



Values and aspirations for coastal waters of the Kimberley: Social values and participatory mapping using interviews

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The Western Australian Marine Science Institution's (WAMSI) mission is to establish a world-leading research capacity that underpins the conservation and sustainable management of the marine environment and its resources, for the economic, social and environmental benefit of the State of Western Australia and all Australians. Its structure is like no other – a collaboration 15 partner organisations that include State, Federal, industry and academic entities working together to deliver large-scale marine research in a multi-disciplinary and holistic way (<http://www.wamsi.org.au/>).

WAMSI Kimberley Marine Research Program

Initiated with the support of the State Government, the Kimberley Marine Research Program is co-invested by the WAMSI partners to provide regional understanding and baseline knowledge about the Kimberley marine environment. The program has been created in response to the extraordinary, unspoilt wilderness value of the Kimberley and increasing pressure for development in this region. The purpose is to provide science based information to support decision making in relation to the Kimberley marine park network, other conservation activities and future development proposals.

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Front cover (L-R): Campsite, Gambanan, Dampier Peninsula (Photo: J Strickland-Munro); loading dock, Koolan Island, Buccaneer Archipelago (Photo: J Strickland-Munro); Interview, Middle Lagoon Dampier Peninsula (Photo: Beau Strickland-Munro); marine transport barge workers en route to Silvergull Creek, Yampi Sound (Photo: Jennifer Strickland-Munro); Lookout, Two Moons Whale and Marine research Base, Dampier Peninsula (Photo: Jennifer Strickland-Munro).

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Executive summary

This is the first report from the “Values and aspirations for coastal waters of the Kimberley” research project funded by the Western Australian Government and administered by the Western Australian Marine Science Institution (Kimberley Research Node Project 2.1.2). The study area extends from the south western end of Eighty Mile Beach to the Northern Territory Border, a coastline 13,296 km in length at low water mark including the islands. The aim of this 3-year research project is to document and analyse the social values and aspirations of people associated with the existing and proposed marine parks at Eighty Mile Beach, Roebuck Bay, Lalang-garram (Camden Sound) and North Kimberley, and with other coastal waters of the Kimberley.

This report provides results from 167 in-depth interviews (232 people in total) and associated participatory mapping. The interviews and mapping were undertaken to identify and describe stakeholders’ values regarding the coastline and marine environment. Seven geographic areas were the focus of interviews: Darwin, Kununurra/Wyndham, Derby, Broome, the Dampier Peninsula, Eighty Mile Beach, and Perth. Collectively, these are the principal access routes to the Kimberley coast as well as major tourism nodes. A focus on access points to the marine parks also influenced where the interviews were conducted. The exception was the North Kimberley Marine Park, where no land-based interviews were undertaken. The reasons for this were twofold: the expense and time taken to access Kalumburu; and at the time of fieldwork (mid-2013) WAMSI was still negotiating a working relationship with the Wunambal Gaambara Aboriginal Corporation making it premature to be progressing research with these Traditional Owners at this time.

Agreement-based research with Aboriginal groups underpinned the research design, given the enduring relationship that Traditional Owners have with the land and sea country of the Kimberley. Considerable efforts were made to develop a collaborative approach to this research, through three loosely defined stages: (1) introductions, scoping and project adjustments with Aboriginal groups that might want to participate, beginning up to six months prior to fieldwork commencing; (2) interviews with Traditional Owners identified by their prescribed Body Corporates or who self-identified themselves as Traditional Owners or with members of ranger teams; and (3) sharing of research findings with Traditional Owner groups via face-to-face meetings and production of individualised map books of study results for each group.

Stakeholders interviewed included Aboriginal Traditional Owners; Aboriginal and non-Aboriginal residents; tourists and the tourism industry; commercial and recreational fishing, and aquaculture; federal, state and local government; mining, oil, gas and tidal energy interests; marine transport and aviation; and environmental non-government organisations. Aboriginal Traditional Owners were particularly important to engage and involve in this research given they own the sea country for a number of the Kimberley marine parks. Another particular focus for the interviews was the WA Government’s Department of Parks and Wildlife, given their policy, planning and management role in these marine parks.

Analysis of interviews involved their digital recording, transcription and then analysis using NVivo 10, a qualitative coding software package. Using a methodology that developed emergent codes and relied on freely drawing valued places on maps, rather than prescribing value categories and using dots to locate these values on maps was chosen because the values people ascribe to this coastline and marine environment are largely unknown. Most importantly, recent research has shown that free mapping and flexibility in how values are defined and assigned are an effective methodology with Indigenous people. To report these emergent values, they have been generally organised according to a values framework developed by the Millennium Ecosystem Assessment in 2005: direct use values (non-consumptive and consumptive), indirect and non-use values.

The interviews and associated analysis revealed the social values for the Kimberley coastline and marine environment as largely non-consumptive, direct uses including the physical landscape, Aboriginal culture, therapeutic, recreation (other than camping and fishing), social interaction and memories, experiential, learning and research, historical, and spiritual values (listed here in descending order of mention in the interviews). Direct use, consumptive values included recreation (camping), recreation (fishing), subsistence (e.g. food collection and fresh water provisioning), economic (tourism), and economic (commercial fishing, pearling and aquaculture) (again in descending order). Biodiversity was the only indirect use value, with bequest and existence the two non-use values. Biodiversity is ascribed as a ‘use’ value because it is a ‘regulating service’ for ecosystems.

In the interviews respondents were asked to draw important, valued places on a series of base maps for the Kimberley coastline and marine environment. A total of six 1:1,000,000 maps collectively cover this area, plus one more detailed map of the Dampier Peninsula (at 1:250,000), was provided given it is the most populous and used part of the study

region. An average of six (range 1–30) places were marked per interview, with 986 places (i.e. polygons) mapped in total.

The boundaries of these mapped places were then digitised and analysed in a GIS. The aggregated results of the participatory mapping show all the Kimberley coast as valued. Value hot spots are evident for Roebuck Bay, the western and northern coastal fringes and marine environments of Dampier Peninsula, the Buccaneer Archipelago, Horizontal Falls and Talbot Bay, and Montgomery Reef. A number of other sites northwards also appeared as hot spots, although of less intensity than these listed areas. The results for the northern Kimberley coast should be treated with caution, however, given the paucity of land-based interviews and lack of involvement of several key Traditional Owner groups for this sea country at the time this fieldwork was conducted.

A GIS analysis was also undertaken to describe the attributes of individual values, including their frequency of occurrence and the mean size of areas mapped. The physical landscape had the highest frequency of occurrence, followed by recreation (fishing), biodiversity, recreation (other than camping and fishing), and Aboriginal culture. Existence and economic (commercial fishing, pearling and aquaculture) values had polygons with the largest mean areas, while social interaction and memories, and recreation (camping) had the smallest mean areas.

Management Implications: Knowledge to action

The following management implications derive from the research reported in this document.

- (1) All of the Kimberley coast is valued. Thus, no part is 'value-free' and people must be consulted regarding its future, no matter if the location appears to be used (i.e. a 'direct use, consumptive values' and 'direct use, non-consumptive values') or not (i.e. 'indirect use values' and 'non-use values').
- (2) Aboriginal peoples' values for the Kimberley coast and marine environments extend well beyond cultural values and as such Aboriginal people must be included in decision making associated with all the values of the Kimberley coast.
- (3) Physical landscape values dominated the interviews and were pivotal to peoples' experiences of the Kimberley. Recognition of the importance of this value must underpin all planning and decision making. Future tourism efforts must protect this coast's 'wildness' while also capitalising on it.
- (4) Biodiversity was widely and intensely valued, both on- and offshore. This valuing provides an important base for societal support for marine parks and their nature conservation role.
- (5) Careful consideration of the social impacts of developments associated with access to the Dampier Peninsula and Buccaneer Archipelago is essential.

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I. Introduction

I.1. Scope and purpose of this research

This is the first technical report produced from the Western Australian Marine Science Institution Kimberley Research Node Project 2.1.2 *Values and aspirations for coastal waters of the Kimberley*. The study area encompasses all State coastal waters extending from the south western end of Eighty Mile Beach to the Northern Territory Border (Simpson 2011). A primary focus of the funding for this research, by the Western Australian Government, is to support the management of the proposed marine parks at Eighty Mile Beach, Roebuck Bay, Camden Sound and North Kimberley (Figure 1). Hence, they are a particular focus of the research reported here.

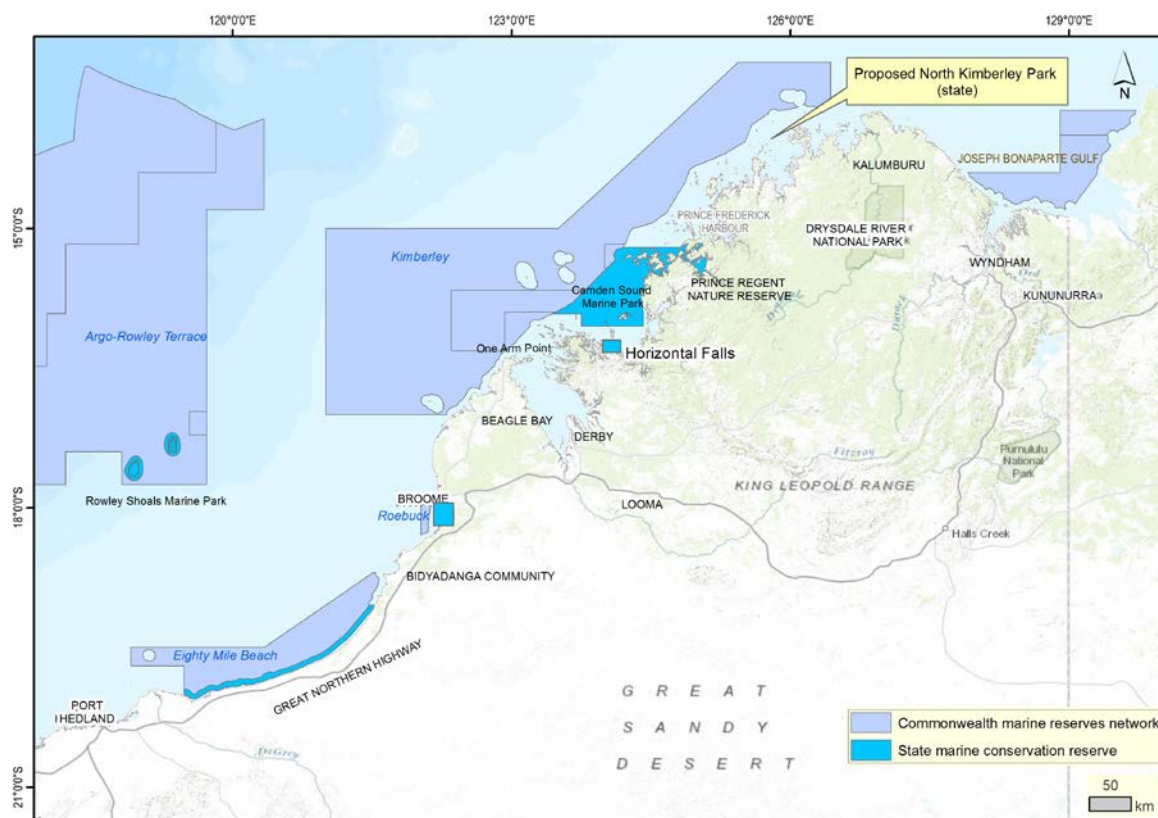


Figure 1. Kimberley marine parks (current and proposed)¹ (Source: Geoscience Australia 2014, Department of Parks and Wildlife pers comm 2014)

The Kimberley Marine Research Node Projects are guided by the Kimberley Marine Research Program (Simpson 2011), which focuses on two major areas of research: bio-physical and social characterisation (providing foundational data sets and better understanding impacts) and understanding key ecosystem processes. This technical report addresses the first major area by contributing to social characterisation of the Kimberley coastline and marine environment. It goes beyond a focus on people as ‘impacts’ to help understand peoples’ needs and values.

Understanding peoples’ needs and values is essential for effective planning and management, particularly when ‘public’ assets such as marine parks are involved. Voyer et al. (2012), in their review of Australian marine park planning, note that the social impacts and values associated with such areas have been inadequately considered to-date. These authors posit that failure to adequately consider social factors in planning and management may have implications for the long-term success of marine protected areas. They note that in two of their three cases studies social and economic arguments were used to delay and block future expansion of such areas. They conclude that where social values and impacts have been considered, they have relied on public participation and economic modeling as surrogates for comprehensive research and analysis of social values,

¹ An approximate extent of Horizontal Falls Marine Park is depicted.

perceptions and aspirations with respect to proposed (and existing) marine parks. As such, this research focused on researching social values as a contribution to enhanced decision-making and management.

1.2. Social values

No clear-cut and consistent definition of the term 'value' exists, with definitions varying according to the discipline of enquiry. For instance, anthropology, sociology, environment, philosophy and ecological economics all consider the term in different ways (Reser & Bentrupperbaumer 2005, Song et al. 2013). Despite this profusion of uses and lack of clarity, some commonalities are evident. In this research the scope is narrowed to 'values' as identified in the environmental field.

The environmental literature typically classifies values as either held or assigned. The focus of this research is 'assigned values': "values that people attach to things, whether they are goods such as timber, activities such as recreation, or services such as education" (Lockwood, 1999, 382). People also have 'held values', which are much more abstract – they are principles or ideas "that are important to people, such as notions of liberty, justice or responsibility" (Lockwood, 1999, 382). Brown (1984) described held values as fundamental underlying ideals that prioritise modes of conduct or desirable qualities, e.g. bravery, loyalty, fairness, beauty. Held values are believed to influence assigned values through subjectively evaluating objects (Brown 1984, Lockwood 1999, Brown & Weber 2012).

While natural features such as waterfalls and turtles are often described as values, they are better understood as natural features that give rise to values (Lockwood 2011). These features are the source of values, rather than being values themselves. The same holds for cultural and historical sites, for example, Aboriginal art sites and shipwrecks. Features can also give rise to multiple values, a waterfall or bay may be aesthetically beautiful, it may have recreational opportunities, and it may have spiritual values for Aboriginal people (Lockwood 2011).

Assigned rather than held values have been argued as more useful for examining values in relation to specific sites (McIntyre et al. 2008). The idea of assigned values having a 'geography' (Davies 2001, 82 in McIntyre et al. 2008) recognises that they are place-based. The spatial nature of assigned values implies that value may be allocated at a range of scales from highly site specific to broader ecosystem, regional, national or global levels (McIntyre et al. 2008).

Knowing about assigned values is important for natural resource managers because these values influence how people behave at a place and the concerns and aspirations they have about it now and in the future. Assigned values also influence how people respond to proposed changes in policy and management. Brown and Weber (2012) suggest that mapping landscape values (they define these as a type of relationship value that bridges held and assigned values) can help managers: identify potential land-use conflict areas; assess the compatibility of land uses (e.g. zoning in marine parks) with landscape values; and provide public input to managing public lands (and waters). A number of other researchers (e.g. McLain et al. 2013) use the term 'landscape values', strongly influenced by the work of Greg Brown (see Brown & Reed 2000), who developed a list of landscape values for National Forests in the United States, with this list underpinning numerous studies over the intervening period.

In this research we adopt the term **social values** to broaden the suite of values beyond the 'landscape'. Although many landscape value typologies being applied are suitably broad, for example, including health and spiritual values (e.g. Besser et al. 2014), we take a more expansive perspective in this report to avoid such values being narrowly construed as restricted to the 'landscape'. We define social values as *"the importance of places, landscapes, and the resources or services they provide as defined by individual and/or group perceptions and attitudes towards a given place or landscape"*.

1.2.1. Value typologies

Many typologies of values exist. Lockwood has written a handful of seminal papers on values, with the most recent (Lockwood 2011) organising values for protected areas into three primary categories: direct use, indirect use and non-use (existence) values, with economic value included as a fourth separate category. Direct use values include nature-based recreation, maintenance of public facilities, personal development (e.g. development of leadership skills), therapeutic and physical wellbeing values, education, research and some forms of resource extraction (e.g. honey production). Indirect use values (equated with ecosystem services) include 'the filtering of air and water, the assimilating of waste, the cycling of nutrients, and the regulation of climate' (Lockwood 2011, 4). Non-use (existence) values include appreciating a protected area just because it is there, as well as knowing it will be there for future generations (bequest value). Non-use values also include spiritual and cultural connections with nature, and personal identity. The latter can encompass elements of personal, family and community histories. Economic values are not separate, with Lockwood (2011) noting they are merely another way of expressing values, especially use values. 'Biodiversity' is considered the source of many different values rather than being a 'value' in its own right.

The Millennium Ecosystem Assessment (2005), in their Total Economic Value Framework, present a similar values typology to Lockwood, discussing direct use, indirect use and option values with respect to ecosystem services. However, they take the typology one step further by dividing direct use values into consumptive (the taking of resources e.g. fishing) and non-consumptive (no reduction in resources, e.g. recreation, spiritual, social aspects) categories. Indirect use values similarly refer to values associated with water purification, waste assimilation and other regulating services. The final category of option values includes existence and bequest value as well as value attached to the potential to use a service in the future.

This research draws on both typologies. Lockwood's research has been specifically directed to protected areas and as such encompasses the complexity of values such areas hold. Such complexity is also likely to typify the Kimberley coast and marine environments. As such, his typology was one of the two frameworks to underpin this study. The second framework is the utilitarian approach taken by the Millennium Ecosystem Assessment (2005) with their Total Economic Value Framework. It was chosen because of the current interest in ecosystem services expressed by protected area managers and the hope that framing the research as such would enable a more rapid uptake of the findings.

We discuss social values in four broad ways: (1) Direct use, non-consumptive values. This category of value implies that while the Kimberley coast was directly used in the attainment of value, the quantity of goods or value available was not diminished or reduced as a result. (2) Direct use, consumptive values. This category includes values accrued through direct use of the Kimberley coast and its waters, with a concomitant reduction in the quantity of goods and value available due to that use. (3) Indirect use values. Indirect use values are those associated with air and water purification, waste assimilation and other regulating services. Biodiversity is considered one of these 'services'. (4) Non-use values. This final category of value includes those unrelated to physical experience or use of the Kimberley coastline or marine environment.

1.3. Overview of research to-date on marine social values

The marine environment, and marine protected areas (MPAs) in particular, are receiving an increasing amount of attention in regards to biodiversity conservation (Pita et al. 2013). While MPA ecology and economics have been well studied in the past, the social aspects of marine conservation and MPAs have received much lesser consideration, although there is a growing recognition of their importance in terms of the ongoing success of marine conservation (e.g. Charles & Wilson 2008, Pollnac et al. 2010, Voyer et al. 2012). These 'social aspects' include the relationships that people have with the marine environment and may be reflected in the social values they express (people's preferences and opinions regarding management, benefits or ecosystem goods and services derived, attitudes and perceptions pose other elements of social interest). While understanding people's social values, perceptions and aspirations in relation to the marine environment is increasingly seen as critical for long term conservation, comprehensive investigation and analysis has been lacking to-date (Voyer et al. 2012).

A recent review of the scientific literature concerning social considerations relating to marine environments (Strickland-Munro & Moore in prep) supports Voyer et al.'s (2012) assertion. Their review of articles variously exploring social values, perceptions, attitudes, preferences and benefits derived from marine and coastal landscapes highlights a lack of consistency and rigour characterising the investigation of social considerations. For instance, the particular social construct investigated in the articles (e.g. value, perceptions, attitudes) was typically undefined or used interchangeably with other related terms (e.g. concurrent use of the terms attitudes, perceptions, values and views). In addition, articles at times explored more than one (undefined) construct simultaneously. This use of multiple, undefined research constructs contributes to confusion over construct meaning already present within and among different disciplines. It may also be indicative of language 'slippage' within the wider environmental values literature (Reser & Bentrupperbaumer 2005). Strickland-Munro and Moore (2014 in prep) conclude that failure of many reviewed articles to provide clear definitions of their social research construct impedes their ability to convey meaning across disciplinary divides and their usefulness for decision making.

Further, their review illustrates that while a range of stakeholder groups (e.g. tourists, recreational, subsistence and commercial fishers, conservation management agencies, government, conservation organisations, the tourism industry, divers, local community members, scientists) have been involved in social research, the vast majority of studies engaged with only two primary stakeholder groups, commercial fishers and local community members. While these stakeholder groups clearly have a close involvement with the local marine environment and are likely to be impacted by management changes (Pita et al. 2013), future research would benefit from engaging with a greater number and more varied range of stakeholders to help provide a greater diversity of perspectives.

The review highlights recreational values as the most frequently identified value evident in existing studies. Economic and biodiversity values were the next most commonly identified social value relating to marine and coastal environments. Over 20 other values were identified, in addition to a number of ecosystem goods and services. These included the notable presence of a range of non-use or intrinsic values including existence, bequest, and option values (Strickland-Munro & Moore 2014 in prep).

1.4. The Kimberley coast and marine environment as valued places

1.4.1. *Aboriginal connection to country*

Aboriginal people have occupied the Kimberley region for an estimated 40-60,000 years and evidence an enduring relationship with the landscape. The physical landscape, or 'country', is more than a mere geographical space for Aboriginal people, it is a living entity, as active and responsive as people. As Rose (2002, 14) explains, in Aboriginal English, the word 'country' is both a common noun and a proper noun. People talk about country in the same way that they would talk about a person: they speak to country, sing to country, visit country, worry about country, grieve for country and long for country. People say that country knows, hears, smells, takes notice, takes care, and feels sorry or happy. Country is a living entity with a yesterday, a today and tomorrow, with consciousness, action, and a will toward life. This contrasts to western ontology with its emphasis on geography, location, boundaries, utilitarian use, and topography with flora and fauna. Instead country is life affirming, active and the means through which people can work in conjunction with "the totality of beings that are ever-present in land, water and the heavens" (Doohan 2006, 117).

Long-established ontological traditions and practices connect the health of country to the health of people. Country, and one's relationship to it, entails a suite of personal, cultural and spiritual obligations and responsibilities. Country exceeds the biophysical: it also includes that which cannot be seen including spirits, the old people, the forces that shape behaviour, and laws and rules for conduct. This means that country has the capacity to instruct, direct and influence at the same time as offering people specific sites that allow them to hunt, conduct education, carry out law and ceremony and inspire song, language, story and law (YRNTBC 2011).

The centrality of country to Aboriginal culture means that great value is placed on keeping country healthy. This applies equally to land and sea (or saltwater) country, which are inseparable for coastal Aboriginal people (Smyth 2007). Vigilante et al. (2013, 146) describe saltwater country as a "complex enculturated place". Saltwater country activates all sorts of things for local Aboriginal people. It brings to life story, song and memory. It brings to life not just a landscape that is 'out there' or truncated from human subjectivity. It holds the imprints and life force of ancestral characters and spiritual activity. It can heal and it can punish. Thus saltwater country calls up and maintains "layer upon layer of relationships to land and ancestors" (Sharp 2002, 77).

A consistent set of themes runs through various Aboriginal ideas about the coast. Most fundamental is the interconnected relationship between people, country and law. These first principles in Aboriginal ontology involve the interweaving of community (through old kin-based social structures and rules), country (through keeping places alive by visiting, walking, hunting and caring) and law (through transmission of song, culture, language, knowledge and story from generation to generation).

Significant archaeological evidence of Aboriginal occupation and use exists along the Kimberley coastline as well as on a number of offshore islands. This evidence includes rock art, stone arrangements, shell middens and other human artefacts (Zell 2007, Vigilante et al. 2013). Saltwater country also provides evidence of Dreamtime events in the form of rock art, stone arrangements, sacred sites, song lines and other in/tangible features of land and sea within which reside ancestral creator beings (Smyth 2007, Vigilante et al. 2013). Maintaining contemporary connections to these Dreaming events is paramount and achieved through complex religious narratives known as 'stories' (Vigilante et al. 2013). The transmission of knowledge via stories is the *raison d'être* for Aboriginal life, giving elders the chance to have their accounts listened to, young people the chance to learn and Aboriginal culture the chance to rejuvenate.

1.4.2. *Overview of Aboriginal values*

The enduring and all-encompassing role of country provides insight into a number of ways in which Aboriginal people value the Kimberley coastline and marine environment. The following section provides a brief overview of these values but is in no way a comprehensive representation of the special relationship between Aboriginal people and country. The centrality of subjective values and involvement of both physical and metaphysical realms contrasts with objective Western measures of 'health' (Scherrer et al. 2011), posing one difficulty in accurately portraying Aboriginal relationships to country. Reticence in sharing culturally sensitive information

with outsiders presents another challenge, as found in other values mapping research (e.g. Klain & Chan 2012).

Coastal (or saltwater) Aboriginal people continue to rely on coastal and marine environments and the resources therein for their cultural identity, health, wellbeing and domestic as well as commercial economies. Their connections to sea country have remained strong despite the impacts of dispossession (Smyth 2007) that saw traditional Aboriginal language groups decimated and Aboriginal people forcibly removed from their homelands. Beyond the metaphysical spiritual and cultural values associated with the need to care for country and maintain spiritual health, a number of more tangible values relating to the coastline and marine environment are evident. These include the provision of food resources from the sea and coastal area, with coastal Aboriginal groups noted for their heavy reliance on sea resources to comprise their traditional and preferred diet.

For Kimberley Aboriginal groups the connection between people and country is paramount. This is because in Aboriginal ontology and cosmology learning about traditional kinship obligations is incorporated into the business of looking after 'sea-country'. Indeed to think about people without reference to country is akin to talking about the future of a child without reference to its mother (Rose 2004). As Edwards (1988) further explains this is because in Indigenous cosmology country is the place where present living family, ancestors and as yet unborn children dwell. This means that as a member of one's family, country demands care. In turn, country offers care. To visit country, to travel through it, hunt on it, make fire on it and sing to it is much like visiting an older relative. In both acts one maintains relationships, obligations and 'keeps alive' one's family. In this way, keeping country healthy (by visiting it, dancing on it and warming its soul by fire) also involves the act of keeping community healthy (Collard & Palmer 2006).

1.4.3. European history and current land use

The Kimberley coast has a relatively long history, by Australian standards, of exploration. Makassan sea traders (from today's Indonesia) began visiting the Kimberley coast between 1669 and 1763 (Crawford 1969, 2001 cited in Vigilante et al. 2013). Early explorers from the 16th century onwards included the Portuguese, Dutch, French and British. French, Dutch and English names attached to this coast as a consequence of these early European explorers. Australian-born Phillip Parker King visited from 1817-1822 and provided excellent charts for the area. He also carved *HMC Mermaid* into a boab tree at Careening Bay where he hauled his boat up for repairs.

An early attempt at settlement, at Camden Harbour in 1864/5 for sheep grazing, failed within a year. A similar attempt by pastoralists at Roebuck Bay also failed. Pearling began in the Kimberley in the 1850s and was well established by 1870. A fleet of 400 luggers was in evidence at Broome by 1910, however, by 1950s few were left after plastic and Bakelite made pearl shell redundant. The late 1950s saw a resurgence in the pearl industry in the late 1950s as cultured pearls became popular. The Australian pearl industry is now a world leader owing to high water quality and a shallow continental shelf.

Broome was named in 1883 and became the main base for pearling. The majority of workers in the industry were Japanese and Malaysian, but there were also Chinese, Filipino, Amborese, Timorese and Makassan, as well as Aboriginal people and Europeans. Thus, the multicultural history of Broome was born. Derby was established at about the same time, as a port for shipping cattle. The Wyndham meatworks, also developed as part of the supporting infrastructure for the beef cattle industry, were established in 1919 and closed in 1985.

Commercial fishing and aquaculture in the Kimberley coastal waters includes prawns, barramundi, demersal scalefish, shark, mud crabs, mackerel, aquarium fish, specimen shells, beche de mer, trochus and pearls (DPW & DAC 2014). The Kimberley coastline and marine environment is highly prospective, with iron ore currently mined on Cockatoo and Koolan Islands. There are large reserves of petroleum and gas offshore in the Browse and Bonaparte basins. The Port of Broome is currently being used as a supply base for rig servicing and supply logistics.

An integral part of the history of the Kimberley has been the establishment of Christian missions for Aboriginal people. A Presbyterian mission was established at Port George IV in 1912 and then shifted to Kunmunya by 1916. By 1949, Worora, Wunambal & Ngarinyin people lived in two major mission settlements: Kunmunya and Munja due to pastoral stations occupying almost all Aboriginal land in the north Kimberley. Beagle Bay mission was established in 1890, Lombadina in 1892 and Sunday Island in 1898-9. Sunday Island mission closed 1957, with people moved to Derby until 1967. They then moved back to Sunday Island in 1967 and then to One Arm Point in 1972. In many cases different language groups were forced to live side by side in missions, further contributing to a sense of disconnect from country and kin.

Native title determinations are dramatically changing how lands and coastal waters in the Kimberley are delineated, valued and ultimately managed. Native title recognises under Australian law that some Indigenous

people have rights and interests to their land associated with their traditional laws and practices. Native rights and interests may include: living on an area; access for traditional purposes such as camping or ceremonies; visiting and protecting important places; hunting and gathering food; and teaching law and custom on country (NNTT 2014). Almost all of the Kimberley coast is subject to native title applications and determinations (refer to http://www.nntt.gov.au/Mediation-and-agreement-making-services/Documents/Quarterly%20Maps/WA_Kimberley_NTDA_schedule.pdf for the most recent map).

The Kimberley provides a range of tourism activities, many of them with a coastal, nature-based focus. Activities include ecotourism, ground and fly-drive operations, four-wheel-drive opportunities, luxury coastal cruising with a tour company, independent cruising, coastal resorts, and Indigenous cultural tours. A comprehensive report on coastal tourism in the Kimberley published by Scherrer et al. (2008) placed tourism third in terms of economic contribution to the Kimberley, with minerals and petroleum (including diamonds, iron ore and crude oil) first, and retail second.

1.4.4. Current marine park activities

The global and national biological significance of the Kimberley is well recognised. The marine environment in particular is noted for its 'very good' ecological condition and inclusion in the 3.7% of global oceans considered to have had very low human impact (Halpern et al. 2008). While acknowledged as ecologically diverse and untouched, pressures on the marine environment are growing. Further, there is a recognised dearth of scientific knowledge regarding the marine environment (GoWA 2009), which has been described as "one of the great frontiers for science" (GoWA 2011, 28).

Seeking to remedy this lack of scientific knowledge and invest in long term conservation for the region, in 2011 the Western Australian Government introduced the Kimberley Science and Conservation Strategy (GoWA 2011). Part of the commitments enshrined in the Strategy was to introduce a system of marine reserves through the establishment of four new, multiple use marine parks. Located at Eighty Mile Beach, Roebuck Bay, Camden Sound and North Kimberley (Figure 1), the marine parks were to cover 48% of the Kimberley's coastal waters, and increase the area of State marine parks and reserves from approximately 1.5 million hectares to 4.1 million hectares (Thomson-Dans et al. 2011). A fifth marine park for the iconic Horizontal Falls area was announced in 2013, as were plans to extend the North Kimberley Marine Park eastwards to the Northern Territory border. To-date only two parks have been established, at Eighty Mile Beach and Lalang-garram/ Camden Sound, with the remaining three parks yet to be formalised. These existing and proposed State marine parks complement four existing Commonwealth marine reserves located at Eighty Mile Beach, Roebuck Bay, Argo-Rowley Terrace and 'Kimberley' (Figure 1). Commonwealth marine reserves are located beyond State boundaries in Commonwealth waters, which extend seawards from the limit of West Australian coastal waters.

Commonwealth marine reserves are managed primarily for biodiversity conservation outcomes but also allow for a range of activities including commercial and recreational fishing, tourism, mining operations, and pearling and aquaculture (CoA 2014). All existing and proposed State Kimberley marine parks are to be managed with Aboriginal Traditional Owners under formal joint management agreements.

2. Methods

2.1. Research approach

2.1.1. Research question and objectives

This technical report contains the first set of results from the 3-year social research project (*Socio-cultural values of the Kimberley coastline and marine environment*), reporting on the first part of the project: participatory mapping of social values using interviews.

The overarching aim of this 3-year research project is to document and analyse the social values and aspirations of people associated with the existing and proposed marine parks at Eighty Mile Beach, Roebuck Bay, Lalang-garram (Camden Sound) and North Kimberley and other coastal waters of the Kimberley between Eighty Mile Beach and the Northern Territory border.

This research aim is being pursued through the following research objectives. This report addresses the first one.

- a) Describing and analysing how people value the Kimberley coastline and marine environment and what places are important to them, especially for Aboriginal people, through approximately 160 in-depth face-to-face interviews accompanied by participatory mapping in the Kimberley region, Perth and Darwin.
- b) Undertaking a follow-up web-based Public Participation GIS survey to extend and validate the results from Objective 1.
- c) Undertaking comprehensive stated preference choice analyses. This will be achieved by including a series of questions designed to elicit respondents' preferences regarding future activities on the Kimberley coast and future management of this coastline and its waters in the web-based survey detailed under Objective 2.
- d) Undertaking a detailed analysis of the social values for up to two marine parks through extended consultation with Aboriginal Traditional Owners and others with a particular interest in the chosen marine park(s).

2.1.2. Research design

The study area for this research was the Kimberley coastline from the Western Australia – Northern Territory border to Cape Keraudren at the western end of Eighty Mile Beach (Figure 1). Respondents were located predominantly but not exclusively along this coastline. All were asked to focus their responses on the coast and associated islands and waters. Much of the coast and its waters are either held under native title by Aboriginal Traditional Owners or are currently subject to native title negotiations. The WA Government is committed to jointly managing Eighty Mile Beach, Roebuck Bay, Lalang-garram (Camden Sound) and North Kimberley Marine Parks with Aboriginal Traditional Owners. All marine parks in WA are vested in the Marine Parks and Reserves Authority, with joint management possible under section 56A of the Conservation and Land Management Act 1984 (WA).

Interviews based on open-ended questions (Neuman 2012), where the social values from the study area were determined from analyses of the interviews and maps, rather than relying on a pre-determined list of values provided by the researchers, was taken in this project (Klain & Chan 2012). A variety of methods have been used to collect socio-spatial data, including open-ended personal interviews (as per this study) through to web-based tools (McLain et al., 2013). Usually, both interview and web-based approaches have relied on pre-defined value categories, most often those developed by Brown and Reed (2000). Using these pre-defined categories, respondents are asked to allocate a number of tokens or markers, for example in the Greater Alpine study (Brown & Weber 2011), 6 markers each for the 18 variables (including 9 'experience' [=value] variables) were available for respondents to spatially allocate. More recently these approaches have been modified to explore values encapsulating ecosystem services (Bryan et al. 2010). A much smaller number of studies, which include this one, ask respondents to use their own words to describe what is important to them and valued at a place (Black & Liljeblad nd, Klain & Chan 2012). No predetermined value categories were used in this study.

One reason for the 'interpretivist' approach taken in this study is using a methodology that allows deep exploration of the complex associations between people and the landscape (McIntyre-Tamwoy 2004). Such an approach is based on the view that meanings (in this research, values) emerge through interactions between researcher and respondent, and in this study through respondents simultaneously talking about and mapping the values and importance of places. Narrative-based methods, which are common in interpretivist research, are well suited for exploring subjective, experiential topics such as values (Lindlof & Taylor 2002, in Klain &

Chan 2012, 105). The conversations that are part of such interviews can enable respondents to more deeply consider and articulate their values than a paper- or web-based survey (Klain & Chan 2012).

Another reason for working within an interpretivist paradigm is acknowledging the subjectivity of values, and these values only being 'knowable' through the subjective 'lived experiences' of respondents. The Kimberley coastline, with its diversity of Aboriginal Traditional Owners, rich past and present culture, high biodiversity values, vast landscapes and tourism industry, has a wealth of values, unlikely to be fully represented by the set of landscape values developed in North America for forests. An interpretivist approach allows the emergence of other categories, especially those of relevance to Aboriginal people, that have not been previously explored and have been identified as a gap in current and past research efforts (Klain & Chan 2012). A final reason is that an approach using open-ended interviews can potentially allow access to intangible non-monetary values such as such as education and existence (Klain & Chan 2012).

Asking respondents to mark the places they value on maps rather than assigning tokens (Klain & Chan 2012), markers (Brown & Weber 2011) or cubes (Ruiz-frau et al. 2011) is also part of facilitating an interpretivist approach. Black and Liljeblad (nd) and Klain and Chan (2012) asked respondents to draw lines around places important to them. These researchers also generated emergent categories for values, as noted above. Using polygons (i.e. obtained through drawing lines around places) requires a smaller number of participants to identify areas of significance (i.e. hotspots) with a high degree of confidence than does using dots (as part of spatially allocating pre-determined values). A minimum of 350 participants is recommended when using dots versus about 25 when using polygons (Brown & Pullar 2012). Ramirez-Gomez et al. (2013) note that most participatory mapping exercises have been undertaken in developed countries with non-Indigenous participants. They advocated and adopted an approach similar to that undertaken in this study, of drawing simple shapes on maps rather than allocating dots. They suggest using "simple mapping methods that are feasible in rural settings" (Ramirez-Gomez et al. 2013, 8).

The vastness of the Kimberley and its small, dispersed population made decisions regarding the sampling design particularly challenging. With an area of 423,500km² the Kimberley is almost twice the size of the state of Victoria and three times the size of England (Kimberley Society 2014). Its coastline extends 7,331 km at MHW excluding the islands and 13,296 km at LWM including the islands, with more than 1,200 islands in the Buccaneer Archipelago alone. With a population of 34,795 people this is a sparsely populated region. A total of 40% of this population is Aboriginal (ABS 2014). Economic activities associated with the Kimberley coast (the focus on of this study) include commercial fishing, pearling and other aquaculture (e.g. barramundi farming), oil and gas extraction, iron ore mining, tourism, and pastoralism. The Kimberley towns of Broome, Derby, Wyndham and Kununurra are important service centres.

A sampling design was selected to access people living in the Kimberley, tourists visiting the Kimberley, and others with an ongoing interest in the Kimberley but living remote from it. People and organisations associated with the existing and proposed marine parks were of specific interest, given the Kimberley Marine Science Plan identifies these as of particular interest for the overarching research program of which this project is part. These individuals and groups are collectively referred to stakeholders in this report, that is, persons having an interest in the area. For these interviews the sampling design favoured those living in or visiting the Kimberley. A web-based survey and analyses of online blogs are planned for a later stage of this project to comprehensively access the values of those geographically remote from but still with a deep interest in the Kimberley.

Stakeholders for interviews included: Aboriginal Traditional Owners; Aboriginal and non-Aboriginal residents; tourists and the tourism industry; commercial and recreational fishing, and aquaculture; federal, state and local government; mining, oil, gas and tidal energy interests; marine transport and aviation; and environmental non-government organisations. Aboriginal Traditional Owners were particularly important to engage and involve in this research given they own the sea country for a number of the Kimberley marine parks. Another particular focus for the interviews was the WA Government's Department of Parks and Wildlife, given their policy, planning and management role in these marine parks. Emphasis was also placed on securing tourist interviews as tourism has been identified as the most likely major Kimberley-wide growth industry in the future (Simpson 2011). Efforts were also made to interview yachts people and guests on luxury cruises, both notoriously hard-to-access respondent groups but actively using the Kimberley coast and its waters.

Most people interviewed lived in or were visiting the Kimberley. The exception was respondents remote from the Kimberley who worked for organisations with a presence in the Kimberley. Their interests included: mining, oil, gas or tidal energy; government administration; or non-government environmental interests. Previous research into social (non-monetary) considerations of coastal and marine environments has generally focused on one to two stakeholder groups only. Strickland-Munro and Moore (in prep) note that 49% of published articles on this topic focus on only 1-2 groups, with only a handful of studies (16%) addressing 7

groups or more. Investigating a large number of stakeholder groups (see list in previous paragraph) was essential in this study given the diversity of interests associated with the Kimberley coast.

Previous participatory mapping research has relied on a wide range of respondent numbers, from 30 interviews in a recent interview-based study on Vancouver Island, Canada (Klain & Chan 2012) to 351 responses in an online Public Participation GIS survey for the Australian Alps (Brown & Weber 2011) (Table 1). As noted earlier, a minimum of 25 participants is recommended when using polygons (Brown & Pullar 2012). This number was considered too low for this study given the number of different stakeholder groups.

Table 1. Selection of recent studies and respondent numbers in participatory values mapping research

Study focus	Authors & date	No. of respondents
Bitterroot National Forest, USA	Black & Lijebad n..	15 interviewees
Murray-Darling, Australia	Raymond et al. 2009	56 interviewees
Australian Alps, Australia	Brown & Weber 2011	351 responses (web-based)
Kangaroo Island, Australia	Brown & Weber 2012	115 responses (web-based)
North Vancouver Island (marine), Canada	Klain & Chan 2012	30 interviewees
Suriname, South America	Ramirez-Gomez et al. 2013	198 participants

To adequately cover the range of interests and the diversity within each stakeholder group (e.g., diversity among tourists, diversity among the tourism industry) judgments were made before commencing the fieldwork regarding the optimal number of interviews. Table 2 details the rationale behind these decisions for each stakeholder group. The goal of 140-160 interviews was based on the reasoning in Table 2, which reflects a trade-off between obtaining as broad a range of views as possible and the time and other resources available. Resources were available to undertake up to 4 months fieldwork (i.e. with one researcher based on the Kimberley, often in remote settings) and contributions by other researchers for shorter periods of time. A significant amount of this time was allocated to building relationships with Aboriginal Traditional Owners (see 3.1.3 for further details).

Table 2 Rationale for choices regarding interview numbers for stakeholder groups

Community of interest	Sampling approach and rationale	Planned no. of interviews and estimated "population" (where relevant)
Aboriginal people	Participants as recommended by PBCs or who volunteered to be involved having heard about the research	As many interviews as possible, although we asked PBCs to suggest 8-10 people
Residents (non-Aboriginal)	Opinion leaders sought in Broome to capture community sentiment regarding the coast. Frequent users of the coast sought in Derby. Resident ex-tourism operators sought in all locations	5-10 residents each from Broome and Derby
Tourists	Popular tourist destinations were targeted i.e. Dampier Peninsula, Horizontal Falls, Eighty Mile Beach, people off cruises at Broome. Focus was tourists in nature, rather than those staying in caravan parks or resorts in Broome	Up to 40 interviews planned to access the diversity of tourists
Tourism industry	Both Aboriginal and non-Aboriginal tourism operators were sought	Up to 20 interviews planned across the Kimberley 148 tourism operators in Kimberley (Broome, Derby and Kununurra) (Tourism Council of WA, pers comm, 2013), however, most of are terrestrial-focused, not marine. Actual no. involved in coastal/ marine areas likely to be significantly smaller
Commercial fishing	Range of fishing interests sought to represent active fishing operations in the Kimberley as well as operators amenable to involvement. Included northern demersal scalefish, mud crabbing, mackerel, Kimberley gillnet &	1 interview from each industry 7 major commercial fishing industries listed for the northern region (number of active licences unclear) (WAFIC & Dept of Fisheries,

	barramundi, pearl oyster, Broome prawn, northern shark, and beche de mer	2013)
Aquaculture (inc pearls)	Focus on pearls given their history in the region, also trochus, barramundi	See commercial fishing above
Recreational fishing	Local recreational fishing organisations were contacted e.g. Broome Fishing Club, Mary Island Fishing Club Several charter operators were contacted but they declined to participate as it was the height of tourist season so very busy	Up to 5 interviews with official recreational fishing groups sought Fishers from a range of locations sought. Often people interviewed when camping or residents were also recreational fishers so there was no need to pursue them as a separate group
Commonwealth government	Agency with close involvement with the coast, based in Broome	1 per organisation 1 agency active in Broome and involved with whole Kimberley
Department of Parks and Wildlife	Senior and marine park management staff in Kimberley regional and district offices	As many staff as possible involved in marine park management
Other state government departments	Departments involved in marine park policy, planning and management and working in Broome (e.g. Department of Fisheries, Department of Premier and Cabinet)	1-2 staff from each department
Local government	Shire councillors and Shire staff with environmental planning expertise were sought	1-2 per Shire 3 shires associated with the Kimberley coast (Shires of Broome and Derby/West Kimberley, No-one from Wyndham/ East Kimberley Shire interviewed)
Mining, oil, gas, tidal energy	Mining interests on the Kimberley coast and islands, active oil and gas developments offshore, tidal energy	1 per organisation
Marine transport, ports	Interests identified included barge operators, nearshore and offshore support services, ports	1 from each organisation Three commercial ports (Wyndham, Derby, Broome) Three barge transport companies (Yampi Sound/ Kalumburu) Source: local knowledge
Aviation	Aviation companies operating ex Kununurra, Derby & Broome with both a tourism focus as well as other commercial interests (e.g. mining, exploration)	Estimated 14 companies in operation Source: local knowledge & tourist bureaus
Environmental non-government organisations	Organisations active in the Kimberley	1 from each organisation Source: local knowledge
Yachts people	Yachts people available to interview in land-based locations (e.g. Darwin, Derby, Broome) Whomever the researcher could safely interview while anchored on the Kimberley coast (working in area of extreme tides and currents)	Up to 10 interviews Initial contacts made via membership of the Kimberley Coast Cruising Yacht Club

Several different strategies were used to identify and contact respondents. For stakeholders with a formal organisation (e.g. Nyamba Buru Yaruwu, Shire of Broome, Kimberley Coast Cruising Yacht Club), that organisation was contacted either in person or by phone or email and interviews arranged. This purposive sampling approach is particularly useful when stakeholder groups are known to the researchers (Neuman,

2012). Those interviewed from government and industry had to have a field knowledge of the Kimberley coast to be included. Convenience sampling was used with tourists and residents, particularly on the Dampier Peninsula. Using this approach, tourists and residents accessible to the researcher were approached and invited to be involved. In using convenience sampling, all researchers in this study sought to obtain as wide a range of respondents as possible, in terms of age, gender and life cycle stage (e.g., with young family, retired etc). Snowball sampling was the third sampling strategy deployed, with contacts in organisations asked to recommend others for interviewing as well as asking respondents to recommend others. An overarching concern was to 'fill the quotas' detailed in Table 2, however, these were regarded as flexible given that there can often be great discrepancies between sampling designs pre-fieldwork and the execution of research in the field. Therefore, this research drew on a combination of purposive, convenience and snowball sampling under the umbrella of a quota-based approach.

2.1.3. Agreement-based research with Aboriginal people

Aboriginal people were essential respondents for both ethical and practical reasons, given their enduring relationship with the landscape as Traditional Owners of Kimberley land and sea country. Considerable efforts were dedicated to gaining their participation in the research. Aboriginal participation was also significant in a theoretical or academic sense, as research drawing on Indigenous participatory mapping for conservation remains an underdeveloped area and relatively few examples exist that combine Indigenous participatory mapping with actions resulting in larger scale conservation outcomes (Ramirez-Gomez et al. 2013), as is the purpose of this research. Commitment to mutually beneficial, collaborative and ethically conducted research led to a more intensive engagement approach with Aboriginal than non-Aboriginal participants.

In the past researchers have tended to treat Indigenous groups as subjects of research, peripheral to the research process, to be ignored or quickly consulted. Recent developments in native title, human rights conventions, legislation and government policy now make it imperative for researchers to review and change their practice. As a consequence, it is no longer reasonable for researchers to assume access to country, data and informants. Likewise, the new conditions of research demand that researchers enter into arrangements with Indigenous people regarding joint management of the research work. One response has been a shift to 'agreement-making', where researchers enter into arrangements for data sharing, intellectual property rights, training, resource exchange, fee for service arrangements, commercial partnerships and protocols for research activity. An agreement-making approach underpins design and execution of this research project.

The agreement-making process for this research project has had three loosely defined stages to-date (as of July 2014): (1) introductions, scoping and project adjustments with Aboriginal groups that might want to participate; (2) interviews and conversations in the field with Aboriginal people/groups who have agreed to be involved; and (3) community feedback at meetings in the Kimberley and Perth.² A similarly staged process was used by Ramirez-Gomez et al. (2013) in their participatory mapping research with Indigenous people living in five villages in southern Suriname (north-eastern South America).

In the first stage (1) WAMSI approached recognised Aboriginal organisations, and in particular the Kimberley Land Council (KLC), to discuss and progress the establishment of research agreements enabling and supporting the WAMSI research projects, including this one. WAMSI's aim was to create research partnerships providing useful research outcomes including benefits to Aboriginal people. They developed relationships with the KLC and Aboriginal Prescribed Body Corporates (PBCs) associated with the Kimberley coast. These Body Corporates hold and manage native title interests when a group of Aboriginal people succeeds in having their native title recognized in a Federal Court determination. PBCs oversee group interests and act as conduits for external interests and negotiations. The KLC is the Native Title Representative Body for the Kimberley region and assist Aboriginal people regarding their native title rights and interests (KLC 2014).

In tandem with and in consultation with WAMSI, the research team on this project also established relationships with a number of these PBCs and their Aboriginal ranger teams working on land and sea country through out the study region, as well as the KLC. Relationship building commenced early in the project, with researchers making contact six months prior to fieldwork and then maintaining ongoing contact with key persons from the Body Corporates and other relevant groups, presenting on the research and its potential benefits (and constraints) to each relevant Body Corporate, remotely in the first instance and then in-person. Prior liaison with people who had existing working relationships with these groups assisted in this regard by providing researchers with referrals or personal introductions to key contacts. The researchers remained open through out this process regarding the development and action on mutually beneficial arrangements.

² More stages are anticipated as this research is part on ongoing relationship building and consolidation.

In some instances engagement with the Body Corporates and other groups led to the development of formal research agreements; in others, it resulted in permission to carry out the research with members as well as a list of key contacts to approach. In the second stage (2) interviews were conducted with Traditional Owners (TOs) identified by the PBCs or who self-identified themselves as TOs, and with members of Aboriginal ranger teams. In the third stage (3) the researchers met with TO groups who had participated in the research to share the research findings (as a series of values maps in an A3 book, produced specifically for the sea country of that TO group). A map book was also prepared for another PBC who had been unable to participate in the interviews, but who expressed a particular interest in seeing the results for their sea country.

2.1.4. Conducting ethical research

The research was conducted in accordance with approvals gained from the Murdoch University Human Research Ethics Committee (Permit No. 2013/033). Transparent research processes, requirements for informed consent and the right to refuse or withdraw participation helped to ensure the project was conducted in an ethical manner. Engagement with Aboriginal people was a carefully considered component of the research approach, as detailed above. Prior to commencing the interviews, participants were emailed or handed a brief information postcard outlining project intent and introducing the key researchers (Appendix 1). They were also asked to sign an informed consent form outlining data confidentiality, anonymity and right to refuse or withdraw participation at any stage (Appendix 2). Participants were also asked to indicate if they wished to receive a copy of their interview and/or project reports when available. Access to raw interview transcripts and maps was restricted to members of the research team. Project partners and funders were provided with access to higher level, aggregated data only.

2.2. Data collection

2.2.1. Interviews

Data collection relied on face-to-face, semi-structured interviews (Neuman 2012), consisting of 8-10 open-ended questions derived from the landscape values literature (Klain & Chan 2012) and focused on eliciting the values attached to the Kimberley coast (Appendix 3). Although the same core questions covered what was important, what was valued, and threats and preferences for the future, the interview questions were structured and worded slightly differently for different respondent groups. Separate interview scripts were used for non-tourists (Appendix 3a), tourists (Appendix 3b) and Aboriginal people (Appendix 3c). Particular attention was paid to ensuring culturally appropriate design and framing of the Aboriginal interview questions, as well as how to conduct the interviews, accounting for the important role of storytelling in communication (Schuler et al. 1999). Probes were used as appropriate to more fully explore peoples' responses. At the start of each interview, an interview data sheet was completed, including a unique interview identification code, date, time and place of interview, and respondent name(s) and affiliation(s) (Appendix 4). This technical report presents to results from the values-related questions only. The other results (perceptions of threats, aspirations for the future) will inform subsequent stages of this research.

Participation was voluntary, and with permission interviews were digitally recorded to enhance the accuracy of interpretation. Comprehensive notes were taken in instances where permission to record was denied or impractical. All digital recordings were transcribed for analysis. Once completed, transcripts were returned to participants and their feedback sought to further ensure accuracy of research data. Prior to fieldwork, researchers contacted potential participants occupying professional roles by telephone and/or email to request their participation. At this point, participants were given background information on the study and an appointment for an interview was made. A few days prior to the interview the respondents were re-contacted to confirm interview date and time and to ensure their availability. Other participants (e.g. tourists, local residents) were typically approached in person on the day of interview or just prior to request participation.

2.2.2. Participatory values mapping

The interviews included participatory mapping based on a series of six 1:1,000,000 topographical base maps covering the entire study area (Figure 2). A more detailed map of the Broome region, encompassing the Dampier Peninsula (1:250,000) was also produced to allow for a more detailed consideration of the most populated and visited part of the Kimberley coastline. Considerable effort was invested in annotating the maps with well-known place names to ensure adequate representation of key coastal access points and destinations, tourist nodes and Aboriginal communities. The maps served as values elicitation tools and formed an integral part of data collection, with interviewees asked to locate and mark up to five places of importance to them on the maps. Respondents were free to choose which and how many of the maps they marked their places onto.

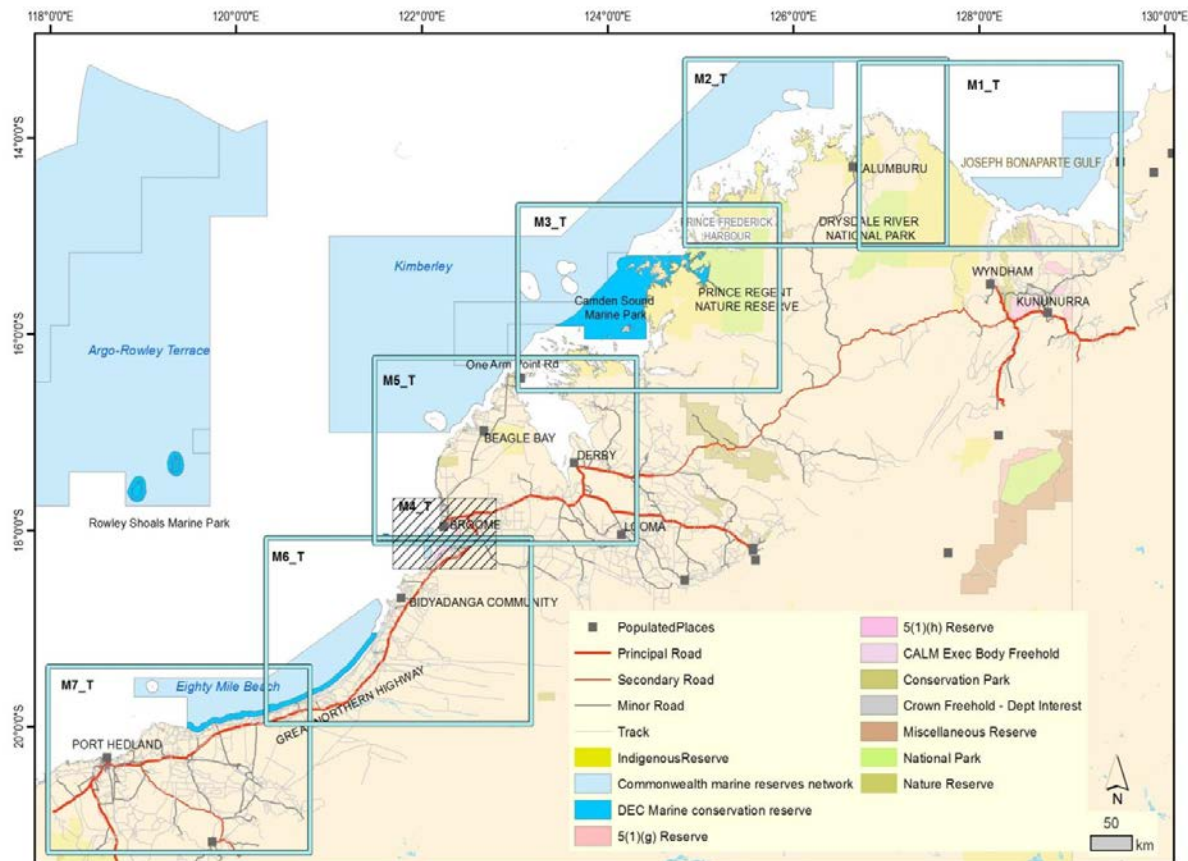


Figure 2 Index of seven maps of the study area used in the interviews

No restrictions were placed on respondents regarding the shape or spatial extent of the areas they mapped as important. A similarly “unconstrained” approach was taken by Klain and Chan (2012) in mapping coastal values in British Columbia (Canada), by Ramirez-Gomez et al. (2013) in their recent research with five indigenous villages in South America, and by Black and Lijebblad (nd) in their mapping of place attachment in the Bitterroot National Forest, in the northern USA. A number of other studies rely on respondents placing dots with pre-determined values on maps (e.g. Brown & Weber 2011, Brown & Weber 2012). Dots or points were not used in this study because of a hesitancy to pre-determine values for respondents (which usually accompanies such an approach) and a desire to access unique landscape and seascape experiences of the Kimberley which may extend beyond the spatial extent of a single point or even a set of 5-10 points. In addition, associations people have with the Kimberley coast may be related to a set of connected locations as opposed to individual land or seascape points, as exemplified by Aboriginal songlines.³ Each of the mapped important places was then discussed in further detail with each respondent to explore the range of personal and broader societal values associated with that particular place (Appendix 3). Using maps assists people to translate their cognitive knowledge and understanding of the landscape into cartographic and descriptive information (Ramirez-Gomez et al. 2013) on social values.

2.3. Data entry and analysis

2.3.1. Spatial data entry

Once fieldwork was completed, the individually drawn important places from each map (hereafter ‘polygons’) were digitised to closely reflect the areas sketched by each respondent. The smallest spatial footprint possible,

³ The next phase of this project (in 2015) will use web-based participatory mapping and dots to expand on the findings presented in this report and also to investigate how point-based mapping (i.e. dots) performs, relative to the “unconstrained” approach in this part of the study, when values are associated with large and/or dispersed features.

due to the scale of the maps provided (1: 1,000,000), corresponded to 1 km diameter, given that this equated to 1 mm wide dot (the size of the smallest dot that can be drawn with a pencil/pen). All polygons were digitised to accurately represent the location and scale at which they were drawn on the original paper map. ArcGIS software was used to convert these map data into digital format and create an associated database.

The geographical position of each digitised polygon was checked, as was polygon context (i.e. river mouth, bend of the river for camping etc.). A number of other rules were developed during the digitisation process to ensure consistency of spatial data entry (Table 3). A database was established in Excel including a unique identifier for each interview and for every polygon digitized. A validation process for all maps and interviews was run against original interview sheets and the hard copy maps to ensure correct digitisation from these maps as well as checking the correct assignment of respondent codes and polygon labels.

Table 3 Summary of spatial data entry rules used during head-up digitising

Issue	Resolution/rule	Comment
Area indicated by single line drawn along the coastline	Narrow polygon digitised along same part of the coastline	Inland incursion was limited to maximum of 5 km.
Only name of town/location circled	Polygon drawn around the perimeter of the settlement/location	Minimum size, circle of 1 km diameter. Exception was when the spatial footprint was larger than 1 km diameter, and then the geographic extent was used to delineate the boundary e.g. Broome boundary was derived from high resolution remotely sensed images
Cable Beach or other specific beach name circled	Beach extent as per Short (2005) was used to draw the polygon	Exception was 80 Mile Beach where Commonwealth Marine Park boundaries were used
Roebuck Bay drawn as smaller polygon compared to its actual geographic extent	Boundaries drawn as per interviewee intention unless marine park was mentioned and then the polygon followed state marine park boundaries	
Small towns on the coast with marine infrastructure	Small towns were digitised to include the spatial extent of the port/jetty	Wyndham, Derby
Cygnets Bay (referring to Cygnets Bay Pearl Farm) mentioned in the interview and bay in the general locality outlined on the map	Spatial extent included body of water from Skeleton Point to Willie Point	Spatial extent validated by Short (2006) as the pearl farm is actually located in Catamaran Bay
Horizontal Falls chose either by circling the name or by drawing polygon around the location	If only name circled, small polygon (diameter 1 km) drawn at the location of the falls as marked on the 1:250,000 topographic maps, else, exact spatial extent of the polygon was digitised	

2.3.2. Qualitative analysis of interviews

Interviews were analysed using grounded theory (Glaser & Strauss 1967, Corbin & Strauss 1990), an inductive technique generating themes ("theory") from constant comparison of patterns and emerging concepts from qualitative data, such as interviews. Rather than imposing categories on data, this interpretivist research method (Creswell 2003) relies on the emergence of themes from careful analysis of data, such as interview transcripts. In this study, each transcript was analysed to identify key themes or ideas emerging from the data relating to the socio-cultural values held for the Kimberley coastline and marine environment. As new transcripts were considered, and existing transcripts re-considered in an iterative process, these key themes evolved from less nuanced, descriptive ideas into more refined conceptual codes reflecting the values held and expressed by respondents. While emergent from interview data, the coding process was also informed by a

simultaneous review of the landscape and coastal values literature, which encompasses related themes reflecting socio-cultural values. The end result was a set of mutually exclusive categories for these values.

Care was taken in this coding process to provide clear, mutually exclusive definitions of each value in order to avoid 'double counting' of values. This iterative coding and analysis process, based on reading and re-reading interview transcripts, was accompanied by assignment of values to the polygons. That is, at the same time an interview was analysed to fully describe and understand the values, values (often more than one) were assigned to each of the polygons drawn by that respondent. As these value categories were attached to individual polygons, they recorded alongside the polygon identifier information in the database.

Analysis was facilitated by the qualitative, data coding program NVivo 10. NVivo assists analysis by enabling large amounts of interview text to be coded, and for initial codes to be subsequently restructured as the iterative coding process evolves. Analysis of large amounts of data-rich qualitative transcripts is thus made easier. Coding output generated through the use of NVivo informs the results presented in Chapter 3 of this report.

Once analysed, the emergent value categories were organised according to the values typology overviewed in the 1.2.1 *Values typologies*. The headings for this categorisation were: (1) direct use, non-consumptive values; (2) direct use, consumptive values; (3) indirect use values; and (4) non-use values. Use value refers to ecosystem services used by humans for consumption or production purposes. Included are tangible and intangible services of ecosystems used directly or indirectly. Direct use, non-consumptive values for the Kimberley coastal waters could include appreciating the physical landscape or Aboriginal culture (excluding hunting). Examples of direct use, consumptive values are camping, fishing and tourism, all activities that can potentially impact on the natural environment. An indirect use value is biodiversity – something that can be valued from afar as well as onsite. MEA (2005) identifies clean water, soil nutrients and pollination as indirect use values, with biodiversity being a similar value. The term 'non-use values' encompasses bequest and existence values, both referring to values that may not now (or ever) be useful to humans but are nevertheless valued.

2.3.3. Spatial data analysis

Three stages of spatial analysis were undertaken. The first, basic stage was to show all polygons (as lines) on maps of the area. This gave a first visual impression of the extent and density of mapping. The second stage was providing overview maps for each value. Once values had been assigned to all the polygons, that is, for each respondent all the values mentioned for a particular place (delineated as a polygon) by that person had been assigned to that place, for all their places, *and then* the same process undertaken and completed for *all* respondents, then overview maps for each value were generated.

A GIS database of all polygons, which included the Excel database linking polygons and values, provided the source for these overview maps. A macro model within ArcGIS was developed to thematically split the database into GIS files based on the individual values identified through the NVivo analysis. For each value an overview map was generated. The geographic context of the single value polygons contributing to these overview maps was checked to eliminate any ambiguity or errors in data entry. As well, this stage offered the opportunity to remove the sharp edges of polygons as later these created sliver features in overlay analysis, which could not be sensibly interpreted. Polygons were also clipped to within 20 km of the landward extent of mean high water mark, given the marine and coastal focus of this research.

The third and final stage involved analysis of overlapping polygons in order to calculate how frequently different participants selected the same parts of the study area for any particular social value. Another macro model in ArcGIS was constructed to split the multi-part polygons ('made' multi-part where they overlap with other polygons) into single polygon segments. This splitting then allowed counts of the spatial frequency based on the number of overlapping polygon (parts). A frequency table counting overlapping polygons for each value allowed cartographic representation of the output 'heat maps'.

The final heat maps were created using two frequency ranges. The aim in using this approach was to provide sufficient differentiation in the heat maps to show high and low frequency occurrences for each value. The two frequency ranges applied were a minimum of three and a maximum of five frequencies, with more frequency categories applied to describe the more frequently mapped values, and fewer categories applied for values that received less attention. As part of this last stage, the 'valued study area' was defined and its area calculated as reflecting the geographic footprint of all combined value polygons. The percentage of the 'valued study area' occupied by more than 10 overlapping polygons for each value was then computed to indicate relative importance by area for each value. Therefore, results are provided for the frequency of occurrence for each value and its relative importance by area. Heat maps were validated against the existing tourist maps and high resolution topographic maps and imagery to check for any obvious misalignment of values in geographic space, for example camping in the ocean.

In this participatory mapping the rationale for heat maps derives from Brown and Reed's (2009) understanding that aggregations of special place maps (i.e. the heat maps generated in this study) exhibit a degree of collective, spatial consistency. These authors draw on Surowiecki's 'wisdom of the crowd' saying that a diverse collection of individually determined value maps brought together on a GIS platform can produce collective spatial information that is better than that of individuals and even experts (Surowiecki 2004, in Brown & Reed 2009).

3. Results

3.1. Response and respondent details

A total of 167 interviews was completed, which included 232 people. Most interviews were with one person, however, a number were with two or more (and up to six) people. Table 4 summarises these numbers by stakeholder group, with interview numbers given in each cell of the table. The total number of people interviewed, where there was more than one person present at the interview, is given in brackets in each cell. This report is based on 152 of these interviews because at the time of writing, 15 interviews⁴ were still being transcribed and hence were not yet available for analysis. Interviews varied from 20 minutes to two hours duration.

Respondents were 'allocated' to a stakeholder group based on the group they were contacted as being part of (e.g. tourism industry), with this allocation modified during the interview, as and if needed, based on their most obvious professed interests and activities associated with the Kimberley coast. The group they were placed in was influenced by what they were doing (e.g. their professional and other roles that led to them being interviewed), obviously undertaking activities (e.g. being a tourist), where they lived, or expressions of affiliation.

The last category was particularly evident in interviews with Aboriginal people who were Traditional Owners. Because of Aboriginal connections with country and the centrality of their values to this research, they were primarily allocated as Aboriginal Traditional Owner, ranger or resident rather than other affiliations they may have held, such as members of the tourism industry. A total of 31 Traditional Owners and 12 Aboriginal rangers were interviewed. Interviews were also conducted with 7 Aboriginal residents (Table 5).

Many respondents identified with more than one stakeholder group on the basis of residence and current and previous activities in the Kimberley. As such, respondents were allocated to one primary stakeholder group with up to three other secondary affiliations were recorded. Such allocations were undertaken to ensure and report on a broad diversity of respondents (Table 2). Interviews were undertaken with people from 20 stakeholder groups (Table 4). Tourists and the tourism industry were a special focus, with 66 and 18 interviews respectively. Interviews were conducted with stakeholders from the main marine industries of the Kimberley coast: commercial fishing (3 interviews); aquaculture (4); mining, oil, gas and tidal energy (3); marine transport (4); and aviation (6). Tourism industry details have already been mentioned. Interviews were completed with staff from three levels of the Australian government, including 7 interviews with Department of Parks and Wildlife staff.

⁴ Interviews still being transcribed (as of July 2014) include: tourists (2), tourism industry (2), State government (3), Department of Parks and Wildlife (2), local government (1), mining, oil, gas & tidal energy (1), non-Aboriginal resident (2), Aboriginal Traditional Owner (1), Aboriginal resident (1), and other (1) (15 in total).

Table 4. Number of interviews and total numbers of people interviewed in 2013

Location/ Stakeholders	Tourists	Tourism Industry	Commercial fishing	Recreational fishing	Department of Parks and Wildlife	Other State Govt	Local Govt	C'th Govt	Aquaculture	Mining, oil, gas & energy	Marine transport	Ports	Aviation	Yatchies	ENGO	Residents (non Aboriginal)	Aboriginal TOs	Aboriginal rangers	Aboriginal residents	Other ^a	Total # interviews
Darwin										1(1)				2(6)							3
Kununurra/ Wyndham		4(5)	1(1)		1(1)							1(1)				3(3)					10
Yampi Sound											3(3)			2(3)							5
Derby	2(3)	2(2)		4(4)			1(2)						2(2)			7(8)					18
One Arm Point																1(1)	1(1)	5(5)			7
Cape Leveque	15(24)								2(2)				1(2)			1(2)	2(2)		1(1)		22
Lombadina																1(1)	1(1)		1(1)	1(1)	4
Djarindjin																	2(5)		1(1)		3
Chile Creek																	1(1)				1
Middle Lagoon	3(7)															1(1)			1(1)		5
Pender Bay																	1(1)				1
Gnylmarung community	2(7)																				2
Beagle Bay																	1(1)	1(3)			2
Broome	5(14)	7(10)	2(3)		4(4)	4(4)	2(2)	1(1)	2(2)		1(1)		3(3)	3(4)	5(5)	4(5)	7(9)	4(4)	3(3) ^b	1(1)	58
80 Mile Beach/Eco Beach	6(11)															2(3)					8
Bidyadanga																	4(10) ^c			2(2)	6
Perth		1(1)			1(2)	1(1)				2(3)				5(5)	2(2)						12
Total # interviews	33	14	3	4	6	5	3	1	4	3	4	1	6	12	7	20	20	10	7	4	167
Total # people	66	18	4	4	7	5	4	1	4	4	4	1	7	18	7	24	31	12	7	4	232

^a Persons with a history of working with Aboriginal people and Aboriginal organisations who were not in any other category.

^b Includes one resident who was not a member of a coastal Aboriginal group.

^c Includes TOs who are also rangers.

Table 5 . Number of interviews with Aboriginal Traditional Owners, rangers and residents and total numbers interviewed in 2013

Aboriginal Group ^a	# interviews (# people)			Locations interviews undertaken	Agreement with TO group at time of interviews
	Traditional owners	Aboriginal rangers	Aboriginal residents		
Mayala	1 (3)			Broome	TOs sought voluntary inclusion in the research
Bardi	6 (9)	5 (5) <i>One Arm Point</i>	3 (3)	Broome, Lombadina, Djarindjin, Chile Creek, Cape Leveque, One Arm Point	MOU with WAMSI entered into
Baniol		1 (1) <i>Broome</i>			MOU with WAMSI entered into (under auspices of Yawuru rangers)
Jabirr Jabirr			1 (1)	Broome	Resident sought voluntary inclusion in the research
Nyul Nyul	2 (2)	1 (3) <i>Beagle Bay</i>	1 (1)	Broome, Beagle Bay, Middle Lagoon, Pender Bay	TO, rangers and residents sought voluntary inclusion in the research
Yawuru	7 (7)	3 (3) <i>Broome</i>	1 (1)	Broome, Djarindjin, Chile Creek	MOU with WAMSI
Karajarri	3 (8 ^b)	<i>Bidyadanga</i>		Broome, Bidyadanga	Direct contact with PBC based on WAMSI advice
Nyangamarta	1 (2)			Bidyadanga	Direct contact with PBC based on WAMSI advice
Other			1 (1)	Broome (Aboriginal resident from Fitzroy Crossing way)	--
Total # interviews	20	10	7		37
Total # people	31	12	7		50

^a Reflects stated primary affiliation only. A number of Aboriginal respondents identified with two or three groups e.g. Baniol/ Yawuru, Yawuru/ Karajarri, Bardi/ Nyul Nyul.

^b Six of these TOs are also rangers.

Interviews were focused in seven main geographic areas: Darwin, Kununurra/Wyndham, Derby, Broome, the Dampier Peninsula, Eighty Mile Beach and Perth (Figure 3). These areas provide the principal access routes to the Kimberley coast as well as being key tourist nodes. Site selection was further guided by a research focus on the new and proposed marine parks and logistical challenges of accessing a large proportion of the coastline. Interviews were performed at key access points for all marine parks with the exception of the North Kimberley Marine Park, for which no land-based interviews were achieved. The reasons for this were twofold. First, it is expensive and takes a long time and extended four wheel drive travel to reach Kalumburu, the coastal access point for the Park. Second, at the time of fieldwork WAMSI was still in the process of establishing a working relationship with the Wunambal Gaambera Aboriginal Corporation (based at Kalumburu) making it premature for this project to be progressing agreement-based research with the Traditional Owners in this area.

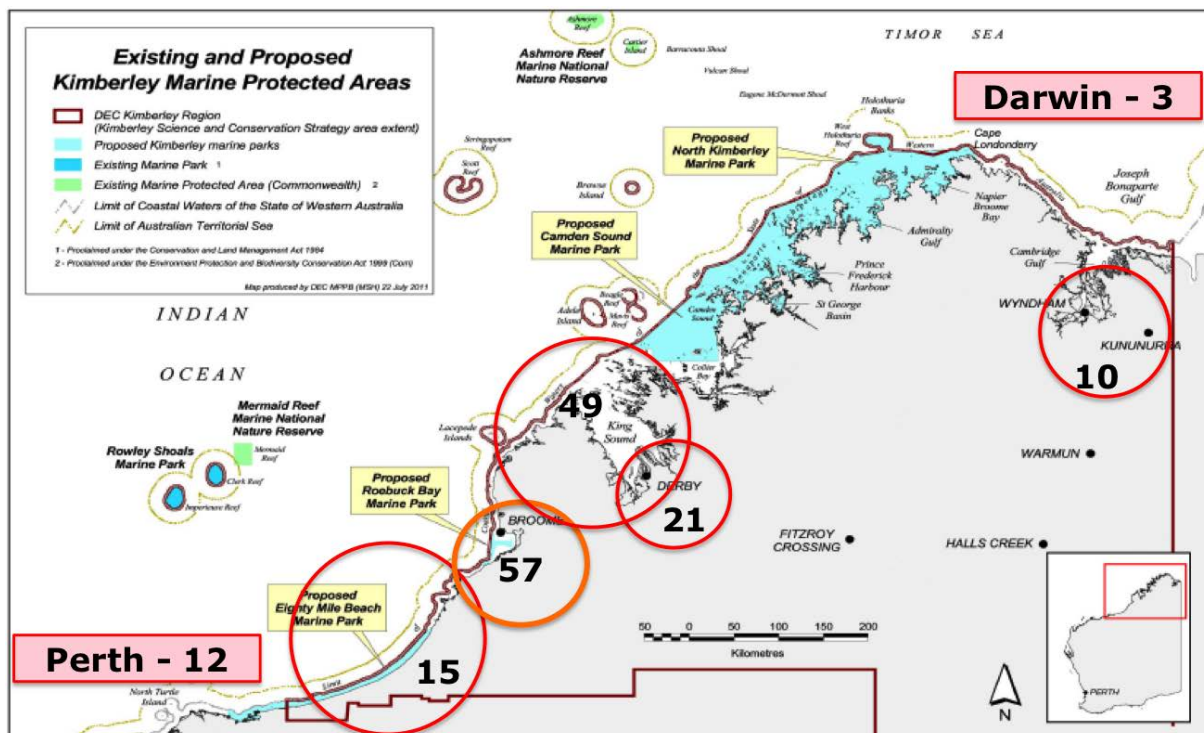


Figure 3 Number of interviews according to geographic location

Four researchers undertook the fieldwork, with one (JSM) based in the Kimberley for four months. Another researcher (JMcB) spent an extended period of time on a yacht between Broome and the Buccaneer Archipelago and interviewed yachts people over this time. Interviews at Bidyadanga were facilitated and undertaken by DP; SM undertook interviews in Broome towards the end of the fieldwork period. In this fieldwork, two individuals declined to be interviewed giving a response rate of 99%, with this rate tempered by the variable extent of engagement by Aboriginal Traditional Owners in this research project.

A total of 11 Aboriginal groups were approached and/or became involved in this research (Table 6). This resulted in interviews with Traditional owners and/or rangers from 8 groups (Table 5). In line with the agreement-based approach to this research, multiple stages of engagement were undertaken, as detailed in 2.1.3. For most groups, the PBC was contacted by phone and or email, followed by contact in-person, meeting attendance and/or in-person liaison with ranger coordinators (see Table 6 for details). For some Aboriginal people (e.g. Jabirr Jabirr) they contacted JSM direct, to be involved in the research.

Table 6 Overview of research contacts with Traditional Owners and Aboriginal rangers and resident

TO Group	WAMSI contact	Contact via KLC	RT PBC contact (phone/email)	RT PBC contact (personal: 1-on-1)	RT PBC meeting attendance	Ranger coordinator (contact by phone/email)	Ranger coordinator (personal: 1-on-1)	Direct TO contact (ph/email)	Direct TO contact (in person)	Direct Ab resident contact
Karajarri-Nyangumarta						x	x			
Yaruwu	x		x	x	x	x	x			
Jabirr Jabirr										x
Goolarabooloo								x ^a		
Nyul Nyul						x	x		x	
Mayala								x	x	
Bardi Jawi	x	x				x	x	x	x	
Dambimangari	x		x		x	x				
Wunambal Gaambera	x		x							
Balanggarra ^b										
Kimberley Land Council		x								

WAMSI – Western Australian Marine Science Institution.

KLC – Kimberley Land Council.

TO – Traditional Owner.

RT PBC – Research Team Prescribed Body Corporate contact.

^a No follow up due to time constraints.

^b Time and cultural constraints (i.e. sorry business) precluded research engagement.

3.2. Categories of values

A total of 17 mutually exclusive categories of values were obtained from analysis of the interviews using a grounded theory methodology, assisted by coding and re-coding using the software package NVivo 10. The 17 values are described here in a way that seeks to honour both coding diversity and richness. Diversity within each value is captured by expanding on the elements that together describe each value category. For example, the value ‘Aboriginal culture’ includes the elements of ‘cultural sites’, ‘connection to country’, evidence of historical use’, and ‘transmission of cultural knowledge’. Richness of coding and values is achieved through the use of excerpts from the interviews to illustrate key themes and elements.

The values are ordered and the results provided here according to the value sets overviewed in Chapter 1, being (1) direct use – non consumptive, (2) direct use - consumptive, (3) indirect use and (4) non-use values (Table 7). Within each set (e.g. direct use – non-consumptive), the associated value categories (e.g. physical landscape) are presented and described in order of how often they were mentioned by respondents as a percentage of the entire interview dataset. Each set begins with the most often mentioned category and works through to the least mentioned. This ordering reflected the relative dominance or importance of the value categories within the total dataset, with two exceptions. These are ‘Recreation – other’ and ‘Experiential’, with the associated rationale provided in the relevant sections below.

Each value category (e.g. physical landscape) is comprised of a number of elements, again presented in decreasing order of frequency of mention. For example, the physical landscape category includes a number of elements such as aesthetics and wilderness. Respondents typically mentioned more than one element within

each value category; as such, the percentage significance accorded to the elements comprising a value category often sum to greater than 100%.

Representative interview excerpts are used to define and describe value characteristics. Excerpts are reported verbatim with minor editing to improve readability. Most of the excerpts are coded as (JSM) given this researcher conducted most of the interviews. Attribution of quotes is made to a particular stakeholder group, with the proviso that respondents were often had multiple groups with whom they had affinities.

3.3. Direct use, non-consumptive values of the Kimberley coast

The first set of values evident from the interviews was grouped and identified as direct use, non-consumptive values. This grouping implies that although the Kimberley coast was directly used in the attainment of value, the quantity of goods or value available was not diminished or reduced as a result. Direct use, non-consumptive values evident from analysis of the interviews included: physical landscape, Aboriginal culture, therapeutic, recreation – other, social interaction and memories, learning and research, experiential, historical and spiritual. Each of these values is considered below together with elements thereof as appropriate.

3.3.1. Physical landscape

'Physical landscape' includes values derived from components of both the Kimberley coast and marine environment. References to the Kimberley coast's 'Physical landscape' were present in 77% of the entire interview dataset. These responses were contextualised through specific reference to particular elements of the physical landscape. The first of these is aesthetics, or values pertaining to the visual landscape of the Kimberley coast. Vibrancy of colours, and contrasts, form a key component of aesthetic values. The second major element of physical landscape value rests on the Kimberley's 'pristine untouched environment'. Other elements of value include the tidal phenomenon characterising the Kimberley coast, the coast's unique landscape, coastal geology, unique nature experiences, and values surrounding concepts of the coastline being 'wilderness' and a 'last frontier'. Each element of value is discussed below ordered according to their proportional attention in the interview data (i.e. from most mentioned first to least mentioned last). Respondents typically mentioned more than one element of 'Physical landscape'; as such, the percentage significance of each element discussed below does not sum to 100%. For example, 'aesthetics' was often mentioned in conjunction with 'pristine environment' and 'coastal geology'. Further values identified from the data including 'spacious landscape' and 'ruggedness' are not discussed here given they appeared in less than 10% of interviews.

Aesthetics

'Aesthetics', defined as values relating to the personal pleasure derived from viewing or experiencing attractive scenery encountered in the physical Kimberley coast landscape, was the most widely held value to emerge from the interview data, for all the value categories considered. Aesthetic value or 'the majestic scenery of the Kimberley region' [Female yachtsperson JIM259] was mentioned in 63% of all interviews. Others mentioned specific elements thereof including visual contrasts and colours in the landscape, waterfalls as key aesthetic attractions, and Kimberley sunsets. Terms captured under the aesthetic category of value included 'stunning', 'beauty', 'pretty', 'stunning', 'picturesque', 'gorgeous' and 'physical and natural beauty', as illustrated by the following excerpts.

'The entire coastline is awe-inspiring. There's nothing that hasn't been, "wow". It's fantastic. Every single thing we look at, it's always, "huh", jaw-droppingly beautiful' [Male & female Tourists JSM44].

'Classic pure nature and the beauty of nature' [Female yachtsperson JIM258].

'It's stunning – stunning places and they're important from my point of view just witnessing that thing and travelling through there you know...just experiencing the beauty of the place' [Male, Mining, oil, gas & energy industries JSM117].

Aesthetic or scenic value was typically cited as a key motivating factor for visiting a particular place: 'it's not the fishing that we go there for it's the beauty' [Husband & wife, Yachts people JSM1]. This was especially true for members of the tourism industry: 'a lot of the trips we do up there are purely scenic... the scenery is just beautiful so you never get sick of it, you can go there six times and it's still you know really amazing' [Female, Tourism industry JSM109].

Aesthetics in a general sense was most commonly mentioned by tourists (24% of all responses). This was followed by responses from Aboriginal rangers and Traditional Owners (13.5% of responses), non-Aboriginal residents (11%), members of the tourism industry (11%) and yachts people (10%). 'Aesthetic' values were also noted from a range of other stakeholders although at lower frequencies.

Table 7 Categories of values from the interviews and their definitions

Value category*	Definition
<i>Direct use, non-consumptive values</i>	
Physical landscape (77%)	Values derived from components of the physical landscape. Major elements: aesthetics, tidal phenomenon, coastal geology, unique nature experiences, the Kimberley's 'pristine untouched environment', and the coastline being 'wilderness' and a 'last frontier'.
Aboriginal culture (63%)	Values derived from the transmission of Aboriginal wisdom, knowledge, traditions, and way of life. Major elements: cultural sites, connection to country, evidence of historical use, and transmission of cultural knowledge. DOES NOT include SPIRITUAL values relating to profound or awe inspiring nature experiences as expressed by non-Aboriginal people.
Therapeutic (62%)	Values derived from places that make people feel mentally better, calm, or recharged. Major elements: escapism, relaxation, remoteness, and personal recharge.
Recreation—other (62%)	Values derived from places that provide opportunities for outdoor recreation unrelated to camping or fishing. Major theme: exploration.
Social interaction and memories (56%)	Social values derived from a place. Major elements: social experience and home/ childhood memories.
Experiential (51%)	Values derived from places offering a unique personal experience. Major elements: adventure, iconic destination, 'blown away' experience, private experience.
Learning and research (34%)	Values derived from the ability to learn from a particular place. Typically expressed in terms of scientific research, but also monitoring, exploration, discovery and more generally the ability to learn about the environment (i.e. 'lay' learning). DOES NOT include transmission of cultural knowledge within Aboriginal society (included in ABORIGINAL CULTURE).
Historical (19%)	Values derived from places of natural and human history that matter to an individual, others, Australia or the world. Major elements: European and missionary history. DOES NOT include evidence of historical Aboriginal use (included in ABORIGINAL CULTURE).
Spiritual (11%)	Values derived from places that are sacred, religious, unique, or that provide deep and/or profound experiences of nature. Typically related to an expressed reverence/ respect for nature by non-Aboriginal people. Major elements: nature as a spiritual landscape. DOES NOT include ABORIGINAL CULTURE e.g. those values related to the transmission of wisdom, knowledge, traditions and way of life.
<i>Direct use, consumptive values</i>	
Recreation—camping (58%)	Values derived from places that offer recreational activities centred on overnight or longer stays in transient and/or fixed accommodation in coastal areas.
Recreation—fishing (54%)	Values derived from places that offer recreational activities relating to the catching of fish species as well as gathering of other marine life e.g. mud crabs, cockles, oysters and stingrays. DOES NOT include fishing undertaken by Aboriginal people as this activity was more commonly referenced as subsistence rather than recreational pleasure.
Subsistence (44%)	Values derived from places that provide for basic human needs. Major elements: subsistence food collection and fresh water provision. DOES include Aboriginal hunting where specifically mentioned in the context of subsistence hunting.
Economic—tourism (36%)	Generic tourism values, or more specifically refers to eco or nature based tourism, or Aboriginal cultural tourism.
Economic—commercial fishing, pearling and aquaculture (24%)	Values derived from commercial fishing, aquaculture and pearling activities. DOES NOT include subsistence food collection (included in SUBSISTENCE).
<i>Indirect use values</i>	
Biodiversity (80%)	Values derived from the presence of flora, fauna and/or other living organisms. Major elements: marine fauna, reef biodiversity, migratory shorebirds and mangroves.
<i>Non-use values</i>	
Bequest (7%)	Values derived from places that offer future generations the ability to know and experience places, landscapes and habitats as they are now.
Existence (4%)	Values derived from knowing that a particular place, environmental resource and/or organism exists, regardless of having physically been to or directly used an area.

* Numbers in brackets refer to percentage of interviews in which each value is mentioned.

In describing aesthetic value, respondents often repeated the same or similar terms to emphasise the values placed on a given area. For example, 'oh it's beautiful... very, very scenic... extremely really scenic there... It's very scenic... Really scenic ...very, very scenic' [Partners, Tourism industry JSM104].

Similarly, it was common for respondents to struggle with adequate ways to describe aesthetic values derived from their experience of the Kimberley coast, with many noting sentiments that 'words cannot do it justice':

'I've seen some really good countryside but not... All the way, we think it can't get any better than that. It's amazing. [We] just keep running out of words to describe things... it's been gobsmacking' [Husband & wife, Tourists JSM114].

'They're all beautiful places that just have something very special about them which is, maybe a little bit intangible, or unexplainable' [Female, Protected area manager JSM13].

Wonder and appreciation of the colours of the Kimberley, particularly the contrast between colours, was a key component of aesthetic value. Reference to visual or colour contrasts was evident in 25% of all interviews. Such responses emphasised the difference between the characteristic visual elements of the Kimberley: red pindan cliffs and soil, clear blue water, and sparkling white beaches. Responses arose largely from tourists (36% of all responses), members of the tourism industry (13%) and Aboriginal residents, rangers and Traditional Owners (also 13%). Response after response highlighted the vibrancy of the landscape and juxtaposition of contrasting elements and colours. For instance:

'You get the blue seas coming up against the white beaches and the white beaches right onto the red cliffs' [Male, Aboriginal ranger JSM14].

'The colours are the thing that stand out for me like the blue and the red and the green of the land. And wherever I go in the Kimberley, those colours just hit me in the face and remind me of all of that, I just love them. I love that experience of seeing that' [Female Tourists, JSM20].

'It's been stunningly beautiful and the colours, the contrast of the colours, like going out on the boat, the colours of the water was amazing, aquamarine blue wasn't it- and then you look back and there is like the white sands and the red cliffs and blue sky. Everything is really bright' [Male Tourists SM197].

'[This] section of coast is just ridiculously amazing like all the contrast there...red cliffs...The green, the bush, the water, everything when it rains, the water...the red bleeds off into the water, it just looks amazing' [Males, Aviation industry JSM36].

Many respondents framed experiencing the colour contrasts as a highlight of their Kimberley experience, noting the visual phenomenon as 'obscenely beautiful' [Male, ENGO JSM87]. Some compared the Kimberley favourably to other global destinations boasting spectacular views. As put by one respondent:

'I've been to Antarctica and you know Antarctica you're looking around like you're just snapping your neck around looking at everything just going "oh my God, oh my God". The first time you go up here you do exactly the same thing. You know one's ice and black rocks and penguins and stuff and then up there [the Kimberley coast] you get the tidal mark then it's white or splash zone where it's red and then you get all the bushes and things and the colour contrast you get is amazing' [Male, Recreational fishing body JSM72].

Pristine, untouched environment

The 'pristine and untouched' [Male, Aboriginal ranger JSM51] environment of the Kimberley coast was a second element contributing to 'Physical landscape'. A total of 33% of all interviews explicitly referred to terms such as pristine, unspoilt, natural and untouched in their descriptions of value. The majority of responses arose from tourists (29% of responses), followed by non-Aboriginal residents (15%) and Aboriginal rangers and Traditional Owners (12.5%).

Most references to the value of pristine, untouched nature noted the Kimberley coast as an unspoilt environment, a place where humans had not yet had a significant impact. Illustrative quotes include 'the area there is like seeing Australia as Captain Cook saw it, totally untouched' [Husband & wife, Tourism industry JSM7] and 'it's quite virgin, in that the country hasn't been upset' [Male, Non-Aboriginal resident JSM78]. Interestingly, such sentiments were particularly poignant among Aboriginal respondents when talking about country:

'I would just describe it as heaven. Peaceful, beautiful, untouched, pristine country, unspoiled...I'll describe it as the most pristine, beautiful, untouched land that you can enjoy for as long as you like' [Female, Aboriginal Traditional Owner JSM48].

'The nature side of things, natural things. You go out to our country; you see these birds, hundreds and thousands of them, whales and all those, areas that never been touched. Things are still there' [Male, Aboriginal Traditional Owner and Male & female, Aboriginal residents JSM107].

'The value in that coastline is its pristine condition. If it's not pristine anymore it doesn't have that value. So pretty much the people want to go and see it for what's not there. Rather than what should be there or what could be there... I would say that it is in the best condition naturally as it ever was and you know it is a beautiful coastline' [Male, Aboriginal Traditional Owner JSM49].

The outstanding condition of the Kimberley coast made it unique in a global sense, in that it is increasingly rare for the earth to possess such untouched environments. For example:

'The fact that it's virtually untouched and there is not many places left that are like that. So apart from its physical beauty, is the remoteness and the fact that it's almost, I imagine, in its original condition' [Male Yachtperson JIM257].

'Compared to the rest of the planet it's pretty pristine, it's the standout part. If you talk to people from overseas, they have nothing to compare it to, it's unique. Stuff's all clean' [Male, Aboriginal Traditional Owner JSM61].

'The fact that when you compare it to all the places around the globe it's actually in the top three percent of undisturbed, least impacted areas' [Male, ENGO JSM87].

The presence of such an unspoiled environment was for some residents a key motivation for living in the region: 'it's a relatively unspoiled beautiful part of the world which is, I guess, part of the reason you live in Kimberley...because those places do still exist' [Male, Non-Aboriginal resident JSM40]. The same premise applied for many tourists, who described the environmental condition as a key motivation for visiting the Kimberley: 'we heard it was pristine...but it's really to see, I guess, the wonderful conditions that are here, where there aren't many people...unspoiled' [Husband & wife, Tourists JSM18]. Others linked the Kimberley coasts' 'physically pristine.... healthy ecosystem' [Male, Aboriginal resident JSM43] to the need to protect and preserve the landscape:

'It's pristine and it's untouched and environmentally sound and it should stay that way' [Husband & wife, Tourists JSM114].

'[The Prince Regent is] one of the very few rivers in Australia which are almost untouched by human sort of inputs if you like, so because most of the headwaters are caught up in nature reserves there is no pastoralism affecting the inflows and [no] mining going on out there, [so it's] a bit of a jewel in the crown that needs to be maintained... just the fact that it's largely untouched it would be [ideal] to keep it actually untouched' [Male, State Government JSM119].

'There is such a difference between a fishing spot you know somewhere in a place like Broome or somewhere that's so populated and when you go to somewhere like Kuri Bay or anywhere along the coastline you know it's just that peaceful, there's no roads out there you know and you can sense it's very untouched. As far as conservation it's so untouched. I suppose it's interesting to show people how untouched it is and how beautiful it is and how beautiful this area can be, if you look after it. So I suppose looking at it is how can we preserve this area in future to keep it so unique' [Male, Non-Aboriginal resident JSM6].

While the overwhelming majority of responses simply referred to the coast as 'pristine', there was some recognition that the current environmental condition was not in fact pristine and had been subject to both natural and anthropogenic changes:

'It's untouched really... it's one of a kind I suppose, it's still very untouched... How it is now is how it was back then, just slight changes' [Male, Aboriginal resident JSM43].

'It is [as] untouched, as something could be in the 21st century' [Female, Tourism industry JSM88].

Tidal phenomenon

Awe, respect and wonder at the tidal phenomenon characterising the Kimberley was a third element in the 'Physical landscape' category, accounting for 30% of all interviews. With a tidal range of between 3-11m (Short 2011), the vast tidal movements and power thereof were defining features of this value set: 'It's just a place of extreme power and beauty' [Male, Aquaculture JSM33]. Tourists provided the bulk of such responses (22%), followed by non-Aboriginal residents and members of the tourism industry (both 11%). Responses centred on several main themes. The first of these concerned respondents being impacted or touched by the power of the tides. For example:

'Interviewee 1: The tide, the running tide, have you seen that? It's really interesting.

Interviewee 2: It's so fast isn't it?

Interviewee 1: That sort of left a mark on me, I've never seen anything like that before' [Female Tourists JSM20].

'Maybe it's because we don't have much on TV out here but even like going down the [Derby] wharf here on a big tide, and watching that water ripping out even after several years still blows me away. So, it's just to see the wave when it rips in and out is the awesome power of it. It's just...it's humbling I suppose' [Male, Recreational fishing body JSM70].

Others also commented on the power of the Kimberley tides, but in the sense of their activities being subject or subordinate to them:

'[It's a] place of power with the tide determines how you be and how you use it, a place to where you realize how powerful nature and the tide and the moon is and that you actually have to bend to its will rather than thinking you can control it' [Female, Other DPI21].

'Everything is dependent on tides in the Kimberley' [Partners, Tourism industry JSM104].

'With the tides...having to work with the tides it's half fun and it's half survival... everything is tidal, we work with the tides. So if the tide's in you walk along the beach, if the tide's out you might go out' [Male, Other JSM42].

Related to this was the danger inherent in such power, and the need to respect it.

'It's a pretty treacherous part of the world, there's big tidal rips, got to know what you're doing out there' [Male, Non-Aboriginal resident JSM40].

'Do I respect [the tides]? Greatly. To live and survive you've got to be on your game. And you got to bring your best game' [Male, Other JSM44].

'The tides are important to us. In certain tides we know we have to be somewhere safe, like cyclone season, big winds. We know to go to a launching area, put our boat somewhere safe' [Male, Aboriginal Traditional Owner JSM107].

'Stokes Bay is its own defence mechanism for the islands. It can go from a mill pond to a washing machine in micro seconds, and it has no general rhyme or rhythm to it. It's a wind driven washing machine, and can be very nasty' [Male, Recreational fishing body JSM73].

Tidal movements produced a number of effects, including dramatic changes to the landscape. As put by one respondent, 'a whole different landscape appears before me in the drop of a tide. You know I would come in to a place and you're sitting there having lunch on the boat and as you... the tides going out, and all this new stuff starts appearing, or the other way round, it starts disappearing and it's just amazing. Especially when you're sitting there over lunch and trees are there before lunch and then you finish lunch and look and the trees gone. You're like "far out"' [Male, Non-Aboriginal resident JSM62].

Respondents noted the sheer power of tidal movements repeatedly, with one describing the incoming tide as 'it's just like hearing ten electric trains coming towards you... you can hear it coming for an hour' [Male, Non-Aboriginal resident JSM55]. Another described her experience as 'watching the massive water whirlpools was incredible... there was a place where the boat was running and I can't describe it but the tides were almost like mating and fighting each other so the boat just stayed really in one place that was almost like, there was a waterfall, it looked like a waterfall in the middle of the ocean, that was quite incredible' [Female, Other DPI26].

Kimberley tides were further discussed in terms of providing an awesome or impressive occurrence. Such comments largely referred to two key phenomena: Montgomery Reef and the Horizontal Waterfalls. Both locations are impressive natural landscapes that provide spectacular evidence of Kimberley tidal movements - Montgomery Reef is a 400km² reef platform that appears to rise from the water as the tide drops and the Horizontal Falls create a visual spectacular as the rising or falling tide rushes through narrow vertical gaps in the rock face, creating a horizontal as opposed to vertical waterfall effect. Respondents linked tidal movements in these two areas to evocative phrases such as 'mind blowing' and 'awe inspiring' in which they outlined their personal response to witnessing these spectacular phenomena:

'Interviewee 1: We didn't actually realise what we were going to look at. We've heard of Montgomery Reef and I thought we were going to sail on there and look through the shallow water at the reef. But they sailed into the spot, threw over anchor and we sat there and it was like somebody commanded the earth to come up

through the water. And it rose a couple of meters out of the ocean...we were sitting in the middle and all this land came up either side of us, and we just went, "whoa". The experience was mind blowing, so to speak' [Husband & wife, Non-Aboriginal residents JSM21].

'Montgomery Reef is mind blowing when you go out there and actually have a look at it as far as the reef system that comes completely out of water and then goes back under water' [Male, Recreational fishing body JSM72].

Unique landscape

Values of the coast as a unique landscape 'like nothing else' contributed a fourth element to the 'Physical landscape' category. A total of 24% of interviews mentioned the Kimberley coast as a unique place unlike any other, 'it's one of a kind I suppose' [Male, Aboriginal resident JSM43], either within Australia or on a global scale. This response came from a variety of stakeholder groups, notably tourists (28%), non-Aboriginal residents (14%) and members of the tourism industry (11%). Residents and tourists alike cited the unique landscape as a drawcard for visitation, as illustrated by the following interview excerpts.

'I felt very privileged and special to be going through [coastal landscape from Kuri Bay through to Pender Bay] and just unique you know it's different. [Like] nothing I've ever seen before' [Male, Aboriginal ranger JSM14].

'It's so different than anywhere else in Australia that's probably more you know the reason we come up this far' [Male, Tourist JSM37].

'It's something that you've never seen before if you live in the city or on the other side of Australia. Or even in WA it's pretty much just one... it's something on its own. It's not like any other place. So yeah, it's an amazing spot really' [Male, Non-Aboriginal resident JSM69].

'Interviewee 1: It was so unique.

Interviewee 2: It's so unique, it is different from anything we have ever seen in the world .

Interviewee 1: And we have seen a lot of the world, very unique' [Husband & wife, Tourists SM201].

The variety of environments to be found along the Kimberley coast comprised another element of 'unique landscape' value. Value was derived from being able to experience a range of environments and habitats often in close proximity. For example, the viewing of 'that beachy ocean thing to the mangroves to little trees to rivers to walking up creeks to billabongs to you know huge rocky outcrops' [Female, Tourism industry JSM88]. This was often described as 'a package' [Male & female Yachts people JSM1] which afforded respondents the ability to continually see different habitats, flora and fauna. The experience therefore remains interesting, despite repeat visitation: 'I've been cruising up there for five years, and every time I go out, I find something exciting, and different' [Male, Tourism industry JSM84].

'Unique landscape' value also included comparisons of the Kimberley coast to a prehistoric or otherworldly environment. This was described as 'it's just like travelling through time' [Male, Non-Aboriginal resident JSM62]. Such responses were linked also to perceptions of wilderness and lack of human footprint. For instance:

'Almost a pre-historic landscape as well, yeah it's...you can be at any time, you know because there's nothing modern out there' [Male, Port industry JSM12].

'It feels like you're looking at something that's really old but you're looking at it untouched and original so you almost expect to see a dinosaur hop out of a valley somewhere, yeah that's how it looks to me. It looks like it would have a long time ago. And that's hard to find' [Male, Aviation industry JSM79].

'Some of the places I'm working you almost expect to see a dinosaur one day walking through there, if that gives you some sort of picture?' [Male, Marine transport industry JSM81].

Coastal geology

The Kimberley coast's 'amazing geological features' [Partners, Tourism industry JSM104] formed a fifth element of the 'Physical landscape' category, with almost one quarter of all interviews noting geology as a key value (22% of all interviews). This included the sheer size and diversity of rock formations themselves, weathering and erosion patterns and striking contrasts. Most responses came from yachts people (26%), tourists (20%), members of the tourism industry (14%) and protected area managers (11.5%). Respondents mentioning geology were typically effusive in their descriptions and appeared quite passionate about the subject. 'Spectacular escarpments' [Male & female Yachts people JSM1] and gorges and cliff faces along river systems, typically described in terms of their enormity, were commonly mentioned geological features, as were waterfalls. Respondents also referred to the history of the geological landscape, describing it as 'ancient' and delving into

the geological forces involved in producing the characteristic geology of the Kimberley coast. The following excerpts illustrate these responses:

'The spectacular cliffs are the most striking feature, the sandstone cliff, just the colours and the height of the sheer cliffs dropping directly into the water... I don't think there is anywhere else in Australia or the world for that matter where you can actually sail your boat past vertical cliffs dropping straight in the still water' [Male, Yachts person JIM257].

'You've got these awesome landforms, geological happenings that have happened in the past. Where there is huge amounts of pressure uplift, land has been turned on its side and runs for miles and miles and miles. So geological features' [Partners, Tourism industry JSM110].

'Interviewee 1: The geology in Secure Bay is pretty incredible, you've got like Hart dolerite igneous intrusions which come out and really forms stripes on the cliff.

Interviewer: Are you into geology?

Interviewee 1: I studied it and I got a bit excited about it.

Interviewee 2: It was pretty spectacular coming to the Bay. It looks like crumbled dark chocolate hanging on a cliff.

Interviewee 1: From a distance it looks like it has been burnt and there is like a trail of burnt...I have never seen a cliff like it' [Female Protected area managers JSM120].

'Fabulous geography. And if you look along West Beach there and you see that terrain, it's almost like a Mars-scape' [Husband & wife, Tourists JSM18].

'Interviewee 2: Really, really, really ancient rocks. Unbelievably weathered.

Interviewee 1: Rocks, believe it or not, are one of the main attractions of the Kimberley' [Husband & wife, Yachts people JSM2].

'You can go to the end of the Dampier Peninsula and look across from One Arm Point hatchery to the islands a couple hundred meters away and you are actually looking across the frontline between the Canning Basin and the Kimberley Rock, so you are transitioning from a 300 million year old roughly sandstone, to 1.9-2 billion year old quartzite. It's a very dramatic shift...it's a very complex, convoluted coastline' [Male, Aquaculture JSM33].

'Looking at Raft Point and there's this big massive like Colossus rock, it's millions and millions of years old. And you can almost picture Tom Cruise on Mission Impossible like hanging off it, or a Red Bull rock climbing series or something there you know. It's really got this kind of, "wow this is awesome"!' [Male, Non-Aboriginal resident JSM62].

Some respondents also linked geological events and formations to the current presence of mining along the coastline, as well as alluding to future mining interests. For example: 'it's just the geology I guess. [Buccaneer Archipelago] is quite intense geology and that's where mining is. But it's just the same up here you know there is a lot going on, millions of years ago to make the country the way it is' [Male, Aviation industry JSM75].

Unique nature experiences

The value of unique nature experiences was a sixth element of 'Physical landscape'. Such values were noted in 21% of all interviews, predominantly by tourists (31% of responses) and members of the tourism industry (13% of responses). Generally, 'unique nature experiences' were valued for providing distinctive opportunities to interact with nature and the Kimberley environment in a manner unlike that to be had or experienced in other locations. Opportunities for interaction with marine wildlife, such as watching turtles hatch or chances to dive or snorkel with an array of species on Montgomery Reef, was a key theme:

'[Montgomery Reef] can change their lives, many people who visited said it was one of the best experiences they've ever had. It's not unusual, on almost every trip that something happens like that [life changing experience]. We've recently taken to doing snorkelling at Montgomery... it was pretty spectacular, and you were whizzing past all the corals, fish, the sharks, turtles, and people thought it was great' [Male, Tourism industry JSM84].

'The channel itself [on Montgomery Reef] is just alive with fish and turtles and it's, everything concentrated in there and all the predator fish are waiting for the little things to get washed over the sides, so they get these, they're like waterfalls just pouring into this big channel, it's quite spectacular' [Male, State Government SMI85].

A second theme characterising 'unique nature experiences' revolved around Kimberley waterfalls: Kings Cascade and King George Falls in particular. Respondents described the thrill of being able to nose a boat directly under the flow of water and experience open air showers, as well as physical relief of being able to wash/ swim without fear of crocodiles.

'King George River is probably one of the most spectacular and fascinating places that I've been to, the fact that I can nose the boat under and put the boat under a waterfall and my crew can muck around and play in there, it's just the highlight, both visually, physically, it's a real rejuvenation point' [Male Yachts person JIM254].

'Having a shower in the dinghy underneath the falls, things that you just don't do in everyday suburban life and that's nice to get off the boat without stressing about crocodiles' [Female Yachts person JIM259].

'Normally anyone can drive the boat right underneath falls, take the nose of boat under the water and have a shower there, but this time we went there it was just awesome there was that much water coming over it, and you really couldn't get within [50m] to it because the mist coming off, it's just so powerful and it stings' [Husband & wife, Yachts people JSM2].

'Kings Cascade... [the captain] brings the boat right up within 20cm of the cliff face and the water runs down the bow of the boat, you can stand up on the bow under that waterfall yeah, you can stand at the bow and just put your hand on the cliff face with the water running down - yeah, it's fantastic' [Husband & wife, Tourists SM200].

Wilderness

Wilderness values, with the Kimberley coast depicted as a region that has had minimal human impact and remains in a highly natural state, posed a seventh element of 'Physical landscape'. A total of 20% of all interviews referred to wilderness value in some form. Members of the tourism industry provided the majority of such responses (23%), followed by tourists (16%) and Aboriginal rangers and Traditional Owners (13%). Responses regarding 'wilderness' included:

'It's just so different to everything else. It's typically wild and basically uncared for' [Female, Tourist JSM27].

'It's just a true wilderness... I just love the feeling of vastness and wilderness' [Male & female, Tourists JSM44].

'It's probably one of the last wildernesses left in Australia I reckon that hasn't been exploited... nature wise, one of the last wildernesses left' [Male, Commercial fishing JSM5].

Most interviews linked wilderness values with the ability to 'get away from it all' [Male Yachts person JIM260] and experience nature without a visible human footprint. As put by one respondent, 'there's no signs, there's no advertising you know you can take people to somewhere and for the intrinsic value of feeling like you're in the middle of nowhere but still within Australia' [Female, Tourism industry JSM109]. The lack of human footprint led some respondents to note that 'it's a real reminder that it is wild incredible country, and [humans] aren't dominant up there, and it's really, really special I think to say that' [Female, ENGO JSM118].

Inability or difficulty in accessing some parts of the coast was also associated with wilderness values, due to the resulting lack of visitation. Descriptions of the terrain as 'rugged' and 'harsh' contributed to perceptions of wilderness. Limited visitor access allowed for a wilder, more untamed experience of the landscape. For example:

'There's a great pack of people [on the western Dampier Peninsula]. You go to certain places you'll have like 10 or 20 cars in one area. And as you get further north then just being too far away from town, then you get a couple [of cars] and then less. On the east side, you'll be the only person there. Wild, untamed, you know? The impact on the western side is so full on with everyone. On the east side...there's nothing there, no impact' [Male, Aboriginal ranger JSM16].

'This is still in the wilderness; it's still don't have much cars in the area where we go' [Male, Aboriginal Traditional Owner JSM93].

A number of respondents framed the Kimberley coast as 'part of Australia's heritage... it's the last frontier really of Australia' [Male, Aviation industry JSM79]. Again, this was linked to the landscape as appearing devoid of human footprint and as a result, offering opportunities for a true 'Australian experience':

'Interviewee 1: That was mind boggling... mind boggling looking down I'm thinking it's... humans have probably never touched so much of that land.

Interviewee 2: Yeah that the coastline and nature could be that brilliant. You know it's just like it shocks you really, it's a shock.

Interviewee 1: "This is Australia" [Husband & wife, Tourists JSM114].

'This place is like... one of those last frontier type places, where people can come, where it's still very real, and have an opportunity to [have an] authentic experience' [Female Tourists JSM28].

3.3.2. *Aboriginal culture*

The second category to emerge from analysis of the interviews centred on Aboriginal culture, defined to include the transmission of Aboriginal wisdom, knowledge, traditions, and way of life. 'Aboriginal culture' was mentioned in some manner in a total of 63% of all interviews. Aboriginal culture formed a significant component of the landscape: 'on top of the natural values of the [Kimberley coast], we have a beautiful cultural blanket across the [Dampier] Peninsula and the rest of the Kimberley Coast that is very vibrant, very rich, very welcoming' [Male, Aquaculture JSM33]. Key contributory elements (discussed here in order of decreasing mention in the interviews) included cultural sites, connection to country, evidence of historical use and transmission of cultural knowledge. As before, respondents often discussed 'Aboriginal culture' in a multifaceted way and therefore the percentage significance of each element discussed below does not sum to 100%. Other values mentioned but at a lower incidence included traditional food harvesting, and references to Native Title. Note the discussion below does not include spiritual values relating to profound or awe inspiring nature experiences as expressed by non-Aboriginal people; these are considered in 3.3.9 *Spiritual*.

Cultural sites

Many references to Aboriginal culture related to the presence of culturally significant sites (42% of all interviews). Not surprisingly, Aboriginal rangers and Traditional Owners provided the greatest volume of such responses (29%). This was followed by members of the tourism industry (15%) and yachts people (11%), who may have been more knowledgeable than other respondent groups due to familiarity with the Kimberley coast. While the following section provides some insights into the range of culturally significant sites present, it is important to note the culturally sensitive nature of such information. Thus, the details below represent information permitted to share with a non-Aboriginal audience or information that may already be present in the non-Aboriginal domain. These constraints were summarised by one Traditional Owner as 'I can only talk about the surface things with you, the deeper [cultural] stuff, it's only for me' [Male, Aboriginal Traditional Owner JSM30].

Values were attached to a range of Aboriginal cultural sites including law grounds, dreaming sites and song lines, burial sites and Aboriginal art. At times, one particular type of site was singled out for special mention while more commonly a range of cultural sites was mentioned in conjunction. The excerpt following is one example of this in which the respondent highlights a range of cultural sites as important and contextualises their value so that a non-Aboriginal can understand:

'Certain significant sites like the traditional grounds, initiation grounds. The law grounds of initiation, you get the female and the male areas. You get the big meeting grounds, the picnic and the actual dreaming places where the ancestors have been travel[ling] through the country and you'll get the song lines. With the song lines, some places are very unique for the Aboriginal population around Broome, and the Dampier Peninsula down to Bidyadanga and down into the Western desert area, because it's all connected with the song line. Some places are really significant. It's just like on the European side, it's like the actual church. Or parliament house, something significant in the European way' [Male, Aboriginal ranger JSM16].

Another respondent likened the cultural significance of Roebuck Bay to 'giant internet downwaves' reverberating throughout the landscape: 'all of this whole area is just full with cultural importance... they tell stories about it how it used to be in first confrontation and they sing about histories...they got that many registered sites there right through the whole lot. So [Roebuck] Bay just plays an important role. Not only for the Yawuru tribe but all other tribes as well connecting to Yawuru...it's like big giant internet downwaves going right through the whole areas in Yawuru and others telling their stories about Yawuru country... hundreds and thousands of them going right through the whole area' [Male, Aboriginal Traditional Owner JSM99].

Traditional law grounds were predominantly mentioned by Aboriginal respondents. This included comments on access and their significance for maintaining culture. For example:

'There are a few like important spots like culturally in the back of Crab Creek. Going back towards the Roebuck Plains [pastoral] station. There is a law ground there that culturally I mean only initiated men are allowed to go. So it's also that cultural importance for that area' [Male, Aboriginal ranger JSM15].

'All the law grounds are important for us to carry on in our customary traditional way, our custom practices. So law grounds are important' [Male, Aboriginal ranger JSM53].

A range of non-Aboriginal respondents also recognised and valued certain areas for their cultural significance to Aboriginal people. For instance: 'culturally it's very significant for the Mayala people, so it's a law ground for them' [Male & female, Tourism industry JSM104].

Aboriginal dreaming sites were a second form of cultural site receiving frequent mention. Again, references arose predominantly from Aboriginal respondents who described the significance of different areas through dreaming stories. For example: 'Whistle Creek is a spiritual place for the salmons... when we go there we always talk you know, look after fish you know, come long way, just have a talk and see what the spirit give you...with the story there, they got song and dance and that for that' [Female, Aboriginal Traditional Owner JSM101]. Other Aboriginal respondents provided detailed insights into cultural significance attached to certain areas yet requested that researchers not share this information further; this information is not included here.

Traditional song lines were a third valued aspect of Aboriginal cultural sites. Interesting in this respect was the clear recognition and value associated with song lines not just by Aboriginal respondents, but by non-Aboriginal respondents also. A number of non-Aboriginal respondents indicated they placed value on the presence of the song lines for both their significance to Aboriginal culture as well as for the opportunity to experience some of that culture and underlying meaning for themselves:

'The indigenous song lines like how important that is for that coastal area, I think that's undervalued' [Females, Tourism industry JSM108].

'When I did the [Dampier Peninsula] Lurajarra Heritage Trail this year it was a really, really special time, I wasn't really sure of what I was I suppose starting off on on that journey. I'd worked with a lot of people out there, and I knew a lot of people, so it was great to be able to share those experiences with them, working, and re-connect, but really understanding, I didn't really have a deep understanding of the culture or really why things are special to Traditional Owners in that area, and how things were so connected, and the song lines, and how they sang their songs, songs for different areas, so it was really interesting to see' [Female, ENGO JSM118].

Burial sites were a fourth aspect of cultural significance noted in the interviews. Both Aboriginal and non-Aboriginal respondents mentioned their presence:

'Sandy Point is our burial ground, it's a registered burial ground through there...we've got the crying tree there as well, so anyone that pass away we go to that tree and actually cry but we believe when we pass away we go back to this area and that we believe that this is our resting spot as well. So that's why we want to protect that area' [Male, Aboriginal Traditional Owner JSM93].

'There is sacred sites through there, in the sand dunes and ...15 years ago we actually my friends and I came across a burial ground. And it wasn't known about so that was pretty spooky actually, coming across some [remains]' [Male, Marine transport JSM81].

'This has got the bones everywhere. They've still got 'em in the sand dunes, in the hill thing' [Males, Aboriginal rangers DPI24].

'We came across a grave site...he must have been a big warrior that man because he had very, very long femurs, and quite a large cranium, and, so we saw that. It was just a little reminder that...there were many people buried in those dunes, and that, it really is, this is a living site for [Aboriginal people] as well, and so I think there's an enormous lack of respect for the fact that it's a graveyard, and a cemetery for those people's ancestors' [Female, ENGO JSM118].

Both Aboriginal and non-Aboriginal respondents highlighted the need to respect and take care around cultural sites, emphasising the need to ensure protection and restrict unauthorised access. This was to protect both human remains as well as to prevent transgression of cultural law and gender restrictions:

'I get really paranoid about it, you know, because some places you can go and some places you can't, [and] there's reasons for those things' [Female, Aboriginal Traditional Owner JSM48].

'There's lots of no go area. Some parts are sacred. Especially for men and some for woman. Some sites maybe old Karajarri people they all passed away' [Male, Aboriginal rangers DPI25].

The final manner in which value was attached to Aboriginal cultural sites was through the presence of art sites. These responses were largely from yachts people and members of the tourism industry (24% each), again likely owing to their familiarity with the remote areas of the Kimberley coast. For the latter, knowledge of Aboriginal art sites additionally forms an important part of their tourism offering. Respondents described being personally impressed, or noted others being moved, by the experience of viewing Aboriginal art:

'The Aboriginal art that we saw, especially on Bigge Island, there is a place near the Osborne Islands where you go around the back to a creek and climb up to a set of caves that is probably for me a remarkable Aboriginal site' [Male, Yachts person JIM254].

'You walk in to these caves and you look up and there's just Aboriginal artworks all above your heads, so it's a really beautiful spot...they say that's quite old the artwork there, who knows how old these are, everyone's got their different dating systems, but it just feels like you've gone back into time...it's a spot people just get to and they look up at the Aboriginal art and they are just completely in awe and silence' [Female, Tourism industry JSM8].

For some respondents, the sense of history imbued in the viewing of art sites was of great value. This was reflected in reference to the age of the art sites and the fact that they had existed for so long. For example, 'it is pretty amazing just being able to walk up the cliff and see all this rock art that has been there for thousands of years' [Females, Protected area managers JSM120].

For others, viewing art formed a central motivation for their visit to the Kimberley coast:

'We visited the Kimberley this time for a specific purpose. We were going to do a short one-week trek...looking for Bradshaw [Gwion Gwion] rock art that we might happen to discover more of' [Female, Yachts person JIM261].

'The Aboriginal art and its some of the best Aboriginal art in the country' [Male, Tourist SM199].

'Areas around the Drysdale [River] were amazing for Aboriginal art. So we spent and concentrated a fair bit of time around those areas, looking at art sites and looking for new art sites' [Male, non-Aboriginal resident JSM10].

Some respondents were concerned about protecting Aboriginal art and expressed reservations about freely sharing information on the specific location of sites:

'I don't tell anybody about [art sites]' [Male, Non-Aboriginal resident JSM55].

'I think I'm a bit selfish... I value those artworks [so] I really am almost not wanting to talk too much about them because I would hate to see people go there and destroy them' [Female, Yachts person JIM261].

Some also expressed concern over the 'freshening up' of art sites. As stated by one respondent, 'there's a lot of Aboriginal art, but it's been bastardised by local Aboriginal people doing their impressions and smartening it up to make it a bit more contemporary, and it's just devastating... to have people doing modern day bloody enhancements of it, it's just to my mind criminal, absolutely criminal. So, that's a real disappointment' [Male Yachts person JIM254]. These concerns contrasted with views of other respondents who recognised the cultural significance of maintaining and updating art:

'The TOs [Traditional Owners] have been doing work updating, going over paintings, refreshing and that kind of thing' [Female Protected area managers JSM120].

'I think people go up and touch it up every few years and ceremonies and things, which keeps it fresh' [Female, Tourism industry JSM8].

Connection to country

Connection to country formed a second element of value associated with Aboriginal culture (32% of all interviews). This element encompassed reference to Aboriginal links to traditional country and the associated spiritual relationships and obligations involved, links between the physical coastal landscape and Aboriginal identity, traditional knowledge systems derived from this relationship, and the need to care for country. Aboriginal rangers and Traditional Owners contributed more than half of all responses regarding connection to country (56%), followed by Aboriginal residents (10%). A range of non-Aboriginal respondent groups including the tourism industry, protected area managers, tourists, mining, oil, gas and energy, aquaculture and aviation also placed importance on Aboriginal connection to country, however these individually formed less than 10% of responses.

For Aboriginal respondents, connection to country forms a fundamentally invaluable and indivisible component of the Kimberley coast. More than a physical landscape, the coast is alive and tangible, with a deep history that imparts considerable meaning. This was phrased by one respondent as:

'When you know stories for the country, you know the people that lived in it. You know where they ate, where they fished, where they died, where they're buried, you know that becomes...I suppose invaluable and you really can't put a price on that. And it's like you know people talk about the Roman era, the Greek era, the

pyramids they have a value that you just can't go and knock down one of the pyramids. Because you want to...it's the same as our country here. It has history, it has knowledge, the whole country is alive' [Male, Aboriginal Traditional Owner JSM49].

Another put it as, 'the coast is significant to my people, its part of the Dreamtime, it connects everything together. It's like a bible that gives you the law' [Male, Aboriginal Traditional Owner JSM30].

Connections are maintained through a variety of activities including physically visiting the landscape, hunting, fishing and camping. These practices nourish the inner self and maintain healthy relationships between individuals and country. The following excerpts describe the value respondents derived from visiting country:

'You can get what you want, just to enjoy yourself and practice sort of like, your knowledge, plus your culture too, because you're getting out on country and making it alive, the country. It is pretty hard to explain but everything is spiritual and just connects to you. The spirit side of you is getting very happy because you are coming back on country and keeping it alive just by your presence in the actual area. Where you are going to be. Some people have different way[s] of understanding but for us, being Aboriginal, going out to certain areas to fish and hunt - as our ancestors did before, walk the land, and getting back on country' [Male, Aboriginal ranger JSM16].

'I was born on [Sunday] Island and my people come from there and [I] don't like to be in inland much, so this is my life you know...where I was born and where I was brought up; this is my life and my home, like I like the sea, I like the island. Sometimes I go [out] on my boat by myself and I just walk around. You know in the islands, walk around... I like to be there and it makes me feel good when I'm in the islands and I feel good doing all that' [Male, Aboriginal Traditional Owner JSM35].

'Just stories and the fishing and camping and you go there and sort of connect to the place...it's connecting through stories I think, but you're actually connecting to the land and Deep Water Point does something to me. Does something inside me, I can't explain it' [Female, Aboriginal resident JSM46].

Non-Aboriginal respondents also recognised the importance of Aboriginal connection to country along the Kimberley coast. This was framed in terms of links to discrete physical spaces as well as more generally in terms of many groups being coastal people with an associated dependence on the sea:

'Aboriginal people have a strong link with that part of the coastline' [Male, Recreational fishing body JSM72].

'Coastal people...they've lived on the coast for 30-40,000 years and they have a very, very strong tie to the marine environment...One of the really interesting things about the Dambimangari people is they are very much coastal people and they still have very strong ties to the land and to the marine environment and they still maintain a lot of their customs and their traditions to go into an area of significance' [Males, Mining, oil, gas & energy JSM121].

A number of Aboriginal respondents emphasised the physical Kimberley coastal landscape as underpinning their 'Aboriginal identity', defined here as a sense of belonging and community, particularly in the sense of belonging to Aboriginality through clan grouping, family ties to an area or other links to country. Aboriginal identity was linked to having family connections to an area or more typically, to being a 'saltwater' person. Being a saltwater person was described as an indivisible part of the self, one that fostered a dependence on and love for the coast:

'It's just embedded in your culture, [we are] coastal people, saltwater people, we run on the tides' [Male, Aboriginal resident JSM43].

'I was born here, we basically identify with this country you know. I'm happy I was raised and born in the saltwater side... [in]land we've got lot of opportunities but it is very important like we [are] saltwater people, all our travel is mainly on saltwater and stuff like that, when we are hunting and gathering is all on saltwater, we are rarely go bush anytime' [Male, Aboriginal ranger JSM53].

'I'm a saltwater man, old man and I grew up here, you know with my elder people and I've been along the coast here with my dad... a saltwater man and that's what I live off, the sea, [I] love the saltwater' [Male, Aboriginal Traditional Owner JSM56].

Traditional knowledge systems, defined as Aboriginal ways of knowing and understanding the landscape, formed an further aspect of connection to country and Aboriginal identity, and Aboriginal respondents in particular placed great value on it. Respondents made reference to the role of dreamtime stories in their relationship to the landscape. They also discussed traditional knowledge concerning seasonality and species abundance that allowed them to follow animal movements and hunt appropriately. The following quotes highlight these elements.

'There's a spirit inside the actual crocodile, the big crocodile at Willie Creek. We are sort of like, connected like the spiritual side. [The crocodile] knows who's a person that come from the actual area, or if there is a stranger coming to the area. If it's a stranger coming to the area, he [the stranger] is in trouble, not us. We are somewhat connected with him. He wouldn't harm us unless there's a stranger there or if we do get attacked or something happened to someone, it's not him. It's a rogue crocodile from up north who is trying to find an area to claim a new territory for himself' [Male, Aboriginal ranger JSM16].

'The coast is really important we do have our Dreamtime stories out there, the Dreamtime stories that actually come from the salt water, and the coral, the rocks and the fish as well' [Female, Aboriginal resident JSM32].

'The whales are storytellers to us [when they're here]; it means it's marrying turtle time' [Males & females, Aboriginal Traditional Owners JSM107].

'I follow the seasons and I go back to the west side for the little milky fat oysters. We just go and get a feed, just follow stuff that [the seasons tell us] are fat' [Female, Aboriginal resident JSM46].

A final theme of connection to country was needs and obligations regarding care. 'Caring for country' encompasses Aboriginal notions of the physical and spiritual responsibility to care for their own country. Aboriginal rangers, whose job description incorporates caring for country, discussed a range of more practical considerations such as weed and feral control and fire regimes. Aboriginal respondents who were not affiliated with ranger groups discussed caring for country in more esoteric terms. Again, this included notions of reciprocal relationships between humans and the landscape. For instance, 'if you look after the country, the country will look after you' [Female, Aboriginal resident JSM32]. Other examples include:

'We know what this country, this whole country belongs to, mother earth, we don't own this country, this country owns us' [Males, Aboriginal rangers JSM64].

'I'm a Mayala man, being proud of Mayala. It's not in the mind, it's in my heart and soul where country belongs. As a Traditional Owner now I'm the elder leading everyone in that path. I want to do the right thing by my young people, care for country' [Male, Aboriginal Traditional Owner JSM107].

'As long as there's respect for the land, the land looks after you that's how I see things, you know you have respect...people expect respect, but the land needs respect too, because the land looks after people whether they are driving on it, whether they are feeding off it, it provides shade, food, access' [Female, Aboriginal Traditional Owner JSM48].

Evidence of historical use

'Evidence of historical use' was a third element of Aboriginal culture (22% of all interviews). This category valued places in the coastal landscape for providing evidence of past Aboriginal use in the form of traditional fish traps, human footprints in rock, campsites/ middens and tools and implements, as well as a more general sense of occupation. Aboriginal rangers and Traditional Owners provided the majority of such responses (29%), most likely owing to their greater knowledge of such areas. This was followed by Aboriginal residents and members of the tourism industry (both 12%).

For Aboriginal respondents, evidence of past use was valued for providing a tangible link to their ancestors. Maintaining sites such as traditional fish traps enabled them to care for country and respect their ancestors. Fish traps were often mentioned during interviews when respondents identified particular sites of importance, for instance:

'At this particular spot there is a fish trap that was made by Karajarri elders a long time ago. They used to camp around there and also their footprints they left behind embedded in the rock' [Females, Aboriginal rangers DPI22].

'That's the fish trap, at Mangkuna. They're really old, yeah, they've been before I was around there. They're built from old Karajarri people many years ago. They're still there' [Males, Aboriginal rangers DPI25].

Similarly, historic campsites and attendant evidence of occupation including tools (e.g. grinding stones, spearheads, axes) and middens also provided a tangible link with the past. Again, this was emphasised by Aboriginal respondents. For example:

'Over there, it's a campsite with lots of middens and shells. Our elders used to camp there' [Male, Aboriginal Traditional Owner JSM30].

'You look at it and you can see the people who have been here before, long before. And we can tell by all the middens that are in the sand dunes. I found this axe in the midden' [Male, Aboriginal resident JSM43].

'As far as the whole of the coastline is concerned, it is very important for me to protect because it's where all of our people lived. [When] I take people out on tour I'm showing them middens. And those middens are just a testament of people's occupation of the place' [Male, Aboriginal Traditional Owner JSM49].

Non-Aboriginal respondents also expressed interest and wonder at evidence of historical use. These views were framed in terms of temporal space and the reflective experience brought on by viewing old campsites and other archeological evidence. For instance:

'Just seeing stuff like this big serpent made out of shells and there is a lot evidence of people living up here. And a lot of people. That's one view that blew me away and you know there is places on beaches where you see these big piles of shells, that is the size of a house. And it's just people sitting there, either a lot of people or over a lot of years just shelling shell fish. Until there is a massive pile, like a "blow you away" size pile' [Male, Aviation industry JSM79].

'It's not so much the art itself, it's more about where they lived. You've got all shellfish there, you can see the big rock ledge they use to live under, the shell middens, thousands of years later and the rock art [is] telling the story about what they caught for the day and it's actually quite interesting...evidence of how they used to live. And that side of it is extremely interesting, you can actually sit there and think, yeah, the kids used to play in this area and at the moment it all would have been covered in spinifex and [it would be] pretty hard to get through. They would have [it] all cleared and tidy enough to live there...actually imagine what it used to be like thousands of years ago because that's what we are talking about, three, 4,000 years back' [Husband & wife, Yachts people JSM2].

'We even found [remains] on the beach which was from one of the burial sites... I started to think a lot about the Aboriginal culture and that's where they lived and yeah that was very sort of humbling to think that people lived there and a long, long time ago and I'm sort of walking through there' [Females, Tourists JSM20].

Respondents who mentioned coming across historical sites typically noted their interest in preservation:

'I never touched any of their stuff. As soon as I saw [artefacts etc] I said we shouldn't stay on that place, just leave it be, because its been there for a long long time and people have a tendency to go in grab some of that stuff but they shouldn't touch it you know' [Male, Non-Aboriginal resident JSM55].

Others reported similar sentiments, noting:

'If we found them [artefacts] basically that would be our secret. It would be all taken in a photo and that's sort of where it would remain. Like obviously with the indigenous stuff around here, we would just sort of obviously respect what they do. They've lived here long enough' [Male, Recreational fishing body JSM73].

Transmission of cultural knowledge

The transmission of cultural knowledge between generations formed a fourth element of Aboriginal culture (mentioned in 22% of all interviews). Aboriginal rangers and Traditional Owners dominated this element (70% of responses), followed by Aboriginal residents (18%). Responses focused on the value inherent in teaching younger generations about Aboriginal culture and the physical landscape. This included passing on detailed knowledge regarding the seasons and hunting, Dreamtime stories and recent local histories, as well as knowledge of the land that would enable children to survive and not get lost. Illustrative quotes include:

'We take our grandchildren with us, on the reef, they family. Show them what to do. They love it' [Females, Aboriginal Traditional Owners JSM47].

'We respect our culture you know what we grew up on and then we just continue on doing what the past has done and keeping it in and showing our young ones...what we've done and learned and pass it down to them. Teach them about the languages you know; showing them the language of the fish and the turtles and the sea cows' [Female, Aboriginal resident JSM63].

'The knowledge has been handed down to me you know from my father going this to place is going to that fish trap and what fish you are going to catch and what sort of medicine and things you can use for this fish, all that story telling around the fire you know. Our father handed them down to me and that's what I'm doing with my kids you know, handing the stories back to them so in the future they know what to do. So they can hand the story down to their kids, that's what the main aim [of] going out camping and, learning, getting them stories off your parents when they growing up here and giving them to the little ones you keep that circle of life of your culture way you know, keep it going, keep it flowing through the community' [Males, Aboriginal rangers JSM64].

3.3.3. Therapeutic

'Therapeutic' values, those derived from places making people feel mentally better, calm, or recharged, was a third key value category to emerge from analysis of the interviews (mentioned in 62% of all interviews). This category was divided into a number of elements defining the particular manner in which therapeutic value was derived. These elements included escapism, relaxation, remoteness and personal recharge. Each of these is discussed below. Two further elements of therapeutic value, favourable weather and artistic inspiration, were evident in the data. They are not discussed here owing to being mentioned in less than 10% of all interviews.

Escapism

'Escapism' was the main way therapeutic values were discussed by respondents (noted in 31% of all interviews). Responses were spread across a range of different stakeholder groups, however, noticeable contributions were made by tourists (21% of responses), members of the tourism industry (17%) and non-Aboriginal residents (15%). 'Escapism' itself was contextualised by a number of different yet related elements. The first of these was the ability to be by yourself, or distant from others, in an uncrowded environment:

'I like places where we are just by ourselves, which happened numerous times, which is lovely' [Husband & wife, Yachts people J1M255].

'Get away from it for three or four days without seeing another person' [Male, Tourism industry JSM103].

'I think just this whole coastline is just a place to get away from everybody' [Male, Tourist JSM111].

'When you are here it's sort of like nothing else exists, that's really strong. You get that...another place to get away and just to feel like you are away from the rest of the world' [Female Tourists JSM20].

'You can get away from it all, the feeling of getting away from it all, there's not many people that go up there all at once' [Male & female, Tourism industry JSM110].

'It isn't too remote, this is remote with a small 'r' rather than a big 'R'... you only have an hour drive from Broome... but you can be a million miles from anywhere' [Husband & wife, Tourists, SM195].

A related aspect was the ability to get 'away from all the hubbub of everyday life' [Male & female tourists JSM44] and more congested urban or town areas. The following quotes illustrate this sentiment:

'It's that experience where you're not surrounded by services, you're not surrounded by sealed roads, you've had to do a bit of a journey to get into them, you're away from things, it's just ...you're removed from the daily grind and the daily pressures and the hectic-ness that is your normal life' [Female, Protected area manager JSM13].

'It's tranquillity I suppose you can get away from the day to day stuff... [extended family's block] it's a place I know I can always go to, pull up on any stretch out there no hassles from anyone' [Male, Marine transport industry JSM81].

Removal from technology, facilities and an appreciation for simplicity also contributed to feelings of escapism:

'Do you know we get people say to us, "what do you see over there it's just miles of nothing". And I think the simplicity of what it is is what we probably like. Sometimes the simple things in your life matter' [Husband & wife, Tourists JSM115].

'Just the absolute peace of the place and how you really have that sense of being quite isolated and disconnected from everything you know, there was no phone coverage' [Female, Other DPI26].

'It's not been taken over by the world' [Female, Tourism industry JSM88].

Responses from a range of Broome and Derby residents highlighted the importance of being able to take a break from town. Responses indicated the coast was valued for providing an easily accessible getaway, as illustrated by the following quotes.

'You know you can get away and you just feel like you can breathe, and it's like you know it's just about getting out. Because living in Broome it can be a little bit claustrophobic I suppose because it is a small place so it's nice just to get out' [Female, Tourism industry JSM109].

'I will go out and have man business and enjoy our weekend. Let loose [from] the pressure of town' [Male, Aboriginal ranger JSM16].

'If you are going there you are like no one will harass you or anything. If you want to get off the grid just go there and you are out' [Male, Aboriginal ranger JSM17].

Similarly, respondents residing in Broome and Derby emphasised the role of the coast as a 'local playground'. The close proximity provided a valuable physical location in which to recreate and escape. These sentiments were reflected in interviews with a range of people:

'Roebuck Bay is the playground of Broome' [Female ENGO JSM118].

'People go out [to Roebuck Bay] just to get away from Broome... you can get away from Broome itself but it's right on Broome's doorstep' [Female Protected area manager JSM13].

'I would go [to the Blue Holes] between five and 20 times a year just for fishing. In my boat takes me 45 minutes to get there I can camp overnight; I can get away from Derby overnight...So, just a quick getaway' [Male, non-Aboriginal resident JSM68].

'I think it's very much for the town of Derby [the mouth of the Fitzroy River] is its recreation playground so it's just important to the people, you know it's an escape, get away' [Male, Recreational fishing body JSM72].

'This whole coast really is Broome's backyard...fantastic place to wind down, get away from it all...that's the kind of main, that's kind of my backyard type of thing' [Male ENGO JSM87].

Relaxation

'Relaxation' was the second manner in which therapeutic values were framed. A total of 30% of interviews mentioned relaxation in some form, with tourists providing the majority of these responses (40% of responses). Recurrent phrases included 'idyllic', 'sit on the beach', 'do nothing', and 'enjoying nature'. Often, responses referred to the stress relief value derived from the coast:

'You would use it as a good place to relax as well as [it's] peaceful, and if you really stressed out just come out to the coast and you'll feel just so relaxed you don't have to do anything else' [Female, Aboriginal resident JSM32].

'Entrance Point really for me is a place where I go regularly, weekly sometimes daily, just in regards to pure relaxation and de-stress I suppose' [Female, Other DPI26].

'There are a couple of time when you stress, if you are stressed out that – that a good place to go if you stressed out, just go on the beach and just relax I suppose' [Male, Aboriginal ranger JSM52].

The physical experience of being in nature and enjoying the coastal surroundings formed a key component of relaxation value. This appeared to apply to both local residents as well as visiting tourists:

'A lot of relaxation time you can dangle a lure in the water if you like or you can just wander along the creek and you can switch off and yeah escape the, let me say, hustle and bustle of Derby...what we call our busy lifestyle' [Male, Recreational fishing body JSM73].

'You can unzip people...just change people. You'd see business people [whose] minds were still go, go, go and they'd come down and they'd just look at the view which was spectacular, and sometimes you'd see their shoulders just drop immediately' [Husband & wife, Tourism industry JSM7]. The ability to do nothing was another component of relaxation value. This aspect was particularly prevalent among tourists but also noted by others:

'Do nothing...just put your feet up, have a rest...Relaxing, doing nothing. You're not feeling pressure to be anywhere or do anything, time just doesn't seem to matter and my watch is useless' [Female Tourists JSM20].

'Great place for a holiday if you just want to lounge and do nothing much' [Husband & wife, Non-Aboriginal residents JSM21].

'Kooljaman and places up here are places where there is nothing to do and you've got all day to do it' [Male, Other JSM42].

Remoteness

'Remoteness' was the third way in which therapeutic value was ascribed to the Kimberley coast (26% of all interviews). Remoteness was closely related to several aspects of 'Escapism' in that responses focused on the value derived from coastal inaccessibility and the resulting lack of people, i.e. value gained through having an uncrowded coastal experience. Mentioned mostly by members of the tourism industry (20% of all such responses), non-Aboriginal residents (17.5%) and tourists and yachts people (both 15%), interview excerpts emphasise the value attached to lack of crowding stemming from remoteness. For example:

'The remoteness of it and lack of visitation I guess makes it attractive' [Male Protected area manager JSM94].

'It's just so isolated... The isolation was wonderful; we didn't see anybody' [Female Yachts person JIM261].

'The isolation I love just feeling like you're the only people there and I guess that's the advantage again of the location where we are because it's only accessible by air or by sea so you don't [have] hordes of people coming through, it's...you really do feel like you're the only ones there and that you're discovering and that's what I love' [Female, Tourism industry JSM11].

'Part of the attraction is it's quite remote and you can get out there without seeing other people' [Male, State Government JSM119].

'It's remote... It's just a great place to be, look you know it's brilliant [the] remoteness is what makes it special' [Male, Non-Aboriginal resident JSM74].

Personal recharge

'Personal recharge' was a fourth element of therapeutic value (mentioned in 20% of all interviews). Responses again were spread among a range of stakeholder groups although yachts people dominated (16% of all such responses), followed by tourists (13%), members of the tourism industry, ENGO representatives and 'others' (10% each). 'Personal recharge' includes improvements in mental wellbeing stemming from personal experiences of the Kimberley coast, such as 'recharging the batteries', quiet reflection, rejuvenation, contemplation and 'cleansing'. These benefits appeared to accrue in both busier town areas as well as in more remote locations. The excerpts below illustrate these concepts.

'I think there is something about the coast and being near the water that's quite therapeutic or cleansing element, healing and I don't know how but I think, yeah, I think for those young people in particular and even for myself in some ways you know if I feel stressed or something I'm often drawn to the coastal, the water. And I think you know a sense of being out there and waves coming in and waves going out' [Female, Other DPI26].

'[The coast] levels you, brings you back to your roots, you know that's how we have got to know where we are from, what we are doing so it makes you clean, it nourishes your soul' [Male, Yachts person JIM250].

'Maybe because you're just so alone and so removed from the conventional world that you've got time to just sit and appreciate the earth moving and you reflect on life, calm down and the tranquillity of the things. I think it makes you feel like a better person if you just spend a bit of time or a lot of time in these spots' [Female, Yachts person JIM259].

'You can climb up on high rocks here, sit there and you can see all the way across King Sound to the other side. And when it's dead still and the water is absolutely flat it's like no other place in the world. Just so quiet and a lot of places I go I would be surprised if any white people have ever been where I've been, so it's remoteness that yeah gives you a bit of a stillness' [Male, Other JSM42].

'It's a pretty special place really and you can sort of do a lot of life reflecting, sitting on the beach out there...so you can sort of slip out there and get away from it all and come back with a fresh outlook' [Male, Recreational fishing body JSM73].

'I'd like to have a toll meter on the [Derby] Jetty Road of a morning. The amount of people who just sit and gaze over the water' [Male, Recreational fishing body JSM73].

'It just felt so good to be there, I was just so happy. And while we were driving through I could feel how happy I was and – yeah, that's amazing I didn't know that you could have these feelings just by watching, yeah the nature, that was amazing' [Female Tourist SM189].

3.3.4. Recreation—other

References to recreational values were prolific in the interviews, with 17 elements pertaining to recreation evident. Camping and fishing, the dominant forms of recreation to which value was assigned, are discussed in 3.4 *Direct use, consumptive values* (see 3.4.1 and 3.4.2). 'Recreation – other' acts as a super category through which to discuss the remaining 15 values relating to non-consumptive elements of recreational use that did not belong to either 'camping' or 'fishing'. These other key elements included exploration (mentioned in 27% of all interviews), swimming (26%), walking and running (24%), wildlife viewing (14%), safe anchorage (12.5%, mentioned predominantly by yachts people and local residents), and diving and snorkelling (11% of all interviews). Beyond this, other recreational aspects including boating, beachcombing, taking photos, four wheel driving, kayaking and canoeing, and picnicking were all mentioned, albeit at lower frequencies with each activity comprised <10% of all interview responses. These latter elements are not considered further here.

Collectively, references to 'Recreation – other' were evident in 62% of all interviews. This high percentage of attention in these results is somewhat misleading, with its dominance attributable to its 'catch all' nature for all recreational values mentioned that were not included in 'camping' or 'fishing'.

Respondents placed great value on 'exploration', defined as the ability to explore the outdoors. Reference to value derived from 'exploration' was evident in 27% of all interviews. 'Exploration' in this sense referred to opportunities to explore as an activity distinct from more formal recreation activities such as camping, fishing or swimming. Responses were predominantly from tourists (24% of all 'exploration' responses), non-Aboriginal residents and yachts people (12% of responses each) and stakeholders from recreational fishing bodies and the tourism industry (10% of responses each). Probing revealed that exploration provided personal value primarily through pleasure or excitement derived from visiting new places and being able experience something not many other people can. For example:

'I've been cruising up there for five years, and every time I go out, I find something exciting, and different' [Male, Tourism industry JSM84].

'It doesn't matter how many times you go up there [Buccaneer Archipelago] or how long you spend there you never ever completely explore the area...Even now and this is some 40 years later, we still go out there and we're still looking, still exploring and we still haven't found everything we want to find' [Male, Non-Aboriginal resident JSM78].

Exploration was also discussed more generally as a way to experience or look around the Kimberley coast by becoming more fully immersed in the surroundings:

'Exploring, you pull up to a spot and you have a look and go "I wonder what's in there?"...shoot off in the tinny, go in and have a look and you know it's just fascinating' [Male, Recreational fishing body JSM73].

'Just walk along it and explore basically look at the area, the cliff faces and things like that' [Male, Aviation industry JSM105].

'We lived on a boat and we used to work in a pearl boat. So when we knock off work...we explored the whole reefs, all the islands, pull up on the beach, camp the night and everything so I think it's like heaven you know' [Male, Aboriginal ranger JSM17].

Other key elements of 'Recreation – other' such as swimming, walking and running, wildlife viewing, safe anchorage, and diving and snorkelling were less nuanced in nature. Respondents typically referred to the fact they valued a particular location for the given activity without expanding further. As such, these elements are not discussed further here.

3.3.5. *Social interaction and memories*

'Social interaction and memories' formed a fifth category of direct use, non-consumptive value evident from the interviews (mentioned in 56% of all interviews) This category emphasised social experiences, centred on values derived from spending time with friends and family in the coastal environment, as well as memories of 'home' and childhood. Value placed upon the presence of self-sustaining Aboriginal communities and perceptions of 'sense of place' were other elements of 'Social interaction and memories', however, these elements appeared in less than 10% of interviews and so are not described further here.

Social experience

'Social experience' captures a subset of values centred around spending quality time with friends and family in the coastal or marine environment (mentioned in 37% of all interviews). Responses from a range of stakeholders were remarkably similar in the values expressed, with commonalities being the emphasis placed on socialising with both old and new acquaintances, and the coast as the setting enabling this to happen. Tourists (27%) followed by Aboriginal rangers and Traditional Owners (20%) dominated responses for this element of value.

For tourists, value was ascribed in several different ways. The first of these centred on visiting friends who live in the area: '[the] primary reason is my relationship with the people' [Male Yachtsperson JIM250]. Making new friends or acquaintances during the travelling experience was another way. Tourists described their pleasure in meeting new people from different areas, the openness of the camping lifestyle and sharing of experiences as highlights. For example:

'It's just meeting people and listening to their experiences I think... I think you learn from other fellow travellers... I like the social side of meeting people' [Husband & wife, Tourists JSM115].

'I in particular love camping like this because already the guy next door has been across to introduce himself, and when you're staying in motels that doesn't happen. So it was just a camaraderie, [for example] somebody else has got one of these [caravans], we've only had ours a few months, and couple of things we didn't quite understand, so went across to those people for a couple of minutes, and half an hour later you are still there talking about your [caravan], so it's fun' [Male Tourist JSM19].

'The atmosphere here is really convivial and I like the people' [Husband & wife, Tourists JSM58].

Stakeholder groups other than tourists also derived value from sharing experiences with friends and family, or from building memories together:

'It's not just the boys going out it's all the families as well but it's camping and it's...even the kids. It's a social...it's a social experience' [Male, ENGO JSM91].

'It's also a place that I've shared many good experiences with other people' [Males & female, Aboriginal residents SM179].

The same premise applied to spending time with family. Time spent with family was often described as a bonding experience and typically linked with the activity of camping, which enabled a freedom to spend time as desired. One respondent phrased this as, 'I'll go down [to the beach] and spend the day with the children' [Male Tourist JSM111].

Home/ childhood memories

'Home/ childhood memories' drew on the physical landscape being either a current or past home for respondents. This value was mentioned in 18% of all interviews. Not surprisingly, Aboriginal responses dominated (Aboriginal rangers and Traditional Owners 46%; Aboriginal residents 14%). Respondents linked their value of a given place in the landscape to their fond memories of childhood at that location:

'It's a place of significance and history to me. Because I grew up around that area...lots of good memories of those places' [Female, Aboriginal Traditional Owner JSM48].

'Our personal and family and community memories are in this place. You know, the children grew up and went to these places. We continue to go there. We shape our new stories around these places so we've got a connection' [Males & female, Aboriginal residents SM179].

'On top of the hills it was just full, you know, memories growing under foreshore right in there' [Male, Aboriginal Traditional Owner JSM99].

'People talk about 'country'. Well, I think that most people are interested in country and we as much as anybody else. This place is ours. We've been here for over 50 years. I've got my father buried up there' [Male, Aquaculture JSM34].

Others described their current home in effusive terms, indicating a strong emotional connection to the landscape based on residence. For example:

'This is where I live so obviously I love it. I wouldn't live anywhere else now' [Female, Aviation industry JSM106].

'There's a sense of belonging, everything. It's home, it's of great value' [Males & female, Aboriginal Traditional Owners JSM107].

'I love it. I love it. There's no place better in my life. I've been everywhere all over the world' [Male, Non-Aboriginal resident JSM113].

3.3.6. Experiential

Experiential values, those derived from places offering a unique personal experience, was a sixth category of direct use, non-consumptive value. Such references were evident in 51% of all interviews. This value category was strongly linked to 'Physical landscape', with the latter appearing to provide the setting in which 'Experiential' values were derived. Major elements included 'blown away' experience, adventure, 'iconic destination' and 'private' experience. Each of these is discussed below in order of decreasing mention in the interview data.

'Blown away' experience

Value derived from being 'blown away' by the experience of the Kimberley coast formed one theme within the 'Experiential' category. Respondents in 21% of all interviews discussed their experiences using terms such as

'awe-inspiring', 'gobsmacked', 'eye opening', 'once in a lifetime' and having their 'breath taken away'. Responses were primarily from tourists (25%), non-Aboriginal residents (19%) and yachts people (16%). People mentioned a range of occasions as fostering their own particular 'blown away' experience of nature, with the Kimberley coast presented as an almost ethereal destination that must be seen to be truly believed. For instance, 'my blog last night said everyone should come to this place at least once. I think you just got to...you've got to come and see it to believe what it's actually like. You can see the photos but you've just got to come here and be blown away by it' [Husband & wife, Tourists JSM29].

Some described their experience of the coast as life changing:

'I know it has changed my life seeing [the coast], going there and witnessing it. It's definitely...I used to like going to Melbourne and looking at the architecture of buildings and then I come up here and I was like "whoa". The architecture of the Kimberley is just something different' [Male, Non-Aboriginal resident JSM62].

'I think there is a lot of people who come away with you know a lot of experiences. One fellow in particular he just basically kept pinching himself kind of "I can't believe I'm here. This is just amazing, absolutely amazing, words can't describe it". So I suppose...words can't describe it unless you're actually there' [Male, Recreational fishing group JSM73].

'When I flew over to Horizontal Falls and then over Cockatoo Koolan and Irvine [Islands] it's like...another world. It's just something yeah that you see and feel really...for some people it's been a transformational journey' [Male, ENGO JSM87].

Others framed their 'mind blowing' experience of the Kimberley coast in a more reflective manner. This included views that experiencing the coast would perhaps enable people to 'get a better appreciation of the world, nature, their impact on it and that kind of thing' [Female Yachts person JIM258]. The coast offered opportunities for internal contemplation, as well as contemplation of the world at large.

'When you're sailing up there and you look up and there's the top, way the heck up there and it's like, you feel so insignificant and [there's] all those histories...you feel completely in awe of it you know, it's where you really wonder about life on earth. [The] meaning of life' [Males & females, Yachts people JSM1].

'Makes you wonder [what] all the world is about' [Male, Non-Aboriginal resident JSM113].

'Just the massive nature of the place just makes you feel quite insignificant that nature is, so much more prevailing, you know, that we haven't destroyed everything either. That there is part that is still untouched, and just so, so majestic in their beauty. I think that's why people like wilderness areas, they get to see themselves within the scale of the planet being so large...it gets you back to seeing where you fit in the place' [Partners, Tourists SM190].

Adventure

'Adventure', being values derived from the challenging experience provided by a location, was a second theme within the 'Experiential' category. This theme, mentioned in 19% of all interviews, incorporated ideas of challenge and difficulty of access. Responses were mainly from tourists (31%), non-Aboriginal residents (21%) and yachts people (17%), all of whom highlighted navigating challenging access roads or difficult coastal currents as a key part of their experience: 'the adventure and challenge of doing it is a big part of it as well' [Husband & wife, Yachts people JSM2]. In some cases the challenge and adventure involved was linked to a sense of personal achievement. The following excerpts are illustrative.

'There's so few areas that you can really adventure, that you are really adventuring in, that not many people, I can't say no people have been there but not many people have been there. You do feel like when you go to a place like this, you have achieved something. You haven't driven there by road or gone there by tourist vessel' [Female Yachts person JIM261].

Interviewee 1: Port Warrender... yeah it's a tough little track but it's a magnificent spot.... The thrill of going over the track. It's a very challenging track two three hours, four hours.

Interviewee 2: Yeah it was lovely, it was a challenge and that's probably why you get into your four-wheel driving, its bit like the Telegraph Track on the Cape [York] you know.

Interviewee 1: One of those things you do.

Interviewee 2: It's not just flat and easy track like this.

Interviewee 1: The last eight [kilometres] I reckon took us about two and a half, three hours. So the track is, well, it's hairy' [Males & female, Tourists JSM59].

'Scaring the hell out of me actually. Ripping through it all [Horizontal Falls] but we always have a little play down there and have a little laugh and just enjoy...see how white the knuckles can get as you go through it. It's adrenaline alright' [Male, Recreational fishing body JSM70].

'There is a dedicated group of tourists that will go there. They want to be off road and they want the adventure. So it's an adventure tourism playground if you're traveling there by road and it's slightly spiky. So adventure tourism, lots of adventure tourism' [Female, Tourism industry JSM71].

'It is always a challenge. There is always a challenge to get the boat down there [Port Nelson] and there is always a challenge to bring the boat home in one piece, all right. It was a challenge' [Male, Marine transport JSM80].

'Horizontal Falls was more like a thrill seeker type of thing...we hung around and waited till we could get through...first time we went out he pulled up in front of the second one and it was absolutely terrifying. I thought it's going to go through and then he turned around, and said "no, it is even too big for me"...Horizontal Falls was awesome...probably one of the few things that was a thrill-seeker type of thing' [Husband & wife, Tourists SM200].

Iconic destination

Values associated with the experience of visiting an iconic destination formed a third theme for 'Experiential'. References to iconic destinations were evident in 18% of all interviews. Members of the tourism industry provided the greatest proportion of responses (23%), followed by yachts people, tourists and Government representatives (all 11.5%).

Cable Beach and Horizontal Falls were two of the iconic destinations mentioned. For the majority of respondents, the value derived from icon status related to tourism interest and subsequent flow-on benefits to the local economy. Such sentiments were particularly evident in responses from members of the tourism industry and Government. For example:

'[Cable Beach has] been recognised universally as being one of the leading beaches in the world. Its importance to the tourism industry can't be understated' [Male, Local Government SM184].

'The iconic name, the Horizontal Falls. It's almost a book end type thing and if you are going to be doing a brochure or tourism guide of the Kimberley, Horizontal Falls is always going in...spectacular from an iconic Kimberley tourism point of view' [Male, State Government JSM119].

Other responses were more general in nature, referring to the generally spectacular and iconic landscape of the Kimberley coast. These responses reflect both individual value as well as recognition of the significance of certain locations to wider society:

'[The Kimberley has] got iconic landscapes. And internationally, its international reputation...Iconic places that put the Kimberley on the map' [Male & female, Tourism industry JSM104].

'It's that tourist value, that iconic landscape' [Male, Recreational fishing body JSM72].

The more general as well as specific places of iconic status were identified as driving visitation to the Kimberley coast. This view was expressed by people in the tourism industry as well as a range of other stakeholder groups. A visit to the Kimberley coast was sometimes likened to a 'bucket list' experience, something that every person should do before they die.

'The spectacular side of the Kimberley coast...the vistas and the panoramas that you see everyday just sitting out there [are] amazing and I think that those sort of visions is what draws people to the area' [Male & female, Tourism industry JSM110].

'Like most people, it's an iconic journey and I think most people try to do it once. For us it was, yeah, something iconic that we wanted to do' [Males & females, Tourists JSM44].

'I think it's one of those places in Australia that everyone would like to go to one day and I suppose I've ticked that box' [Male, Non-Aboriginal resident JSM6].

Private experience

Private experiences were mentioned in 16% of all interviews. This 'private experience' theme incorporated feelings of having experienced the Kimberley coastal landscape as if 'you are the first ones ever to be there' [Male, Tourist JSM23]. Members of the tourism industry (32%), tourists (28%) and yachts people (20%) dominated responses. Indicative excerpts include:

'You kind of feel like "I just stumbled across this little unique little bay that's just ours" you know, even though it's not' [Females, Tourism industry JS108].

'That's what we're loving about it, is getting somewhere and you just...you go to the beach and you feel like you're the only person the world there and it's beautiful feeling' [Husband & wife, Tourists JS114].

'When you go out there it's like you're the first person out there, is your first experience...you still can go out there and be on your own, you know what I mean, it's like you're there as the first person, it's like walking on a whole new area' [Male, Non-Aboriginal resident JS76].

'You will find that at least half the beach won't have a footprint on it...you feel as though you are the first one or the only one that's walked the beach' [Husband & wife, Tourism industry SM195].

'Part of the appeal is like you feel like you are somewhere where no one has been before' [Male Tourists SM197].

The feeling of having a private experience was couched by some as a form of discovery. One respondent phrased this as, 'you kind of feel like you're discovering things for the first time' [Male, Protected area manager JS94]. A few respondents expressed a desire to keep the Kimberley coast as a 'hidden secret' from broader society, so as to preserve the private experience and avoid spoiling the solitude.

3.3.7. Learning and research

Values relating to learning and research were a seventh form of direct use, non-consumptive value evident from the interviews. This category was defined as 'values derived from the ability to learn from a particular place'. Typically expressed in terms of scientific research, learning and research also encompassed monitoring, exploration, discovery and more generally the ability to learn about the environment (i.e. 'lay' learning). This category of values does not include transmission of cultural knowledge within Aboriginal society (described above in 3.3.2 Aboriginal culture).

Values relating to learning and research were evident in 34% of all interviews. Aboriginal rangers and Traditional Owners contributed the greatest proportion of responses (32%), followed by Aboriginal residents (13%), non-Aboriginal residents (11%), tourists (8.5%) and protected area managers (8.5%). The dominance of responses from Aboriginal rangers reflects the intensity of research and monitoring efforts undertaken by ranger teams. These activities occur in Roebuck Bay near Broome as well as along the Dampier Peninsula. Common activities mentioned by ranger teams included turtle, dugong, invertebrate and seagrass monitoring. Monitoring assisted broader research efforts as well providing further information about country and the health of its environment.

'Well, the Rangers do turtle monitoring, look after the beach...We'll check how many tracks; how many old tracks, how many new tracks, and see what sort of turtle tracks' [Females, Aboriginal rangers DP123].

'We do mud sampling at a couple of locations...just monitoring purposes. Also we do the sea grass monitoring in four areas' [Male, Aboriginal ranger JS14].

'Turtle and dugong monitoring with these recording data, sightings, marine surveys...We also do joint marine surveys with the other ranger groups like Dambimangari and Nyul Nyul. I've been involved in looking for snubfin dolphins, so we do joint surveys up there...marine surveys is basically whale watching, turtle counting, mammals birds you know, you name it' [Male, Aboriginal ranger JS51].

Local environmental organisations and the mining, oil, gas and energy industries undertook similar monitoring programs. In addition, a number of responses specifically referred to the learning value of Roebuck Bay, a globally significant Ramsar site providing seasonal habitat for migratory shorebirds, and the Bay's Bird Observatory research site. These responses were from Aboriginal rangers as well as a range of non-Aboriginal respondents who described wonder and interest at the global bird phenomena. For example, 'wonderment at the global migration patterns...[Roebuck Bay is] an outstanding place for the natural phenomenon of birds coming from as far as Siberia to these places every year as well as a place of research and science' [Female, Other DP121].

Responses highlighted the need for further research in the region. The Kimberley coast was portrayed as 'unknown' in many ways, with research hampered by distance, climate and expense. Respondents also emphasised the potential to discover species new to science. For example:

'If people were to look properly, they'd find new species of whatever' [Male, Aboriginal resident JS43].

'They are still discovering species out there. It's only three years ago or something they discovered a new dolphin species that had never been seen...so pretty incredible that that's still going on because it's so, I don't

know, I guess we are early explorers in a sense because we do go out there but even we don't realise that we might be looking at a dolphin that has never been seen before...I just keep reminding myself how privileged we are to be there' [Female, Recreational fishing body JSM83].

'From the biodiversity perspective it's an unknown quantity in many ways. You know there are some surveys that are starting to happen [throughout Camden Sound and the Buccaneer Archipelago] now but it's an area that's so vast and so remote and so expensive to do work in there... we don't know a tenth of what's up there really' [Male, ENGO JSM87].

One long term resident, an ex-commercial fisherman with considerable knowledge of the coast, noted his contribution to scientific research: 'I used to help [Department of] Fisheries in the early days, I think I was the first person to send them the head of an Irrawaddy dolphin...collecting specimens, yeah I got data you know for the juveniles and all that sort of stuff' [Male, Non-Aboriginal resident JSM55]. Others made reference to the potential contribution to climate change research possible through study of Kimberley corals, which are considered unique in their ability to deal with extreme temperature ranges and tidal fluctuations. For instance:

'Coral types of Montgomery and Champagne [Reefs]...because of the Kimberley tidal ranges, extreme temperature zone [they are] really interesting for science looking at adaptation for climate change. You know [they] withstand extremes of tide and temperature and cyclones and all sort of things' [Male, Protected area manager JSM94].

'The most amazing fringing reefs...they can deal with amazing amounts of tide, heat, current [and] turbidity in the water, and still survive, so may be the key to understanding how corals can live in climate change' [Female, ENGO JSM118].

3.3.8. *Historical*

Historical values formed an eighth category of direct use, non-consumptive value (some form of historic value was mentioned in 19% of all interviews). This category incorporated value derived from places of natural and human history that matter to an individual, others, Australia or the world. European and missionary history were major themes. Other themes appearing in less than 10% of all interview responses respectively, and therefore not described further here, include values attached to pearling, wartime, dinosaurs, modern maritime, Maccassan and pastoral history. This category excludes values associated with historical Aboriginal use and occupation; this was discussed previously in 3.3.2 *Aboriginal culture*.

European history

Value associated with early European maritime explorers and pioneers was the dominant European history theme (12% of all interview responses). Tourists and yachts people provided the greatest number of responses (22% each). This was followed by members of the tourism industry (16%) and Aboriginal rangers and Traditional Owners, non-Aboriginal residents and protected area managers (all 11%).

A number of responses centred on Careening Bay and Brentlock Harbour as places of significance for early European exploration and settlement. Careening Bay and the emblazoned boab tree carved with 'HMC Mermaid 1820' were of particular interest for yachts people, perhaps owing to their greater ability to visit the remote site. For instance:

'Careening Bay, people really enjoy the sense of history and anybody who has read anything about Phillip Parker King know that he was there and this is where he careened his boat and emblazoned in the tree it's really, that got my crew and it always gets me yelling "I know this thing, it's wonderful", the atmosphere there' [Male, Yachts person JIM254].

'Phillip Parker King went there and he marked on the boab tree...It's where they careened the boat, the Mermaid. And it was just nice to know that you've been somewhere an historical Australian naval figure had [been]. That was just exquisitely special to go and walk along that beach and look in the little creek and see where they got the water from and where they careened and sit there on the shingle and dream.

I think to tie the early Australian history as far as Australian explorers' [Female, Yachts person JIM261].

Other respondents mentioned the abortive attempt at European settlement that occurred in Brecknock Harbour within Camden Sound, focusing on the sheer folly and hardship experienced by would-be settlers:

'Camden Sound which was a settlement, an early settlement. 1864, '65. It's one of those fantastic things, one of the first settlements in certainly northern W.A.' [Male & female, Tourism industry JSM110].

'Historically it's amazing if you consider the Brecknock Harbour incident when all the people from Melbourne came around on the explorer Grey's advice [who said] "it's a wonderful country" and they all came around and had a dreadful time' [Male, Non-Aboriginal resident JSM78].

'European history as well, they all, the settlement in Brecknock Harbour. It was like the first settlement in the Kimberley... but, yeah, they failed, epic fail there' [Male, Protected area manager JSM94].

Other responses included values attached to the history of Broome, Eighty Mile Beach: '[John] Forrest went through there...there's a cairn on Barn Hill itself, it's good European history' [Partners, Tourists JSM22], locations within King Sound and the Dampier Peninsula. Often, respondents linked the actions of early explorers to the current names of valued locations, for example:

'Point Torment's named for when the ship landed there and they had to sleep in hessian sacks because they were just getting tormented by mozzies and sandflies' [Male, Recreational fishing body JSM72].

'Captain Beagle, from HMAS Beagle, came into this area here and that's why it's called Beagle Bay' [Male, Aboriginal Traditional Owner JSM93].

Missionary history

Missionary history was a second theme within 'Historical value' (10.5% of all interview responses). This theme included values placed on areas stemming from their religious or missionary history. Tourists (32% of responses) were most likely to mention missionary history as an important value, followed by Aboriginal rangers and Traditional Owners (25%). The dominance of responses from the latter group may reflect the fact many missions were located on traditional Aboriginal lands.

Kalumburu, Beagle Bay and Kunmunya were locations valued for their missionary history mentioned by a number of respondents. Responses focused on the hardships endured by members of the religious orders as well as impacts on the Aboriginal population. Tourists and members of the tourism industry in particular noted the inherent tourism value of historic mission sites:

'The history of you know the first missions that was set up there [Sunday Island] and you know the history between white fellows and the indigenous people. It was at one time the only self supporting mission in Australia. And then they came along and moved [the mission] made them all go to the mainland. And that was the end of that' [Male & female, Tourism industry JSM110].

'We drive in [Beagle Bay] to have a look at the church, that was main reason we were here, because it's got you know it's got history...the historic attraction' [Partners, Tourists JSM25].

'Beagle Bay area, the shell church and all that sort of stuff, that's kind of significant to me because I was brought up as a Catholic even though I don't practice my Catholic religion, but I really appreciate the history there and what that brought to the people and the dedication of the nun that was there' [Female Tourists, JSM28].

'The history of the Aboriginals up [in Kalumburu] with the museum it's an incredibly good museum. You know that was a nice attraction for me' [Husband & wife, Tourists JSM45].

3.3.9. Spiritual

Spiritual values, those derived from places considered sacred, religious, unique, or providing deep and/or profound experiences of nature, formed a final category of direct use, non-consumptive values. A total of 11% of all interviews attributed such values to the Kimberley coast. This final category does not include values associated with Aboriginal spirituality; these are discussed above in 3.3.2 Aboriginal culture. Yachts people provided the greatest number of responses (33%) followed by members of the tourism industry and Aboriginal rangers and Traditional Owners (both 19%).

Interview excerpts reflect a range of facets relating to spiritual value. This included feeling 'affected' by the landscape which 'leaves a mark on you' [Females, Tourists JSM20] and references to the Kimberley coast's 'aura' and 'spiritual vibe'. For example:

'It's just a special place, it's just got that air about it or that aura' [Males & females, Yachts people JSM1].

'There is just a certain feel about this place...80 Mile [Beach] it's got a spiritual feeling about this place it certainly has.... we've got a lot back spiritually' [Husband & wife, Non-Aboriginal residents JSM112].

Others mused on the coast as possessing tangible energy and being a profound and powerful place where nature 'talks'. These aspects were considered to facilitate experiences that brought people closer to God, or a non-religious equivalent. The following excerpts illustrate these ideas.

'It's one of those spiritual places, it's a really powerful place. And I feel for myself and nature just talks there' [Females, Tourists JSM28].

'Not of an orthodox religion, but yes, I think that that's the thing that reaches the God within us and just lets you centre yourself. [It's] more of a feeling of being one with world and feeling the majesty and the grandeur of creation or all evolution depending of which word you think of at the time, the whole world around us.

For me the spiritual side is those brief moments in time when you're – everything – the world around you is all making sense and you are part of that' [Female, Yachts person JIM259].

'When you see those things together, it is a little frightening, very exciting, incredibly awe inspiring and very humbling to see. It is a landscape that is...just profound and if you are not religious, I think you would reconsider it...there's energy out there that's tangible' [Male, Aquaculture JSM33].

'I think the land has got a real sacred beauty to it. You can feel that presence that's there in that place...there is something so deep within the location of it that it is sacred' [Partners, Tourists SM190].

3.4. Direct use, consumptive values of the Kimberley coast

The second set of values evident from analysis of the interviews was classed as direct use, consumptive values. This set includes values accrued through directly using the coast and its waters, with a concomitant diminishing in the quantity of goods and value available as a result. Direct use, consumptive values evident from analysis of the interviews included: recreation (camping or fishing), subsistence, and economic (tourism or commercial fishing). The commercial fishing category also included pearling, aquaculture and fishing for subsistence purposes. As for the previous set, these value categories (e.g. Recreation – camping) are presented and described in order of how often they were mentioned by respondents, with each set beginning with the most often mentioned and working through to the least mentioned.

3.4.1. Recreation–camping

'Recreation' was the main direct use, consumptive value identified through these interviews for the Kimberley coast. While recreation itself represents an activity rather than a value per se, it is commonly referenced as such in the wider environmental values literature and we continue that tradition here in order to link into the broader body of research. This category is defined from this study as the 'values derived from places that offer recreational activities centred on overnight or longer stays in transient and/or fixed accommodation in coastal areas'. A total of 58% of all interviews referred to camping as an important aspect their Kimberley experience. The majority of responses arose from Aboriginal residents, rangers and Traditional Owners (23% of all responses) followed by tourists (12.5% of all responses). Various facets of value were attributed to camping. Aboriginal respondents typically framed camping in relation to visiting country and spending time with family, on country:

'That is a very important place that we time to time go back to visit for camping and fishing' [Female Aboriginal ranger DPI22].

'When I'm by myself or...I take my nephew, or other boys, or my sister, or my family, I like take them out and take them camping' [Male, Traditional Owner JSM35].

While spending time with friends and family was also important for non-Aboriginal respondents, these interviews highlighted how camping facilitates enjoyment of the natural environment: 'great opportunities for camping being out in nature, communing with nature' [Male ENGO JSM87]. As the following quotes illustrate, the ability to camp very close to the water is a highly prized component of the enjoyment of nature:

'The opportunity to, as we are here, camp virtually on the beach' [Female, Tourist JSM27].

'My eldest was about one year old and we'd camp there and have the suitcase up in the doorway and the water is only about a metre away' [Male, ENGO JSM91].

A subset of respondents valued camping specifically for the ability to 'get back to basics' and live simply. In contrast, others discussed 'glamping' or 'five star camping' [Husband & wife, Tourism industry JSM7]. Glamping, the ability to go camping 'without lugging everything' [Female, Tourism industry JSM110], was valued on account of making the camping experience easier, while also allowing those less comfortable with the rigours of camping and the Kimberley environment to also experience nature. The following quotes illustrate this value.

'It's an opportunity for people to be in the bush and be very close to nature, but not be freaked out by it' [Female Tourists JSM28].

'It was experiencing nature in [the] raw but feeling safe' [Husband & wife, Tourism industry JSM7].

'Luxury in the sense of being like we are staying in a tent so you kind of feel like you are camping and you are in the bush and there were kangaroos fighting outside our tent the first morning and you hear the bird sound and you feel like you are in the middle of nature [but] with all the comforts of a luxurious pool, toilet and shower and your tent' [Male Tourists SM197].

3.4.2. Recreation–fishing

Recreational fishing was the second manner in which direct use, consumptive values were discussed: 'for us, for me [it's] what's in that water. Fishing' [Male Tourist JSM115]. A total of 54% of all interviews referred to fishing in some form as a value relating to the Kimberley coast and marine environment. 'Recreational fishing' in this instance encompasses values derived from places that offer recreational activities relating range of activities relating to the catching of fish species as well as gathering of other marine life e.g. mud crabs, cockles, oysters and stingrays.

This value includes recreational fishing activities only, with the majority of responses from tourists (22% of all fishing responses), local (non-Aboriginal) residents (16%) and members of the tourism industry (14%). It includes fishing by yachts people (which might be regarded as subsistence fishing), and does not include fishing undertaken by Aboriginal people as this activity was more commonly referenced in the context of subsistence rather than recreational pleasure. The exclusion of Aboriginal fishing from this category also acknowledges the importance of fishing in supplementing incomes and diets for Aboriginal people in the Kimberley.

Fishing values were contextualised in a number of ways. While many respondents were content to simply state 'fishing' as a value of a given place, others were more specific of the value they derived via fishing. These responses included fishing as an activity linked to memories of a first catch, a particularly memorable catch or a learning experience. The following excerpts are illustrative:

'I learnt how to mud crab down there and the fishing area is amazing' [Female, Tourism industry JSM108].

'We went fishing and of course I caught little fish and was laughed at because I was very happy to catch little fish and the lady said "that's bait fish you're catching" so that was very funny" [Female, Other DPI21].

Many responses made reference to the abundance of species present and the subsequent ease of catching fish or other marine life:

'The fact that you can always catch a fish...they're places you would always go and catch your fish' [Male, Port facilities JSM12].

'Lots and lots of fish out there. I've been fishing every day. [My wife] never fished in her life and she caught so many barramundi it just wasn't funny' [Male, non-Aboriginal resident JSM21].

'There's plenty of fish still which is great. My husband goes out fishing every week' [Female, Aviation industry JSM106].

'Good fishing and you can actually catch fish off the side. The water was clear so you could actually see the fish coming around' [Male, Yachts person JIM260].

Related to this was value derived from the Kimberley marine environment being regarded as uncrowded, resulting in less fishing competition than elsewhere. Greater personal satisfaction from fishing activity is thus achieved, an aspect particularly important for the tourism industry: 'Walcott Inlet, fishing wise it's really good...again just because it's not many boats out there, so the fishing is so good and that's what people come up here for' [Female, Tourism industry JSM109].

The derivation of personal pleasure through the fishing activity posed a final element of value. Responses noted the experiential aspect of fishing rather than emphasising the catching itself:

'Yeah attitudes are changing...it's not like we're fishing for your freezer anymore; you're fishing to enjoy the moment' [Female, Tourism industry JSM108].

'Whether we catch one or twenty it's not a big deal, it's just getting out there and doing something I suppose it's the effect' [Female, Tourism industry JSM109].

3.4.3. Subsistence

Subsistence values, those derived from places that provide for basic human needs, formed a third direct use, consumptive value (44% of all interviews). This category does not include fishing or the gathering of other marine life in a recreational capacity; all responses coded to 'Subsistence' were contextualised by reference to

the provision of livelihood needs. Aboriginal rangers and Traditional Owners (52%) and residents (16%) provided the majority of responses (68%).

Respondents referred to both past as well as contemporary hunting and gathering (29% of all interviews). Turtles, dugongs, mud crabs, cockles and a range of fish were the dominant marine species targeted, together with turkeys, goannas, geese and bush fruits in the terrestrial domain. Aboriginal respondents emphasised the role of seasonality and traditional knowledge in guiding subsistence food collection, which occurred both in the marine and terrestrial environment:

'This is my backyard and this is what I practice every year, go from seasons to other seasons and that's why country looked after me, gave me food and that's what we crave on and then you got your bush, when you go hunting for kangaroo, goanna, turkey, ducks, geese, yeah. That's my country and it's really rich' [Female, Aboriginal Traditional Owner JSM101].

The identity enconced in being a 'saltwater' person, which linked an individual to the sea and its resources, was cited:

'They call us a saltwater people and we live off to sea' [Male, Aboriginal resident JSM102].

'Being part Yawuru and part Bardi, I grew up living off the land and the sea, so culturally you know that provides for us' [Male, Aboriginal ranger JSM14].

'The salt water country is just the same, if not more valuable to us as black fellows because we live off the salt water. It's our main form of food' [Males, Aboriginal rangers JSM64].

'Sea life is the main source of food for people; it's of big value to us. Something I found in my work, is that people don't budget, because they depend on the sea [for food]. A lot of people still depend on the sea...these [coastal] places are of great value 'cos they [are] a source of survival' [Males & female, Aboriginal Traditional Owner JSM107].

Others linked the subsistence use of coastal resources to their saltwater identity while also citing financial factors involved in modern day living. For example:

'We are saltwater people and they use the coast. We don't often buy meat from the store, it's too expensive. Everything we can get from the ocean' [Male, Aboriginal Traditional Owner JSM30].

'We just go and get a feed that's it, just follow stuff that are fat. Its not recreational fishing, it's just going to get what fish are fat. Not to fill my fridge and anything like that, it's just grab what you need. In a cultural perspective because we still live off the land and lot of people up here are low income earners, what's in the land and sea is we are still maintaining, we [are] still using those resources. Like when people got no money they'll go to the beach and get a feed...everybody is just surviving, because on low incomes, the food prices are so high and the fuel is too, I don't know sometimes how these people live. And it's the sea, resources here that keep them going' [Female, Aboriginal resident JSM46].

'I value the food that it provides for everybody, the sea food, the bush food, the fruits from the bush...it will always be important to people, because it provides food, not everybody eats beef and not everybody eats sheep, lamb, pigs. You got salt water and all you've got to do is find it and everything is good...Even though there are shops around and we still look for the shops to buy the shop food, we could survive quite easily and so could people in 30 years time, my children, my grandsons. I'm just rich everything I got here, I don't have to have dollars to be rich. And a lot of people shouldn't have to have dollars to be rich, because the country is rich in what it has got and provides' [Female, Aboriginal Traditional Owner JSM48].

'It's a constant struggle for us to get food on our table especially when you got no work, so people get up and doing hunting' [Male, Aboriginal ranger JSM53].

Subsistence hunting and gathering was also noted in an historical or more recent past tense, mostly by older Aboriginal respondents:

'It was more survival back then and living off the land and resources so you had to go out and hunt and gather on regular basis...It's our home, it where we have been hundreds of years, it's where we've been hunting and gathering...know get most of the food from the ocean. So yeah the coast is very important to not only just the Bardi people, my tribe, but every tribe on the Kimberley coast you know' [Male, Aboriginal ranger JSM51].

'We never got hungry you know [as children]. Now, kids they are saying, "oh you got money [so we can go to] the shop", where you are trying to say, well when we are hungry, we used to get our line and just go fishing' [Female, Aboriginal Traditional Owner JSM97].

'We lived off the sea. If we didn't live off the sea we would starve' [Female, Non-Aboriginal resident SM191].

A second element of subsistence emerged in the value placed on locations offering a supply of fresh water (21% of all interview responses regarding subsistence). The value derived from fresh water is obvious in the harsh Kimberley environment. Fresh water supply was particularly valued by Aboriginal people as well as yachts people, who often travelled without a desalinator on board and thus needed to frequently punctuate their journey with stops to collect water. Other stakeholder groups valued freshwater for the ability to swim or the provision of a relaxing area to visit.

3.4.4. *Economic–tourism*

Economic value derived from tourism was a fourth category of, direct consumptive uses. This tourism-focused category encompassed tourism more generally as well as more specific mention of nature based or ecotourism, Aboriginal tourism ventures and cultural tourism. A total of 36% of all interviews mentioned tourism value in one of these forms. Unsurprisingly, most responses arose from members of the tourism industry (24%) and tourists (15%), followed by ENGO representatives (12%). Locations receiving a greater number of mentions included Horizontal Falls, Broome, Eco Beach Resort, Kooljaman Resort at Cape Leveque, and major river systems including the Berkeley, King George and Drysdale. Interestingly, the results also indicated tourism value associated with mining operations on Koolan and Cockatoo Islands, perhaps because of the stark contrast with the surrounding environment and subsequent interest from tourists in discovering more about mining on the two islands.

Responses were not particularly nuanced and typically simply referred to a location's popularity with tourists, high levels of visitation or the fact it featured heavily in tourism literature and travel itineraries. Some also noted tourism value in terms of revenue contribution to local communities:

'Horizontal Falls it's extremely important to Broome and Derby in terms of tourism revenue...[it's] probably as important for the West Kimberley as the Bungle Bungles is for the East Kimberley in terms of bringing people in...And 100, 000 people go out through Horizontal Falls Seaplane Adventure Tours every year so that's quite a bit of money' [Partners, Tourism industry JSM104].

Respondents associated with tourism (e.g. aviation, members of the tourism industry) noted the influence of iconic destinations, marketed as such, on the choice of destinations by tourists:

'[Horizontal Falls is] just one of those things everyone wants to see, so that's obviously why we do trips there' [Males, Aviation industry JSM36].

'Horizontal Waterfalls is obviously a main attraction because the majority of people coming up here, that's what they've heard about, so that's why they want to go there, [it's] quite an important place as far as tourism goes to make sure we get in there' [Female, Tourism industry JSM109].

Other respondents (12% of all interviews) placed value on Aboriginal tourism ventures. This value was associated with locations (typically, but not exclusively located on the Dampier Peninsula) providing economic opportunities for Aboriginal people. Responses often expressed positivity for community role models and self-sustaining communities, as well as Aboriginal people retaining control of who entered their land:

'[Horizontal Falls] is where [the value] starts to come back to the actual tourism value and very good opportunity for local indigenous groups to be engaged in [Horizontal] Falls' [Male, State Government JSM119].

'[Traditional Owners have] set up business there and they are selling indigenous art...it's really good what they've got set up there, it is pretty successful. The fact that they have just done really well as an opportunistic thing with [tourists] coming past' [Females, Protected area managers JSM120].

'Community-run tourism opportunities, that's a really positive thing and a lot of people coming to Broome want that experience, and [in] the northern parts of Dampier Peninsula you can definitely get that. And some of them are really, really well run and provide a great service for the Peninsula' [Female, Protected area manager JSM13].

'I like those locally owned [tourism ventures]. You know, the Traditional Owners still manage it and look after it and say who comes and all that sort of thing...they're deciding the impacts, they're deciding where we can go and what we can do, and I think that's the way it should all – the whole [Dampier] Peninsula should be.

That we're invited' [Males & females, Tourists JSM44].

Cultural tourism opportunities and the attendant interaction with Aboriginal people and culture (9% of all interviews) were also valued. This included responses from both Aboriginal cultural tourism providers, who valued being able to share their culture with others, as well as non-Aboriginal recipients of the tourism experience. The following two excerpts demonstrate these values:

'We went on a tagalong tour, a little bit of cultural experience and you know turtles and we saw fish and stingrays and we learnt how to whistle a shell, you know childhood games but we all tried it and did it and things like that so it was a really, really good experience. It was a great experience. I'll recommend it to anyone who comes up here' [Husband & wife, Tourists JSM24].

'On my tours, I talk about country and the connection between country and Aboriginal people, how birds and other animals were once people and the story of how they came to be other beings. I want to help non-Aboriginal people understand Aboriginal culture, the kinship between family groups, how people are connected between families and across the land to different Aboriginal groups...The focus is on understanding Aboriginal culture and how it connects people to the land' [Male, Aboriginal Traditional Owner JSM30].

3.4.5. *Economic-commercial fishing, pearling and aquaculture*

Economic value derived from commercial fishing, aquaculture and pearling activities formed a fifth component of direct use, consumptive value (24% of all interviews). This category includes commercial activities only, i.e. it excludes subsistence or recreational food collection. Responses came from a variety of stakeholder groups, with most from Aboriginal rangers and Traditional Owners and members of the tourism industry (both 17%).

Unsurprisingly, respondents involved in the commercial fishing industry either currently or in the past derived value from 'commercial fishing'. They ascribed value to areas based on them being important fishing grounds and fish habitat, linking this to subsequent economic value. For example:

'My most important area because that's where the particular fish stocks are that I target so they're the most significant areas...it's a huge feeding ground for fish because there's a lot of other different species of fish there. It's turbulent waters, massive tides. It's quite productive in the value of the fish' [Male, Commercial fishing JSM5].

'Fishing at Prince Regent [River] was fantastic, the most we ever got was 174 cartoons of filleted fish in one night - that's a lot of fish' [Male, Non-Aboriginal resident JSM55].

'It's been a really good fishery for 25 years now...commercially it's been really good for a long time' [Male, Commercial fishing JSM95].

Aquaculture was mentioned in relation to the One Arm Point trochus hatchery and Cone Bay barramundi farm. The trochus hatchery was valued as an educational experience for tourists and other non-Aboriginal people: 'One Arm Point love that for the hatchery, yeah that's awesome' [Female, Aviation industry JSM106]. Aboriginal people in contrast viewed aquaculture related to the hatchery in more economic terms, given its past and current economic contribution to the community, as well as personally. For instance: 'when I was younger I used to go there often because of trochus shells... the community used to get trochus shells off us and they used to export to overseas, there used to be a market for it' [Male, Aboriginal ranger JSM54].

Pearling was another aspect of economic value. Pearling was linked to two main locations, Cygnet Bay pearl farm and Eighty Mile Beach, with various other pearling lease sites mentioned, including Kuri Bay where a number of respondents had previously worked. Cygnet Bay was valued for providing insights into the process of pearl production whereas Eighty Mile Beach was valued as a source of wild pearl shell:

'Immediately offshore you've got very healthy wild pearls, probably the largest pearl spat collection point on the coast. So it just seems to be a bit of a hotspot of activity but it's in what appears to be quite a desolate and unproductive area' [Female, ENGO JSM119].

'Eighty Mile Beach underpins the Australian pearling industry and it's a natural phenomenon not found anywhere in the world... *Pinctada maxima* beds are not found anywhere in the world like that. It's really a natural phenomenon' [Male, Aquaculture JSM33].

3.5. Indirect use values of the Kimberley coast

The third set of values evident from the interviews was classed as indirect use values. Indirect use values are those ecosystem services associated with water purification, waste assimilation and other regulating services (Millennium Ecosystem Assessment 2005). Biodiversity is also one of these 'services', and the only one mentioned by a sufficient number of respondents (i.e. in more than 10% of interviews) to warrant inclusion here.

3.5.1. *Biodiversity*

'Biodiversity' is included here as an indirect use value, although it is recognised that biodiversity is the source of many different values rather than being a 'value' in its own right (Lockwood, 2011). We define biodiversity as

the value derived by humans from the presence of flora, fauna and/or other living organisms. Responses ranged from the general to the specific. General responses typically simply referred to 'biodiversity' as a value of a given location (17% of all interview responses). In such instances, further prompting was used to explore the specific elements of biodiversity that were of value. This prompting resulted in specific elements of biodiversity featuring in 80% of all interviews. Often, respondents framed their replies within the context of their professional or personal interest in ecology:

'I'm just a nature nut and I just like all the biodiversity stuff' [Female, Protected area manager JSM13].

'The whole coast I suppose is special in its own ways in regards to country and the flora and fauna life' [Male, Aboriginal ranger JSM14].

'I guess really from my personal interest its ecological values' [Male, Protected area manager JSM94].

Others valued the diversity and richness of species present:

'Immense beauty and richness in the ocean...there is just so much stuff in the ocean, it's incredible' [Females, Tourists JSM28].

'Roebuck Bay is one of the few systems internationally like there is so few places like this in the world, that have this diversity, the ecological diversity...internationally it's just incredible' [Female, ENGO SM192].

The coastline was further valued for providing a superb example of an intact marine ecosystem that remains relatively untouched:

'It's an intact marine ecosystem that's pretty well untouched and you can apply that to all the reef systems through all those areas, there's been some trawling north of the Hayward Islands but not a lot. So it hasn't been so hammered by commercial fishing. And I think it's really important to value those things and to consider them as marine parks, you can actually protect the areas, you know, haven't been hammered and are actually in good condition' [Partners, Tourism industry JSM104].

'The nature side of things, natural things. You go out to our country; you see these birds, hundreds and thousands of them, whales and all those, areas that never been touched. Things are still there' [Males & female, Aboriginal Traditional Owners JSM107].

A final element of general 'biodiversity' value referred to the Kimberley marine environment as a nursery and resting ground for a range of species. People thus valued the environment for providing a place for species' renewal and protection. For example:

'The whole area is really a lot of it is just marine nursery you know people don't really appreciate this coast...this whole coastal area it's not just whales, it's dolphins, it's dugong, it's manta rays' [Females, Tourism industry JSM108].

'[Admiralty Gulf is] a bay area and often in those types of bay areas, there's a lot of activity with different species where they come there to birth or be protected' [Females, Tourists JSM28].

'It is a huge, an enormous hatchery for all sorts of things, the environment is really important for that' [Female, Tourism industry JSM88].

Respondents also placed value on a specific biodiversity elements. Table 8 outlines these elements together with their relative importance from the interviews. Overall, the range of elements valued indicates a broad appreciation for the many species present in the Kimberley coastal and marine environment.

Table 8. List of all valued biodiversity elements

Element of biodiversity	Percentage of all interview responses (%)
Turtles	34
Whales	32
Fish	26
Other marine life	24
Crocodiles	23
Birds (generic)	21
Marine mammals (e.g. dugongs, dolphins)	18
Reefs (corals)	17
Migratory shorebirds	11
Mangroves	11
Invertebrates	6
Shells	6
Seagrass	5
Monsoonal vine thickets	5
Rainforest	5
Seabirds	5
Other threatened species & communities	4
Trees	4
Endemic species	1
Wetlands	1

Individual biodiversity elements of particular importance included turtles, whales, fish, other marine life (e.g. oysters, cockles, stingrays) and crocodiles (Table 8); respondents typically placed value on more than one element simultaneously. People often described feelings of awe or privilege at being able to see these animals in the wild in an environment free from excessive human interference. Turtles were highly valued (34% of all interviews). Aboriginal rangers and Traditional Owners were most likely to mention turtles as a valued element of biodiversity (26% of interviews), perhaps because of their cultural significance as well as involvement in turtle monitoring activities. Tourists (14%) were the next most dominant group citing turtles; this may reflect turtle status as an iconic and charismatic species. Turtles were discussed in terms of being able to witness them in water or on the land, as well as value placed upon nesting areas:

‘That’s where turtle comes to lay their eggs...where the turtle comes up and lay their eggs, we need to protected [that] and it’s very important to us’ [Females, Aboriginal rangers DPI 22].

‘There were lots of turtles. There were lots of turtle tracks up and down onto the sand, and when we get up in the morning, there’s even more turtle tracks’ [Male, Yachts person JIM260].

‘Things like the turtle hatching which takes place on the beach there...you could see the tracks where the turtle had come up and she was actually just on her way back into the water and to think that that’s still...you know that’s there, that’s taking place, mother nature at her best and we have the privilege of observing that’ [Female, Tourism industry JSM11].

Whales were another biodiversity element valued by respondents (32% of all interviews). Members of the tourism industry dominated responses (22%), perhaps owing to the fact many offered tours solely or partly based on the presence of whales. Whales were mentioned primarily in relation to the annual migration and calving spectacular, and associated opportunities to witness this. Camden Sound was singled out for its special significance for whales although a number of other sites were also mentioned, in addition to the coastline in general. Indicative quotes include:

‘It’s a really important area for humpback whales, it’s a calving area and it’s a resting area for the whales and other cetaceans it’s also a feeding area for the whales...very important place for the whales, you know, calving and resting area, mating area’ [Partners, Tourism industry JSM104].

'Camden Sound [whales] certainly cruise through and you have the mothers and babies resting quite often in the water all through this area. So that's important' [Male, Mining, oil, gas & energy JSM117].

'We've seen hundreds of whales...where we go fishing there are always whales around the boats. We've seen the whales that come over to you and have a play and jump out of the water and they wander off...[because of] the whales, I've got a fair bit of respect for the place' [Males, Commercial fishing JSM65].

'The main significance and interest for me is definitely the whales. July through to October, you've got hundreds of whales per week that you're seeing, maybe thousands [that] you're not seeing and they're all coming in, getting it on making baby whales' [Female, Tourism industry JSM8].

'We love to see the whales on this coast here, I mean you can literally walk along here like we did last weekend and we were watching whales breaching off the coast. It's incredible' [Female, ENGO SMI93].

'The reason I value all of this coastline, all of these waters close into Broome, is [because] this is a resting area for our humpback whales. The humpback whales use this as a resting area. We have a permanent population of thousands of whales that are out there every day. And there we got the largest population of humpback whales in the world...massive natural resources that's no one is aware of. You know, I would say that 70% of the people who get on our??? boat did not know that there was a humpback whale in Broome a day before they booked their tour' [Male, Tourism industry JSM103].

Fish were a third valued element of biodiversity (26% of all interviews). Non-Aboriginal respondents dominated responses (23% of all replies). Replies from across all stakeholder groups emphasised the value placed on areas where spawning occurred:

'The mouth of the Fitzroy is paramount for barramundi and the breeding cycles of the barramundi, they'll head up the Fitzroy River to spawn' [Male, Non-Aboriginal resident JSM68].

'May [River is] mainly another area that's good for the breeding of the barramundi and whatever. It's sort of much the same as the Fitzroy itself' [Male, Non-Aboriginal resident JSM76].

This value was related to values placed on fish biodiversity in terms of the resultant fishing opportunities:

'Interviewee 1: You'll appreciate the biodiversity even if you can't catch it.

Interviewee 2: Absolutely' [Males & females, Tourists JSM44].

'We catch the most mackerel in Australia; no one catches more than us. It's not because we're wonderful [fishermen], it's just because they're the richest Spanish mackerel grounds in Australia. And we average probably 40 boxes when we get there...they say all this [Kimberley] coast is the richest mackerel grounds in Australia' [Males, Commercial fishing JSM65].

Others valued the diversity of fish species they could see, and appreciated the implications for fish populations:

'To watch from a vantage point of clear water those fish and the fish started to come in to feed on the tide and go back out, it was just...unbelievable the extent of the fish stocks, you know. So, that was a good point, that's really quite good' [Male, Yachts person JIM254].

'We used to go fishing at Eco Beach. You can see all the fish jumping out of the sea' [Female, Aboriginal Traditional Owner JSM100].

'Really healthy fish populations' [Male, Non-Aboriginal resident JSM40].

Generic references to marine life formed the fourth valued element of biodiversity (24% of all interviews). This category of biodiversity was broad ranging and encompassed a suite of species not captured in other existing categories (e.g. crocodiles, seabirds, see Table 8). However, no definitive trends or patterns were evident that warrant detailed discussion.

Crocodiles were a fifth element of biodiversity highly valued by respondents (23% of all interviews). Crocodiles were seen as an inherent component of the Kimberley marine environment and one that invoked awe, as well as respect and fear. Respondents described seeing crocodiles as part of their coastal experience, at times referring to particularly large specimens and scary experiences related to this. For instance:

'When we were [in the Kimberley] last time there was a huge crocodile, I had a huge croc experience I'm going to remember for the rest of my life because it was much longer than my dingy' [Males & females, Yachts people JSM1].

'To see crocs that big, it's really they're like dinosaurs' [Male, Recreational fishing body JSM70].

'Malcolm Douglas went and did a documentary on the crocodiles at Montgomery [Reef], yeah which is interesting because you get tourists walking around and not realising there are crocodiles on the Reef' [Female, Tourism industry JSM8].

Some locations, such as Walcott Inlet, the Ord River and Prince Frederick Harbour were valued because of their status as crocodile breeding grounds:

'It's a massive crocodile area. You've got the Ord River which is one of the second largest areas in the Kimberly for crocodiles....you've got Prince Frederick Harbour and these places up here which are quite significant to crocodiles...they're the two biggest breeding grounds so on the nature side of it that's pretty important' [Male, Commercial fishing JSM5].

Associated with these values were references to increasing populations and issues surrounding rogue crocodiles that posed a threat to human safety. These issues were mostly mentioned by Aboriginal rangers, Traditional Owners and protected area managers who were involved in monitoring and relocation programs. Other respondents who had been previously employed in crocodile hunting along the coast also noted these issues. Illustrative quotes include:

'Interviewee 1: This one [crocodile] it was being a problem, bumping boats and stalking people, so we said now we can't have this [and relocated it].

Interviewee 2: Make it safer for the family and stuff to go fishing' [Males, Aboriginal rangers JSM64].

'Twenty years ago, the crocodile population was not much around the Broome area. Now, there's been an increase and every spring tide or big tide, you get a sighting of crocodiles in the Roebuck Bay area. You just have to be wary that just like me, at night I used to sit up the beach with my dragnets, hanging the nets when wading in the water. But now, you can't because of the actual predation of the crocodiles' [Male, Aboriginal ranger JSM16].

3.6. Non-use values of the Kimberley coast

The final set of values evident from the interviews was classed as non-use or intrinsic values. This infers that the values were not related to the physical experience or use of the coastline or marine environment. Two non-use values were identified: bequest and existence. While a smaller number of respondents referred to these two values compared to the others it is important to discuss them here as they appear in most value sets for natural areas (e.g. Brown and Reed, 2009) and for many people nature has value irrespective of whether it is used or has use (Lockwood 1999). Lockwood 1999).

3.6.1. Bequest

Bequest here refers to the value placed upon a given location for its ability to provide future generations the opportunity to know and experience landscapes and habitats as they are now. A total of 7% of all interviews referred to bequest value in relation to particular locations. Respondents also inferred bequest value to the Kimberley coastline and marine environment as a whole, larger entity, although this broader perspective is not discussed here.

Aboriginal rangers and Traditional Owners provided the majority of bequest value responses (45%). Theirs and other responses highlighting bequest value typically emphasised the need to protect the Kimberley environment and maintain its pristine nature for respondents' future generations to enjoy. Preservation of a 'natural' experience was paramount. The following excerpts illustrate the value placed on bequest:

'It's Karajarri country and we've got to look after it for the next generation and they can look after it too. Pass it on to the future' [Males, Aboriginal rangers DPI25].

'I'd like to think that my grandchildren in 20, 30 years time can take their children to this place and they're as pristine as what I'm seeing them today' [Female, Yachts person JIM261].

'I think just managing the area for future generations so that they can enjoy what we have to enjoy nowadays...the more we can look after it and protect it from the threats I talked about and the longer it can last will benefit not only us but the future generation, in the future years to come there has to be a place that is you know still natural its own way' [Male, Aboriginal ranger JSM14].

'Your kids can get to these areas and see it the same' [Male, Aboriginal Traditional Owner JSM56].

'I would like to leave it like this for future generations [so they] can actually see what I have seen as a kid and actually to do what we had done as kids...I want to leave it pristine instead of saying "oh that was there, but now it's gone, and that was there and [now] it's gone"' [Male, Aboriginal Traditional Owner JSM93].

3.6.2. Existence

Existence value was the second non-use value evident from the interviews. Existence values are derived from knowing that a particular place, environmental resource and/or organism exist, regardless of having physically been to or directly used an area. Existence values for particular locations were mentioned in 4% of all interviews.

As with bequest value, existence value reflected respondent interest in preservation of the pristine and natural Kimberley environment. Respondents mentioned specific locations or more generic areas of the Kimberley coast as 'wish list' or important destinations, valued because of what they knew about them from various information sources rather than having physically been there themselves:

'Interviewee: the concept of the beauty of the colour and the pristineness is what appeals. So I hope one day to go to the Eighty Mile Beach.

Interviewer: so you value it, irrespective of the fact you haven't been there.

Person: yeah, and I would hate if anything is going to be built there' [Partners, Tourists JSM25].

'I think we need places all around Australia or around the world that remain relatively untouched...the fact that there are places like this whether the people come here or not, that's still Australia' [Males & females, Tourists JSM44].

'[Someone] said to me, you're the best type of environmentalist and tourist, because you know it's got to be there but you don't need to go' [Female, Tourism industry JSM88].

'The opportunity to look at [Montgomery Reef] is not very frequent unless you've got lots of money...nonetheless [it is] incredibly important to conserve these areas' [Male, ENGO JSM87].

3.7. Participatory values mapping

In this research, the maps helped interviewees to focus on their valued places as distinct from the broader Kimberley landscape, producing imagery in their minds that assisted them to explain how and why they valued a given place. In this sense, the maps helped to ground otherwise potentially abstract discussions, and were typically referred to throughout the interviews as participants sought to refresh images in their mind. A small number of interviewees (less than five) declined to nominate and draw specific places of importance, preferring instead to discuss the entire study region as a whole on the grounds of ecological integrity. A larger number of interviewees had difficulty limiting their important places to the requested five, in which case they were permitted to mark more.

Figure 4 illustrates what a base map looked like after an interview, with important places circled.

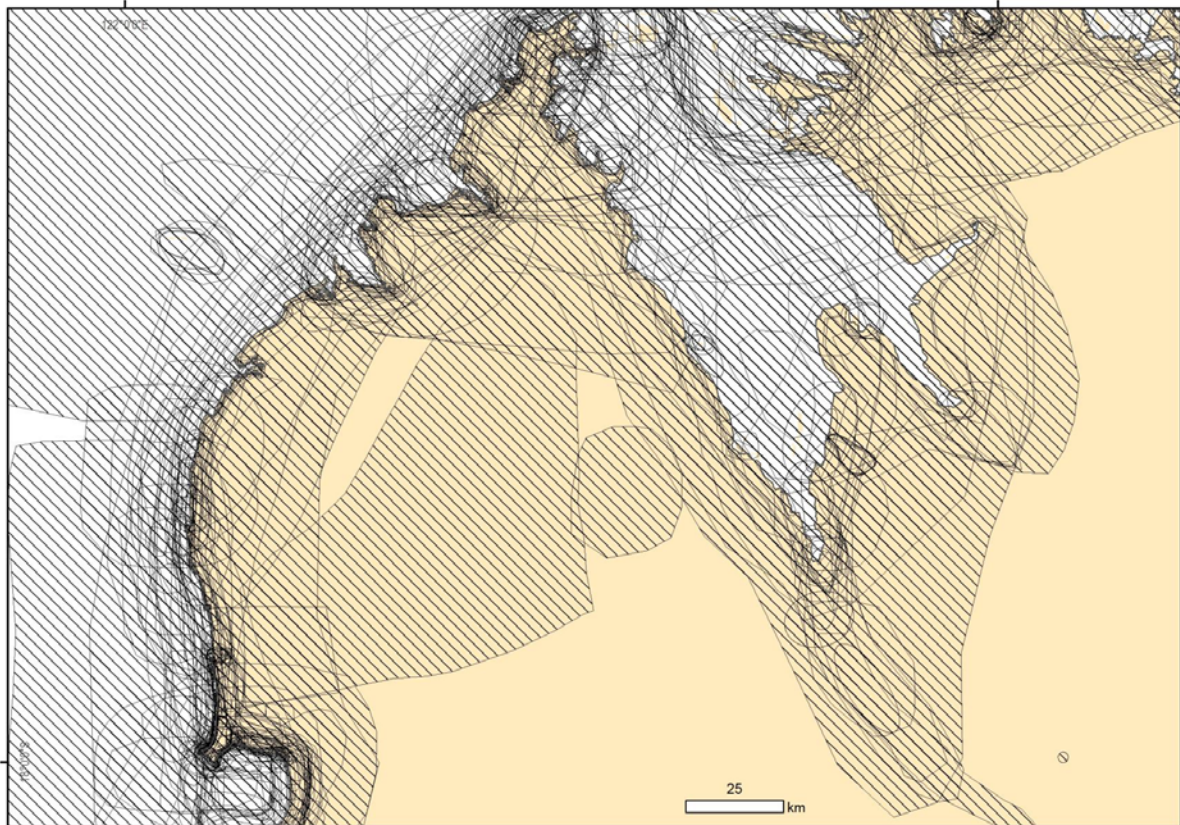


Figure 5 Example of all digitised polygons from part of the study area (Dampier Peninsula)

Analysis of the interviews was accompanied by assignment of value categories (Table 7) to the polygons marked on the maps in interviews. Figure 6 provides an example of how values were assigned to polygons. This example shows how multiple values were often assigned to a single polygon.

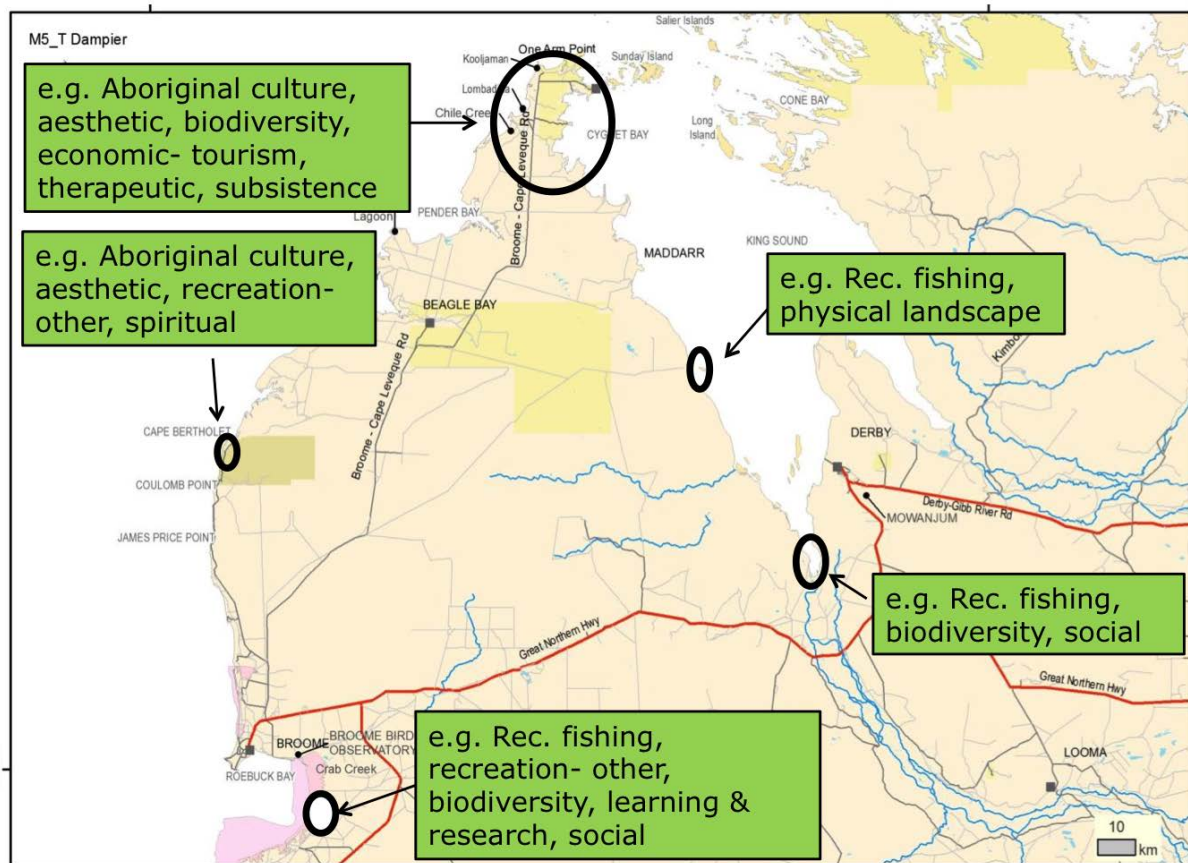


Figure 6 Example of allocating emergent values to digitised polygons

3.7.2. Values mapping and heat maps

Heat maps were produced using counts of spatial frequency for individual values. In this section they are presented according to the value set (e.g. direct use, non-consumptive values; direct use, consumptive values and so on) and in the same order they were described in the previous section (3.2 *Categories of values*). The most important result – illustrated in Figures 7–23 – is that no part of the Kimberley coast is free of value, with *all* of the coast and associated marine environments encompassed by the value polygons included in one or more of these figures.

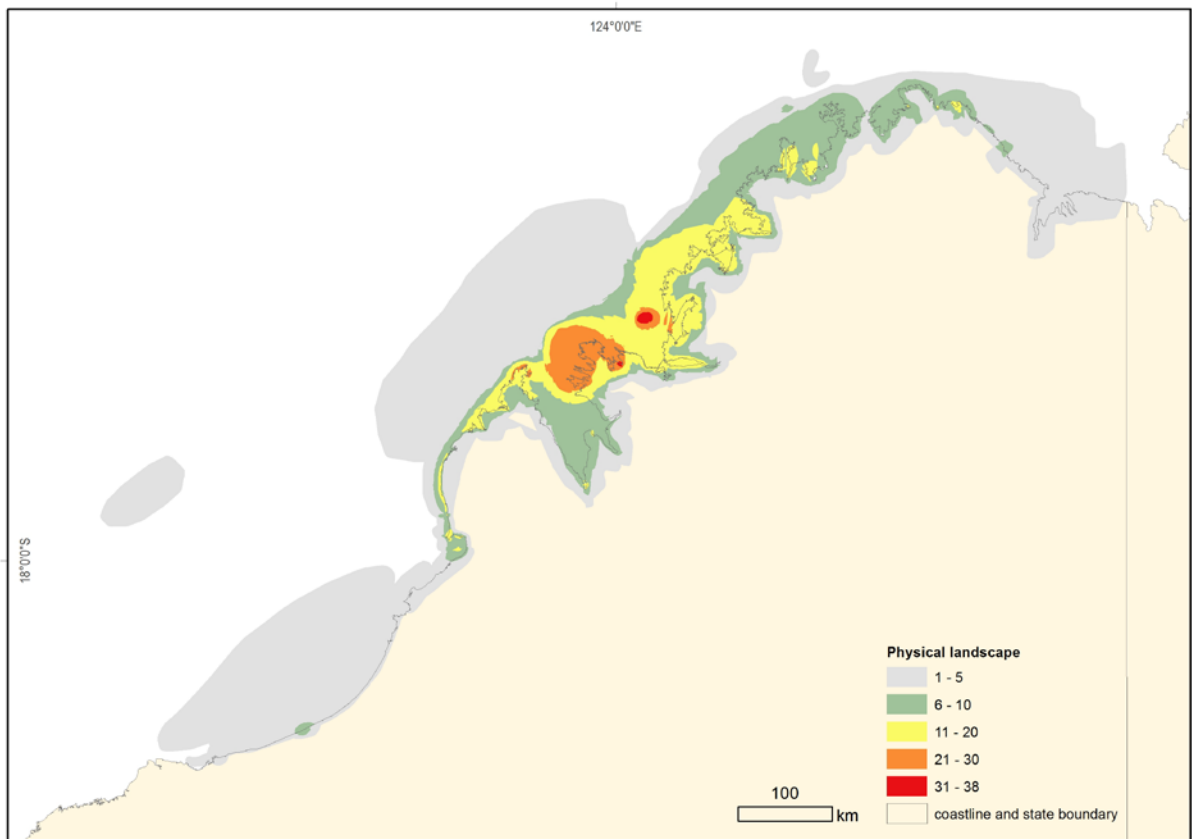


Figure 7. Frequencies for 'physical landscape' values

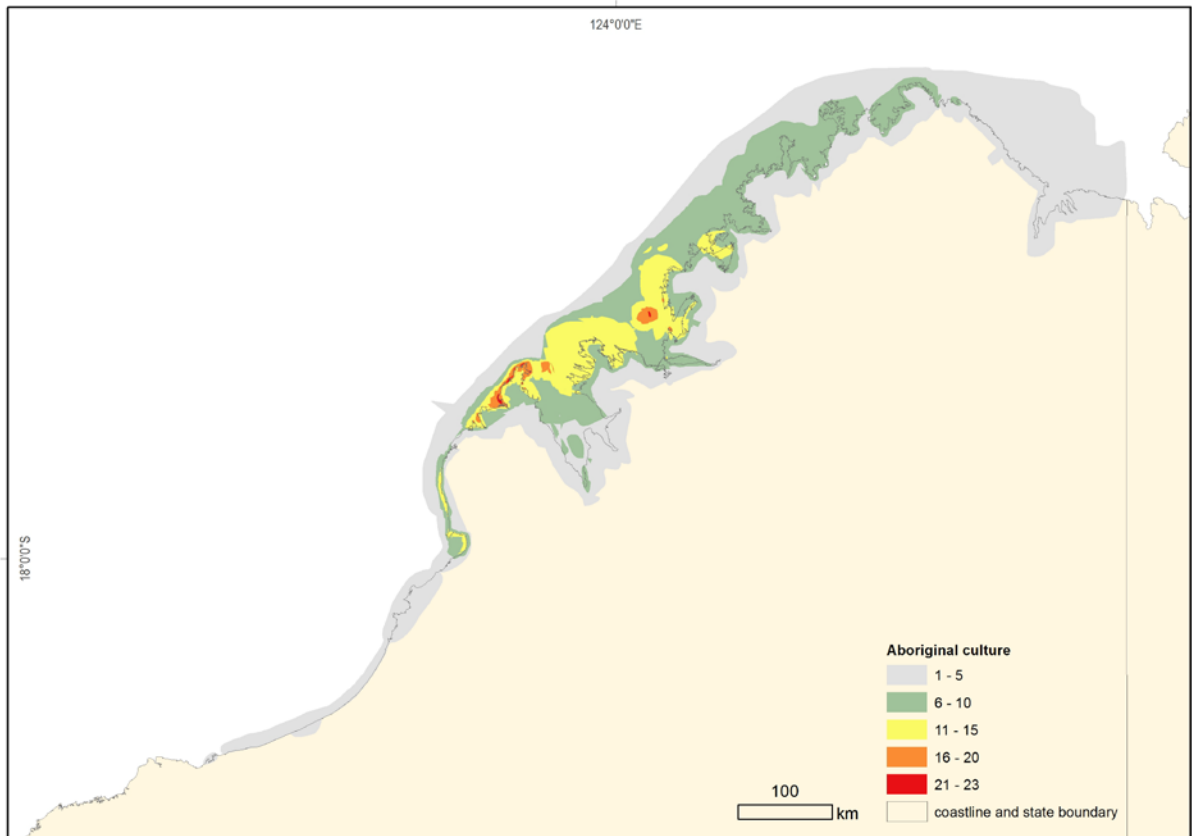


Figure 8. Frequencies for 'Aboriginal culture' values

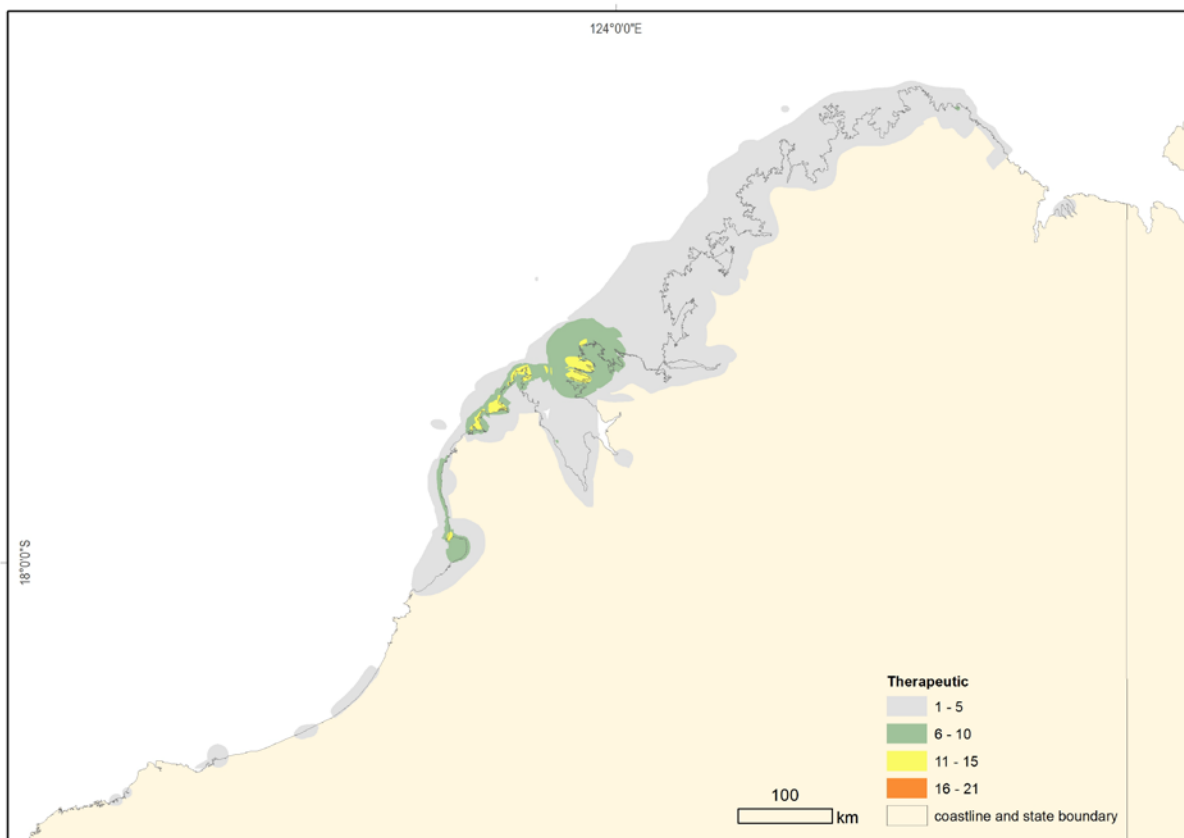


Figure 9. Frequencies for 'therapeutic' values

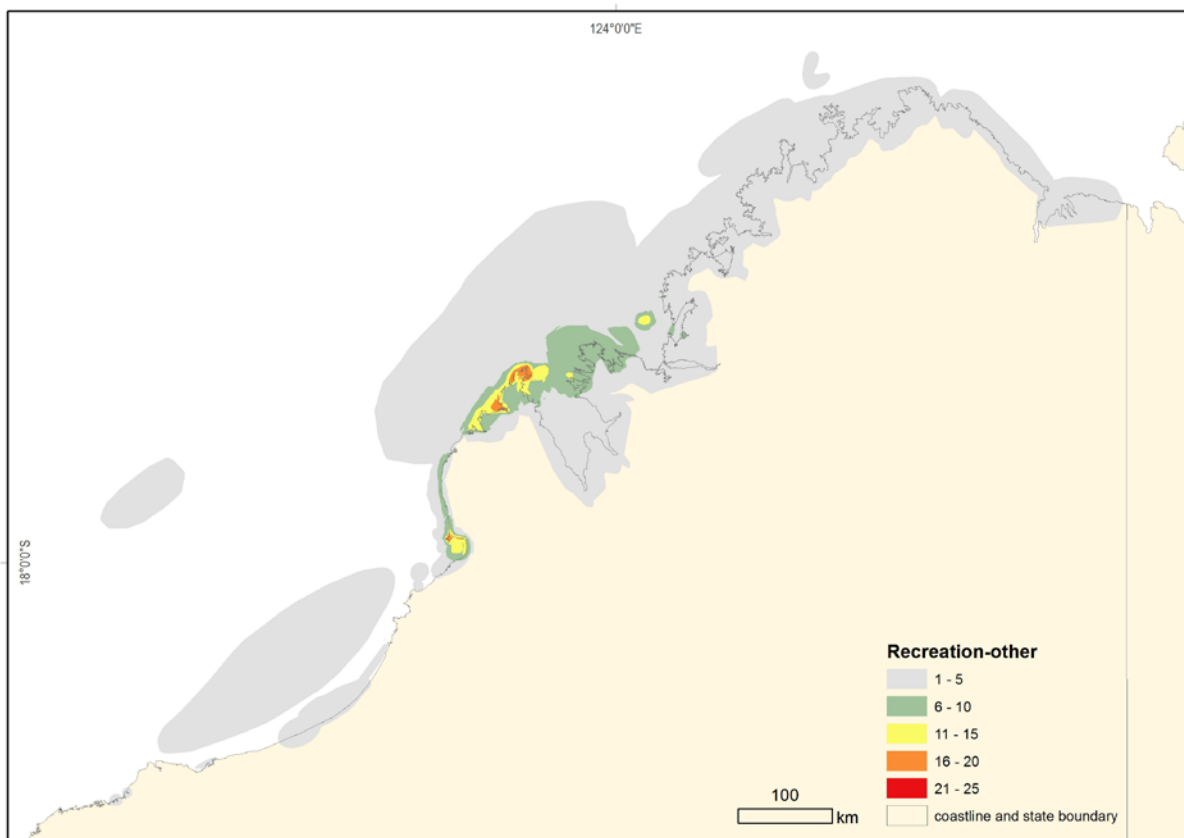


Figure 10. Frequencies for 'recreation - other' values

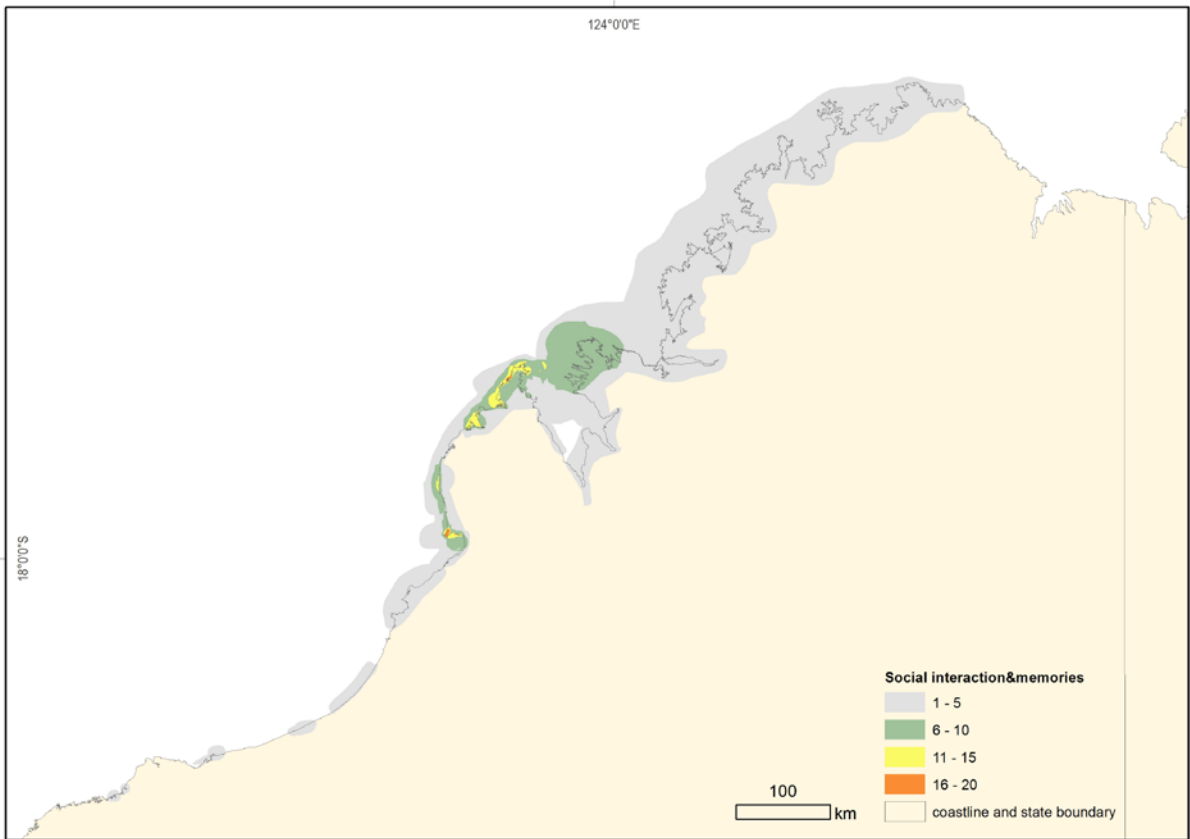


Figure 11. Frequencies for 'social interaction and memories' values

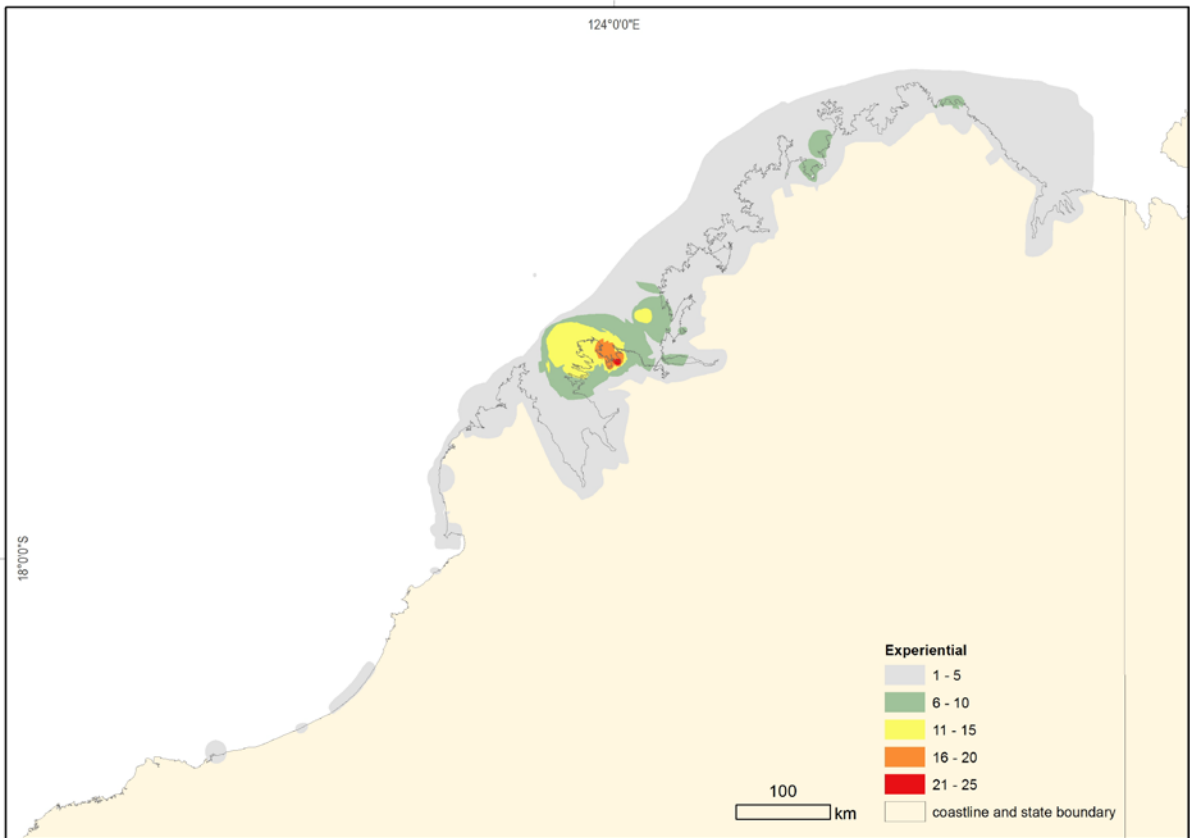


Figure 12. Frequencies for 'experiential' values

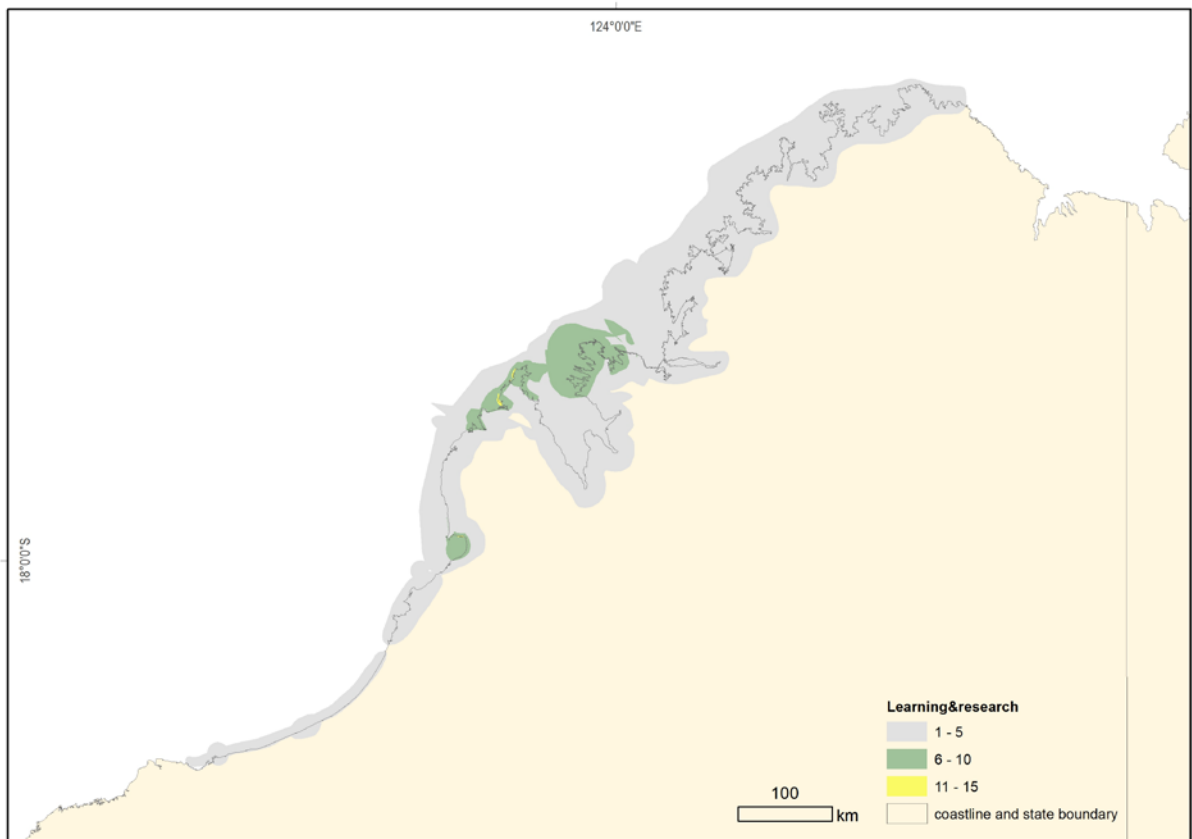


Figure 13. Frequencies for 'learning and research' values

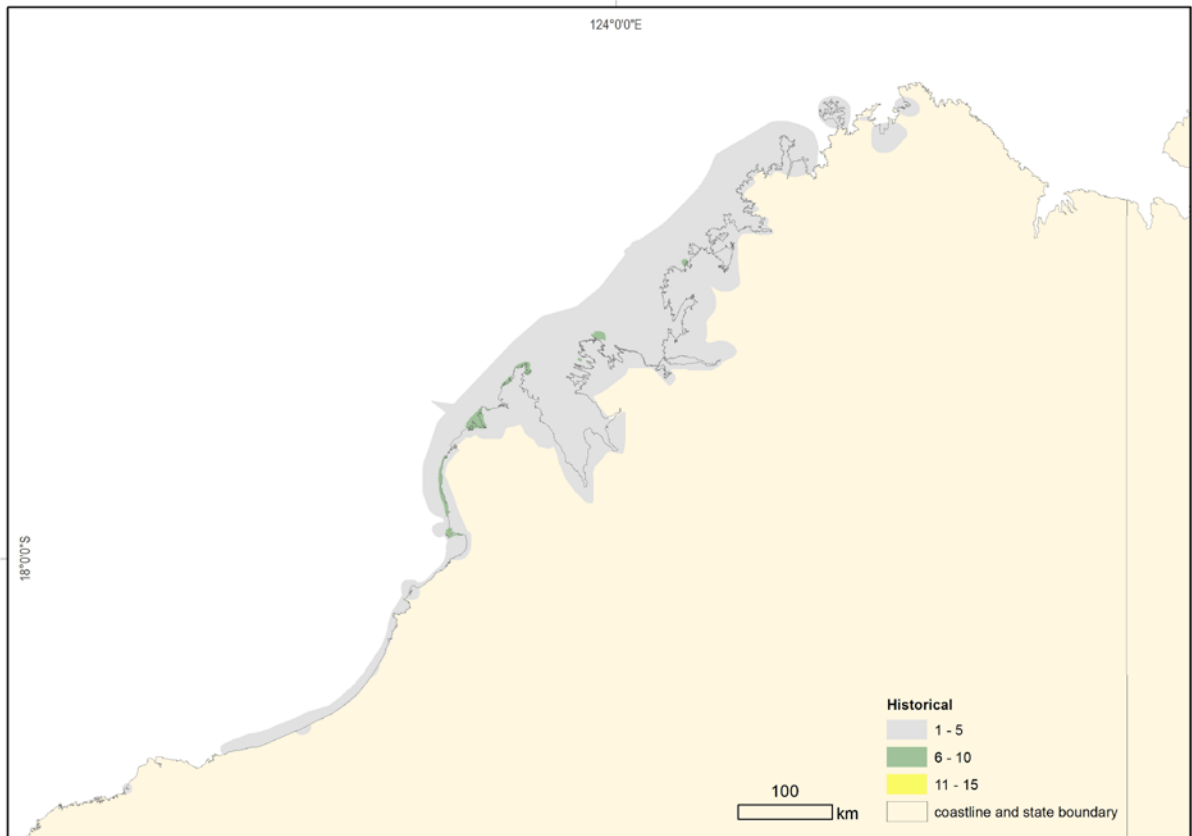


Figure 14. Frequencies for 'historical' values

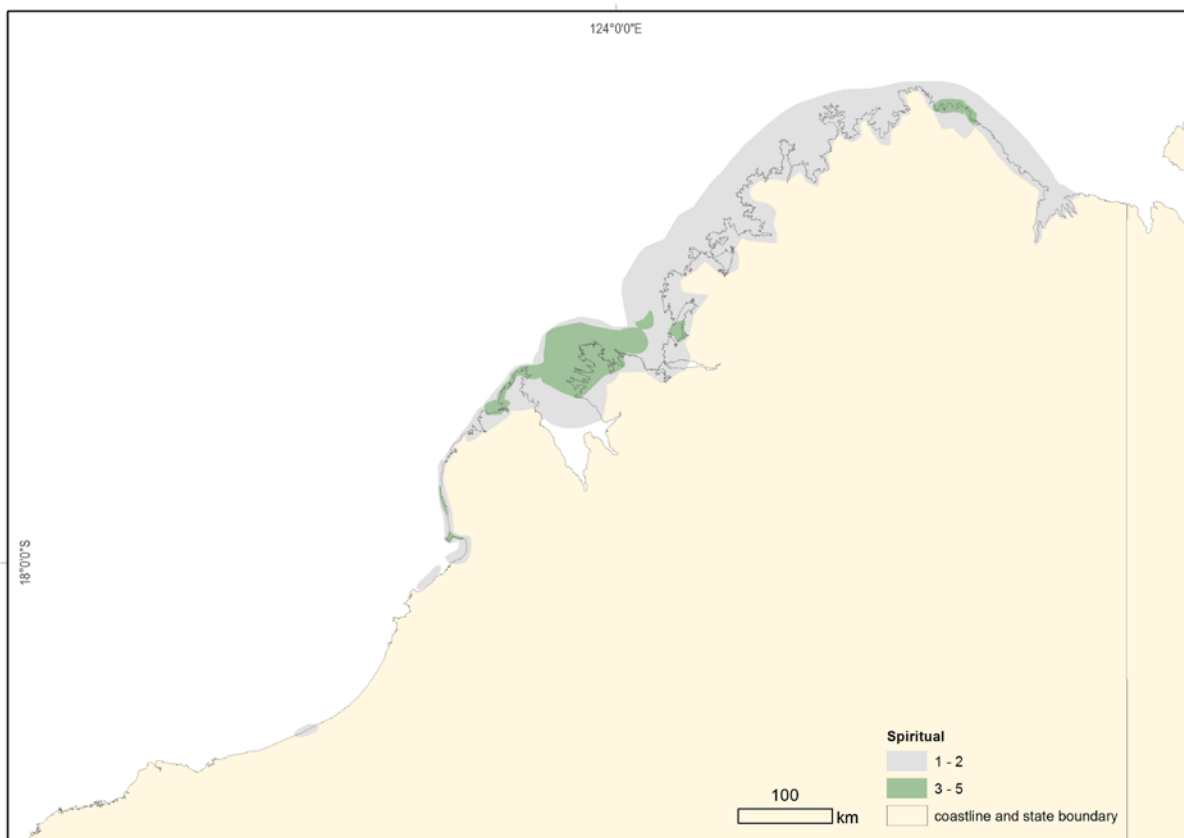


Figure 15. Frequencies for 'spiritual' values

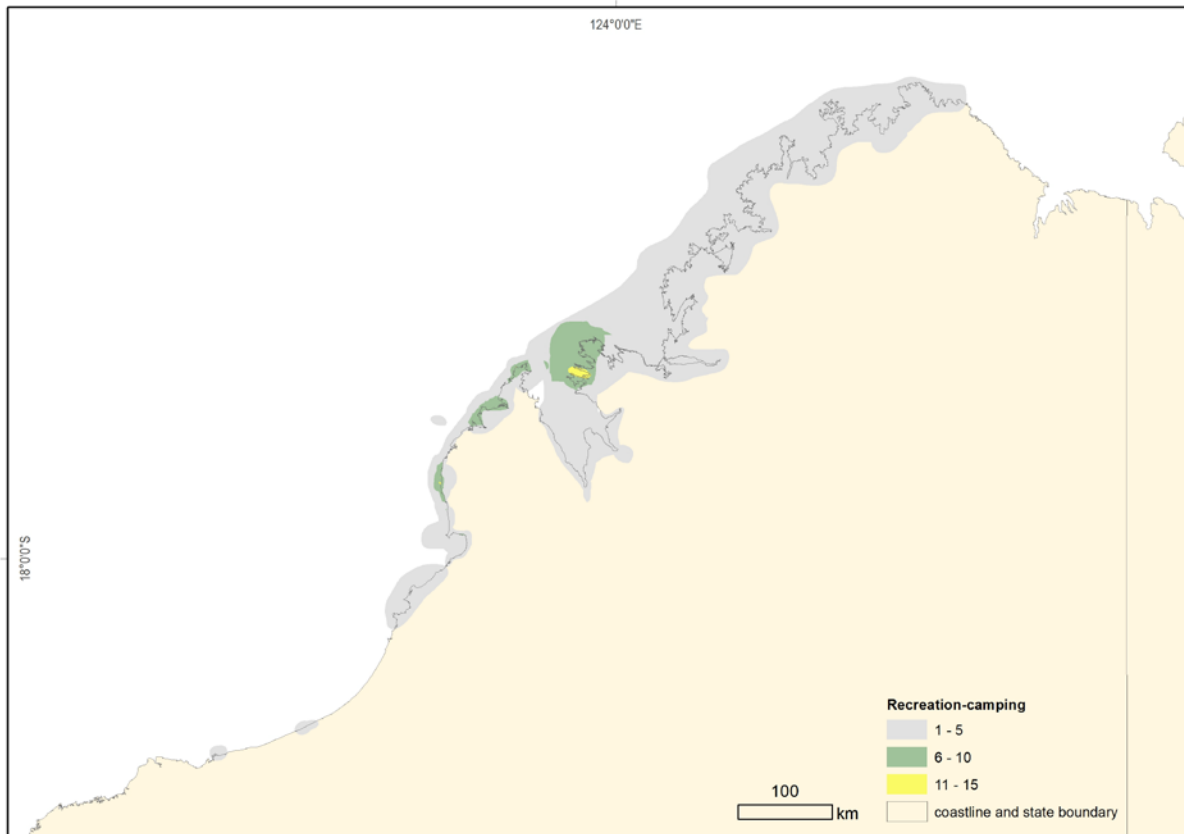


Figure 16. Frequencies for 'recreation – camping' values

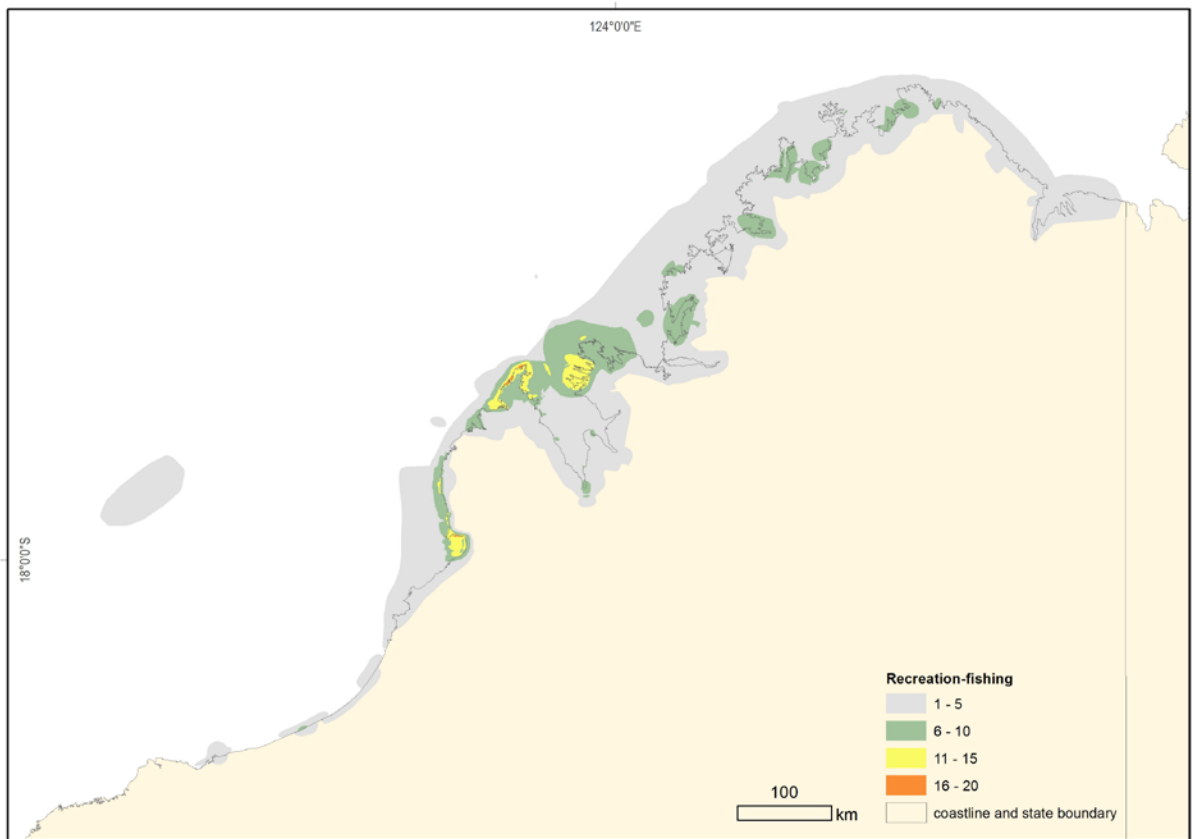


Figure 17. Frequencies for 'recreation – fishing' values

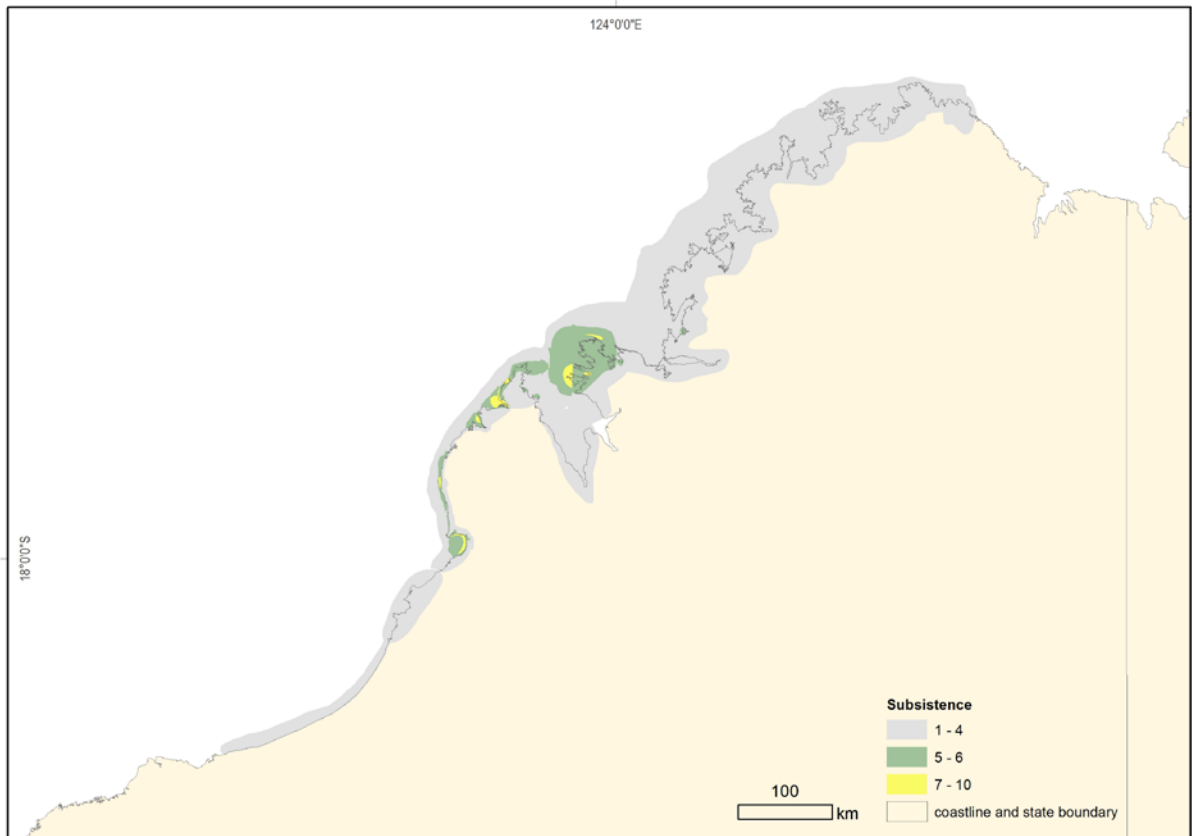


Figure 18. Frequencies 'subsistence' values

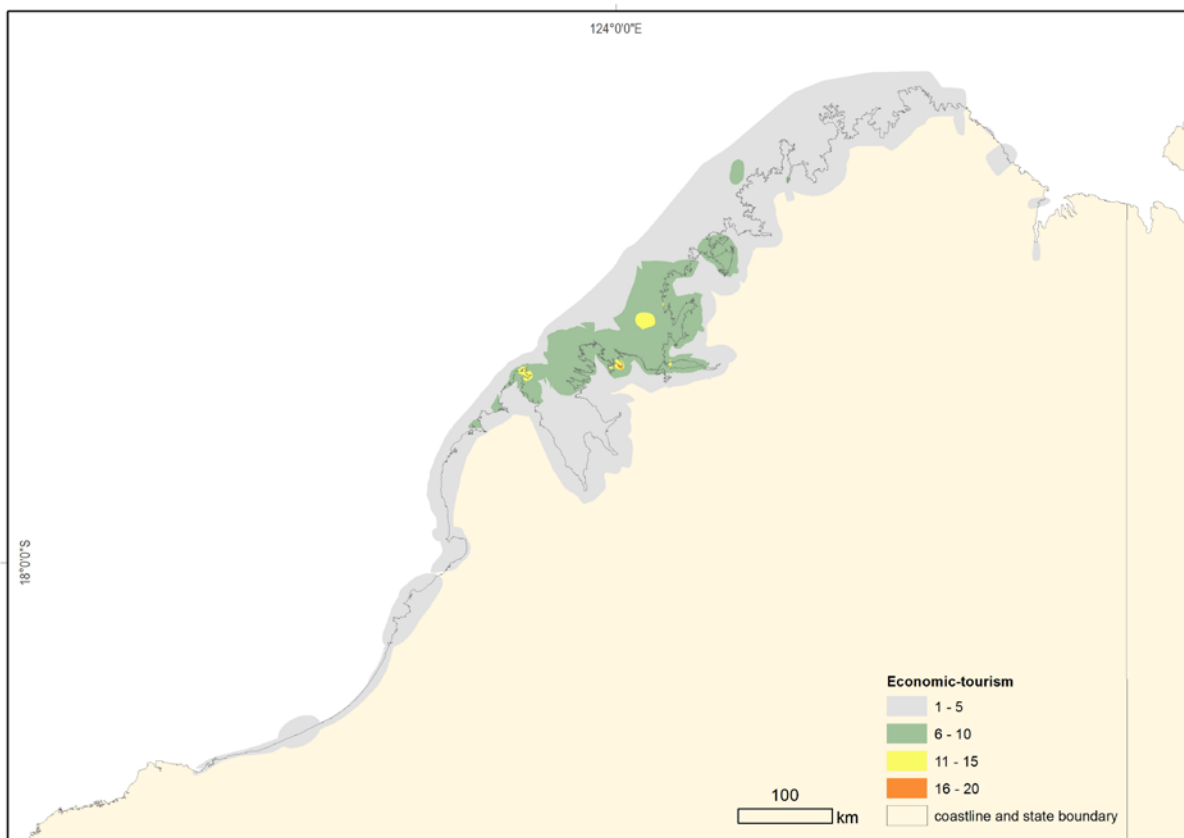


Figure 19. Frequencies for 'economic – tourism' values

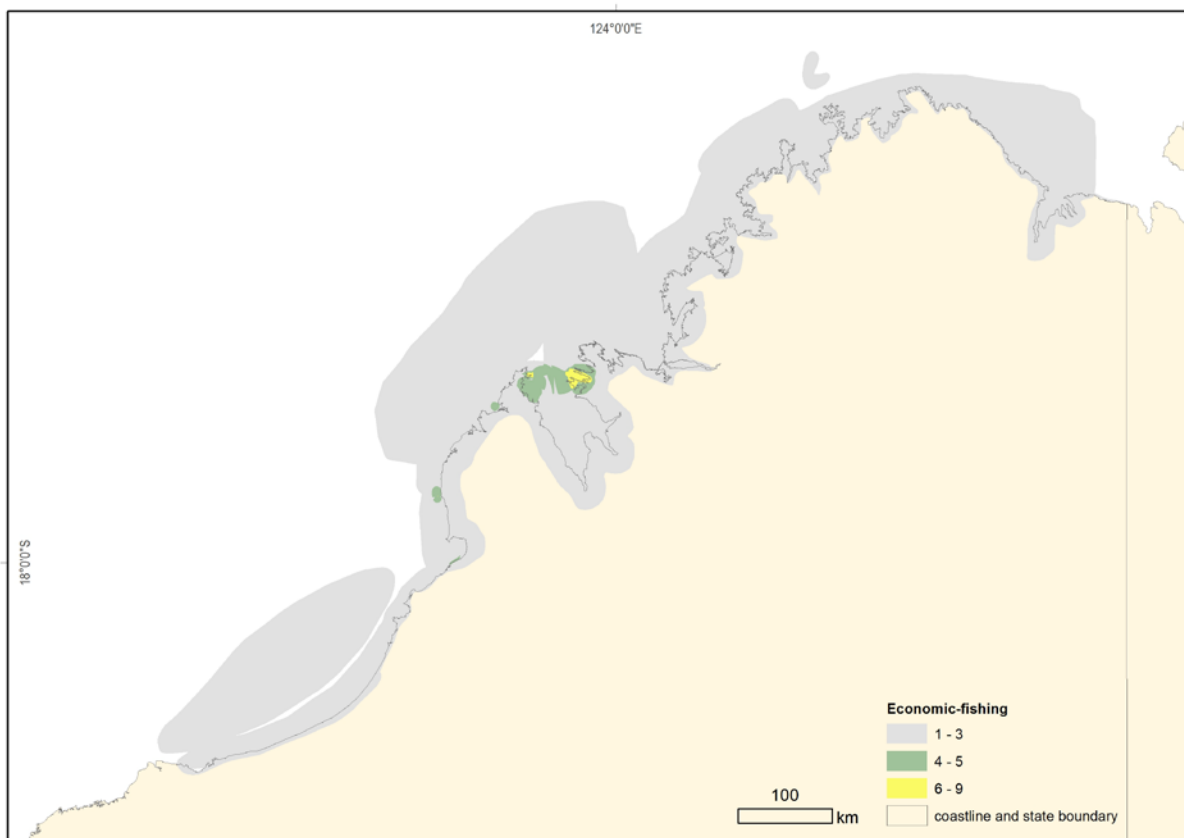


Figure 20. Frequencies for 'economic – fishing' values

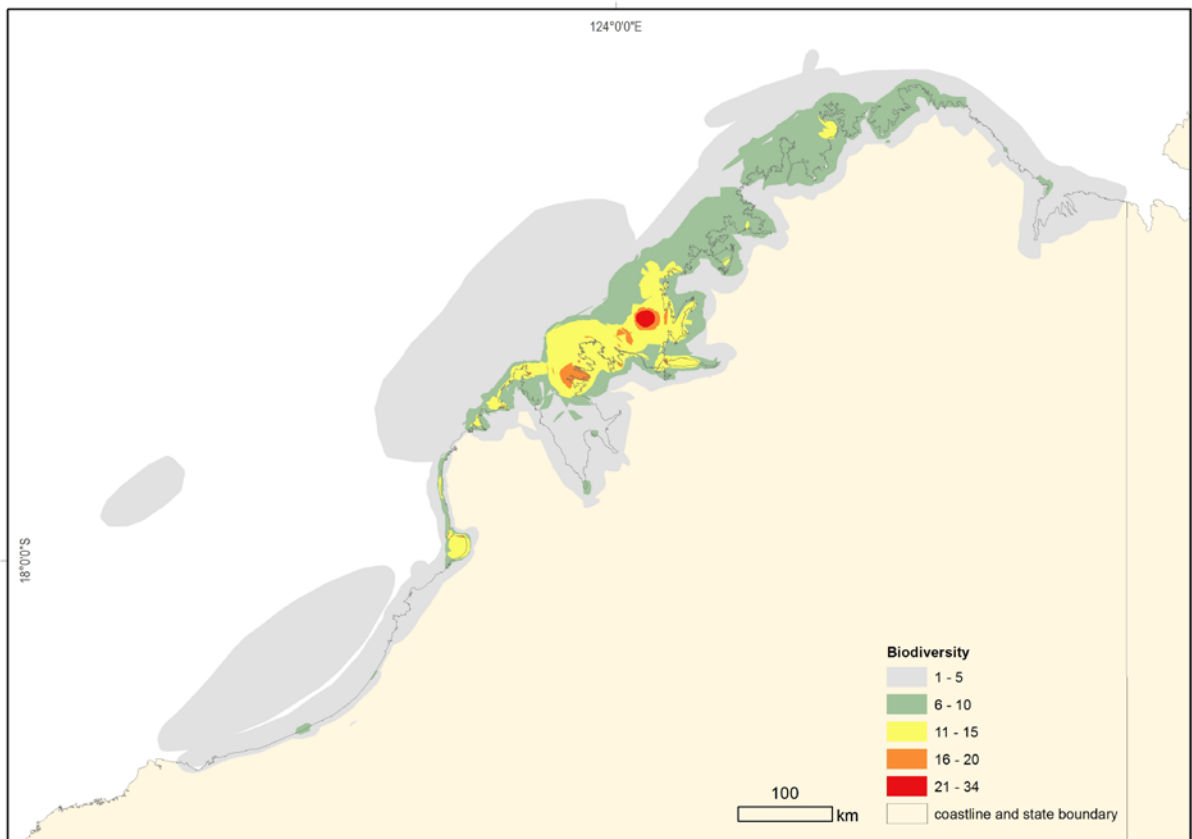


Figure 21. Frequencies for 'biodiversity' values



Figure 22. Frequencies for 'bequest' values

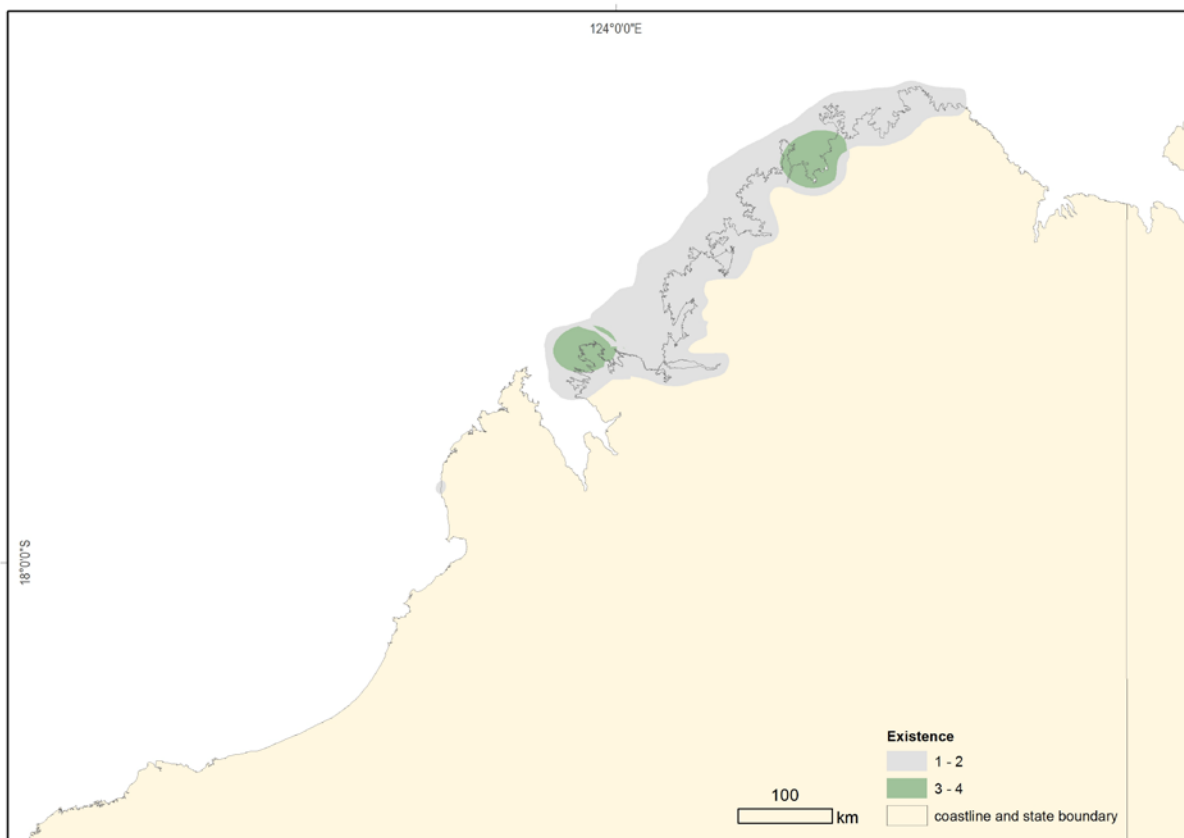


Figure 23. Frequencies for 'existence' values

Direct use, non-consumptive values of the Kimberley coast

The physical landscape dominated this value set, with 38 overlapping polygons. The highest frequency occurrences were associated with the Buccaneer Archipelago, Montgomery Reef, Horizontal Falls and the northern tip of the Dampier Peninsula (Figure 7). All the coast associated with the Traditional Owner groups interviewed was valued, the highest frequencies evident along the western and northern coast and marine environment of the Dampier Peninsula, Sunday Island, Raft Point, Freshwater Cove, and Montgomery Reef (Figure 8). The whole Kimberley coast was identified as having therapeutic values, with a concentration along the coast between Roebuck Bay and north west to the Buccaneer Archipelago (Figure 9). Recreational use (excluding from camping and fishing) had up to 25 overlapping polygons, with the greatest concentrations at Roebuck Bay, Middle Lagoon, Pender Bay and the northern tip of the Dampier Peninsula (Lombadina, Cape Leveque, Kooljaman, One Arm Point) (Figure 10).

Social interaction and memories was a focus of value particularly for Broome, and also for Roebuck Bay, and the western coast and marine environment of the Dampier Peninsula, including the James Price Point area (Figure 11). A different part of the coast was the focus for experiential values, with Horizontal Falls and surrounds being a particular loci but also the Buccaneer Archipelago, Montgomery Reef and several areas to the north-east (Kimberley Coastal Camp and Port Warrender, Osborn Islands, and The Bush Camp Faraway Bay) (Figure 12).

Learning and research were most evident in the more southern parts of this extensive coastline, although value was assigned to the whole coast (Figure 13). The highest frequency was 11–15 overlapping polygons for Roebuck Bay, Beagle Bay and the west coast of Cape Leveque. Much of the Kimberley coastline has a rich European history, as identified by a number of those interviewed, with up to 15 overlapping polygons in a number of places (Figure 14). Spiritual values, the last of the value categories in the direct use, non-consumptive set, were characterized by 5 or less overlapping polygons, although like most other values, spiritual connections were evident with the whole coastline, from Eighty Mile Beach almost to the Northern Territory border (Figure 15). The Ganthaume Point area was an interesting feature indicated as having spiritual values.

Direct use, consumptive values of the Kimberley coast

'Recreation–camping' and 'Recreation–fishing' had high frequencies of occurrence along the western edge of the Dampier Peninsula and around its northern point and then across into the Buccaneer Archipelago (Figures 16 & 17). For 'Recreation – fishing' there were also higher concentrations of overlapping polygons at Roebuck Bay, and for many of the bays and river mouths northwards and eastwards (e.g. Prince Frederick Harbour, Berkeley River mouth). Subsistence values extend along the entire coast, with higher frequencies (up to 10 overlapping polygons) from Roebuck bay northwards to the Buccaneer Archipelago, and then Doubtful Bay (Figure 18).

'Economic–tourism' has the highest frequency (16-20 overlapping polygons) at Horizontal Falls and Talbot Bay, followed by the northern point of the Dampier Peninsula, Montgomery Reef, Walcott Inlet, Freshwater Cove, St George Basin, Mitchell River mouth, Bigge Island, and Beagle and Pender Bays (Figure 19). 'Economic–commercial fishing and aquaculture' had a similar breadth of coverage for the entire Kimberley coast, with points of higher frequency being Cone Bay barramundi farm and the aquaculture venture at One Arm Point (Figure 20).

Indirect use values of the Kimberley coast

Biodiversity is the only value category in this set. Such values were strongly evident for the whole coast, with Montgomery Reef having the highest frequency of overlapping polygons (Figure 21, 21–24 overlapping polygons). Many sites throughout the Buccaneer Archipelago were identified by multiple respondents as having biodiversity values.

Non-use values of the Kimberley coast

Although bequest and intrinsic values were mapped by very few respondents in this research they are included here because of their inclusion in most landscape value mapping studies. For bequest, most of the Kimberley coast was valued, with a slightly higher frequency of overlapping polygons at Roebuck Bay than elsewhere (Figure 22). Existence value had a somewhat similar configuration, although interestingly the only part of the Dampier Peninsula given existence value was James Price Point area. Yampi Peninsula (Buccaneer Archipelago) and Admiralty Gulf, Port Warrender and Walmsley Bay had a slightly higher number of overlapping polygons than the rest of the coast (Figure 23).

3.7.3. Summary information on frequencies

The physical landscape had the highest number of polygons (407), followed by recreation–fishing (348), biodiversity (321), recreation–other (263) and Aboriginal culture (261) (Table 9). Bequest and existence values had the smallest number of mapped polygons (18 and 9 respectively). In terms of areas mapped, existence values had the polygon with largest minimum area (118 km²) and its polygons had the largest mean area (6,886 km²). On the other hand, recreation–fishing, subsistence, and biodiversity – where value is generally attached to a small, specific site – had polygons with the smallest minimum areas, at 1.0 km². The values with the smallest mean area for the polygons mapped differed to those values with the minimum areas and included social interaction and memories (795 km²), recreation–camping (843 km²), therapeutic (902 km²), and recreation–fishing (929 km²) (Table 9).

Landscape values, biodiversity and recreation – other had the highest mean number of overlapping polygons (17, 13, and 13 respectively). Bequest and existence had the lowest mean frequency, at 2 each (Table 9). To determine the importance of a value relative to all other values in the study area, the percentage spatial occurrence of 10 or more overlapping polygons for each value relative to the 'whole valued area' was calculated. The 'whole valued area' was the sum of all areas included in polygons. Physical landscape, biodiversity and Aboriginal culture values each occupied 8% or more of the valued area (Figure 24).

Table 9. Summary of frequency statistics for the mapped values

Value	Polygon count	Min area (km2)	Max area (km2)	Mean polygon area (km2)	Mean number of overlapping polygons	Range in numbers of overlapping polygons	% of 'valued area'
Physical landscape	407	1.0	59,603.2	1,894.0	17	1-38	15
Aboriginal culture	261	1.0	59,603.0	1,892.0	12	1-23	8
Therapeutic	207	1.0	40,397.0	902.0	10	1-21	2
Recreation—other	263	1.0	52,033.2	1,164.6	13	1-24	2
Social interaction & memories	187	1.0	40,397.0	795.0	10	1-19	1
Experiential	114	1.0	59,603.0	2,560.0	12	1-24	3
Learning & research	94	1.0	40,397.0	1,705.0	7	1-14	0
Historical	78	1.0	39,742.0	1,490.0	6	1-13	0
Spiritual	41	1.0	42,854.0	1,958.0	3	1-5	0
Recreation—camping	140	1.0	40,397.0	843.0	7	1-15	0
Recreation—fishing	348	1.0	52,033.0	929.0	10	1-20	2
Subsistence	113	1.0	40,397.0	1,139.0	5	1-10	0
Economic—tourism	139	1.0	52,033.0	2,010.0	8	1-17	1
Economic—commercial fishing & aquaculture	48	1.0	59,603.0	3,952.0	4	1-9	0
Biodiversity	321	1.0	52,033.0	1,833.0	13	1-34	9
Bequest	18	2.2	36,577.0	2,677.0	2	1-4	0
Existence	9	118.0	40,397.0	6,886.0	2	1-4	0

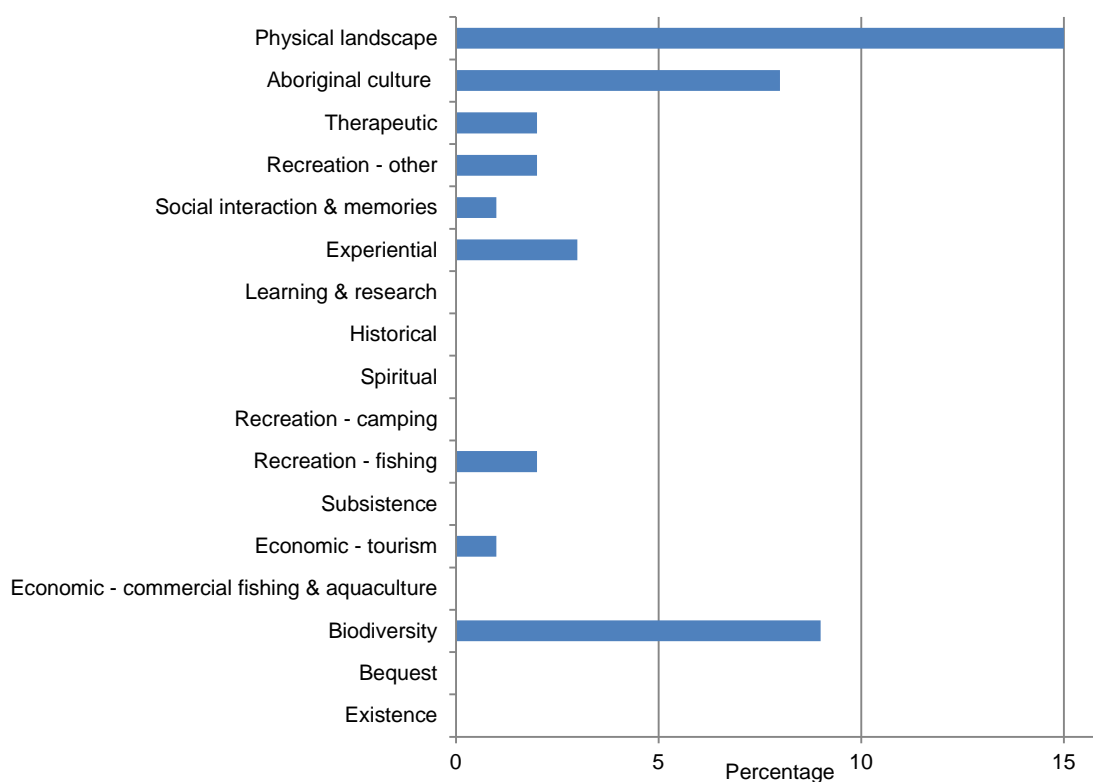


Figure 24. Relative spatial frequency of mapped values for the Kimberley coast and marine environments

3.8. Validation of results and study limitations

3.8.1. *Sharing of results with stakeholders*

Data validation and participant feedback was achieved through the return of interview transcripts to interviewees where requested. In addition a number of Kimberley-based feedback meetings were held in May 2014 following preliminary data analysis. These meetings were used to present preliminary research findings and generated discussion around the validity and accuracy of the data. Feedback from meeting attendees was then used by the research team to improve subsequent data analysis and to note gaps requiring further investigation. Four meetings were held: one on country with Aboriginal participants near Bidyadanga, and a further three in Broome with community members at Lotteries House, Department of Parks and Wildlife at their office, and representatives from Nyamba Buru Yawuru at their office. A briefing and feedback was achieved through a second meeting with Department of Parks and Wildlife planners and marine scientists in May 2014, where these results were presented.

3.8.2. *Study limitations*

This research represents preliminary data pertaining to an under-researched part of the world. The Kimberley region has a recognised dearth of data regarding the biological, physical and social environments, and it is tempting to extrapolate meaning from data that they are not intended to convey. While the data presented in this report represent a significant qualitative data set exploring socio-cultural values held for the Kimberley coast, it is not statistically representative. There is a recognised need to further validate and extend research findings to a larger, more representative sample size; this will be explored in subsequent phases of the research.

Access and agreement-based research was possible with some but not all Aboriginal Traditional Owners. As such, no interview or participatory mapping results from Traditional Owners associated with Lalang-garram or the North Kimberley Marine Parks are included. Much of the associated coastline is inaccessible and this, combined with respecting the wishes of these Traditional Owners not to be involved at this stage, means that no land-based interviews were conducted in these areas.

This analysis represents a snapshot of the social values of the Kimberley at a given place in time. Marine and coastal systems, and their provision of ecosystem services (often equated with values) and benefits derived, are highly variable in both space and time (Koch et al. 2007). Socio-cultural values captured in this phase of research are by necessity contingent in nature and reflective of the particular people who were interviewed. Further, they are likely to be influenced by the interviewee's social and cultural experience, habits & belief systems, traditions of behaviour, judgement, and styles of living (Kumar & Kumar 2008).

Most importantly, these documented values provide a starting point for ongoing dialogue about what is important to people in the Kimberley. They provide an input to policy and planning, but ultimately, such values must co-produced through meaningful discussions among all those interested in the future of the Kimberley.

4. Management Implications and Conclusions

4.1. Management implications

Management Implication 1: All of the Kimberley coast is valued. Thus, no part is 'value-free' and people must be consulted regarding its future, no matter if the location appears to be used (i.e. 'direct use, consumptive values' and 'direct use, non-consumptive values') or not (i.e. 'indirect use values' and 'non-use values').

The most widely held values evident from the participatory mapping were Aboriginal culture, physical landscape, recreation (fishing) and economic (fishing, pearling and aquaculture). These values were mapped from Eighty Mile Beach through to the Northern Territory border. These are likely to be influential values in determining the future of the entire Kimberley coast.

Management Implication 2: Aboriginal peoples' values for the Kimberley coast and marine environments extend well beyond cultural values and as such Aboriginal people must be included in decision making associated with all the values of the Kimberley coast.

The importance of engaging with Traditional Owners because of their connections to country and Native Title rights are increasingly respected and understood. This research has explicated the important elements of Aboriginal cultural values including cultural sites, connection to country, evidence of historical use, and transmission of cultural knowledge. Also important are other less-obvious values held by Aboriginal people for this coastline, for example opportunities for camping. Subsistence food collecting is another important value. As such, Aboriginal people must be included as important stakeholders in decision making regarding these other values as well as their more widely acknowledged inclusion in decisions about Aboriginal cultural values.

Management Implication 3: Physical landscape values dominated the interviews and were pivotal to peoples' experiences of the Kimberley. Recognition of the importance of this value must underpin all planning and decision making. Future tourism efforts must protect this coast's 'wildness' while also capitalising on it.

The physical landscape as a value in this study included the elements of aesthetics, pristine untouched environment, tidal phenomena, unique nature experiences, and wilderness. Appreciating wilderness, and the 'wild' and remote, appeared in many interviews and is both an opportunity and constraint for the tourism industry.

Management Implication 4: Biodiversity was widely and intensely valued, both on- and offshore. This valuing provides an important base for societal support for marine parks and their nature conservation role.

Marine wildlife was a particular focus but so too was highly valued rare coastal vine thickets. Roebuck Bay Marine Park and Lalang-garram/Camden Sound Marine Parks, and their surrounds, as well as the Buccaneer Archipelago, were areas with the highest frequency of ascribed biodiversity values from the participatory mapping results.

Management Implication 5. Careful consideration of the social impacts of developments associated with access to the Dampier Peninsula and Buccaneer Archipelago is essential.

The northern extent of the Dampier Peninsula and Buccaneer Archipelago and associated marine environments are highly valued. Any infrastructure development such as upgrading access roads or boat launching facilities on the Dampier Peninsula must take into account the breadth and intensity of values regarding these two areas.

4.2. Future research

The interview-based and participatory mapping methodology used in this study provided detailed information on the values held by a variety of stakeholders regarding the Kimberley coast and marine environment. Importantly, it enabled categorisation and description of these values according to Kimberley residents and tourists; these categories were not imposed from research undertaken elsewhere (e.g. forests in the United States). The values for the south western Kimberley coastline were comprehensively researched, however, more effort is now required for the northern and eastern Kimberley coastlines. There are also opportunities, yet to be realised, to more comprehensively map the cultural and other values held for Kimberley sea country by Traditional Owners. A final gap is researching the values of stakeholders remote from the Kimberley, but with an interest in its future.

As such, the next stages of this research project are to:

- (1) Undertake a web-based Public Participation GIS survey to extend and validate the results from the interviews and participatory mapping. The survey population will be Kimberley residents and visitors, and

those remote from the Kimberley but with an interest in it, for example non-government organisations, industry, and government.

- (2) Conduct further detailed analysis, using interviews and participatory mapping, of the social values of up to two marine parks, with an emphasis on agreement-based research with the associated Aboriginal Traditional Owners. Resources are currently available for this research with Traditional Owners and stakeholders of one marine park, and perhaps two, but no more. The choice of park(s) will depend on which Traditional Owner groups want to be part of this research and the priorities of the Department of Parks and Wildlife.
- (3) Carry out an analysis of blogs posted on the internet to better understand how the Kimberley is valued by those who visit and those who might never visit but appreciate it from afar.

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6. Appendices

Appendix I Information card

Research Project: Human values and aspirations for coastal waters of the western Kimberley



Murdoch University (Perth) is interviewing lots of different people to find out what is important to them about the west Kimberley coast and waters. We plan to interview about 200 people so many different views can be available for planning and managing for the future of this area.

These interviews will take about an hour each and will be recorded if you agree. You can choose not to answer a question if you don't want to and you can end the interview at any time. What ever you say will be anonymous and won't be linked to you.

These are the researchers you're likely to meet:



Dr Jennifer
Strickland-Munro



Dr Sue
Moore



Dr Dave
Palmer



Dr Jim
Macbeth



Please contact Jennifer –
J.Strickland-Munro@murdoch.edu.au with any questions you have.

This study has been approved by Murdoch University's Human Research Ethics Committee (Approval 2013/033). You can contact Murdoch University's Research Ethics Office (ph. 08 9360 6677) or e-mail ethics@murdoch.edu.au and they will address any questions or concerns you may have.

We are happy to answer your questions. A summary of our findings will be available to you within 3 months of your interview.

All images sourced from the web



Consent Form – Interview

WA Marine Science Institute Kimberley Marine Science Research Program

Human values and aspirations for the coastal waters of the western Kimberley

The following interview is about human values regarding the coastal waters of the western Kimberley.

Participant

I have read the participant information sheet, which explains the nature of the research. The information has been explained to me and all my questions have been satisfactorily answered. I have been given a copy of the information sheet to keep.

I am happy for the interview to be audio recorded. I understand that I do not have to answer particular questions if I do not want to and that I can withdraw at any time without consequences to myself.

I agree that data gathered from this study may be published, provided my name or any identifying data are not used. I have also been informed that I may not receive any direct benefits from participating in this study.

I understand that all information provided by me is treated as confidential and will not be released by the researcher to a third party unless required to do so by law.

Signature of Participant

Date

Print Name

(Position)

Investigator

I have fully explained to _____ the nature and purpose of the research, the procedures to be employed, and the possible risks involved.

Signature of Investigator

Date

Print Name

Position

Consent Form – Interview

WA Marine Science Institute Kimberley Marine Science Research Program

Human values and aspirations for the coastal waters of the western Kimberley

Participant

This interview is about what is important to you and your community about your coast.

The interview should only go ahead if you are happy with all of the following: (tick the boxes if you wish).

☐

This research has been properly described to me and all my questions have been answered.

☐

The benefits of this research to me and my community have been discussed.

☐

I understand that my name will be kept private and my written comments will not be traceable to me.

☐

I am happy for the interview to be recorded so the researcher can accurately remember what we discuss.

☐

I agree that information I give to the researcher may be published, provided my name or any identifying data are not used.

☐

I have the right to hear or read what the researcher has recorded so that I can say if it is ok to publish it or if some parts are private.

☐

I know that the researchers on this project understand that not all information can be shared.

☐

The researcher and I agree that I can change my mind at any time about being involved in this research.

☐

I know that the researchers will provide reports and feedback on this research to me and my community.

☐

I understand that I will receive financial payment for this interview.

Signature of Participant

Date

Print Name

Investigator

I have fully explained to _____ the nature and purpose of the research, the procedures to be employed, and the possible risks involved.

Signature of Investigator

Date

Print Name

Appendix 3a Interview questions—non-tourist

1. To begin, I'd like to ask you some questions about your work activities associated with the Kimberley coast, its waters and islands.
 - *What is your current job title and how long have you been in this role?*
 - *How long have you been working in the Kimberley?*
 - *How are your current work duties associated with the Kimberley coast? What do you do?*
 - *Do you recreate on the coast? What do you do?*
2. In terms of your work, what are/are there important places for you along the Kimberley coastline or out into the Kimberley's coastal waters, including the islands?
 - *Please describe your experience of these places.*
 - *Why are they important to you/your organisation?*

Let's locate those important places on a map. [Assist in marking up to 5 places on base maps]

Guidance for interviewer. These places can be up to 5 km inland and anywhere between 80 Mile Beach and the NT border. Use the 1: 1,000,000 Kimberley map set (6 maps) and the 1:250,000 map for Broome and the Dampier Peninsula to get respondents to mark these important places. Mark with fine pencil because 1 mm dot on 1: 1,000,000 equals 1 km. Polygons are ok as most respondents will want to circle an area.

3. Thinking about place [X], what do you value about it?
 - *If needed, can define value as the qualities of place [X] that make it important, good or worthy.*
 - *How valued & why - what are the area characteristics contributing to this value?*
 - *Explore values to: **individual, group** they are part of (i.e. family, friends, department, business) and to **wider society**.*
4. Let's keep exploring your important places and their values [up to 5 places].
 - *Again, probe on values to individual, group & to wider society.*
5. If you had to describe the values of the entire Kimberley coastline rather than just your important places, what would you say/how would you describe them?
 - *Again, probe on values to individual, group & to wider society.*
6. What are the threats, if any, to the Kimberley coastline?
 - *How might those threats be managed?*
7. Do those threats apply to your important places also?
 - *Are there any other threats that apply to your important places?*
 - *How might those threats be managed?*
 - *Go through each 'valued' place and discuss specific threat(s) and possible management*
8. There is a lot of interest in the future, and what places will be like in our children's lifetime. What would you like this coast and its waters to be like in about 30 years time? What management would be needed between now and then to achieve this?

SCREENING QUESTION. Have you visited the Kimberley coastline or coastal waters in the last 3 months?

Yes, proceed.

No, terminate with thanks.

1. How frequently have you visited the Kimberley coastline or coastal waters (including this visit)?

First time	< 4 times per year
Daily	Once a year
Weekly	Once every 1-2 years
Monthly	Once every 3-5 years
4 times per year	> 5 years

2. What was the reason for this visit?
- *Probe to see if there are multiple reasons*
 - Get answers to: *how long are you at the interview location, in the Kimberley in general, on the coast we are interested in (and where), and where have you been and where do you plan to go next? Who are you travelling with?*
3. Are there important places for you along the Kimberley coastline or out into the Kimberley's coastal waters, including the islands?
- *Please describe your experience of these places.*
 - *Why are they important to you/the people you are travelling with?*

Let's locate those important places on a map. [Assist in marking up to 5 places on base maps]

Guidance for interviewer. These places can be up to 5 km inland and anywhere between 80 Mile Beach and the NT border. Use the 1: 1,000,000 Kimberley map set (6 maps) and the 1:250,000 map for Broome and the Dampier Peninsula to get respondents to mark these important places. Mark with fine pencil because 1 mm dot on 1: 1,000,000 equals 1 km. Polygons are ok as most respondents will want to circle an area.

4. Thinking about place [X], what do you value about it?
- *If needed, can define value as the qualities of place [X] that make it important, good or worthy.*
 - *How valued & why - what are the area characteristics contributing to this value?*
 - *Explore values to: **individual, group** they are part of (i.e. family, friends, department, business) and to **wider society**.*
5. Let's keep exploring your important places and their values [up to 5 places].
- *Again, probe on values to individual, group & to wider society.*
6. If you had to describe the values of the entire Kimberley coastline rather than just your important places, what would you say/how would you describe them?
- *Again, probe on values to individual, group & to wider society.*
7. What are the threats, if any, to the Kimberley coastline?
- *How might those threats be managed?*
8. Do those threats apply to your important places also?
- *Are there any other threats that apply to your important places?*
 - *How might those threats be managed?*

- *Go through each 'valued' place and discuss specific threat(s) and possible management*
9. There is a lot of interest in the future, and what places will be like in our children's lifetime. What would you like this coast and its waters to be like in about 30 years time? What management would be needed between now and then to achieve this?
10. What has been most memorable about this particular visit and why?
- *Also probe on what has been most awe-inspiring and why.*

Appendix 3c Interview questions—Aboriginal

1. Where do you go on the coast? What do you do there?
 - *How often do you go there? Would you like to go more (or less) often? Ask why...*
 - *Is going there part of your job (if so, what does that involve)? Is it for personal or family reasons (if so, what does that involve)?*
 - *How would you describe the Kimberley coast (or your favourite places) to someone who has never been there?*
2. Could you tell me a story/talk to me about a time you went to the coast.
 - *Probe on where they went and what they 'did'.*
 - *Why was the place or places they visited 'important'. Who did they go there with.*

Let's locate those important places on a map. [Assist in marking up to 5 places on base maps]

Guidance for interviewer. These places can be up to 5 km inland and anywhere between 80 Mile Beach and the NT border. Use the 1: 1,000,000 Kimberley map set (6 maps) and the 1:250,000 map for Broome and the Dampier Peninsula to get respondents to mark these important places. Mark with fine pencil because 1 mm dot on 1: 1,000,000 equals 1 km. Polygons are ok as most respondents will want to circle an area.

3. Thinking about place [X], what do you value about it?
 - *If needed, can define value as the qualities of place [X] that make it important, good or worthy.*
 - *How valued & why - what are the area characteristics contributing to this value?*
 - *Explore values to: **individual, group** they are part of (i.e. family, friends, department, business) and to **wider society**.*
4. Let's keep exploring your important places and their values [up to 5 places].
 - *Again, probe on values to individual, group & to wider society.*
5. If you had to describe the values of the entire Kimberley coastline rather than just your important places, what would you say/how would you describe them?
 - *Again, probe on values to individual, group & to wider society.*
6. What are the threats, if any, to the Kimberley coastline?
 - *How might those threats be managed?*
7. Do those threats apply to your important places also?
 - *Are there any other threats that apply to your important places?*
 - *How might those threats be managed?*
 - *Go through each 'valued' place and discuss specific threat(s) and possible management*
8. There is a lot of interest in the future, and what places will be like in our children's lifetime. What would you like this coast and its waters to be like in about 30 years time? What management would be needed between now and then to achieve this?

Interview data sheet

DATE: INTERVIEWER: RESPONDENT NAME: RESPONDENT REFERENCE No.: RESPONDENT GROUP:
--

T= tourist	Ti= tourism industry	G= Govt
I=Industry		
Ab= Aboriginal	Aq= Aquaculture	NGO= Environmental
NGO		
Rf= recreational fishing	Cf= Commercial fishing	Y=
yachties		
R= resident/community group	Pa= protected area managers	

Location of interview:

Non-tourists

Organisation:
 Current job title:
 Length of time in current job:
 Length of time living in Kimberley:
 Previous relevant positions:

Tourists

Occupation:

If retired, previous occupation:

Indigenous

TO group:

All

Age group?					
18-24	25-34	35-44	45-54	55-64	65 or older
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Gender

M F
☐ ☐

Highest level of education?

Primary/ some secondary	Secondary	Vocational/ technical eg TAFE	Tertiary/ university
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Normal place of residence

Australia (state/ postcode)	International (country)
_____	_____