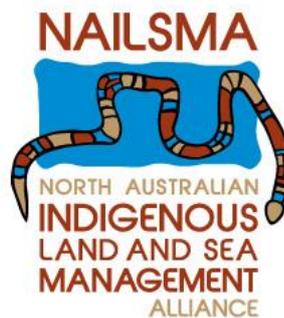


NORTHERN SEASCAPE SCOPING PROJECT (A12)
**DESKTOP REVIEW OF INDIGENOUS RESEARCH AND
MANAGEMENT PRIORITIES FOR THREATENED AND MIGRATORY
SPECIES – AUGUST 2017**



This work was undertaken for the Marine Biodiversity Hub, a collaborative partnership supported through funding from the Australian Government's National Environmental Science Programme.



National Environmental Science Programme

Background

The current 'Developing the North' agenda includes plans and potential for large-scale development activities such as agriculture, aquaculture, port development, mineral industry infrastructure and water extraction which have the potential to impact biodiversity and cultural values. (Problem Statement, A12 project outline)

Indigenous Australians have been the custodians of the seascapes of this country for millennia, continuing up to the present day. However, since European settlement, Indigenous governance and management of (land and) sea country has been significantly eroded, leaving much sea country unmanaged. New governance and management systems, interests and needs are emerging across Australia as dramatically changed circumstances, pressures, opportunities and information needs demand critical thinking for protecting and managing healthy coastal and marine environments.

Substantial legal Indigenous rights exist in coastal and marine country in this project area under various legislative instruments (e.g. *Aboriginal Land Rights (Northern Territory) Act 1976* (Cwlth), *Native Title Act 1993*, (Cwlth), *Northern Territory Sacred Sites Act*, *Aboriginal Land Act* (NT)), built largely on recognition of customary rights and interests. Additionally, historical engagement, extant knowledge systems, familiarity and recognised essential livelihood needs, strongly suggest collaborative approaches between Indigenous people and western science are needed in the complex interplay of anthropogenic and natural processes affecting coastal and marine environments, including their human capital.

Aboriginal and Torres Strait Islanders recognise the need to apply these different knowledge systems collaboratively to manage their sea country into the future, and demand recognition and respect for their rights and interests in the manner and operation of these collaborations. Whilst local knowledge systems/interests substantially overlap with formal science, for instance in identifying conservation targets, what these targets mean to traditional custodians may differ dramatically from the targets as objects of scientific research. In Indigenous accounts of their sea country certain ontological characteristics are common, for instance:

- sea country is continuous with the land – local language is equally derived from it and defines it, creation stories travel between and through land and sea, traditional ownership and customary estates equally apply over them, traditional knowledge systems emanate from and influence the health of each;
- Indigenous people do not distinguish themselves from their land or sea country – their ancestral and spiritual essences are in and animate the land and sea scapes; plants, animals and features of those scapes are variously familial, totemic and important agents in ceremonial life.

Furthermore, customary economies based on sea country are significant foundations for community resilience, livelihoods and wellbeing, and tend to be played out through local cultural rules and protocols. In State and cash economies, long histories of engagement in fishing, and other marine industries are common amongst traditional owners (TO's) of sea country. Many, such as trading with Macassan fishers, are prior to colonisation by the British.

“We are not just another stakeholder; we are first Australians whose identity and essence is created in, through and with the sea and its creatures. We wish to contribute to regional and national economic development, in keeping with our time-honoured responsibilities to care for the land and sea.

Our relationship with the sea and its resources is fundamental to our religious, social and economic life and wellbeing. We continue our care and guardianship as our ancestors have done. We have an intimate knowledge of the environment and ecology in the places

for which we have rights and responsibilities. We want our children and grandchildren to receive this knowledge so they can look after sea country. We do not come and go like most non-Indigenous people do. We want to continue to stay here permanently. However, it is becoming increasingly difficult to undertake this work because our interests are often ignored or are seen as secondary to non-Indigenous issues of open access, economic exploitation and the welfare of the well known and loved marine animals like turtles, dolphins, dugong and whales.” (Dhimurru 2006)

This desktop review shows the broader Indigenous treatment of sea country within which obligations to country and its wildlife are described and actions to meet those obligations are set out. It is through this broader contextual lens that engagement with Indigenous sea country managers over threatened and migratory species can be made meaningful and fruitful.

Purpose

This report aims to provide a brief overview of marine animal species of importance to Indigenous communities in the Northern Territory, including the Gulf of Carpentaria and western Cape York (collectively encompassing the North Marine Bioregion), based primarily on a desktop study of readily available written materials. Following this desktop component, information from this review will be considered alongside the outcomes of consultations with Indigenous community members/groups to provide a more comprehensive view of ‘priority’ marine fauna for future research. To effectively inform research and management actions, a complementary purpose in this report (and project more broadly) is to identify local practical responses to species specific research and management needs, articulated through the kind of social and cultural context summarised above. This includes discussion about appropriate principles for engaging Indigenous individuals and organisations in discussion about and research on their country.

This work is part of a broader collaborative research project titled “Scoping a seascape approach to managing and recovering northern Australian threatened and migratory marine species” (herein referred to as ‘the Northern Seascapes project’) being delivered under the Marine Biodiversity Hub of the Commonwealth Government’s National Environmental Science Program (NESP). The project is led by Charles Darwin University (CDU) and involves the Australian Institute of Marine Science (AIMS), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Geoscience Australia.

The purpose of the Northern Seascapes Project is to scope research needs and directions for a 3-year (2018-2020) collaborative, multi-disciplinary NESP Northern Seascape project by synthesising the (albeit preliminary) findings of constitutive scoping components to inform future research strategies and identify future research hotspots. The geographical scope of the project is the North Marine Bioregion, from coastal and estuarine habitats to the edge of the Australian Exclusive Economic Zone, and there is a focus on *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed Threatened and Migratory Marine species (TMMS).

Methodology

We have drawn primarily from published land and sea country management plans and strategies framed by various Indigenous Land Management (ILM) groups involved in caring for country throughout the Northern Marine Bioregion. In terms of desktop research these cover only parts of the coast and mostly focus on sites or areas where research and conservation efforts are formally supported or being considered. Other material, perhaps with limited emphasis on relevant research but indicating practical interests, aspirations and concerns, have also been included.

It is essential, as we have attempted to do here, to recognise the significant effort that people have already committed to articulating their aspirations and plans for caring for country into the future.

Where available, Indigenous Protected Area (IPA) Management Plans and other Sea Country plans should be recognised as incorporating (to greater or lesser extent) local and traditional knowledge, customary protocols and other enabling and empowering features of resilient communities, adapted to deliver agreed environmental management outcomes. They are generally developed over a period of several years through extensive, considered and representative consultation with all the appropriate traditional owners and other relevant community members. They clearly articulate community desires with regard to sea country matters, set in the context of an ongoing commitment to continue the ancestral custodianship of their traditional estates, using both traditional and contemporary approaches to manage sea country for their people and for all Australians. They are a primary resource for anyone interested in working in land and sea country. For example, the Dhimurru sea country plan (2006) explains that “We wish to be understood as not only the traditional custodians and managers of our sea country, but also as contemporary and future managers.” It details the intent of the plan as follows: “Our Sea Country Plan:

- Lets everybody know what our sea country means to us and explains how we look after it, both in keeping with traditions and through our contemporary work at Dhimurru.
- Makes clear the concerns we have for our sea country and its management.
- Suggests to others with interests in our sea country how we can work together for sustainable management in ways that respect and acknowledge our rights and interests and those of other users.”

Aboriginal people have a clear interest in research relating to their sea country. It is important to consider not only what future research should be conducted, but how. In cross-cultural research the partnerships underlying, and processes adopted in the conduct of projects are of critical importance. Broader issues of communication, access, consent and intellectual property, scale and context, compensation, appropriate use of Indigenous knowledge and governance need to be considered in exploring what is best practice collaborative research. Some communities already have considerable experience working with western scientists, and this experience has enabled them to establish a clear process for managing engagement in research projects. In some cases, communities are driving the research agenda and actively seeking out partnerships to address identified knowledge gaps. We have included a discussion of engagement principles at the end of this review, and provided some examples of research applications and protocols developed by Indigenous land management organisations.

Scope and qualifications

As non-local authors of this remote study we must be clear about the scope and purpose, acknowledging; the information bias towards the interests of groups/communities who have an incentive and the capacity to publish, the tendency (given the nature of ILM support) to isolate conservation and other environmental management issues, the unavoidable simplification of the great heterogeneity of ILM interests; and the non-Indigenous authorship in English (not withstanding direct quotes to circumvent this). This desktop review can hint at local perspectives and interests, suggesting overall approach and potential targets for dedicated research and action (a conditional snapshot of the global needs) but cannot replace locally tailored approaches to ascertaining detail and effective collective action (the local context). The sea country plan prepared by Yanyuwa traditional owners from southwest Gulf of Carpentaria (near Borroloola) reflects this in affirming that

“[it] should not be used to identify people’s attitudes to particular issues and proposals or as a basis for redefining development proposals to circumvent the consultation process. This is a critical point and the Yanyuwa community is at a point in their discussions in relation to proposed and actual development where wrongful use of the data presented here could do more harm than good.” (Bradley & Yanyuwa families 2007)

Finally, it is worthwhile considering the lens through which we are looking at the research question to underpin an effective approach. The broad aim of this desktop review is to ‘get to’ threatened and migratory marine species important to the traditional custodians and managers of sea country, as prescribed in the Seascapes project on the whole. On the one hand, we may assume that individual species have meaning and value independent of the holistic biocultural landscape in which they are naturally treated by Indigenous society. This is in a sense an artificial view, in which it may be unclear to custodians how their connection (spiritual, economic, ceremonial) to that target species will be treated and understood. Alternatively, recognising co-dependence and connectedness of species within their cultural context that determines their meaning and place, affords greater comfort and value for ILMs when focusing on individual species, being able to contribute theirs to other useful knowledge forms about them. ‘Two-way’ knowledge can enhance value derived from for example, AQIS and biosecurity contracts, biodiversity surveys and fisheries impact monitoring. Better engagement with people around their knowledge and connection to target species helps them revitalize knowledge and cultural learning. The frame and approach are important. As the delegates of the 2012 National Indigenous Sea Country Workshop explain

“Our Estate, including land, sea country, fresh water, spiritual aspects, cultural aspects, and intellectual property; and Aboriginal and Torres Strait Islander Peoples, are intrinsically entwined.”

Current management arrangements in the North Marine Bioregion

As mooted above, formal arrangements for management of environmental values (particularly Indigenous Protected Areas (IPA’s) are based on qualities emanating from estate ownership and time immemorial kinship and ‘caring for country’ obligations, interests and skills. It is therefore important to note that the strongest authority, core capabilities and enabling factors for sea country management are on homelands (or out stations) where traditional ownership, local knowledge systems, livelihood dependence and related well-being outcomes are most keenly manifest. These embedded customary arrangements are seen as best practice by ILMs but are often outside IPAs, ranger groups and National Parks for example, where (other) critical financial, technological, research, service and skill resources are acquired. They continue to be a standard and sounding board for best practice in IPAs and Indigenous ranger groups more generally. Very little published material on homelands based land and sea management is available for this review but IPA plans, and other materials referenced here heavily reflect that background yard stick.

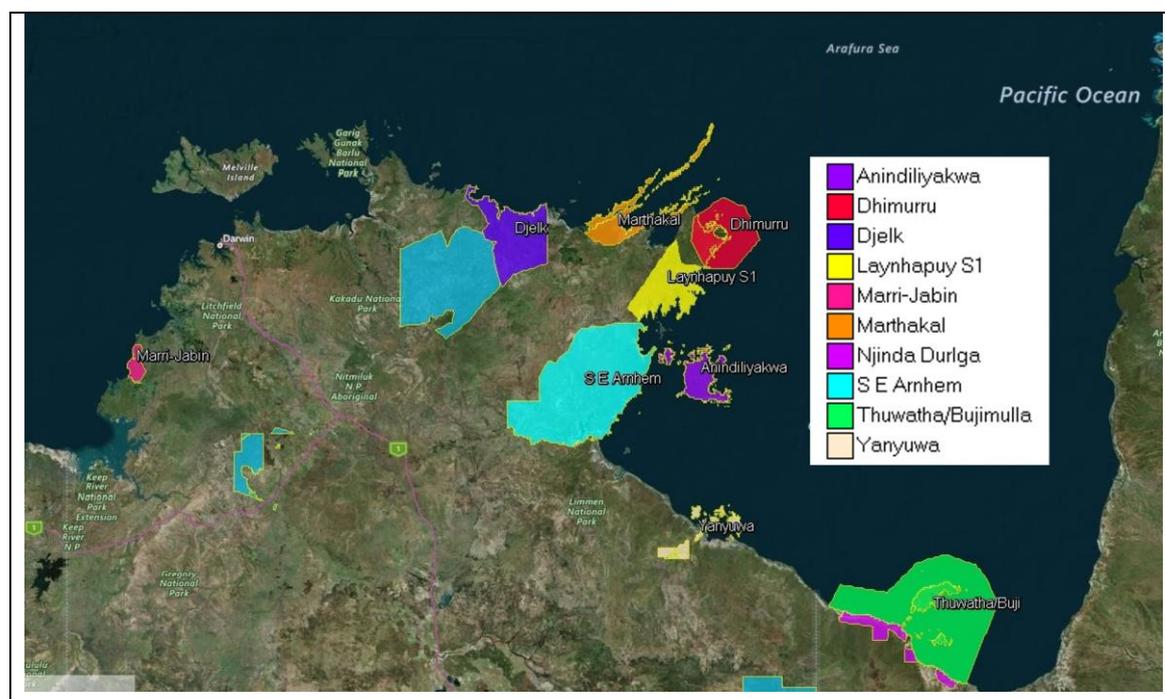
In the Northern Territory, there are six dedicated IPAs encompassing coastal and/or sea country: Anindilyakwa, Dhimurru, Djelk, Laynhapuy - Stage 1, Marthakal - Stage 1 and South East Arnhem Land. There are a further three formally proposed, all seaward expansions of existing IPA’s: Anindilyakwa – Stage 2, Laynhapuy - Stage 2 and Marthakal – Stage 2. There are aspirations for at least two more: The Crocodile Islands (Gambold 2016) and South East Arnhem Land – Stage 2 (Gambold 2015). In the Western Cape and Southern Gulf region of Queensland there is only one dedicated IPA with sea country: the Thuwathu/Bujimulla IPA; and one formally proposed: The Wik, Wik Way and Kugu. There may well be others in the early stages of planning. A frequently updated map of existing and formally proposed IPA’s, along with the Commonwealth funded Indigenous

Ranger groups can be found on the Department of Prime Minister and Cabinet's website here https://www.pmc.gov.au/sites/default/files/files/ia/IEB/IPA_WOC_national_map.pdf

The table below lists the existing IPA's within the study area (see also IPA map), and notes whether there is a corresponding Management Plan available.

Indigenous Protected Area	Management Plan available? Year of pub. / operational period	Ranger group/s
Anindilyakwa	Yes	Anindilyakwa
Dhimurru	Yes 2015 - 2022	Dhimurru
Djelk	Healthy Country Plan 2015 - 2025	Djelk
Laynhapuy – Stage 1	No, but publication imminent (sea country extension planned)	Yirralka
Marri-Jabin (Thamurrurr) – Stage 1	No	Thamurrurr
Marthakal - Stage 1	Yes (sea country extension planned) 2015 - 2020	Gumurr Marthakal
Nijinda Durlga (Gangalidda) – Stage 1	Yes 2015	Gangalidda Garawa
South East Arnhem Land	Yes (sea country extension mooted) 2015 - 2020	Yugul Mangi and Numbulwar Numburindi Amalagayag Inyung
Thuwatha/Bujimulla (Wellesley Islands)	Yes 2015	Wellesley Islands
Yanyuwa (Barni-Wardimantha Awara)	Sea Country Plan 2007	li Anthawirriyarra

Indigenous Protected Areas within the study area.



Indigenous Protected Areas within the study area.

Whilst IPA management plans are probably the most widely recognised (and possibly the strongest currently existing) vehicles for articulating traditional land owners' commitment to management of their country, there are numerous other arrangements where traditional owners may be supported in managing country. Even without dedicating IPA's, many communities have articulated their aspirations in land and sea country (and healthy country) management plans, for example the Mapoon Country Plan 2013 - 2020 and the *Ngamp inth Wantharr Yumphanam* Pormpuraaw Land and Sea Country Cultural and Natural Resource Management Plan 2010 – 2015 from Queensland; and the Tiwi Islands Regional Natural Resource Management Plan (2004) from the Northern Territory.

In the Northern Territory, there a number of relevant jointly managed parks including Kakadu (Commonwealth) and Cobourg (Garig Gunak Barlu) Marine Park (Territory). Cobourg (Garig Gunak Barlu) Marine Park is the only marine park declared under the Territory Parks and Wildlife Conservation Act. It is jointly managed by the Northern Territory Government and traditional owners through the Cobourg Peninsula Sanctuary and Marine Park Board (CPS&MPB 2011). There is however minimal discussion on the cultural values of animal species in the management plan. Similarly, in the Kakadu National Park Management Plant 2016-2026 there is very little detailed information regarding the cultural values of animals, beyond some general recognition that native animals are integral to the cultural landscape of the park, and the importance of some bush tucker species including Magpie Goose and others. There are some cursory statements around management arrangements which support sustainable harvest of species such as Dugong and marine turtles, as provided for by Native Title legislation.

Important marine animals

Marine turtles, dugong and seagrass are represented in the logo (see page 8) of the li-Anthawirriyarra sea rangers (the ILM group for Yanyuwa people) and Yanyuwa people express the close relationship between these lifeforms thus *walya nyiki-nganji ki-maramannku* "the dugong and sea turtle they are kin to the sea grass". The term *walya* includes dugong and all marine turtles and is one of the most detailed and complex categories in Yanyuwa biological classification, including 16 names for dugong expressing multiple and contextual meanings, often also defining behaviour and response (Bradley & Yanyuwa families 2007). We can see some parallels with the way western science might consider multiple values inherent in a species, or a food web in which a key animal may have many functions.

And the depth of this interconnectedness extends far beyond what current ecological sciences may identify. Baymarrwanja & James (2014) discuss:

"The Yan-nhaṅu language is a sign of belonging, a spring of knowledge, and a source of ancestral connection to country. Yan-nhaṅu people say 'We are kin to the sea' and 'We care for him/her and she/he keeps us alive'. Here in Yan-nhaṅu language can be seen the complementary relations, the harmonisation of opposites, of *Dhuwa* and *Yirritja*, underlying a holistic world view. The names of places and people, and the everyday words of language reflect the notion of relatedness and the indissoluble connections of people to their sea country."

"All the other species that live and visit the (Crocodile) islands are named, sung, painted and danced by people of the islands. All of them are linked to people through kinship. This idea that kinship underpins the Yan-nhaṅu world view; it is just one of the reasons the Yan-nhaṅu people know and care for their sea country. After all, this inheritance sustains life."

Traditional owners from the region around Pormpuraaw explain:

“Remember we do not distinguish between the ‘cultural’ and the ‘natural’ when it comes to resource use and management. We do not look after the Brolga, the Crocodile, the Barramundi, the Savannah Grass or other plants and animals in isolation. These are our Ancestors, our Totems, our Culture, our Country. We remain connected to our Culture, our Country and its Songs across all ‘values’ – from the cultural, the natural and the spiritual – integral to ourselves and our homelands.” (Pormpuraaw 2011)

There are also some quite clear and explicit statements of the importance of particular species, for example the Thuwathu/Bujimulla IPA Management plan states “The most important marine mammal is the dugong, which is a major source of food for us as well as being central to our identity as Saltwater people.” (CLCAC, 2015b). The Yanyuwa Sea Country Plan (Bradley & Yanyuwa families 2007) states “The future health of our people and culture depends on taking care of our dugongs”.

The story of the Anindilyakwa Land Council (ALC) logo below, is also indicative of treatment of individual iconic species, some of which are TMMs or closely related. Though no conclusions can be drawn from this treatment about research priorities, the focus clearly identifies nuanced understanding and interest.



“In the beginning the island was dark. *Barnimbirra* (morning star) brought daylight to the island and ever since then there has been a day and night. In creation times, *Yumaduwaya* (stingray), *Mungwarra* (Hammerhead Shark) and *Yukwurririndangwa* (sawfish), began their journey from the eastern coast of Arnhem Land. On their way to Groote Eylandt they stopped at Bickerton Island where they transformed themselves from human beings into sea creatures. They then continued their journey to Groote Eylandt. On the way, they agreed to go to the centre of the island and decided to enter from the north. *Yukwurririndangwa* however, said: “I’ll take a short cut”. After the *Yumaduwaya* had left him, *Yukwurririndangwa* set off with a crowd of many different stingrays following him. *Yukwurririndangwa* led the way, probably because he was the biggest.

Meanwhile *lirreba* (the tide), was growing big. *Yukwurririndangwa* reached Groote Eylandt, came out of the sea, and started to cut his way through the land, using his teeth and nose as he went. As he cut out the land, and threw the earth aside, he created the Angurugu River. He opened a way for himself to travel towards Central Lake. As the water came in, the dirt was stirred up. *Lirreba* grew bigger and bigger and followed close behind *Yukwurririndangwa*. The stingrays used *lirreba* to continue following *Yukwurririndangwa*. *Yukwurririndangwa* then went to the centre of the island where he created Central Hill (*Yandarrnga*).” (Taylor 2016)

We also make reference to other representations of marine life where they have been presented to the public, in the form of organisational logos and artworks. In response to increasing use of their sea country and marine resources by commercial and recreational fishers Yolŋu artists in the late 1990’s created a collection of paintings to publicly communicate the cultural, spiritual, and economic importance of their sea country. “The paintings reveal Yolŋu saltwater country in many states, showing qualities of depth, surface and the sacred and often dangerous land just below the surface, the profound depths and the totemic life forms that inhabit these waters” (Dhimurru

2006). Dugong, marine turtles, whales, stingray and mantra rays are among the marine lifeforms represented in this series of paintings.

It is important to remember that some statements in the various management plans reviewed are likely to reflect a combination of cultural values and a recognition of western conservation values, as alluded to in the prelude to the 'Statement of Vision' in the Tiwi Islands Regional Natural Resource Management Strategy (2004):

"The Tiwi vision is a statement of values placed on the natural values of the Tiwi islands by the majority stakeholders; Tiwi people. It recognises their importance in terms of economic development, while also acknowledging their cultural, spiritual and recreational values. Other also value the Islands' natural resources, predominantly for contemporary conservation aims. The challenge is to accommodate and protect the variety of values placed on the Tiwi Islands, while acknowledging that it is those who rely on the Islands for their daily living that will be most affected by natural resource management actions both now and into the future." (Tiwi Land Council 2004).

Many of the formal management plans note the known and likely occurrence of species and assemblages of (western) conservation significance. Some refer to them in describing management actions or goals for example in the Djelk Healthy Country Plan the presence of migratory species including seabirds and turtles will be used as an indicator of healthy sea and coasts, which will be measured through population surveys of migratory species, and surveying community members for harvest of seabird and marine turtle eggs (Ansell & Djelk Rangers 2015). This is a clear indication, not only of the willingness to take up new and useful knowledge forms and to embed collaborative action research in local management interests, but also of the importance of good inclusive process, engagement and support for ILMs which provides the confidence to do so.

Dugong and marine turtles

"The future health of our people and culture depends on taking care of our dugongs". (Bradley & Yanyuwa families 2007).

"The most important marine mammal is the dugong, which is a major source of food for us as well as being central to our identity as Saltwater people." (CLCAC 2015b)

"We believe our wellbeing and turtle (*miyapunu*) wellbeing are inseparable. To put it another way, we belong to turtles and turtles to us; we sustain them and they us." (Dhimurru 2015)

"Marine turtles and their eggs continue to be an important part of our traditional food and we are committed to ensuring that we use this resource sustainably" (CLCAC 2015b).

Saltwater people across the north almost universally identify the Dugong as a vitally important part of the cultural and physical landscape, and alongside it often one or multiple marine turtle species. The multi award winning NAILSMA-led Marine Turtle and Dugong Project recognised this fact, bringing together communities across the region to work towards the project vision "Healthy and sustainable populations of dugong and marine turtles in north Australian waters that support Indigenous livelihoods". The Australian Government's Evaluation Performance Story Report (Bessen Consulting Services 2008) concluded the project was a standout success that had outstripped the original expectations, and importantly "From this project, the Australian Government has learnt that Traditional Owners can manage a very large project and achieve the outcomes specified as well as achieving a large number of additional social, cultural, environmental and economic outcomes." (Kennett & Kitchens 2009)

Many documents discuss the threats, concerns and management goals for these species together. This connectedness is further demonstrated in language, such as the Yanyuwa term *walya*, discussed above, which includes dugong and all marine turtles. (Bradley & Yanyuwa families 2007). These two logos of ranger groups from the Gulf region, li Anthawirriyarra rangers from Borroloola (representing Yanyuwa TO's) and the Numbulwar Numburindi rangers from Numbulwar both feature marine turtle and dugong together.



Numbulwar Numburindi

The most consistently recognised threatening processes in the seascapes of the North Marine Bioregion known to be impacting both marine turtles and Dugong, include entanglement in ghostnets, commercial fishery bycatch, boat strike and in many locations also water quality impacts on seagrass,

“...without seagrass there would be no sea turtles or dugong; but likewise it is said that without the dugong and sea turtle, there would be no seagrass, as the feeding upon it keeps it healthy (Bradley & Yanyuwa families 2007).

Six marine turtle species occur on Yanyuwa country and there are 36 known significant nesting sites. One estimate of the Dugong population in Yanyuwa sea country was 8,000, suggesting it was the largest population in the Northern Territory. Yanyuwa people have expressed a number of very serious concerns about sea turtles on their country including observations of an increasing number of sick turtles and dugong, and also falling nesting rates on island beaches where previously turtles ‘nearly nested on top of each other’. Yanyuwa people know that seagrass is critical to both dugong and marine turtles, and have expressed a desire to be involved in any relevant research. Issue 8 of the Yanyuwa Sea Country Plan 2007 clearly articulates community aspirations for monitoring, informed management and sustainable use of dugong and marine turtles (Bradley & Yanyuwa families 2007).

Marine turtles are known in the lingua-franca of east Arnhem Land as *Miyapunu*, and as indicated above they are a central to the culture of people whose sea country is represented in the Dhimurru IPA. The Rangers regularly record Green, Hawksbill, Olive Ridley and Flatback turtles and are the custodians of internationally significant rookeries of these species; Leatherbacks and Loggerheads are occasionally sighted. Traditional owners are concerned about the common threats to marine turtle and dugong, and for nest and turtle hatchling predation by feral pigs is an additional threat. Bycatch is also a focus “Catch reports from fisherman suggest few turtles and sea birds are casualties from fishing. We know this to be untrue because we have reliable off-the-record reports from deckhands and some skippers contradict this, confirming that many are killed (Dhimurru 2006).

There is clearly a gap in reliable evidence for fisheries management, suggesting the need for independent marine and fisheries researchers with senior traditional custodians’ involvement in the research process.’ There is also recognition that some young (local) people have disregarded proper cultural protocols when harvesting *miyapunu* so senior TO's and other custodians aim to develop a *miyapunu* management plan to encourage culturally and environmentally sustainable harvest, with the Learning on Country program also playing a role in educating youth (Dhimurru,

2006). Note also Laurie Baymarrwanga's turtle sanctuary and management plan on Murrungga Island – supported by Crocodile Island Rangers (Baymarrwanga and James 2014). One of guiding principles for Dhimurru IPA management is Sustainability – ensuring that dugong, turtle, fish, and other culturally and economically important species are harvested sustainably for the generations to come (Dhimurru 2015).

Together the adjoining Nijinda Durlga and Thuwathu/Bujimulla IPA's in the Southern Gulf region represent a protected area of some 175,350 hectares. Traditional owners recognise that they share challenges and are committed to facing them together (CLCAC 2016a). Both Management plans both include considerable discussion about depletion of dugong and marine turtle numbers, it is clearly a pervasive concern for ILM's in the region. Aerial surveys during the late 1990s indicated that about 3,000 dugongs lived around the Wellesley Islands; two other aerial counts since that time suggested that numbers to remain constant over that period of time. Another survey was conducted in September 2007 and though numbers counted were similar, the researcher involved with all three surveys suspects this number to be very conservative with numbers closer to 5,000 being more realistic (CLCAC 2015). Dugong is an important shared resource in the region. Both plans outline actions relating to monitoring of sick or underweight Dugong, fisheries bycatch issues and impacts on seagrass meadows. Hunting is not a regular activity of Gangalidda people with "most dugong obtained, as it has been done for generations, by trading resources with our Wellesley Island neighbours." (CLCAC 2015a) Reflecting the fact that most Dugong hunting occurs around Wellesley Island, the Thuwathu/Bujimulla IPA management plan (CLCAC 2015b) outlines a proposal to conduct a long-term survey of customary dugong harvest activities.

Six marine turtle species are found in sea country of the Southern Gulf region. High numbers of nesting Green and Flatback turtles make the Wellesley Islands an area of international significance. Many unhealthy or dead turtles have been observed in the region (CLCAC 2015a, b). There are concerns that they are being affected by pollution from mining in the region and also by observed seagrass bed dieback. People 'intend to work together with researchers to better understand what is happening to turtles and to protect their feeding grounds and nesting beaches.' Since publication of the 2006 Thuwathu/Bujimulla sea country management plan people have become aware of additional information about these issues such as scientific evidence to suggest that the presence of zinc in the water could affect marine turtles sense of smell, having an impact on the ability to feed, and recognition of the disease fibropapilloma. Commercial fishery bycatch issues are a concern. Gillnets used in the barramundi fishery pose a significant threat to dugong and turtle. There is recognition (and respect for) the demonstrated reduction in the impact of the Northern Prawn Fishery through the introduction of turtle exclusion devices. Regarding turtle nesting success there are clear predation impacts of feral pigs and dogs, and possibly an increase in goanna predation as their other food sources become more scarce. People have also heard about increasing nest mortality in other areas of the Gulf due to nest inundation linked with climate change driven sea level rise and rangers intend to monitor for this. Both the southern Gulf IPA management plans outline numerous complimentary actions intended to contribute to conservation of marine turtles (CLCAC 2015a, b)

One of the nine main targets in the Mapoon Country Plan is *minya/kai kai* (bush meat foods). Dugong and *traina* (marine turtles) feature heavily in this category. There are specific aims and actions described to improve the health of dugong and turtles including ensuring harvest is done in the right season, respecting old peoples custom and lore, improving turtle hatchling success and ensuring healthy feeding (seagrass) grounds (ML&SP 2013).

Five species of *yimenda* commonly occur across Anindilyakwa sea country: *enuwa* (Flatback), *yijirakamura* (Olive Ridley), *yimuwarraka* (Green), *dingaluwa* (Hawksbill) and *yinubungwaya* (Loggerhead); the first four are also known to nest there. Given the spiritual and practical value of *yimenda*, Anindilyakwa people possess unique knowledge of locally common species.

Yimuwarraka are a shared totem for four clan groups and are the most valued for their meat. *Enuwa*, *yijirakamurra* and *yinubungwaya* are also eaten on occasion. Eggs of *yimenda* species are traditionally dug from nests and consumed. A target in the IPA monitoring and evaluation framework is to establish and undertake annual monitoring of nesting *yimenda*.

Four species of marine turtle are known to occur in the sea country of the Marthakal IPA, *garriwa* (Flatback) *wirrwakunha* (Hawksbill) *dhalwatpu* (Green) and *mududhu* (Olive Ridley). There have also been two recent isolated sightings of the Leatherback turtle, but there is no language name known for this species, so it is unlikely to be considered culturally important. The Gumurr Marthakal Rangers patrol for ghostnets and marine debris along the coastline. They are monitoring key sea turtle nesting beaches. Where appropriate, the Rangers invoke customary law to manage the customary use of sea turtles; supporting traditional owners to regulate hunting in their estates. They are actively educating local people about the conservation status of sea turtles, discouraging take of nesting turtles from beaches, advocating restraint in egg harvest and exposing non-traditional methods of hunting within the local community (Gambold 2016).

All six of the marine turtles of Australia are known to occur in the sea country around Pormpuraaw. The coastline north of the community has an extensive Olive Ridley nesting rookery. Feral pigs were responsible for 90% predation of the Olive Ridley prior to aerial culling operations by ranger staff in 2014. At the time of reporting, predation of nests in the 2016 nesting season was 2 nests. The Pormpuraaw Land and Sea Rangers believe that ongoing culling operations are essential for the long-term sustainability of Olive Ridley populations (CYNRM 2016) and in addition as many individual Olive Ridley nests as possible are protected against predation with aluminium nest protection devices (CYNRM 2016). Thaayorre and Mungkan TO's from the region also recognise the common threats mentioned above, and feel they also impact on Dugong. The turtles may also be facing over-hunting in some areas, and light pollution impacting on nesting behaviour (Pormpuraaw 2010).

The Pormpuraaw Land and Sea Rangers are one of the founding members of the Western Cape Turtle Threat Abatement Alliance (WCTTAA), playing a key role in the reduction of threats to vulnerable and endangered marine turtles nesting on the west coast of Cape York Peninsula. The other ILM members of WCTTAA are Mapoon Land and Sea Rangers, Nanum Wungthim (Napranum) Land and Sea Management Rangers, NPARC/Apudthama Rangers and the Kowanyama Aboriginal Land & Natural Resource Management Office. On beaches monitored by WCTTAA rangers in 2016, turtle egg predation fell below scientifically determined target levels, increasing the chance of maintaining viable turtle nesting populations in future. Participating groups have been involved in a variety of collaborative turtle research and management activities since WCTTAA formed in 2013, it is noted that funding for the Alliance currently expires at the end of 2017 (CYNRM 2017). This is critical work but perhaps only marginally effective unless collaborations to address adult mortality are explored and supported.

In recent years, mainstream society has been questioning people's right to customary harvest of Dugong and marine turtles. The widely criticised 2003 National Recreational and Indigenous Fishing Survey (Bessen Consulting Services 2008) led to a belief that customary harvest of turtle and dugong in Australian waters were unsustainable. Immediately to the north of the North Marine Bioregion in the Torres Strait a journalist claiming to be a researcher secretly filmed hunting activities, selected footage was used as the basis for an inflammatory and deeply divisive television exposé. In addition to creating a completely unwarranted sense of shame for many people about traditional practices that are central to their culture, Marsh and Loban (2017) explained that the deception by the journalist consequently created deep distrust of the scientific research community, when prior to this TO's in the region were actively involved in scientific research projects. Whilst there is a general acceptance that there is a small minority of Indigenous people disregarding correct cultural protocols for harvest of dugong, marine turtles and turtle eggs (often Aboriginal people from elsewhere, and occasionally younger members of communities)

(Dhimurru 2015, Gambold 2016), ILMs are resolutely committed to ensuring customary harvest activities are adhered to and are sustainable, as clearly demonstrated throughout this section. An important issue for management is the erosion of customary knowledge around sustainable hunting and the critical protocols that guide and enforce it. How such knowledge can best be strengthened to avoid further erosion of sustainable practice, is as much a question for traditional owners and their ranger groups as it is for researchers serious about effective collaboration in species conservation and protection.

“Across northern Australia, there is concern that Traditional Owners are taking too many dugongs, that the rules of customary take are no longer being adhered to and that the use of powered boats makes hunting extremely efficient. While from a cursory glance there is some substance to this argument, we object to the fact that Indigenous people seemed to be targeted as the only factor contributing to the decline in dugong numbers. We are well aware of other pressures exerted on dugongs by ghost nets, pollution, loss of seagrass meadows and other forms of environmental degradation, boat strikes, climate change and other human impacts.” (CLCAC 2015b)

“We do not believe there is an issue with the amount of dugong and turtles that are taken as a food source and for cultural reasons in our waters. However, we understand that discrete areas within the overall landscape of our sea country can be over-utilised for this purpose. To combat this problem, we proposed to close particular areas to hunting on a seasonal basis, or even a permanent basis” (CLCAC 2015b)

“Marine turtle harvesting is based in strong traditional customs and deep social and cultural associations. The advent of modern boats and hunting tools has allowed far greater access to this resource. There is a resulting imperative for our community to make strong management decisions to ensure sustainability of these traditional resources. However, modern Indigenous hunting is not responsible for the falling numbers of turtles. We understand that worldwide turtle populations are in serious decline as a result of coastal development, commercial fishing, poisoning by and entrapment in marine debris, predation by feral animals and human over-exploitation. Areas such as North East Arnhem Land are by contrast, strongholds for these threatened species.” (Gambold 2016)

In the Torres Strait significant research effort was applied to investigate this issue. Contrary to previous findings by Marsh *et al* (2004) a subsequent re-evaluation by Marsh and others (2015) using multiple lines of evidence, and new research by Hagihara *et al* (2016) supported the notion that Torres Strait dugong harvest is sustainable. The status of the foraging Green Turtle population in was less certain than that of the dugong (Hagihara *et al* 2016).

Cobourg Marine Park is considered to be one of the most significant areas for dugong in the Northern Territory. All six marine turtle species are known to occur and there are numerous nesting beaches for Green and Flatback Turtles including what may be the most important Flatback nesting sites in the Northern Territory (CPSMPB & PWSNT 2011). Coastal and marine areas of Kakadu National Park including *Gardangal* (Field Island) and *Djidborddu* (Barron Island) near the mouth of the South Alligator River, are of great importance to Bininj/Mungguy traditional owners; numerous sites of significance are located within and adjacent to the park. Five species of marine turtle occur in the waters adjacent to Kakadu. Gardangal has a small beach which regularly supports nesting Flatback Turtles and is a key site for an annual monitoring programme for this threatened species, and 20 years of survey data is now available for Flatbacks, and Saltwater Crocodiles (KNPBM 2016).

Whales and dolphins

There are 5 species of *dinginjabena* (dolphin) and two whale species known to occur in the seas of the Anindilyakwa IPA; including the Australian Snubfin Dolphin, Indo-Pacific Humpback Dolphin, Australian Humpback Dolphins, and also the False Killer Whale. *Dinungkwulangwa* (Dugong) and *dinginjabena* are significant to Anindilyakwa people. Individuals of several clan groups (for which *dinungkwulangwa* and *dinginjabena* are totems) hold and pass on their associated Dreaming stories. *Dinginjabena* are no longer considered a resource; however, they were once utilised in a manner similar to *dinungkwulangwa*. A whale ancestral being is represented in a painting by prominent Yolŋu artists included in the collection Saltwater: Yirrkala Bark Paintings of sea country (Dhimurru 2006).

Indo-Pacific Humpback Dolphin, Australian Snubfin Dolphin (referred to as Irrawaddy in the plan), and False Killer whales, Pilot whales and a species referred to as 'Roqual' (possibly the Humpback Whale) are known to occur around the Wellesley Islands (CLCAC 2015b). The Australian Snubfin and Indo-Pacific Humpback Dolphins, Short-finned Pilot Whale, Black Whale (likely to be the Killer Whale) are known to occur in Yanyuwa sea country (Bradley & Yanyuwa families 2007). It is considered the Australian Snubfin Dolphin is likely to occur in the sea country around the Dhimurru IPA, and this is supported by number of records showing on Atlas of Living Australia (ALA 2017).

The Pormpuraaw plan notes the occurrence of the Indo-Pacific Humpback, Australian Snubfin (referred to as Irrawaddy in the plan), Common, Risso's, Spotted and Spotted Bottlenose Dolphins, along with Killer Whale, Bryde's Whale and Blue Whale. Although there is no discussion of their cultural value there are a number of threats noted (PLSM & PASC 2010). Kakadu is home to twoinshore dolphin species, the Indo-Pacific Humpback and Australian Snubfin. There is no mention of the cultural significance of these species. Management recognise that illegal fishing using gillnets could pose a threat to these species. Australian Snubfin Dolphins and Bryde's Whales are known to occur in the waters of the Laynhapuy IPA (Laynhapuy 2013).

Shorebirds and Seabirds

Yanyuwa people recognise close kinship ties between seabirds and fish. "To see many birds over the sea country is to know that the country is well, 'They hold the country up when there are no people present (Una Harvey 2005 in Bradley and Yanyuwa families 2007)

<i>Kilu-ngabunjama</i>	The tern dives into the sea
<i>Wunjurrkunjurr</i>	the vast open expanse of the ocean
<i>li-walamakamakala</i>	they belong with the sea country
<i>kumba-jajirra</i>	they are the ones that dive into the depths of the sea

(Jack Baju in Bradley & Yanyuwa families 2007)

There are 33 recorded shorebird nesting colonies on Yanyuwa country; including the world's largest known rookeries of the largest Crested Tern and Roseate Tern. At least 35 migratory bird species to visit Yanyuwa sea country, of which 21 are known to breed.

Mapoon traditional owners consider the presence of shorebirds and their nests as indicators of healthy beaches. Vehicles on beaches are recognised as a threat, so rangers patrol beaches educating tourists about rules and protocols designed to protect birds and their nests. Initiated by a collaboration with Birdlife Australia and NAILSMA in 2012, the Mapoon rangers have been undertaking annual shorebird surveys of their coastal country (Jackson *et al* 2016). The group plans to monitor shorebirds and sea turtles in order to improve knowledge about local impacts of climate change. The Curlew Sandpiper, Red Knot, Bar-tailed Godwit, Lesser Sand Plover, Greater

Sand Plover, Great Knot and Eastern Curlew are all known to occur on the Anindilyakwa IPA. Approximately half of the marine and shorebirds are listed as migratory. Many, including species of *dirrkba* (Plover), sandpiper and *yijarra* (Tern), visit the IPA marine zone.

Kakadu National Park supports more than one per cent of the East Asian–Australasian Flyway population, of the following waterbirds: Magpie Goose, Wandering Whistling-duck, Plumed Whistling-duck, Radjah Shelduck, Pacific Black Duck, Grey Teal, Brolga, Black-necked Stork, Marsh Sandpiper, Little Curlew, Common Sandpiper, Australian Pratincole and Sharp-tailed Sandpiper, however the management plan does not explore the values or management aspirations of traditional owners, beyond recognising that several are popular bush tucker species.

Dhimurru IPA provides important foraging habitat for breeding aggregations of migratory seabirds such as the Common Noddy, Roseate Tern, the listed marine Crested Tern, Black-naped Tern, Caspian Tern, Brown Booby and Lesser Frigatebirds. But there is concern about potential bycatch issues from commercial fishing, whilst formal records suggest few seabird (and Dugong) mortalities “We know this to be untrue because we have reliable off-the-record reports from deckhands and some skippers that many are killed.” (Dhimurru 2006) Bycatch by commercial (and illegal) fishers is identified as a threat to seabirds (also turtles and marine mammals) on the Djelk IPA too. Through Learning on Country and other community events, the Djelk Rangers aim to increase the awareness of conservation issues associated with migratory birds, along with other marine species of conservation concern (Ansell & Djelk Rangers 2015).

The islands of Cobourg Marine Park are a nationally significant breeding site for Crested Terns and regionally significant breeding site for Black-naped Terns; lower numbers of other species including roseate and bridled terns also use these islands to breed (CPS&MPB 2011) There is no mention of the cultural value of these birds. Wellesley Islands are home to large breeding colonies of Crested Tern, Roseate Tern, Brown Booby and Lesser Frigatebird. Adjacent to the islands, the coastal areas of the Nijinda Durlga IPA provide valuable habitat for numerous shorebird species. Four Nationally Important Wetlands are found on Gangalidda country in the gulf of Queensland, including part of the Southern Gulf Aggregation, which is the largest continuous estuarine wetland of its type in northern Australia and one of the three most important areas for shorebirds in Australia providing habitat for species listed under international agreements: 22 species under Japan –Australia Migratory Bird Agreement and 31 species listed under the China- Australia Migratory Bird Agreement (CLCAC 2015a). Within the Marthakal – Stage 1 IPA there are 1,750 kms of natural coastline, offering extensive habitat for a variety seabirds and migratory shorebirds; with the extensive tidal flats of Buckingham Bay providing a major stop over point on the East Asian-Australasian Flyway (Gambold 2016).

Sawfish, sharks and rays

Marine and riverine environments within Kakadu National Park provide key habitat for the Northern River and Speartooth Sharks, as well as theARGETooth, Dwarf and Narrow Sawfishes (KNPBM 2016).

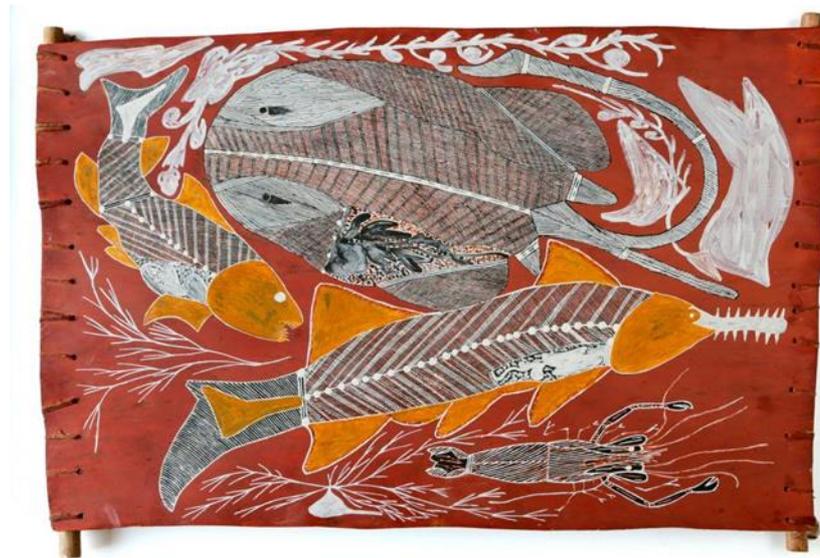
Three species of sawfish are commonly found in Gangalidda traditional waters. Traditional owners attest to a serious decline in numbers, and point to scientific evidence that suggests that their traditional country includes important nursery grounds for sawfish in general, also highlighting that more research is needed to fully understand the life cycle of sawfish (CLCAC 2015a). It is clear that Gangalidda people are interested in supporting sawfish conservation efforts. They had been in initial discussions with the State level authority about creation of an unzoned marine park which would include critical habitat for sawfish within their traditional estate and the adjacent Thuwathu/Bujimulla IPA. Despite that particular marine planning process being abandoned they states that they would gladly resume such discussions and that their rangers are eager to work with scientists to ensure the local survival of sawfish species.

Anindilyakwa people have strong traditional connections with *aranjarra* (the cartilaginous fishes). *Yukwurrirringangwa* (sawfish), *yumaduwaya* (stingray) and *mungwarra* (Hammerhead shark) are significant totemic species which feature in the Anindilyakwa creation story shared earlier. The Speartooth Shark, Green Sawfish and Dwarf Sawfish are known to occur in the Anindilyakwa IPA, as well as frequently hunted (Saunders & Carne 2010) *amarbirra* (Cow-tail stingray) and *yilyanga* (giant shovelnose ray). *Malarra* (manta ray) and *gawaṅalkmirri* (stingray) are totemic beings represented in painting by prominent Yolŋu artists included in the collection Saltwater: Yirrkala Bark Paintings of sea country (Dhimurru 2006).

Yanyuwa people have observed an overall decline in the number of stingrays.

This painting (below) “Berelh” is by Graham Rostron, a Baraba man living at Korlorbirrahda on the Arnhem Plateau. Graham’s description of this piece is as follows:

“Berelh is the Kunay word for the flat one, stingray. This is a female one. In the day she stays down in the sand ground, where it is cool. At night she swims around looking for tucker, looking for prawn, crab and other tucker. All night she swims, then goes back and rests herself, she covers herself back up with sand. This stingray is swimming around, she sees the sawfish, the shark and the prawn. The sawfish we call Djenkundamen, he is dangerous when we are hunting so we be careful. The shark, he’s dangerous too, same like crocodile. The shark we call Wamba. The little prawn, he’s a day time, night time man, walking around under the water enjoying himself. These all live in the river where they hunt tucker. They are all tucker for us too on our country.”



Berelh © Graham Rostron

Reptiles

Around 20 species of sea snake are believed to occur within the Cobourg Marine Park, including the Critically Endangered Short-nosed Sea snake (CPSMPB & PAWSNT 2011). The Dhimurru IPA is believed to support between 19 and 26 sea snakes. 19 species of sea snake are noted as occurring in the seascape adjacent to Pormpuraaw (PLSM & PASC 2010). In these three cases, there is no specific discussion of the value cultural value of sea snakes to the traditional owners. For Yanyuwa people there is a sea snake ancestral being (Bradley and Yanyuwa families 2007). Similarly, Anindilyakwa people recognise a songline associated with a sea snake.

“According to Anindilyakwa tradition, the history of people began with the formation of the land and seascape during the Dreaming. During this time, ancestral creatures travelled across the land and sea along ‘songlines’. They sang the country’s features – including the plants, animals, hills and rivers – into being and brought Anindilyakwa people to the region. There are various songlines that traverse the islands and sea within the IPA. These include tracks related to *angwura* (fire), *yukwurrirringangwa* (sawfish), *dumurrengmurra* (sea snake) and *dinginjabena* (dolphin).

To Yolŋu people, the Estuarine Crocodile, known as Bāru is a significant ancestral being. There are strict customs governing the hunting or killing of the species and conservation of Bāru habitat is important to ensure the survival of the species. Extinction of the species would have major consequences for Yolŋu spirituality (Dhimurru 2015). Estuarine Crocodiles are important cultural and totemic species for some clans from the Djelk IPA region. However, consultations revealed they are now perceived as a major threat to safety ‘on country’ and are restricting access to customary resources. In particular, senior people reported Estuarine Crocodiles in places and numbers that they have never experienced in their lifetimes, and have observed that the increasing numbers have coincided with increasing feral animal numbers. Traditional Owners hope that in 2020 there will have been no further spread of Estuarine Crocodiles beyond 2015 levels, and that the Djelk Rangers have increased their capacity to assist Landowners to manage Estuarine Crocodiles in culturally appropriate ways (Ansell & Djelk Rangers 2015).

Involvement in marine research to date

Indigenous landowners have been active participants in research and management to advance goals - like reduction in greenhouse gas emissions - that sit outside traditional obligations and experience (Russell-Smith *et al* 2009). They are eager to deploy assets, skills and practices to problems important to other members of Australian society, especially where delivery of those external goals can contribute to meeting customary obligations to country. Communities and Indigenous organisations with the capacity to engage with researchers and commission work have done so. In 2004-2005 the Tiwi Islands rangers and the World Wildlife Fund undertook a multidisciplinary research project, the sea turtle conservation and education project (Whiting *et al* 2007). In 2008 a partnership between Fisheries staff of the Northern Territory Department of Resources the Anindilyakwa Rangers undertook a survey of the customary harvest of sharks and stingrays; prior to this project the 2003 National Recreational and Indigenous Fishing Survey was the only other survey attempting to evaluate customary harvest of sharks and rays. Many Indigenous ranger groups have contributed to research undertaken by Ghostnets Australia (Gunn *et al* 2010).

Dhimurru have a long history of involvement in collaborative research and management projects on a diverse range of subjects including: Marine turtle and dugong conservation and management, ghostnet and other marine debris mitigation and removal, distribution of inshore dolphins and dugongs, Seagrass monitoring and mapping, fish abundance and health, Crocodile management, cultural mapping, Yellow Crazy Ant control, Northern quoll relocation, terrestrial biodiversity surveys, management of the endemic Gove crow butterfly, ethnozoology of frogs and toads, fire management, and biosecurity. The Malak Malak rangers from the Daly River region have been working with researchers to learn more about the distribution and habitat requirements of the Largetooth Sawfish (Simpfendorfer *et al* 2016) and the traditional owners are eager to contribute to the conservation of the species through a ranger of on-ground management activities (NESP 2016)

Planned research and monitoring directions

Several groups have outlined some specific research and/or monitoring directions. For example, the Mapoon rangers plan to monitor shorebirds and sea turtles in order to improve their knowledge about local impacts of climate change (Mapoon 2013). Anindilyakwa aspire to detect, describe and/or map 1 new species, population or ecological community annually.

In the Dhimurru sea country plan (2006) 'Invitations to stakeholders' section one broad aim is "To extend and develop our role as real partners in monitoring and research on marine creatures and their habitats. This includes both customary and contemporary scientific knowledge and involves careful cooperative management planning at sub-regional, regional and state levels." In the subsequent IPA management plan Dhimurru have identified mapping sea country habitats and marine biodiversity surveys as a high priority before 2020. They also want to investigate all causes of turtle mortality resulting from commercial fishing, and invest in the development of solutions. Dhimurru want to continue to explore and develop 'both ways' approaches to manage and protect vulnerable species and habitats, and encourage cooperative partnerships for research and management.

Indigenous land managers of the Thuwathu/Bujimulla and neighbouring Nijinda Durlga IPA's point out that there is a serious lack of baseline data in a number of key areas including species population levels and trends and overall habitat health, recognising that without it, it is difficult to assess the effectiveness of the management plan and on-ground actions (CLCAC 2015a, b). Gangalidda people have included a direct call to potential collaborators in their management plan to help fill this gap. "We actively invite scientists involved in research projects applicable to our region, visiting researchers, etc. to work with our rangers in what will be a mutually beneficial arrangement to collect environmental information across the region" (CLCAC 2015a). In addition to a need for baseline information, there was mention of increasing nest mortality in other areas of the Gulf due to nest inundation linked with climate change-driven sea level rise, and they stated an intent to monitor for this (CLCAC 2015a, b).

Principles of appropriate engagement in future research

The above analysis of documents is an important preliminary step in the process, recognising the work already done by communities to communicate their intent for the ongoing custodianship of their sea country. These documents identify threats, priorities and knowledge gaps; giving an indication of where future research efforts may be of most value to Aboriginal people as legal and customary holders of land and sea country over most of the project area and as the dominant and most affected group outside the larger towns.

As communities continue to build their capacity to engage with the western science community on their own terms, there is growing (two way) research collaborations often driven by Indigenous interests and actions (Dobbs *et al* 2016, James & NAILSMA 2016; Jackson *et al* 2015; Jackson *et al* 2016, Dhimurru 2013; Ens 2017; NAILSMA 2006; Simpfendorfer *et al* 2016). This marks an emerging trend away from research projects primarily founded on non-Indigenous actors, interests and priorities. In these examples of collaborative and cross cultural research it is the partnerships and processes adopted in the conduct of projects that put them on a good footing for success.

Some key principles of engagement can be summarised as:

- Know and respect local rights, interests and aspirations
- Where possible, engage local people in the research agenda

- Discuss value and legacy of research for the respondents and their communities
- Provide useful information – explaining background and broader context
- Use opportunity to employ and pass on skills
- Respect local timeframes
- Right people, right country
- Manage expectations
- Use local language or parlance when reporting back
- Respect “both ways/two knowledge systems*” approaches and existing knowledge systems.

*Two knowledge systems: Maintaining the balance between the Yolŋu and the mainstream worlds and the active practice of both-ways natural and cultural resource management is an important key guiding principle. As one Rirratjingu elder put it “We need to ensure there is balance between Yolŋu and Njapaki [western] land and sea management and that Njapaki work does not over run Yolŋu ideas.” (Dhimurru 2015)

The Dhimurru IPA Management Plan (2015) provides some very clear guidance about future research processes and directions. One of the guiding principles is collaborative relationships – continued development of collaborative relationships with government agencies and other organisations in programs and research to support sustainable use and management of Yolŋu land and seas.

“From inception, Dhimurru has steadily developed its capacity and participation in research to support land and sea management objectives. In collaboration with university and government agency researchers, we have undertaken many successful collaborative research projects through our ‘both-ways’ approach to combining Yolŋu and scientific approaches to problem-solving, environmental understanding and policy development.”

While Dhimurru are keen to focus on collaborative research that directly supports their identified management priorities, they will also consider approaches from researchers who wish to undertake projects involving Dhimurru IPA and its cultural and natural resources. The proposed research activity:

- should align with national policy directions and guidelines;
- be consistent with Dhimurru’s Research Protocols;
- comply with Australian guidelines for the conduct of ethical research involving indigenous people;
- contribute to the understanding and/or protection of the cultural or natural heritage of Dhimurru IPA; and
- contribute to training and capacity-building of Dhimurru staff and Yolŋu people.

Anindilyakwa traditional owners support research projects that aim to address knowledge gaps and inform the management of the IPA marine zone. They have a research application available (Appendix 1) to assist people/organisations to put their proposal forward. In the IPA monitoring and evaluation framework there is a target of 2 environmental research projects (terrestrial and/or marine) to be supported by the ALC LSM Unit, and 30 days participation in projects with researchers/other land managers. Such projects must meet a number of criteria:

- respect Anindilyakwa culture and traditional rights to natural and cultural resources; benefit and appropriately acknowledge the contributions of traditional owners;
- recognise the rights of Anindilyakwa traditional owners to their cultural and intellectual property;
- provide information that can inform management activities undertaken by the ALC Rangers;
- and provide opportunities for ALC Rangers to participate and gain experience and skills.

The Tiwi Land Council have also developed a process for considering research projects including a research application to be completed by the organisation and researcher protocols to be signed by individuals involved in on-ground activities (Appendix 2)

As part of the permitting process Parks Australia and the Kakadu Research and Management Advisory Committee have developed research guidelines that outline how Kakadu traditional custodians want to work with researchers. In consultation with the Aboriginal Areas Protection Authority and traditional owners they also intend to develop Indigenous research protocols designed to ensure that research:

- incorporates traditional custodians' knowledge and perspectives;
- reflects consultation with traditional custodians depending on expected level of impact;
- engages with and provides opportunities for collaboration with and employment for traditional custodians; and
- is in accordance with the EPBC Act and the management plan.

Summary table

Species /group	Significance/nature of interest	Identified issues/pressures	Some possible research questions	Relevant IPA's/communities
Dugong	<p>Powerful cultural affiliations for the majority of groups</p> <p>Customary resource for many groups</p> <p>Indicator of ecosystem health</p>	<p>Overall reduction in numbers</p> <p>Impact of customary harvest (actual, potential and perceived)</p> <p>Resilience to harvest</p> <p>Unhealthy animals observed (underweight, unusual fat colour)</p> <p>Impacts of pollution (marine & terrestrial origin) on animal health and on primary food (seagrass)</p> <p>Non-target mortality including commercial fishery bycatch, ghostnets, and commercial and recreational boat strike</p> <p>Application of traditional law for managing customary harvest</p>	<p>Broad scale investigation of population status and dynamics,</p> <p>Development of local survey methods,</p> <p>Possible impacts of chemical pollutants on animal health,</p> <p>Impacts of pollution (chemical and sedimentation) on seagrass food source</p> <p>Bycatch levels and mitigation methods</p>	<p>Anindilyakwa</p> <p>Cobourg</p> <p>Dhimurru</p> <p>Djelk</p> <p>Mapoon</p> <p>Marthakal</p> <p>Nijinda Durlga</p> <p>Thuwathu/Bujimulla</p> <p>Yanyuwa</p> <p>Also important in adjacent regions of the Torres Strait and the Kimberley</p>
Marine turtles	<p>Powerful cultural affiliations for majority of groups</p> <p>Customary resource (eggs & adults) for most groups</p> <p>Indicator of ecosystem health</p> <p>Interest in conservation status</p>	<p>Overall reduction in numbers</p> <p>Impact of customary harvest of adults and eggs (actual, potential and perceived)</p> <p>Resilience to harvest</p> <p>Unhealthy animals observed (floaters, fibropapilloma)</p>	<p>Broad scale investigation of population status and dynamics</p> <p>Causes of diseases and illness</p> <p>Possible impacts of chemical pollutants on animal health</p> <p>Ongoing impacts of marine debris and ghostnet</p>	<p>Anindilyakwa</p> <p>Apudthama</p> <p>Cobourg</p> <p>Dhimurru</p> <p>Djelk</p> <p>Kowanyama</p> <p>Mapoon</p> <p>Napranum</p>

		<p>Impacts of pollution (marine & terrestrial origin) on animal health and on primary food (seagrass)</p> <p>Non-target mortality including commercial fishery bycatch, ghostnets, commercial and recreational boat strike</p> <p>Feral animal impacts on nesting success</p> <p>Climate change (sea level rise affecting nesting)</p> <p>Light pollution affecting nesting</p> <p>Application of traditional law</p>	<p>Impacts of pollution (chemical & sedimentation) on seagrass food source</p> <p>Bycatch levels and mitigation methods</p> <p>Nesting success: predation rates & mitigation methods, sea level rise, incubation temp, light pollution</p> <p>Customary harvest surveys</p>	<p>Nijinda Durlga</p> <p>Pormpuraaw</p> <p>Tiwi</p> <p>Thuwathu/Bujimulla</p> <p>Yanyuwa</p> <p>Yirralka (Laynhapuy)</p> <p>Also important in adjacent regions of the Torres Strait and the Kimberley</p>
Cetaceans	<p>Dolphins totemic in one region (was also historically a customary resource)</p> <p>Whale an ancestral being</p> <p>Interest in conservation status</p>	<p>Possible bycatch issues (commercial & illegal fishers)</p> <p>Boat strike</p>	<p>Bycatch levels and mitigation methods</p>	<p>Anindilyakwa</p> <p>Dhimurru</p>
Sawfish Sharks Rays	<p>Powerful cultural affiliations for some</p> <p>Common customary resource (mainly rays and sharks)</p> <p>Interest in conservation status</p>	<p>Observed reduction in number of rays and Sawfish</p> <p>Commercial fishery bycatch</p>	<p>Population surveys</p> <p>Investigate lifecycle</p> <p>Investigate causes of population reduction</p> <p>Fishery interactions</p> <p>Habitat quality</p>	<p>Anindilyakwa</p> <p>Arnhem/Kakadu</p> <p>Dhimurru</p> <p>Malak Malak</p> <p>Nijinda Durlga</p> <p>Thuwathu/Bujimulla</p> <p>Yanyuwa</p>
Shorebirds	<p>Indicator of healthy beaches</p> <p>Interest in conservation status</p>	<p>Nest mortality (vehicle impacts)</p>	<p>Population surveys</p> <p>Climate change impacts on habitat availability</p>	<p>Djelk</p> <p>Mapoon</p> <p>Napranum</p>

				Kakadu Thuwathu/Bujimulla
Seabirds	Some species totemic Former customary resource (food & ceremonial items) Indicators of healthy sea country Interest in conservation status	Commercial bycatch Local harvest of eggs Nest mortality (vehicle impacts)	Fishery interactions & mitigation methods Population surveys Interaction between feral numbers and crocodiles Impacts of egg harvest	Anindilyakwa Djelk Yanyuwa
Crocodiles	Powerful cultural affiliations for some Eggs a resource for ILM enterprise	Increasing numbers and expanded range (since cessation of widespread culling) Egg harvest Climate change impact on nesting		Djelk Dhimurru
Sea snakes	Powerful cultural affiliations for two groups			Anindilyakwa Yanyuwa

Conclusion and next steps

This work focuses on EPBC Act listed species and related issues, and shows that many of the species accorded this formal significance are also of great importance to Indigenous people. Although the motivations and criteria for assigning significance may be different, there is certainly a strongly shared commitment to ensure that they continue to define north Australian seascapes and maintain their spiritual and instrumental value to Australian society. The research interests identified by Indigenous people reflect the powerful obligations they accept as custodians of country and the lifeforms and ancestors depending on their management of country.

Research “hotspots” may be identified in many ways, potentially as simple as taking a list of EPBC Act listed species about which multiple Indigenous groups express interest and concern and selecting some sites where those species are abundant and thought to be subject to a known pressure. However, such an approach would not necessarily deliver strong Indigenous engagement/ participation nor the “seascape approach”, which would not be plausible without the participation of the Indigenous owners of critical elements of seascapes.

Lists of the favoured - by definition - also exclude. For example, uncritical application of lists may devalue the apparent relevance of the knowledge, interests and particular cultural responsibilities of traditional owners and/or authoritative managers of putative hotspots. If genuine Indigenous engagement is to be achieved, this and related issues must influence how research questions are framed, site and species selections are made, would-be collaborators are identified and real benefits generated by participation.

Within limited scope, this desktop assessment has sought identification and comments about EPBC Act listed migratory and threatened marine species evident in marine management and IPA plans etc and importantly, to hint at the perspectives from which these species particularly are ascribed value and meaning. The latter broadens the opportunity for useful engagement around research, management and monitoring over the long term.

We propose that in the second, consultative phase of this study, known concerns as documented in this report are further explored to deal with both the ‘right’ engagement and ‘seascape’ issues. This will involve discussions around questions like:

- what other animals or places are affected by the pressures you think are affecting (listed species x, y, z)
- will these species show effects before or after (listed species y, z)?
- what will happen to them?
- if you watched these animals closely, would they give you warning of problems coming for others, including (listed species y, z)?

- management actions so far identified to help protect (listed species y, z) are (actions a, b)
- will those actions also help (unlisted) species that you are worried about?
- are there other actions that would help them as well other (unlisted) species of concern?
- if you had to choose one or a few actions that would help the most species, what would they be?
 - how would you know whether they were working?

- are there places with many (listed species x, y, z) where management is good and pressures not too bad?

- what do we need to do to keep them that way?
- are there places where numbers of (listed species y, z) are good but there are signs or recent changes that worry you
- are there places where the numbers of (listed species y, z) aren't all that high but are still really important?
 - what needs to be done to look after these places?
- because some of these (listed species y, z) move into and out of your country, how will you work with others to make sure they are looked after in all the places they need?
- do you know enough about where they go and what they need in other places?
 - what additional information about movements do you think would be most useful?

The aim in this further work and final report will be to build on the demonstration of shared interests to support design for optimising opportunities and effectiveness in collaborative research programs that addresses both Indigenous and non-Indigenous values.

APPENDIX 1 Anindilyakwa Research application

Anindilyakwa

All environmental researchers must:

- complete an Anindilyakwa IPA Research Application for appraisal by the traditional owners and the ALC LSM Unit staff
- obtain the free, prior and informed consent of relevant traditional owners
- meet the requirements and obligations outlined in their Research Application
- provide feedback to the ALC LSM Unit (and / or traditional owners) regarding the findings of the research.

Anindilyakwa Indigenous Protected Area Research Application

The Anindilyakwa Land and Sea Management (LSM) Unit supports researchers to undertake environmental projects within the Anindilyakwa IPA that:

- respect Anindilyakwa culture and traditional rights to natural and cultural resources
- benefit and appropriately acknowledge the contributions of traditional owners
- recognise the rights of Anindilyakwa traditional owners to their cultural and intellectual property
- provide information which can inform land and / or sea management activities undertaken by the ALC Rangers
- provide opportunities for ALC Rangers to participate and gain experience and skills.

Researchers must obtain, through the ALC LSM Unit, the free, prior and informed consent of relevant traditional owners and communities before undertaking any project within the Anindilyakwa IPA. Representatives from the LSM Unit will use the information disclosed in the Research Application Form to identify and consult with traditional owners.

Additional requirements should your application be approved:

- attend a full day Groote Eylandt Cultural Induction
- make appropriate arrangements with LSM Unit for ranger/s, traditional owner/s and/or relevant ALC staff to accompany you during fieldwork
- discuss major changes to the methodology, which arise throughout the duration of the project, with the LSM Unit
- provide traditional owners and the LSM Unit with:
 - a copy of any publication, results or reports arising from the research
 - a plain English report (picture book) outlining the outcomes of the project
 - feedback throughout, and at the completion of, the project.

Methodology

Please provide details of the methodology of the project. This should include: target species, fauna and flora survey/sampling methodology, firearm or poison use and any plans to undertake

bioprospecting activities.

Has the project received approval from an authorized ethics committee?

Will this research affect the physical environment? If so, how do you plan to mitigate these impacts?

Will you visit any communities during the research? If so, please list which communities and how

often you anticipate visiting each community.

Logistics

What transportation arrangements will you make for your time on the island?

Do you require any logistical (or other) support from the ALSM unit?

Aboriginal culture and intellectual property rights

Does the project seek to use local indigenous knowledge? If so, how will you ensure indigenous knowledge gathered during the project remains confidential? What provisions in the research proposal ensure Aboriginal cultural and intellectual property rights are protected?

Do you plan to include photography, film, sound recording or other forms of media as part of your project?

Do you intend to use flora or fauna genetic material?

Dissemination of research outcomes

Please provide details of how you plan to present the progress and outcomes of the project to traditional owners and the ALSM unit.

Aboriginal participation

How do you propose to engage traditional landowners in this project?

Does your project require the knowledge and participation of traditional owners? If so, how will individuals be compensated for their services?

What types of monetary or non-monetary benefits will be provided to the communities/traditional owners for the use of their land, waters or knowledge? (e.g. skills and training, awareness and education, capacity development).

Does your research provide opportunities for ranger skill/knowledge development?

How will the research outcomes inform land and/or sea management activities undertaken within

the Anindilyakwa IPA?

Please attach any other relevant information about your project that has not been covered above

APPENDIX 2 Tiwi Islands Research application & protocols

RESEARCH ACCESS AGREEMENT

BETWEEN: TIWI LAND COUNCIL, a Statutory Authority of the Commonwealth of Australia at PO Box 38545 WINELLIE NT 0821
(the Council)

AND: [NAME & ADDRESS]
(the Proponent)

RECITALS:

A. The Council is the legal representative of the landowners of Bathurst and Melville Island (**the Tiwi Landowners**) established for the purpose of that representation and for the protection of the rights and interests of the Tiwi Landowners and their property.

B. The Proponent has been engaged or requested access to the Tiwi Landowners and certain parts of Bathurst and Melville Island in order to

.....
(the Project).

C. The Council has agreed, for itself and on behalf of the Tiwi Landowners, to permit the Proponent to enter and have access to certain parts of Bathurst and Melville Islands subject to this Agreement for the purposes described in Clause 1.1 (**the Permitted Purpose**).

1. PERMITTED PURPOSE:

1.1 The Council agrees to permit the Proponent to enter and have access to Bathurst and Melville Islands and the Tiwi Landowners for the purposes of the Project to:

- i) ii)
- iii)
- iv)
- v)

1.2 The Proponent agrees to:

i) submit to the Council a list of all of its employees, members and invitees who will access the Tiwi Landowners and parts of Bathurst and Melville Islands for the Permitted Purpose; and

ii) Acquire an official permit for the Permitted Purpose, and for the duration of that purpose.

1.3 Unless otherwise agreed in writing, the Proponent agrees to meet agreed costs of transport, accommodation and any associated costs that may be incurred in undertaking the Permitted Purpose whilst entering or utilising Bathurst and Melville Islands.

1.4 This Agreement grants no personal releases of any directors, employees, agents or contractors of the Council or the Tiwi Landowners they represent and it is the sole responsibility of the Proponent to obtain the relevant releases from all persons consulted for advice or depicted in any image taken by the Proponent on or in the vicinity of Bathurst and Melville Islands.

2. COLLABORATION:

2.1 The Proponent agrees that the Project will be undertaken as a collaborative project between the Proponent and the Council, unless directed otherwise in writing by the Council.

2.2 The Council will provide details to the Proponent prior to the commencement of the Project the required level of collaboration.

3. CONSIDERATION:

In consideration of the rights granted by the Council under this Agreement, the Proponent must:

3.1 Provide the Council, as soon as practicable after publication, with four copies of any printed record (book, magazine or newspaper) containing any depiction or account of the Council property or its use.

3.2 Grant to the Council a royalty-free, non-exclusive licence to use, in perpetuity, any visual images produced as a result of the Permitted Purpose for its own purposes save that none of these purposes shall be commercial purposes.

3.3 In any printed publication or in any medium containing any image or account of the Council property, Tiwi Landowners or their use, the Proponent warrants that it will ensure the Council receives a billing credit by referring to the Council as *'Tiwi Land Council and Landowners'*.

4. FURTHER CONSENTS RELEASE:

4.1 The Proponent warrants that it will undertake that work described in Recital B and for that purpose as described in Clause 1.1 (*permitted purpose*) and for no other purpose, and further that it will not on-sell or in any other manner apply any product arising out of the Permitted Purpose without the consent, first obtained in writing by the Council.

5. INTELLECTUAL PROPERTY:

5.1 Intellectual property in all material produced under or in accordance with the terms of this Agreement including, but not limited to, reports, technical information, drawings or maps, calculations, tables, schedules and any other data created in the course of the Project, will be freely shared amongst the parties both of which shall have the non-exclusive right to use such material for any purpose directly related to the Permitted Purpose.

5.2 Clause 5.1 does not affect rights or ownership in any intellectual property in existence prior to the commencement of this Agreement.

5.3 Each party warrants that any intellectual property in existence prior to the commencement of this Agreement embodied in or used in connection with the Agreement is the property of the Party or the Party is legally entitled to use the same for the Permitted Purpose.

5.4 Each party grants to the other party a permanent, irrevocable, free, world-wide, non-exclusive licence (including the right of sub-licence) to use, reproduce, adapt and exploit any intellectual property in existence prior to the commencement of this Agreement which is made available in connection with the Project for any purpose directly related to the Permitted Purpose.

5.5 The Proponent will not use or allow the use of any intellectual property in existence prior to the commencement of this Agreement, or any part of the intellectual property in existence prior to the commencement in this Agreement, in a manner contrary to or in conflict with the title or interest of the Council.

5.6 This clause survives the expiration or earlier termination of this Agreement.

6. DATA SHARING:

6.1 All data produced under or in accordance with the terms of this Agreement, including data created in the course of the Project, will be freely shared amongst the parties, each of which shall have the non-exclusive right to use the data for any purpose directly related to the Permitted Purpose.

6.2 Clause 6.1 does not affect rights or ownership in any data in existence prior to the commencement of this Agreement.

6.3 Each party warrants that any data in existence prior to the commencement of this Agreement embodied in or used in connection with the Agreement is the sole property of the Party or the Party is legally entitled to use the same for the Permitted Purpose.

6.4 Each party grants to the other party a permanent, irrevocable, free, world-wide, non-exclusive licence (including the right of sub-licence) to use, reproduce, adapt and exploit any data in existence prior to the commencement of this Agreement which is made available in connection with the Project for any purpose directly related to the Permitted Purpose.

6.5 The Proponent will not use or allow the use of any data in existence prior to the commencement of this Agreement or any part of any data in existence prior to the commencement of this Agreement in a manner contrary to or in conflict with the title or interest of the Council.

6.6 This clause survives the expiration or earlier termination of this Agreement.

7. CONFIDENTIALITY:

7.1 Subject to Clause 7.4, all information received or otherwise acquired by one Party from the other Party in the course of performing the Permitted Purpose is deemed to be confidential information.

7.2 Except as permitted or required by this Agreement, each of the Parties must not at any time divulge or allow to be divulged to any person any confidential information of the other Party, other than to those persons to whom the other Party has given written permission to divulge such confidential information or in the proper course of the Permitted Purpose.

7.3 The Parties acknowledge the confidential nature of the terms and conditions of this Agreement and agree to treat the terms and conditions of this Agreement as confidential.

7.4 The obligations of confidentiality in clause 7.2 does not apply to any information that:

7.4.1 is or becomes generally available to the public (other than by reason of a breach of this Agreement); or

7.4.2 is required to be disclosed by any applicable law; or

7.4.3 was known to the recipient party at the time of disclosure by the disclosing party or which was independently developed by the recipient party without having access to the disclosing party's confidential information;

7.5 This clause survives the expiration or earlier termination of this Agreement.

8. INDEMNITY:

8.1 Subject to clause 8.2 the Proponent releases to the full extent permitted by the law, the Council and its employees, agents, contractors and invitees from all responsibility or liability for loss of or damage to any property, or injury or death to any person arising out of any involvement (negligent or otherwise) of the Proponent pursuant to this Agreement.

8.2 The Proponent is not liable to the Council or to any other person for:

8.2.1 any losses or damages of any kind that are indirectly or directly caused by or contributed to or result from any wrongful, wilful or negligent act or omission of the Council or any of its officers, employees, agents or contractors and invitees; and

8.2.2 any indirect, incidental, special or consequential damages, including loss of profits or anticipated profits, even if notified of the possibility of that potential loss or damage.

8.3 This indemnity extends to and includes all costs, damages and expenses reasonably incurred by the Council in defending such action, proceeding, claim or demand.

8.4 Subject to this clause 8, the maximum aggregate liability of the Council for all proven losses, damages or claims arising out of this Agreement, is limited to the amount actually recovered by the Council under applicable insurance policies.

9. ENTIRE AGREEMENT AND VARIATION:

9.1 This Agreement constitutes the entire agreement between the Council and the Proponent as to its subject matter.

9.2 And in relation to that subject matter, supersedes any prior understanding or Agreement between the Council and the Proponent and any prior warranty or representation given or made by either to the other.

9.3 And may only be amended in writing signed by both the Council and the Proponent.

10. NO ASSIGNMENT:

10.1 The Proponent may not assign its rights or transfer its obligations under this Agreement unless with prior written consent of the Council.

11. APPLICABLE LAW:

11.1 This Agreement is governed by the laws applicable in the Northern Territory of Australia and each party submits to the non-exclusive jurisdiction of the Courts of the Northern Territory.

11.2 The undersigned signatories represent and warrant that they are empowered to execute this Agreement for the Council and the Proponent respectively.

IN WITNESS WHEREOF, the parties have hereunto set their names and signatures:

This.....day of.....20

TIWI LAND COUNCIL:

.....Chairman

.....Executive Member

.....Witness

[PROPONENT]:

.....Officer

.....Witness

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