Niiwalarra Islands (Sir Graham Moore Islands) National Park and Lesueur Island Nature Reserve

Joint management plan 2019

Management plan 93

GOVERNMENT OF WESTERN AUSTRALIA

Conservation and Parks Commission

Department of **Biodiversity, Conservation and Attractions**

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WARNING: This plan may show photographs of, and refer to quotations from people who have passed away.

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NB: The spelling of some of the words for country, and species of plants and animals in language are different in various documents. This is primarily due to the fact that establishing a formal and consistent 'sounds for spelling' system for a language that did not have a written form takes time to develop and refine.

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Front cover photos:

Top left: *Niiwalarra*. Photo – Grace Patorniti/DBCA
Top right: *Niiwalarra* (front), Geranium islands (middle) and *Niiwalarra* (back). Photo – Jennifer Munro/DBCA
Bottom left: *Niiwalarra* (front), Kim Island (middle) and *Neawangu* (back). Photo – Grace Patorniti/DBCA
Bottom right: Lesueur Island. Photo – Ben Broady Photography
Main: *Niiwalarra*. Photo – Grace Patorniti/DBCA

This document is available in alternative formats on request.

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Contents

1. Introduction

Western Australia's vast Kimberley region is spectacular and world-renowned; a region set in rugged and remote landscapes. The area faces significant and immediate threats such as unmanaged fire, unregulated access, weeds and introduced animals, and mitigating these threats is critical to the protection of its cultural and natural values.

Located along the north Kimberley's rugged coastline are the *Niiwalarra* islands (Sir Graham Moore islands), which are exceptional for their cultural connection for local Aboriginal people, high biodiversity values and relatively undisturbed landscape; and Lesueur Island, which is important for its habitat for seabird nesting and its fringing reef. The remoteness of the islands helps in protecting the unique and mostly intact ecosystems, but also poses a challenge for access and undertaking management operations.

This management plan for the *Niiwalarra* Islands National Park and Lesueur Island Nature Reserve (also referred to as 'the planning area' or 'the islands'), provides management direction and guidance for the planning area. The management plan was prepared by the Conservation and Parks Commission (the Commission) and Balanggarra Aboriginal Corporation (BAC), through the Department of Biodiversity, Conservation and Attractions (DBCA or the department).

The islands lie within the Balanggarra Traditional Owners' country for which they have continuing rights and responsibilities. Balanggarra means 'one mob together for country' (Vigilante *et al.* 2013). Balanggarra country comprises four distinct land groups. Land group 1 is associated with Kwini people and encompasses the planning area. Kwini people hold cultural authority to speak for the planning area.

> *"Land group 1, Kwini people, are the people who talk Belaa, that's their language. [They are] the only people who can talk for this country"*
> [Matthew Waina]

The islands are to be jointly managed with traditional owners (see the section **Joint management**).

1.1 Management plan area

Niiwalarra islands and Lesueur Island are located off the coast of the Kimberley region of Western Australia and cover an area of about 3,200ha.

The *Niiwalarra* islands are unallocated Crown land and are located north of Anjo Peninsula, at the northern end of Napier Broome Bay. They are situated about 40km north of Kalumburu; and comprise the following islands, landward of high water mark (**Map 1**):

- *Niiwalarra* Island (Sir Graham Moore Island)
- *Neawangu* Island (Scorpion Island)
- Kim Island
- Geranium Islands (consists of three islands)

These islands are collectively referred to as '*Niiwalarra* islands' throughout the document. Where the term '*Niiwalarra* Island' is used singularly it refers to the main *Niiwalarra* Island only.

Lesueur Island is located about 12km off the coast, north-north-west of Koolama Bay at the mouth of King George River (**Map 1**). Lesueur Island (Crown Reserve 44678) extends to low water mark. It also comprises Crown Reserve 44677 (0.11ha) vested in the Commission, for 'Conservation, Navigation, Communication, Meteorology and Survey' (Conservation Commission of WA 2009).

Niiwalarra Island and *Neawangu* Island are the traditional Kwini (also known as Belaa language group) names for the islands formerly known as Sir Graham Moore Island and Scorpion Island, respectively. No traditional names are documented for Lesueur Island, Kim Island or the Geranium Islands.

Table 1 outlines the islands that form the planning area.

Table 1: Areas of proposed *Niiwalarra* Islands National Park and Lesueur Island Nature Reserve

Park name / tenure	Reserve number/ identifier	Existing purpose	Existing vesting	Class	Area (ha)^
Niiwalarra Island / UCL	PIN 639667	N/A	N/A	N/A	2,770
Neawangu Island / UCL	PIN 639674	N/A	N/A	N/A	346
Kim Island / UCL	PIN 639672	N/A	N/A	N/A	29
Geranium Islands / UCL	PINs 639671, 639668, 1261097	N/A	N/A	N/A	19
Lesueur Island / Crown reserve	R44678 and R44677	Conservation of flora and fauna	Conservation and Parks Commission	A	72
Total					**3,236**

^ Approximate area

The islands are also located within the boundaries of the North Kimberley Marine Park, an area of approximately 1,845,00ha, extending from York Sound in the west, around Cape Londonderry to the Western Australian/Northern Territory border. The marine park extends from the mainland high water mark to the limit of the State coastal waters (DPaW 2016). The marine areas surrounding the [*Niiwalarra* islands] and Lesueur Island are zoned for recreation and conservation within the 'Sir Graham Moore Islands' and the 'King George River' Special Purpose Zones, respectively (DPaW 2016).

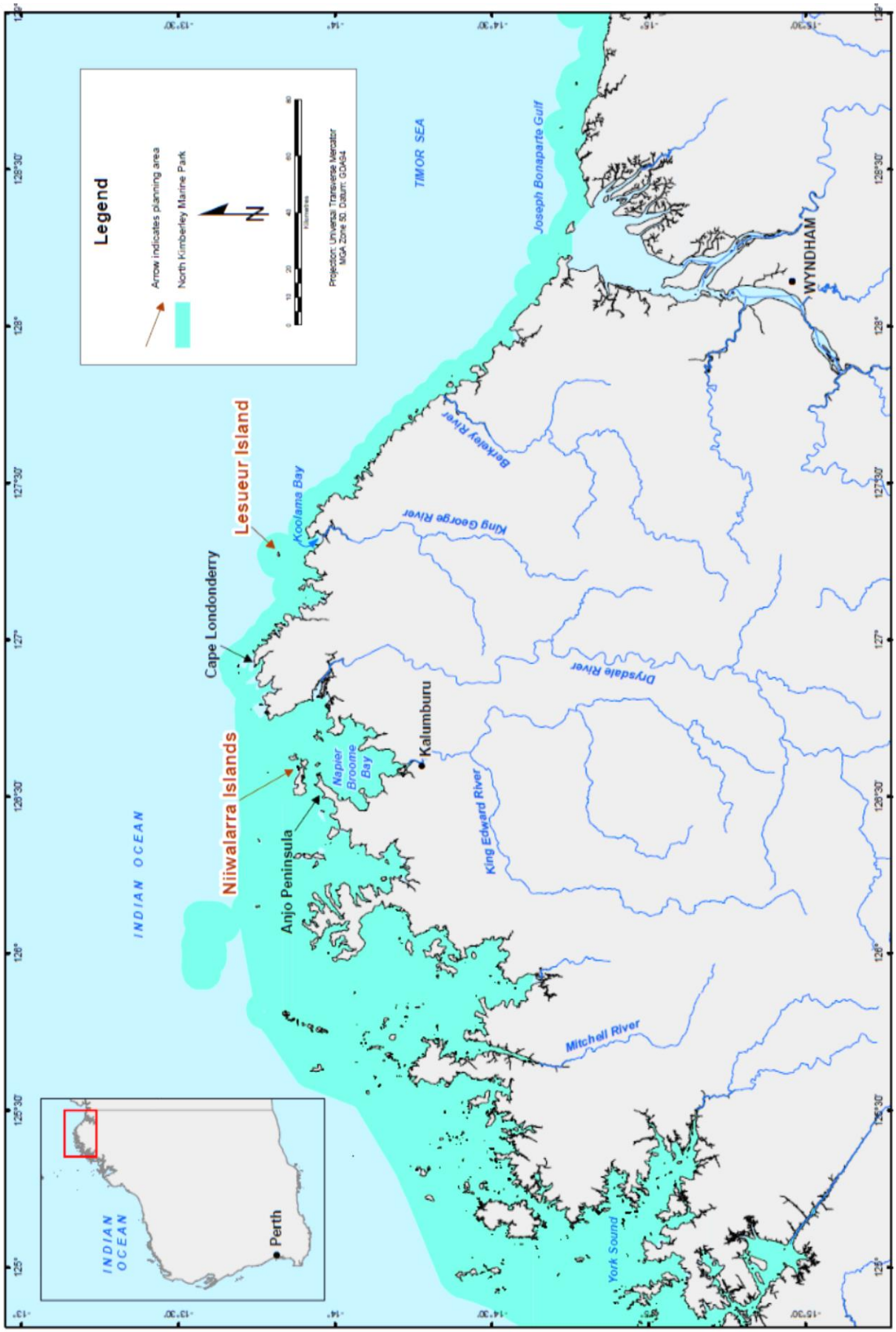
The story of Scorpion Island splitting apart from Sir Graham Moore Island

*"[*Niiwalarra*] and [*Neawangu*] islands used to be one big island, [until] a shooting star fell and cut it in half. Two brothers were fighting over a wife, on the one big island. The younger brother fell in love with his older brother's wife. Them two was fighting for that wife and the older brother killed the younger brother, the one who wanted his wife.*

A maband [witchdoctor] came and he saw those two brothers on the island arguing for the one woman. He said to those two brothers, 'you two better be careful', but they still fought for the one woman. Then he [the older brother] killed his brother. The witchdoctor came back, said 'you've been naughty, I'm sending a shooting star to cut the island in half. You're not coming [back] to the mainland ever, you are to stay on the island until you die'"

[Story recounted by Agnes Charles]

Map 1: *Niiwalarra* Islands and Lesueur Island: Locality map



In order to validly create the *Niiwalarra* Islands National Park, an Indigenous Land Use Agreement (ILUA) between the State and BAC has been executed and registered, as required under the *Native Title Act 1993 (Cth)* (see the section **Native title**). The creation of the national park will provide security of tenure[1] and contribute to a comprehensive, adequate and representative reserve system. The proposed *Niiwalarra* Islands National Park (to be a class 'A' national park) and the existing Lesueur Island Nature Reserve will be jointly vested in BAC and the Commission.

The planning area is currently managed according to the *Healthy Country Plan*[2] as part of the Balanggarra Indigenous Protected Area (IPA), although the remote location of the islands means that visitation by traditional owners and management actions have been limited to date. The Balanggarra IPA covers about 2.6 million hectares of land and sea country with the *Niiwalarra* islands and Lesueur Island being in the northern part of Balanggarra known as 'blue water' country (the southern part is 'brown water' country) (DoE 2013).

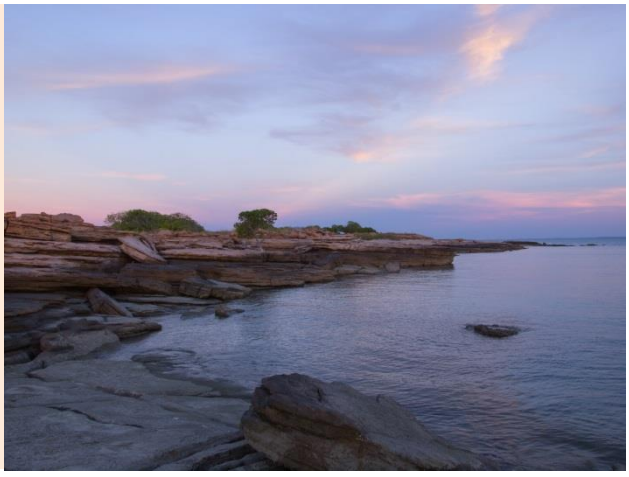
The planning area will be provided protection under the *Conservation and Land Management Act 1984* (CALM Act), with the management plan providing a joint management framework to conserve and protect the values of the planning area. It will build on the work already undertaken by DBCA staff and the Balanggarra community, in particular the *Healthy Country Plan*.

The *Niiwalarra* islands and Lesueur Island are nationally important as part of the naturally and culturally significant North Kimberley National Biodiversity Hotspot and West Kimberley National Heritage Area.

1.2 Vision and strategic objectives

Vision

To jointly manage the islands to protect and learn about Kwini cultural and natural heritage for the benefit of traditional owners, future Kwini generations and visitors, and to support ongoing connections to country.



Niiwalarra Island. Photo – Sean McGee/DBCA

[1] Security of tenure reflects the level of approval required to reduce the area or purpose of a reserve. Excision of areas greater than one hectare or 5% of the total area from class 'A' reserves requires the agreement of both Houses of Parliament.

[2] The term '*Healthy Country Plan*' is used throughout this document to refer to the *Balanggarra Healthy Country Plan 2012-2022* (Balanggarra Aboriginal Corporation and Kimberley Land Council 2011).

Strategic objectives

The following strategic objectives provide the overarching direction for management of the planning area and link to the key values:

- To protect and conserve biodiversity and ecological integrity.
- To protect and conserve the cultural heritage values of Balanggarra country.
- To increase understanding of the values of the planning area, to guide, adapt and improve management.
- To support tourism experiences for the appreciation of the islands' landscape, and natural, cultural and historical heritage values.

1.3 Key values and management issues

This management plan focuses on the protection of the cultural heritage, natural, and recreation and tourism values for the islands.

The key values and management issues (these are described further in the section **Managing the *Niiwalarra* Islands and Lesueur Island**) are summarised as:

Key values

Cultural heritage values

- *Niiwalarra* Islands (Group)
    - Aboriginal cultural heritage: Significant sites and continuation of customary activities; occupation up to the early 20th century
    - Trepang processing settlements: sites resulting from Southeast Asian and 20th century activities
    - European exploration: islands' histories relate to British (Phillip Parker King 1817-22) voyages of discovery
    - Other Australian heritage: World War II (WWII) history, both Australian and American; Kalumburu mission; soldier settlement schemes.
- Lesueur Island
    - European exploration: island's history relates to French (Nicholas Baudin 1801-04) voyages of discovery
    - Other Australian heritage: lighthouse.

Natural values

- *Niiwalarra* Islands (Group)
    - Islands with natural fire regimes, that is the islands have not been subject to regular, extensive fires that have modified and damaged vegetation and habitat on the mainland
    - Turtle nesting on beaches
    - High bird species richness (*Niiwalarra* Island has the third highest documented bird richness of the Kimberley islands[3])
    - Geologically diverse island (*Niiwalarra* Island) with sandstone, laterite and sand dunes
    - Large area of consolidated coastal dunes on *Niiwalarra* Island and *Neawangu* Island that is uncommon on Kimberley islands
    - A diversity of wetlands (*Niiwalarra* Island) that is uncommon on Kimberley islands
    - Diverse biota resulting from habitat diversity (geology and wetlands).

[3] In total there are 2633 Kimberley islands (Conservation Commission of WA 2010); the third highest bird count of 92 species and the second highest bird count of 95 species at Augustus Island is data recorded from the 2007-2010 bird survey of 24 islands off the north Kimberley coast, which was combined with records from literature and unpublished lists (Pearson *et al.* 2013). The highest count of 116 bird species at Koolan Island is data recorded from separate detailed bird surveys on this island over a ten-year period (McKenzie *et al.* 1995 as cited in Pearson *et al.* 2013).

- Lesueur Island
    - Habitat for periodic, high volume seabird breeding events
    - Turtle nesting on beaches.

Recreation and tourism values

- *Niiwalarra* Island
    - Opportunities for Kwini people to provide a diverse range of cultural and nature-based visitor experiences
    - Remoteness that can provide a unique nature-based visitor experience.

Management issues

- *Niiwalarra* Islands (Group)
    - limited access to the islands to undertake management activities
    - culturally sensitive sites, particularly burial sites, which require culturally appropriate management
    - unregulated access from visitors/recreational boats
    - biodiversity knowledge gaps
    - impacts from weeds
    - potential visitor risk from WWII relics (i.e. old fuel drums and asbestos from WWII infrastructure on *Niiwalarra* Island)
    - potential incursions of introduced animals, including cane toads.
- Lesueur Island
    - limited access to the island to undertake management activities
    - biodiversity knowledge gaps.

The management issues and the potential impacts to the key values are addressed in the management strategies presented throughout the plan. Background text in each section supports and explains the key values, management issues and strategies (also see the section **Performance assessment**).

Lesueur Island. Photo - Ben Broady Photography

2. Management context

This management plan aims to conserve the key values of the planning area in the long-term.

Management plans for national parks seek to provide opportunities for recreation (by members of the public) consistent with the maintenance and restoration of the natural environment, the protection of native plants and animals, and the preservation of any feature of archaeological, historic or scientific interest, as outlined under section 56(1)(c) of the CALM Act. In the case of nature reserves, management plans seek to maintain and restore the natural environment, and to protect, care for, and promote the study of, indigenous flora and fauna, and to preserve any feature of archaeological, historic or scientific interest, as outlined under section 56(1)(d) of the CALM Act. They also have the purpose of 'protecting and conserving the value of the land to the culture and heritage of Aboriginal persons', as described in section 56(2) of the CALM Act.

The management plan provides a summary of operations proposed to be undertaken in the planning area as guided by DBCA and Commission policies and guidelines[4], and the aspirations of traditional owners. This management plan also provides a framework for joint management (see the section **Joint management**) and guidance for operational documents that provide more specific on-ground management direction that allows for adaptive management.

Management will encompass protecting the cultural values across the islands as well as focusing on management issues affecting the natural values. This includes coordinating the management of weeds, introduced animals and visitors in collaboration with traditional owners.

Once finalised, this management plan will guide management of the planning area for 10 years from the date the plan is gazetted. During this time DBCA, together with BAC and the Commission, may amend the plan under section 61 of the CALM Act, with any proposed changes first released for public comment. If the plan is not reviewed and replaced by the end of the 10 year period, it will remain in force until a new plan is approved.

2.1 Native title

The islands lie within the Balanggarra native title determination area. Balanggarra Traditional Owners, of which Kwini people are a subgroup, have determined native title rights and interests over the planning area based on strong and ongoing cultural connections to their land. The Balanggarra native title determination (i.e. *Balanggarra Combined 2013* determination) area, which includes the planning area, covers approximately 26,000km^2 of land and sea in the northern Kimberley region of Western Australia (Kimberley Land Council 2018).

An ILUA is an agreement under the Native Title Act between a native title group and others, about the use and management of land and waters. The Western Australian Government has negotiated an ILUA with the Balanggarra native title holders, which is required to provide the native title consent for the creation of *Niiwalarra* Islands National Park. The creation of the national park will not extinguish native title rights. The CALM Act contains provisions which enable Aboriginal people to undertake Aboriginal customary activities on CALM Act land. Accordingly, native title rights and interests can continue to be exercised by Kwini people in most circumstances unless inconsistent with the Conservation and Land Management Regulations 2002 (CALM Regulations) or the CALM Act. These restrictions are generally limited to key

[4] Departmental policies can be found at: dbca.wa.gov.au/about-us/36-policies-and-legislation. The Conservation and Park Commission's Position Statements can be found at: conservation.wa.gov.au/position-statements.aspx.

health, safety or environmental risks (e.g. there are some restrictions on hunting close to areas such as visitor areas and campgrounds).

This management plan takes into account the values, aspirations and objectives articulated in the *Healthy Country Plan* and discussions between Kwini people and DBCA staff, including a series of on-country meetings within the planning area in 2017 and 2018.

Kwini people and DBCA staff during on-country trip to *Niiwalarra* Island in 2017. Photo - Sean McGee/DBCA

2.2 Joint management

The planning area will be managed by the Woonbalu - North Kimberley Marine Park Joint Management Body (JMB) in accordance with the provisions of the CALM Act, *Biodiversity Conservation Act 2016* (replaces the *Wildlife Conservation Act 1950*), and other relevant legislation mentioned throughout this plan[5]. Joint management will be given effect under the CALM Act through a section 56A Joint Management Agreement (JMA) between BAC and DBCA.

For formal joint management to occur, the management plan requires the Chief Executive Officer of DBCA to jointly manage the planning area with BAC. Formal joint management can commence once the proposed national park has been created and the JMA attached to the management plan is signed. The JMA provides for the establishment of a JMB with representatives from BAC and DBCA. The JMB will be responsible for making decisions about how country is looked after in the context of setting priorities for the implementation of the management plan.

The JMB will oversee management of the islands, make management decisions, provide strategic input into how management strategies are implemented and monitor implementation of the plan. Operational

[5] Relevant legislation can be found on the department's website at: dbca.wa.gov.au/about-us/36-policies-and-legislation or the State Law Publisher website: slp.wa.gov.au.

responsibility will be coordinated by DBCA, utilising Kwini people as casual rangers or direct employees and the existing Balanggarra Rangers under the guidance of the JMB and as agreed in the JMA.

Joint management will enhance the protection of cultural heritage, geology and landforms, native plants and animals and habitats, while allowing culturally appropriate opportunities for recreation and tourism. The joint management framework will also apply to research and monitoring activities and the management of fire, introduced animals and weeds.

Management objective	Management strategies
To ensure the national park and nature reserve have appropriate legal, administrative, financial and human resource frameworks in place so that they are jointly managed with traditional owners.	1. The CEO of the Department of Biodiversity, Conservation and Attractions will jointly manage the islands with the Balanggarra Aboriginal Corporation in accordance with the JMA attached to the management plan.

Key performance indicator		
Decision making		
Performance measure	**Target**	**Reporting**
Ability of Balanggarra Traditional Owners (Kwini people) to make decisions about the management of their country.	Conduct JMB meetings in accordance with the JMA.	Annually

2.3 Administration

DBCA will provide administrative support for the JMB. Under the guidance of the JMB, the department's East Kimberley District will be responsible for coordinating the operational management of the planning area. The regional office in Kununurra and a number of other specialist branches will provide support, direction and assistance.

2.4 Management effectiveness

Management of the planning area will be based on cultural understanding and scientific knowledge. Ongoing research, monitoring and evaluation are important to assess effectiveness of management practices, priority setting and allowing for adaptive management.

Performance assessment

The objectives and strategies define the management direction for the planning area and are complemented by key performance indicators (KPIs). The KPIs have been identified for selected key values and management issues and are presented throughout the plan. The KPIs reflect the highest conservation and management priorities of the Commission, DBCA and joint management partners.

Monitoring and evaluating the outcomes of management strategies and reporting against KPIs allows the implementation of the plan and management effectiveness to be assessed. This outcome-based approach provides a robust framework to support adaptive management of the planning area.

The Commission is responsible for periodic assessment of the implementation this management plan in accordance with section 19(1)(g)(iii) of the CALM Act. Assessment is an important component of an adaptive management framework and can signal where management may need to be altered if it is not successfully meeting management objectives. The JMB, BAC and DBCA will provide information to the Commission to enable the plan's implementation to be assessed. A portfolio of evidence (such as quantitative data, photographs or imagery which show any spatial and temporal changes or other written documents) will be maintained to help demonstrate management implementation and outcomes.

3. Managing the *Niiwalarra* Islands and Lesueur Island

The following sections summarise the proposed management to be undertaken jointly by DBCA and BAC through the JMB. Given the remoteness of the islands, implementing management strategies for the planning area will require careful planning to ensure efficient use of resources.

Management of the planning area will focus on the mitigation of impacts from weeds, introduced animals (i.e. monitoring for new incursions of introduced animals such as cane toads) and unmanaged fires. The other management priority is managing visitor use, including visitor safety and visitor awareness and appreciation of cultural heritage and natural values.

3.1 Kwini cultural heritage values

The *Healthy Country Plan* articulates the importance and values of country to Balanggarra Traditional Owners. It is a key resource for: information about the Balanggarra vision for looking after their country [their *gra*], Balanggarra law and culture, insights into the relationship Balanggarra have with their *gra* and their cultural values.

Bush grapes on *Niiwalarra* Island.
Photo – Grace Patorniti/DBCA

Connection to country means they have responsibility to look after country. Some plants and animals are especially important to traditional owners, and their presence in the planning area and wider Balanggarra country is one indicator of the cultural significance of the area. Plant foods identified by Kwini people as being locally important on *Niiwalarra* Island are listed under Table 2. The Vigilante *et al.* (2013) report includes a comprehensive list of edible plant species on 24 islands, including *Niiwalarra* Island, based on ethnoecological literature and species recorded during the Kimberley Islands Biodiversity Survey[6] (See **Appendix 1**).

Table 2: Plants of cultural significance on *Niiwalarra* Island[7]

Language name	Common name (Scientific name)
Kuleyi	green plum *(Buchanania obovata)*
Kukulangi/kulangi	blackberry *(Vitex glabrata)*
Kandala	bush pear *(Persoonia falcata)*
Biijimbul	bush fig (*Ficus aculeata*)
Unknown	bush olives (*Sersalisia sericea*)
Jaburru winya	bush grape (*Ampelocissus acetosa*)
Karnmangku minya	long yam (*Dioscorea transversa*)

[6] *"In December 2006, the Department of Environment and Conservation, in collaboration with the Kimberley Land Council, Western Australian Museum and Australian Museum, commenced a biological survey of [24] selected islands off the north Kimberley coast"* (Gibson 2009), including *Niiwalarra* Island.

[7] Plants of cultural significance as identified by traditional owners during on-country trips in 2018 and from Vigilante *et al.* (2013, Table 2, page 163).

Bush olives on *Niiwalarra* Island. Photos - Grace Patorniti/DBCA

Connection to country

Balanggarra country covers approximately 26,000km^2 of land and sea in the northern Kimberley region of Western Australia. This country has been home to Balanggarra Traditional Owners, of which Kwini people are a subgroup, for many thousands of years.

Kwini people have expressed a desire to visit and camp on-country, including *Niiwalarra* Island, for cultural purposes.

> *"Members of the [Balanggarra] claim group have their own narratives regarding the creation of their country and the source of their laws and customs. These accounts emphasize the ancestral Snake Wunggurr, also called Lu, who created the King George Falls. This ancestral Snake resides at Sir Graham Moore Island and in the adjacent waters of the sea"* (Vigilante *et al.* 2013, page 157).
>
> *"The old people used to tell the story about the Wungkurr[8], the sea serpent, where once upon a time all the islands were joined together as one big island. The islands were [then] formed by the sea serpent thrashing around [when] the shark and the Wungkurr had a fight and split the land. The shark won the fight, and the Wungkurr went up to King George Falls [Oomari] – that's why there's twin falls there. Wungkurr travelled up and went all the way out to the desert. You can see the path from the ridges, the escarpment heading out to the desert"*
> [Recounted by Clement Maraltadj]

Niiwalarra Island had permanent water, a freshwater pool on its north side with waterlilies and seepage on the southern side, and rich resources (Vigilante *et al.* 2013) - the freshwater pool is now brackish and waterlilies are replaced by mangroves. These resources supported a semi-permanent population, which were associated with a particular clan group (Crawford 1983).

[8] Spellings of the ancestral snake differ. Wungkurr is taken from the most recent Belaa language resource, Cheinmora *et al.* (2018).

"There was a family group of adults and children, different skin groups living in the wrong way. A maband man [witchdoctor] came travelling inland, looking for water to fill his baler shell. He found the family group living with the wrong skin and punished them. The maband man hit a boab tree and worms came out, killing them [adults]. One woman and the children were spared. The maband hit a stone next to the boab tree and water came out. That's the spring"
[Recounted by Clement Maraltadj, Bernadette Waina and Dorothy Djanghara]

There has been no documented historical or contemporary cultural connection to Lesueur Island, most likely due to its remoteness.

Significant Law and cultural sites

There has been little historical archaeological research undertaken on the islands. Archaeological research has shown there is ongoing occupation of the Kimberley from the Pleistocene onwards (O'Connor *et al.* 2014) and with changing sea levels (Lambeck *et al.* 2014) these islands have emerged subsequent to the Last Glacial Maximum (the most recent glacial period), and consequently have the potential to provide information on how use of these places has changed with islandisation. Stone structures recorded on these islands were analysed by Benson-Lidholm (1983) as part of an honours thesis; however more comprehensive archaeological research of all cultural sites is needed here.

Some sites of cultural importance in the planning area have been recorded; however this work needs to continue. Recording the location of sites allows traditional owners to maintain and manage them, and to connect to country and to their ancestors.

Some places hold special significance for Kwini people. These sites, which offer a unique sense of place, include stone arrangements, burial sites and shell middens.

Niiwalarra islands is a registered Aboriginal site (Name: Sir Graham Moore Islands, ID: 14797 and 14798), being a place assessed as meeting the criteria for section 5 of the *Aboriginal Heritage Act 1972*. Any impacts to the site will need to be managed under section 16 (if there is any ground disturbance) or section 18 of the Act. There may be other sites to which the *Aboriginal Heritage Act* applies that are not on the Register of Aboriginal sites, as all Aboriginal sites are protected under the Act, whether they are registered or not. It is an offence to alter an Aboriginal site unless permission is granted in accordance with the Act.

Niiwalarra Island is known as an area of cultural importance, and a number of occupation and ceremonial sites are to be expected given the island's significance to Kwini people. Documented sites include:

- burial sites
- important freshwater place
- stone arrangements
- significant shell middens.

Kwini people request that anyone who comes across a suspected cultural site act in a respectful manner, take no photos and leave the site untouched (e.g. objects not to be touched, picked up or moved).

Cultural sites may be impacted by weeds, vandalism or damage from visitors (e.g. disturbing human remains). Management of these issues is described in the following sections of the management plan. Information on visiting cultural sites is provided under the section **Visitor experience**.

Customary activities, and native title rights and interests

Undertaking customary activities and traditional practices on country is central to maintaining the cultural heritage of the land and connections to it. Customary activities, which will continue once the national park is created, include hunting for turtle, collecting turtle eggs and spearing. These activities are currently restricted due to limited access. Kwini people aspire to increase visitation to the islands with a concomitant increase in customary activities.

Traditional owners have expressed a desire to increase access to *Niiwalarra* Island so that children from the Kalumburu community can experience on-country trips and undertake customary activities. Customary activities are an important part of Kwini and wider Aboriginal culture, enabling maintenance of traditional relationships and connection with the land and water; sharing of knowledge; engagement in traditional practices; and accessing and looking after significant places.

Gathering during an on-country trip at *Niiwalarra* Island. Photo - Sean McGee/DBCA

The creation of the national park will not extinguish native title rights, which will be able to be exercised by Kwini people in most circumstances. Customary activities must be carried out with due regard to health, safety and environmental issues, and be consistent with this management plan, and relevant legislation (e.g. CALM Regulations) and department policies.[9]

Smoking ceremony during an on-country trip at *Niiwalarra* Island. Photos – Sean McGee/DBCA

[9] For further details see: dbca.wa.gov.au/parks/aboriginal-involvement/92-customary-activities.

Management objective	Management strategies
To conserve and protect cultural sites and support the continuation and strengthening of connection to country and sharing of cultural knowledge.	1. Support Kwini people to undertake cultural planning to record the cultural heritage values of the planning area. 2. Support Kwini people in the management of cultural sites for their protection (e.g. fencing and signage) and maintenance where appropriate. 3. Through the JMB, develop guidelines to ensure cultural heritage values, cultural knowledge, and cultural laws and protocols (where appropriate) inform land management, research and monitoring programs. 4. Apply commercial operator licence conditions to ensure culturally sensitive and appropriate visitation to cultural heritage sites. 5. Identify opportunities to provide employment, business and training for Kwini people on country to assist in maintaining connection to country. 6. Support Kwini people to maintain their connection to, and responsibilities for, the planning area by facilitating the conduct of Aboriginal customary activities, and native title rights and interests.

Key performance indicators		
Culturally sensitive sites and cultural heritage		
Performance measure	**Target**	**Reporting**
Employment and training opportunities (direct and indirect) are generated.	Maintained or increased employment and training opportunities across the planning area.	Annually
Opportunities for traditional owners to visit their country, including for on-country planning meetings, visiting of special sites, and fee-for-service work.	Maintained or increased numbers of Kwini people are able to access their traditional lands.	Annually

3.2 Other heritage

This is a region where there has been little historical archaeological research, although there are historical archaeological studies of the interior of the Kimberley. Archaeological research has focussed on the prehistory of the region (i.e. O'Connor 1987, 1989, 1990, 1993). There are three distinct overlapping phases of regional activity in the historical period, which can be conveniently defined as the past half millennia. These are:

1. Southeast Asian seafarers and trepang harvesters (last few hundred years until 20th century).
2. European exploration and activities (both prior to the foundation of the Swan River colony in 1829, and later in the colonial era).
3. 20th century historical sites including shared Aboriginal and non-Aboriginal heritage.

These phases of occupation have all occurred at *Niiwalarra* Island (and possibly Lesueur Island), which reflects the fact that the islands are distinctive targets for any seaborne visitors to the region.

1. Trepang sites:

One the most poorly understood forms of historical contact with the region occurred from island Southeast Asia. Australia's north coast was the southernmost extremity of a network of maritime trade and travel connecting to Southeast Asia and indirectly the marketplaces of China (Crawford 1968, 1969; McKnight 1972; Powell 2010; Morwood 2002; Morwood and Hobbs 1997:198). Indonesians came on monsoon winds to *Kayu Jawa* (Makassarese name for the Kimberley coast) to harvest pearl and trochus shell, turtle, clam meat, shark fin and the valuable beche-de-mer.

The extent of *Kayu Jawa* remains undefined outside sites in the northern Kimberley (Macknight 2013). Early voyages largely originated from Makassar in southern Sulawesi; however, crews were ethnically diverse, including Bugis, Javanese, Ceramese, Sumbawese and Bajau people. Later vessels came from Kupang in West Timor and the island of Roti. Earlier visits have been hypothesised, but not validated (Fox 1977). Unlike the Kimberley, visits to the Northern Territory are better studied.

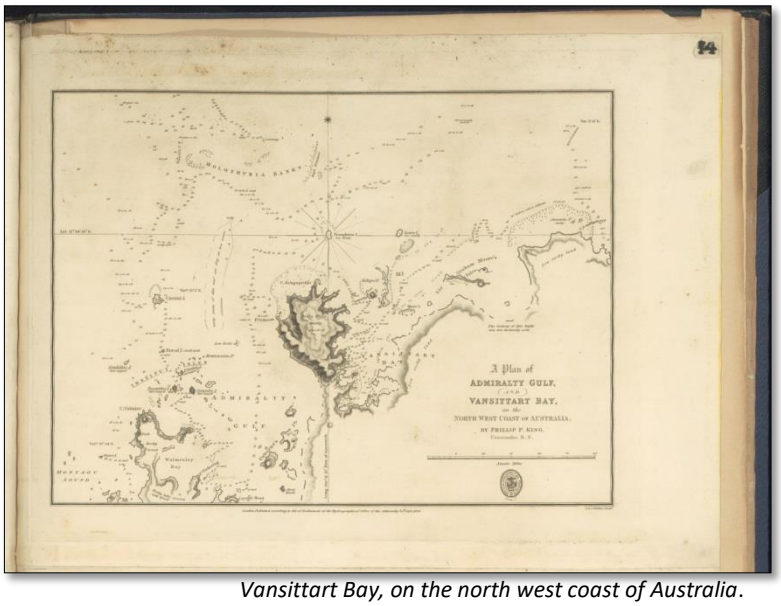
At Vaia Point on *Niiwalarra* Island a series of stone fireplaces indicates trepang processing occurred at two coves, probably with an earlier Indonesian phase and later 20th century presence.

Historical stone fireplace at Vaia Point on *Niiwalarra* Island.
Photo - Alistair Paterson

2. European exploration:

The Western Australian coastline was visited and surveyed from the seventeenth to the nineteenth centuries by the Dutch, French and English (Battye 1912). The Kimberley region's first European visit was by Abel Tasman (1644); then Dampier (1688); later the region was visited by Nicholas Baudin as part of a French expedition in 1801-04 (Burbidge and McKenzie 1978).

From 1817 – 1822 the Kimberley coastline was extensively explored and mapped during four expeditions by Lieutenant Phillip Parker King; the surveys involved the naming of coastal features including naming Sir Graham Moore Island (Battye 1912; Burbidge and McKenzie 1978). The island was originally named in 1819 after Sir Graham Moore, whom was then holding a seat on the English Admiralty Board (Conservation Commission of WA 2010).



Vansittart Bay, on the north west coast of Australia.
Copyright - National Library of Australia (2018)

Lesueur Island is named after Charles-Alexandre Lesueur (1778 –1846) who served as the ship's artist on board Nicolas Baudin's ship, La Géographe (Péron 1824). The Baudin expedition (1801-1804) was mounted by members of the Institut National des Sciences et Arts for 'observation and research relating to Geography and Natural History' (Péron 1824). Baudin's ships Le Geographe and Le Naturaliste sailed with a complement of 24 scientific staff including botanists, zoologists, astronomers, artists and hydrographers including, Louis de Freycinet. Upon reaching Australia, the expedition first sailed up the west coast to Timor before heading to Tasmania and the south eastern coast (Péron 1824). Baudin also encountered Matthew Flinders in the Investigator at Encounter Bay in this race to chart and name the coast of New Holland (Péron 1824).

Baudin then followed the southeast stretch of coast from Lesueur Island to Mount Casuarina but with the wind against him, after a further four days he only got to the entrance of Cambridge Gulf (Péron 1824). The wind continued to prevent him making a landward course and after many days of contending with squalls and heavy seas Baudin elected to head to Timor. This decision was also to preserve the remaining live specimens on board consisting of ten kangaroos, two wombats, four emus and fifty smaller birds (Horner 1987:313). Baudin had intended to return to mapping the northern coast of New Holland but died on the

return journey at Mauritius and the official account of the voyage was entrusted to one of the naturalists, François Péron. Péron wrote the first volume, entitled Voyage de découvertes aux Terres australes, published in 1807. This volume was accompanied by an Atlas of illustrations of Aborigines, native animals and plants drawn by the artists of the expedition, Charles-Alexandre Lesueur and Nicolas-Martin Petit.

3. 20th century history:

Aboriginal people lived on *Niiwalarra* Island well into the 20th century. In 1917 an exploring party visited *Niiwalarra* Island and described about 70 Aboriginal people living there (Stuart 1923:117). Both film and photographs of this expedition were distributed around Australia and the world over subsequent years; the account is significant for revealing that people lived at *Niiwalarra* Island, something of their lifeways and the presence of Indonesian sites.

The first reported European settlement was around 1919 to 1921, when cotton was grown experimentally on *Niiwalarra* Island by WWI ex-servicemen (*Cotton Growing: The Hope of the North* 1923; Hall 1970) (**Map 2**). They planted around four acres; however soon after flowering, the plants died and the project ended - the men then left the island (*Cotton Growing: The Hope of the North* 1923; Hall 1970).

During WWII *Niiwalarra* Island was visited by military personnel from the United States Army Air Force (USAAF) to construct and operate a radio base and towers (LORAN station) (Burbidge and McKenzie 1978; DEE 2018). The LORAN (an acronym for long range navigation) station was established on the north-west corner of *Niiwalarra* Island (**Map 2**) and operated from 1944 until the end of 1945 by USAAF. The USAAF demobilised from the site in late 1945 with Australian military personnel taking over operation of the LORAN station until 1946 (Fenton 1999; Ralph 2003; DEE 2018).

> In November 1946, the Australian naval ship HMAS LST 3008, which was recovering LORAN radio equipment installed on [*Niiwalarra* Island], had to call for medical aid as 30 crew members were suffering from an outbreak of dysentery (*Medical Aid Rushed by Air to Crew of Ship* 1946; *30 Men (Many Sick) Stranded on L.S.T.* 1946).

Using a network of terrestrial transmitting sites, the LORAN radio navigation station gave ships and aircraft the ability to get a fix on their location within a few hundred feet by using the difference in the timing of two or more signals from the stations (DEE 2018). The *Niiwalarra* Island station was one of three stations in north-west Australia - *Niiwalarra* Island, Bathurst Island and Champagny Island. The site consisted of a radar building, radio building, a powerhouse and a campsite. Concrete foundations are mostly all that remain today (Peet 1997; Fenton 1999; DEE 2018). Also left on the island near the WWII site are empty rusty 44 gallon drums, which contained fuel to power the LORAN and further east are parts of the distillation plant that produced distilled/fresh water (Peet 1997; Fenton 1999; Ralph 2003).

Remnants from the LORAN site.
Photo - Grace Patorniti/DBCA

Remnants from the LORAN site.
Photo – Jennifer Munro/DBCA

On the eastern side of *Niiwalarra* Island an early warning radar equipment and station (i.e. RAAF radar station No. 317), and camp was established in April 1944 during WWII, with the station closed and vacated at the end of 1945 (Peet 1997; Fenton 1999; Ralph 2003) (**Map 2**). During its operation the radar tracked both friendly and enemy aircraft (Fenton 1999). Few remnants of the Australian WWII camp remain, which include an old Metters stove and building foundations situated on a terrace between the coast and ridge, and lengths of copper cable extending up to the Mesa top with occasional wooden posts.

The radar operators, usually dressed in shorts and short-sleeved shirts, would sometimes get blisters on their exposed skin. The source was found to be fruit from a tree about 3-5m high with the fruit covered in a fluid that was always dropping off. If the fluid came in contact with skin, blisters would form in a few seconds. The leaves and fruit of the tree were returned to Perth and given to WA Government Botanist, Mr Gardner, who identified it as *Grevillea viscidula gardneri* (Fenton 1999).

This plant (*Grevillea viscidula* C.A.Gardner) is more recently known as *Grevillea pyramidalis* subsp. *leucadendron*, which is one of three subspecies of caustic bush (*Grevillea pyramidalis*). Traditionally the fruit/berries had been used by Aborigines for tattooing or making ceremonial scars on their bodies.

In 1955, a pilot on the way from Timor to Drysdale River Mission had to force-land his Proctor aircraft on *Niiwalarra* Island due to a storm. He was sighted on the island by an RAAF aircraft and then taken by vessel to the Mission with the plane salvaged at a later date (*He's going back for his plane* 1955).

The LORAN station and the No. 317 radar station sites are listed on the State Register of Heritage Places. The management of heritage sites is guided by WA's *Heritage Act 2018*. The Commonwealth *Underwater Cultural Heritage Act 2018* protects Australia's shipwrecks and their associated relics, and other types of underwater cultural heritage. There are presently no known shipwreck sites in the waters around the islands, although there is the potential for colonial underwater sites (Souter 2009a, 2009b). DBCA will continue to work with the WA Museum, as delegated authority under the Act, to ensure the timely reporting and management of sites, if or when they occur.

On Lesueur Island there is a navigational aid (lighthouse) (**Map 2**), which is managed by the Australian Maritime Safety Authority. The lighthouse, a steel open lattice framework tower with a white flashing light at an elevation of 20m, was built in 1963 on the north-west section of the island (Cumming *et al.* 1995). From 1963 until the 1990s [when most lighthouses were automated] the purpose-built ship M.V. Cape Don, serviced navigational aids primarily along the Western Australian coast, including Lesueur Island (MV Cape Don Society Inc. 2018). No heritage assessment has been undertaken.

Management objective	Management strategies
To conserve and protect heritage values and support the sharing of historical knowledge.	1. Identify, document and map other Australian cultural heritage within the planning area. 2. Control access to, protect, maintain and monitor known or identifiable other Australian cultural heritage consistent with legislation and departmental policies such as Corporate Policy Statement No. 18 *Recreation, Tourism and Visitor Services*. 3. Apply commercial operator licence conditions to ensure appropriate visitation to sites of heritage value.

Map 2: *Niiwalarra* Islands and Lesueur Island: Heritage sites

3.3 Natural values

Geology and landforms

The planning area lies off the coastline of one of Australia's most rugged regions. The *Niiwalarra* islands and Lesueur Island are part of the island groups of the north Kimberley's submerged coastline (Graham 2001; DEC 2009; DPaW 2015).

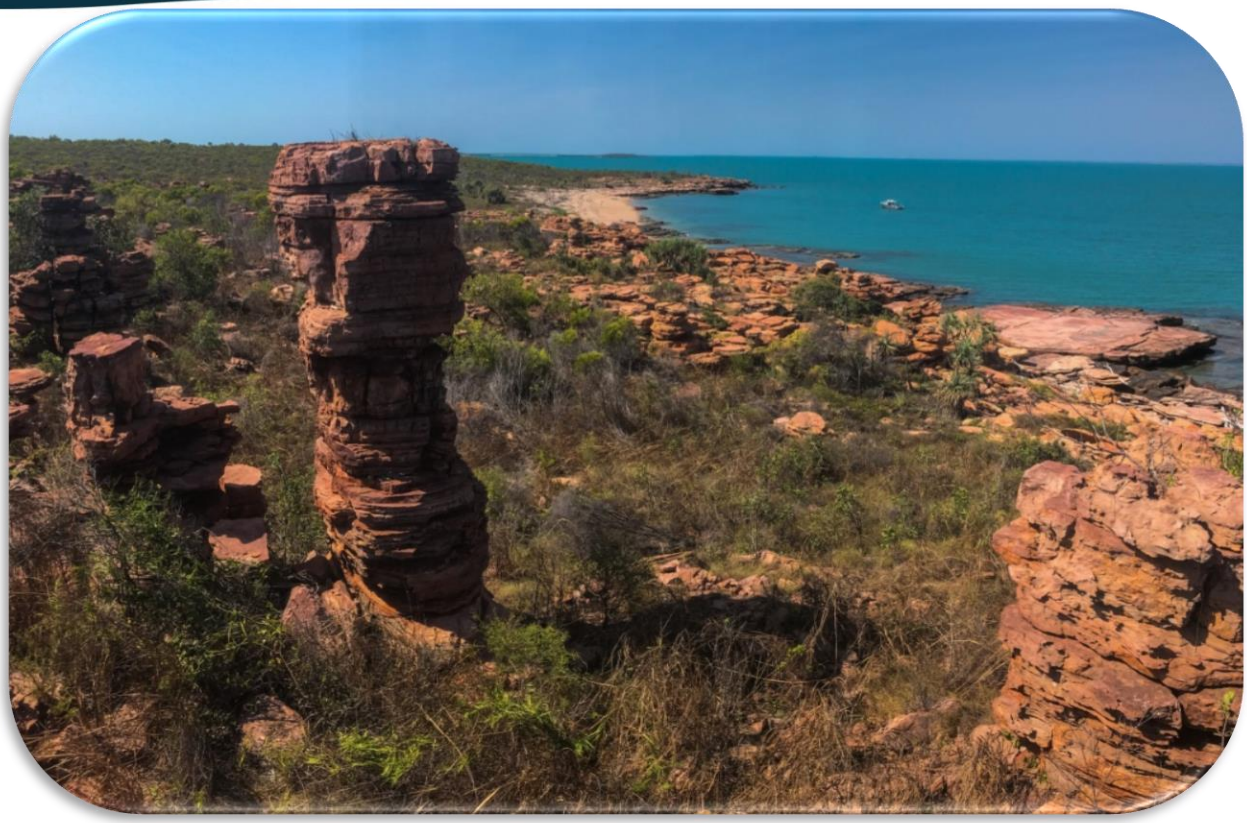
The landscape holds important cultural and natural values for Kwini people, where a rich tapestry of oral traditions is closely bound to the landforms and stone arrangements. The consideration of both traditional and scientific knowledge will contribute to effective management of geology and landforms.

> *"They used to use the rock shelters for [shelter from] rain or as burial sites"*
> [Dorothy Djanghara]
>
> *"Tribes used their fingers to paint rock art… stone axes, spears – they used the rock for that"*
> [Dorothy Djanghara]
>
> *"They used to use the sandstone rock to dam little creeks, making fish traps"*
> [Clement Maraltadj]

Much of the larger western portion of *Niiwalarra* Island has relatively subdued relief, with more elevated areas of King Leopold Sandstone along the southern side. The main central part of the island is overlain by iron-rich duricrust (laterite) that can be massive, rubbly or gravelly. The northern shore and south-western tip of the island features extensive beach deposits developed into a series of consolidated dunes. Small areas of sand, silt and mud are associated with tidal areas and wetlands (Philips and de Souza Kovacs 2016).

The eastern more elevated end of the island features a Mesa underlain by basalt and capped by iron-rich duricrust (laterite). The remainder of the eastern section is dominated by King Leopold Sandstone with small areas of beach sand and dunes at the northeast tip of the island (Philips and de Souza Kovacs 2016).

Sandstone of Niiwalarra Island. Photo - Jennifer Munro/DBCA



Weathered and exposed landforms of *Niiwalarra* Island. Photo - Matt De Candia/DBCA

Three wetlands occur on *Niiwalarra* Island. The largest and likely permanent wetland, on the north side of the island, probably varies between fresh and brackish depending on the relative seasonal input of major rain events and tidal influence. It includes drainage lines with mangroves and is surrounded by saline coastal flats dominated by samphire (*Tecticornia* spp.) along the wetland margin and coastal flats. Another, smaller perennial wetland in the south-west of the island, formed by coastal dunes barring drainage, supports a closed sedgeland surrounded by low closed forests of Melaleuca. Near the northwest tip of the island a Melaleuca swamp (*Melaleuca viridiflora*) probably fills after major wet season rainfall. It supports rich herb and sedge assemblages on its' margins, and the only known Kimberley island record of tropical reed (*Phragmites karka*). Several tidal saline coastal flats with fringing mangrove communities occur in some of the deeper embayments on the southern shores of *Niiwalarra* Island. Smaller freshwater seepages and small seasonal creeks occur on *Niiwalarra* Island and may also occur on the other islands.

Large wetland on the northern side of *Niiwalarra* Island.
Photo - Grace Patorniti/DBCA

Mangroves in the large wetland.
Photo - Grace Patorniti/DBCA

Smaller wetland on the south-western side of *Niiwalarra* Island. Photo – David Chemello/DBCA

Neawangu Island is dominated by King Leopold Sandstone. A large area of beach sands with a well-developed series of consolidated dunes occurs in the southern portion of the island (Philips and de Souza Kovacs 2016). On the central western coast, a large wetland (that probably fills seasonally) is set between the sandstone and beach sands, draining to the sea along a narrow mangrove lined creek.

Lesueur Island is a low island composed of Warton Sandstone with beach sands and dunes around its margin (Philips and de Souza Kovacs, 2016). The island is surrounded by a well-developed fringing reef.

Management objective	Management strategies
To identify, protect and conserve geological features.	1. Identify key geological features and ensure they are considered when planning management activities. 2. Manage access to significant geological features which are vulnerable to damage.

Climate

The tropical monsoonal climate of the planning area has distinctive wet and dry seasons. Much of the 900 - 1500mm of annual rainfall falls within the wet season from about November to April (BoM 2016), with the average annual rainfall for *Niiwalarra* islands and Lesueur Island being approximately 900-1000mm. These wet season rains dramatically transform the landscape - revitalising and reworking it - through transport of water and sediments. High rainfall intensity and major flood events are common in the region due to extreme weather events such as tropical cyclones and other intense low pressure systems during the wet season. Significant variability in inter-annual rainfall is common and the region may experience long periods that are considerably wetter or drier than others (CSIRO, 2009). Although the Kimberley is perceived to have abundant water resources, long dry seasons and very high evapotranspiration rates can render the region seasonally water-limited (CSIRO 2009).

Kwini people further understand the seasons in terms of direct relationships between plants, animals, tides and climatic conditions.

Native plants, animals and habitats

The following section contains information on the native plants and animals found in the planning area (Note: aside from the plant and animal surveys undertaken on *Niiwalarra* Island during the Kimberley Islands Biodiversity Survey[10], the *Niiwalarra* islands have had minimal or no surveys). Each species listed is described by its Kwini (Belaa) name, where this is known, and the common name and corresponding scientific name.

Native plants

The planning area is situated within the botanically rich North Kimberley National Biodiversity Hotspot, one of only 15 in Australia[11]. The planning area also forms part of the Northern Kimberley Bioregion[12] and is part of the North Kimberley 1-Mitchell IBRA subregion (Graham 2001).
Niiwalarra Island supports numerous plants and plant communities (Burbidge and McKenzie 1978; Burbidge *et al.* 1991; Lyons *et al.* 2014) including:

- A broad series of coastal dunes dominated by *Triodia microstachya*, with emergent shrubs and low trees on long unburnt areas. These include the rainforest elements *Diospyros maritima* and *Mimusops elengi.* These dunes include one of only two island records of *Habenaria triplonema*, a geophytic orchid. Floristically similar dunes are likely to occur on *Neawangu* Island. At the landward edge of these dune fields, thickets of *Canarium australianum, Brachychiton diversifolius subsp. diversifolius* and *Sersalisia sericea* occur with *Pandanus spiralis.*

  > *"They used to use pandanus for making baskets, to carry water sometimes. When [pandanus] gets dry, cook it in the fire and get the nuts out of it; they taste like almonds"* [Bernadette Waina]

- The large wetland in the north-western portion of the island includes areas of mangroves including *Aegiceras corniculatum*, *Avicennia marina*, *Bruguiera exaristata*, *Lumnitzera racemose*, *Osbornia octodonta* and *Rhizophora stylosa*, surrounded by low-closed forest of *Melaleuca viridiflora.*
- Extensive samphire (*Tecticornia*) communities occur on the sandy flats fringing the large wetland on the northern coast. Samphire communities are rare on Kimberley islands.
- The *Melaleuca viridiflora* swamp on the north-western tip of the island includes rich assemblages of sedges and herbs. The extensive low laterite areas of the western portion of the island support *Eucalyptus miniata* woodlands with mixed shrublands of *Acacia gonocarpa* and *A. plectocarpa* subsp*. plectocarpa* along with the regionally endemic shrub *Scaevola* sp. Sir Graham Moore Island (P.G. Wilson 11204).
- The laterite capped mesa in the east of the island supports a diverse woodland community of *Eucalyptus miniata, Corymbia bella, C. bleeseri* and *C. greeniana.*
- The sandstone communities of the island include *Acacia arida, A. retinervis, Templetonia hookeri* and *Jacksonia argentea* shrublands on shallow soils. On deeper soil areas mixed woodlands of *Eucalyptus miniata, Corymbia bleeseri* and *Brachychiton* spp. occur over species rich shrub understoreys.
- *Niiwalarra* Island also has a population of the iconic species, the palm *Livistona lorophylla,* recorded near the large wetland.

Botanical surveys in 2006-2008 recorded numerous plant species from *Niiwalarra* Island, with a total of 290 species recorded on the island (Lyons *et al.* 2014) (See **Appendix 2**).

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[10] The surveys on 24 Kimberley islands, undertaken as part of the Kimberley Islands Biodiversity Survey, were conducted from July 2007 to June 2010 (Gibson and McKenzie 2012a).

[11] Biodiversity hotspots are areas that support natural ecosystems that are largely intact and where native species and communities associated with these ecosystems are well represented. They are also areas with a high diversity of locally endemic species, which are species that are not found or are rarely found outside the hotspot (Department of the Environment 2016).

[12] The Interim Biogeographic Regionalisation for Australia (IBRA) divides Western Australia into 26 biogeographic regions and smaller subregions, based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation (CALM 2003).

Brachychiton sp. and *Pandanus* sp. on *Niiwalarra* Island.
Photo - Grace Patorniti/DBCA

Tecticornia sp. on *Niiwalarra* Island.
Photo - Grace Patorniti/DBCA

There have been minimal surveys of plants on Lesueur Island. The few plant collections in the WA Herbarium for Lesueur Island[13] are listed under Table 3.

Table 3: Plants recorded on Lesueur Island

Language name	Common name (Scientific name)
Unknown	Indian lantern flower *(Abutilon indicum var. australiense)*
Unknown	Tar vine *(Boerhavia burbidgeana)*
Unknown	Watergrass *(Bulbostylis barbata)*
Unknown	Wild jack bean (*Canavalia rosea*)
Unknown	Rhynchosia *(Rhynchosia minima)*
Unknown	Prickly Saltwort *(Salsola australis)*
Unknown	None recorded *(Sida pusilla)*

Plants of conservation significance

The plant species of conservation significance that have been recorded on *Niiwalarra* (Lyons *et al.* 2014; Conservation Commission of WA 2010; NatureMap, data extracted 15/5/2018) are listed under Table 4.

Table 4: Plants of conservation significance recorded on *Niiwalarra* Island

Language name	Common name (Scientific name)	Conservation status – State[14] (Commonwealth EPBC Act)
Unknown	Fringe-rush *(Fimbristylis subaristata)*	Priority one
Unknown	None recorded *(Heliotropium* nesopelydum)	Priority one
Unknown	None recorded *(Alysicarpus major)*	Priority three
Unknown	Bottletree *(Brachychiton tridentatus)*	Priority three
Unknown	None recorded *(Decaschistia byrnesii* subsp. *lavandulacea)*	Priority three
Unknown	None recorded *(Goodenia byrnesii)*	Priority three
Unknown	None recorded (*Spermacoce* sp. Berthier Dunes R.L. Barrett RLB 5753)	Priority three

[13] Specimens collected by Dr I. Abbott in June 1978 and A.A. Mitchell (Northern Australia Quarantine Strategy survey) in March 1993 (data extracted via NatureMap on 14 May 2018).

[14] Conservation codes explained, and priority flora listed, in the Threatened and Priority Flora List (list dated 5 December 2018). Available at: dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants.

Native animals

Historical surveys in 1971-1973[15] (Burbidge and McKenzie 1978) and more recently in 2007-2010[16] (Gibson and McKenzie 2012a) have recorded numerous native animal species from *Niiwalarra* Island, including:

- 12 mammal species, *Waambu minya* or Water-rat (*Hydromys chrysogaster*), Mosaic-tailed Rat (*Melomys burtoni*), Delicate Mouse (*Pseudomys delicatulus*), eight bat species and the only known Kimberley island with a population of Red-cheeked Dunnart (*Sminthopsis virginiae*) (McKenzie and Bullen 2012; Gibson and McKenzie 2012b). *Kundili* or Agile Wallaby (*Macropus agilis*) is historically known to occur on *Niiwalarra* Island (Vigilante *et al.* 2013), with DBCA staff observing wallaby tracks on *Niiwalarra* Island in 2008 and 2015.
- 92 bird species, including iconic species *Kurranda binya* or Brolga (*Grus rubicunda*) and Golden-headed Cisticola (*Cisticola exilis*) (Pearson *et al.* 2013). *Niiwalarra* Island is one of two islands to record *Dijil manya* or Grey-fronted Honeyeater (*Ptilotula plumula*), a species mainly associated with semi-arid country (Burbidge and McKenzie 1978). There have been anecdotal observations from traditional owners about the occurrence of Gouldian Finches (*Erythrura gouldiae*) being present on *Niiwalarra* Island.
- 29 reptiles, including the only known Kimberley island with populations of *Carlia munda* and *Pseudonaja mengdeni* (Palmer *et al.* 2013). *Niiwalarra* Island is relatively large and for Kimberley islands is a comparatively species-rich island (29 taxa) with a diverse array of habitats (Palmer *et al.* 2013). *Juluwarru manya* or Green Turtles (*Chelonia mydas*) are known to breed on beaches within the *Niiwalarra* islands.

Melomys burtoni on *Niiwalarra* Island.
Photo - Russell Palmer/DBCA

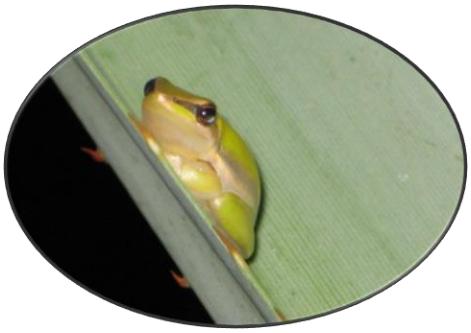
Skink *(Ctenotus inornatus)* among Beach Morning Glory (*Ipomoea pes-caprae)* on *Niiwalarra* Island.
Photo - Grace Patorniti/DBCA

*"[*Niiwalarra Island*] was a meeting place because of the turtles, lots of people came here. [We] used big animals like turtles and dugong, for smoking, sorry business"*
[Bernadette Waina]

[15] Fauna survey work undertaken on *Niiwalarra* Island on 12 August 1971 and 30 June-3 July 1973 (as part of surveys of the coastal islands of the north-west Kimberley in 1971-73). The purpose of the survey was to visit the island and take fauna collections with plant specimens collected from most of the islands visited; collections were taken mainly around Geranium Harbour (Burbidge and McKenzie 1978).

[16] The surveys on 24 Kimberley islands, undertaken as part of the Kimberley Islands Biodiversity Survey, were conducted from July 2007 to June 2010, with *Niiwalarra* Island (Sir Graham Moore Island) being surveyed in 2007 (Gibson 2009; Gibson and McKenzie 2012a).

- 10 *Limirrirri manya* or land snails, including one land snail (*Torresitrachia aquilonia*) endemic to *Niiwalarra* Island (Gibson and Köhler 2012).
- Seven frogs, including the Fat Toadlet (*Uperoleia crassa*) endemic to the Kimberley region and the only island population of the Small Sedge Frog (*Litoria bicolor*) (Doughty *et al.* 2012).



Litoria bicolor on *Niiwalarra* Island.
Photo – Russell Palmer/DBCA

St Andrews Cross spider (*Argipoe* sp.) on *Niiwalarra* Island.
Photo - Grace Patorniti/DBCA

The natural values of Lesueur Island include a significant *Mardumarl manya* or Flatback Turtle (*Natator depressus*) rookery and importance as a seabird breeding island with habitat to support high volumes of seabird breeding (Conservation Commission of WA 2010). There is a known breeding colony of Bridled Tern (*Sterna anaethetus*) with breeding recorded in 1978, 1982 and 2000, and *Naabûlo manya* or Osprey *(Pandion cristatus)* with breeding recorded in 1973 (Burbidge and McKenzie 1978; Abbott 1979[17], Swann 2000, 2004; Conservation Commission of WA 2010). Also observed at Lesueur Island are Silver Gull (*Larus novaehollandiae*) (four) and Crested Tern (*Sterna bergii*) (18) and Gilbert's Dragon (*Lophognathus gilberti*) (Abbott 1979). Lesueur Island has the only known island population of Gilbert's Dragon or Ta-Ta lizard in the North Kimberley.

Numerous other birds, including the Brown Quail (*Coturnix ypsilophora*), Tawny Grassbird (*Megalurus timoriensis*) and Yellow White-eye (*Zosterops luteus*) have been recorded on the island during surveys in 1999, 2000 and 2004 (Swann 1999, 2000, 2004). A complete list of animals of conservation significance recorded and/or observed on and in the vicinity of Lesueur Island is under Table 6.

With additional survey effort, more species are likely to be recorded on other areas of the *Niiwalarra* islands and Lesueur Island.

[17] Observations made by Dr I. Abbott in June 1978 on a 47-day voyage on the lighthouse tender M.V. Cape Don to the mid- and north- western coasts of Australia to investigate tropical island ecosystems and observations of seabirds (Abbott 1979). Abbott (1979) landed on five mainland sites and 22 islands, including Lesueur Island, and spent 55 hours counting seabirds at sea.

Animals of conservation significance

The animal species of conservation significance that have been recorded on *Niiwalarra* (Palmer *et al.* 2013; Conservation Commission of WA 2010; NatureMap, data extracted 15/5/2018) are listed under Table 5.

Table 5: Animals of conservation significance recorded on *Niiwalarra* Island

Language name	Common name (Scientific name)	Conservation status – State[18] (Commonwealth EPBC Act)
Unknown	Eastern Curlew (*Numenius madagascariensis*)	Critically endangered (Critically endangered)
Juluwarru manya	Green Turtle (*C. mydas*)	Vulnerable (Vulnerable)
Dikamana(a)dika manya	Ghost Bat (*Macroderma gigas*)	Vulnerable (Vulnerable)
Unknown	Northern Leaf-nosed Bat (*Hipposideros stenotis)*	Priority two
Unknown	Kalumburu Kimberley Slider *(Lerista kalumburu)*	Priority two
Unknown	Gouldian Finch *(E. gouldiae*)	Priority four (Endangered)
Waambu minya	Water-rat, Rakali (*H. chrysogaster*)	Priority four
Unknown	Red-necked Stint (*Calidris ruficollis*)	Migratory (Marine and migratory)
Unknown	Greater Sand Plover (*Charadrius leschenaultii*)	Migratory (Vulnerable, marine and migratory)
Wunjuwunju manya	Lesser Frigatebird (*Fregata ariel*)	Migratory (Marine and migratory)
Unknown	Bar-tailed Godwit (*Limosa lapponica*)	Migratory (Vulnerable)
Unknown	Whimbrel (*Numenius phaeopus*)	Migratory (Marine and migratory)
Unknown	Wilson's Storm-petrel (*Oceanites oceanicus*)	Migratory (Marine and migratory)
Naabûlo manya	Osprey (*Pandion cristatus*)	Migratory (Marine and migratory)
Unknown	Pacific Golden Plover (*Pluvialis fulva*)	Migratory (Marine and migratory)
Unknown	Grey Plover (*Pluvialis squatarola*)	Migratory (Marine and migratory)
Unknown	Roseate Tern (*Sterna dougallii*)	Migratory (Marine and migratory)
Narinkari mayna	Brown Booby (*Sula leucogaster*)	Migratory (Marine and migratory)

The species of conservation significance that have been recorded and/or observed on and in the vicinity of Lesueur Island (Abbott 1979; Swann 1999, 2000, 2004; Conservation Commission of WA 2010) are listed under Table 6.

[18] Threatened species and migratory birds protected under an international agreement as listed under the Wildlife Conservation (Specially Protected Fauna) Notice 2018 (dated 11 September 2018); and conservation codes explained, and priority fauna listed, in the Threatened and Priority Fauna List (last updated 11 September 2018). Available at: dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals?view=categories&id=109. As of the 1 January 2019 the Specially Protected Fauna Notice published under the *Wildlife Conservation Act 1950* will transition to be the Threatened Fauna and Specially Protected Fauna listed under Part 2 of the *Biodiversity Conservation Act 2016*, until the next Notice is published.

Table 6: Animals of conservation significance recorded and/or observed on or near Lesueur Island

Language name	Common name (Scientific name)	Conservation status – State[19] (Commonwealth EPBC Act)
Unknown	Atlas Moth (*Attacus wardi*)[20]	Threatened - Braby *et al.* 2012
Mardumarl manya	Flatback Turtle (*Natator depressus*)	Vulnerable (Vulnerable)
Unknown	Common Sandpiper (*Actitis hypoleucos*)	Migratory (Marine and migratory)
Unknown	Ruddy Turnstone (*Arenaria interpres*)	Migratory (Marine and migratory)
Unknown	Greater Sand Plover (*Charadrius leschenaultii*)	Migratory (Vulnerable, marine and migratory)
Unknown	Eastern Reef Egret (*Egretta sacra*)	- (Marine)
Unknown	White-bellied Sea-Eagle (*Haliaeetus leucogaster*)	- (Marine)
Naabûlo manya	Osprey (*Pandion cristatus*)	Migratory (Marine and migratory)
Unknown	Pacific Golden Plover (*Pluvialis fulva*)	Migratory (Marine and migratory)
Unknown	Bridled Tern (*Sterna anaethetus*)	Migratory (Marine and migratory)
Narinkari mayna	Brown Booby (*Sula leucogaster*)	Migratory (Marine and migratory)
Unknown	Grey-tailed Tattler (*Tringa brevipes* (*Heteroscelus brevipes*))	Migratory (Marine and migratory)
Unknown	Lesser Crested Tern (*Thalasseus bengalensis*)	- (Marine)
Karrimaru manya	Crested Tern (*Thalasseus bergii*)	Migratory (Marine and migratory)

Habitats

The islands support relatively intact examples of mainland habitats, due to the islands' natural fire regime. These habitats represent important refuges for native animals (DPaW 2015) from the threatening processes more prevalent on the mainland, such as unmanaged fire, feral cats, introduced herbivores and cane toads.

Niiwalarra Island has a diversity of habitat types, including those associated with Quaternary sands, sandstone outcrops, a lateritic plateau and wetlands, which is likely to explain the large number of species (eight bats, 92 birds, two camaenids and eight non-camaenids land snails[21], 290 plants, 29 reptiles, seven frogs and four non-volant[22] mammals) recorded during the Kimberley Islands Biodiversity Survey (Gibson 2009; Gibson 2014).

> *"*[Niiwalarra Island] *supports many widespread species as well as taxa more typical of the drier Kimberley mainland (e.g. reptiles: Strophurus ciliaris and Carlia munda; birds:* [Dijil manya or] *Grey-fronted Honeyeater,* [Dijil manya or] *Singing Honeyeater and Little Button-quail;* [Limirrirri manya or] *land snails (Gastrocopta pediculus); plants: Acacia platycarpa and Senna oligoclada, and some sand specialists which it shares with Mary Island (e.g. reptiles: Diporiphora magna and Ctenotus mesotes)…"* (Gibson 2014, page 260).

[19] Threatened species and migratory birds protected under an international agreement as listed under the Wildlife Conservation (Specially Protected Fauna) Notice 2018 (dated 11 September 2018); and conservation codes explained in the Threatened and Priority Fauna List (last updated 11 September 2018). Available at: dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals?view=categories&id=109. As of the 1 January 2019 the Specially Protected Fauna Notice published under the *Wildlife Conservation Act 1950* will transition to be the Threatened Fauna and Specially Protected Fauna listed under Part 2 of the *Biodiversity Conservation Act 2016*, until the next Notice is published.

[20] A specimen of *Attacus wardi* was found on the lighthouse tender M.V. Cape Don in 21 April 1974 and the collector was the ship's carpenter. The specimen was sighted and identified by J.E. Nielsen (WA Museum) on 30 Sept 2010.

[21] Camaenids land snails belong to the family, the Camaenidae and non-camaenids land snails belong to other various families of non-marine gastropods (Gibson and Köhler 2012).

[22] Non-volant mammal – land based mammals that cannot fly or all land based mammals excluding bats.

Threatened/priority ecological communities

There are currently no known threatened or priority ecological communities[23] within the planning area; however, detailed surveys have not been conducted (Conservation Commission of WA 2010).

Management objective	Management strategies
To identify, protect and conserve native assemblages, and plants, animals and habitats, particularly those of cultural or conservation significance.	1. Undertake or support baseline surveys of native plants, animals and ecological communities. 2. Monitor trends over time in non-volant mammal species, threatened and priority animal populations, vegetation/habitat condition and ecological communities, and analyse results against factors including fire behaviour patterns, rainfall data and introduced animal and weed numbers. Adapt management as appropriate in response to results. 3. Develop, update and implement recovery plans for threatened plants and animals as required. 4. Encourage and support, wherever possible, the involvement of Kwini people in research with external agencies and individuals whose research contributes directly to the joint management objectives or the implementation and auditing of this management plan. 5. Ensure relevant information gained through research and monitoring in the planning area is available for management purposes and actively shared with relevant land managers and partners.

Key performance indicators

Native plants, animals and habitats

Performance measure	Target	Reporting
Abundance of native fauna	Stable trends in the number of non-volant mammal species.	Every five years
Diversity of native fauna	Stable trends in the number of different fauna species.	Every five years
Vegetation/habitat condition across major vegetation types	Stable or improving trends in monitored vegetation condition rank.	Every five years

Management issues

Fire

Fire is an important natural component of ecosystem function. While many species have adapted to fire, inappropriate fire is the largest threat to biodiversity. Some species require several, and up to 10, years to mature and produce seed. These species will disappear from the landscape if not protected from too frequent fire. Likewise, fauna require refuge habitat during and after fire and need sufficient time to recolonise burnt country.

[23] Threatened ecological communities are defined in *Definitions, categories and criteria for threatened and priority ecological communities*. See: dbca.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities.

Islands tend to be true refugia, mimicking natural processes that once occurred on the mainland as they are less exposed to human-caused ignitions. "*Most Kimberley islands burn infrequently, mainly from lightning strikes*" (Conservation Commission 2010, page 12).

When lightning strikes (a natural source of ignition) during the monsoonal 'build-up' to the wet season (October-December) the seasonal rainfall limits the impact of any naturally occurred bushfires. Therefore on islands it is not necessary to introduce fire (i.e. no prescribed burns) during the early dry season as is required on the mainland to prevent large, late dry season fires. Early dry season burning on islands would compromise the values of older aged (>10 years old) vegetation that is commonly found on islands and now relatively rare on mainland. Also, as there is no management presence on the islands and difficult to dispatch resources from the mainland, bushfire suppression is unlikely to occur on the islands.

Fire is an important part of Balanggarra culture, and has long been used as a tool Aboriginal people use to keep country healthy, and to manage its bush foods and medicines (Balanggarra Aboriginal Corporation and Kimberley Land Council 2011). *"Traditionally* [Balanggarra people] *will start burning* [on the mainland] *in Kolorrirru [May] after the rain eased and the ground starts drying out, but most burning happens during Yirrma [June to August] when the south-easterlies blow steadily and the grasses cure"* (Balanggarra Aboriginal Corporation and Kimberley Land Council 2011, page 18).

Karnmangku minya or long yam (*Dioscorea transversa*) was an important staple food for North Kimberley Aboriginal people and abundant on *Niiwalarra* Island, with fire management on the island traditionally undertaken after the yams were harvested as the vines would otherwise be difficult to locate (Vigilante *et al.* 2013).

> *"Fire management on islands is a complex issue that requires a case by case assessment of island size, fire history, fuel loads and seasonal influences (including cyclones), along with a consideration of traditional burning by Aboriginal people. Clearly, future fire management on the islands needs to be carefully considered so that fire-sensitive vegetation and associated fauna is not lost"* (Lyons *et al.* 2014, page 226).

The engagement and involvement of traditional owners in fire management planning will be important.

Management objective	**Management strategy**
To protect and conserve the natural, and cultural values of the planning area from bushfires.	1. Establish and maintain monitoring sites (including aerial observations of the island/s post wet season to identify any burns missed by NAFI / Landsat) to measure impact of bushfires and to develop an understanding of fire ecology requirements and post-fire weed control.
Key performance indicator	
Monitoring	

Performance measure	**Target**	**Reporting**
The impact of bushfires on the natural and cultural values.	1. Undertake triennial monitoring.	Every three years

Introduced species

Introduced animals

Niiwalarra Island has a history of the introduction of animals (goats and pigs) (Palmer *et al.* 2013). Surveys undertaken in 1971-73 recorded the presence of feral pigs (Burbidge and McKenzie 1978). Traditional owners also recount a 1985 expedition by the Australian Army Defence Force (NORFORCE), the purpose of which was to cull feral pigs to eradicate foot and mouth disease (Matthew Waina, *pers. comm.* 30 May 2018). The pig population is believed to have died out when the island's only freshwater source became

saline from tidal surge after a cyclone (Conservation Commission of WA 2010). Field trips in recent years have found no signs of pigs or any recent pig activity on the island.

Another potential threat for the planning area is the cane toad (*Rhinella marina*) (DPaW 2015). The arrival of cane toads to the Kimberley region (since approximately 2009) is having a significant impact on native species (DPaW 2014) with reptiles being particularly vulnerable to cane toads (see Appendix 3 for a list of reptile species recorded on *Niiwalarra* Island). It is essential to develop and implement a biosecurity regime and monitoring program for the Kimberley islands that will detect incursions of cane toads and if possible deliver suitable management actions to reduce their impact and presence, and ensure the protection of cultural and natural values.

Weeds

Niiwalarra Island has a relatively high number of weeds recorded for a Kimberley island, due to past levels of human activity. A Northern Australia Quarantine Strategy program survey in 1993 recorded the following introduced taxa from *Niiwalarra* Island, as listed under Table 7.

Table 7: Introduced plant species recorded on *Niiwalarra* Island in 1993

Language name	Common name (Scientific name)
Unknown	Morning glory *(*Ipomoea pes-tigridis)*
Unknown	Alyce Clover *(*Alysicarpus vaginalis)*
Unknown	Stinking passionflower (**Passiflora foetida)*
Djanggara	Pink purslane (**Portulaca pilosa*)

"The nuns used to use djanggara as vegetables [at the mission]"
[Clement Maraltadj]

Additionally, flora surveys undertaken on 24 selected inshore islands off the Northern Kimberley coast including *Niiwalarra* Island, between 2007 and 2010 recorded the following five introduced taxa on *Niiwalarra* Island (Lyons *et al.* 2014), as listed under Table 8.

Table 8: Introduced plant species recorded on *Niiwalarra* Island during 2007-2010

Language name	Common name (Scientific name)
Unknown	Oval-leafed Alysicarpus *(*Alysicarpus ovalifolius)*
Unknown	Rosella *(*Hibiscus sabdariffa)*
Unknown	Mint weed *(*Hyptis suaveolens; now known as *Mesosphaerum suaveolens)*
Unknown	Passion flower *(*Passiflora foetida* var. *hispida)*
Unknown	Caltrop *(*Tribulus terrestris)*

"The nuns used to make jam from the rosella [at the mission]"
[Clement Maraltadj]

"Hyptis suaveolens, a major weed of the mainland [North Kimberley] *bioregion, was only recorded from Sir Graham Moore Island, near the site of a World War II military radar base* [LORAN station site] *and an earlier (1920s) agricultural venture (Crawford 2001). Hibiscus sabdariffa (Rosella) was also only recorded on Sir Graham Moore from the margin of a Melaleuca swamp in the vicinity of the previous habitations. This species is grown for human consumption and is likely to have been a deliberate introduction"* (Lyons *et al.* 2014, page 216).

Mesosphaerum suaveolens on *Niiwalarra* Island.
Photo – David Chemello/DBCA

Weed control - spraying *of Mesosphaerum suaveolens* on *Niiwalarra* Island.
Photo - Grace Patorniti/DBCA

The high impact, rapidly invasive weeds *Passiflora foetida* and *Hyptis suaveolens* (now known as *Mesosphaerum suaveolens)* are found across the Kimberley. The extent of the two weeds on *Niiwalarra* Island is unknown with known occurrences of *M. suaveolens* around the previous WWII operational sites located on *Niiwalarra* Island (DPaW 2015). A program is in place for traditional owners and DBCA staff to control isolated populations of *M. suaveolens* from *Niiwalarra* Island, including around WWII artefacts [where there is visitation and increased risk of spread], and to monitor the island for these and other infestations.

The only record of weeds on Lesueur Island is caltrop (*Tribulus terrestris*[24]). Further survey work is required to identify any other weeds on the island.

Management objective	Management strategies
To minimise the impact of introduced animals and weeds on natural, cultural, and recreation and tourism values.	1. Implement a fauna monitoring program to detect incursions of introduced animals, in particular cane toads; and implement mitigation strategies for the introduced animals if possible. 2. Implement the relevant actions outlined in the *Cane toad strategy for Western Australia 2014-2019* (DPaW 2014), including: • Investigate the feasibility of using remote monitoring techniques on islands to detect the arrival of cane toads. • Develop and implement an effective approach to biosecurity management with a focus on maintaining the environmental integrity of Kimberley islands. 3. Undertake or support baseline surveys of weeds. 4. Undertake control programs to reduce the impacts of weeds (e.g. prevent the spread of existing weeds), where such control is feasible. 5. Undertake priority site monitoring to locate new incursions of weeds and eradicate any new incursions of weeds as soon as practicable. 6. Develop and implement an information and education program (e.g. signage, brochures) for commercial tour operators and private visitors, that promotes awareness and understanding of the importance of applying appropriate hygiene measures to prevent new and damaging weeds becoming established and incursions of introduced animals.

Key performance indicators		
Introduced animals and weeds		
Performance measure	**Target**	**Reporting**
Presence of introduced animals	Mitigation measures undertaken to reduce the impact of any introduced animal observed within the planning area.	Every five years
Presence of priority weeds	No increase in the extent of any priority weed found within the planning area.	Every five years

3.4 Recreation and tourism values

Visitor experience

The planning area features incredible scenery and diverse wildlife (in particular birds and reptiles) characteristic of the Kimberley. Together with a rich cultural heritage, the landscape provides opportunities for nature- and culture-based tourism experiences.

Planning will be undertaken by the department with Kwini people to identify the possibility of potential tourism site(s) on *Niiwalarra* Island in accordance with traditional owner aspirations. Planning for visitor use needs to protect the cultural and natural values, and maintain and enhance the experiences that attract people to the area. Opportunities to enhance visitor experiences and create greater appreciation of the cultural values of the planning area will be sought on an ongoing basis.

[24] WA Herbarium specimen collected by Dr I. Abbott in June 1978 on a voyage on the lighthouse tender M.V. Cape Don to the mid- and north-western coasts of Australia to investigate tropical island ecosystems and observations of seabirds (Abbott 1979).

Culturally appropriate information and interpretation helps to enhance visitor experience and safety, and promotes support for management. Pre-visit information for visitors can be provided via electronic media (i.e. the *Explore Parks WA* website and various phone apps produced by DBCA) or printed material.

There is a high level of visitation (compared to other Kimberley islands) to *Niiwalarra* Island and Lesueur Island from recreational fishing boats and charter boats. Currently, there is no infrastructure (e.g. amenities, signage) on the islands for visitors and as such it is necessary to install/provide information and interpretation that promotes visitor appreciation and understanding of cultural and natural values, visitor safety, visitor behaviour and Leave No Trace principles.

Given the potential severe impacts of fire on biodiversity and risks to human life, the lighting of fires on the islands is prohibited (i.e. visitors to the islands will be permitted to use gas cooking equipment only - open camp fires will be prohibited). Information will be provided to visitors about the risk of fire on the islands and to encourage no lighting of fires.

It is also important to ensure commercial tourism operators deliver appropriate messages to visitors on guided tours. Operators have one-on-one contact with visitors and the ability to deliver messages (see the section **Commercial operations**).

Access

The islands may be accessed via private or commercial operator vessels; however there are limited anchorages. Vessels can only land on Lesueur Island during calm conditions due to the fringing reef.

The mouth of Circular Cove is the only anchor point on *Niiwalarra* Island. Visitors on private or commercial operator vessels may undertake a short hike within *Niiwalarra* Island to view places of interest along the coastline; however there are no formal walking trails on the island. If any future visitor infrastructure (e.g. campground) is established on *Niiwalarra* Island then formal walking trails should be considered. Any future walk trails will depend on the availability of funding, outcomes of a trail assessment through the WA Trail Development Process and consultation with Kwini people.

Circular Cove. Photo - Matt De Candia/DBCA

Visitor safety

Kwini people and the department have a shared concern for visitor safety. There is an inherent risk in going to such remote places. Combined with high temperatures and presence of crocodiles[25], visitors need to take care while on the islands. Kwini people ask that all visitors be mindful of their personal safety and be aware of natural risks present in the planning area, such as crocodiles. They also ask visitors to act respectfully and with appropriate behaviour around cultural sites.

To help minimise the risk of injury to visitors DBCA has developed *Corporate Policy Statement No. 53: Visitor risk management* and *Guideline No. 28: Visitor risk management*, which outline visitor risk management procedures, and a *Crocodile Safety Communication Strategy*.

Management objective	Management strategies
To support safe and culturally appropriate opportunities for visitors to experience, appreciate and understand the cultural and natural values.	1. Support appropriate opportunities for tourism that consider cultural and natural values. 2. Monitor impacts associated with visitor activities and manage these to minimise unacceptable impacts. 3. Investigate options for managing access to sensitive cultural areas (such as prohibiting or controlling access and installing signage). 4. Identify areas to be restricted for cultural purposes and implement appropriate management strategies, including consideration of classified areas under section 62 of the CALM Act. 5. Undertake visitor risk assessments to identify and manage risks associated with visitor use, and implement appropriate action as necessary (e.g. provide appropriate information/signage). 6. Enhance visitor experience by developing and implementing an information and interpretation program that promotes visitor appreciation and understanding of cultural and natural values, visitor safety, visitor behaviour and Leave No Trace principles.

Commercial operations

Commercial operators can provide a range of activities, general sightseeing tours and opportunities for visitors. Even though there may be tourism opportunities for the public, to date there are no licenced commercial operations for the *Niiwalarra* islands or Lesueur Island.

DBCA supports Kwini people aspirations to establish and benefit from commercial development and tourism services in the planning area.

Management objective	Management strategies
To promote commercial tourism opportunities and activities that are compatible with protection of the planning area's cultural, natural, and recreation and tourism values.	1. Through the JMB, DBCA will work with the traditional owners to investigate and, where appropriate, establish commercial opportunities within the planning area. 2. Monitor commercial tour operations that operate within or near the planning area to ensure compliance with licence conditions.

[25] The risk of encountering crocodiles is high and they therefore present a significant danger to visitors. For information on being 'Crocwise', see: parks.dbca.wa.gov.au/sites/default/files/imce/Be%20CROCWISE%20Factsheet.pdf.

3.5 Resources and utilities

Mineral exploration and development

There is no current or proposed mining (e.g. prospecting or exploration) or petroleum tenure that covers the planning area.

Infrastructure within the planning area includes:

- Remnant infrastructure from the two WWII camps on *Niiwalarra* Island
- Navigational aid on Lesueur Island (Crown Reserve 44677).

Management objectives	Management strategies
To minimise the impact of mineral, petroleum or geothermal exploration and development on cultural and natural values. To minimise the impact of utilities or infrastructure use on cultural and natural values.	1. Provide advice to the Minister for Environment and the EPA regarding mineral, petroleum or geothermal proposals that may impact on the planning area via the applicable statutory assessment processes and seek to avoid or minimise these impacts. 2. Work with the Department of Mines, Industry Regulation and Safety and, where applicable, the EPA to evaluate proposed mineral, petroleum or geothermal proposals and operations that may impact on the planning area, and seek to avoid or minimise these impacts. 3. Provide advice, when required, to ensure that any areas disturbed by mineral, petroleum or geothermal exploration and development are rehabilitated in accordance with the conditions of the mining, petroleum or geothermal tenure or approval documentation, as well as DBCA rehabilitation standards and guidelines. 4. Ensure that all exploration and development and basic raw material extraction adhere to DBCA hygiene practices. 5. Ensure areas disturbed by basic raw material extraction are rehabilitated in accordance with DBCA policies, and undertake post rehabilitation monitoring and evaluation to ensure compliance. 6. Where there is no other viable alternative, locate new utilities or infrastructure at sites where impacts on the area's cultural and natural values and visual amenity, are minimised.

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Appendices

Appendix 1: Edible plant species recorded on *Niiwalarra* Island

The presence of edible plant species on *Niiwalarra* Island, based on ethno-ecological literature and the plant species recorded during the Kimberley Islands Biological Survey (Vigilante *et al.* 2013).

SPECIES	FOOD USE*	REF.#
Acacia tumida var. tumida	seeds	2,3
Ampelocissus acetosa	fruit, roots	2,5
Amyema spp.	fruit, nectar	1,2,3
Antidesma ghaesembilla	fruit	2,5
Avicennia marina	fruit	3
Brachychiton diversifolius subsp. diversifolius	seeds, roots, gum	1,2,3,4
Brachychiton fitzgeraldianus	seeds, roots, gum	1
Brachychiton tridentatus	seeds, roots	1
Bridelia tomentosa	fruit	3
Buchanania obovata	fruit, roots	1,2,5
Canarium australianum	seeds	1,2,3
Canarium australianum var. Glabrum	seeds	
Capparis umbonata	fruit	2
Cassytha fliliformis	fruit	3
Cayratia trifoliata	roots	2
Celtis philippensis	fruit	3
Cyperus bulbosus	roots	2,3
Dendrophthoe acacioides	fruit	2
Dendrophthoe acacioides subsp. acacioides	nectar	3
Dioscorea transversa	roots	1,2,5
Eucalyptus miniata	seeds	3
Exocarpos latifolius	fruit	3
Ficus aculeata	fruit	1
Ficus aculeata var. Indecora	fruit	-
Ficus platypoda	fruit	1,2
Flueggea virosa subsp. melanthesoides	fruit	1,2,3
Grevillea pteridifolia	nectar	2
Grewia breviflora	fruit	3,5
Ipomoea costata	roots	1,2
Ipomoea macrantha	roots	2
Ipomoea pes-caprae subsp. brasiliensis	roots	5
Livistona lorophylla	leaves	1,2
Mallotus nesophilus	-	3
Mimusops elengi	fruit	2,3
Murdannia graminea	roots	2
Opilia amentacea	fruit	2
Pandanus spiralis	seeds	1,2,3,5
Passiflora foetida	fruit	1,2
Persoonia falcata	fruit	1,2,3,5

SPECIES	FOOD USE*	REF.#
Portulaca pilosa	roots	1
Sersalisia sericea	fruit	1,2,3,5
Sesuvium portulacastrum	fruit	2
Tacca maculata	roots	2
Terminalia canescens	gum	1,2,3
Terminalia petiolaris	fruit, gum	3
Trophis scandens	fruit	1

*Food uses are classified as either fruits, roots, leaves or nectar.

References (Ref.) to the ethnoecological literature are as follows (as cited in Vigilante *et al.* 2013):

1 – Karadada *et al.* (2011)

2 – D. Cheinmora, *pers. comm.,* Crawford (1982)

3 – Kenneally *et al.* (1996)

4 – Wheeler (1992)

5 – Brock (1993)

Appendix 2: Plant species recorded on *Niiwalarra* Island

The following list of native plant species recorded on *Niiwalarra* Island is information adapted from the Electronic Appendices for the paper *Flora and vegetation communities of selected islands off the Kimberley coast of Western Australia* (Lyons *et al.* 2014).

FAMILY	SPECIES
Acanthaceae	*Avicennia marina*
Aizoaceae	*Sesuvium portulacastrum*
Aizoaceae	*Trianthema pilosa*
Amaranthaceae	*Amaranthus interruptus*
	Amaranthus undulatus
	Gomphrena diffusa
	Ptilotus conicus
	Ptilotus corymbosus
	Ptilotus giganteus
	Ptilotus spicatus
Anacardiaceae	*Buchanania obovata*
Apocynaceae	*Cynanchum carnosum*
	Gymnanthera oblonga
	Marsdenia angustata
	Tylophora flexuosa
	Wrightia saligna
Araliaceae	*Trachymene didiscoides*
Arecaceae	*Livistona lorophylla*
Asparagaceae	*Asparagus racemosus*
	Lomandra tropica
Asteraceae	*Blumea diffusa*
	Blumea integrifolia
	Blumea saxatilis
	Pluchea rubelliflora
	Pterocaulon serrulatum
	Pterocaulon verbascifolium
	Pterocaulon sp. A Kimberley Flora (B.J. Carter 599)
	Wedelia asperrima
Bignoniaceae	*Dolichandrone heterophylla*
Boraginaceae	*Heliotropium cunninghamii*
	Heliotropium foliatum
	Heliotropium ventricosum
Burseraceae	*Canarium australianum*
Byblidaceae	*Byblis filifolia*
Campanulaceae	*Lobelia dioica*
	Wahlenbergia queenslandica
Cannabaceae	*Celtis philippensis*
	Trema tomentosa var. aspera
Capparaceae	*Cadaba capparoides*
	Capparis quiniflora
	Capparis sepiaria
	Capparis spinosa var. nummularia
	Capparis umbonata
Caryophyllaceae	*Polycarpaea involucrata*
Celastraceae	*Stackhousia intermedia*
Chenopodiaceae	*Salsola australis*

FAMILY	SPECIES
	Tecticornia indica subsp. indica
	Tecticornia pergranulata
Cleomaceae	*Cleome tetrandra*
	Cleome viscosa
Combretaceae	*Lumnitzera racemosa*
	Terminalia canescens
	Terminalia petiolaris
	Terminalia platyptera
Commelinaceae	*Cartonema spicatum*
	Commelina ciliata
	Murdannia graminea
Convolvulaceae	*Bonamia pannosa*
	Evolvulus alsinoides var. decumbens
	Ipomoea coptica
	Ipomoea costata
	Ipomoea eriocarpa
	Ipomoea macrantha
	Ipomoea pes-caprae subsp. brasiliensis
	Jacquemontia paniculata
	Merremia incisa
	Polymeria ambigua
	Xenostegia tridentata
Cucurbitaceae	*Cucumis maderaspatanus*
Cyperaceae	*Actinoschoenus sp. E Kimberley Flora (C.R. Dunlop 5309)*
	Bulbostylis barbata
	Crosslandia setifolia
	Cyperus carinatus
	Cyperus conicus
	Cyperus cracens
	Cyperus dactylotes
	Cyperus microcephalus subsp. microcephalus
	Cyperus pulchellus
	Cyperus scariosus
	Eleocharis spiralis
	Fimbristylis blepharolepis
	Fimbristylis cymosa
	Fimbristylis dichotoma
	Fimbristylis punctata
	Fimbristylis rara
	Fimbristylis sericea
	Fimbristylis subaristata
	Fimbristylis tetragona
	Fuirena ciliaris
	Schoenus falcatus
	Scleria brownie
	Scleria novae-hollandiae
Dioscoreaceae	*Dioscorea transversa*
Droseraceae	*Drosera dilatatopetiolaris*
Ebenaceae	*Diospyros maritima*
Euphorbiaceae	*Euphorbia alsiniflora*
	Euphorbia atoto

FAMILY	SPECIES
	Euphorbia drummondii subsp. drummondii
	Excoecaria ovalis
	Mallotus nesophilus
	Microstachys chamaelea
Fabaceae	*Abrus precatorius subsp. precatorius*
	Acacia cowleana
	Acacia gonocarpa
	Acacia lamprocarpa
	Acacia nuperrima
	Acacia platycarpa
	Acacia plectocarpa subsp. plectocarpa
	Acacia retinervis
	Acacia stigmatophylla
	Acacia translucens
	Acacia tumida var. tumida
	Aeschynomene indica
	Canavalia rosea
	Christia australasica
	Crotalaria alata
	Crotalaria medicaginea var. neglecta
	Crotalaria montana var. angustifolia
	Crotalaria novae-hollandiae
	Crotalaria ramosissima
	Crotalaria retusa
	Cullen badocanum
	Desmodium trichostachyum
	Erythrophleum chlorostachys
	Gompholobium subulatum
	Indigofera haplophylla
	Indigofera linifolia
	Indigofera sp. A Kimberley Flora (G.J. Keighery & N. Gibson 70)
	Jacksonia argentea
	Neptunia gracilis
	Senna goniodes
	Senna oligoclada
	Sesbania cannabina
	Sesbania formosa
	Sesbania simpliciuscula var. fitzroyensis
	Templetonia hookeri
	Tephrosia brachyodon
	Tephrosia oblongata
	Tephrosia phaeosperma
	Tephrosia stipuligera
Flagellariaceae	*Flagellaria indica*
Goodeniaceae	*Goodenia arachnoidea*
	Goodenia bicolor
	Goodenia byrnesii
	Scaevola macrostachya
	Scaevola taccada
	Scaevola sp. Sir Graham Moore Island (P.G. Wilson 11204)
Haemodoraceae	*Haemodorum parviflorum*

FAMILY	SPECIES
Haloragaceae	*Gonocarpus leptothecus*
Lamiaceae	*Clerodendrum floribundum var. coriaceum*
	Premna acuminata
	Vitex rotundifolia
Lauraceae	*Cassytha capillaris*
	Cassytha filiformis
Lecythidaceae	*Barringtonia acutangula subsp. acutangula*
	Planchonia careya
	Planchonia careya
Linderniaceae	*Lindernia tectanthera*
Loganiaceae	*Mitrasacme laxiceps*
Loganiaceae	*Strychnos lucida*
Loranthaceae	*Amyema dolichopoda*
	Amyema mackayensis
	Amyema sanguinea var. sanguinea
	Decaisnina angustata
	Dendrophthoe acacioides subsp. acacioides
Lythraceae	*Ammannia multiflora*
	Sonneratia alba
Malvaceae	*Brachychiton diversifolius subsp. diversifolius*
	Brachychiton fitzgeraldianus
	Brachychiton tridentatus
	Decaschistia byrnesii subsp. lavandulacea
	Gossypium exiguum
	Gossypium costulatum
	Grewia breviflora
	Grewia glabra
	Hibiscus fryxellii
	Hibiscus fryxellii var. mollis
	Hibiscus geranioides
	Hibiscus sabdariffa
	Hibiscus tiliaceus
	Melhania oblongifolia
	Thespesia populneoides
	Triumfetta albida
	Triumfetta aquila
	Waltheria indica
Marsileaceae	*Marsilea angustifolia*
Meliaceae	*Xylocarpus granatum*
Menispermaceae	*Tinospora smilacina*
Molluginaceae	*Glinus oppositifolius*
Moraceae	*Ficus aculeate*
	Ficus platypoda
	Trophis scandens
Myrtaceae	*Calytrix exstipulata*
	Corymbia bella
	Corymbia bleeseri
	Corymbia dendromerinx
	Corymbia greeniana
	Eucalyptus bigalerita
	Eucalyptus miniata

FAMILY	SPECIES
	Melaleuca leucadendra
	Melaleuca nervosa
	Melaleuca viridiflora
	Verticordia verticillata
Nyctaginaceae	*Boerhavia burbidgeana*
	Boerhavia dominii
Oleaceae	*Jasminum didymum subsp. didymum*
Onagraceae	*Ludwigia perennis*
Opiliaceae	*Opilia amentacea*
Orchidaceae	*Habenaria triplonema*
Orobanchaceae	*Buchnera ramosissima*
Pandanaceae	*Pandanus spiralis*
Passifloraceae	*Adenia heterophylla subsp. australis*
Phrymaceae	*Mimulus uvedaliae var. lutea*
Phyllanthaceae	*Antidesma ghaesembilla*
	Breynia cernua
	Bridelia tomentosa
	Phyllanthus aridus
	Phyllanthus maderaspatensis
	Phyllanthus reticulatus
	Sauropus trachyspermus
Plantaginaceae	*Stemodia lythrifolia*
Poaceae	*Alloteropsis semialata*
	Aristida exserta
	Aristida holathera var. holathera
	Arundinella nepalensis
	Cenchrus elymoides
	Chrysopogon fallax
	Chrysopogon latifolius
	Chrysopogon setifolius
	Cymbopogon ambiguus
	Eriachne ciliate
	Eriachne sulcata
	Heteropogon contortus
	Leptochloa fusca subsp. fusca
	Leptochloa neesii
	Mnesithea rottboellioides
	Panicum seminudum
	Paspalidium rarum
	Paspalum scrobiculatum
	Phragmites karka
	Schizachyrium fragile
	Sorghum plumosum var. plumosum
	Sorghum stipoideum
	Spinifex longifolius
	Sporobolus virginicus
	Triodia aff. bynoei (T.H. Handasyde TH 3146)
	Triodia microstachya s.l
	Triraphis mollis
	Urochloa piligera
	Xerochloa imberbis

FAMILY	SPECIES
Portulacaceae	*Calandrinia quadrivalvis*
	Calandrinia uniflora
	Portulaca bicolor
	Portulaca pilosa
Primulaceae	*Aegiceras corniculatum*
Proteaceae	*Grevillea agrifolia*
	Grevillea erythroclada
	Grevillea pteridifolia
	Grevillea refracta
	Hakea arborescens
	Persoonia falcata
	Stenocarpus acacioides
Pteridaceae	*Cheilanthes caudata*
	Cheilanthes contigua
	Platyzoma microphyllum
Putranjivaceae	*Drypetes deplanchei*
Rhizophoraceae	*Bruguiera exaristata*
	Ceriops australis
	Rhizophora stylosa
Rubiaceae	*Spermacoce auriculata*
	Spermacoce sp. Berthier Dunes (R.L. Barrett RLB 5753)
	Spermacoce leptoloba
	Tarenna pentamera
Rutaceae	*Boronia wilsonii*
	Glycosmis trifoliata
	Harrisonia brownii
	Zanthoxylum parviflorum
Santalaceae	*Exocarpos latifolius*
Sapindaceae	*Alectryon kimberleyanus*
	Atalaya salicifolia
	Atalaya variifolia
	Dodonaea hispidula
Sapotaceae	*Mimusops elengi*
	Sersalisia sericea
Scrophulariaceae	*Myoporum montanum*
Smilacaceae	*Smilax australis*
Solanaceae	*Solanum echinatum*
Stylidiaceae	*Stylidium multiscapum*
Taccaceae	*Tacca maculate*
Violaceae	*Hybanthus enneaspermus subsp. enneaspermus*
Vitaceae	*Ampelocissus acetosa*
	Cayratia trifolia
Xyridaceae	*Xyris complanata*
	Xyris oligantha
Zygophyllaceae	*Tribulus cistoides*

Appendix 3: Reptile species recorded on *Niiwalarra* Island

Twenty-nine terrestrial reptile taxa have been recorded on *Niiwalarra* Island (Palmer *et al.* 2013). Large-sized goanna burrows were also observed in sandy areas on the island during the Kimberley Islands Biological Survey suggesting *Varanus gouldii* or *V. panoptes* is present. The larger frog-eating reptile species (e.g. species of the Varanidae family, lizards; or the Elapidae family, snakes) are likely to be impacted by cane toads[26].

FAMILY	SPECIES
Agamidae	*Diporiphora magna*
Diplodactylidae	*Amalosia rhombifer*
	Oedura gracilis
	Strophurus ciliaris ciliaris
Gekkonidae	*Gehyra koira koira*
	Gehyra nana
	Heteronotia binoei
Pygopodidae	*Delma borea*
	Lialis burtonis
Scincidae	*Carlia munda*
	Carlia triacantha
	Cryptoblepharus metallicus/ruber
	Ctenotus inornatus
	Ctenotus mesotes
	Eremiascinus isolepis
	Lerista kalumburu
	Morethia ruficauda ruficauda
	Notoscincus ornatus wotjulum
	Tiliqua scincoides intermedia
Varanidae	*Varanus acanthurus*
	Varanus glauerti
	Varanus glebopalma
	Varanus gouldii or panoptes (only evidence of species observed)
Typhlopidae	*Anilios kimberleyensis*
Boidae	*Antaresia childreni*
	Liasis olivaceus olivaceus
Colubridae	*Dendrelaphis punctulata*
Elapidae	*Demansia papuensis*
	Pseudechis weigeli
	Pseudonaja mengdeni

[26] As discussed in journal paper on predator responses to cane toads (*Behavioural responses of reptile predators to invasive cane toads in tropical Australia*, Pearson *et al.* 2014).

Appendix 4: Section 56A joint management agreement

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