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Aquaculture-Community Futures: North West Tasmania

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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Executive Summary

What is the report about?

To secure the future of Australian aquaculture, it is increasingly clear that, alongside effective and responsible production, building and maintaining community support is vital. This report details a study by researchers from the Institute for Marine and Antarctic Studies at the University of Tasmania into marine and coastal wellbeing and how it can be considered in regional marine and coastal development decision-making.

This report presents a novel framework for understanding marine and coastal wellbeing. It introduces a practical method for assessing wellbeing in a greenfield site or development expansion. It also reveals key public decision-making process points in which wellbeing can be considered.

Why was the project undertaken?

The need for this project arose from a desire by selected Tasmanian aquaculture industry members to better understand levels of community acceptability of their operations (or 'social license to operate'). They wanted to know, how marine industry development could contribute towards meeting shared values and how this could be tracked and evaluated into the future.

What did we want to achieve?

The key planned outcome of this project was to assist the Tasmanian aquaculture industry to make and monitor effective decisions about regional development in the North West of Tasmania, supported by an understanding of the mix of community interests and values and how marine industries could potentially contribute towards the achievement of desired conditions or states of community values.

What did we do?

Using a mixed methods approach that combined participatory mapping, qualitative and quantitative primary data, and desk-top research, we i) developed a conceptual framework through which to understand place-based marine and coastal wellbeing; ii) elicited wellbeing values using a combination of desk-based socio-economic indicator analysis and a web-based survey; and iii) identified where and how wellbeing can be considered in existing public decision-making processes, and where changes may be needed, using the Delphi expert elicitation method.

What did we find?

Wellbeing is comprised of three dimensions: the material, the relational, and the subjective or interpersonal. The material relates to welfare or standards of living. The relational is about social relations, personal relationships, and access to the resources we need. The subjective is about how we perceive our individual experience of life. Each of these dimensions comprises several domains as shown in the table below.

Specific marine and coastal places matter to wellbeing. This does not mean marine industry development and expansion in such areas cannot occur as they can also have positive effects on place-based wellbeing. It does mean that considering human wellbeing in development and expansion decision-making is likely to further enhance development options and reduce the risk of losing a social license to operate.

Considering wellbeing in the decision-making process is challenging because some aspects are difficult to measure. Wellbeing domains don't easily dovetail with customary socioeconomic quantitative measures. However, the survey tool developed in this study examine place-based wellbeing could be easily utilised by companies or government agencies to factor wellbeing into their decision-making.

Wellbeing dimension	Wellbeing domain
---------------------	------------------

Material	Ability to have a good job (unpaid or paid)
	Health
	Education and skills
	Income and wealth
	Safety and security
Subjective	Culture and spirituality
	Personal connection with nature (emotional and physical effects of spending time in that place)
	Sense of place and my identity from this place and this community
	Freedom and choice
Subjective & Relational	The quality of the natural environment
Relational	Feeling part of a connected community (social cohesion)
	Participation as a citizen (be heard on political issues, join campaigns, vote, stand for election etc.)
	Experience of positive relationships
	Access to resources

What do we recommend?

- Coastal and marine industries should not focus solely on how development promotes material wellbeing (i.e., jobs and income), but provide time and space for understanding the subjective and relational components (and how the three dimensions are linked) of wellbeing early in planning discussions.
- Coastal and marine industries should recognise that environmental-focused arguments may reflect concerns about psychological and social wellbeing, and not just reflect conservation, anti-development, or “NIMBYism”. There is an opportunity to directly raise and understand more about people’s wellbeing through their ties to coastal and marine places, early in consultations, to inform siting and development options.
- As part of the assessment process, coastal and marine industries should identify the psychological and social connections people hold with activities in place, as although it may seem as though the activity can be relocated – this may not always hold true.
- The survey developed in this study provided rich insights into wellbeing and could provide a useful tool for coastal and marine industries if used prior to making decisions regarding greenfield site development or existing site expansion.

Keywords

Marine industry; regional development; wellbeing; decision-making

1 Introduction

1.1. Background

The release of the Tasmanian State Government's 'Sustainable Industry Growth Plan for the Salmon Industry', in the face of considerable community concern about expansion and impacts as well as initial sensitisation to aquaculture activities, led to industry interest in how to enable space for consideration and negotiation, via open dialogue, regarding multiple, and often conflicting values and interests in possible aquaculture industry expansion.

The research team were approached to develop a research project to investigate and map values and interests held by communities regarding coastal and marine ecosystem goods and services; in particular to investigate a) how a range of values could be acknowledged within aquaculture expansion plans; b) the potential flow of positive and negative effects of alternative aquaculture development scenarios; and c) and how the industry could ensure operations contribute towards realising preferred marine futures.

This project builds on FRDC projects, Let's Talk Fish (2012-301), License to Engage (2015-300), and Determinates of socially supported wild-catch and aquaculture fisheries in Australia (2017-158), which laid the foundations to understand the drivers and determinates of social acceptability and recommended approaches to build societal support in Australian fisheries. This project extends these projects by focusing specifically on the concept of community values, and how the aquaculture industry can potentially contribute towards achieving these values.

1.1.1. Regional development and wellbeing

Governments and businesses pursuing regional development often argue that those activities which exploit commons assets will increase human welfare by supporting employment and creating wealth-generating activities. These arguments arise from neo-classical interpretations of what human welfare is. However, the failure of the 'trickle down' mechanism to effectively distribute gains has led to extensive critique of the economic growth paradigm. This is clear in the case of the Blue Growth/Blue Economy policy agenda where the global shift from traditional industries such as fishing and maritime transportation, to increasingly industrialised activities such as mariculture, marine energy extraction and marine tourism, has also led to increased conflict over what forms of welfare such development is meant to enhance, how such welfare is distributed and at what cost to other forms of human welfare.

In response, non-neo classical economic approaches have begun to explore a more nuanced interpretation of human welfare, drawing on research on the more encompassing notion of human wellbeing. In turn, government and industry discourse is also increasingly utilising the concept of wellbeing to examine how commons resource users are likely to be affected by industry development in any given region. For this reason, the focus of this project (after discussions with selected industry members) became how to incorporate wellbeing into regional development decision-making. As such, two key concepts underpin this work: regions and wellbeing.

Regarding regional development, we are referring to sub-national geographical areas. We use the definition by Markusen from 1985 who defines a region as an: *"historically evolved, contiguous territorial society that possesses a physical environment, a socioeconomic, political, and cultural milieu, and a spatial structure distinct from other regions and from the other major territorial units, city and nation"*. (Markusen, 1985 pp. 16-17)

When we refer to wellbeing, we recognise that the term has been conceptualised in many ways. Following Breslow et al., 2016, we define wellbeing as *"a state of being with others and the environment, which arises when human needs are met, when individuals and communities can act meaningfully to pursue their goals, and when individuals and communities enjoy a satisfactory quality of life"*. (Breslow et al., 2016)

1.1.2. North-west Tasmania

The north-west region of Tasmania covers a vast area (Figure 1), extending from Devonport in the east to the Pieman River in the south. The region covers the nine local government areas of Burnie, Central Coast, Circular Head, Devonport, Kentish, King Island, Latrobe, Waratah—Wynyard and West Coast, and the major regional centres of Burnie, Devonport, Queenstown, and Smithton. The gateway to the region is Devonport, with an airport and the Spirit of Tasmania (ferry between Victoria and Tasmania) terminus. The region is a major farming area with much of Tasmania's vegetable, cattle and dairy products being produced there. The north-west region of Tasmania is also predominantly a wild-catch production area for shellfish, in particular Southern Rock Lobster, Abalone and Scallop. Salmon, Oyster and Abalone farms are also established in the region.

At the time of project development, industry members were considering industry expansion projects in the waters off the north coast of King Island and the coastal waters between Stanley and Woolnorth. As such, the focus of this project is the far north-west, that is, the local government authority areas of Circular Head and King Island. Circular Head covers the far north-west of the state mainland and major towns and localities include Arthur River, Marrawah and Stanley with Smithton being the largest principal town. King Island is an island in Bass Strait off the north-western tip of the state. The island's principal town is Currie, situated on the island's west coast.

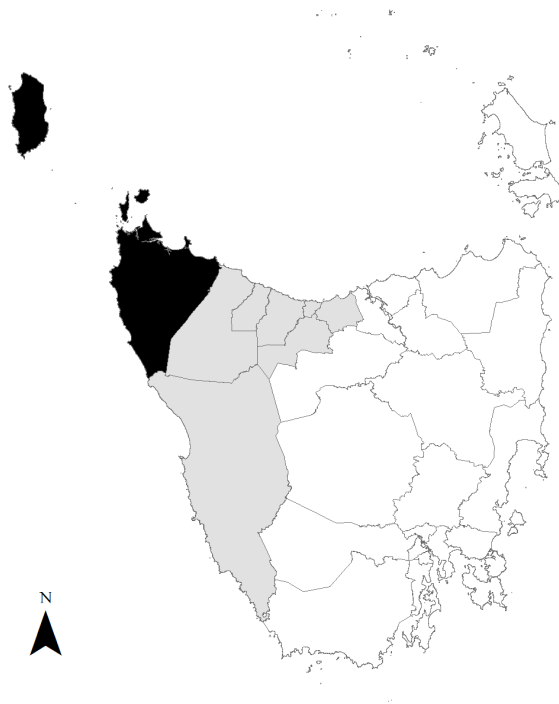


Figure 1. Map showing north-west region of Tasmania (grey and black areas combined) and location of far north-west case study areas (black areas).

1.2. Need

To secure the future of Australian marine industries (including aquaculture), building and maintaining a sufficient level of support and trust from interested and affected communities is vital. Worldwide, there have been several examples of where marine operations have been threatened because of a lack of societal acceptability. In Australia, a recent example of this was the environmental non-governmental organisations (eNGOs) campaigns against proposed fish farm operations in Okehampton Bay on Tasmania's east coast (Murphy-Gregory, 2018). In 2014, King Island became a site of contestation over proposals for the largest wind farm development in Australia (Colvin et al., 2016) and in 2019 became the location for protests against aquaculture developments in the area. In the Tasmanian context, attitudes toward the commercial exploitation/use of natural resources have involved multi-

dimensional, often conflicting, values - often with a spatial dimension (Evans et al., 2018).

FRDC Project 2017-158 'Determinates of socially-supported wild-catch and aquaculture fisheries in Australia' revealed that several factors contribute towards achieving community acceptance: the perception that a company offers benefits; that it contributes to the wellbeing of the region and respects the local way of life; that it listens, responds and exhibits reciprocity; and that relations are based on an enduring regard for each other's interests. These factors are often based on understanding and contributing towards achieving a certain state or condition of that which is valued by local and regional communities (e.g. a certain level of local employment, or of threatened habitat protection). Indeed, a lack of social acceptance for the aquaculture industry has often resulted in part from their practices being seen to, or in some cases actually, compromising the condition or state of what communities 'value' (believe is very important).

The need for this project arose from an intent to improve community practice through knowledge of those marine values which are important to community. The industry desired to know what regional development and wellbeing futures residents of NW Tasmania valued, and what opportunities, if any, existed for salmon farming to contribute towards meeting these shared values and how this could be tracked and evaluated into the future. As such, this project was designed to examine the mix of community interests and values, and to identify how marine industries and regional communities can contribute to the achievement of desired conditions or states of community values. Fundamentally, this project investigated how to achieve regional development while still considering community wellbeing in two Tasmanian locations: Circular Head and King Island.

The overarching research questions were:

- i) Where and in what ways can marine industries impact upon community wellbeing?
- ii) Where and in what ways can local preferences (with respect to wellbeing) be explicitly considered in regional development decision-making, and how can accountability be ensured?

2 Objectives

The original objectives of this project were as follows:

1. Identify what the NW communities and Tasmanian residents' value ("community values") in relation to the NW Tasmanian coastal and marine region
2. Establish which of these values future aquaculture in NW Tasmania can contribute to ("shared values")
3. Ascertain community preferences for how salmonid farming in NW Tasmania could contribute to these shared values, and how this should be tracked and benchmarked
4. Determine preferences of NW communities and Tasmanian residents for community-industry engagement, communication and partnership models (social engagement strategies)

However, upon discussion with industry members, a revised project plan was submitted to FRDC as part of milestone 2. Revised objectives were not formally submitted, but can be implicitly recognised within the revised project plan as follows:

1. Identify what place community wellbeing plays in regional development
2. Identify what communities' value (using a wellbeing framework) in relation to the NW Tasmanian coastal and marine region
3. Establish how changes in marine industries have/could affect wellbeing values
4. Ascertain how wellbeing values can be explicitly considered in NW Tasmanian regional development decision-making

Project Design

3.1 Overview

This project was designed to generate analysis of the strongest/most deeply held community wellbeing values and how these can be incorporated into future regional development decision-making. Moreover, it was designed to generate meaningful, balanced, and independent insights that could be trusted across community and company stakeholders.

Using mixed methods (combining participatory mapping, qualitative and quantitative primary data, and desk-top research), this project comprised four stages: (i) Project inception and governance; (ii) Conceptual framework development; (iii) Eliciting wellbeing values data; (iv) Co-design of wellbeing decision-points.

3.2 Project governance structure

The project was structured around levels of research governance that provided opportunities for stakeholders to drive, monitor and learn from the research process:

- Project Governance Group (PGG): Tassal and Petuna representatives were kept updated on project delivery and considered the project outputs and outcomes from an industry perspective
- Community governance (CG): Community councils, comprising representatives of the resident communities, engaged with the project at various stages, and reviewed research outputs.

3.3 Project R&D activities

We undertook several activities relating to three studies (Table 1).

Table 1. Activities undertaken for each study.

Study	Activities
1: What place does community wellbeing play in understanding regional development?	<ul style="list-style-type: none"> • Desk-based literature review • Development of conceptual framework
2: Where and in what ways could marine industry activities affect community wellbeing in Northwest Tasmania?	<ul style="list-style-type: none"> • Desk-based socio-economic indicator analysis • Online mapping-based survey
3: Where and in what ways can wellbeing be explicitly considered in NW regional development decision-making and how can accountability be ensured?	<ul style="list-style-type: none"> • Delphi analysis (a process used to arrive at a group opinion or decision by surveying a panel of experts based on rounds of surveys)

We view the project design as a set of nested studies (Figure 2). The conceptual framework developed in study one provided the basis for an exploration of wellbeing values in our case study regions. Outputs from study two provided the basis for the policy delphi used in study three. Together, these studies identified those wellbeing domains of importance to communities in north-west Tasmania as well as the relevant decision-points at which state and local resource managers could incorporate wellbeing into decision-making.

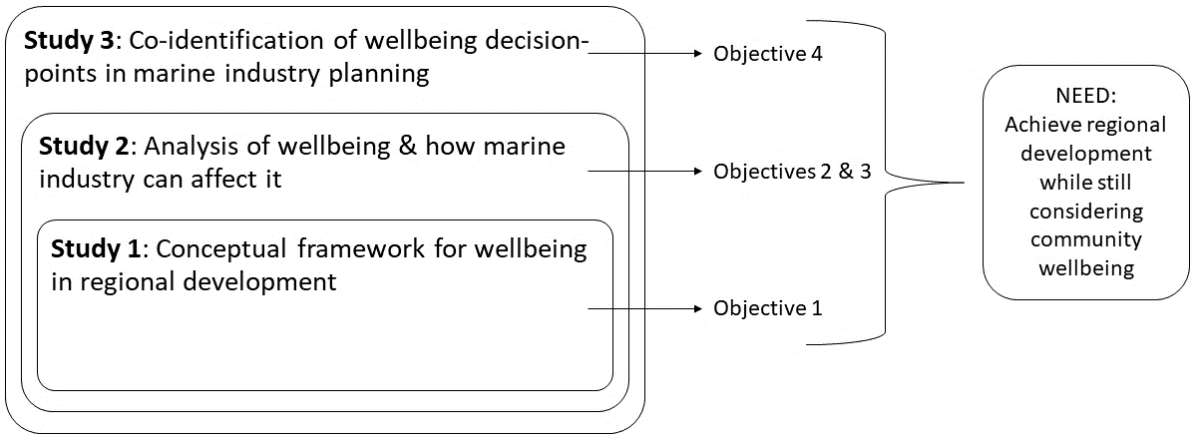


Figure 2. Schematic of how project design addresses objectives and need.

4 Inclusion of Wellbeing in Regional Development

4.1 Scope and Study Objectives

Government policy discourse, and increasingly industry discourse, is utilising the concept of wellbeing to understand how those who use the public goods that such commons provide are likely to be affected by development and conservation activities. But how is wellbeing addressed in the context of regional development?

In this study, we sought to address three questions: i) Have researchers studied the links between wellbeing and regional development and if so for what reasons; ii) What domains and dimensions of wellbeing have been linked to regional development in the scholarly literature; and iii) How has wellbeing been measured in the regional development literature?

Based on the answers to these questions, we were able to address project objective 1 (1. Identify what place community wellbeing plays in regional development). The conceptual framework for understanding wellbeing used in the following studies was developed based on the findings of this study.

4.2 Methods

To address these research questions, we conducted a systematic review of empirical literature (Ganann et al., 2010). Systematic literature reviews attempt to identify, appraise, and synthesise all relevant studies to answer a particular question, with the overall aim of producing a scientific summary of the evidence. Systematic reviews also enable the reduction of literature review bias and allow follow-ups to be more likely to reflect knowledge development (Petticrew and Roberts, 2006).

Data collection consisted of three steps:

Step 1: A comprehensive search of empirical literature. We used the search terms 'regional development AND 'wellbeing (OR well-being)' in four electronic indexing databases: JSTOR; SCOPUS; Science Direct; and Web of Science. The search was limited to articles written in English only, and only peer-reviewed academic journal articles. This led to our first set of papers.

Step 2: Systematically select relevant articles. Titles and abstracts were reviewed based upon two inclusion criteria: 1) must directly address both regional or economic development and wellbeing; and 2) must deal with sub-national 'region' (and not national e.g. Australia or transnational regions e.g. Oceania). This led to a second (reduced) set of papers.

Step 3: Review referenced and citing peer reviewed articles. This was undertaken for all articles included in set two using the same relevance as previously. This led to our third set of papers. We then combined sets two and three, removed duplicates and gathered PDF copies of each article using Endnote X8 software. This fourth set of papers was then read fully, analysed against the inclusion criteria, and further papers were removed (Figure 3).

To analyse the articles included in this review, we imported the PDF files of set 3 into QSR International's NVivo12 Pro software, a computer-assisted qualitative data analysis software which facilitates coding and retrieval, making the analysis process more efficient. Coding is a form of analysis which sorts, focuses, and organises data; this software was used to code and compare the articles, thus allowing large amounts of qualitative data to be reduced into smaller packages. We used 'inductive' or 'open' coding (where the researcher reads and interprets raw textual data to develop themes). These were guided by three questions:

- How were the findings (or methods) relevant to regional development policy or practice?
- How was wellbeing defined?

- What methods were used specifically for analysing wellbeing?

The articles were coded by two researchers who then compared and contrasted results. This enabled the identification of patterns and commonalities.

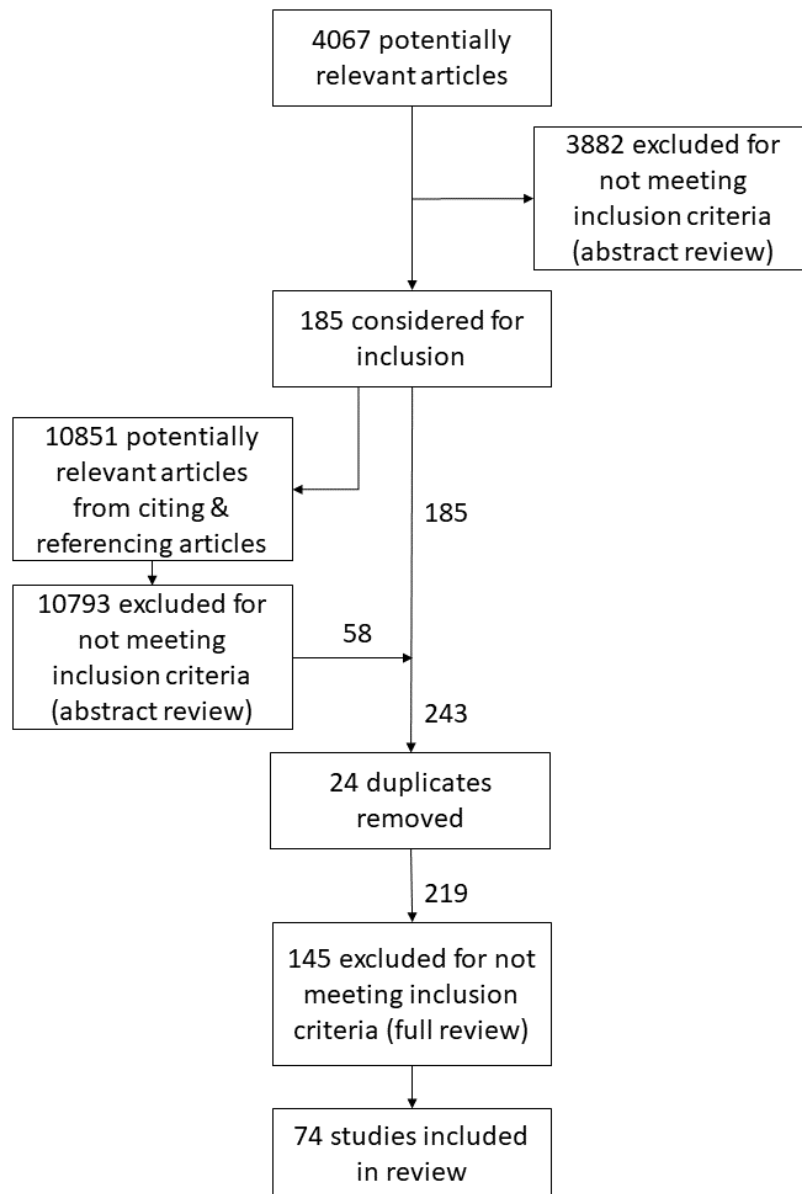


Figure 3. Summary of the steps taken, and the number of articles at each step of the systematic review.

4.3 Results

The first step of the data collection process identified 4067 results (Figure 2). However, 3882 articles were then excluded from the set as they did not meet the inclusion criteria. This meant that 185 articles were put forward for consideration. The review of citing and referenced papers for these 185 articles revealed a further 10,851 potential papers. However, 10,793 of these were excluded due to not meeting the inclusion criteria. This left a further 58 articles put forward for consideration. Combined, these two sets led to 243 articles. At this point, duplications were removed leaving 219 articles, which were then reviewed fully against the exclusion criteria and a final set of 74 studies were included in the

review (see Appendix D1).

4.3.1 Have researchers studied the links between wellbeing and regional development and if so for what reasons?

The inclusion of 74 articles for review in this study suggest that yes, researchers have studied the links between wellbeing and regional development. Furthermore, we found three key sets of reasons: the academic reasons, the applied reasons, and others.

Academic - Limited research available, need for theory on wellbeing and regional development.

Gaps in the available research and a paucity of theory linking wellbeing research and measurement with regional development policy, practice and measurement were strong drivers of the literature (18 of 74 papers; e.g. Beling et al., 2018, Green et al., 2019, Monni and Pallottino, 2015, Phelan et al., 2017, Poudyal et al., 2019). Research from other disciplines which have started to overturn neo-economic assumptions regarding increased wealth and its impact on wellbeing was commonly cited as a motivating research purpose (Betz and Snyder, 2017, Huggins and Thompson, 2012, Ogwang et al., 2018). Several authors sought to combine the paradigm of 'sustainable development' with the established interpretation of development as primarily an economic concern (Nguyen et al., 2017, Ozkan and Schott, 2013, Rodrigues-Filho et al., 2013). The sustainability paradigm introduces a 'triple bottom line' definition of development that is adding social and environmental indicators alongside economic indicators.

Applied – Need to improve decision-making to enable wellbeing impacts, and to understand post-development impacts for wellbeing.

A second major driver of this research related to better enabling wellbeing outcomes through the policy and decision-making context (18 of 74 papers; e.g. Dax and Fischer, 2018, Fulford et al., 2017, Silva and Ferreira-Lopes, 2014, Walde et al., 2019). Common also were efforts to make wellbeing explicit within regional development as opposed to the existing state in which human wellbeing was implicitly the purpose of policy (Bryan et al., 2010, Kohler et al., 2017, Nikšič et al., 2018, Palomo et al., 2011), either at the individual or collective level. Two key timeframes were evident: post-development evaluation; and forward-looking improvements to development planning. Many authors discussed limits or failures to existing regional policy (Sorensen et al., 2007, Silva and Ferreira-Lopes, 2014, Ozdemir and Gul, 2019). Other studies focused on the need for local community impacts to be included in regional development decision making and management (Abdel-Latif et al., 2012, Holmes and Cavanagh, 2016, Walde et al., 2019). In regard to the latter timeframe, studies focused on assessing the impact of particular industries such as mining (e.g. Rolfe et al., 2007, Carrington and Pereira, 2011, Nguyen et al., 2017, Phelan et al., 2017); energy (Wilmsen, 2016) and forestry (Charnley et al., 2008).

Other reasons. A small number of papers sought to understand how qualitative wellbeing frameworks linked to notions of place and established regional development measures and data (e.g. Fernando and Cooley, 2016, Poudyal et al., 2019). Among these were articles addressing how indigenous [cultural frameworks] for what comprises 'a good life' for example the Australian place-based identity experience of 'country' (Sangha et al., 2019), and the Latin American notion of 'buen vivir' or good life (Chaves et al., 2018, Chassagne, 2019).

4.3.2 What domains and dimensions of wellbeing have been linked to regional development in the scholarly literature?

The four most referred-to domains of wellbeing were employment and livelihoods (29 of 74 papers), health (28), education and skills (25) and the quality of the surrounding environment (22) (Figure 4).

A second cluster of common components was also apparent. This cluster comprised: safety and security; social cohesion; culture and spirituality; civic participation and political enfranchisement; the experience of positive relationships; access to resources; connection with nature; a sense of place and attachment to place; freedom and choice; material wellbeing; and income and wealth. Two of these, 'connection with nature' and 'sense of place and attachment to place', may appear to be related but in fact reflect different experiences. The former referred to physical and mental health effects of time spent in natural environments (Chassagne, 2019, Dax and Fischer, 2018, Fulford et al., 2017)

whereas the latter referred to the influence of a specific geography (urban or natural environment) on an individual or collective narratives and experience of identity (Carrington and Pereira, 2011, Chaves et al., 2018, Sangha et al., 2018).

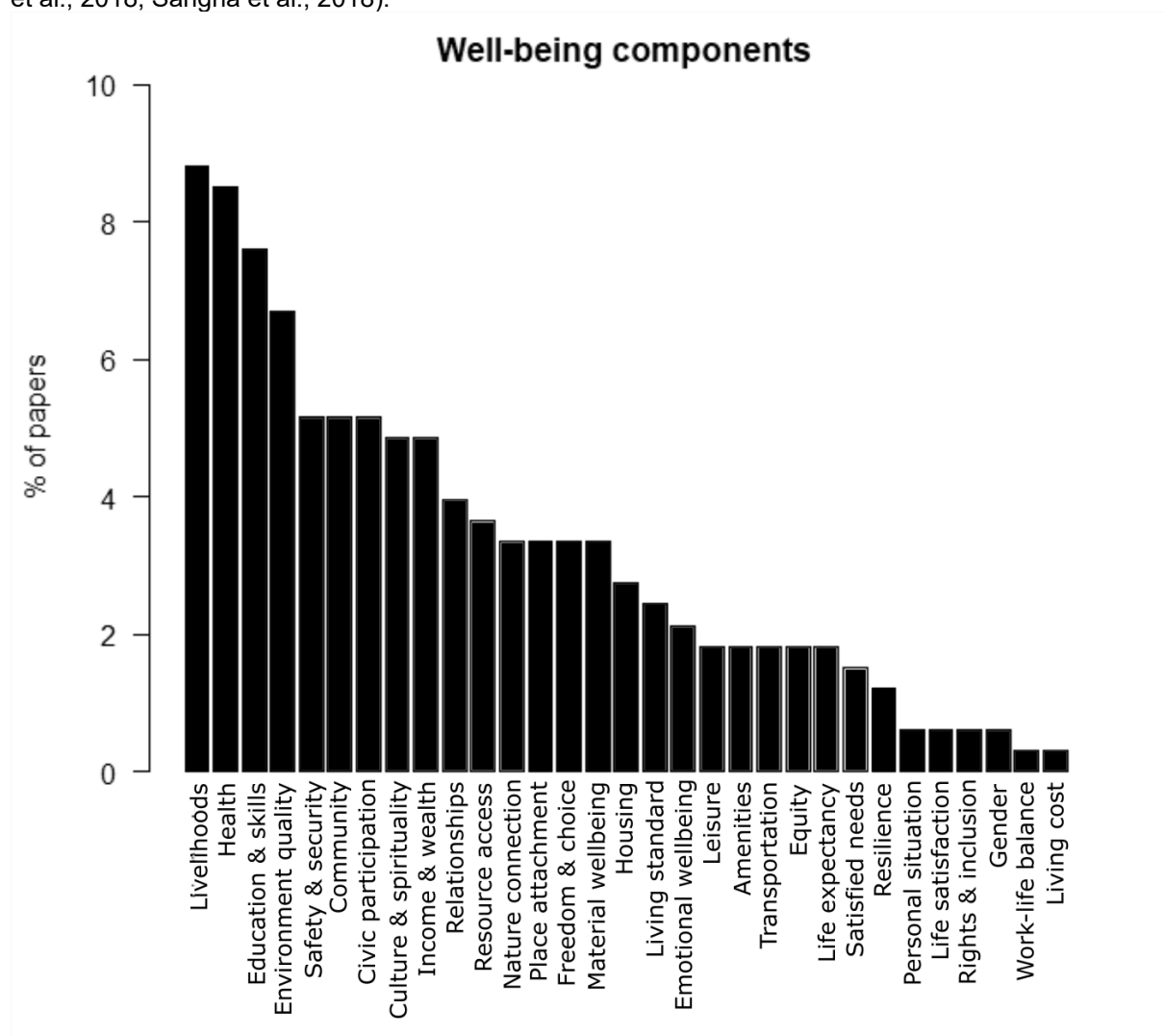


Figure 4. Percentage of papers using each of the identified domains of wellbeing.

Similarly, on the surface ‘material wellbeing’ and ‘income and wealth’ may be perceived to be related but in fact reflected different qualities. The component ‘Income and wealth’ referred specifically to the amount of money and accumulated money an individual or household held (Karst, 2017, Wilmsen, 2016, Ozdemir and Gul, 2019). ‘Material wellbeing’ was used as an amalgam of components that together form the basis of wellbeing including possessions and the consumption of goods, accumulated wealth and income and employment (Brauers et al., 2010, Busch et al., 2011, Ejdemo and Söderholm, 2015, Fernando and Cooley, 2016, Guardiola and García-Quero, 2014, Wang et al., 2017).

4.3.3 How is wellbeing measured?

A variety of methods of data collection and data analysis were identified across the articles. Overall, most studies used statistical analysis of existing data or survey data (Tables 2 and 3) and there was much less use of qualitative methods of data collection and analysis.

Table 2. Methods of data collection

















Type	% Papers	Examples
 Spatial mapping	2	"In some cases, participatory mapping promotes qualitative analysis of local knowledge through a variety of data collection methods (e.g. photographs, audio recordings, video, animations, text and sketches)" (McRuer and Zethelius, 2017)
 Focus groups	7	"Focus groups consisted of 11–25 community members with representation from schools, faith-based organizations, health care services, senior services, businesses and economic agencies, law enforcement, elected officials, and social service agencies ..."
 Workshops	7	"a standing interdisciplinary workshop was organized to discuss conceivable links between the potential changes in the six ecosystem services" (Busch et al., 2011)
 Literature/ document review (policy material & research studies)	16	"Secondary sources included local newspapers and magazine articles, documentary films, government reports, and analyses conducted by social movements and local as well as international NGOs." (Giovannini, 2015)
 Existing data	13	"In order to define the community context, demographic, economic, and social data from the 2006 census (Statistics Canada, 2006) were used" (Ruddell, 2011)
 Participant observation	6	"In addition to attending several household pujas (rituals), the author participated in three religious community events" (Karst, 2017)
 Surveys	14	"Data collection was primarily conducted online using Qualtrics online survey software." (Morgan et al., 2016)
 Interviews	14	"The government interviews provided qualitative information about local, provincial and national development strategies and contexts." (Wilmsen, 2016)
 Existing wellbeing indices	21	"Local agrifood system sustainability/resilience was measured through a previously constructed index" (Green et al., 2019)

Table 3. Methods of data analysis

Type	% Papers	Examples
 Theory development	1	"To analyze the responses provided from key informant interviews, focus groups, and open-ended survey questions, a grounded theory approach was used." (Allen et al., 2018)
 Multi-criteria decision analysis	1	"The fields of multi-criteria decision analysis (MCDA) and social impact assessment (SIA) were drawn on to provide such methods." (Esteves, 2008)
 Pressure–state–response analysis (PSR)	1	"We selected the pressure–state–response (PSR) approach proposed by OECD (1993) as the basis for our indicator system." (Zhen et al., 2009)
 Coding (of texts or interview data)	9	"Data from field notes were used to elicit key themes and codes... compare different perceptions and scenarios between communities, and capture the complexity of local perspectives" (Karst, 2017)

 Index creation (often combining different established indices)	10	"The main purpose of this research was to construct a multi-dimensional (composite) index measuring the overall level of rural development and quality of life in individual rural regions of a given EU country." (Michalek and Zarnekow, 2012)
 Modelling	14	"Firstly, Pythagorean Fuzzy Analytic Hierarchy Process (PFAHP) is used to assign weights to indicators of wellbeing index for provinces (WiP) in Turkey. Then, a TODIM (an acronym in Portuguese of interactive and multiple attribute decision making) based ranking model for 26 regions was applied." (Ozdemir and Gul, 2019)
 Ongoing co-analysis with stakeholders	7	"The consultative process that led to the definition of the QUARS [composite indicator] grants a strong legitimacy to the index that in this way overcomes a number of drawbacks due to the contribution of scholars alone. The inclusion of a large civil society coalition implies the lack of any particular interest, and focuses its attention to the reaching of wellbeing for all citizens" (Segre et al., 2011).
 Content analysis	22	"Data were analysed using thematic and content analysis techniques based on the emerging issues" (Ogwang et al., 2018)
 Statistics	35	"Student's t-tests for independent and dependent samples as well as their robust alternatives, the Mann-Whitney-U test and the Wilcoxon sign rank test, were applied. Proportions were statistically tested using the two-proportion z-test." (Walde et al., 2019)

Fifteen studies (of 74) utilised a mixed methods research design. Some studies used document analysis to derive data about a range of wellbeing components and combined these with statistical analysis. In others, interviews and focus groups were used to bring local experiences of wellbeing into the statistical and document-based analyses and to provide regionally relevant weightings for quantitative indicators. In these instances, a much more holistic understanding of wellbeing was obtained.

4.4 Synthesis and conceptual framework

The results of this study reaffirmed that any framework for measuring wellbeing should include a range of dimensions to encapsulate both the social and individual processes contributing to wellbeing and the interplay between them (Table 4). Based on this, we proposed that the three main dimensions of wellbeing are the material, the relational, and the subjective or interpersonal, described by White (2010) as follows:

The material comprises assets, welfare, and standards of living. For practical analysis, the relational is divided into two spheres: the social: social relations and access to public goods; and the human: capabilities, attitudes to life, and personal relationships. The subjective also has two aspects: on the one hand people's perceptions of their (material, social, and human) positions, and on the other hand cultural values, ideologies, and beliefs [pp. 161].

For each of these dimensions, multiple indicators have been developed for the range of components that contribute to wellbeing (for example financial security, culture, and spirituality), ranging from external quantitative measures of welfare (for example, employment, income, mortality rates) through to subjective measures which are less quantifiable (for example, life satisfaction, quality of life, cultural wellbeing).

Table 4. Most common wellbeing domains identified in literature review according to dimension

Wellbeing dimension	Wellbeing domain
Material	Ability to have a good job (unpaid or paid)
	Health
	Education and skills
	Income and wealth
	Safety and security
Subjective	Culture and spirituality
	Personal connection with nature (emotional and physical effects of spending time in that place)
	Sense of place and my identity from this place and this community
	Freedom and choice
Subjective & Relational	The quality of the natural environment
Relational	Feeling part of a connected community (social cohesion)
	Participation as a citizen (be heard on political issues, join campaigns, vote, stand for election etc.)
	Experience of positive relationships
	Access to resources

This framework for wellbeing underpins the following two studies in this project.

5 Place-based wellbeing and interactions with Marine Industry

5.1 Scope and Study Objectives

Community interest in the impacts of coastal and marine development across Tasmania has led to a need to consider multiple and often conflicting values and interests with respect to the marine environment. Several factors have been proposed to contribute towards the achievement of community acceptability or 'social license to operate' including: the perception that a company offers benefits; that it contributes to the wellbeing of the region, and acts fairly; that it listens, responds, and exhibits reciprocity (Boutilier and Thomson, 2011). In this report we focus upon the concept of wellbeing.

Currently, our primary form of assessing wellbeing and the effects that coastal and marine industry development may have has been through a) the use of regional level collective socioeconomic indicators such as the number of jobs created, the growth in regional income, and b) assessments of immediate area impact like noise, light, and visual amenity. The opportunity arose to explore whether wellbeing concepts can be expanded to incorporate what people value about places, and how wellbeing values could be effected by the development of different aquaculture activities (onshore and marine).

As such, our research objectives were to:

- Investigate and map wellbeing values and interests held by the case study communities.
- Investigate how changes in coastal and marine industry could impact wellbeing.

By addressing these research objectives, we were able to address project objective 2 (Identify what communities' value (using a wellbeing framework) in relation to the NW Tasmanian coastal and marine region).

As requested by the industry partners, the far northwest of Tasmania (comprising the Circular Head and King Island Local Government Areas) is the instructive case study for this research. This is useful for two inter-related reasons. Firstly, to date, neither area has experienced industrial scale marine industry development. Secondly, both areas have been identified in the recent past for potential marine industry development such as aquaculture and renewable energy. For example, the far northwest was named up in the 2017 Tasmanian Government Sustainable Industry Growth Plan as an area of potential growth.

5.2 Methods

Notwithstanding the complexity of measuring wellbeing in ways that make sense for decision makers, it is important that empirical efforts to do so are made (van Putten et al 2018). In the previous study, we identified that mixed methods that bring together quantitative and qualitative data on experience of wellbeing is essential for a rounded picture of wellbeing. As such, we used a mixed methods case study approach combining (1) population level socio-economic analysis with (2) a survey to understand place-based individual data on subjective experiences of wellbeing.

5.2.1 Population level socio-economic wellbeing analysis

This analysis was based on the components of wellbeing identified in Table 4, with relevant indicator data identified for each location (Table 5).

Data was compiled from the Australian Bureau of Statistics (2011–18; for Circular Head and King Island), the 2016 Regional Wellbeing Survey (RWS; for the Cradle Coast NRM region), and regional reports (e.g., election reports, community health check (CHC) reports etc). It is important to note that the RWS data includes the local government areas of Burnie, Central Coast, Circular Head,

Devonport, Kentish, King Island, Latrobe, Waratah/Wynyard, and West Coast. It is unknown whether any respondents were specifically from Circular Head or King Island, and so this data must be understood in this broader context.

Table 5. Socio-economic indicators per wellbeing components

Components of wellbeing	Socio-economic indicator
Employment	Unemployment rate (ABS); level of occupation (ABS); location quotient per sector, % employment share, % change in employment share
Health	Self-reported health level (CHC); % obesity (CHC); psychological distress level (CHC); % smokers (CHC); alcohol consumption habits (CHC); % taxpayers with private health (ABS); % persons needing assistance for core activities (ABS)
Education and skills	Year completion rate (year 8 + ABS); Qualification attainment level (ABS); field of education (ABS); perceived access to education (RWS)
The quality of the natural environment	Population density (ABS); Air quality; Recreational Water quality; Protected areas as percentage of regional surface (ABS); Perceived environmental health (RWS)
Safety and security	Type & number of crimes (Burnie magistrates court); Perception of crime and safety (RWS)
Social cohesion	Perceptions of sense of belonging (RWS); Perceptions of getting involved (RWS); Perceptions of community wellbeing (RWS)
Culture and spirituality	Rate of religious affiliation (ABS)
Participation as a citizen	Perception of having a say and being heard (RWS); % undertaking voluntary work (ABS); % participation in local elections (election reports)
Experience of positive relationships	Divorce rate (ABS); % single adult households (ABS); Perceptions of personal relationships; Perceptions of spending time with friends and family (RWS)
Access to coastal and marine resources	% of commercial wild-fishing licenses (TSIC); % recreational fishing effort (UTAS)
Personal connection with nature (e.g., emotional and physical effects of spending time in that place)	No appropriate measures available
Sense of place and my identity from this place and this community	No appropriate measures available
Freedom and choice	No appropriate measures available
Income and wealth (Individual)	Median employee income (ABS); % earning \$499 a week or less (poverty line is \$459); % population owning home (ABS); Perceptions of household financial wellbeing (RWS); Perceptions of financial distress (RWS)

Data was analysed using descriptive statistics where appropriate. In many instances, data previously analysed have been reported directly, this is particularly the case for data from the 2016 Regional Wellbeing Survey.

A limitation of this analysis is that some potential indicators have not been included as the data is not

available. For example, a more comprehensive profile of health might include indicators such as number of hospital beds, hospital bed occupancy rate, life expectancy and elective surgery waiting list length. Similarly, safety and security could be expanded with indicators such as levels of Police staff in region relative to population size, compared with the State average. As such, it should not be assumed that the indicators included here present the full picture on a wellbeing domain.

5.2.2 Survey

The survey comprised three data sets: (1) spatial locations (GIS mapping); (2) pre-set text options and (3) open questions targeted to qualitative text. The full survey instrument can be seen in Appendix D2 but in summary covered the following areas:

- What kinds of marine and coastal activities are conducted?
- Where respondents like to conduct those activities.
- How wellbeing is experienced because of these activities; and
- What kinds of changes might affect individual experiences of wellbeing in those places (positive or negative effects)?

The survey was conducted in August and September 2020 using online mapping and survey software Maptionnaire (www.mapta.com). Two of the project team attended the locations in person to promote the survey. Promotion included placing posters in prominent locations, social media coverage, and newspaper articles.

The survey was conducted using an online platform however Wi-Fi and internet connection were not consistently reliable across the case study areas. This made the survey difficult to fill out for some residents, particularly regarding the mapping component.

Initially, the questions in the online survey were not 'locked' i.e., requiring an answer before proceeding. This meant that several respondents chose not to address every question. On discovery of this problem, the questions were 'locked' at the end of the first week of the survey. The impact of this was a reduced sample of useable data for the project.

Connection to 'country' is a well-established determinant of Indigenous wellbeing (Ganesharajah, 2009). As such and given the high population per capita of Aboriginal people in the Circular Head LGA, the research team canvassed the idea of a specific study into connection between the marine environment and Aboriginal people's experience of wellbeing in the area in partnership with Aboriginal people from the case study area. We discussed this idea with three key people from the Aboriginal communities from the area and were advised in each case that a full co-design process was not appropriate at the time of the research. As such, while Aboriginal voices highly likely to be represented in the data, they are not identified as distinctively Aboriginal (nor is any demographic group specifically highlighted in the data). This is a limitation to this study, and the connections between the marine environment and Tasmanian Aboriginal people's experiences of wellbeing is a critical area for future research that ought to be conducted in partnership with local Aboriginal people.

Finally, the wellbeing component 'health' was included in Question 1 as a component of wellbeing (general) however, this component ('health') was missed out of the comparison wellbeing component at question 4.1 (i.e., wellbeing associated with marine environment). This was an error in the survey design that was not identified despite several reviews. Health, in particular mental health, did appear in the qualitative results. This means that health impacts were captured, however, we recognise this gap is a limitation to the results.

To analyse the mapping data, we used ArcGIS software to create heat maps showing frequency of geographical places identified as sites for significant wellbeing-place links. The pre-set text options were analysed in Excel for the frequency of response and patterns of co-occurrence of key items. The open-ended text responses were organised and analysed thematically using NVIVO 12 software.

5.3 Results

5.3.1 Socio-economic analysis of wellbeing of NW

Table 6. Headline results from the analysis of population-level data on socio-economic wellbeing.

Wellbeing domain	Headline results
Employment	<ul style="list-style-type: none"> • Dominated by primary industries, with agriculture, forestry, and fishing, and manufacturing underpinning economies of both regions • Fast growing industries in Circular Head include rental, hiring, real estate, health care and social assistance • Fast growing industries in King Island include arts and recreation, professional, scientific and technical occupations, accommodation and food, finance and insurance
Health	<ul style="list-style-type: none"> • 2020 Circular Head Community Health Check – 78% of residents rated their health as ‘excellent’, ‘very good’ or ‘good’ • 2020 King Island Community Health Check – 77% of residents rated their health as ‘excellent’, ‘very good’ or ‘good’
Education and skills	<ul style="list-style-type: none"> • Proportion of residents completed Year 12 of high school (or equivalent) in both regions lower than the state average
Quality of natural environment	<ul style="list-style-type: none"> • Circular Head and King Island regions sparsely populated: 1.6 persons per square kilometre in Circular Head, and 1.5 persons per square kilometre in King Island. • Australia’s only Baseline Air Pollution Station is at Cape Grim in Circular Head – some of cleanest (unpolluted) air in the world.
Safety and security	<ul style="list-style-type: none"> • No indicators available for either region specifically • In Regional Wellbeing Survey, Cradle Coast NRM region scored crime and safety at a mean of 3.9 (1 = low, 7 = high levels of safety)
Social cohesion	<ul style="list-style-type: none"> • In Regional Wellbeing Survey, Cradle Coast NRM region scored sense of belonging at a mean of 5.1 (1 = low, 7 = high levels of belonging) • Involvement in local community scored at a mean of 3.5 (1 = low, 7 = high levels of involvement) • Community wellbeing scored at a mean of 5.3 (1 = low, 7 = high levels of wellbeing)
Culture and spirituality	<ul style="list-style-type: none"> • Little data available. • 2016 census data: in both regions most residents perceive themselves as Christian or non-religious.
Participation	<ul style="list-style-type: none"> • 2016 census data for voluntary work: 23.7% of Circular Head residents; 33.8% of King Island residents. • In Regional Wellbeing Survey 55.5% of Coast NRM region participants agreed that they could get involved in local decision-making processes if they wanted to
Positive relationships	<ul style="list-style-type: none"> • Difficult to quantify the experience of positive relationships • Divorce rates are below the State average (10.3% in 2016), and separation rates are about the same as the State average (3.5%). • 7% of families in King Island and 9% of families in Circular Head are one parent families with dependent children
Access to resources	<ul style="list-style-type: none"> • Little quantitative data is available • TSIC Seafood Industry Workforce profile 2017: 14% of wild-catch fishery license holders live in the West and North-west. • In 2017, north-west coast attracted 11% of the overall recreational fishing effort (fisher days).
Income and wealth	<ul style="list-style-type: none"> • In Regional Wellbeing Survey, household financial wellbeing ranked at 3.7 (1 = low, 7 = high levels of financial wellbeing) • Participants also ranked a score of 1.1 for financial distress (0 = no distress, 4 = high levels of distress).

Indicators to reflect a personal connection with nature, a sense of place and identity, and freedom and choice were not identified through this analysis. The full analysis is included as an annex to this report (Appendix D3).

5.3.2 Survey findings about wellbeing and marine and coastal places

299 adults from the general population across the case study (Circular Head LGA and King Island LGA) participated in the survey. However, because respondents were able to skip responses, we identified a usable sample of 174 responses (those who answered all wellbeing related questions). Headline results from the survey are provided below. The full analysis is included as an annex to this report (Appendix D4).

In terms of survey respondents, the demographic breakdown was as follows:

- Proportionally more responses from King Island residents than from residents of Circular Head (no substantial differences in the results necessitated applying a weighting to the findings).
- Gender split similar across the LGAs with a clear bias towards female respondents.
- Most respondents were aged between 35 and 44 years. Very few King Island respondents were aged under 34 years, this is a potential gap in the data.
- Most respondents to the survey had received higher education, attending at least until year 9 of high school.
- Fewer respondents were prepared to reveal income level, of those that did respond, the majority lived on incomes between \$500 and \$1999 per week.

It was clear from the wellbeing mapping component of this survey that some locations were more important for marine and coastal wellbeing than others. For example, in Circular Head, Stanley was considered important for all aspects of wellbeing (except for participation). On King Island, Currie harbour was considered important for access to resources, personal connection with nature and positive relationships amongst others (Figure 5).

The quality of the natural environment was the domain most frequently associated with significant places. This domain expresses the feelings of wellbeing that are derived from knowing the environment is in a positive state, suggesting that the state of the environment was significant to the respondents. A personal connection with nature was the second most identified domain. In both cases the natural environment is at the centre of respondents' experience of wellbeing.

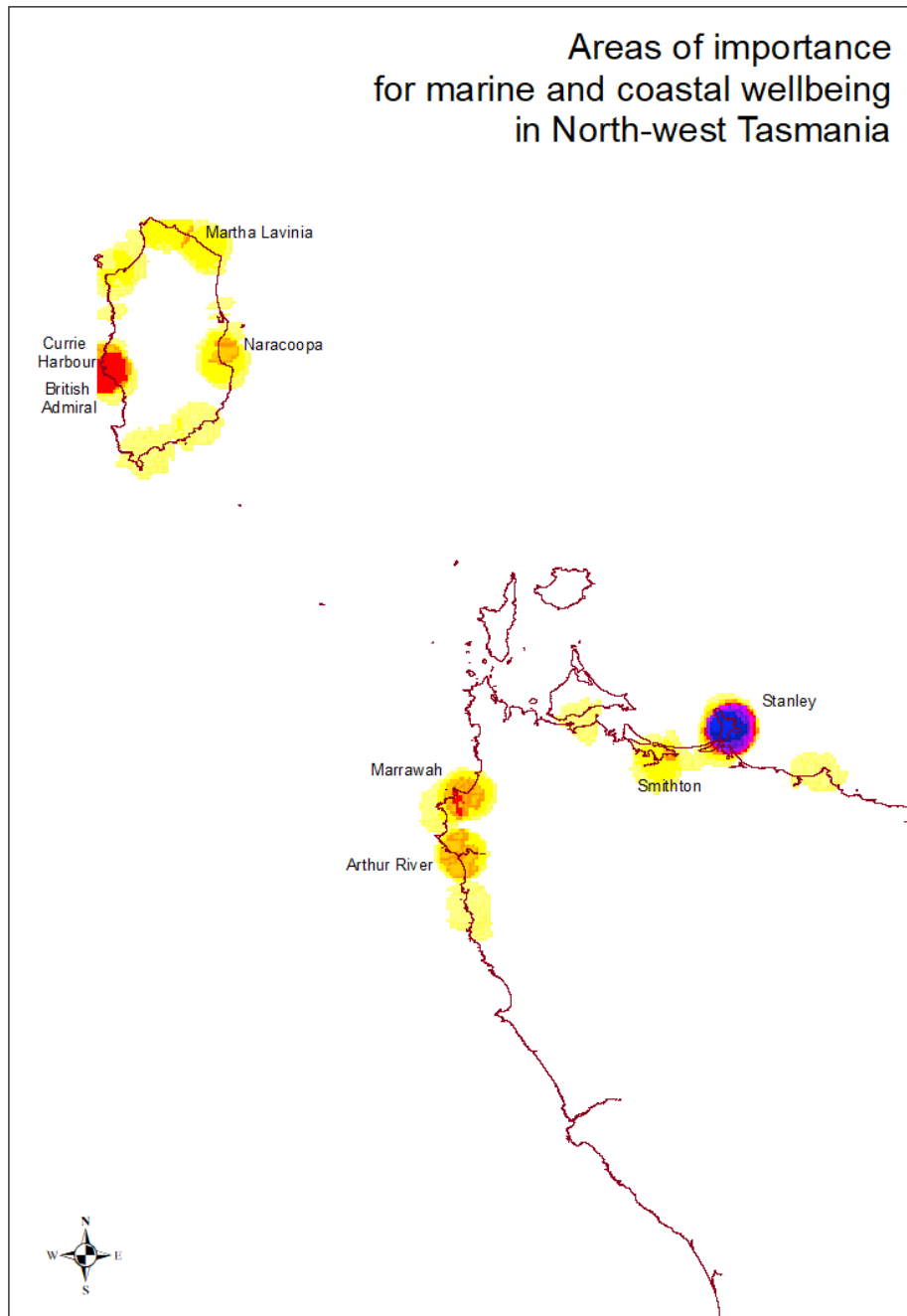


Figure 5. Areas of importance for all marine and coastal wellbeing data combined.

The qualitative analysis revealed five themes of wellbeing significance based on respondent descriptions of why a specific place was important to them: environmental or nature connection; social connections; individual experience; cultural significance; and a small number of livelihood associations.

Environmental or nature connection theme from descriptions that referenced the environment as comprising the significance to the respondent. The qualities of isolation and solitude were linked with ease of access and the sense of freedom as aspects of the 'wild' or 'natural' environment that are significant in the experience of wellbeing. Many descriptions emphasised the beauty, wild, untouched, or pristine characteristics of the marine and coastal environment as central to their significance.

Social connections comprise descriptions that referred to experiences with other people as the core

reason the place is significant. Home, family, and friends were the most commonly descriptions provided and ranged from memories to current sense of home. Intergenerational experiences, from childhood memories to raising families were central to the connections between social connection and place.

Alongside social connections, the **individual's experience** connected with marine and coastal places showed up as highly significant. Amongst the experiences we found the feeling of freedom, solitude, spiritual connection and "recharging" or mental health.

Cultural significance comprised two main elements: heritage connections and cultural richness. These connections had both and intergenerational connection and were linked to current activities.

Livelihood connections involved respondents identifying sustainability, local ownership and a sense of the places being 'untouched by industry' as central to the significance of the place or the region.

5.3.3 Survey analysis of how marine and coastal change affects wellbeing

The four most frequently mentioned overarching themes regarding what would detract from wellbeing were consistent for both case study sites. These were: **development, destruction of or damage to the natural environment; restrictions to public access to the environment; and recreational uses**. The remaining themes were quite descriptive and less related to the development of marine industries per se.

In particular, the development theme had several sub-themes, one of which directly related to aquaculture. The introduction of industrial aquaculture (fish farms) concerned respondents in two ways: the impact on water quality and condition of marine ecosystems were prominent; and trust concerns regarding the truthfulness of decision-making (approval) processes and the environmental effects of industrial aquaculture.

There were fewer mentions of changes that would enhance people's experience of wellbeing compared to those that would detract from the experience. The most frequently mentioned change was **development**, followed by **improved environmental management**. Support for development as enhancing wellbeing and the marine and coastal places was associated with a sensitivity to the culture of the area (as discussed in the previous section) and with sustainability in mind. Responses identifying improved environmental management as a positive change focused on protecting marine habitats and the coastal zone including restricting vehicles access to beaches.

5.4 Synthesis of wellbeing analysis

Subjective and relational elements are more important than material. Subjective and relational experiences were the more strongly featured dimensions of wellbeing, over material wellbeing, when people described their experiences. The material domain includes education and skills and income and wealth and employment and none of these featured strongly in how people described their experiences of wellbeing. The individual experience associated with the northwest Tasmanian environment and the experiences of family, friendships and community specifically associated with the marine and coastal environments in this location were, however, highly valued. We were unable to identify socio-economic indicators to reflect a personal connection with nature, a sense of place and identity, and freedom and choice. This suggests that if we only use socio-economic indicators to assess wellbeing, we are potentially missing out on understanding those wellbeing domains that people value the most.

Wellbeing is strongly linked with the quality of place and environment-related values. Individual and collective wellbeing were strongly associated with specific qualities of marine and coastal environments such as wild, untouched, isolated. As noted in the socio-economic analysis, the Circular Head and King Island regions are particularly sparsely populated and so may be more likely to be perceived as isolated and untouched than many other areas of Tasmania. The quality of the environment and associated values could not have been inferred from the socio-economic data alone. In the socio-economic data we saw that 'quality of the natural environment' indicators pointed to the

cleanest air in the world and low population density. Clearly these features are valued by local people, but the association between these and the restriction of access to the wild (freedom) could not have been identified without qualitatively examining how people experience their wellbeing. This suggests that where what is typically assessed as 'environmental values' in Social Impact Assessment processes, may not be only a matter of conservation or 'greenie' values, but are also directly relevant to people's wellbeing.

Environmental change will affect subjective and relational wellbeing, as well as material. People like to walk on the beach and look at the ocean, they like to fish, swim, surf and spend time with family and friends. However, pairing common recreational activities with the qualitative analyses on how these activities influence respondents' wellbeing reveals that these activities are intrinsic to northwest Tasmanian residents' sense of self, their mental health, and their personal and cultural identity. The results show that any change to the environment created by marine development, that has the potential to affect activities, is therefore likely to affect these other aspects of wellbeing also. It is reasonable to extrapolate that any change, not just marine industry development, that affects the identified activities could also therefore affect wellbeing.

6 Inclusion of Wellbeing in Marine Industry Decision-making

6.1 Scope and Study Objectives

Marine industries are better able to consider/contribute to the wellbeing of the region in which they operate where wellbeing is considered in the decision-making process for industry green fields development and expansion.

Study 1 identified that a key driver of identifying links between wellbeing and regional development was to better consider wellbeing outcomes through the policy and decision-making context. Some studies have investigated the links between natural ecosystems and social wellbeing to improve governance (Harris et al., 2009) and how to incorporate wellbeing (particularly health) into governance processes such as spatial planning (Flannery and Ó Cinnéide, 2012, Gray et al., 2011). However, there is a paucity of research which investigates how wellbeing is currently considered in governance or marine industry decision-making systems.

In this study we had two objectives:

- Identify how the results from our previous studies might be applied by decision-makers in the existing decision-making context and
- Explore ideas for change to, and development of, the decision-making context.

By addressing these research objectives, we were able to address project objectives 3 and 4 (Establish how changes in marine industries have/could affect wellbeing values; and ascertain how wellbeing values can be explicitly considered in NW Tasmanian regional development decision-making).

6.2 Methods

The Delphi technique (subsequently referred to as the Delphi) seeks to gain the most reliable consensus of a group of experts. It is a method which has been used frequently to explore complex policy questions (the policy Delphi) on topics such as urban growth management (Perveen et al., 2017), healthcare delivery (Putrik et al., 2021) and offshore windfarm siting (Ho et al., 2018). For these reasons we perceived this to be a suitable method for obtaining consensus by decision-makers on how wellbeing is currently considered in decision-making and how it might be considered in the future. Following Reid (1988), Hasson and Keeney (2011) and Sekayi and Kennedy (2017) we took a qualitative approach to the Delphi and defined it as *“the systematic collection and aggregation of informed judgement from a group of experts on specific questions and issues”*.

The main advantage of the Delphi is the achievement of consensus in an area of uncertainty or lack of empirical evidence. A wide range of knowledge and experience is brought to the process, and the feedback between rounds can widen knowledge for all involved, stimulate new ideas, and be highly motivating (Powell, 2003). However, it should also be noted that the consensus approach may also lead to a ‘watered down’ version of best opinion (Sackman, 1975).

We undertook a three-round approach, supported by an initial brief online workshop to introduce the process (Figure 6). To conduct the Delphi, we used the Mesydel online software program to conduct the activity online. We engaged a purposive sample of experts, defined by their occupation of formal professional roles relevant to the Tasmanian decision-making context. Fifteen participants were invited to take part in the Delphi, comprised of state and local government officials as well as industry participants.

Governments, local councils and marine industries need to take into account many and often conflicting values and interests in the development of the marine environment. It is not clear how this can be done in ways that also focus on community wellbeing. As such, the problem addressed by the

Delphi was how community members' experiences of wellbeing might be better considered in the decision-making process for coastal and marine development.

Round one was comprised of two parts. Firstly, to identify where and how the wellbeing research results (Study 2) might be considered in decision-making. Secondly to explore what changes might be considered to the existing decision-making context and processes based on any insights gained from considering the wellbeing research results (Study 2). Subsequent rounds sought clarification of earlier findings to assist the move towards consensus. For details of the questions included in each round, see Appendix D5.

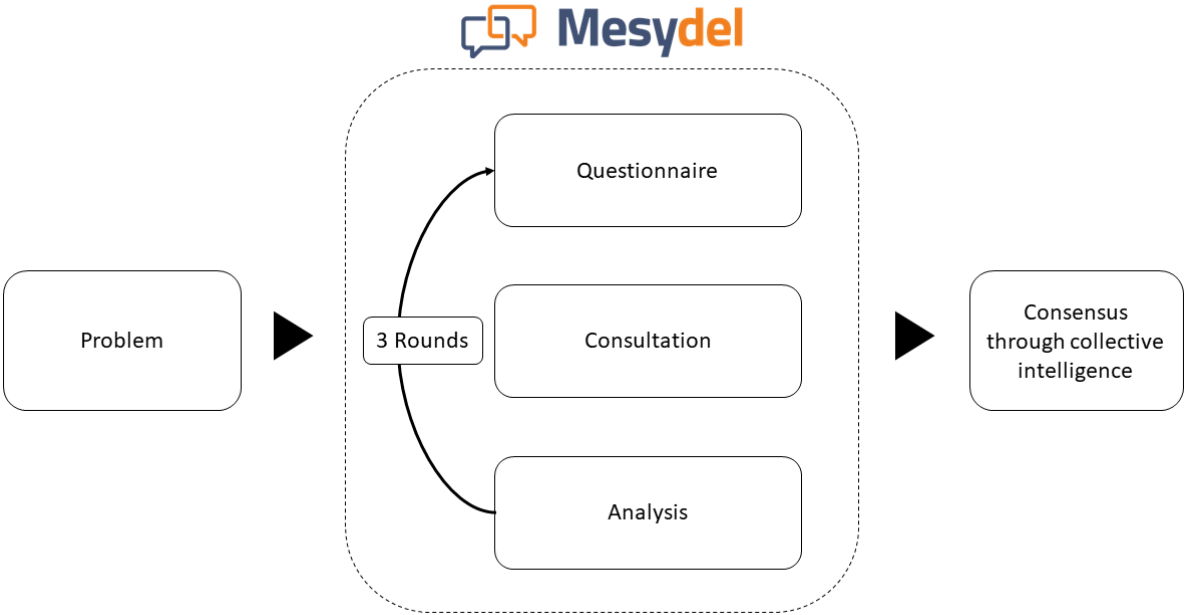


Figure 6. Conceptual diagram of Delphi process. Steps in dotted line were undertaken in the Mesydel software program.

6.3 Results

The results of this study are presented in the format of the final findings upon which consensus was achieved. For more details on the progression of results, see Appendix D5.

The final Delphi panel was comprised only of state and local government officials. Industry participants chose not to take part in the process. Round 1 comprised 10 of 15 participants. Round 2 comprised 6 of 15 participants. Round 3 comprised 6 of 15 participants.

Finding 1. All three domains (material, subjective, relational) are accounted for in marine and coastal strategic policy documents however wellbeing does not strongly influence the decision-making processes.

Finding 2. Material wellbeing is the most considered domain and is directly addressed within the marine and coastal planning systems.

Finding 3. Subjective wellbeing is implicit in the codified rules that guide marine and coastal planning for example implicit within planning codes and in strategic policy objectives. The subjective wellbeing effects for individual stakeholders of specific development proposals can be articulated through public representations, and based on these, subjective wellbeing can be considered in specific decisions.

Finding 4. Relational wellbeing is implicit within the local authority zoning process and the rules that codify appropriate coastal land use.

Finding 5. Relational wellbeing is implicit within the codified rules that guide marine planning processes in for example implicit within planning codes and in strategic policy objectives.

Finding 6. To more explicitly articulate subjective and relational wellbeing domains in the rules and planning processes would constitute a major overhaul of the existing planning system and would be constrained by the capacity to quantify (and therefore operationalise) measures for subjective and relational wellbeing.

Finding 7. Subjective and relational wellbeing assessment could be more explicitly considered in the following existing points in the marine development decision-making processes: setting of criteria for environmental impact statements (i.e. for the socio-economic section), submission of a proposal summary (notice of intent), stakeholder engagement activities and analysis, and during public representation phases.

Finding 8. Measuring and communicating the subjective and relational domains of wellbeing remain a challenge for incorporating those domains into decision-making. However, for the marine context, the environmental impact statement provides for assessment of recreational and social values through which those domains could be specifically articulated.

Finding 9. Local authorities can represent constituent needs with respect to subjective and relational wellbeing into marine development assessment processes through established engagement and public representations processes.

Finding 10. The current requirements for stakeholder engagement and public representation processes provide opportunity for subjective and relational domains to be expressed within the existing decision-making processes (marine and coastal). While this is technically accurate for public representations and hearings in coastal development, for the content of such representations to substantively influence decisions at this point, the existing rules governing this point of the process would need to be changed to invite consideration of subjective and relational domains.

6.4 Synthesis

6.4.1 Where and in what ways can local preferences (with respect to wellbeing) be explicitly considered in NW regional development decision-making?

These results of this study suggest that all three domains of wellbeing are already considered in NW development decision-making: in policy and strategy, in rule-setting and planning, and in proposal assessment.

It appears to be that the material domain is directly considered. Whereas consideration of the subjective and relational domains are considered to be implicit within the rules and processes involved in decision-making. To explicitly consider the latter two domains would require substantive change to existing decision-making structures.

6.4.2 What are the options for ongoing accountability for incorporating local preferences (regarding wellbeing) into regional development decision-making?

This study revealed three key points in current decision-making processes through which wellbeing criteria could be set. These included environmental impact assessments (incorporating stakeholder engagement), planning review processes (including public representations) and appeals processes.

However, a key barrier to incorporating wellbeing into industry and government decision-making relates to a lack of tools or processes through which to incorporate subjective and relational wellbeing. The participants felt that current stakeholder engagement and public representation processes already allowed for these domains to be expressed although questions remain regarding how such expressions are considered.

7 Discussion

7.1 Marine and coastal wellbeing

This project has identified and tested a number of ‘wellbeing domains’ in the NWest Tasmania. Wellbeing domains can be understood as something that is valued by a regional community (Table 7).

Table 7. Wellbeing domains as a proxy for what is valued in marine and coastal communities

Wellbeing dimension	Wellbeing domain
Material	Ability to have a good job (unpaid or paid)
	Health
	Education and skills
	Income and wealth
	Safety and security
Subjective	Culture and spirituality
	Personal connection with nature (emotional and physical effects of spending time in that place)
	Sense of place and my identity from this place and this community
	Freedom and choice
Subjective & Relational	The quality of the natural environment
Relational	Feeling part of a connected community (social cohesion)
	Participation as a citizen (be heard on political issues, join campaigns, vote, stand for election etc.)
	Experience of positive relationships
	Access to resources

The results of this study have revealed that wellbeing is integrally related to people’s positive experience of, and perceptions of, the coasts and ocean. This finding agrees with the substantial scholarly literature which states that there is a strong positive link between natural environments and wellbeing (see e.g. MacKerron and Mourato, 2013, Newton, 2007, Craig and Prescott, 2017). It has, in fact, been found that individuals feel more connected to nature and have improved health and wellbeing following visits to rural and coastal areas over urban green space (Wheeler et al., 2012, Wyles et al., 2019). If changes occur in the marine and coastal environments to which people are connected, their wellbeing will be affected.

Although material wellbeing was recognised, in the coastal communities we examined, stronger associations with the relational and subjective domains of wellbeing were held. Often, when governments and industries make the case for marine industry development and expansion, material wellbeing is the key focus. As an example, in Tasmania’s ‘Sustainable industry growth plan for the salmon industry’ (Department of Primary Industries, 2017) the first sentences of the executive summary notes job creation and economic impact and suggest that these are the benefits that flow to the community of such an industry. Similarly, in a media release by Tassal about Storm Bay developments, the company note the number of jobs the development will provide and the contribution to the economy (Tassal Group Limited, 2018). However, our findings suggest that this does not address those dimensions and domains of wellbeing that are of high importance to the communities in which marine industries operate. There is a risk that subjective and relational dimensions of wellbeing are overlooked because they need qualitative data to be understood. However, feedback from industry indicates that stakeholder audit processes seek to gather this information currently.

In the marine and coastal context, wellbeing, place and social connection are strongly linked. We identified strong associations between community culture (relational wellbeing), identity (subjective wellbeing) and the quality of highly valued marine and coastal places (relational and subjective). The sense of home, family and friends, intergenerational links associated with marine and coastal places were central the experience of wellbeing and figured strongly in determining how people described positive or negative industry development. This is similar to other findings in the literature (e.g. Gollan et al., 2019, Sangha et al., 2018) and draws attention to the social capital aspect of wellbeing and industry development (see Costanza et al., 2013). Bringing a social capital or social connection lens to assessing industry development and management of the marine environment is growing, as are calls for social data to inform marine governance (Barclay et al., 2017, Rasheed, 2020). The approach taken in this study could be adopted by industry members to identify social capital opportunities and risks in planning industry developments.

The most highly ranked domain of wellbeing was the quality of the environment, that is, the knowledge and

trust that the environment is in good order. This has been found elsewhere (e.g. Wyles et al., 2019, Marselle et al., 2015), with quality often being discussed in terms of aesthetics or attractiveness (Elwell et al., 2020), although our findings suggest that healthy ecosystem function and a healthy unpolluted environment are equally important. The role of environmental quality on subjective wellbeing has been well studied (see e.g. Orru et al., 2016, Yuan et al., 2018, Krekel and MacKerron, 2020). Subjective wellbeing has, in fact, been proposed as a valuation system for assessing environmental quality (Tang et al., 2020). This suggests that if industry is to consider how they may positively or negatively affect wellbeing, the impacts of the development or expansion on environmental quality (and how any negative impacts would be mitigated) should be framed in such a way as to consider not just physical change, but also change to the domains included within subjective and relational wellbeing dimensions.

7.2 Wellbeing and decision-making

This study revealed three key points in current decision-making processes through which wellbeing criteria could be set. These included environmental impact assessments (incorporating stakeholder engagement), planning review processes (including public representations) and appeals processes. Those broader mechanisms which could be used to integrate a wellbeing approach in public policy decision-making such as shaping budget discussions, legislation, strategic planning and performance frameworks, new institutional structures, and capacity building (Durand and Exton, 2019) were not considered, or were considered problematic due to a need to overhaul the system.

Research elsewhere has found that health and wellbeing impacts do not tend to be considered explicitly within environmental impact assessments (Harris et al., 2009), nor fully in planning appraisals, although environmental health issues such as pollution and noise do tend to be considered (Gray et al., 2011). In a detailed examination in New South Wales, Australia, some aspects have been considered indirectly regarding the identification of public health exposures associated with the physical environment, and to a lesser extent through identification of social and economic impacts (Harris et al., 2009). The consideration of wellbeing in such processes would clearly add value, but it is likely that the development of guidance and tools are required to ensure the inclusion of wellbeing considerations in such processes.

When it comes to the question of how to incorporate wellbeing into industry and government decision-making, a key concern appears to be the intangible nature of subjective and relational wellbeing. Subjective wellbeing is often measured through surveys, for example Study 2 referenced use of the 2016 Regional Wellbeing Survey run by the University of Canberra and it may be that the outputs from this survey could be considered by government/developers (although it is at quite a coarse scale). Subjective wellbeing is possible to measure quantitatively. Although human beings are a critical part of the social-ecological systems they are not widely recognized as key stakeholders in the EIA process (Beach et al., 2006, Dagiliute and Juozapaitiene, 2018). However, there appears to be little reason why EIAs could not incorporate subjective wellbeing surveys as part of the assessment process, provided they are granted the time/resource/assistance to do this. Whilst there may be a risk of mobilising political opposition, this may occur regardless.

Relational wellbeing is more difficult to address in such a context. It can be considered as process rather than state. It is substantive rather than evaluative. And it tends to be measured qualitatively rather than quantitatively (White, 2015). This is an area which needs further research to develop guidance and tools.

Planning decisions are now made through participation (negotiated outcomes facilitated and mediated by the planner) rather than the planner deciding based on preset assumptions about what matters and has value (highly normative rational models) (Lane, 2005). When it comes to planning review processes and planning appeals, citizens are invited to submit representations regarding marine and coastal developments. However, it has been argued that these methods of public participation in government decision making are not as effective as they could be, as they don't achieve broadscale participation across the community, often don't provide officials with information of use, and in many instances don't satisfy those making the representations or the public at large (Innes and Booher, 2000). It may be that affected parties do not have the resources to engage in this process and to make their voices heard regarding their wellbeing preferences. Proposed solutions to address such problems include digital technology such as apps which notify citizens of the potential of development change when they enter an area, and simultaneously allow them to give quick responses to prompt-questions (Wilson et al., 2019).

8 Conclusion

A key finding of this study is that specific marine and coastal places matter to wellbeing. This does not rule out the possibility of marine industry development and expansion in such areas as they can also have positive effects on place-based wellbeing. However, considering human wellbeing in the decisions that are made regarding these areas is likely to further enhance development options and reduce the risk of losing a social license to operate.

A key difficulty in considering wellbeing in the decision-making process is that the subjective and relational aspects of wellbeing are difficult to measure. They don't easily dovetail with customary socioeconomic quantitative measures. However, the tool we developed in this study to undertake a place-based wellbeing survey could be easily utilised by companies or government agencies to factor wellbeing into their decision-making.

9 Implications

Whilst an understanding of community wellbeing does not automatically reduce the risk of community objection to new and expanded marine activities, an understanding of how changes to the natural environment may affect different aspects of wellbeing may be critical to its reduction. The survey instrument provided in Appendix D of this report may provide a useful tool for industry members to examine wellbeing in other locations, assisting them to assess development options.

Furthermore, understanding the decision-points in which wellbeing can be considered provides direction and guidance to the industry regarding where they can undertake further assessment to ensure that wellbeing is a consideration in the development process.

It is difficult to quantify these benefits in terms of costs avoided (assuming costs arising from conflict), but the financial benefit for industry could be the difference between developing operations or not.

10 Recommendations

- Coastal and marine industries should not focus solely on how development promotes material wellbeing (i.e., jobs and income), but provide space for the subjective and relational components (and how the three dimensions are linked) of wellbeing early in planning discussions.
- When considering environmental-focused arguments against development, recognise that these may reflect concerns about psychological and social wellbeing, and not just reflect conservation, anti-development, or “NIMBY” arguments in the face of proposed change. Examining the psychological and social ties people experience with place early in consultations may draw out significant place connections out to inform siting and development options.
- Identify the psychological and social connections people hold with activities in place, as although it may seem as though the activity can be relocated – this may not always hold true.
- The survey used in this study provided some rich insights into wellbeing in particular communities. Coastal and marine industries may consider using such a survey instrument to undertake their own wellbeing consultations prior to greenfield site development or existing site expansion.

10.1 Further development

There are several areas where the findings from this research could be expanded further to assist marine industries.

- Identification of the connections between the marine environment and Tasmanian Aboriginal people’s experiences of wellbeing (which ought to be conducted in partnership with local Aboriginal people).
- The development of guidance and tools to measure relational wellbeing.
- How to consider relational and subjective wellbeing as part of an Environmental Impact Assessment
- How to set environmental thresholds or qualitative indicators of cultural characteristics that feature in wellbeing (e.g. wild, freely accessible)

11 Extension and Adoption

11.1 Direct project stakeholders

Semi-regular meetings (~ every 4 months) were held with project stakeholders to ensure that research components were shared and discussed, and that the industry could benefit from the knowledge outputs provided by this project.

Milestone reports were also sent to project partners and discussed at meetings.

11.2 Industry

To date, we have not engaged with the industry further than the project partners.

11.3 Government

Throughout the lifetime of this project, we have engaged with government, both state and local.

We provided initial presentations and update presentations on the project to the local councils of both case study locations:

- Introduction and project engagement (August 2019 and January 2020)
- Report back on survey findings (January and February 2021)

Future planned engagements include:

- Local Council workshop on incorporating wellbeing (August 2021, Clarence Council, Tasmania)
- Workshop on research findings with Local Government Association Tasmania
- Workshop with King Island Council on incorporating project findings into their strategic planning.

11.4 Research community

To communicate about this project with the research community, we published findings in an international peer-reviewed journal and presented at an international conference:

- Fudge, M., Ogier, E. and Alexander, K.A., 2021. Emerging functions of the wellbeing concept in regional development scholarship: A review. *Environmental Science & Policy*, 115, pp.143-150.
- Alexander, K.A., Fudge, M., Ogier E. 2021 'Wellbeing in a Blue World: linking regional development and human welfare'. Oral presentation, MARE People and the Sea XI. Online, 28 June – 2 July 2021
- Fudge, M., Ogier, E., Alexander, K.A. 2021 'Marine places, wellbeing and blue local economies'. Oral presentation, MARE People and the Sea XI. Online, 28 June – 2 July 2021

We expect that two further research papers will be published from this research.

11.5 Wider civil society

We used a couple of key online resources to communicate with wider civil society about this project:

- Firstly, we created a project page on www.bluegovernance.com/nw-community-futures where we provided information on what the project was about, why it was important, what we had been up to and our outputs.
- Secondly, we used the 'Blue Governance Lab' Facebook page to communicate about the project with wider civil society, particularly when communicating about the public survey. Several local community groups communicated with us about the project using this page.
- Also, as part of Science Week 2020, we participated in a Q&A session about the project at Smithton Library, which was broadcast on the Circular Head Science Big Gig Facebook page.

We also communicated with wider civil society using traditional media sources:

- ‘Marine survey for Circular Head’ Circular Head Chronicle, 22 August 2020
- ‘Do you love living by the sea? How good is your life? UTAS researchers are here to ask you why’ King Island Courier, 26 August 2020
- ‘Community Marine Futures Project’ Interview on King Island Radio 100.5 FM, 25 August 2020



Lastly, we communicated with wider civil society about the results of the project at a UTAS Cradle Coast-run ‘Café Lab’ held at Burnie Makers Market on 29 April 2021.

Future ongoing public engagement will include a photography exhibition (of those locations of importance for marine and coastal wellbeing) and public talks in Circular Head on project findings as part of the Circular Head Arts Festival (CHArts) which runs from 3rd September to 2nd October 2021.

Appendix A: References

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Appendix B: Project staff

Dr Karen A. Alexander (PI) is a Senior Lecturer in the Institute for Marine and Antarctic Studies and the Centre for Marine Socioecology. She combines human geography and environmental sociology to investigate the interactions between communities/societies and the marine environment. Karen's work focuses specifically on natural resource conflict and marine governance, and she is the author of *Conflicts over Marine and Coastal Common Resources*. She specialises in human dimension issues relating to marine spatial planning and the transition to a blue economy. Recently, her research has focused on societal support for emerging and expanding marine industries such as offshore renewable energy and aquaculture.

Dr Maree Fudge (CI) is a Research Fellow in the Institute for Marine and Antarctic Studies. She is interested in governance, decision-making, public policy, the political and institutional dimensions of marine social-ecological systems and changing processes of democratic legitimacy and political participation.

Dr Emily Ogier (CI) is a Marine Social Science Research Fellow at the Institute of Marine and Antarctic Studies. She is interested in the human dimension of marine systems, and the way this interaction is governed through formal institutions, markets and social processes. Her research focuses on public policy for marine resources and spaces, and the design of institutions and assessment processes that address the breadth of values, uses, communities, private and state actors. Her work has included a particular focus on fisheries and aquaculture sectors, although with increasing attention to the scope of the emerging blue economy, and the policy challenges arising from climate change and the political economy implications for benefit sharing and distributive justice.

Appendix C: Project materials

Knowledge-based outputs

As noted in section on Extension and Adoption, one peer-reviewed scientific paper has been published to date, with further manuscripts planned:

- Fudge, M., Ogier, E. and Alexander, K.A., 2021. Emerging functions of the wellbeing concept in regional development scholarship: A review. *Environmental Science & Policy*, 115, pp.143-150.

Further knowledge-based outputs specific to North West Tasmania can be found in Appendix D Supplementary materials. These include:

- A socio-economic analysis of wellbeing in North West Tasmania (Appendix D3)
- A survey analysis of place-based wellbeing in North West Tasmania (Appendix D4)

Process-based outputs

- Survey instrument which can be used to examine place-based wellbeing (in Appendix D2)

Appendix D: Supplementary material

D1 Studies included in literature review

Authors	Year	Title	Journal
Abdel-Latif et al.	2012	Egyptian coastal regions development through economic diversity for its coastal cities	HBRC Journal
Al-Roubaie	2018	Building capacity for knowledge economies in the Arab world: The role of human capital	International Journal of Engineering and Technology
Amos et al.	1981	Life Satisfaction and Regional Development: A Case Study of Oklahoma	Social Indicators Research
Arellano-Yanguas	2019	Extractive industries and regional development: Lessons from Peru on the limitations of revenue devolution to producing regions	Regional and Federal Studies
Barber & Jackson	2017	Identifying and categorizing cobenefits in state-supported Australian indigenous environmental management programs international research implications	Ecology and Society
Barkin	2012	Communities Constructing Their Own Alternatives in the Face of Crisis: Economic Globalization in Mountain Regions	Mountain Research and Development
Becker	2018	Help wanted: Health care workers and mental health services. An analysis of six years of community concerns from North Dakota's oil boom residents	Journal of Rural Studies
Beling et al.	2018	Discursive Synergies for a 'Great Transformation' Towards Sustainability: Pragmatic Contributions to a Necessary Dialogue Between Human Development, Degrowth, and Buen Vivir	Ecological Economics
Betz & Snyder	2017	Coal and family through the boom and bust: A look at the coal Industry's impact on marriage and divorce	Journal of Rural Studies
Brauers et al.	2010	Regional development in Lithuania considering multiple objectives by the MOORA method	Ukio Technologinis ir Ekonominis Vystymas
Brauers et al.	2009	Robustness in regional development studies. The case of Lithuania	Journal of Business Economics & Management
Bryan et al.	2010	Quantifying and Exploring Strategic Regional Priorities for Managing Natural Capital and Ecosystem Services Given Multiple Stakeholder Perspectives	Ecosystems

Busch et al.	2011	Conceptualizing the link between marine ecosystem services and human well-being: The case of offshore wind farming	International Journal of Biodiversity Science, Ecosystem Services & Management
Buse et al.	2018	Locating community impacts of unconventional natural gas across the supply chain: A scoping review	The Extractive Industries and Society
Carrington & Pereira	2011	Assessing the social impacts of the resources boom on rural communities	Rural Society
Chapman et al.	2015	The resource boom and socio-economic well-being in Australian resource towns: a temporal and spatial analysis	Urban Geography
Charnley et al.	2008	Forest Management Policy, Amenity Migration, and Community Well-Being in the American West: Reflections from the Northwest Forest Plan	Human Ecology
Chassagne	2018	Sustaining the 'Good Life': Buen Vivir as an alternative to sustainable development	Community Development
Chaves et al.	2018	Radical ruralities in practice: Negotiating buen vivir in a Colombian network of sustainability	Journal of Rural Studies
Ciommi et al.	2018	A new class of composite indicators for measuring well-being at the local level: An application to the Equitable and Sustainable Well-being (BES) of the Italian Provinces	Ecological Indicators
Davies & Tonts	2009	Economic Diversity and Regional Socioeconomic Performance: An Empirical Analysis of the Western Australian Grain Belt	Geographical Research
Dax & Fischer	2018	An alternative policy approach to rural development in regions facing population decline	European Planning Studies
de Waroux & Chiche	2013	Market Integration, Livelihood Transitions and Environmental Change in Areas of Low Agricultural Productivity: A Case Study from Morocco	Human Ecology
Dixit	2010	Market-led growth and well-being - Gujarat, 1980-2005	Journal of Developing Societies
Ejdemo & Soderholm	2015	Wind power, regional development and benefit-sharing: The case of Northern Sweden	Renewable and Sustainable Energy Reviews
Esteves	2008	Mining and social development: Refocusing community investment using multi-criteria decision analysis	Resources Policy
Fernando & Cooley	2016	An oil boom's effect on quality of life (QOL): Lessons from western North Dakota	Applied Research Quality Life

Feyeh	2016	Nature parks as instruments for sustainable integrated regional development: Review of a survey of opinions from stakeholders in Luxembourg	Parks
Fulford et al.	2017	A Keyword Approach to Finding Common Ground in Community-Based Definitions of Human Well-Being	Human Ecology
Giovannini	2014	Indigenous community enterprises in Chiapas: A vehicle for buen vivir	Community Development
Green et al.	2019	Exploring the relationships between local agrifood system resilience, multiple measures of development, and health in the Southern United States	Community Development
Guirdioloa & Garcia-Quero	2014	Buen Vivir (living well) in Ecuador: Community and environmental satisfaction without household material prosperity	Ecological Economics
Holmes & Cavanagh	2016	A review of the social impacts of neoliberal conservation: Formations, inequalities, contestations	Geoforum
Huggins & Thompson	2015	Culture and Place-Based Development: A Socio-Economic Analysis	Regional Studies
Huggins & Thompson	2012	Well-being and competitiveness: are the two linked at a place-based level	Regions, Economy & Society
Karst	2017	"This is a holy place of Ama Jomo": buen vivir, indigenous voices and ecotourism development in a protected area of Bhutan	Journal of Sustainable Tourism
Kohler et al.	2017	Participative Spatial Scenario Analysis for Alpine Ecosystems	Environmental Management
Kubizewski et al.	2015	Estimates of the Genuine Progress Indicator (GPI) for Oregon from 1960-2010 and recommendations for a comprehensive shareholder's report	Ecological Economics
Lu et al.	2004	A scenario exploration of strategic land use options for the Loess Plateau in northern China	Agricultural Systems
Mcmanus & Connor	2014	What's mine is mine (d): Contests over marginalisation of rural life in the Upper Hunter, NSW	Rural Society
McRuer & Zethelius	2017	The difference biocultural "place" makes to community efforts towards sustainable development: Youth participatory action research in a marine protected area of Colombia	International Review of Education
Michalek & Zarnekow	2012	Application of the Rural Development Index to Analysis of Rural Regions in Poland and Slovakia	Social Indicators Research
Monni & Pallottino	2015	A New Agenda for International Development Cooperation: Lessons learnt from the Buen Vivir experience	Development

Morgan et al.	2016	Fracked: Coal seam gas extraction and farmers' mental health	Journal of Environmental Psychology
Newey & de Oliveira	2019	Wellbeing as Emergent from the Leveraging of Polarities: Harnessing Component Interdependencies	Social Indicators Research
Nguyen et al.	2017	Mining, development and well-being in Vietnam: A comparative analysis	The Extractive Industries and Society
Nicsic et al.	2018	Revealing residents' shared values through crowdsourced photography Experimental approach in participatory urban regeneration	Urbani Izziv
Ogwang et al.	2018	Impacts of the oil boom on the lives of people living in the Albertine Graben region of Uganda	The Extractive Industries and Society
Ohlan	2013	Pattern of Regional Disparities in Socio-economic Development in India: District Level Analysis	Social Indicators Research
Ozdemir & Gul	2019	Measuring development levels of NUTS-2 regions in Turkey based on capabilities approach and multi-criteria decision-making	Computers & Industrial Engineering
Ozkan & Schott	2013	Sustainable Development and Capabilities for the Polar Region	Social Indicators Research
Palomo et al.	2011	Participatory scenario planning for protected areas management under the ecosystem services framework: The Doñana social-ecological system in Southwestern Spain	Ecology and Society
Perrons & Dunford	2013	Regional development, equality and gender: Moving towards more inclusive and socially sustainable measures	Economic and Industrial Democracy
Phelan et al.	2017	Evaluation of social externalities in regional communities affected by coal seam gas projects: A case study from Southeast Queensland	Ecological Economics
Poudyal et al.	2019	Local residents' views of surface mining: Perceived impacts, subjective well-being, and support for regulations in southern Appalachia	Journal of Cleaner Production
Randell	2016	The short-term impacts of development-induced displacement on wealth and subjective well-being in the Brazilian Amazon	World Development
Rodrigues-Filho et al.	2013	Regional sustainability contrasts in Brazil as indicated by the Compass of Sustainability – CompasSus	Environmental Science & Policy
Rolfe	2007	Lessons from the social and economic impacts of the mining boom in the Bowen Basin 2004-2006	Australasian Journal of Regional Studies
Ruddel	2011	Boomtown policing: Responding to the dark side of resource development	Policing

Sangha et al.	2018	An ecosystem services framework to evaluate indigenous and local peoples' connections with nature	Ecosystem Services
Sangha et al.	2019	Repurposing government expenditure for enhancing Indigenous well-being in Australia: A scenario analysis for a new paradigm	Economic Analysis & Policy
Segre et al.	2011	Well-Being in Italian Regions. Measures, Civil Society Consultation and Evidence	Social Indicators Research
Shaker	2018	A mega-index for the Americas and its underlying sustainable development correlations	Ecological Indicators
Silva & Ferreira-Lopes	2014	A Regional Development Index for Portugal	Social Indicators Research
Sorensen et al.	2007	Changing governance of Australian regional development: Systems and effectiveness	Space & Polity
Tomaney	2017	Region and place III: Well-being	Progress in Human Geography
Tonts & Jones	2007	From state paternalism to neoliberalism in Australian rural policy: Perspectives from the Western Australian wheatbelt	Space & Polity
Tubadji et al.	2015	Culture-based development in the USA: culture as a factor for economic welfare and social well-being at a county level	Journal of Cultural Economics
Walde et al.	2019	A protected area between subsistence and development	International Journal of the Commons
Walsh	2010	Development as Buen Vivir: Institutional arrangements and (de)colonial entanglements	Development
Wang et al.	2017	Linking land use change, ecosystem services and human well-being: A case study of the Manas River Basin of Xinjiang, China	Ecosystem Services
Wilmsen	2016	After the Deluge: A longitudinal study of resettlement at the Three Gorges Dam, China	World Development
Zang et al.	2017	Integrated sustainable development evaluation based on human well-being indices and pressure indices: A case study of the South China Sea Neighboring Countries	The Social Science Journal
Zhen et al.	2009	Comparison of sustainability issues in two sensitive areas of China	Environmental Science & Policy

D2. Survey instrument

Preamble

We are researching how the sea and coast affect wellbeing and how these experiences can be taken into account in decisions about regional marine and coastal development in Circular Head / King Island. We are interested in how you think about your wellbeing, and if marine and coastal places play a part in your wellbeing. When we say wellbeing we mean your experience of a good life, it might include good health, good friends, enough money and other things that matter to you. We have 7 questions in this survey. Please note that the second question involves some map software so that you can show us the places that mean the most to you.

Are you aged over 18 years? YES / NO

[If no] I'm so sorry we are only surveying people aged over 18 years [EXIT SOFTWARE]

[If yes] Do you live in Circular Head / King Island i.e. you are not a visitor to the area.

[If no] I'm so sorry but we are only surveying people who live in the area. [EXIT SOFTWARE]

[If yes] Please read our information and consent form. If you would like to clarify any aspects of this survey before starting please call Karen Alexander on 6226 4869 or email maree.fudge@utas.edu.au

Q1. What is wellbeing to you?

These terms refer to parts of wellbeing, we want to understand which are most significant to you in your life.

Could you please rank these in order of importance to you – 1 = the most important to you, 10 = least important to you. Choose as many or as few as you like

Aspects or parts of wellbeing	Importance to me
Ability to have a good job (unpaid or paid)	
Health	
Education and skills	
The quality of the natural environment	
Safety and security	
Feeling part of a connected community (social cohesion)	
Culture and spirituality	
Participation as a citizen (e.g. be heard on political issues, join campaigns, vote, stand for election etc.)	
Experience of positive relationships	
Access to resources	
Personal connection with nature (e.g. emotional and physical effects of spending time in that place)	
Sense of place and my identity from this place and this community	
Freedom and choice	
Income and wealth	
Other things we haven't asked about –	

Q.2 We now want to understand which marine/coastal places have the most meaning for you, and that might increase your experience of wellbeing

Q.2.1 Can you please show me on this map the places that have particular meaning to you?

[Instructions]

Click on the green marker, move the marker to places that have meaning for you and important to your wellbeing and click the tick. You can mark your top three places. When you have finished placing all markers, please click "Done" to save and exit the exercise.

Q2.2. Where you have just placed the marker, please tell me the name of the point

Q2.3 Where you have just placed the marker, what type of activity you associate with that place/What do you most often do there? You can choose up to 3 most significant activities.

- Walking (or equivalent)
- Swimming
- Diving

- Surfing
- Boating (recreational)
- Fishing
- Looking and photographing
- Camping
- Family activities
- Work – Fishing
- Work – Diving
- Work – Tourism
- Other – please specify

Q.3 - Now I'd like to understand which is the *most* important of those these places to you.

Q.3.1 Which one would you say is your number 1 special place?

Q.3.2. Please tell me why that particularly important to you

Q.3.3. Have you got a favourite quick story about its importance to you?

Q.4. Now we'd like to get a sense of how this particular place (marker b) influences your sense of wellbeing?

Q.4.1 Do any of these options [drop down menu] reflect how you experience wellbeing in this place (where you have placed the marker b).

DOMAINS OF WELLBEING

Q.4.2 If none of these are right for you, how would you describe it?

Q.5. What kinds of changes to this place might take away from your experience of wellbeing here?

Q.6. Is there anything else you'd like to tell me re marine/coastal places and wellbeing?

Q7. To finish the survey, would you be willing to share some basic demographic information about yourself? None of this will identify you, it is just so we can see if there are any patterns across this community. Y/N

7.1 Gender

- Male
- Female
- Non-binary
- Prefer not to say

7.2 Age

- Persons - 18-19 years
- Persons - 20-24 years
- Persons - 25-29 years
- Persons - 30-34 years
- Persons - 35-39 years
- Persons - 40-44 years
- Persons - 45-49 years
- Persons - 50-54 years
- Persons - 55-59 years
- Persons - 60-64 years
- Persons - 65-69 years
- Persons - 70-74 years
- Persons - 75-79 years
- Persons - 80-84 years
- Persons - 85 and over

7.3 Highest year of school completed.

- Completed Year 12 or equivalent (%)
- Completed Year 11 or equivalent (%)
- Completed Year 10 or equivalent (%)
- Completed Year 9 or equivalent (%)
- Completed Year 8 or below (%)
- Did not go to school (%)
- Completed higher education (e.g. TAFE or University of other professional qualifications)

- Highest Year of School Completed - Not stated (%)

7.4 Usual occupation

- Managers (%)
- Professionals (%)
- Technicians and trades workers (%)
- Community and personal service workers (%)
- Clerical and administrative workers (%)
- Sales workers (%)
- Machinery operators and drivers (%)
- Labourers (%)
- Not currently working in paid employment

7.5 Usual household income

- Persons earning \$1-\$499 per week (%)
- Persons earning \$500-\$999 per week (%)
- Persons earning \$1000-\$1999 per week (%)
- Persons earning \$2000-\$2999 per week (%)
- Persons earning \$3000 or more per week (%)
- Persons earning nil income (%)

7.6 Length of time resident

- Less than 2yrs
- 2-5yrs
- 6-10yrs
- 11-20yrs
- More than 20yrs
- I've always lived here

You have finished the questionnaire – thank you very much for your responses! Before you SUBMIT your answers please review them carefully and make any changes you want.

After you have submitted your responses you will not be able to withdraw or change anything you have provided to us. This is because we do not keep any information that will identify you in the questionnaire – we won't be able to tell which responses are yours.

If you are happy to go ahead and submit your responses, please let us know by choosing one of the following statements:



I have reviewed my answers and am ready to submit them. I understand that after click the SUBMIT button on the next page that I cannot change or withdraw my answers



I am ready to submit my responses. I understand that after I click the SUBMIT button on the next page that I cannot change or withdraw my answers

Thank you so much for your time. If you'd like to see our research report, please contact Maree Fudge by email to maree.fudge@utas.edu.au

D3. Full socio-economic analysis

Employment

The employment domain of wellbeing considers the ability to get a good job.

An analysis of unemployment rates for both regions, in comparison with the whole of Tasmania, shows that both regions have slightly lower unemployment rates compared to the state.

In the 2019 December quarter:

- the unemployment rate in the Circular Head Council area was 4.4%
- the unemployment rate in the King Island Council area was 1.7%
- the unemployment rate for Tasmania was 6.3%

A low unemployment rate can indicate an affluent area with a high rate of access to jobs, or a place where those who can't find jobs leave the area.

Employment in Circular Head and King Island is dominated by primary industries, with agriculture, forestry and fishing, and manufacturing clearly underpinning the economies of both regions. In 2018/19, agriculture, forestry and fishing generated 1099 FTE jobs in Circular Head and 250 FTE jobs in King Island. Figure 1a displays the composition on industry clusters in Circular Head whereas Figure 1b displays the composition for King Island. In Circular Head, a few industries provide a larger share of employment relative to the rest of Tasmania in 2017 (location quotients exceeding 1), including: agriculture, forestry and fishing, manufacturing, and mining – although the latter two have seen a decrease in the amount of employment between 2013-17. The former is likely dominated by dairy farming given that Circular Head is Tasmania's largest dairy area with more than 30% of the State's dairy farms. For King Island, all industries provide a smaller share of employment relative to the rest of Tasmania.

Some industries appear to be fast-growing. In Circular Head, these are industries such as rental, hiring and real estate, and health care and social assistance. In King Island this is clearest regarding arts and recreation, but also the case for professional, scientific and technical occupations, accommodation and food, and finance and insurance. These may be key industries for future employment in these regions.

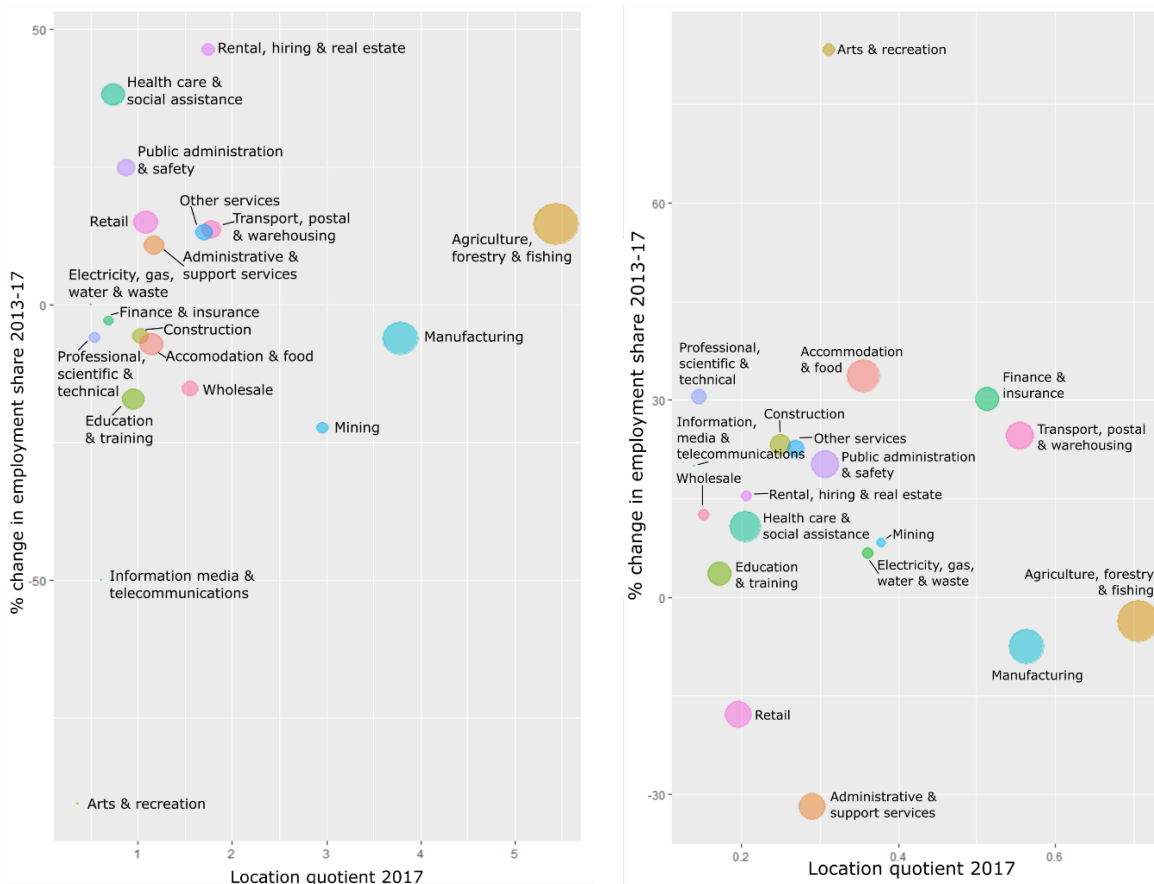


Figure 1a (left) and 1b (right). Cluster concentration (occupational location quotient comparing region and state) and cluster growth (percentage-point change in employment share between 2010 and 2017). Bubble

size represents cluster share of Circular Head area employment in 2017. Figure a) Circular Head; Figure b) King Island. Derived from ABS data.

Unsurprisingly perhaps, given the key industries in Circular Head and King Island, most occupations sit within the roles of labourers and managers (Figure 2). Professionals, community and personal services, and clerical and admin services are all at a lower level in both regions than across the state.

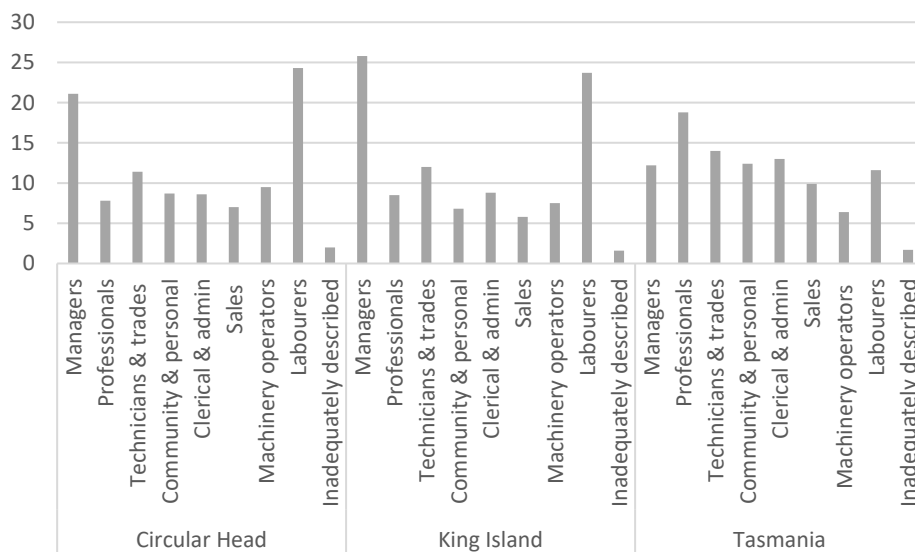


Figure 2. Comparison of the types of occupations between Circular Head LGA, King Island LGA and Tasmania as a whole. Data from ABS.

Health

Residents of rural and remote communities often have poorer health outcomes than their regional and urban counterparts. In Tasmania, however, the health status of rural Tasmanians is generally equivalent to that of regional Tasmanians.

According to the 2020 Circular Head Community Health Check:

- 78% of residents rated their health as 'excellent', 'very good' or 'good' (81% across Tasmania)
- 20.2% of residents were classed as obese (24.3% across Tasmania)
- 29.2% of residents consumed two or more alcoholic drinks per day (38.8% across Tasmania)
- 29.3% of residents were a current smoker (15.7% across Tasmania)
- 7% of adults held high or very high levels of psychological distress (11% across Tasmania)

According to the 2020 King Island Community Health Check:

- 77% of residents rated their health as 'excellent', 'very good' or 'good'
- 7.6% of residents were classed as obese
- Data were not available for drinking habits, smoking habits, or levels of psychological distress

King Island Taxpayers are more likely to hold private healthcare, but the percentage of taxpayers with private care has increased over time for both regions (Figure 3). In Australia, Medicare is a government scheme which gives access to health care (paid for by taxes), and so private health insurance is an optional cover which may be taken to out provide more choice when it comes to healthcare, to help to avoid financial penalties for high-income earners, or to reduce the burden on the public system¹. Whichever the reason, this suggests that health is important to residents of Circular Head and King Island.

¹ <https://theconversation.com/explainer-why-do-australians-have-private-health-insurance-38788>

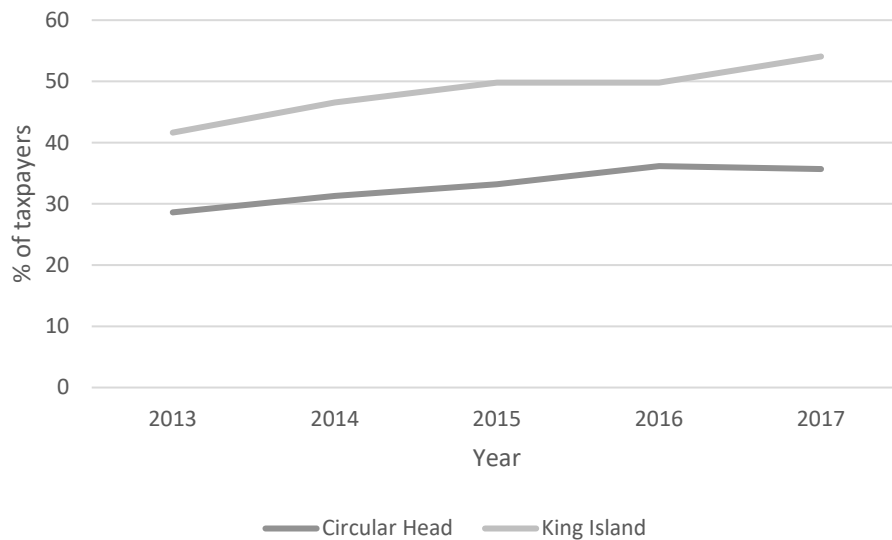


Figure 3. Comparison of rates of taxpayers who report having private health insurance between 2013 and 2017 in Circular Head LGA and King Island LGA. Data from ABS.

Education and skills

In both regions, the proportion of residents that have completed Year 12 of high school (or equivalent) is lower than the state average (Figure 4). This is particularly the case for Circular Head, where 16% fewer than the state average reaches this level of education.

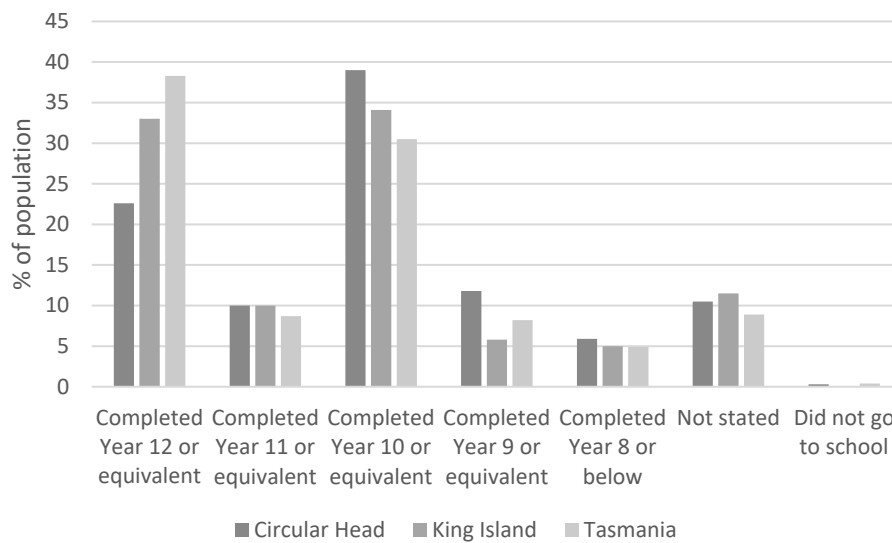


Figure 4. Level of schooling per proportion of population in 2017 in Circular Head LGA and King Island LGA. Data from ABS.

In 2011–12, the Programme for the International Assessment of Adult Competencies (PIAAC) was developed to provide a greater understanding of the availability of key skills in society and their use at work and at home, in participating countries, including Australia. This program revealed that 49% of Tasmanians were assessed at Level 3 and lower for literacy, and 59% below level 3 in numeracy, with level 3 described as the minimum required for individuals to meet the complex demands of everyday life and work.

In 2016, only 12% of Circular Head residents and 19% of King Island residents undertook tertiary education (Figure 5).

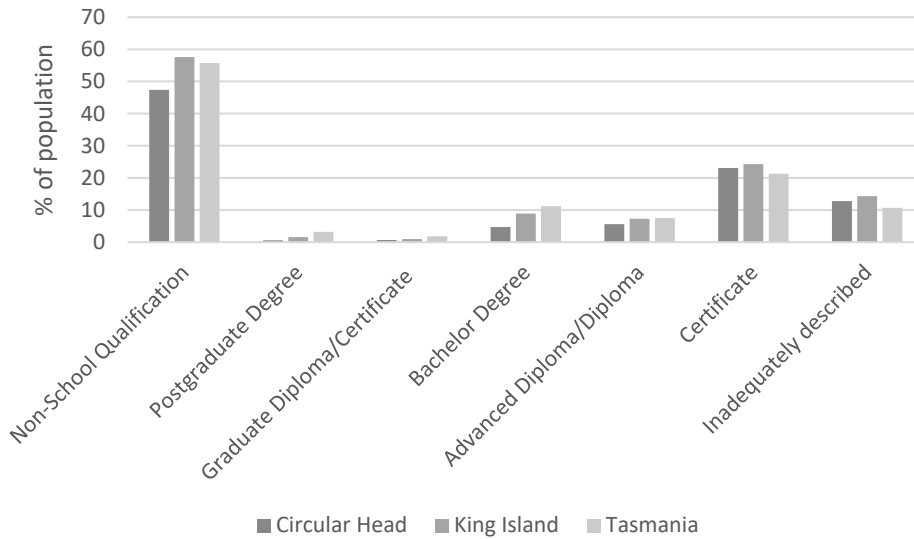


Figure 5. Comparison of levels of education achieved between Circular Head, King Island and Tasmania. Data from ABS.

In both regions, the most commonly studied fields were:

- Engineering and Related Technologies (Circular Head = 15.7% in 2017; King Island = 20.1% in 2017) and
- Management and Commerce (Circular Head = 11.4% in 2017; King Island = 11.3% in 2017).

Such fields of study fit well with the industries and the types of occupation in both regions.

In the Regional Wellbeing Survey, when asked about access to education (e.g. schools, distance education and vocational training), 14.4% of respondents believed access to be poor, 6.8% of respondents felt access was neither poor nor good, and 78.8% believed that access was good. This indicates that it is not a lack of access that is preventing people from Circular Head and King Island from obtaining secondary and tertiary education.

The quality of the natural environment

Higher population densities can put stress on air and water quality, as well as exacerbating habitat loss. Nowhere in Tasmania is considered densely populated, but the Circular Head and King Island regions are particularly sparsely populated with densities of 1.6 persons per square kilometre in the former, and 1.5 persons per square kilometre in the latter, and this has not changed much in recent times (Figure 6). Therefore, population density is unlikely to affect the quality of the natural environment.

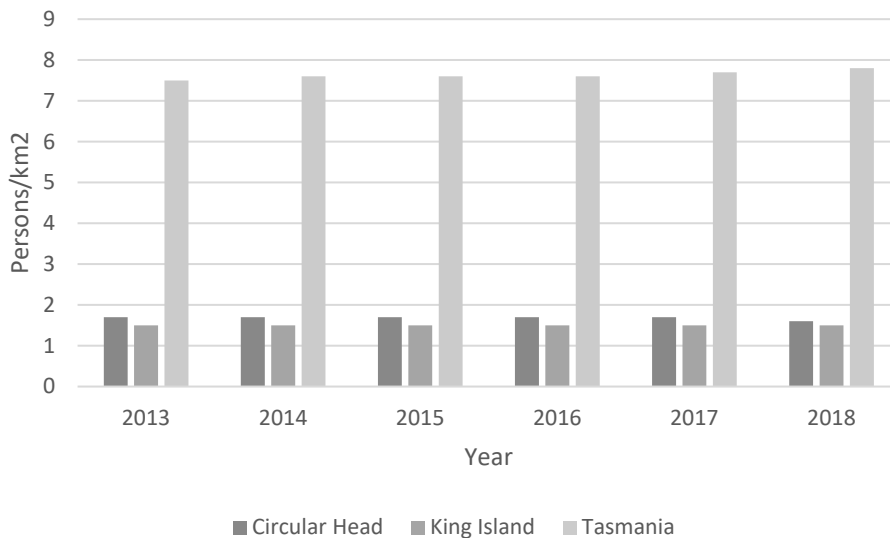


Figure 6. Comparison of population density between Circular Head LGA, King Island LGA and Tasmania. Data from ABS.

Australia's only Baseline Air Pollution Station is at Cape Grim in Circular Head, meaning this area has some of the cleanest (unpolluted) air in the world. Since the station first began measurements in 1976, carbon dioxide levels have increased by more than 20%, methane has increased by 23% and nitrous oxide has increased by 10%².

In the 2017-18 Recreational Water Quality Annual Report, Circular Head Council noted that while there has been an improvement of water quality in some bodies, permanent signs remain in place advising against primary contact activities at these sites due to previous non-compliance. On King Island, the Council did not conduct sampling during the 2017-2018 season, nor in several years previously, and in 2014-15 it was noted that this was due to an absence of pollution.

As of 2018, 37.7% of Circular Head regional surface was classed as protected area, split between indigenous protected area (0.1%), National Park (2.2%) and Other protected areas (35.4%). These areas include Rocky Cape National Park, Perkins Island Conservation Area, The Nut State Reserve and Preminghana Indigenous Protected Area. In King Island, 15.8% of regional surface was classed as protected area in 2018; comprised of National Parks (7.1%), Nature Reserves (0.2%) and Other protected areas (8.2%). These areas include Lavinia State Reserve, Seal Rocks State Reserve, Sea Elephant Conservation Area and Colliers Swamp Conservation Area.

In the Regional Wellbeing Survey, participants from Cradle Coast NRM region perceived the health of the environment to score a mean of 3.3 (with 1 being poor and 7 being good). The key problems considered to be big included:

- soil erosion (39% of respondents considered it a big problem),
- vegetation loss (42.9% of respondents),
- declining numbers of animals or birds (57.5% of respondents),
- invasive weeds (59.5% of respondents)
- feral animals (38.9% of respondents)

Safety and security

No indicators of safety and security are available for either region specifically. Burnie Magistrates Court is the closest court to both locations and the one most likely to deal with crimes from these regions. Data from records in 2019³ shows that most crime consists of misdemeanours. These include: common assault (263 counts), stealing (253 counts), breach of family violence order (237 counts) and driving whilst not holding a license (200 counts).

In the Regional Wellbeing Survey, participants from Cradle Coast NRM region perceived crime and safety in the local community to score a mean of 3.9 (with 1 being low levels of safety and 7 being high levels of safety).

- 33.6% of participants believed that people in the community drank too much
- 21.4% believed that people in the community abused drugs
- Over half of respondents (54.9%) believed that there was a high crime rate in the community
- 81.9% of respondents agreed that the community was a safe place to live

Social cohesion

Social cohesion refers to the extent of connectedness and solidarity among groups in society. It consists of two main components: the sense of belonging of a community and the relationships among members within the community itself.

Social cohesion can be difficult to measure outside of perceptions surveys. As such, all findings in this section come from the Regional Wellbeing Survey and comprise responses from participants across the broader Cradle Coast NRM region.

Participants perceived their sense of belonging to score a mean of 5.1 (with 1 being low sense of belonging and 7 being high).

- 67.3% of people felt welcome in their location
- 59.4% felt part of the community
- 19.7% felt like an outsider

² <https://research.csiro.au/acc/capabilities/cape-grim-baseline-air-pollution-station/>

³ <https://www.peter-johnson.com.au/TasmanianCrimeStatistics?Year=2019&Court=BUR>

The extent of involvement in the local community was scored as a mean of 3.5 (with 1 being low levels of involvement and 7 being high levels of involvement). Several items were investigated:

- 33.9% of residents were regularly involved in arts or cultural events
- 50.5% of residents regularly attended community events
- 27.3% of residents regularly attended meetings of local clubs
- 24.5% of residents took part on sports groups or teams

Participants also perceived community wellbeing to score a mean of 5.3 (with 1 being low levels of wellbeing and 7 being high levels).

- 82.6% of participants agreed that their community was a great place to live
- 61% felt that the community coped well when faced with challenges
- 77.6% of participants agreed that they felt proud to live in the community
- 62.8% of residents agreed that the community had a bright future
- 74% agreed that there was a good community spirit where they lived

Culture and spirituality

Little data is available regarding culture and spirituality. However, when it comes to religious affiliation, 2016 census data shows that in both Circular Head and King Island, the majority of residents perceive themselves as either Christian or non-religious (Figure 7). In Circular Head, this amounts to 87% of the population and in King Island this totals 88% of the population.

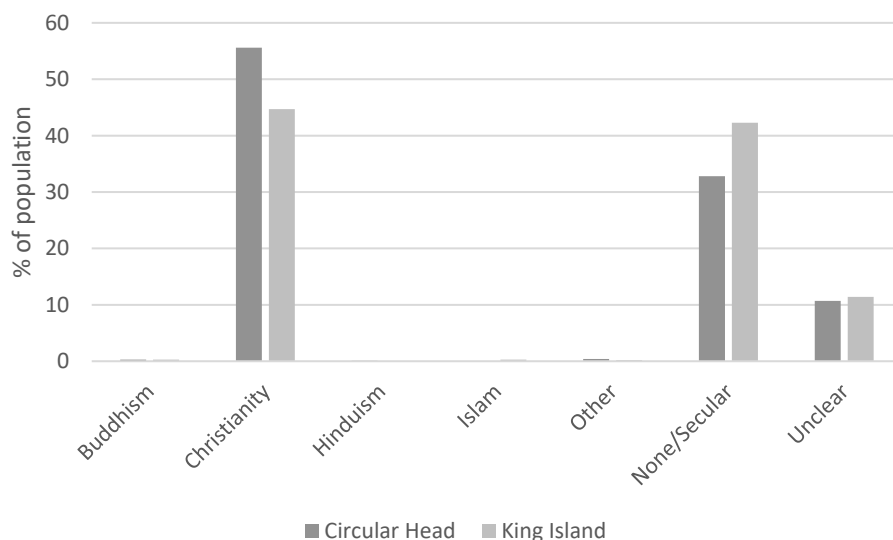


Figure 7. Rate of religious affiliation in Circular Head LGA and King Island LGA in 2016. Data from ABS.

Participation as a citizen

Several indicators can give a sense of participation as a citizen. We have been able to identify data for three such indicators.

The first indicator of participation relates to the undertaking of voluntary work for an organisation or a group. The 2016 census shows that in Circular Head 23.7% of the population takes part in voluntary work, and in King Island 33.8% of the population takes part in voluntary work. The Regional Wellbeing Survey suggested that participants from Cradle Coast NRM region regularly volunteered 26.6% of the time, and occasionally volunteered 40.6% of the time.

Also in the Regional Wellbeing Survey, 55.5% of participants from Cradle Coast NRM region agreed that they could get involved in local decision-making processes if they wanted to as opposed to 27% of residents who believed that they couldn't.

Finally, voting in local council elections is not compulsory in Tasmania (unlike State and Federal elections). Therefore, this can also be an indicator of the level of participation as a citizen. In the 2018 Circular Head Council Elections 67.1% of electors returned their ballot papers. In the 2018 King Island Council Elections, 82.9% of King Island electors returned their ballot papers. In both cases this shows a high level of participation.

Experience of positive relationships

It is difficult to quantify the experience of positive relationships. Divorce rates (Figure 8) are below the State average (10.3% in 2016), and separation rates are about the same as the State average (3.5%). Furthermore, 7% of families in King Island and 9% of families in Circular Head are one parent families with dependent children. Of course, it is not possible to know whether this is caused by particularly negative experiences of relationships.

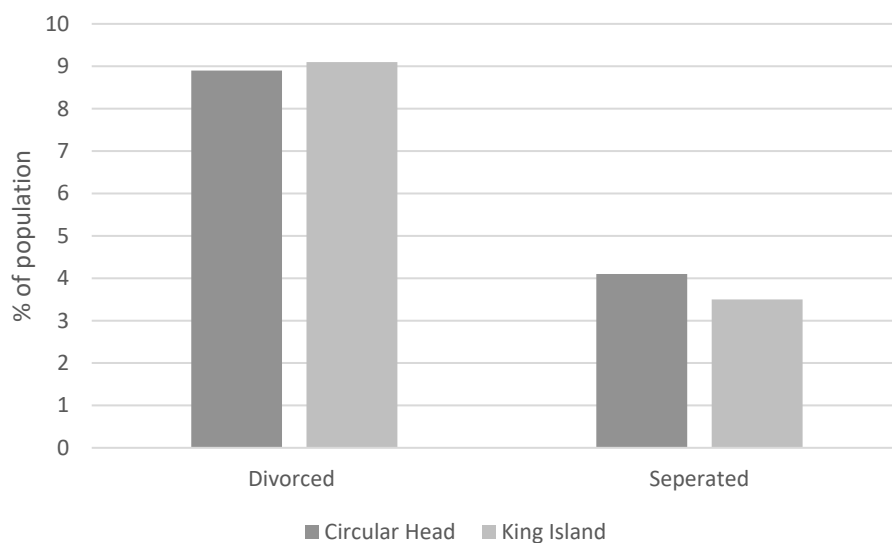


Figure 8. Percentage of population who are divorced and separated in Circular Head LGA and King Island in 2016

According to the Regional Wellbeing Survey, residents in Cradle Coast NRM give their personal relationships a mean score of 72.1 (with 0 being completely dissatisfied and 100 being completely satisfied). When it comes to spending time with friends and family, residents of the region gave a mean score of 4.4 (with 1 reflecting low levels of informal social connectedness and 7 reflecting high levels). In both instances, respondents gave scores which were slightly lower than other regions except for NRM North. This suggests that this regions' residents' experience of relationships is slightly less positive than the state as a whole.

Access to coastal and marine resources

Very little quantitative data is available to use as a proxy for access to coastal and marine resources in Circular Head LGA and King Island. What is available relates largely to fishing. According to the TSIC Seafood Industry Workforce profile in 2017, 14% of wild-catch fishery license holders live in the West and North-west. Also, in 2017 the north-west coast attracted 11% of the overall recreational fishing effort (fisher days).

Individual income and wealth

The median employee income trend has been similar between Circular Head and King Island, with the King Island median rising slightly quicker over more recent years (Figure 9). For Circular Head, it has increased from \$37,646 in 2013 to \$40,989 in 2017. For King Island it has increased from \$37,201 to \$45,201 per annum. The mean employee income sits at around \$3,000 more in both cases. Unfortunately, the data was not available to enable a comparison with Tasmania as a whole.

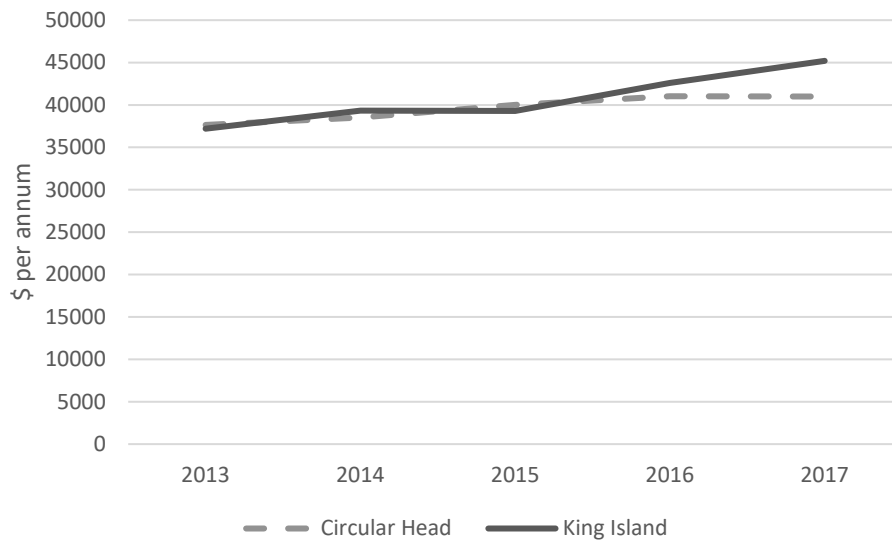


Figure 9. Trend in median income per annum in Circular Head LGA and King Island.

In 2016, 33.1% of people living in Circular Head were learning \$499 or less per week and 26.5% of King Islanders were earning \$499 or less per week. In 2016, the poverty line (50% of median income) for a single adult was \$426.30 a week.

In 2017, 68.5% of Circular Head LGA residents owned their home (34.7% were owned outright). In the same year, 63.6% of King Islanders owned their own home (40.2% owned outright).

According to the Regional Wellbeing Survey, residents in Cradle Coast NRM ranked their household financial wellbeing at a score of 3.7 where 1 was the lowest level of financial wellbeing and 7 was the highest level of financial wellbeing. These values were based on a combination of household income and self-rated financial wellbeing where respondents were asked: 'given your current needs and financial responsibilities, would you say that you and your family are...'prosperous, very comfortable, reasonably comfortable, just getting along, poor, very poor'. Alongside NRM North, this was the lowest value across the state.

Regarding perceptions of financial distress, Cradle Coast NRM residents ranked a score of 1.1 for financial distress where 0 meant no financial distress and 4 was the highest level of financial distress. 'The financial distress measure was calculated based on the response to the question 'in the last year, did any of the following happen to you because you didn't have enough money?': (i) Had to delay or cancel non-essential purchases e.g holiday, going to a restaurant or movie, buying clothes; (ii) Could not pay bills on time e.g. electricity, rent, gas; (iii) Went without meals, or was unable to heat or cool home; (iv) Asked for financial help from friends or family; (v) None of these. The mean score for Cradle Coast NRM was the highest of all NRM regions.

D4. Full survey analysis

Whose wellbeing?

299 adults from the general population across the case study (i.e. Circular Head LGA and King Island LGA) participated in the survey. However, because respondents were able to skip responses, we identified a usable sample of 174 responses (those who answered all wellbeing related questions). Not all 174 respondents answered every demographic profile question, meaning that the response numbers for each demographic profile element is slightly different (varies between 162 and 168 respondents). However, we expect that the % trend would remain the same even with additional demographic responses included. Table 1 presents the breakdown of responses by LGA. As can be seen, we received proportionally more responses from King Island residents than from residents of Circular Head. We analysed all data by LGA as well as a combined sample and identified no substantial differences in the results that would necessitate applying a weighting to the findings.

Table 1: Number of survey respondents per LGA (n=174)

LGA	Number of responses	Percentage of responses	LGA % of sample
KI	74	42%	17%
CH	100	58%	83%

The gender split of respondents was similar across the Circular Head and King Island areas (Figure 1) with a clear bias towards female respondents.

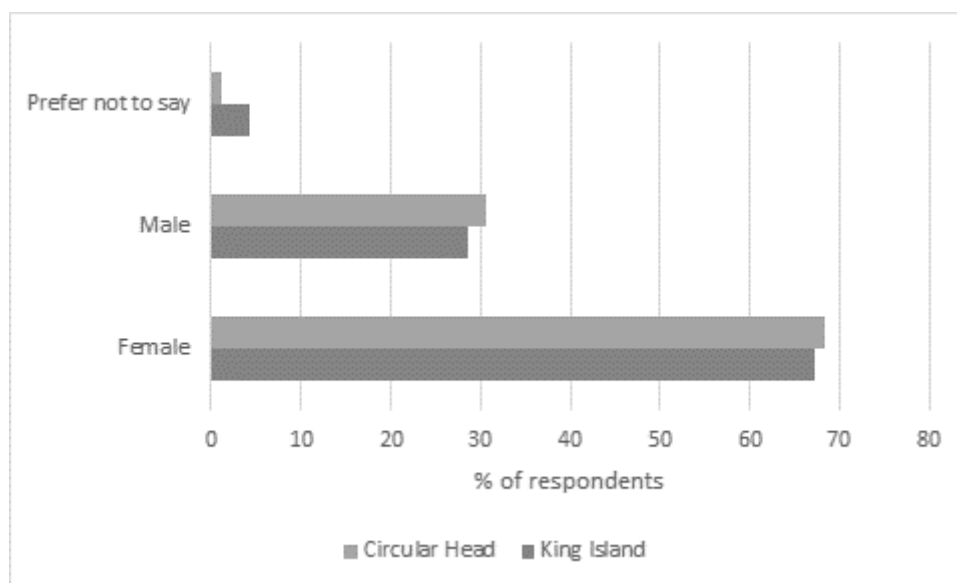


Figure 1: Gender profile of the population sample (n=168)

In both locations, the number of participants who had lived in the area for more than 20 years or forever far outweighed those who had been there less than 20 years (Figure 2).

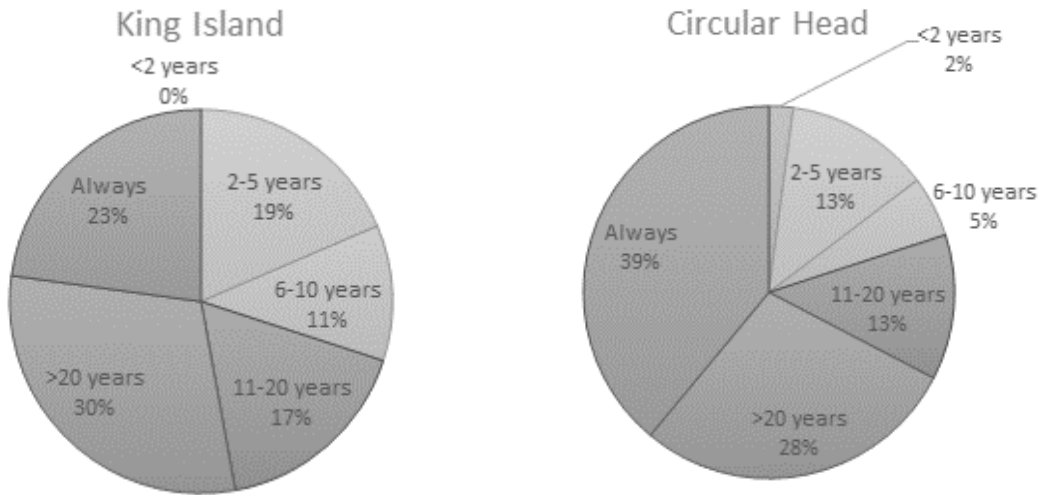


Figure 2: Length of time respondents have lived in LGA areas (n=165)

Most respondents were aged between 35 and 44 years, with most respondents spread quite evenly across the 45 to 54yrs, 55 to 64yrs and 65 to 74yrs age groups (Figure 3). Very few King Island respondents were aged under 34 years, this is a potential gap in the data.

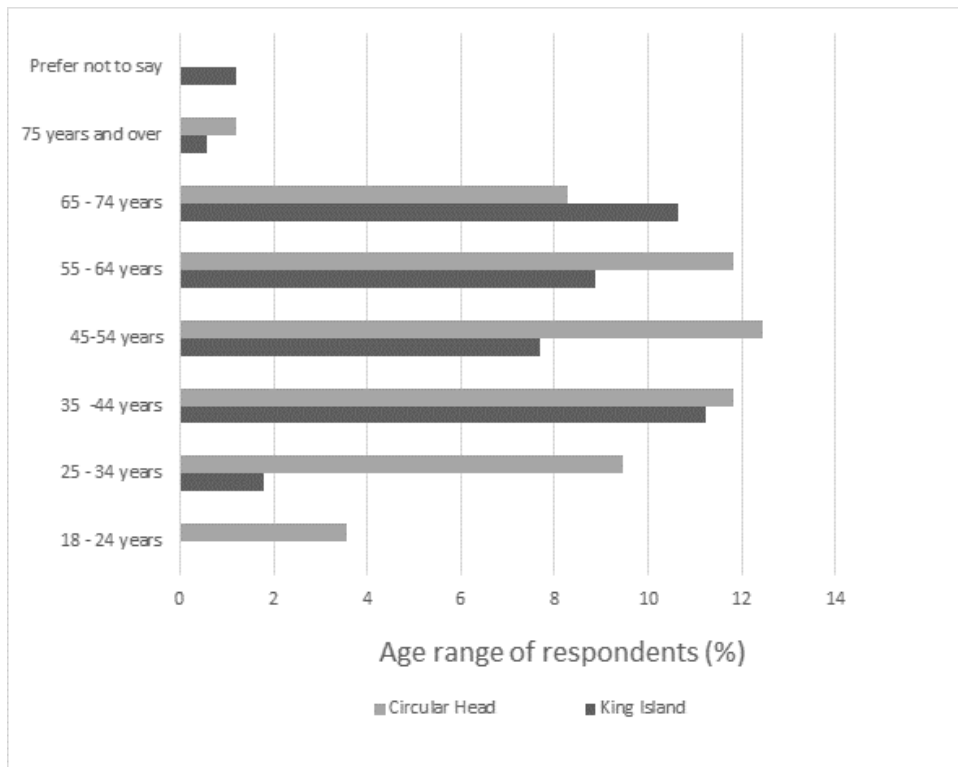


Figure 3. Age of respondents per region.

Most respondents to the survey had received higher education, with all who selected an option (other than 'prefer not to say') attending at least until year 9 of high school (Table 2). This indicates a bias in respondents as the proportion of residents that have completed Year 12 of high school (or equivalent) is lower in these areas than the state average.

Table 2: % educational attainment of respondents by LGA (n=168)

Education	Higher education	Year 12 (or equiv)	Year 11 (or equiv)	Year 10 (or equiv)	Year 9 (or equiv)	Year 8 (or equiv)	Did not go to school	Prefer not to say
King Island	28	5	1	7	1	0	0	0
Circular Head	34	5	5	12	1	0	0	1

Slightly fewer respondents were prepared to answer the question about income level than for the other demographic profile questions (Figure 4). Of those that did respond, the majority live on incomes between \$500 and \$1999 per week.

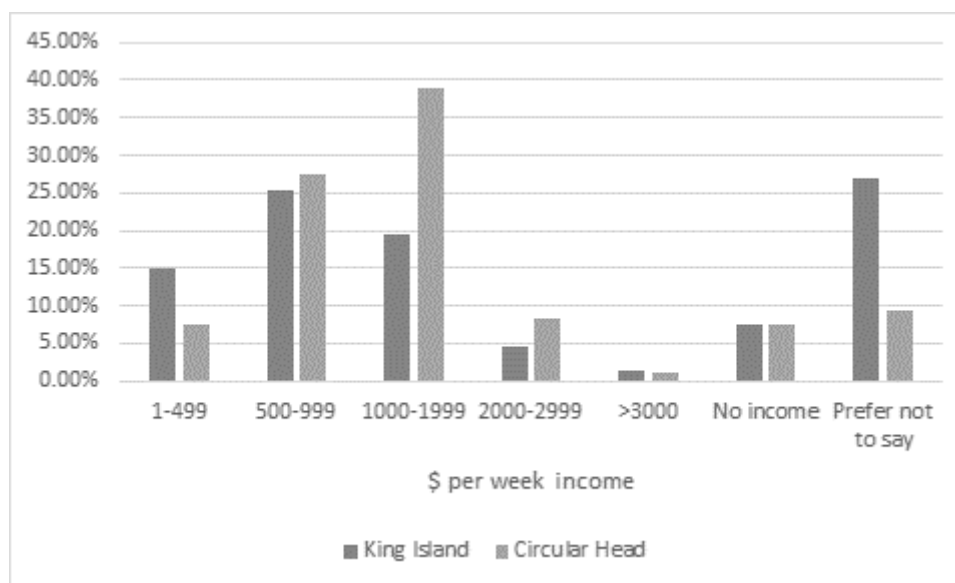
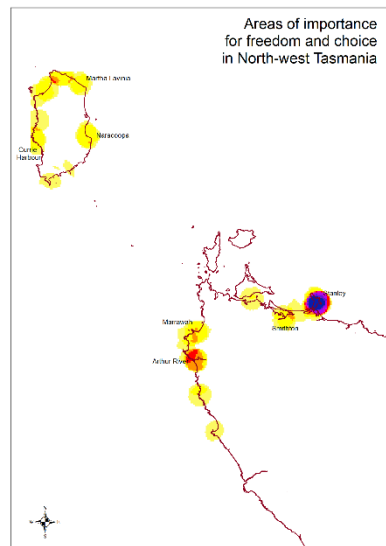
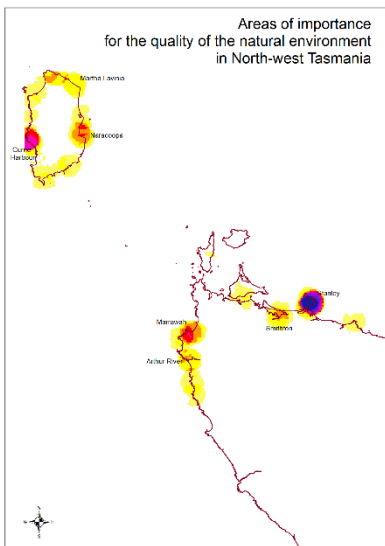
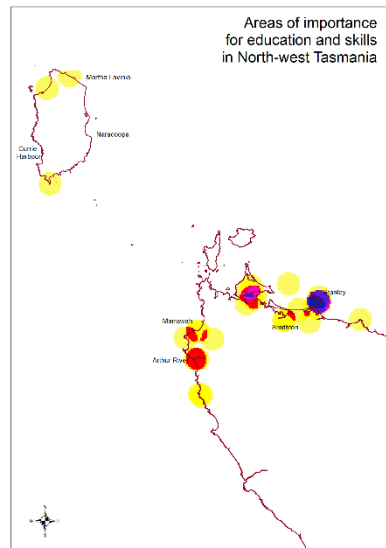
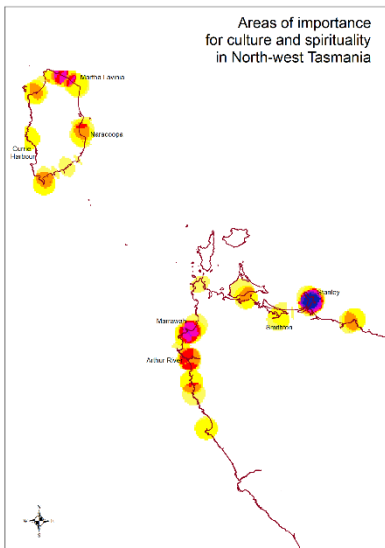
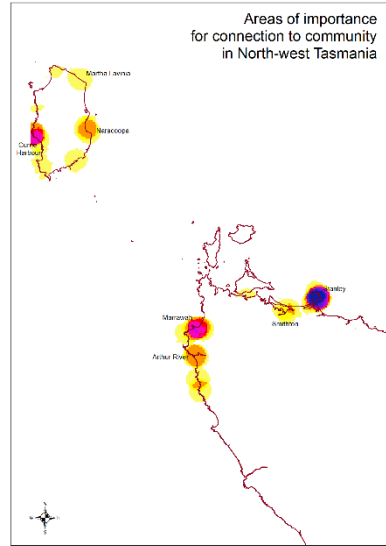
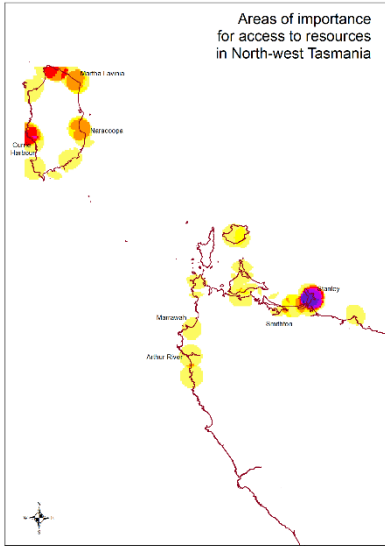


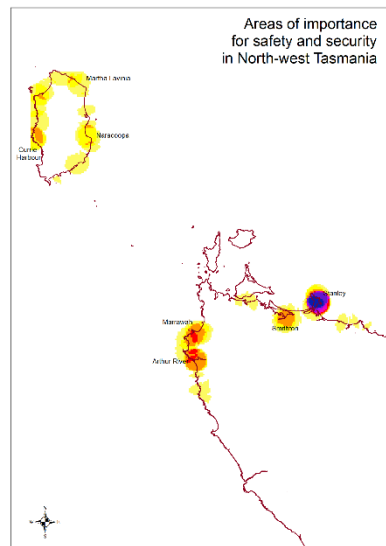
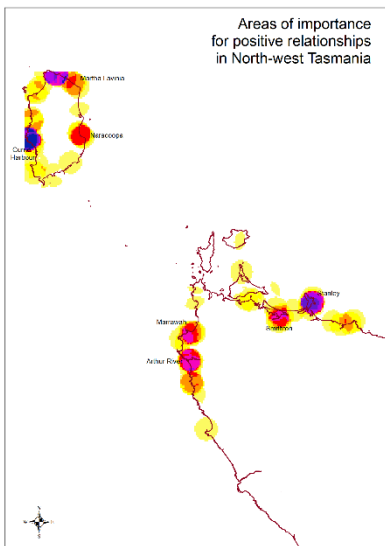
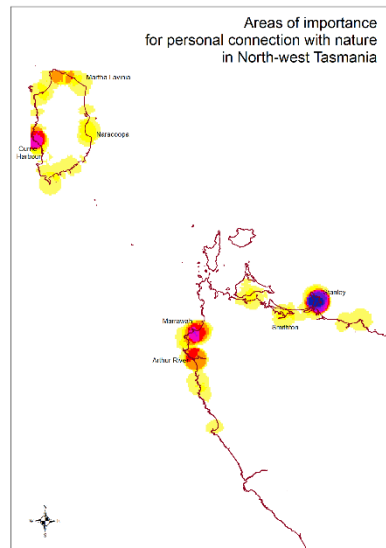
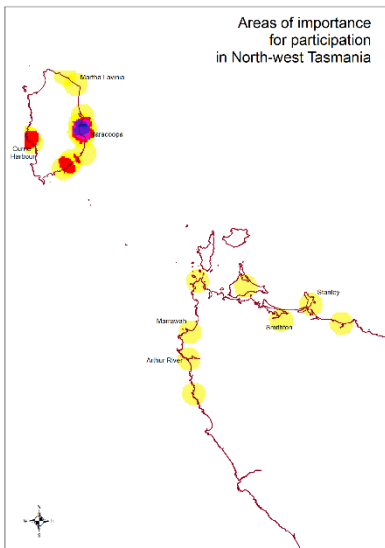
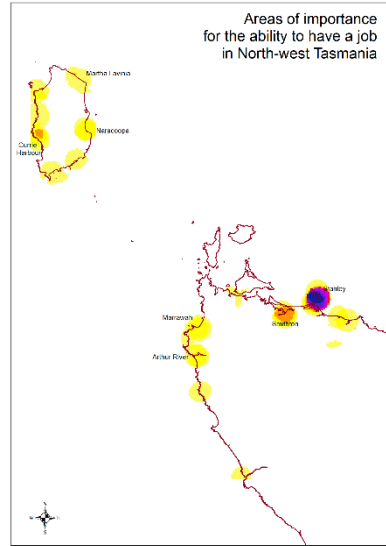
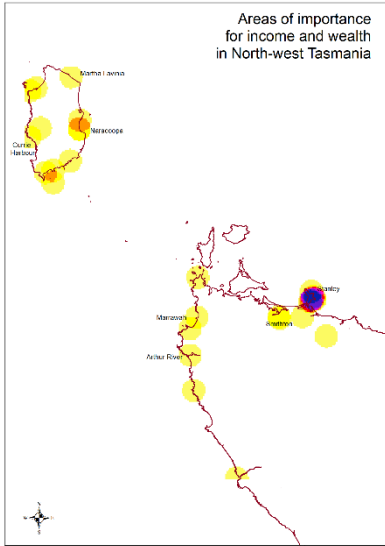
Figure 4: Income profile of respondents by LGA (n = 162)

Wellbeing in a marine and coastal context

Places of importance for marine and coastal wellbeing

It is clear from the wellbeing mapping component of this study that distinct locations are important for various aspects of wellbeing. For example, as shown in Figure 5 in Circular Head Stanley is considered important for all aspects of wellbeing (except for participation). On King Island, Martha Lavinia is considered important for access to resources, culture and spirituality, personal connection with nature and positive relationships.





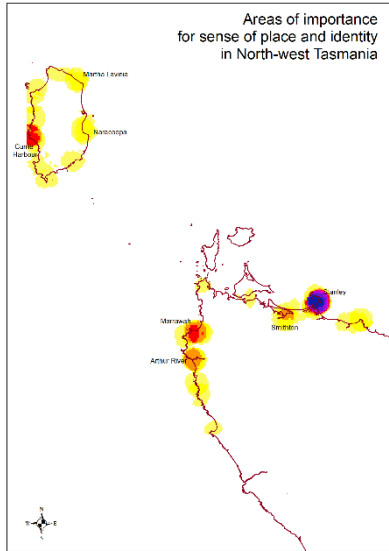


Figure 5. Heatmaps for each of the wellbeing indicators. These maps were based on participant input regarding which domains were linked to the areas the participant considered most important for their wellbeing.

The quality of the natural environment was the domain most frequently associated with significant places. This is an interesting wellbeing component as it expresses the feelings of wellbeing that are derived from *knowing* the environment is in a positive state. As such this indicates that the state of the environment is significant to the respondents. The second most frequently identified component was the personal connection with nature. In both cases the natural environment is at the centre of respondents' experience of wellbeing. These findings resonate strongly with those of the previous section, placing the quality of the natural environment, in this case the marine and coastal areas, as highest amongst the values of the survey respondents.

A group of five responses sitting below the top two point to strong associations between the quality of the community and the marine and coastal places. These were:

- sense of place and identity from the place and community
- safety and security
- freedom and choice
- feeling part of a connected community, and
- experience of positive relationships.

Taken together, these components paint a picture of a connected, secure community as strongly associated with the marine and coastal environment. Social connection, which featured strongly in the previous section, is common to three components in this group (sense of place and identified from the place and community; feeling part of a connected community and the experience of positive relationships). Freedom and choice associated with the marine and coastal environment is somewhat of a surprise, but if interpreted in the context of the top two components (the quality of the natural environment and the personal connection with nature) it suggests that autonomy and freedom experienced through living in and engaging closely with the marine and coastal environments are strong aspects of the cultural landscape of both communities (King Island and Circular Head).

Responses for three components were similar: culture and spirituality; access to resources and the ability to have a decent job.

The least mentioned components as associated with the marine and coastal environment were education and skills, income and wealth and political agency. A simple cross tabulation query was conducted to identify the most commonly co-occurring wellbeing components, that is where a respondent identified both components in their response. These were:

- Personal connection with nature and the quality of the natural environment
- Sense of place and identity and the quality of the natural environment
- Sense of place and identity and personal connection with nature
- Safety and security and personal connection with nature
- Safety and security and quality of the natural environment.

Each of these components were in commonly cited and are clearly also strongly associated. This grouping indicates the strength of the personal or individual experiences of wellbeing in the environment, and the significance of the marine environment in identity or sense/experience of self. If so, this may indicate

sensitivity is required for development of the marine and coastal environments that risks detracting from the quality of the environment or access to the environment.

Secondly, a grouping of co-occurrences was evident around the component 'Feeling part of a connected community':

- Personal connection with nature
- The quality of the natural environment
- Sense of place and identity
- Safety and security.

Finally, the 'Freedom and choice' component featured moderately but consistently across all components and figured most strongly in associated with 'Personal connection with nature'.

Key themes of wellbeing significance

We identified five themes of wellbeing significance based on respondent descriptions of why a specific place was important to them: environmental or nature connection; social connections; individual experience; cultural significance; and a small number of livelihood associations (Table 3).

Environmental or nature connection theme from descriptions that referenced the environment as comprising the significance to the respondent. The qualities of isolation and solitude were linked with ease of access and the sense of freedom as aspects of the 'wild' or 'natural' environment that are significant in the experience of wellbeing. Many descriptions, such as that following, emphasised the beauty, wild, untouched, or pristine characteristics of the marine and coastal environment as central to their significance to the respondent:

Home, and pure clean beauty, untouched and free

Concerns about the kinds of development and extent of development of significance places was linked by many to these wild or untouched qualities of the natural environment, for example:

Because it's the last frontier and we don't need it to be locked up

Social connections comprise descriptions that referred to experiences with other people as the core reason the place is significant. Home, family, and friends were the most commonly descriptions provided and ranged from memories to current sense of home. Intergenerational experiences, from childhood memories to raising families were central to the connections between social connection and places as demonstrated in the following quotes:

Childhood memories, my own children growing up here, building my own house.

Years of camping, fishing, muttonbirding, beach combing, diving, boating. So many things! Basking in the serenity. This feels like home to me.

The connection between the environment and family life i.e., spending time as a family in the environment, was highly valued for creating positive family experiences and establishing a home. Time with friends and family was also frequently mentioned in connection with recreational activities such as camping, surfing, snorkelling, kayaking, and fishing.

Being part of a community was also intricately linked to the marine environment for many respondents. In these narratives, the marine environment created a context of togetherness, though recreational activities, but also through the small size of the community, meeting in the environment such as the beach, and the draw of common values with respect to the marine environment.

Table 3: Description of 'significance' themes. As these were qualitative free-text descriptions, a number are linked to more than one theme.

Environmental or nature connection	Social connection	Individual experience	Cultural meaning	Livelihood
Nature / the environment	Community	Memories	Culturally rich	Small scale marine based work
Beauty	Home	Sense of freedom	Heritage	Lifeblood of the area
Wildlife interactions	Cultural practices	Isolated, remote, solitude	Custodian	Sustainability and local ownership
Wild place	Intergenerational connections	Clear your head	Initiation	Untouched by human activity
Untouched by industry	Lifeblood of the area	Recreational activities	Spiritual	
Accessible, not built out	Raised family	Creative expression	Intergenerational connections	
Clean safe peaceful	Recreational activities	Healing		
Has a magical feel	Time with family and friends	Identity		
Isolated remote solitude		Offers positive challenges		
No other place like it		Spiritual		
Sense of freedom		Wildlife interactions		

Alongside social connections, the individual's experience connected with marine and coastal places showed up as highly significant. Amongst the experiences we found the feeling of freedom, solitude, spiritual connection and "recharging" or mental health, such as expressed in the following:

It is an ideal place to walk and photograph the beach, a shallow place to paddle and walk the dog and it has a secluded beach as well as the port to watch the unloading of the ferry. It is the ideal place to recharge your emotional batteries.

The expression used to describe the connection was often deeply psychological and emphasised that the significance of the marine environment goes beyond just enjoying the scenery as can be seen in the quote below:

Beach covered in shells bearing testament to the life under those waves. It is the peaceful part of the island when the storms are raging... our environmental church with domes and arches of aqua blue.

Cultural significance comprised two main elements: heritage connections and cultural richness. These connections had both and intergenerational connection and were linked to current activities, for example:

It is where I come to fish, swim, enjoy family time and it is part of my heritage that has been handed down.

Referencing both Aboriginal and colonial/settler heritages, respondents described honouring the past associated with the marine environment, in terms that indicate the past actively informs contemporary identities.

Livelihood connections. Here we saw respondents identifying sustainability, local ownership and a sense of the places being 'untouched by industry' as central to the significance of the place or the region. The

following quotes show these qualities in the respondents' own words:

This place equals futures and survival, it is the most beautiful natural forest in the world and something that is what I believe is tasmainias (sic) biggest draw card and uniqueness that makes us shine bright in this world

Sustainability and local owned is the ONLY way to keep it our future. (emphasis in the original)

How do respondents perceive that changes in marine industry will affect their wellbeing?

Which changes would enhance your experience of wellbeing in this place?

There were fewer mentions of changes that would enhance people's experience of wellbeing compared to those that would detract from the experience. The most frequently mentioned change was development, followed by improved environmental management. The full range of suggested changes are set out in Table 4.

Support for development as enhancing wellbeing and the marine and coastal places was associated with a sensitivity to the culture of the area (as discussed in the previous section) and with sustainability in mind for example this was expressed by one respondent as follows:

Sensitive development and positive progress would add to.

A group of respondents suggested strengthened industry regulation and management would assist in enabling development while keeping it 'sensitive' and appropriate. We noted that in most cases, interest in development read more as a general wellbeing strategy rather than directly or specifically linked by the words used with wellbeing in the marine and coastal places. An example of this can be seen in the following quote:

Better spent council money, concentration on tourist attractions to bring money into our town.

Responses identifying improved environmental management as a positive change focused on protecting marine habitats and the coastal zone including restricting vehicles access to beaches. For example:

I feel restrictions on vehicles on beaches could be a positive, especially in during the breeding season for many seabirds. It makes me mad seeing tyre marks above the high tide mark where people know there could be nests.

Finally, we noted that many of the comments in this category were more focused of general wellbeing rather than specifying a link with enhancing wellbeing associated with marine and coastal places. These themes were: increased public services (e.g., medical services), Less roadkill, More cultural experiences, and Police presence on the west coast.

Which changes would detract from your experience of wellbeing in this place?

The four most frequently mentioned overarching themes were consistent for both case study sites (Table 5). These were: development, destruction of or damage to the natural environment; restrictions to public access to the environment; and recreational uses. The remaining themes were quite descriptive and less related to the development of marine industries per se.

Development was by far the most identified potential effect on wellbeing and comprised 4 sub- themes.

(1) *General concerns about unspecified development* had two main threads to it. Firstly, concerns about the impact of any further development on the quality of the environment itself, and secondly, that regardless of the kind of development, *any* would detract from the wild and isolated qualities of the environment that underpin those respondents experience of wellbeing.

(2) *Population increases* were identified as potentially undermining the connectedness of the local culture, driven by increased tourism and urban development rather than marine industry development. Here people were worried about changes to the atmosphere and enjoyment of the small quiet community and quiet coastal environments that underpins their experiences of wellbeing.

(3) *The introduction of industrial aquaculture (fish farms)* concerned respondents in two ways: the impact on water quality and condition of marine ecosystems were prominent; and trust concerns regarding the

truthfulness of decision-making (approval) processes *and* the environmental effects of industrial aquaculture.

(4) Similarly concerns regarding the *introduction of wind farms* included the environmental impact of a specific and controversial proposal and the trustworthiness of the decision-making process. These concerns were solely from Circular Head responses and may be linked to a proposal under consideration at the time of the survey. The proposal is for a large-scale wind farm on Robbins Island, a place holds significance for many people despite being privately owned. The trust concerns regarding the decision-making process centred on concerns that decision-makers would preference industrial development over the connections and significance of Robbins Island for local people, and that the negative impacts on the communal wellbeing components would not be valued in the face of industry development for private gain.

Concerns about the destruction of nature included development-related worries: pollution and debris in the water and the coastal zones; bush clearing and the loss of coastal and marine habitats due to the exploitation of marine resources for commercial gain. Some concerns were voiced about erosion of beaches and other climate change effects, and the lack of environmental management resources to deal with these. Others still referred to the negative effects of recreational uses particularly vehicles (motorbikes or 4WD) and a lack of respect for the environment in the attitudes of some.

Restriction of access to marine and coastal places was prominent for both case study sites, and reflects the wellbeing theme of the freedom, wildness and isolation discussed in the previous section. Any kind of change that would stop locals from their current valued activities and significant experiences was rejected, for example:

Lack of public access as it currently exists and is respected, would be a tragedy.

The main potential drivers of restricting access identified were development (discussed above), conservation or heritage protection (i.e., increased state-managed parks or protected sites) and private ownership. Finally, and linked with the previous points in this section, respondents voiced concerns about the effects of some recreational uses of marine and coastal environments. Prominent here were the loss of solitude, the destruction of nature due to motorbikes or 4WD vehicles in the bush or on the beaches or illegal fishing. Some tension was evidence within responses where people confronted the trade-off between the environmental effects of free access against the principle of free access. Overall, the balance came down on the side of free unrestricted access as can be seen in the following quote:

I dislike the use of motorised vehicles on the beach but understand other's needs to use the beach for this purpose. I would not want to see the beach locked up.

D5. Synthesised results of Delphi process

Round 1 Delphi survey

This round aimed to examine participants opinions regarding how wellbeing was considered in various parts of the marine industry decision-making process, which domains could not be considered and why, and what amendments would be required to incorporate wellbeing into the process. This data was then used to develop propositions which provided the basis for Round 2.

Question 1. Tasmanian planning system

Relational and subjective wellbeing

These are not easily reflected in the statutory instruments but are more readily reflected in the policy and strategic documents (at any scale) for example a strategic plan.

These domains can be checked at the local level after the statutory material requirements are assessed.

Public representations are important points when these domains are taken into account.

Representations and engagement in actual assessment processes but also in rule setting and plan making are points important points at which these domains of wellbeing could be considered.

Members of the public do not always use the opportunities for engagement in the process and in regional communities do not always have the capacity to represent these wellbeing domains.

Environmental impact assessments are formal points at which these domains can be considered if so determined by the relevant agency or planning authority (and allowable under the process rules).

Relational wellbeing is implicit within the zoning process and establishment of appropriate land use. This means that zone objectives and future character statements for example are points at which relational wellbeing is taken into account.

Material wellbeing

Material wellbeing is most prominent and specifically dealt with in the planning scheme.

The other wellbeing domains are built on material wellbeing, and it is up to people in decision-making positions to ensure material wellbeing is interpreted ethically to account for relational and subjective wellbeing.

Question 2. Local planning authority

Subjective wellbeing

Planning is based on 'public' issues rather than individual issues (subjective wellbeing).

Relational wellbeing

Local level decision making may be able to take this into account if it is a discretionary process.

Zoning provisions and requirements are spatial expressions of relational wellbeing.

This can be considered at appeals and consultation stages, but not all members of the public know how to make wellbeing domains present through their appeals or representations.

At the local scale, appeals or representations that address wellbeing domains are treated as not serious or not relevant to the legislative considerations.

General observations

Subjective or relational wellbeing cannot be considered at the point of development applications (local planning authority).

Wellbeing domains need to be addressed in objective-setting and strategic policy scales.

Developments in the marine environment can not be influenced at the local planning authority scale.

Gaps in the flowchart

Integration with environmental assessments under the EMPCA.

Does not address the appeal process.

Question 3. Marine farming (Marine Farming Planning Act 1995)

Environmental impact assessment (EIS) process is a key point for introducing wellbeing domains into marine farming assessments because the EIS criteria is set and tailored for each planning application or amendment

Public consultation or participation are the entry points for wellbeing domain in this process.

Wellbeing domains are not considered in the process, only where the process might interact with a planning scheme e.g. for land-based infrastructure.

Wellbeing is included through interpretation of the strategic level objectives (resource management planning system) and there are no limitations on considering wellbeing domains under the MFPA.

If the zoning process (planning) is transparent and parallels the land-based planning this would provide a point for including wellbeing domains into marine decision-making at the strategic scale.

Only material wellbeing is considered in this process.

Wellbeing domains are not included in this process because they are values based and do not have measurable criteria that can be included.

Observations

The planning authority in this case is very different from the local scale, i.e. It is the Secretary of DPIPW (as delegate)

Gaps

The question is misleading because it does not identify the relevant Act. It is the Marine Farming Planning Act 1995

Question 4. Aboriginal Heritage Tasmania

Any consideration under this process and Act would be addressed prior to an application coming to the planning authority at the local scale.

This is mostly a closed controlled process and so does not offer opportunity for broader sense of relational wellbeing to be considered.

This Act and process refers mainly to relics and not so much to living landscapes and the marine environment so wellbeing in the sense being discussed here may not be considered.

Question 5. Where and in what ways could the wellbeing domains be considered in the assessment and decision-making processes you just commented on in the previous question/s?

Wellbeing domains should be formally recognised in policy and legislation. To date there has been a lack of community engagement in rule-setting stages meaning that the codified rules do not consider values and preferences.

Wellbeing domains should also be considered as part of the environmental impact assessment process and at all other points of consultation, liaison or discussion between the different entities involved in marine developments.

When considering wellbeing, the different domains must be weighted according to the environmental, social, and economic principles of the State.

Finally, there should be a right to public appeal of marine developments through an independent review process as the current lack of such a process leads to little consideration of wellbeing domains.

Question 6 Which wellbeing domains could not or should not be incorporated into the assessment and decision-making process, and please explain why?

All wellbeing domains should be considered in assessment and decision-making processes, although this would be at odds with streamlined and efficient processes. As such it would make more sense to consider all wellbeing domains at the policy-setting and plan-making stages.

The inclusion of all wellbeing domains will allow decisions to be made with all consequences considered, using a precautionary approach.

Question 7. What amendments (major or minor) would be required to adopt those wellbeing domains?

Moderate structural changes are required to enshrine wellbeing into legislation.

Environmental impact assessment guidelines could be refined to explicitly consider wellbeing.

Question 8. Are there any other comments you would like to make about the significance, value or feasibility of including wellbeing domains into the assessment and decision-making processes that influence marine industry developments?

Using the wellbeing domains concept will add considerable value to the assessment of marine developments.

Marine industries should consider the subjective and relational aspects of wellbeing, particularly regarding interactions with, and material wellbeing effects upon, other users. A key challenge will be managing stakeholder expectations versus outcomes.

The wellbeing domains should be considered in both land-based and marine-based developments.

Round 2 Delphi survey

The synthesised data from Round 1 was sent out to participants as a large list of propositions. Respondents were asked to agree or disagree with the propositions, and to explain why.

Question 1. Wellbeing considered in decision-making processes

Respondents largely agreed with the propositions but noted many instances where clarifications or further nuance was required. This tended to be based on clear expertise in relation to the specific part of the decision-making process.

Question 2. Accountability

Respondents largely agreed with the propositions but noted many instances where clarifications or further nuance was required.

Some respondents commented on the ability of the public to engage with the decision-making process and the information required for them to do so. This was outside of the scope of this project and this information was not further included.

Based on the feedback received from Round 2, the previous list of propositions were condensed into the propositions presented below.

Round 2 condensed propositions

Policy and strategy

All three domains (material, subjective, relational) are accounted for in marine and coastal strategic policy documents.

Rule setting and planning

Material wellbeing is the most considered domain and is directly addressed within the marine and coastal planning systems.

Subjective wellbeing is not currently present in the existing marine and coastal planning rules.

Relational wellbeing is implicit within the local authority zoning process (land-based) and the establishment of appropriate land use. [We are unclear on whether it is implicit within marine zoning processes]

The wellbeing domains could be incorporated into rule-setting and planning through representation and engagement processes.

Proposal assessment

Environmental impact statements (EIS) are the formal point at which the wellbeing domains could be considered.

Measuring and communicating the subjective and relational domains of wellbeing remain a key challenge for incorporating wellbeing into an EIS (or any other assessment process).

Local authorities have no formal connection points into the assessment process for the marine environment and so cannot represent subjective or relational wellbeing domains.

Round 3 Delphi survey

In this final round, we presented an amended set of propositions regarding how the three wellbeing domains are/could be considered in marine and coastal development governance processes. We asked respondents if they agreed or disagreed with these propositions, and if they disagreed to explain why.

Proposition 1. All three domains (material, subjective, relational) are accounted for in marine and coastal strategic policy documents.

3 respondents agreed and 3 disagreed with the propositions. Of those that disagreed with the propositions, two respondents noted that they did not feel in a position to unequivocally agree.

Overall respondents agreed with this proposition and nuance was added to reflect opinion that while they are present, they do not carry much weight in decision-making:

Final revised proposition 1. All three domains (material, subjective, relational) are accounted for in marine and coastal strategic policy documents however wellbeing does not strongly influence the decision-making processes.

Proposition 2. Material wellbeing is the most considered domain and is directly addressed within the marine and coastal planning systems.

5 respondents agreed with this proposition and 1 did not agree. Overall respondents agreed with this proposition and **no changes were made to proposition two.**

Proposition 3. Subjective wellbeing is not currently present in the existing marine and coastal planning rules.

2 respondents agreed with this proposition and 4 disagreed. Overall respondents did not agree with this proposition. Attention was drawn to the implicit presence in the codified rules, and we connected this to the provision for public representations regarding negative amenity impacts for neighbours of development proposals.

Final revised proposition 3. Subjective wellbeing is implicit in the codified rules that guide marine and coastal planning for example implicit within planning codes and in strategic policy objectives. The subjective wellbeing effects for individual stakeholders

of specific development proposals can be articulated through public representations, and based on these, subjective wellbeing can be considered in specific decisions.

Proposition 4. *Relational wellbeing is implicit within the local authority zoning process (land-based) and the establishment of appropriate land use.*

3 respondents agreed and 3 disagreed with the propositions. The following comment was provided to explain 1 disagreement: *[Participant] is not well qualified to comment either way with respect to this proposition.*

Overall respondents agreed with this proposition and the proposition was reworded to provide greater clarity on where the relational wellbeing is implicit in the local authority decision-making regime.

Final revised proposition 4. Relational wellbeing is implicit within the local authority zoning process and the rules that codify appropriate coastal land use.

Proposition 5. *Relational wellbeing could be embedded within marine spatial planning processes.*

4 respondents agreed with this proposition and 2 disagreed. Overall respondents agreed with this proposition, however one respondent argued for more specific wording to better explain that relational wellbeing is implicit within the rules and can be included in environmental impact statement criteria and is accounted for in specific decisions through public representations.

Final revised proposition 5. Relational wellbeing is implicit within the codified rules that guide marine planning processes in for example implicit within planning codes and in strategic policy objectives.

Proposition 6. *The wellbeing domains could be incorporated into rule-setting and planning through representation and engagement processes.*

5 respondents agreed with this proposition and 1 did not agree. No comments were offered for this question. Overall the respondents agreed with the proposition, however the comments emphasised that the change required to explicitly articulate subjective and relational wellbeing would be substantial. The proposition has been reworded to reflect this.

Final revised proposition 6. To more explicitly articulate subjective and relational wellbeing domains in the rules and planning processes would constitute a major overhaul of the existing planning system and would be constrained by the capacity to quantify (and therefore operationalise) measures for subjective and relational wellbeing.

Proposition 7. *Environmental impact statements (EIS) are the formal point at which the wellbeing domains could be considered.*

3 respondents agreed and 3 disagreed with the propositions. Of those that disagreed with the propositions, two respondents noted that they did not feel in a position to unequivocally agree. Overall the respondents agreed with the proposition, however one respondent expressed caution about introducing these qualitatively assessed elements alongside assessment of environmental effects in the EIS. On the other hand, a different respondent emphasised that the existing process has provision for addressing these domains of wellbeing

Final revised proposition 7. Subjective and relational wellbeing assessment could be more explicitly considered in the following existing points in the marine development decision-making processes: setting of criteria for environmental impact statements (i.e. for the socio-economic section), submission of a proposal summary (notice of intent), stakeholder engagement activities and analysis, and during public representation phases.

Proposition 8. *Measuring and communicating the subjective and relational domains of wellbeing remain a key challenge for incorporating wellbeing into an EIS (or any other assessment process).*

5 respondents agreed with this proposition and 1 disagreed.

Overall the respondents agreed with this proposition, and one respondent reiterated the capacity of the EIS approach to include criteria that explicitly address the subjective and relational domains for specific proposals and planning processes.

Final revised proposition 8. Measuring and communicating the subjective and relational domains of wellbeing remain a challenge for incorporating those domains into decision-making. However for the marine context, the environmental impact statement provides for assessment of recreational and social values through which those domains could be specifically articulated.

Proposition 9. *Local authorities have no formal connection points into the assessment process for the marine environment and so cannot represent subjective or relational wellbeing domains.*

5 respondents agreed with this proposition and 1 disagreed. Overall respondents agreed with this proposition, however one comment provided clarification on points at which local authorities could represent wellbeing considerations through the specific roles and functions under the Act that makes them distinct from other stakeholders.

Final revised proposition 9. Local authorities can represent constituent needs with respect to subjective and relational wellbeing into marine development assessment processes through established engagement and public representations processes.

Proposition 10. *Statutory public representations to are the point at which subjective and relational domains can be accounted for in the assessment process.*

4 respondents agreed and 2 disagreed with this proposition. Of those that agreed, comments identified the need to be more specific in explaining how wellbeing would need to be handled in order to be addressed through public representations (e.g. such as appeals and similar hearings). Accordingly, this proposition was expanded to capture this important point.

Final revised proposition 10 The current requirements for stakeholder engagement and public representation processes provide opportunity for subjective and relational domains to be expressed within the existing decision-making processes (marine and coastal). While this is technically accurate for public representations and hearings in coastal development, for the content of such representations to substantively influence decisions at this point, the existing rules governing this point of the process would need to be changed to invite consideration of subjective and relational domains.

FRDC FINAL REPORT CHECKLIST

The final report checklist can now be filled in when submitting your final report deliverable in [FishNet](#).