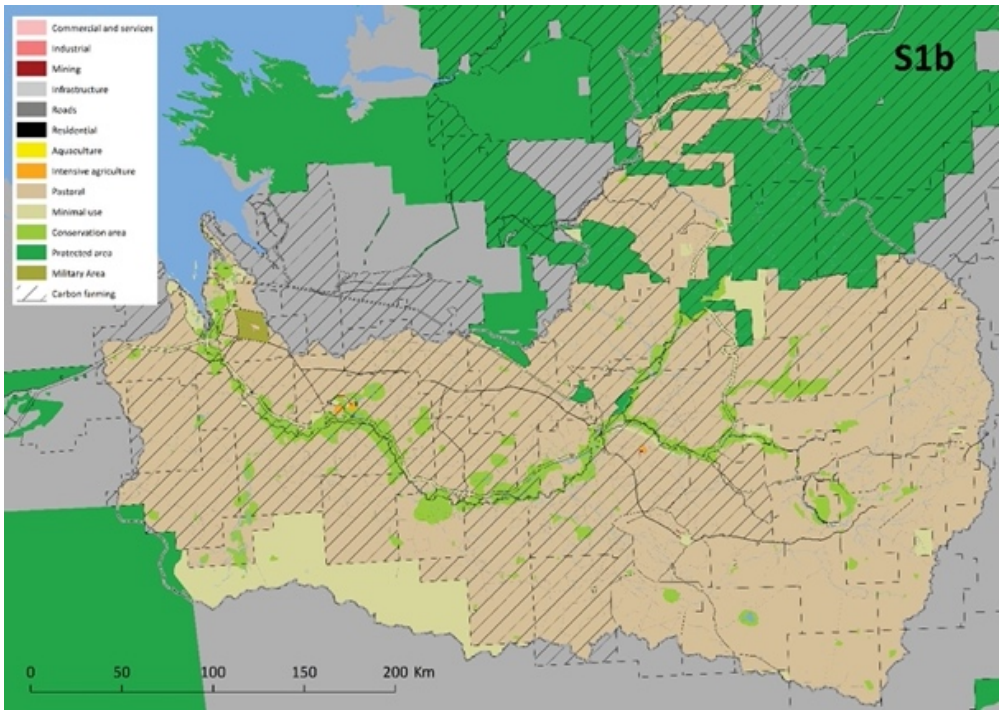


	Description & value	Distribution	Employment	Other
Irrigated agriculture	Rhodes grass stand and graze (spray irrigation, *groundwater*) integrated within existing beef enterprises Value: **$47 million**	**Six medium** developments in Grant Group-Poole Sandstone; 6 x 1,000 ha = **6,000 ha** (3.3% of suitable land, 122% increase); **33%** within Indigenous stations	**46 FTE: 34** unskilled (6 each), **29** Indigenous (*2 Indigenous stations w*/100% Indigenous; *4 x non-Indigenous* (80% Indigenous) *stations*; **12** skilled (1 manager, 1 permanent p/u)	Moderate development with consideration of local values (minimise impact) Water: **100 GL** (17 each), **2.9%** of annual recharge
Aquaculture	Coastal, intensive barramundi farm with earthen lined ponds, using local water supply Value: **$7.3 million**	**One farm** close to Derby; **100 ha** (30 x 1 ha ponds, 0.3% of suitable land)	**15** FTE: 1 manager, 4 skilled technicians, 7 trainees, casuals (80% Indigenous farm workers)	Small development considers local values, minimise impact Water: **500 ML, 0.01%** of annual recharge
Carbon farming	Large-scale carbon farming using savanna burning (aerial + ground activities) Value: **$3.7 million**	Project across the catchment, summing 61,694 km^2; include 19,766 km^2 of Indigenous land (32%) + 41,928 km^2 managed via ILUAs	**185 rangers**, projects managed by Indigenous orgs, via ILUAs within areas where there is no exclusive title	Strong abatement effort results **in high carbon price** ($38) and policies supporting enterprises Coordinated projects across large areas reduces costs and maximises outcomes
Conservation estate	Conservation areas (national and state parks); high targets maximise protection and complement existing protected areas	Significant increase to **16,459 km^2** (17%); high-impact approach (mitigate threats); well connected	**Joint management** with TOs; coordination leads to fairer distribution of costs and benefits **82 rangers** across all parks	Collaborative planning and high funding to manage and monitor threats (e.g. fire, weeds, pests) Allow **traditional uses**
Tourism	Integrated cultural- and nature-based tourism; +100% increase 173,000 domestic 20,000 international Value: **$134 million**	Visit conservation areas and other areas of interest; 85% of the new tourism enterprises would be indigenous owned/managed	**578 FTEs** across 34 businesses (17 people each; most operate from towns, but employ people (guides) from communities within vicinity (85% Indigenous)	Good investment in road (more access) and infrastructure, as well as in capacity building and governance
Pastoral	Extensive grazing of native vegetation, mostly to live trade market (71%) Value: **$69.3 million**	Average size of 230,129 ha (15,919 - 403,189) and herd of 8,200 AE (629 - 21,860), sum ~331,000 AE (208,600 head)	**144 FTE** on-farm worker for the pastoral land portion within the catchment; 115 Indigenous (increase to 80% on average)	Better access; improved control of grazing (including exclusion from sensitive areas) and reduction of overgrazed areas
Resource extraction	Potential resources in the catchment include coal, diamonds, precious metals, oil and gas, quarrying, etc.	Proposed: 118 km^2 (0.12%) Exploring: 24,232 km^2 (24.5%) Known: 178 km^2 (0.18%) Applications: 7,638 km^2 (7.7%)	Unknown (highly variable)	Expected higher participation of Indigenous people in workforce

Scenario 1(b)

- Stronger policies protect local and national values (including those of national and international significance) and give certainty; also, strong collaborative leadership (coordinated decisions) and strong Indigenous governance (Indigenous empowerment and participation, recognised by other stakeholders) enable better planning and management
- Higher demand and investment in development initiatives that maintain natural-cultural landscapes
- Negotiations around development are more fair and take place under equal conditions
- Evidence-based decisions and monitoring allow identifying changes and adjusting uses accordingly

- land use dominated by grazing natural vegetation
- better land and water management, including cattle control and reduced overgrazing
- better access to country, including for recreation, subsistence, and cultural activities
- good investment and extensive carbon farming using savanna burning (fewer large & hot fires)
- large increase in the number and extent of new conservation areas (17%), managed through joint management
- large increase (+100%) in cultural- and nature-based tourism (85% Indigenous businesses)
- one new small-scale coastal barramundi farm
- similar level of resource extraction (low impact)
- no new irrigated agriculture developments.

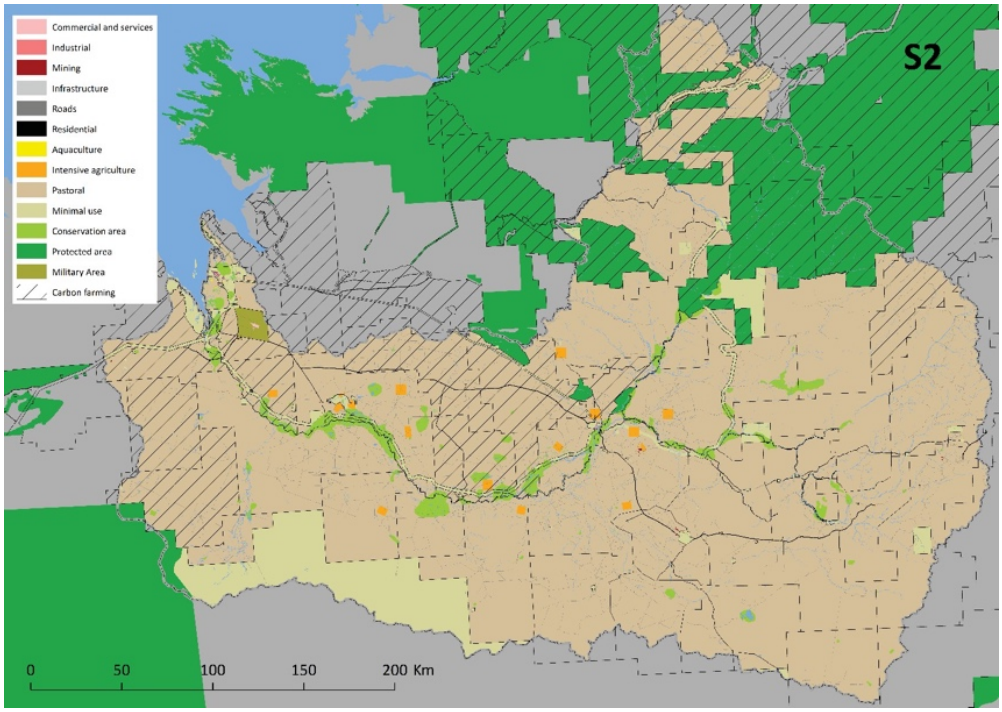


	Description & value	Distribution	Employment	Other
Irrigated agriculture	No new irrigated agriculture developments	N/A	N/A	N/A
Aquaculture	Coastal, intensive barramundi farm with earthen lined ponds, using local water supply Value: **$7.3 million**	**One farm** close to Derby; **100 ha** (30 x 1 ha ponds, 0.3% of suitable land)	**15 FTE**: 1 manager, 4 skilled technicians, 7 trainees, casuals (80% Indigenous farm workers)	Small development considers local values, minimise impact Water: **500 ML, 0.01%** of annual recharge
Carbon farming	Large-scale carbon farming using savanna burning (aerial + ground activities) Value**: $3.7 million**	Project across the catchment, summing 61,694 km^2; include 19,766 km^2 of Indigenous land (32%) + 41,928 km^2 managed via ILUAs	**185 rangers**, projects managed by Indigenous orgs, via ILUAs within areas where there is no exclusive title	Strong abatement effort results in **high carbon price** ($38) and policies supporting enterprises Coordinated projects across large areas reduces costs and maximises outcomes
Conservation estate	Conservation areas (national and state parks); high targets maximise protection and complement existing protected areas	Significant increase to **16,459 km^2** (17%); high-impact approach (mitigate threats); well connected	**Joint management** with TOs; coordination leads to fairer distribution of costs and benefits **82 rangers** across all areas	Collaborative planning and high funding to manage and monitor threats (e.g. fire, weeds, pests) Allow **traditional uses**
Tourism	Integrated cultural- and nature-based tourism; +100% increase 173,000 domestic 20,000 international Value: **$134 million**	Visit conservation areas and other areas of interest; 85% of the new tourism enterprises would be indigenous owned/managed	**578 FTEs** across 34 businesses (17 people each; most operate from towns, but employ people (guides) from communities within vicinity (85% Indigenous)	Good investment in road (more access) and infrastructure, as well as in capacity building and governance
Pastoral	Extensive grazing of native vegetation, mostly to live trade market (71%) Value: **$69.3 million**	Average size of 230,129 ha (15,919 - 403,189) and herd of 8,200 AE (629 - 21,860), sum ~331,000 AE (208,600 head)	**144 FTE** on-farm worker for the pastoral land portion within the catchment; **115** Indigenous (increase to 80% on average)	Better access; improved control of grazing (including exclusion from sensitive areas) and reduction of overgrazed areas
Resource extraction	Potential resources in the catchment include coal, diamonds, precious metals, oil and gas, quarrying, etc.	Proposed: 122 km^2 (0.12%) Exploring: 24,272 km^2 (24.6%) Known: 178 km^2 (0.18%) Applications: 7,638 km^2 (7.7%)	Unknown (highly variable)	Expected higher participation of Indigenous people in workforce

Scenario 2

- Stronger policies protect local and national values (including those of national and international significance) and give certainty; also, strong collaborative leadership (coordinated decisions) and strong Indigenous governance (Indigenous empowerment and participation, recognised by other stakeholders) enable better planning and management
- Higher demand and investment in development initiatives that modify natural-cultural landscapes
- Negotiations around development are more fair and take place under equal conditions
- Evidence-based decisions and monitoring allow identifying changes and adjusting uses accordingly

- land use dominated by grazing natural vegetation
- better land and water management, including cattle control and reduced overgrazing
- better access to country, including for recreation, subsistence, and cultural activities
- medium-level investment in carbon farming using savanna burning (moderate reduction in fires)
- medium increase in the number and extent of new conservation areas (13%), incl. joint management
- medium increase (+50%) in cultural- and nature-based tourism (75% Indigenous businesses)
- two new small-scale coastal barramundi farms
- medium increase in resource extraction (low impact)
- 12,000 ha of irrigated rotation system (groundwater: 120 GL, 3.4% of recharge) + 18,000 ha of Rhodes grass (300 GL, 6.1% of median discharge).

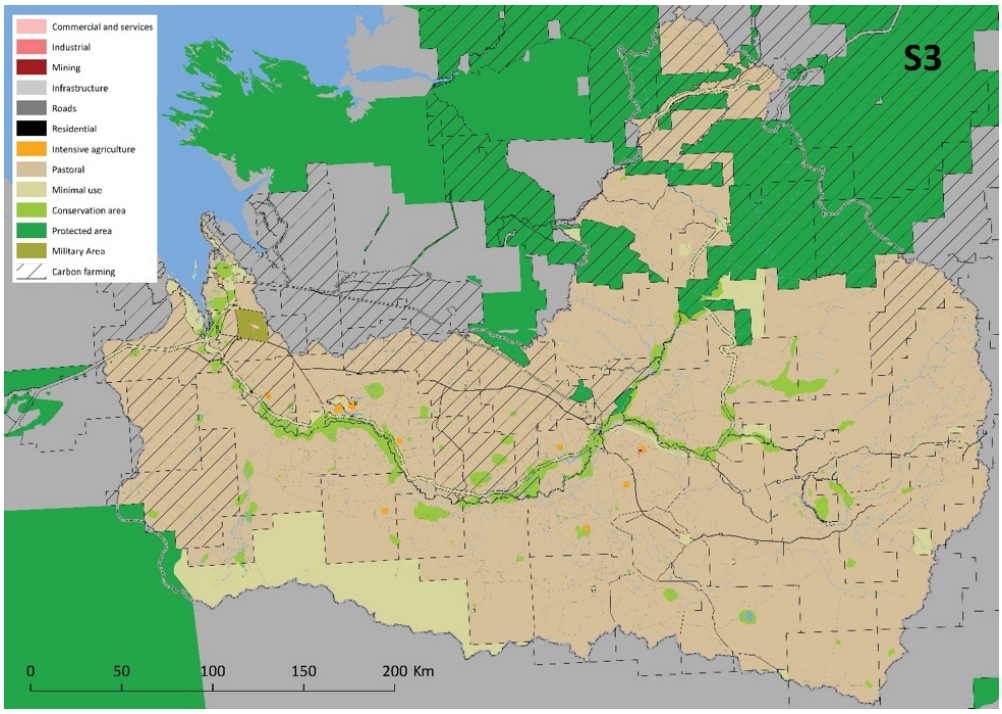


	Description & value	Distribution	Employment	Other
Irrigated agriculture	Rotation (cotton-mungbean-forage sorghum) within beef enterprises (groundwater); value: **$84 million** Rhodes grass stand and graze (spray irrigation, off-stream) integrated within existing beef enterprises; value: **$141 million**	Six 2000-ha farms (**12,000 ha**, 6.7% of suitable land, 245% increase) in Grant Group-Poole Sandstone; **33%** Indigenous Six 3000-ha farms (**18,000 ha**, 10% of suitable land, 367% increase) based on off-stream storage; **33%** Indigenous	**103 FTE: 91** unskilled (15 each), **79** Indigenous and **12** skilled (1 manager, 1 staff p/u) **132 FTE: 120** unskilled (20 each), **104** Indigenous and **12** skilled (1 manager, 1 staff p/u)	Large development with consideration of local values (minimise impact) Groundwater: **120 GL** (20 each), **3.4%** of annual recharge; off-stream: **300 GL** (50 each), **6.1%** of median discharge
Aquaculture	Coastal, intensive barramundi farm with earthen lined ponds, using local water supply Value: **$14.6 million**	**Two farms** close to Derby; **200 ha** (60 x 1 ha ponds, 0.6% of suitable land)	**30 FTE**: 2 managers, 8 skilled technicians, 14 trainees, casuals (80% Indigenous farm workers)	Small development considers local values, minimise impact Water: **1 GL, 0.03%** of annual recharge
Carbon farming	Medium-scale carbon farming using savanna burning (aerial + ground activities) Value: **$2.3 million**	Project across the catchment, summing 28,732 km^2; include 7,291 km^2 of Indigenous land (25%) + 21,441 km^2 managed via ILUAs	**86 rangers**, projects managed by Indigenous orgs, via ILUAs within areas where there is no exclusive title	Strong abatement effort results in **high carbon price** ($38) and policies supporting enterprises Coordinated projects across large areas reduces costs and maximises outcomes
Conservation estate	Conservation areas (national and state parks); medium targets increase protection and complement existing protected areas	Moderate increase to **12,694 km^2** (13%); moderate-impact approach (try avoiding areas of very high production value); moderately connected	**Joint management** with TOs; coordination leads to fairer distribution of costs and benefits **63 rangers** across all areas	Collaborative planning and medium funding to manage and monitor threats (e.g. fire, weeds, pests) Allow **traditional uses**
Tourism	Integrated cultural- and nature-based tourism; +50% increase 130,050 domestic 15,000 international Value: **$100 million**	Visit conservation areas and other areas of interest; 75% of the new tourism enterprises would be indigenous owned/managed	**433 FTEs** across 26 businesses (17 people each; most operate from towns, but employ people (guides) from communities within vicinity (75% Indigenous)	Good investment in road (more access) and infrastructure, and medium investment in capacity building and governance
Pastoral	Extensive grazing of native vegetation, mostly to live trade market (71%) Value: **$91.4 million**	Average size of 230,129 ha (15,919 - 403,189) and herd of 8,200 AE (629 - 21,860), sum ~331,000 AE (208,600 head)	**144 FTE** on-farm worker for the pastoral land portion within the catchment; 115 Indigenous (increase to 80% on average)	Better access; improved control of grazing (including exclusion from sensitive areas) and reduction of overgrazed areas
Resource extraction	Potential resources in the catchment include coal, diamonds, precious metals, oil and gas, quarrying, etc.	Proposed: 124 km^2 (0.13%) Exploring: 25,736 km^2 (26.1%) Known: 178 km^2 (0.18%) Applications: 7,769 km^2 (7.9%)	Unknown (highly variable)	Expected higher participation of Indigenous people in workforce

Scenario 3

- Weaker policies that favour external interests and result in uncertainty; based on weak individualistic leadership (uncoordinated decisions) and weak Indigenous governance (less Indigenous empowerment and participation) that result in poor planning and management
- Higher demand and investment in development initiatives that maintain natural-cultural landscapes
- Negotiations around development are less fair and take place under unequal conditions
- Decisions are not always evidence-based and monitoring of environmental impacts is limited

- land use dominated by grazing natural vegetation
- land and water management, including cattle control and reduced overgrazing, does not improve
- access to country remains limited, including for recreation, subsistence, cultural activities
- moderate investment in carbon farming using savanna burning (some reduction of fires)
- moderate increase in the number and extent of conservation areas (14%), with limited joint management with TOs
- small increase (+10%) in cultural- and nature-based tourism (65% Indigenous)
- no coastal barramundi farms
- similar level of resource extraction (some impacts)
- six 1000-ha stand & graze farms (6000 ha) based on groundwater (110 GL, 3.1% of recharge).

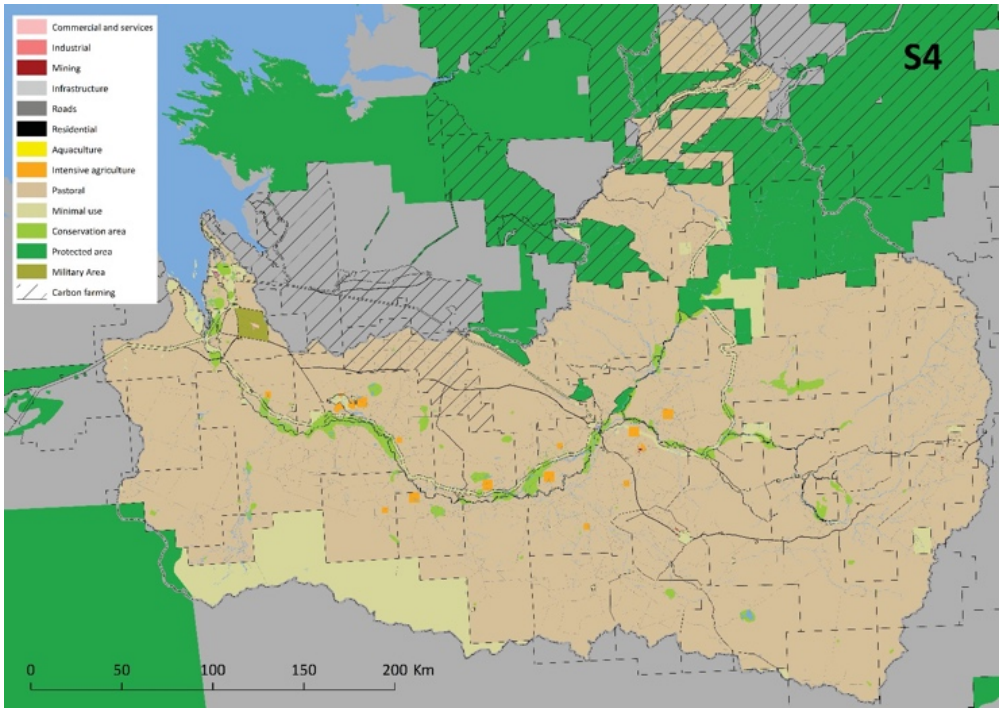


	Description & value	Distribution	Employment	Other
Irrigated agriculture	Rhodes grass stand and graze (spray irrigation, *groundwater*) integrated within existing beef enterprises Value: **$47 million**	**Six medium** developments in Grant Group-Poole Sandstone; 6 x 1,000 ha = **6,000 ha** (3.3% of suitable land, 122% increase); **17%** within Indigenous stations	**46 FTE: 34** unskilled (6 each), **10** Indigenous (*1 Indigenous station w/*100% Indigenous; *5 x non-Indigenous* (15% Indigenous) *stations;* **12** skilled (1 manager, 1 permanent p/u)	Moderate development with limited consideration of local values (minimise costs) Water: **110 GL** (25 each), **3.1%** of annual recharge (compliance issues, limited monitoring)
Aquaculture	N/A	N/A	N/A	N/A
Carbon farming	Medium-scale carbon farming using savanna burning (aerial + ground activities) Value: **$1.4 million**	Project across the catchment, summing 28,732 km^2; include 7,291 km^2 of Indigenous land (**25%**) + 21,441 km^2 managed via ILUAs	**86 rangers (37 Indigenous)**, projects mainly managed by non-Indigenous orgs, via ILUAs within areas where there is no exclusive title	Moderate abatement effort results in **lower carbon price** ($23) and weaker policies to support the enterprises Limited coordination increases costs and lower effectiveness
Conservation estate	Conservation areas (national and state parks); medium targets increase protection and complement existing protected areas to some extent	Moderate increase to **14,094 km2** (14%); moderate-impact approach (avoid areas of high production value); some connectivity	Limited joint management; un-coordinated planning leads to less fair distribution of costs and benefits across TO groups **56 rangers** across all areas	Limited consultation and low funding restrict management and monitoring of threats (e.g. fire, weeds, pests) Limited **traditional uses**
Tourism	Integrated cultural- and nature-based tourism; +10% increase 95,370 domestic 11,000 international Value: **$73.7 million**	Visit conservation areas and other areas of interest; 65% of the new tourism enterprises would be indigenous owned/managed	**323 FTEs** across 19 businesses (17 people each; most operate from towns, but employ people (guides) from communities within vicinity (65% Indigenous)	Poor investment in roads (less access) and infrastructure, and limited capacity building and governance
Pastoral	Extensive grazing of native vegetation, mostly to live trade market (71%) Value: **$69.3 million**	Average size of 230,129 ha (15,919 - 403,189) and herd of 8,200 AE (629 - 21,860), sum ~331,000 AE (208,600 head)	**144 FTE** on-farm workers for the pastoral land portion within the catchment; 55 Indigenous (80% in Indigenous and 15% in non-Indigenous stations)	Limited access; no improved control of grazing (e.g. grazing sensitive areas) and limited reduction of overgrazing
Resource extraction	Resources in the catchment include coal, diamonds, precious metals, oil and gas, and quarrying	Scattered and small-scale resource extraction (some impact); slight reduction of resource extraction (4%), due to increase in conservation areas across the catchment	Unknown (highly variable)	Expected relatively low participation of

Scenario 4

- Weaker policies that favour external interests and result in uncertainty; based on weak individualistic leadership (uncoordinated decisions) and weak Indigenous governance (less Indigenous empowerment and participation) that result in poor planning and management
- Higher demand and investment in development initiatives that modify natural-cultural landscapes
- Negotiations around development are less fair and take place under unequal conditions
- Decisions are not always evidence-based and monitoring of environmental impacts is limited

- land use dominated by grazing natural vegetation
- land and water management, including cattle control and reduced overgrazing, does not improve
- access to country remains limited, including for recreation, subsistence, and cultural activities
- small-scale investment in carbon farming using savanna burning (little improvement in fire mgt)
- low increase in number and extent of conservation areas (12%), limited joint management with TOs
- modest increase (+25%) in cultural- and nature-based tourism (65% Indigenous)
- one new small-scale coastal barramundi farm
- high increase of resource extraction (higher impact)
- 6,000 ha of groundwater (110 GL, 3.1% of recharge) and 18,000 ha off-stream (360 GL, 7.3% of median discharge) irrigated Rhodes grass.



	Description & value	Distribution	Employment	Other
Irrigated agriculture	Rhodes grass stand and graze (spray irrigation, *groundwater*) integrated within existing beef enterprises; value: **$47 million** Rhodes grass stand and graze (spray irrigation, off-stream) integrated within existing beef enterprises; value: **$141 million**	**Six medium** developments in Grant Group-Poole Sandstone; 6 x 1,000 ha = **6,000 ha** (3.3% of suitable land, 122% increase); 17% within Indigenous stations Six 3000-ha farms (**18,000 ha**, 10% of suitable land, 367% increase) based on off-stream storage; 33% Indigenous	**46 FTE: 34** unskilled (6 each), **10** Indigenous (*1 Indigenous station w/*100% Indigenous; *5 x non-Indigenous* (15% Indigenous) *stations;* **12** skilled (1 manager, 1 permanent p/u) **103 FTE: 91** unskilled (15 each), **79** Indigenous and **12** skilled (1 manager, 1 staff p/u)	Large development with limited consideration of local values (minimise costs) Groundwater: **110 GL** (18 each), **3.1%** of annual recharge; off-stream: **360 GL** (60 each), **7.3%** median discharge; compliance issues, limited monitoring
Aquaculture	Coastal, intensive barramundi farm with earthen lined ponds, using local water supply Value: **$7.3 million**	**One farm** close to Derby; **100 ha** (30 x 1 ha ponds, 0.3% of suitable land)	**15 FTE**: 1 manager, 4 skilled technicians, 7 trainees, casuals (15% Indigenous farm workers)	Small development with limited consideration of local values (minimise costs) Water: **500 ML, 0.01%** of annual recharge
Carbon farming	Small-scale carbon farming using savanna burning (aerial + ground activities) Value: **$0.7 million**	Project across the catchment, summing 10,047 km^2; include 3,208 km2 of Indigenous land (32%) + 6,839 km^2 managed via ILUAs	**30 rangers (13 Indigenous),** projects mainly managed by non-Indigenous orgs	Moderate abatement effort results in **lower carbon price** ($23) and weaker policies to support the enterprises Limited coordination increases costs and lower effectiveness
Conservation estate	Conservation areas (national and state parks); low targets, low level of protection; not always complement existing protected areas	Low increase **to 12,356 km^2** (12%); minimise conflict with industry (avoid areas of med- to high-production value); low connectivity	Limited joint management; un-coordinated planning leads to less fair distribution of costs and benefits across TO groups **50 rangers** across all areas	Limited consultation and low funding restrict management and monitoring of threats (e.g. fire, weeds, pests) Limited **traditional uses**
Tourism	Integrated cultural- and nature-based tourism; +25% increase 108,375 domestic 12,500 international Value: **$83.8 million**	Visit conservation areas and other areas of interest; 65% of the new tourism enterprises would be indigenous owned/managed	**361 FTEs** across 21 businesses (17 people each; most operate from towns, but employ people (guides) from communities within vicinity (65% Indigenous)	Some investment in roads (moderate access) and infrastructure, but limited capacity building and governance
Pastoral	Extensive grazing of native vegetation, mostly to live trade market (71%) Value: **$69.3 million**	Average size of 230,129 ha (15,919 - 403,189) and herd of 8,200 AE (629 - 21,860), sum ~331,000 AE (208,600 head)	**144 FTE** on-farm workers for the pastoral land portion within the catchment; **55** Indigenous (80% in Indigenous and 15% in non-Indigenous stations)	Limited access; no improved control of grazing (e.g. grazing sensitive areas) and limited reduction of overgrazing
Resource extraction	Potential resources in the catchment include coal, diamonds, precious metals, oil and gas, quarrying, etc.	Proposed: 147 km^2 (0.15%) Exploring: 26,011 km^2 (26.34%) Known: 179 km^2 (0.18%) Applications: 7,794 km^2 (7.9%)	Unknown (highly variable)	Expected lower participation of Indigenous people in workforce

Appendix 5: Current situation full output

The lists below were compiled from those generated by each of the three workshop groups. Redundant items have been removed and typographical errors amended.

Wellbeing category and question addressed by the workshop group	Matters raised by participants
1. Enough food and water How do people get food and water from the catchment today?	<u>Food sources</u> Fishing Hunting Abundance of native foods – ability to regenerate Roadhouse Supermarket Hospitality (e.g. from the community) Own vegetable garden Killers supplied or not supplied Killing vermin Beef from pastoralists Catch turkey when mustering Sharing and reciprocity Restaurants <u>Water sources</u> Bore water – public or private supplier – quality and volumes can be concerns Goundwater Supermarket or shops generally River, springs, soaks Dams Rain <u>Issues with food and water</u> Bore water – public or private supplier – quality and volumes can be concerns Is there enough or access to enough eg ILUAs Deliveries of food, e.g. trucking can be impacted dry/wet seasons Water quality can be an issue – nitrates, arsenic, salinity - filtration/processing plants may be a solution
2. Satisfying work, meaningful work What are the opportunities in the catchment for meaningful work today?	Domestic work Pastoral industry Further development of cattle industry Rangers Tourism (cultural tours) Service industries (teaching, nursing, health, municipal, CDP) Volunteer work Government (state, local, national) Aboriginal corporations – PBC Arts and culture eg dance Supplying bush tucker, bush medicine Providing cultural immersion, cultural awareness courses Child rearing Mining and exploration Cultural leadership and mentorship (unpaid) Agriculture

	Land management, NRM, weed management Support roles for main industries, e.g. pastoralism, tourism, agriculture Human services • health • education • service industries <u>issues</u> Does the training and education available – help people to get meaningful work Access to business development opportunities?
3. Knowledge of country and culture The catchment is a library of knowledge and heritage. In what ways do people connect to this important resource today?	Place of belonging Defines identity Language groups Language and culture passed on by family and community Western education Most knowledge gained by experience and relationships Knowledge is safety Knowledge of food, timing of flowering and fruiting, seasonal calendar Communal knowledge Experience and observation Knowledge gives people authority Knowledge from elders Underpins everyone's wellbeing Continuing connection – native title and ILUAs Gives access to practice tradition and culture Ranger programs – transmission of cultural knowledge, generating and sharing knowledge Research from outside – connections – aligning multiple knowledge systems Recent strong history / knowledge of pastoral – European and Aboriginal Learn from history – apply this to future development Language centres record history – written and verbal Prospecting – gold – history Videos /movies as a way to connect with past Dance / ceremony Visual landmarks – if destroyed knowledge gone Plants and animals and place in landscape Legal process – native title TOs have to give assent / knowledge on applications – heritage clearances Google Information bays/boards Kimberley knowledge and culturel centre KALACC – cultural blocs, opportunities to demonstrate and practice knowledge, through ceremonies for example keep knowledge strong Cultural tourism Partnering to TOs – they have an openness to share knowledge, sharing knowledge through collaborations Long term (intergenerational) relationships with Fitzroy River as a life force, food source, identity Documentation of culture and stories in videos, books, arts, music Sharing knowledge through experiences <u>Issues</u> Challenge as TOs get older that younger people have the same knowledge
	Knowledge provides safety Distinguish: Physical safety versus emotional safety Poisoned water or depleted water*

4. A feeling of safety [safety, feeling safe and secure] What are the living things that make people feel safe or not safe in the catchment today?	Crocodiles Crime Food abundance* River as a living thing > feeling of safety. 'Living water' = safe to drink* Family members > safety Poisons – DDT * Poisonous plants and animals If healthy land have a sense of safety and security – if not healthy – feel unsafe Other people can make you feel safe or unsafe Animals on roads – stock Pigs and other feral species Access to medical services – know help is available if needed – ambos Cane toads Need meaningful work for young people to feel safe and secure Community makes you feel safe – if you know your community Drugs, alcohol, crime make you feel unsafe (same as anywhere) Unsafe weather – harsh conditions, cyclones etc Mosquito borne disease • Japanese encephalitis • Ross River Fever Strong sense of community, e.g. people will stop if you break down on the side of the road, linked to harsh conditions because consequences of being stuck in remote areas can be dire Using animals for safety: • E.g. pea hens around the homestead to keep snakes away • Sentinel donkeys with flocks Building relationships – getting to know one another: • Investing in opportunities to talk • Creating empathy across worldviews Access to country
5. Fun – recreation, leisure	Fishing Swimming Bird watching Camping Bushwalking Boating Photography Family activities Visiting people and places Site seeing Just being there Storytelling Junpa – dance ceremony Stargazing Hunting Cooking Tracking Football Arts and interpretation Sitting around – relaxing National parks Boating Sightseeing Photography Astronomy

	Jandamarra story Talking Exploring Volunteering – conservation Events/festivals Music Socialising Eating and drinking Scenic flights Social events • Races • Bbqs etc Work – pleasure derived at work Kids playing, e.g. in the river
6. Strong family and community relationships How do people connect to their families and communities today? What is it about the catchment that helps these relationships?	Memories Identity Your totem teaches you empathy for the country Catchment helps us connect as a family Inclusiveness and having a shared right and responsibility to pass on knowledge and experience Storytelling Connecting to country Travelling back to the river and catchment as a family helps us connect It's like a magnet that draws us back. A drawcard. Feeling of belonging. Responsibility to care for it. Improve it. Facebook – social media digital communication Community noticeboard River – boundary for different family and responsibilities Hunting and fishing having something to catch Colleagues – strong for people outside of catchment or who live there short term Sport Service culture – volunteering Bands – family bands Rodeos – 3 day event at FX Associations / boards /corporations, KCPA, PGA, NRM, PBCs Schools / community centres/ art centres Partnerships between industry / groups Native title recognised – family and community connection Strong community character – supportive Recreation sites and family connection to places Traditional kinship systems Connection to country very important for family connection and culture Catchment itself is an important entity for activities which foster strong communities and relationships The fact that there is one law for the whole of the river that connects all the groups along the river including desert people The river is a sacred ancestral living being and have a duty to look after the river <u>Issues</u> Some social organisations are floundering, e.g. country fire association struggling for new members Social media having a negative impact because people are inside on their phones all the time and don't use spare time connecting with family and community Community leaders who create opportunities

	• Transience brings new people into communities with new energies to drive things • Conversely good thing can stop when people leave Issues preventing wellbeing. e.g. grog, drugs, violence lead to isolation and poor connection to community and family.
7. Healthy country, healthy river What are the things that are healthy and unhealthy about the physical environment of the catchment today?	Clean up after activities (litter, nets, etc.) The country is healthy if we work together Good access to the river (where it is well managed) Cultural sites in good condition (in some cases, not all) Water quality Last stronghold of sawfish Connection to healthy marine environment Natural / cultural flows Water supply available for animals Very diverse fish – no feral fish sp Birds diversity Cyclones and harsh weather conditions • Negative: destructions • Positive: brings rain to dry part of the country Water for: • Land • River • And people – all need water The system is relatively intact – some weeds and feral issues <u>Issues</u> Thallium (pollution) in the groundwater Fracking Good design of road crossings to limit erosion. Otherwise get tidal intrusions and scouring. Water pollution killing fish Vermin Weeds Degradation and salinity, pollution from arsenic, nitrates Over-grazing Leaking oil from old machinery River pools filling in with sediment Lowering through pumping Wild/hot fires before wet season resulting in silting when storms come Abandoned mine (lara) – leaking into environment Historical chemical use Emus and wallabies still missing from the landscape after massive culls in 1960s Land management is key – rotate stock Variable condition of pastoral land – some degraded – some not As temperatures increase what will be the impact on species? Catchment has value as a refuge for biodiversity – nationally recognised Cyclones and harsh weather conditions • Negative: destructions • Positive: brings rain to dry part of the country Fires can affect transportation of foods and other essentials Climate change affects food and water scarcity through seasonality and impact on rainfall • More extreme weather

8. Places and things that make you feel good [aesthetics] Are there special places and things that make people feel good when they see, touch, taste, smell, or feel them?	All the above Memory and experience – shared experience Living waters versus normal water Some places are significant. Others, anybody can go there. Viewing the river in flood. It's not about picking out the little bits. It's a whole entity. Remoteness, Untouched Colours – moon and soils etc Sweet smell (after rain) Big landscapes Sense of story Rainfall – see the river flow Green grass grow – cattle fed Heat to a point – makes you slow down Boab trees Tides Spectacular natural events Birdsong Sense of age and cultural continuity Clean air Storms / lightning Stars Devonian reef Wildlife River and gorges Uninterrupted natural sound eg wind sounds – no sirens… Mouth of the river and tidal change Lots of places <u>Issues</u> Things that make you feel good and things that make you feel sad, e.g. scars on the landscape – example given of disused dam, issues related to solastalgia
9. Inner peace, spiritual fulfilment How do people find inner peace and spiritual fulfillment in the catchment today?	All the above Do all those things (family, connection to country, caring for country) and you'll get inner peace. Connecting with nature / country Getting back to half decent seasons – green grass / water flow When pressure increases get out on country and relax – come back refreshed Cultural flows – TOs special places and traditions Story telling – getting back to history – feeling grounded When outside of catchment – can carry it with you thru language and stories Watching Aboriginal artists connect through art – long history Seeing the stars even the space between the stars – no pollution see into space Having meaningful work eg rangers managing country and elders watching and knowing next generation can carry on Need meaningful work for young people to move into Dual/multi religious beliefs Tension between wanting what the rest of the world has – as seen on the internet etc, and valuing what we have in the Fitzroy. Church / religion Peace and quiet sitting by yourself next to the river People and sense of wellbeing when other people are at leave you find your own peace – peace in relationships Moments, e.g. sunsets and sunrises

	• Sitting on the veranda at sunset after working hard all day – sense of people, time and situation • Getting hit by the first storm of the season • first rain Ethics of care Can be via practicing culture, but there can also be scary aspects of practicing traditional culture and spiritualism Knowing that you can see the stars (compared with city, even if you don't go outside to look at them) Having spiritual activities in your communities, or activities that have spiritual compenent, e.g. yoga or community groups with spiritual aspects People gain inner peace and spiritual fulfilment from the river, connection to the river, practicing ceremonies and culture

Appendix 6: Evaluation of wellbeing categories

At the end of the workshop, participants were given an opportunity to comment on the usefulness of the wellbeing categories, and also to suggest improvements to the workshop. Responses to the standard questions were captured through facilitated group discussion, with the researchers reporting on group evaluations. These evaluations have been summarised in the table below.

Workshop question	Summary of participant comments	Researcher responses
1. Are there any views/aspects of wellbeing-liyan that are not covered in our categories?	Comments included: a. Lack of conflict. b. Climate change – place in the world. Breadth of connections. c. Liyan – does the spiritual category capture it all? Participant feels not. It's internal d. Health – linked to food but not explicit e. Mental wellbeing – you can have most of those categories met and still have depression, anxiety. f. Illbeing – wellbeing not being met. Litigating for loss of quality of life. [That is, a participant suggested that the loss of wellbeing suffered by Traditional Owners should be compensated for…]. g. Wealth, wealthbeing to encompass all aspects of wellbeing.	Health is a summary term and is captured under various of the wellbeing categories, however, genetic disorders, such as type 1 diabetes, are not accounted for under the existing categories; and the relationship between physical and mental health, and wellbeing categories, should be made explicit. Note also that personality type becomes important when assessing some of these issues. In the case of wealth, financial and other capitals were mentioned during the presentation, so future presentations need to make this more explicit Solastalgia which, according to Wikipedia, '…describes a form of mental or existential distress caused by environmental change…', is an interesting concept, and Nyungars are seeking this type of compensation in the south-west, so it is a live issue.
2. In assessing the scenarios, which categories of wellbeing-liyan did you <u>not</u> find useful?	Comments included a. Useful: Inner peace, Knowledge of country and culture, Community relationships, Healthy country b. Not useful: Food and water. Too wide c. More personal, subjective categories, such as inner peace, are more difficult to assess on behalf of a group d. A number of the categories are hard to measure in the scenarios, e.g. 'enough food and water', 'safety and security' could do research on these and/or present better data with the scenarios e. 'Places that make you feel good' felt superfluous – comes into healthy country.	These comments emphasise the importance of presenting as much data as practicable with the scenarios linking them to the wellbeing categories. Comments under (a) and (e) are broadly in line with the summary of the TO workshop under the current situation. Interesting that Knowledge of country and culture and Healthy river and country are listed under (a), as these two categories are in the top three with the most 'weight' in assessments.
3. Any other suggestions to improve the assessment or workshop?	Comments included: a. People generally liked it. b. They liked the way it was neutral – did not bias assessment towards any particular industry	Comment (e) reflect points made above. Comment (c) will be considered for future iterations of the approach. Comment (d) is an important point that needs to be considered further, particularly once considering the

	c. Desirable that there be more opportunity to express rationale and qualitatively add detail about reasoning behind scores d. The different knowledge sets among Indigenous people concerning specific sites is an issue – person A with greater knowledge will more accurately assess a site, for example, than someone without the relevant knowledge e. Compensated/compensation related to illbeing via negative impacts from development.	importance of specific areas and elements.