



NSW National Parks and Wildlife Service

# Barunguba Montague Island Nature Reserve

Draft planning considerations



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Cover photo: Greater crested terns on Barunguba Montague Island. Stuart Cohen/DPE

This report is a draft for public comment. The provisions in the final report may differ from the provisions of this draft report.

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## How to use this report

This planning considerations report outlines the matters considered in preparing the *Barunguba Montague Island Nature Reserve draft plan of management*, including the park's key values, management principles and management considerations. Further information is provided in the appendices, including relevant legislation (Appendix A) and scientific names for common names of species (Appendix B).

**It is recommended that readers of this report also read the draft plan of management.**

The plan of management describes the desired outcomes for the park's values and actions that the National Parks and Wildlife Service (NPWS) proposes to undertake to achieve these outcomes. It also sets out the recreational and commercial activities that are permitted in the park and any requirements to undertake these activities, including whether consent must be sought from NPWS to undertake them.

This planning considerations report will be updated when appropriate, for example if we have new information on:

- the values of the park, for example, new threatened species
- management approaches, for example, new pest management techniques
- new programs.

Changes will only be made to this report if they are consistent with the plan of management.

## Acknowledgements

Barunguba Montague Island Nature Reserve is in the traditional Country of the Yuin People. This report was prepared by NPWS, with assistance from relevant stakeholders.

## Contact us

For more information about this plan of management or Barunguba Montague Island Nature Reserve, contact NPWS at [npws.eurobodalla@environment.nsw.gov.au](mailto:npws.eurobodalla@environment.nsw.gov.au), PO Box 4282 Narooma NSW 2546 or by telephone on 02 4476 0800.

## **Acknowledgement of Country**

Barunguba Montague Island is Yuin Country. Aboriginal people have a deep spiritual and cultural connection to this Country. Their ancestors have lived here for thousands of years and, in doing so, form part of this living landscape.

Barunguba Montague Island is an integral part of a rich and complex cultural landscape that is of profound significance. The rights of the Yuin People, their enduring connections to Country and their aspirations for their Country are acknowledged and respected.





Figure 1 Map of Barunguba Montague Island Nature Reserve



# Barunguba Montague Island Nature Reserve

Barunguba Montague Island Nature Reserve (also referred to as ‘the park’ in this document) is located on Barunguba Montague Island, an island in the Tasman Sea, approximately 9 km south-east of Narooma, off the Far South Coast of New South Wales (NSW) (see Figure 1). The park comprises all of Barunguba Montague Island, above the mean high water mark, and has a total area of 82 ha. The island was dedicated as Montague Island Nature Reserve in January 1990, except for a relatively small lot (0.35 ha) containing Montague Island Lighthouse, which was retained by the Australian Maritime Safety Authority until it was reserved in March 2003.

The island was officially dual named Barunguba Montague Island in 2021, and the park named changed to Barunguba Montague Island Nature Reserve on 7 July 2023. Place names help to convey the significance, sense of history and identity of a place. Dual naming recognises the significance of the island to Aboriginal people and promotes this significance to the broader community.

Barunguba Montague Island has a north–south orientation and is 1.8 km long and approximately 500 m wide. The island has 2 elevated sections divided by a narrow ravine. The 2 elevated sections are commonly referred to as the north and south ‘islands’. The south island is approximately twice the size of the north island. The lighthouse and other heritage assets are located on the south island. There has been no development on the north island.

Aboriginal people have a long association with Barunguba dating back at least 20,000 years (HLCD 2008). The island is part of a broader landscape of cultural and social significance to the Yuin Aboriginal people, which includes the landforms of Gulaga Mount Dromedary, Biamanga Mumbulla Mountain and Najanuka Little Dromedary Mountain. Barunguba, Najanuka and Gulaga are connected through song lines. In 2018 Barunguba was declared an Aboriginal place, in recognition of its importance as a very significant ceremonial area and a significant resource gathering place for the Koori people on the Far South Coast of New South Wales.

Barunguba Montague Island also has shared historical significance, largely associated with the establishment and operation of the lighthouse. Europeans have been living on Barunguba Montague Island, providing coastal surveillance and recording the weather since the lighthouse commenced operating in 1881.

The proximity of the continental shelf and the confluence of the warm East Australian Current and cooler waters originating off southern Australia create a marine environment that supports a wide diversity of life, including a colony of fur seals and a variety of seabirds, many of which shelter or breed on Barunguba. The nature reserve has been declared as an asset of intergenerational significance (see Box 1) to enhance protection and management of its breeding population of Gould’s petrel.

Batmans Marine Park was established in 2006 to protect the rich marine environment. The waters surrounding the park contain a mix of sanctuary and habitat protection zones (see Box 2).

In 2014, the park was included on the International Union for the Conservation of Nature (IUCN) Green List of Protected and Conserved Areas, recognising excellence in protected area management (see Box 3). Only 3 other Australian reserves are currently on the Green List: Arakwal National Park and Cape Byron State Conservation Area in New South Wales, and Warby-Ovens National Park in Victoria.



Barunguba Montague Island Nature Reserve lies within the Bateman subregion of the South East Corner Bioregion on the south-east coast of New South Wales. The South East Corner Bioregion is characterised by folded and metamorphosed Ordovician to Devonian (approximately 350 to 488 million years old) sedimentary rocks intruded by granite. The most prominent feature of the region is the Great Escarpment, a line of steep hills and gorges on the coastal side of the Great Divide. The Bateman subregion has characteristic steep hills below the Great Escarpment and vegetation communities of heath and eucalypt woodlands.

### Box 1: Assets of intergenerational significance

Under section 153G of the *National Parks and Wildlife Act 1974*, the Minister for the Environment has declared Barunguba Montague Island Nature Reserve as an asset of intergenerational significance for the protection of vulnerable Gould's petrel and their habitat.

An asset of intergenerational significance can be any area of exceptional value – environmental or cultural – that warrants special protection, including dedicated management measures.

The declaration of an environmental asset of intergenerational significance is informed by a range of considerations, including:

- sites for critically endangered, endangered or vulnerable species
- important areas for breeding, feeding or shelter
- locations where locally extinct mammal species are being reintroduced
- locations where the national park otherwise provides important habitat.

For each asset of intergenerational significance, NPWS prepares and implements a concise **conservation action plan** which sets out:

- key risks to the declared area of habitat for the threatened species
- priority actions to reduce risks to this important habitat – such as dedicated feral animal control or fire management, or the establishment of insurance populations
- actions to measure and report on the health/population of the threatened species.

A conservation action plan has been prepared for Barunguba Montague Island Nature Reserve and its population of Gould's petrels (NPWS 2022).

Opportunities to declare land as cultural assets of intergenerational significance will also be examined. These cultural assets may include lands with tangible cultural heritage of importance to Aboriginal people, such as rock art, scar trees and middens. Protection may also be provided to intangible values, such as places of spiritual importance where storylines live on in the landscape and where significant cultural activities occurred and continue to take place.

### Box 2: Batemans Marine Park

Batemans Marine Park was established in 2006 and is managed under the *Marine Estate Management Act 2014* by the NSW Department of Primary Industries. The marine park covers some 850 km<sup>2</sup> of NSW coastal waters from Murramarang Beach near Bawley Point to Murunna Point on the southern side of the Wallaga Lake entrance. It includes rivers, estuaries, bays, lagoons, inlets, and saline and brackish coastal lakes;

and extends to waters surrounding offshore islands, including the rich marine environment surrounding Barunguba Montague Island. Key habitats in the marine park include intertidal rocky shores, offshore rocky reefs, kelp beds, seagrasses, mangroves, sponge gardens, sandy beaches, estuaries and open waters.

Barunguba Montague Island is recognised as a key feature of the marine park, providing habitat for fur seals, shearwaters, little penguins and other seabirds. It's waters are recognised as critical habitat for the critically endangered grey nurse shark, protect large aggregations of morwong, trevally and snapper and are zoned as either sanctuary or habitat protection zones (see Figure 2).

Activities such as recreational fishing, commercial fishing and collection of materials are typically prohibited in sanctuary zones. However, in December 2019, the NSW Government announced increased recreational fishing access to sanctuary zones in the Batemans Marine Park, including the 2 sanctuary zones adjacent to Barunguba.

Recreational fishing is generally allowed in habitat protection zones while most types of commercial fishing are prohibited. Within the inner habitat protection zone, on the northern coast of the island, fishing is subject to seasonal restrictions to protect grey nurse sharks. These seasonal restrictions also apply in the sanctuary zones adjacent to the island where recreational fishing is allowed.

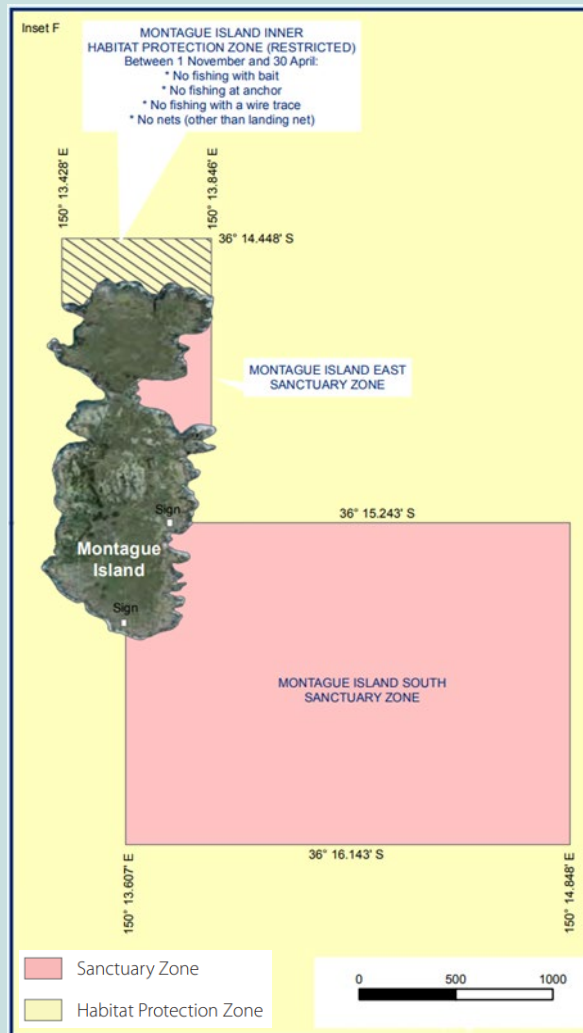


Figure 2 Batemans Marine Park Zoning Map, extract of Inset F Montague Island (DPI 2018)

### Box 3: IUCN Green List

The overarching objective of the IUCN Green List of Protected and Conserved Areas (IUCN Green List program, often referred to simply as the Green List) is to 'increase the number of protected and conserved areas that deliver successful conservation outcomes through effective and equitable governance and management'.

At the core of the IUCN Green List program is the IUCN Green List Standard, the first global standard of best practice for area-based conservation. The objective of the standard is to 'provide a global benchmark for protected and conserved areas to assess whether they are achieving successful conservation outcomes through effective and equitable governance and management'.

The standard is organised into 4 components of successful nature conservation in protected areas. There are 3 baseline components: good governance, sound design and planning, and effective management. Together, these baseline components support the fourth component: successful conservation outcomes.

A protected or conserved area that reaches the IUCN Green List Standard is certified and recognised as achieving ongoing results for people and nature in a fair and effective way. Gaining Green List status demonstrates:

- **respect** for the local community through fair and meaningful engagement of rights-holders and stakeholders
- **design** – planning that identifies the needs to secure the important values of the area
- **effective management** – monitoring of the status of these important values
- **successful conservation results** for nature and for people
- **clear contribution** to climate change responses, health and wellbeing and other challenges.



# 1. Protecting the natural environment

## 1.1 Geology, landform and hydrology

Barunguba Montague Island was formed around 90 million years ago from volcanic activity associated with Gulaga Mount Dromedary. At its height as an active volcano, Gulaga would have reached around 2,000 m, its lava-clad slopes stretching from Tuross in the north to beyond Bermagui in the south. On its flanks were smaller volcanoes, which made Najanuka Little Dromedary Mountain and Barunguba Montague Island, and several other cones which have now eroded down to the level of the surrounding hills (Eggleton 2014).

Much of this area is composed of the late Cretaceous age **Mount Dromedary Igneous Complex** geological formation which extends across 40 km<sup>2</sup>. The summit and upper slopes of Gulaga consist of banatite, a rock lying between a quartz monzonite and a quartz diorite in composition, which occurs in a somewhat circular mass with a diameter of approximately 4.8 km. Monzonite surrounds the banatite core (Chalker and Bembrick 1975, 1976).

Banatite also occurs on the southern section (the 'south island') of Barunguba and at Najanuka. The northern section of Barunguba (the 'north island') is composed of an older volcanic complex consisting of andesite lava and tuffs (Chalker and Bembrick 1975, 1976). See Photo 1.

The south island of Barunguba reaches 64 m above sea level and has many rock outcrops. The northern island is slightly lower, with fewer rock outcrops but with steep cliffs on the coastline. The gap between the 2 rock formations formed a weak zone which has eroded to below sea level (Heyligers and Adams 2004).

Barunguba has a cover of dune sand up to one metre in depth (NPWS 2003). The soils formed on the island's dunes are coarse textured, having formed in windy sand environments over the top of bedrock. They range from black to red-brown in colour, have limited drainage qualities and are of an acidic nature. Soil depth varies across the island. Where rock outcrops do not prevent the development of soils, soils are moderately deep, allowing seabirds to create burrows. Where the dunes have been cemented by the leaching of iron oxides and humates, a distinctive 'coffee rock' horizon has developed. This is most evident on the eastern side of the island (Heyligers and Adams 2004).

Swampy areas occur on the slopes, particularly near the southern end of the island. Freshwater springs provide more or less permanent water, enabling extended stays by Aboriginal people (Sullivan 1975; OEH 2017) (see Section 2.1).

Around 20,000 years ago, with the sea level approximately 125 m lower than today, Barunguba would have been located some 6 km inland. Ten thousand years ago, the sea level was approximately 30 m below its present level, and Barunguba formed the headland of a narrow promontory extending 8 km from what is now Cape Dromedary. Around 9,000 years ago, sea levels rose, and Barunguba was isolated from the mainland (Sullivan 1975).

### 1.1.1 Management considerations and opportunities

The coarse textured and sandy soils are prone to erosion where they are not protected by vegetation cover. The protective vegetation cover is most at risk where there are high levels of human impact, such as at key visitor sites and along tracks and trails used by visitors and for management. These sites should be monitored. Where erosion occurs, it should be repaired as soon as practicable.

Freshwater springs have played an important role providing for Aboriginal people and Europeans. These springs also have an important cultural significance for Aboriginal people and should be protected and maintained.



**Photo 1** Aerial view of Barunguba Montague Island looking south. The different geology is clearly visible – the north island has fewer rock outcrops and higher cliffs. Geoff Comfort/DPE

## 1.2 Native plants

The native vegetation of the park provides important native animal habitat, particularly for nesting seabirds.

The earliest written records of the vegetation date back to 1814, when Matthew Flinders noted the island supported small trees. Since that time, European settlement has significantly impacted the island's vegetation in 3 key phases: initially removing trees and shrubs; then introducing invasive grasses; and more recently removing introduced grasses and planting local remnant headland native plants to improve habitat for native animals.

Maps dating from the construction of the lighthouse in the 1880s describe scrub, trees and grass. Tree species present at that time probably included those typical of mainland coastal headlands, including bangalay, banksias, acacias, casuarinas and pigeon-berries. In 1907 Arthur Francis Hull observed that the only trees on the island were a few very ragged and dwarfed banksias and pigeon-berries scattered at wide intervals. By 1932, when the botanist FA Rodway visited, trees were no longer present and shrub species, including coastal rosemary, white correa, sea berry saltbush and sea box, only persisted along steep sections of cliffs.

Rabbits and goats, both introduced in the mid to late 1800s to provide a food supply for shipwrecked sailors, may have been responsible for the loss of trees and the reduced distribution of shrubs (Pacey 2013; Heyligers and Adams 2004). Locals visiting in 1869 commented that the island was literally swarming with rabbits (Pacey 2013). Lighthouse

keepers may also have played a part, cutting down trees to supplement coal supplies for cooking and heating.

The main vegetation types across the park were mapped in the early 1990s (Heyligers 1993, see Figure 3), and changes over time described in the early 2000s (Heyligers and Adams 2004). Following the removal of most woody plants, the vegetation was dominated by spiny-headed mat-rush, which thickly covered much of the island. Bracken and coast tussock grass commonly occurred with spiny-headed mat-rush and were sometimes locally dominant.

Other species frequently occurring included dusky coral pea, rock isotome, sea berry saltbush and milk vine. Where drainage was impeded, there was a ground cover of commelina and common reed.

Where soils are very shallow, such as over and among fractured rock outcrops or on the higher parts of the island, a lower, more mixed vegetation was found. In addition to spiny-headed mat-rush, bracken and coast tussock grass, this community included kangaroo grass, lovegrass and blady grass. Ferns were found to grow in small rock crevices.

A low carpet-like vegetation, dominated by prickly couch and sand couch, occurred in areas subject to heavy salt spray, including along the very southern coastline of the island, and in places along the island's east coast. Scattered among the grasses were herbs, including kidney weed and New Zealand spinach (also known as warrigal greens). Several species of lichen were found on exposed rock surfaces, with vigorous growth on southerly aspects.



**Photo 2 Extensive recovery of the shrub layer has occurred following control of kikuyu grass and planting of native plants. Justin Gilligan**

Following extensive planting of more than 90,000 native plants as part of an integrated program to control kikuyu grass and to restore habitat for seabirds (see Box 4), areas of the south island now have a more diverse and extensive vegetation cover, including a ground layer or understory of spiny-headed mat-rush, coastal rosemary and coast tussock grass; a



shrub layer of bracelet honey-myrtle, swamp oak, drooping sheoak, coast banksia and coastal wattle; and a canopy layer of bangalay.

## 1.2.1 Management considerations and opportunities

Weeds, including the introduced kikuyu grass, are a key threat to the island's native plants. Other key threats include climate change, visitation (particularly inappropriate visitor behaviour) and inappropriate fire regimes. Pest animals (goats, rabbits and mice) have been eradicated from the park and no longer threaten the island's native plants.

Kikuyu grass poses a threat to seabird breeding, particularly nesting little penguins and shearwaters. Since 2001, extensive efforts have been made to control kikuyu grass and revegetate with native plants. Areas of the park now have a thick shrub layer following significant reductions in the extent of kikuyu grass and planting of more than 90,000 native plants (see Box 5 for a discussion of kikuyu grass control and the Seabird Habitat Restoration project). A **habitat restoration plan** would help to guide future revegetation and habitat restoration work. A plant nursery has been established on the island to support that work.

Other weeds adversely impacting native plants and animals include exotic vines and scramblers such as Cape ivy, dolichos pea and coastal morning glory. See Section 1.3.1 for a more detailed discussion of the weeds and pest animals that occur, or have occurred, on the island.

Ongoing work in the park to restore native vegetation may be threatened by the effects of climate change, including increasing temperatures, seasonal shifts in rainfall, and increasing intensity and frequency of storm events. Increasing temperatures and seasonal shifts in rainfall may stress plants, particularly plants recently established as part of the Seabird Habitat Restoration project. Increased storm events could lead to more intense overland flows and to larger areas of the park being exposed to higher levels of saltwater inundation, both of which could affect the ability of existing plants to survive. See Section 1.3.1 (and Box 7) for more information about climate change and its potential impacts on Barunguba Montague Island Nature Reserve.

Visitation also has potential to threaten native plants. For example, while its separation from the mainland protects the park, weeds, pests, disease or pathogens could be introduced by visitors. Preparation of a biosecurity plan that includes emergency response procedures would help to minimise and mitigate the potential impacts of any biosecurity threats and is a requirement of the asset of intergenerational significance conservation action plan for Gould's petrel. See Box 1 for more information about assets of intergenerational significance.

Public visitation to the island is regulated to limit the potential for impacts on native plants and other park values, including native animals, Aboriginal cultural heritage and historic heritage. See Section 3 for more information.

Inappropriate fire regimes are generally considered a threat to native plants. However, on Barunguba Montague Island, there have been significant changes to the native vegetation since European settlement. These changes mean it is no longer possible to classify the vegetation community and determine biodiversity thresholds for fire (OEH 2005). Despite this, fire is managed to protect life and property, and the park's natural, historic and cultural heritage. Section 1.3.1 (and Box 6) provide additional information about fire management in the park.

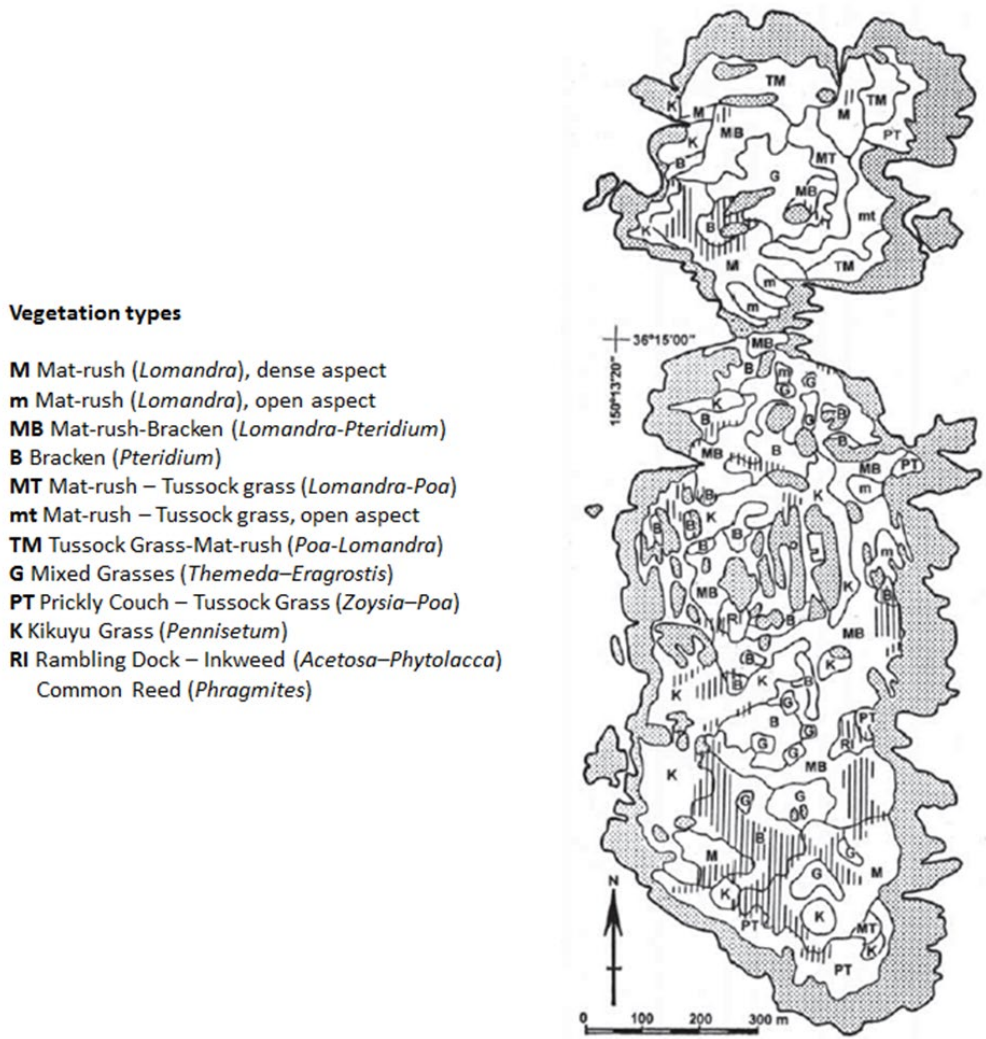


Figure 3 Early 1990s vegetation mapping (Heyligers 1993)

### 1.3 Native animals

Barunguba Montague Island Nature Reserve supports a diverse assemblage of native animals. The park is a haul-out and breeding site for Australian fur seals and long-nosed fur seals. More than 100 species of birds have been recorded in the park, including 20 breeding species. An estimated 15,000 pairs of shearwaters breed annually in the park, predominately short-tailed shearwaters and wedge-tailed shearwaters, and fewer than 100 pairs of sooty shearwaters (Montague Island Partners 2009). The park also supports smaller colonies of greater crested terns and silver gulls. It is home to one of the largest colonies of little penguins in New South Wales, and more recent arrivals – Gould’s petrels (see Box 4), white-faced storm-petrels and Caspian terns – are now also breeding on the island (Carlile et al. 2020). The surrounding marine park contains a diverse range of marine fauna, including migrating whales, turtles, fur seals, fish and crustaceans.

A total of 9 threatened fauna species listed under the *Biodiversity Conservation Act 2016* have been recorded in the park, and a further 8 are listed as migratory under various international agreements under the *Environment Protection and Biodiversity Conservation Act 1999* (see Table 1 and Table 2).

Strategies for the conservation of threatened species, populations and ecological communities have been set out in a statewide **Biodiversity Conservation Program**.

Actions listed in each of these strategies are prioritised and implemented through the Saving our Species program, which aims to maximise the number of threatened species that are secured in the wild in New South Wales for 100 years.



**Photo 3** Greater crested tern nesting site on Barunguba Montague Island. Stuart Cohen/DPE

Recovery plans prepared previously may still provide useful information but no longer determine the actions required for the conservation of NSW-listed threatened species. The Australian Government prepares recovery plans for nationally listed threatened species under the Environment Protection and Biodiversity Conservation Act. These plans apply to nationally listed threatened species occurring in the park.

## Shearwaters

Shearwaters are migratory birds that spend most of their life at sea, only returning to land to breed. Uniquely, 3 species of shearwaters occur in the park – short-tailed, wedge-tailed and sooty shearwaters – breeding in mixed colonies by burrowing into sandy soils, typically under vegetation such as spiny-headed mat-rush (Fullagar et al. 1991). Each of these 3 species of shearwater breed at a range of sites around the Pacific and Indian oceans, generally in the southern hemisphere (Marchant and Higgins 1990; Skira 1991; Newman et al. 2009), except for the wedge-tailed shearwater, which also breeds on islands in the tropics of the northern hemisphere (Dyer and Carter 1997) and has shown some expansion to its distribution in recent years (see Priddel et al. 2017). Nonetheless, Barunguba Montague Island provides important breeding habitat for shearwaters, with birds returning to the same nesting area each year.

The southern hemisphere breeding season begins with shearwaters' return to the colonies in September and ends with their departure in April. Breeding takes place in burrows that can



be up to 2 m long, with less than one-quarter of the park having deep sandy soils suitable for shearwater nesting (Fullagar 1973).

The number of shearwater fledglings produced on Barunguba Montague Island each year has been recorded since the early 1960s in one of the longest, continuous seabird studies in the world. Records over this time show considerable variability in breeding success, from over 2,000 chicks fledged per hectare in some years to catastrophic breeding failure in others (for example, when extreme summer rainfall flooded burrows; see Tiller et al. 2013). While the number of fledglings produced is variable, long-term data shows the species composition shifting with a gradual decline in the dominance of short-tailed shearwaters and an increase in the proportion of wedge-tailed shearwaters (55% of burrows in 2021) with sooty shearwaters maintaining low numbers of less than 1% of burrows in all years (Crowley et al. 2021).

Shearwaters, or muttonbirds, and other seabirds nesting on Barunguba Montague Island, have provided local Aboriginal people with an important food source for countless generations. Barunguba is a declared Aboriginal place in recognition of its importance as a ceremonial area and a resource gathering place for the Koori people on the NSW Far South Coast (see Sections 2.1 and 2.2).



Photo 4 Adult shearwater resting on Barunguba Montague Island. Mike Crowley

#### **Box 4: Recent discoveries on the island**

##### **Gould's petrel**

In the 1990s, the Australian population of Gould's petrel declined to around 200 breeding pairs (Priddel et al. 1995). Conservation efforts to improve Gould's petrel habitat on Cabbage Tree Island, also known as John Gould Nature Reserve, an uninhabited island off Port Stephens on the NSW coast, led to a population recovery with estimates in 2006 of up to 1,000 breeding pairs (Priddel and Carlile 2007). In 2009

the species conservation status under the Biodiversity Conservation Act was downgraded from endangered to vulnerable because of the population recovery.

The first sighting of a Gould's petrel at Barunguba Montague Island Nature Reserve was in 2012 when 2 birds were identified on the north island during a terrestrial bird survey (Carlile et al. 2020). This same year a second site with a single adult was found, and a chick fledged from the initial site. Additional surveys and continued monitoring of this threatened species show the population to be expanding – 20 nesting locations were identified in 2016 (Carlile et al. 2020), and up to 77 marked nest sites with 17 nests having chicks present were observed in 2021 (DPE survey). The interlinking of the Barunguba Montague Island and Cabbage Tree Island colonies was confirmed in 2021 when an adult bird, originally banded on Cabbage Tree Island as a chick, was found in a burrow on Barunguba Montague Island.

The presence of Gould's petrel in the park is attributed to achievements in the recovery of the species on other islands in New South Wales and has been supported by the removal of vertebrate pests such as goats, rabbits and mice and by the Seabird Habitat Restoration project work undertaken on Barunguba Montague Island (see Box 5).

Barunguba Montague Island Nature Reserve has been declared as an asset of intergenerational significance for the protection of Gould's petrel and their habitat and a conservation action plan has been prepared (NPWS 2022). NPWS is required to implement the conservation activities described in the action plan.



**Photo 5** Gould's petrel in burrow on Barunguba Montague Island. Yuna Kim

### **White-faced storm-petrel**

Another beneficiary of the improved habitat in the park, including the removal of vertebrate pests, is the white-faced storm-petrel, also first discovered on the island in 2012. These small birds are vulnerable to predation from rats and mice. The white-faced storm-petrels on Barunguba Montague Island have a strong association with sea

berry saltbush. The dense, lower woody branches of sea berry saltbush create a matrix that is largely impenetrable to other seabirds.

This plant species was previously restricted to cliff margins by heavy grazing by goats (Heyligers and Adams 2004) but is now recovering and slowly spreading onto shallow-soiled upper slopes of the island. Recent research on the island has demonstrated that without this protective woody barrier, storm-petrel nests are vulnerable to competition from larger burrowing seabird species (Carlile et al. 2020).



**Photo 6** An adult white-faced storm-petrel outside a burrow on Barunguba Montague Island. Lachlan Hall

## Little penguins

Little penguins return to Barunguba Montague Island to nest during the spring and early summer months, and a post-breeding moult period restricts them to land for up to 2 weeks (Stahel and Gales 1987). Outside of these events little penguins return to the ocean to spend extended periods of time away from the island. The island's little penguin population has been surveyed since 1992, with estimates of between 3,500 and 7,000 breeding pairs annually (Fullagar and Heyligers 1995; Trezise 1999; Weerheim et al. 2003; NPWS survey data), making it one of the largest little penguin colonies in New South Wales. Nesting adult penguins usually forage within 25 km of the island, targeting mainly small schooling pelagic species (such as sardine, anchovy and sprat) that aggregate within cooler currents around the island (Weber 1994; Bester 1997; Carroll et al. 2016). However, the warm East Australian Current can influence foraging distances of breeding penguins on Barunguba Montague Island, with warmer sea surface temperatures around the island associated with greater distances that penguins must travel to capture food (Carroll et al. 2016). The accessibility and abundance of food near Barunguba Montague Island during the penguin breeding season is likely to influence fluctuations in the number of penguins breeding and their nesting outcomes in any one year (Weber 1994; Trezise 1999).

One of the greatest threats to little penguins on Barunguba is kikuyu grass. This introduced grass forms thick, largely impenetrable mats that can entangle adults and chicks, block access to burrows and choke out the preferred vegetation for penguin nests. NPWS has been undertaking the Seabird Habitat Restoration project to control and reduce the extent of



kikuyu grass and to re-establish habitat suitable for little penguins and other seabirds (see Box 5).

On Barunguba, little penguins rarely nest within soil burrows but prefer the dense cover of native spiny-headed mat-rush, which dominates much of the island's vegetation. Vegetative cover above little penguin nests can improve microclimates and reduce burrow temperatures, increase their use, reduce thermoregulation behaviours and improve breeding success for individuals within shaded nests (Fortescue 1992; Colombelli-Négrel 2019; Ratz 2019). Accordingly, revegetation efforts associated with the Seabird Habitat Restoration project have included planting an understory dominated by spiny-headed mat-rush and a canopy of local remnant headland species such as bracelet honey-myrtle, swamp oak, drooping sheoak, coast banksia, coastal wattle and bangalay.

At dusk, little penguins come ashore at over 40 'landing sites' around the island. They rest and preen at the landing site until dusk deepens, then progressively walk, or 'parade' along set pathways before branching off to make their way to their secluded nest sites. A purpose-built viewing platform at Jetty Bay allows visitors to watch returning penguins (see Section 3.3). Walking on land is energetically taxing for little penguins, so the greatest nest densities are found closer to the shoreline, highlighting the importance of suitable nesting habitat close to shore.



Photo 7 Little penguins. Stuart Cohen/DPE

## Fur seals

Barunguba Montague Island is an important site for Australian fur seals and long-nosed fur seals. Both species are listed as threatened in New South Wales and have been protected within Australian waters since 1975. Their populations are recovering from overharvesting, largely for skins, during the 1800s and their treatment as a competitor by commercial fishers during the early 1900s (Kirkwood et al. 2010).

The largest aggregation of fur seals on the NSW coast occurs on Barunguba. Until recently, the greatest concentration of fur seals was typically found on the north-western side of the island. They are now also using the western and southern shorelines, and at times can be found on the island at considerable distances from the water, being agile enough to climb steep cliffs to haul out on grassy slopes and ridges.

An increasing number of fur seal pups are being born on the island, which has been recognised as a breeding site for both species since 2014 (McIntosh et al. 2014). Pups are born from November to January and are present until they are weaned from spring onwards.

While present all year round, numbers of both species typically peak from August to October, when juveniles and large numbers of adults are simultaneously present. Increases in both populations are evident through surveys in 1993, 1994 (306 Australian, 16 long-nosed), and in 1999 with up to 640 fur seals (530 Australian, 110 long-nosed) (Shaughnessy et al. 2001).

Fur seals are particularly sensitive to disturbance when on land. The greatest incidence of disturbance to hauled out fur seals on Barunguba Montague Island has been recorded during spring, when the colony size is at its largest and many juveniles are ashore. Juveniles are particularly responsive to disturbance and appear to panic more often when approached by boats, particularly if the approach is too close, upwind, or too fast (Shaughnessy et al. 2008). Fur seals on Barunguba Montague Island have been viewed by tourists on tour boats since 1991, with in-water snorkelling and diving with the seals activities gaining popularity since their first commercialisation and permits issued from 2009. Marine mammal approach distances are regulated within the Biodiversity Conservation Regulation 2017 to minimise disturbance and include distances beyond which a vessel or person may not approach breeding, hauled out and swimming seals.



Photo 8 Australian fur seals on Barunguba Montague Island. Mike Jarman/DPE

### Other threatened species

As well as providing habitat for shearwaters, little penguins and threatened fur seals, the island is an important breeding site for a variety of threatened birds, including Gould's petrel, which was first recorded on the island in 2012 (see Box 4).

Sooty oystercatchers are found across the rocky periphery of the island, with pairs establishing territories from October to February, where they lay eggs above the shoreline in open rocky 'scrapes'. Pairs of this threatened species are disturbed if approached, and their eggs and chicks are vulnerable to trampling, predation by avian predators (such as *Corvid* species) and inundation by rough ocean conditions. Sooty oystercatchers forage on a variety of prey, including limpets, crabs, urchins, mussels, cunjevoi and periwinkles (Aplin and Cockburn 2012).

Other threatened and migratory species, whilst not breeding in the park, utilise it as an important foraging or roosting location (see Table 1 and Table 2).

## Other animal species

A total of 146 bird species have been recorded on Barunguba Montague Island or in the adjacent waters. New species sightings, such as the scarlet honeyeater sighted in March 2021 (Crowley et al. 2021), now occur regularly. These sightings of new bird species have been influenced by kikuyu grass removal and the subsequent regeneration of native vegetation undertaken as part of the Seabird Habitat Restoration project. For example, New Holland honeyeaters are now commonly observed foraging on flowering banksias and melaleuca.

Two large nesting colonies of greater crested tern and silver gull occur from September to January, with both species now having up to 2,000 breeding pairs annually. The island's silver gull colony has steadily decreased, possibly due to movements towards urban areas, from up to 10,000 nests in 1973 (DECC 2009). In recent years silver gulls and greater crested terns have changed their distribution to include areas around the lightstation, the quarry area and Jetty Bay. Like other seabirds nesting on Barunguba, these ground-nesting birds are sensitive to human disturbance.

Other birds known to breed in the park include welcome swallow, brown quail, little grassbird, golden-headed cisticola, Australian pipit, yellow-faced honeyeater, nankeen kestrel, peregrine falcon, swamp harrier and buff-banded rail.

Birds that commonly visit the park, but are not known to breed, include the great cormorant, little pied cormorant, white-faced heron, white-fronted tern, silvereye, bar-shouldered dove, willy wagtail, black-shouldered kite and spotted harrier. Less common species include sacred kingfisher, rufous fantail, rose robin, brown goshawk and crimson rosella.

Reptiles found in the park include the grass sun-skink and white's skink which are readily sighted across the island. The white-striped free-tailed bat has been heard calling (Fullagar et al. 1998). There have also been recent sightings of striped marsh frog adults and tadpoles in temporary freshwater puddles and the vegetable garden water well.

Over 110 species of invertebrates have been recorded on Barunguba, including over 30 species of moth and butterfly, 15 species of spider including the humped golden orb-weaving spider, as well as numerous centipedes, millipedes, crickets and wasps (Perkins 2019).

**Table 1 Threatened and migratory native birds recorded in the park**

Common name	BC Act status	EPBC Act status
Australasian bittern	E	E
Caspian tern	–	M
Dusky woodswallow	V	–
Gould's petrel	V	E
Greater crested tern	–	M
Pink robin	V	–
Ruddy turnstone	–	M
Sharp-tailed sandpiper	–	M
Short-tailed shearwater	–	M
Sooty oystercatcher	V	–
Sooty shearwater	–	M
Spotted harrier	V	–



Common name	BC Act status	EPBC Act status
Wedge-tailed shearwater	–	M
Whimbrel	–	M
White-bellied sea eagle	V	–

Note: BC Act = Biodiversity Conservation Act; EPBC Act = Environment Protection and Biodiversity Conservation Act; V = vulnerable; E = Endangered; M = Migratory; – = not listed.

Source: NSW BioNet Atlas (3/3/2020), DPE observation, CSIRO datasets, Montague Island Partners.

**Table 2 Threatened native mammals recorded in the park**

Common name	BC Act status	EPBC Act status
Australian fur seal	V	–
Long-nosed fur seal	V	–

Note: BC Act = Biodiversity Conservation Act; EPBC Act = Environment Protection and Biodiversity Conservation Act; V = vulnerable; E = Endangered; M = Migratory; – = not listed.

Source: NSW BioNet Atlas (3/3/2020), DPE observation, CSIRO datasets, Montague Island Partners.

### 1.3.1 Management considerations and opportunities

Key threats to the park's native animals include weeds, inappropriate fire (especially during breeding or nesting seasons), visitation and inappropriate visitor behaviour, and climate change. Pest animals have been eradicated from the park and no longer directly threaten native plants and animals. However, maintaining biosecurity measures that limit the reintroduction of pests remains a very high priority.

#### Pests and weeds

Effective planning and management of pest animals at Barunguba Montague Island Nature Reserve led to the park being declared vertebrate pest-free in 2009 (Priddel et al. 2011). The range of pest animals formerly present in the park included goats, rabbits and mice. While goats were eradicated in 1990, rabbits persisted, continuing to contribute to soil erosion and damaging vegetation for nearly 2 decades. Rabbits and mice were eradicated during the winter of 2007, when mouse densities were seasonally low and after rabbit numbers had been reduced substantially, probably by a natural outbreak of rabbit haemorrhagic disease (Priddel et al. 2011).

The key weed that threatens the park's native animals is the introduced kikuyu grass. Little penguins and shearwaters generally have lower nest densities in kikuyu grass and a shift in nest distribution away from areas dominated by kikuyu grass has been observed on Barunguba Montague Island (Weerheim et al. 2003; Crowley et al. 2021).

The **Seabird Habitat Restoration project** (see Box 5) has reduced the extent of kikuyu grass and restored breeding habitat for little penguins and other seabirds. Revegetation on Barunguba Montague Island has increased native cover from the understory through to the upper canopy which in turn has stabilised soils, increased competition against weed species, improved native plant diversity and provided greater nesting opportunity for seabirds.





**Photo 5** Time series photos showing control of kikuyu grass, growing left of the path in 2003, spraying and prescribed burning in 2004, and subsequent regeneration of native plants in 2005. Amy Harris/DPE

Other weeds that threaten native animals include exotic vines and scramblers such as Cape ivy, dolichos pea, coastal morning glory and madeira vine. See Appendix C for more information regarding priority weed species present in the park.

While weeds may occur in various locations across the park, tracks and trails are common sites for weed establishment. To limit the potential spread of weeds, only tracks and trails essential for management purposes or visitor use are maintained.

The *Biosecurity Act 2015* and its regulations provide specific legal requirements for the response, management and control of biosecurity risks, including weeds and pest animals. These requirements apply equally to public lands and private lands. Under this framework, Local Land Services has prepared regional strategic weed management plans and regional strategic pest animal management plans for each of its 11 regions, including the South East Region (South East LLS 2017, 2018). These plans identify priority weeds and pest animals in each of the regions, plus the appropriate management response for the region (that is, prevention/alert, eradication, containment or asset protection).

The NPWS regional pest management strategy (OEH 2013) identifies pest species and priority programs for Barunguba Montague Island Nature Reserve. The overriding objective of the pest management strategy is to minimise adverse impacts of introduced species on biodiversity and other park and community values while complying with legislative responsibilities. The strategy also identifies where other site-specific or pest-specific plans or strategies need to be developed to provide a more detailed approach.

A **biosecurity plan** for the park is considered critical given the importance of the habitat for nesting seabirds and the potential for reintroductions of weeds and pests, particularly given

the nature and extent of visitation to the island. The biosecurity plan would include emergency response procedures to potential biosecurity threats and would support the broader weed and pest animal plans relevant to the park and recognise the extent and success of previous and ongoing work to manage pest animals and weeds at Barunguba Montague Island Nature Reserve.

### **Box 5: Kikuyu grass and the Seabird Habitat Restoration project**

Kikuyu grass is a long-lived perennial pasture grass native to eastern Africa. It is widely naturalised in southern and eastern Australia where it can form dense mats and smother native vegetation.

Kikuyu grass is an aggressive coloniser and can regrow from cuttings or rhizome fragments. Once established, kikuyu grass is difficult to control.

Kikuyu grass was first introduced onto Barunguba Montague Island in the early 1900s by early lightkeepers for lawns and to provide better feed for livestock. By 1990 kikuyu grass occupied 16% of the vegetated area, dominating vegetation at several locations on the south island, including along the tracks leading up from the old and new jetties and around the lightstation precinct (Weerheim et al. 2003, Figure 3). It spread rapidly between 1990 and 2000, possibly in association with reduced grazing pressure from goats and increased mowing of tracks for visitors (Heyligers and Adams 2004). By 2001 kikuyu grass covered 37% of the park's vegetated area (Weerheim et al. 2003).

The spread of kikuyu grass led to parts of the park becoming unsuitable habitat for little penguins. Penguins appear to choose new nest sites away from encroaching kikuyu grass (Weerheim et al. 2003) and clumps of kikuyu grass act as a barrier, preventing little penguins from accessing suitable nesting sites beyond the kikuyu grass (Trezise 1999). Kikuyu grass also posed a substantial risk of entanglement. Previously, up to 300 little penguins a year became trapped (Harris 2007).

Kikuyu grass encroachment may also threaten shearwater colonies as the dense mats impede access to existing burrows and the creation of burrows by new pairs.

In 2009 it was estimated that if kikuyu grass had been left to spread unchecked, it could have expanded across the entire island in as little as 12 to 15 years (DECCW 2009).

In 2001, NPWS engaged Charles Sturt University to investigate ways to control kikuyu grass on Barunguba Montague Island. Various methods were trialled, including an integrated kikuyu grass control method of spraying, burning and revegetating with local remnant headland species. The research found the integrated method to be the most effective and most suitable method for controlling kikuyu grass on the island.

Spraying kills kikuyu grass systemically, including its extensive root system. Burning of sprayed kikuyu grass removes thick clumps, reducing the threat of seabird entanglement. Revegetation ensures native plant species conducive to seabird nesting, such as mat-rush, are reintroduced to the treated habitat.

In 2004, NPWS embarked on an ambitious pest and weed removal program, the Seabird Habitat Restoration project, based on the findings of the Charles Sturt University research.

By 2009, the island was declared vertebrate pest-free and by 2014, the area of kikuyu grass had been halved through a combination of spraying and burning, and over 60,000 native seedlings had been planted to reduce the risk of reinfestation and provide suitable seabird nesting habitat.



Hundreds of volunteers have contributed to this extremely successful project, which has treated much of the kikuyu grass on the island. An unexpected indicator of success has been Gould's petrel and white-faced storm-petrel breeding on the island (see Box 4).

Whilst ongoing control for kikuyu grass continues, weed control efforts now also focus on exotic vines, including Cape ivy, dolichos pea, coastal morning glory and madeira vine, which are now threatening seabird nesting habitat, including habitat for Gould's petrel.



**Photo 6 Native plant species establishing on south island in 2022 in an area previously dominated by kikuyu grass. Amy Harris/DPE**

## Fire

Barunguba Montague Island is exposed to strong winds and fuels are generally fine. Despite its maritime surroundings, these conditions can lead to high-intensity fire behaviour. Complicating response to wildfire is that fire crews may need to be deployed from the mainland, and response times may be dependent on weather and sea conditions.

At Barunguba, fire is managed to protect visitors and staff, the island's historic and Aboriginal cultural heritage, and its native plants and animals. Prescribed fire has been a critical component of the integrated pest management approach undertaken to control kikuyu grass and restore seabird habitat (see Box 5) and is also used to help reduce the risks of wildfire to park visitors and to Aboriginal and historic heritage. Prescribed fire may continue to be used on the island for ecological and hazard reduction purposes.

Inappropriate fire poses a risk to the native plants and animals of the island. Wildfire moving through seabird habitat during nesting season may lead to loss of eggs and chicks. It may also lead to loss of adult penguins unable to escape an approaching wildfire. Fire may also reduce nesting opportunities in the initial years following any event for those species that nest within vegetation.



Inappropriate fire may also threaten Aboriginal and historic heritage values and pose a risk to park visitors. See Box 6 for more discussion about fire management in the park.



Photo 7 Prescribed burning to control kikuyu grass and restore seabird habitat. Preston Cope/DPE

### Box 6: Fire in the park

Fire is a natural feature of many environments and is essential for the survival of some plant communities. However, inappropriate fire regimes can lead to loss of plant and animal species and communities, and high-frequency fires have been listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2000a).

A **fire management strategy** that defines the fire management approach has been prepared for the park (OEH 2005). The strategy outlines the island's fire history, key assets, including sites of natural and cultural heritage value, fire management zones and fire control advantages such as management trails and water supply points.

Typically, fire management strategies also contain fire regime guidelines for conservation of vegetation communities based on biodiversity thresholds. However, given the profound impacts on the island's vegetation since European settlement, the vegetation community cannot be determined and the strategy does not identify biodiversity thresholds for maintaining the existing vegetation communities.

However, appropriate fire regimes may be determined for native animals present on the island. For example, the conservation action plan for Gould's petrel on Barunguba Montague Island (NPWS 2022) requires NPWS to develop guidance on the appropriate fire management for Gould's petrel habitat, incorporate these requirements into the park fire management strategy and maintain an appropriate fire regime for the species.

In addition to being a threat to the native plants and animals present on the island, inappropriate fire may also threaten other park values, including Aboriginal and historic heritage values and pose a risk to park visitors.

Aboriginal heritage sites, including artefact scatters and middens, may be damaged or exposed by wildfire and left vulnerable to erosion. Heritage buildings at the lightstation complex could be seriously impacted by wildfire or a building fire.

Wildfire also poses a significant risk for park visitors because evacuation routes are limited. Preparing and implementing an emergency action plan will help to manage and protect visitors in the event of wildfire, serious storms or other emergencies.

Management of fire, including the use of prescribed fire, to protect visitors and staff, the island's historic and Aboriginal cultural heritage, and its native plants and animals remains a high priority.

## Visitation

Unregulated visitor use and inappropriate visitor behaviour may adversely impact native animals. For example, little penguins have been found to avoid areas with high levels of human disturbance and they place burrows away from paths frequented by tourists. Measures such as construction of a penguin viewing platform and walkways at Jetty Bay, limiting the number of visitors and only allowing guided tours helps minimise disturbance to penguins. Ongoing monitoring of human impact on little penguins is required to test the effectiveness of these measures and adapt management responses where needed.

Other seabird species nesting on Barunguba Montague Island may also be directly impacted by visitation. Burrow-nesting species, such as shearwaters and white-faced storm-petrels, are vulnerable to mortality from burrow collapse. Surface-nesting species are vulnerable to trampling of nests and disturbance that may disrupt incubation of eggs and chick feeding and brooding regimes and increase vulnerability to nest predation.

A range of measures have been introduced to protect seabirds, including restricting visitors to authorised walking tracks and preventing public visitor access to nesting habitat. If seabirds begin to nest in areas currently used by visitors, visitor access may need to be modified to limit or avoid nest disturbance.

Seal populations are a drawcard for visitors to the island and may be subject to disturbance from recreational and commercial tourism vessels. Seals may also be impacted by fishing vessels. In December 2019, the NSW Government announced increased recreational fishing access to sanctuary zones in Batemans Marine Park, including the 2 sanctuary zones adjacent to Barunguba Montague Island (see Figure 2). This change may impact on the availability of food resources for fur seals and may also lead to increased interactions between fishers, their vessels and fur seals. Restrictions are in place within the marine park between the start of November and the end of April each year to protect grey nurse sharks, including no fishing with bait, no fishing at anchor, no fishing with wire trace and no nets (landing nets are allowed).

See Section 3 for more information about managing visitors to protect native animals and other park values, including native plants, Aboriginal cultural heritage and historic heritage.

## Climate change

Projected effects of climate change across many regions, including south-east Australia, include increased air and sea temperatures, sea level rise, ocean acidification, increased frequency and intensity of storms, and increased fire risk (for example, Frusher et al. 2014).

Climate change is likely to impact on a wide range of values at Barunguba Montague Island, including Aboriginal and historic heritage values, and it may reduce accessibility for tourism, research and management.

Climate change is also likely to adversely impact global seabird populations, including those that reside on or visit Barunguba Montague Island. Seabirds especially vulnerable to climate change include those that have restricted or specialised diets and those that remain faithful to breeding sites even if conditions become unfavourable.

Sea level rise will initially cause localised flooding of low-lying burrows and subsequent loss of eggs and chicks. However, in the long term, coastal recession as a result of sea level rise could lead to extensive loss of seabird breeding habitat. Coastal recession would also pose a significant threat to Aboriginal sites located close to sea level. Sea level rise may also impact access for tourists, park managers and researchers, necessitating ongoing modifications to the jetty and landing area to maintain safe access to the island.

Increased air temperature may directly impact little penguins, who show advanced heat-stress when experiencing air temperatures greater than 30°C (Stahel and Nicol 1982) and have experienced large-scale mortality during prolonged periods of temperatures greater than 35°C when moulting (Phillip Island Nature Parks 2022).

Increasing winds, lightning and intense rainfall events associated with more frequent east coast low storms may flood nests and make burrows more vulnerable to collapse. Nests are particularly vulnerable to inundation during incubation and early chick-rearing stages, which is when rainfall is projected to increase. Storms may also damage heritage buildings and park infrastructure.

Changes to rainfall may impact on the habitat restoration program and on the island's capacity to cater for visitors. For example, reductions in spring rainfall could limit the availability of water for visitors during the early parts of the penguin season when visitor numbers are typically high.

Other climate change effects, such as increasing sea surface temperatures as well as changes to oceanic circulation and chemistry may have broader impacts on oceanic resources and seabird feeding.

See Box 7 for more information about predicted changes to temperature, rainfall, fire weather and sea levels.

It is critical that potential impacts of climate change on the park's natural and cultural values, and on its ability to provide for visitors, are clearly understood. Undertaking a **climate change impact assessment** would help guide the establishment of appropriate monitoring of park values and locations at risk from climate change and identify practicable and effective mitigation measures.

### Box 7: Climate change

Human-induced climate change is listed as a key threatening process under the *Biodiversity Conservation Act 2016* (NSW SC 2000b), and habitat loss caused by human-induced greenhouse gas emissions is listed under the *Environment Protection and Biodiversity Conservation Act 1999* (TSSC 2001).

The following is a snapshot of the predicted changes to climate for South East and Tablelands Region, which covers Narooma and surrounds and lies adjacent to Barunguba Montague Island (Adapt NSW n.d.):

#### Projected changes 2020–2039 (near future)

- Maximum temperatures are projected to **increase** by 0.5–1.0°C.
- Minimum temperatures are projected to **increase** by 0.4–0.7°C.
- The number of hot days (i.e. >35°C) will **increase**.
- Rainfall is projected to **decrease** in spring and winter.



- Average fire weather is projected to **increase** in summer and spring.

**Projected changes 2060–2079 (far future)**

- Maximum temperatures are projected to increase by 1.8–2.5°C.
- Minimum temperatures are projected to increase by 1.4–2.3°C.
- The number of cold nights (i.e. <2°C) will decrease.
- Rainfall is projected to increase in summer and autumn.
- Severe fire weather days are projected to increase in summer and spring.

Sea level rises, as a result of climate change, are expected to continue through the 21st century and beyond with sea levels rising by 0.21 to 1.06 m by 2100 (IPCC 2021).

Some variability in sea level rise will be due to projected future greenhouse gas emissions. Under a 'peak-and-decline' scenario, where emissions are reduced substantially and urgently, sea level rise in New South Wales is forecast to be 0.22 m and 0.42 m above 1996 levels by 2050 and 2100 respectively. Under an approach where greenhouse gas concentrations continue to rise, sea level rise in the state is forecast to be 0.27 m and 0.78 m above 1996 levels by 2050 and 2100 respectively (Glamore et al. 2016).

## 2. Looking after culture and heritage

Australia has one of the oldest records of human existence on the planet, with records dating back more than 60,000 years. Many places today have particular significance to Aboriginal people. Other places hold significant history to both Aboriginal and non-Aboriginal people, and very often this history is a shared one.

### 2.1 Aboriginal culture and heritage

Aboriginal communities have an association with and a connection to the land. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge, kinship systems and strengthening social bonds. Aboriginal heritage and connection to nature are inseparable and need to be managed in an integrated manner across the landscape.

Yuin People have lived in the Eurobodalla area for thousands of years. There is a long and continuing connection between Aboriginal peoples and Barunguba Montague Island, stretching back to the time before the sea level rose, when the island was part of the mainland. This continuing connection to Country was formally recognised by the declaration of Barunguba Aboriginal Place in 2018 (see Section 2.2).

Barunguba Montague Island, Gulaga Mount Dromedary, Najanuka Little Dromedary Mountain and Biamanga Mumbulla Mountain have all recently been officially dual named. Dual naming recognises the significance of the island and mountains to Aboriginal people, their continuing connection to Country and promotes this significance to the broader community.

#### What is 'Country'?

To Aboriginal people, the landscape is made up of many features that are interrelated. These include land, water, plants and animals, places and stories, historical and current uses, and people and their interactions with each other and place. These features are central to Aboriginal spirituality and contribute to Aboriginal identity. They are inseparable and make up what is known as 'Country'.

**Aboriginal sites** are places with evidence of Aboriginal occupation or places that are related to other aspects of Aboriginal culture. They are important as evidence of Aboriginal history and as part of the culture of local Aboriginal people.

Interviews conducted in 1990 on the significance of Gulaga to Aboriginal people (Rose 1990) clearly articulated Aboriginal connection with Country:

Our landscape is sacred to all Aboriginal people. To damage our Mountains is to physically damage us. The person is the Land and the Land is the person. Our connection with the Mountains, with this Earth, is alive and strong.

In a similar way, interviews for the Barunguba Aboriginal Place assessment (OEH 2017) demonstrated the importance of connection to Country, and the interconnectedness of the landscape:

We see Barunguba as part of a broader cultural landscape that connects us both to Barunguba and also to other cultural places, such as Najanuka and Gulaga.

The social and cultural complex that Barunguba forms part of includes Gulaga, Najanuka, and Biamanga. Barunguba, Najanuka and Gulaga are connected through song lines.

The significant Aboriginal cultural heritage values of Gulaga and Biamanga national parks are recognised by their joint management and lease back agreements with the Aboriginal community.

Barunguba is an important place for cultural lore and learning, particularly for Aboriginal men. During interviews for the Barunguba Aboriginal Place assessment (OEH 2017), one respondent stated:

We conduct ceremonies on Barunguba as part of men's business. It is significant because it's a place of cultural lore and learning. It is a place where you can sit within the lore and you can reflect on it and learn what it is to be a man.

Barunguba is an important seasonal food source for the entire Aboriginal community. Shearwaters, or muttonbirds, were valuable because of their high-fat content, while other birds, eggs and seals supplemented mainland food sources. The collection of birds and eggs at Barunguba, and at Najanuka, is controlled by traditional law/lore to ensure a continual supply is maintained (OEH 2014).

Aboriginal people fished around the island in bark canoes (Pacey 2013). A significant number of Wagonga Aboriginal lives were lost to a fierce storm in 1892 while they were returning from the island in canoes (ECS 2007) – this story is told today as part of the connection to Country.

Freshwater springs enabled extended stays on Barunguba. They also have an important spiritual role, connecting the island to Gulaga (OEH 2017).

There are currently 69 recorded Aboriginal sites on Barunguba. The sites predominantly consist of stone artefact material and shell middens. Most of the stone used in the manufacture of the artefacts was carried to the island and consists of quartz (Sullivan 1975). Hearth stones are also located around the island. Some sites are located close to sea level and may be threatened by climate change and associated rising sea levels (see Section 2.5 and Box 7). An Aboriginal ceremonial ground exists in the southern part of the island with 2 significant granite landmarks (Pacey 2013).

A code of conduct for visitors, recognising the special significance of Barunguba to Aboriginal people, is provided to public visitors, management staff and researchers, and states:

Barunguba Montague Island has great cultural and spiritual significance to the local Aboriginal people. Dreaming stories and song lines link the island to Gulaga and Najanuka. Everything on Barunguba Montague Island is protected by law. There are several locations on the island that are particularly culturally sensitive. Some areas are out of bounds to all visitors.





Photo 8 Looking east across Barunguba to Gulaga and Najanuka. Destination NSW

### 2.1.1 Management considerations and opportunities

Although the NSW Government has legal responsibility for the protection of Aboriginal sites and places, Aboriginal people's spiritual and cultural connection to the park is respected and NPWS acknowledges the right of Aboriginal people to make decisions about their heritage. There is also recognition of the importance of incorporating local Aboriginal knowledge into the ongoing management of the park.

Aboriginal traditions and activities have continued in the park, but opportunities for cultural practices have been impacted by changing ownership, management and access arrangements, among other things.

Developing more formal mechanisms for **ongoing involvement of the local Aboriginal community** in park management decision-making would better support culturally appropriate management of Aboriginal sites, places and related issues, and in the promotion and presentation of Aboriginal culture and history. Greater involvement in decision-making would also provide better opportunities for Aboriginal people to access Country, and to maintain, renew or develop cultural practices and associations.

NPWS supports NSW Government policies that aim to support employment opportunities for Aboriginal and Torres Strait Island peoples and sustainable Aboriginal business growth through government procurement of construction, goods and services. Consistent with this, opportunities for the Aboriginal community to be more involved in the provision of tours and educational services to visitors will be encouraged.

It will be critical to involve Aboriginal communities in the management and protection of Aboriginal sites and values that may be threatened by rising sea levels.

## **2.2 Barunguba Aboriginal Place**

Under the National Parks and Wildlife Act, the Minister for the Environment can declare an area of land within New South Wales that is, or was, of special significance to Aboriginal culture as an Aboriginal place.

Barunguba was nominated as an Aboriginal place in 2014 by the Wagonga Local Aboriginal Land Council. On 29 June 2018, the Minister declared Barunguba Aboriginal Place, which encompasses the whole island with the exception of operational areas (see Figure 4). Declaration of an Aboriginal place provides a formal means for the NSW Government to recognise and provide legal protection to areas of land with special significance to Aboriginal culture.

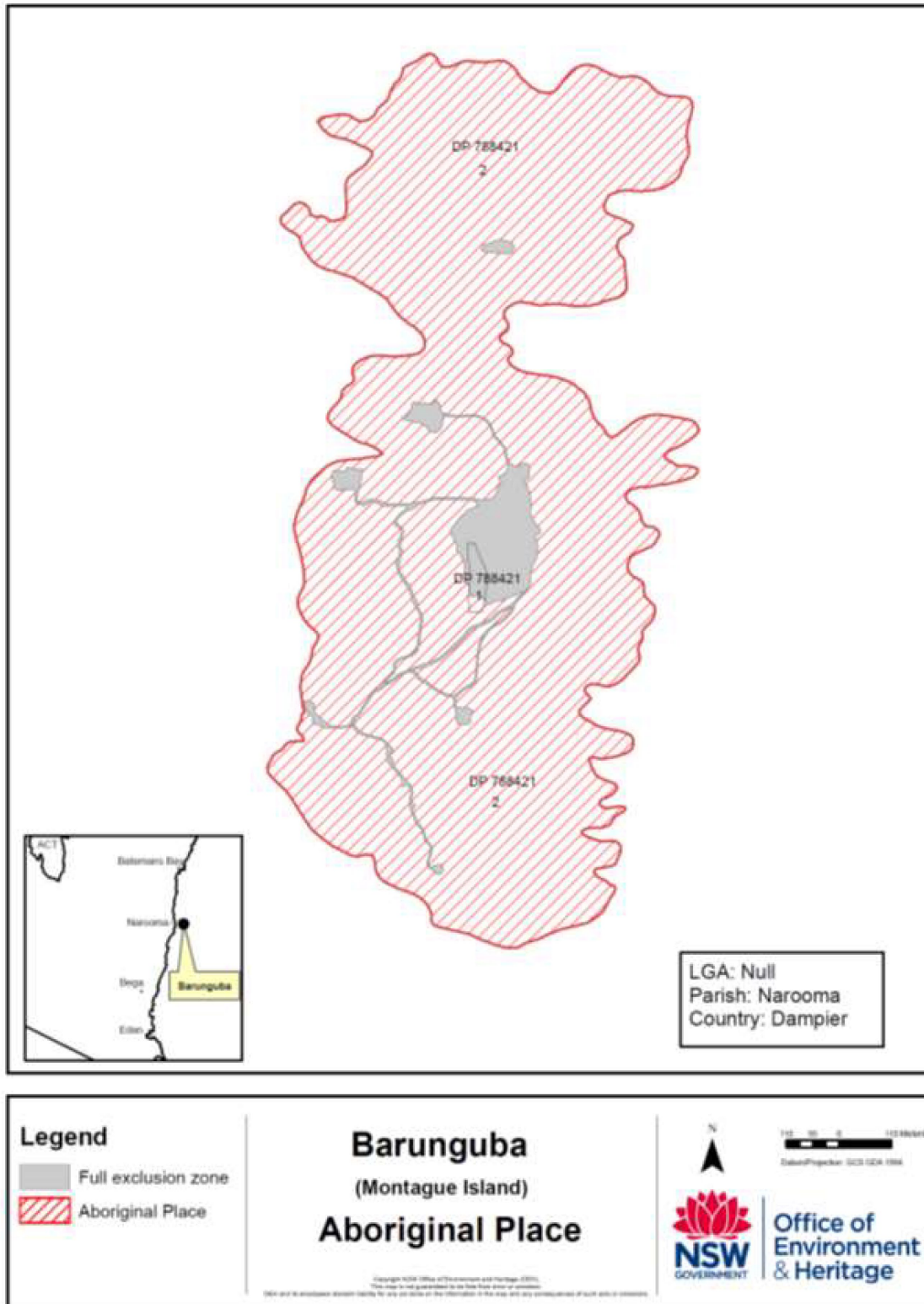


Figure 4 Map of Barunguba Aboriginal Place (NSW Government Gazette No 66, 29 June 2018)



Aboriginal places can protect a range of areas having strong cultural values, including former Aboriginal reserves and missions; land containing Aboriginal burials; important meeting places and ceremonial sites; places of important post-contact historical events, such as massacres and birthplaces of notable Aboriginal people; places with dreaming stories and other spiritual significance; and places with Aboriginal artefacts requiring special recognition and protection.

The values for which Barunguba Aboriginal Place was assessed as being significant to Aboriginal culture included the island being valued as a very significant ceremonial area and a significant resource gathering place for the Koori people on the Far South Coast of New South Wales. The special song lines connecting Barunguba to the mainland are observed through the traditional accounts of Barunguba being the eldest son of nearby Gulaga Mount Dromedary and his little brother Najanuka Little Dromedary Mountain. The knowledge of the cultural significance of Barunguba has been passed down by the ancestors to the traditional custodians of the NSW Far South Coast, and this cultural knowledge and connection to Country remains strong to this day (OEH 2017).

Barunguba has been described as a story about family and law:

It's about connections to Country and maintaining those connections. It's a story about our cultural landscape, about mother, father and the 2 children which is Gulaga, Biamanga, Najanuka and Barunguba. When ceremony took place in Country during certain times of the year, senior law men would go to these special places to conduct ceremonies. Barunguba is one of those special places when only the senior law men and their novices would go and conduct business on the southern end of the island. During this time of the year no women were allowed to go to the island. However, during other times of the year, women would go to the island and gather resources, this was important during the mutton bird season, when eggs and birds were gathered. A lot of nesting sites were on the northern side of the Island. But it's all about Country, it's about the landscape, the stories and people, and the very important relationships between each other (OEH 2017).

## **2.2.1 Management considerations and opportunities**

Protection and management of Barunguba Aboriginal Place requires a cooperative approach between the local Aboriginal community and NPWS. It also requires the preparation and implementation of a management plan for Barunguba Aboriginal Place.

## **2.3 Historic heritage**

The shared history of the first Australians – Aboriginal people – and history since European settlement is represented through our historic heritage which comprises places and items that may have historic, scientific, cultural, social, archaeological, architectural, landscape or aesthetic significance. NPWS conserves the significant historic heritage features of NSW parks.

In addition to its rich Aboriginal heritage, the island has extensive historic heritage, commencing with the first recorded European sighting by James Cook in 1770, continuing with its important role in coastal shipping through the design, construction and staffing of the lightstation. More recently, the island has been the location for extensive research into key biological values and testing of technical equipment by the Royal Australian Navy.

Table 3 provides a summary of the key historic heritage precincts and structures in the park and Figure 5 shows the location of key precincts.

**Table 3 Key historic heritage precincts and structures in the park**

Heritage site/precinct	Description	Significance <sup>1</sup>
Lightstation complex	The lighthouse tower and ancillary buildings including the residences and oil store constructed in 1880–81.	Exceptional
Graves site	Small, fenced enclosure containing the graves of Charles Townsend (lighthouse keeper) and John and Isabella Burgess (children of lighthouse keeper John Burgess).	Exceptional
Quarry	The quarry for the granite tower is located to the north-east of the lighthouse. Quarrying was above ground. The cutting formed in the boulder frames a pathway to the nursery and Navy hut ruins. The impressions in the quarry face for extracting the stone are still evident and discarded stones remain on site.	Exceptional
Vegetable garden (Old garden precinct)	Established soon after the first lighthouse keepers arrived in 1881 to provide fresh fruit and vegetables. Two fenced areas and a low corrugated iron structure that may have been used as an animal shed.	High
Walking tracks, trails and the tramway	Tracks were mainly established during the lighthouse construction and some maintenance has occurred to facilitate stabilisation and drainage.	High <sup>2</sup>
Jetty Bay precinct	Located on the western shore, this area contains facilities to dock and load boats. Includes jetty, cranes, ramp and boatshed.	Moderate
Old Jetty Bay precinct	Further south from Jetty Bay, this area contains remnant wharf structures, and originally housed a small storeroom.	Moderate
Nursery precinct	North-east of the lighthouse, includes remnants of tractor shed, poultry shed and Navy buildings.	Moderate-Low

1. Significance as described in the conservation management plan for the island (HLCD 2008, section 5.5).

2. Walking tracks with high significance are Eastern Track, Western Track, Old Jetty Track, Graves Track, Garden Track and Jetty Track.



Figure 5 Location of main historic heritage precincts (HLCD 2008)

## Early Europeans

The first recorded European sighting of Barunguba Montague Island was by James Cook in April 1770. As he sailed by, Cook named the island Point Dromedary, thinking it was an extension of land from Gulaga, which he called Mount Dromedary. In 1790, Captain Anstis of the convict transport *Surprise* recognised it as an island, naming it Montagu after George Montagu Dunk, the English Earl of Halifax. In 1798, Matthew Flinders recorded the island as Montague.

Prior to the establishment of the lighthouse in 1881, European visitors included survivors from several shipwrecks and planned visits to harvest resources, including seabird eggs, collected to sell to gold miners at Nerrigundah (about 10 km north of Narooma) in the mid-19th century (Gibney 1989). Plans from 1883 show several fishing shacks on the west of the island, however, no remains have been located.





**Photo 9** Historic heritage on Barunguba Montague Island. Clockwise from top left: Graves site, boatshed, quarry and lighthouse, Lighthouse keeper's residence. Stuart Cohen/DPE

## The lightstation

Through the mid-1800s, coastal shipping increased significantly leading to several shipping disasters and many shipwrecks. Pressure mounted for navigational aids along the NSW coast.

A series of lighthouses, including Montague Island Lighthouse, were constructed between 1875 and 1903 stretching from Green Cape to Cape Byron. These became known as the 'coastal highway' (Graham Brooks and Associates 2001).

Construction of the Montague Island Lighthouse took place from 1878 to 1881 using a design by James Barnet, the NSW Colonial Architect. Barnet heavily influenced lighthouse design along the coastal highway, resulting in common design and visual features.

The lightstation complex contains the lighthouse, residences, brick and weatherboard store buildings and a communications mast. The lighthouse was constructed of granite blocks quarried from a large rock outcrop to the north-east of the tower (see Photo 13). The foundation stone for the Sydney General Post Office also came from this quarry. The residences were constructed of brick brought from the mainland. The build was completed in October 1881, and the lightstation was officially opened on 1 November 1881.

Jetty Bay and Old Jetty Bay (see Figure 5) are both locations where supplies have been landed since before the lighthouse was constructed. A tramway was constructed from Jetty Bay in 1880, suggesting it was the primary landing area used during construction of the lighthouse and residences.



**Photo 10 Residents and staff with local photographer WH Corkhill, circa 1900. WH Corkhill/National Library of Australia**

Lighthouses at the time were typically operated by 3 keepers, a head keeper and 2 assistant keepers, working overnight, every night, from sundown to dawn, in 3-hour shifts. Accommodation for lighthouse keepers was typically a 2-bedroom residence for the head keeper and 2 semi-detached 2-bedroom residences for the assistant keepers. The Montague Island lightstation complex generally follows this design, except the head keeper's residence has 4 bedrooms, including an additional bedroom for visiting inspectors.

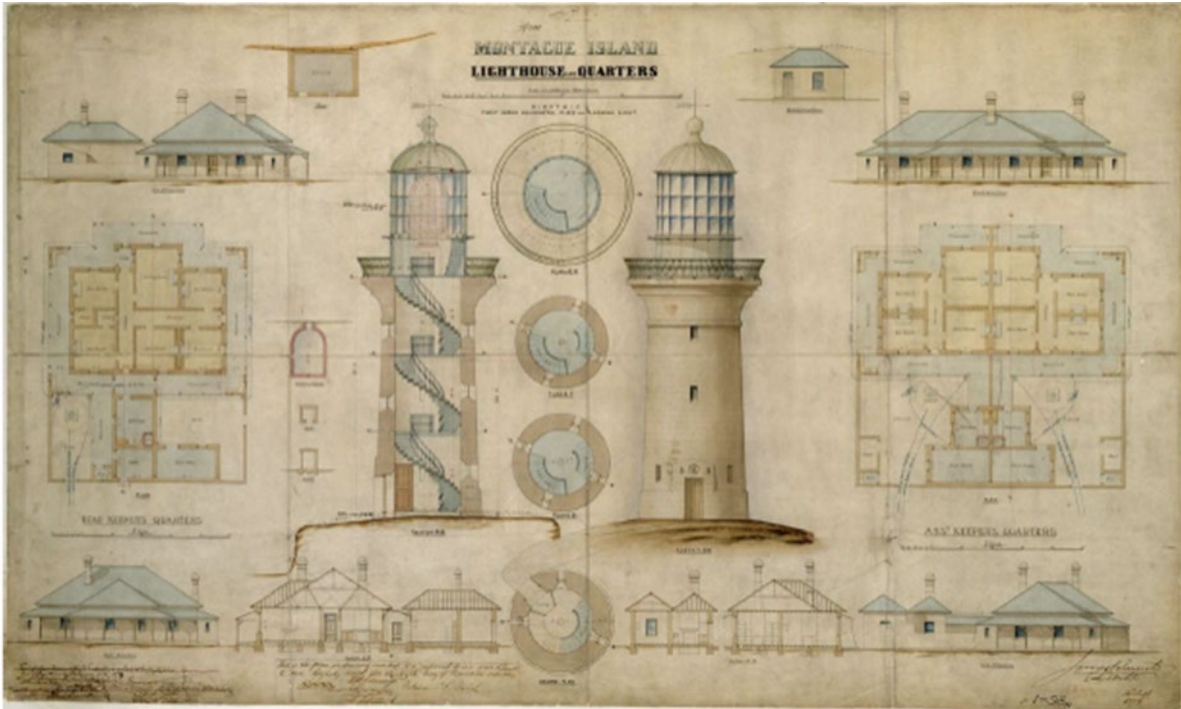
The island's remote location limited regular deliveries of food. Gardens were established soon after the first lighthouse keepers arrived, providing keepers and their families with fresh fruit and vegetables and supplementing stores from the mainland. Morris (2014) stated that the vegetable garden on Barunguba Montague Island:

... is of high significance as a rare surviving example of a garden associated with an intact and extensive lightstation complex of state significance for New South Wales. It is of significance for its connection with the way of life of light keepers and its capacity to demonstrate the self-sufficiency of the inhabitants of the remote Montague Island Lightstation.

A range of vegetables, including tomatoes, peas, silver beet, carrot, cabbage, sweet potato, lettuce, beetroot, celery and spring onion were grown in the gardens. Fruits such as passionfruit, gooseberry and banana were also grown as were a range of ornamentals, including iris, violet and dahlia. Maintaining the gardens and continuing to grow heirloom plants such as these provides an ongoing link to the history of the lighthouse.

A variety of domestic animals, including chickens, goats, rabbits, dairy cows, ducks, geese and pigs, were kept to supplement imported foodstuffs. At the time of the lighthouse commissioning, rabbits and goats had already been introduced onto the island to provide an emergency food supply for shipwrecked sailors (Pacey 2013).

The tending of gardens and keeping of domestic animals illustrate the isolation early lighthouse keepers and their families experienced. Graves associated with the lighthouse, including those of 2 young children, also provide a poignant reminder of their isolated lifestyle.



**Figure 6 Montague Island Lighthouse and Quarters architectural drawing by James Barnet, 1878**

## Management history

From 1881 to 1915, all lighthouses in New South Wales were managed by the Marine Board and subsequently the Department of Navigation. In 1915, the Commonwealth acquired all NSW lightstations. From 1915 until 1991, all lightstations were maintained by the relevant federal department including, initially, the Commonwealth Lighthouse Service, then later the Department of Shipping and Transport and the Commonwealth Department of Transport and Communications. The Montague Island Lighthouse continues to operate as a navigational aid.

In 1953, the island was registered as a wildlife sanctuary under the protection of the National Trust of Australia, becoming Australia's first National Trust property.

The lighthouse was fully automated in 1986, however, lighthouse keepers remained on the island taking weather observations and assisting with environmental activity and marine search and rescue operations. In December 1987, the Commonwealth transferred ownership of the island, the lighthouse keepers' residences and other buildings (but not the lighthouse itself) to the NSW Government and NPWS. Even then, lighthouse keepers remained on site for a further 12 months while NPWS established funding and staff for the island.

Under NPWS management, day tours began in 1989 and proved very popular. The island was dedicated as a nature reserve in January 1990, apart from a small lot containing the lighthouse, which was subsequently reserved in 2003. Since 1998, the lighthouse has been leased back to the Australian Maritime Safety Authority, who remain responsible for its operation and maintenance.

Consistent with the conservation management plan for Barunguba Montague Island Nature Reserve (HLCD 2008, 2009), NPWS continues to maintain a full-time staff presence on the island to provide essential management, protect the natural environment and built structures and to supervise visitors to the island.



### Box 8: Historic heritage listings

The Montague Island lightstation and its setting is listed on the State Heritage Register. The State Heritage Register listing curtilage includes the entire island. The lighthouse itself, which remains under the control of the Australian Maritime Safety Authority, is also listed on the Commonwealth Heritage List.

The lightstation complex consists of the light tower, residences, store buildings and a communications mast. The State Heritage Register listing recognises these occur in a cultural landscape, which includes the Old Jetty area, the New Jetty, the poultry shed/navy precinct, the vegetable garden area, the quarry and the graves site.

The statement of significance for the Montague Island lightstation notes that the lightstation and its setting 'are highly significant as one of a collection of lighthouses which combine the natural values of a rugged coastal island with the cultural values of a prominent landmark and isolated outpost associated with the development of coastal shipping in the late 19th Century.'

The State Heritage Register listing recognises the historical, aesthetic and social significance of the lightstation and its setting, and the research potential of the island.



**Photo 11 Montague Island Lighthouse, circa 1890. William Henry Corkhill/National Library of Australia**

Under the NSW *Heritage Act 1977* all buildings listed on the State Heritage Register, other than ruins, must meet minimum standards of maintenance and repair.

A conservation management plan has been prepared for Barunguba Montague Island Nature Reserve (HLCD 2008, 2009). The conservation policies developed as part of the



plan recognise opportunities for development, including to enhance the existing use as a research base and as an ecotourism destination. Other opportunities recognised in the report include the potential for a new staff/research facility at the Nursery precinct; and opportunities to better interpret how lighthouse keepers and their families lived on the island, including use of the vegetable gardens. Constraints to development are also identified, including that the high integrity of the buildings means there is little opportunity to change them.

Many of the recommendations identified in the conservation management plan have been implemented and the plan now requires review.

Listing of the lighthouse as a Commonwealth Heritage Place imposes obligations on the Australian Maritime Safety Authority, as an Australian Government agency.

Management principles for Commonwealth heritage places are established under the regulations to the Environmental Protection and Biodiversity Conservation Act. These principles state that the primary objective for the management of Commonwealth heritage places is to identify, protect, conserve, present and transmit to all generations their Commonwealth heritage values. The principles state that management of Commonwealth heritage places should use the best available knowledge, skills and standards for those places, and include ongoing technical and community input to decisions and actions that may have a significant impact on their heritage values.

A heritage management plan has been prepared by the Commonwealth for Montague Island Lighthouse (AMSA 2020).

## **Scientific research history**

The first recorded scientific visit to the park was by amateur ornithologist, Arthur Hull, in 1907 to observe breeding sites of silver gulls. The following years saw visits from scientists from organisations such as the Australian Museum, the National Trust and what is now known as the Commonwealth Scientific and Industrial Research Organisation (CSIRO) researching seals, seabirds, rabbits and myxomatosis.

Judith Cassell, prominent in helping the island be declared a wildlife sanctuary in 1953, studied its wildlife, including seals and penguins. In 1960, CSIRO established a long-term monitoring program for shearwaters, which also recorded changes in the island's vegetation. This monitoring program is now one of the longest, continuous seabird studies in the world.

After the nature reserve was declared in 1990, NPWS recognised that continuing research on the island's vegetation and native animals was important for effective management of the park. NPWS scientists have worked together with established researchers and NPWS has supported numerous postgraduate and doctoral research projects. Volunteers assist with many facets of the research program in the park, including little penguin and shearwater surveys.

Recent research has included fauna surveys, the impact of tourism on fauna, the impact of kikuyu grass on habitat, and fauna tracking studies using new technologies. Section 3.6 also discusses research and monitoring in the park.



**Photo 12** Research into the breeding success of wedge-tailed shearwaters on Barunguba Montague Island Nature Reserve. Laurelle Pacey

## **Naval history**

The Royal Australian Navy (RAN) established an experimental laboratory north of the lighthouse in 1961–62. The site included 3 fibro huts which housed researchers, equipment and diesel generators. This field station was part of the Navy's broader facility known as the RAN Research Laboratory, which conducted research into underwater physics, weapons and fluid mechanics. At Barunguba Montague Island, acoustic experiments were conducted to detect submarines and other shipping by running hydrophone cables from deep water in the Tasman Sea to shore (Hunter 1996; Pacey 2013). The field station operated on Barunguba Montague Island intermittently until the late 1960s. Equipment was removed in the mid-1970s and the huts were dismantled in 1988–89.



Photo 13 HMAS *Kimbla*, one of 3 naval vessels that took part in acoustic experiments off Barunguba Montague Island. Royal Australian Navy

### 2.3.1 Management considerations and opportunities

There is considerable historic heritage on Barunguba Montague Island and NPWS works to protect heritage sites, objects and significant places in the park by:

- continuing to implement the recommendations of the current **conservation management plan** for the island (HLCD 2008, 2009)
- reviewing the conservation management plan as many of its recommendations have been implemented
- maintaining a full-time staff presence on the island to assist with achieving protection of cultural and natural values
- adaptively reusing heritage buildings consistent with the conservation management plan – adaptive reuse is widely recognised as an approach to help preserve heritage buildings
- interpreting and promoting understanding of the history of the island and its historic heritage values.

Protection works and any interpretation are undertaken in accordance with state and national heritage listing regulations and requirements and in accordance with relevant conservation management plans and recognised best practice.



### 3. Providing for visitor use and enjoyment

The purpose of reserving land as a nature reserve is to identify, protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena so as to enable those areas to be managed to:

- conserve their natural and cultural heritage values
- provide for appropriate research and monitoring
- promote public appreciation, enjoyment and understanding of the reserve's natural and cultural values.

Barunguba Montague Island Nature Reserve is a very attractive visitor destination. It is away from development on the mainland, relatively wild, teeming with birds and marine life, and rich in Aboriginal and historic heritage values.

A limited and controlled approach to public visitation has been applied to enable visitors to appreciate, enjoy and understand the park's natural and cultural heritage values and support their conservation.

#### 3.1 A brief history of visitation

Aboriginal people have a long and continuous connection with Barunguba. Sections 2.1 and 2.2 describe the importance of Barunguba to Aboriginal people, the cultural connections between the island and the mainland, and how countless generations of Aboriginal people have visited the island to gather food, conduct ceremony and care for Country.

The island also has a relatively recent history of recreational use from the early days of European settlement. Organised picnics hosted by local shipping businesses, fishing and rabbit hunting expeditions were popular given the proximity to the mainland (Pacey 2013). In the 1920s and 1930s, visits increased in conjunction with the growth of Narooma as a tourist centre. Big game fishing became popular following the catch of a black marlin off the north-west coast of the island in 1933. Tourist excursions to the island ceased during the Second World War. Visits resumed after the war until public access was restricted when the wildlife sanctuary was declared in 1953.

NPWS reintroduced limited access for public visitors in 1989, trialling tours to the park during Heritage Week, and then establishing regular tours in partnership with private charter operators. Tour groups were accompanied by an NPWS guide. These groups were small and were confined to certain sites on the south island.

The 1996 plan of management (NPWS 1996), the first for the park, strictly limited the number of visitors to 90 in any 24-hour period to minimise impacts on native plants and animals, historic places, infrastructure and to maximise public safety. In 2003, the plan was amended (NPWS 2003) to increase visitor numbers to 200 in any 24-hour period, and to enable limited overnight accommodation in existing buildings for visitors associated with research programs. In an attempt to provide a remote and uncrowded visitor experience, the 2003 amendment also introduced a maximum of 80 visitors to the island at any one time.

In the years following this amendment, some park visitors participated in environmental and educational volunteer programs, undertaking activities such as weeding, plant propagation and revegetation as part of the Seabird Habitat Restoration project or participating in penguin surveys. A further amendment was made to the plan of management in 2009 (NPWS 2009) to enable visitors participating in environmental management and or educational activities, not just those associated with research programs, to be accommodated overnight in the park.

The current limitations on number of visitors in any 24-hour period and number of visitors at any one time are not meeting their desired outcomes. Changes are required to better protect the island's values and infrastructure and to reinforce a safe, remote and uncrowded visitor experience – see 'Setting limits on visitor numbers' in Section 3.3.1.

## 3.2 Who visits Barunguba Montague Island Nature Reserve?

A range of visitors access the park, including Aboriginal people, public visitors, volunteers, researchers and NPWS and other agency staff and contractors.

**Aboriginal people**, including Traditional Owners and custodians, visit the park to maintain, renew or develop cultural practices, to maintain connections to Country and to participate in park management activities. See also Section 2.1.

**Public visitors** are members of the public who visit the park principally to enjoy, appreciate and understand the park's values. Public visitors must be part of an authorised short-duration tour accompanied by an NPWS authorised guide or be pre-booked overnight guests. Public visitors are transported to the park by appropriately licensed boat operators (see Section 3.4). Most visitors to the island are public visitors.

Public visitor access is only available to identified sites on the south island (see Section 3.3). Public visitors cannot access the north island. Public visitors must move around the park on foot and remain on authorised walking tracks (see Figure 1).

Vessel access to the island is restricted. Only NPWS approved vessels, such as licensed commercial vessels, are permitted to land on the island. No unlicensed or private vessels (either powered or unpowered) are permitted to land.



Photo 14 NPWS guide leading public visitors to the lighthouse. Daniel Tran/DPE



**Volunteers** visit the park to participate in programs that protect natural and cultural heritage or assist managing public visitors. Volunteers must have authorisation from NPWS to be in the park and to participate in management programs.

Volunteers provide a range of services in the park, including leading visitor tours and participating in programs, such as the Seabird Habitat Restoration project, to protect and restore park values. Volunteers can access all areas of the park as required by their approved program of activity.

**Researchers** visit the park to undertake, or participate in, research on or around the park. Researchers can only access Barunguba Montague Island Nature Reserve if they have a scientific licence from NPWS and ethics approval for fauna research. Researchers can access all areas of the park as described in their licence or as otherwise agreed to by the park manager.

**NPWS and other agency staff and contractors** are based in the park or visit the park for park management purposes and for the operation of the lighthouse and other infrastructure.



Photo 15 Volunteers helping with revegetation efforts on Barunguba Montague Island. Stuart Cohen/DPE

### 3.3 Public visitation

The National Parks and Wildlife Act provides that nature reserves are managed to conserve biodiversity, maintain ecosystem function, conserve cultural heritage values and provide for appropriate research and monitoring. Nature reserves are also managed for the promotion of public appreciation, enjoyment and understanding of their natural and cultural values.

However, unlike national parks, regional parks and state conservation areas, the provision of sustainable tourism use and enjoyment is not a management principle applied to nature reserves. For many nature reserves, this means little or no infrastructure is provided for public visitors, and public visitation is not encouraged.

### 3.3.1 Management considerations and opportunities

At Barunguba Montague Island Nature Reserve, NPWS recognises there is high demand for public visitation and, importantly, that public visitation provides an excellent opportunity to promote public appreciation, enjoyment and understanding of the natural and cultural values of the park.

However, visitation has the potential to impact on a range of park values, including native animals such as little penguins, other seabirds and seals, and their habitat. Cultural heritage sites, including Aboriginal and historic heritage sites, may also be impacted by visitation.

**Minimising human disturbance** to the park's plants, animals and cultural heritage while providing management and promoting public appreciation, enjoyment and understanding of the values through tourism is challenging.

To facilitate a sustainable level of visitation, public visitors can only **access** the park if they are part of an authorised short-duration tour accompanied by an NPWS authorised guide, or if they are pre-booked overnight guests. Confining visitors to appropriate locations and setting limits on visitor numbers also helps facilitate sustainable visitation on the island.

All public visitors are transported to and from the park by licensed commercial operators (see Section 3.4). Public visitors disembark at Jetty Bay. As well as landing on Barunguba Montague Island, boat trips may include opportunities for swimming or diving near the island and circumnavigating the island to view wildlife, especially seals.

Access to the park is highly dependent on favourable weather and sea conditions. At times, travelling to the island and transfers onto the island may be too dangerous. Disembarking and embarking a vessel at Jetty Bay can be difficult and is not without risk, even in good conditions. It requires visitors to listen and follow safety directions and independently climb the access ladder. Safety risks for children younger than 5 years old are considered too great and they are not permitted to land in the park.

#### Short-duration tours

Authorised short-duration tours are accompanied by an NPWS authorised guide.

The key role of guides is to keep visitors safe and enable them to better enjoy, understand and appreciate the values of the park. Guides lead their groups to view wildlife, the lightstation and other features of the island. Along the way, guides educate their groups about the natural and cultural values of the island, about the history of the island and about behaving appropriately and respectfully while on the island.

Short-duration tours occur during the day or evening. The popular evening tours operate during penguin breeding season, providing visitors an opportunity to view little penguins coming ashore at Jetty Bay from the penguin viewing platform.

#### Commercial overnight guests

NPWS prioritises accommodation for NPWS and other agency staff and contractors, Aboriginal people, volunteers and researchers. However, when there is spare capacity, accommodation has been made available for commercial overnight guests.

Commercial overnight guests are pre-booked and are bound by a code of conduct, which outlines NPWS's expectations of overnight guests staying on the island.

To ensure commercial overnight guests behave appropriately and respectfully, and to assist them to better enjoy, appreciate and understand the values of the park, they also receive a briefing from NPWS staff upon arrival. An educational tour led by an NPWS authorised guide is included as part of their accommodation package. Educational material and interpretative signage is also provided.



Currently, all overnight guests are accommodated in the residences at the lightstation complex. Allowing adaptive reuse of other heritage buildings would provide greater opportunities for public visitors to experience overnight stays on the island.

### Managing visitor access

Public visitors must be on an authorised short-duration tour with an NPWS authorised guide or be pre-booked overnight guests complying with a code of conduct. This helps NPWS better manage the number of public visitors to the island, which in turn helps minimise impacts on native plants and animals and heritage values and maximise public safety.

Only allowing authorised access to the island also helps confine public visitation to appropriate areas, which further limits the footprint and impacts of public visitation. Since it commenced, public visitor access at Barunguba Montague Island Nature Reserve has been confined to appropriate locations.

Temporary closures of visitor sites, or the temporary opening of additional visitor sites, may be applied for operational reasons, for visitor safety, or to protect environmental, Aboriginal cultural or historic heritage values.

Volunteers, researchers, Aboriginal people, NPWS and other agency staff and contractors are able to access all areas of the park. The extent and timing of access available for contractors, volunteers and researchers is subject to their approved program of activity or their scientific licence.



**Photo 16 NPWS guide leading public visitors back to the lighthouse after viewing the historic graves site. Daniel Tran/DPE**

### Setting limits on visitor numbers

In addition to requiring public visitors to be on an authorised tour or be pre-booked overnight guests and confining visitors to appropriate locations, NPWS further reduces impacts from visitation by setting limits on visitor numbers.

Limits to visitor numbers help protect park values, including native plants and animals and Aboriginal and historic heritage values. Limits to visitor numbers also help protect the visitor experience by allowing visitors to experience a sense of remoteness, by preventing overcrowding and by ensuring the capacity of visitor infrastructure or facilities is not exceeded.

The impacts of visitation on biodiversity can be difficult to measure and even difficult to identify. For example, the island's population of greater crested terns and their distribution had remained stable for many years. However, correlating with the prolonged closure of the island to tourism during the 2019–20 fire threat and subsequent COVID-19 pandemic, the number of breeding greater crested terns has increased and their distribution has extended, with pairs now nesting in habitat directly surrounding the lightstation precinct and Jetty Bay. The species appears to have adapted to heavily reduced or no tourism by increasing their population and their distribution on the island into areas that had previously been high-use visitor areas. Consequently, in order to minimise disturbance to these ground-nesting seabirds, the area available to host visitors in the lightstation precinct is reduced during the spring and summer months.

Visitor numbers over a 24-hour period and at any one time are limited to ensure visitors appreciate the sense of isolation and to maintain a high level of visitor satisfaction. Public visitors observing what they perceive as too many other visitors are likely to experience a reduced sense of isolation and have lower levels of appreciation and understanding of the park's values. Anecdotal evidence based on feedback to NPWS guides from visitors to Barunguba Montague Island has demonstrated that the current limit of 80 visitors at any one time is not providing visitors with an uncrowded visitor experience or a sense of remoteness.

Furthermore, access into the lighthouse is a pinch point for large groups. To protect heritage values and visitor safety, the lease agreement with Australian Maritime Safety Authority limits access to the lighthouse to groups of 10. Given tour time constraints, this means that large tour groups cannot experience the lighthouse on shorter duration tours.

The current size and capacity of the penguin viewing platform and limited toilet and sewerage treatment facilities on the island also inform visitor numbers. Section 4 provides further information about park infrastructure.

Overloading visitor infrastructure may impact native plants and animals, visitor safety and the visitor experience. For example, if the capacity of the penguin viewing platform is exceeded, visitors may overflow across the nearby ground and disturb little penguins by impinging on their pathways and nesting habitat. Visitor overflow onto unlit areas also presents potential safety issues, increasing the risks of slips, falls and injuries. Furthermore, overcrowding and overflowing of visitors also reduces the visitor experience as it makes it more difficult for visitors to observe the spectacle of the penguins returning to the island.

Visitor number limits are set based on the requirement to protect park values while maintaining the visitor experience and within the context of our current understanding of the impacts of visitation.

The *Barunguba Montague Island draft plan of management* provides for the following visitor number limits:

- a maximum of 120 public visitors on short-duration tours in any given 24-hour period
- a maximum of 40 public visitors at any one time on short-duration tours to reinforce a remote recreation experience and limit crowding at popular sites
- a maximum visitor to guide ratio of 30:1 to enable guides to effectively communicate with their groups, helping visitors to appreciate, enjoy and understand the park. A modest group size also allows guides to manage their groups to limit their impacts and to manage any medical emergencies

- commercial overnight guest numbers (in addition to public visitors on tours) are based on the available beds and rooms in accommodation. These numbers are managed to ensure sustainable overnight guest experiences, to minimise impact to the historic heritage values and to ensure a remote, secluded experience.

The numbers of Aboriginal people, volunteers, researchers, NPWS and other agency staff and contractors able to visit or stay overnight are not restricted by public visitor and overnight guest limits. However, when assessing such visits, NPWS considers the island's ability to accommodate total visitor numbers.

Monitoring the impact of public visitors on park values, the visitor experience and the interaction between public visitors and park infrastructure constraints will help NPWS to decide if changes to the numbers of public visitors are required.

The visitor number limits will be retained for the life of the Barunguba Montague Island plan of management. However, a temporary reduction to visitor number limits may be put in place at times such as during seabird breeding or moulting seasons, if the water supply is restricted, where public visitation may be causing deleterious impacts to the park's native plants and animals or heritage values, or where staff and volunteers will be unavailable to provide guiding or other visitor and park management services. Other factors that may influence a decision to permanently revise public visitor numbers include:

- impacts of public visitors on native plants and animals
- impacts of public visitors on Aboriginal or historic heritage values
- impacts of public visitors on visitor experience
- maintenance of low-key, high-quality tours to maximise public visitor experience
- impacts of public visitors on park infrastructure (for example, tracks and trails)
- capacity of infrastructure to provide for public visitors (for example, sewerage system, water supply)
- capacity of the local emergency services to respond to a public visitor emergency.

### **3.4 Licensing and commercial operators**

Commercial operators transport public visitors to and from the island and must be appropriately licensed by NPWS. Commercial operators licensed by NPWS to land at Barunguba Montague Island Nature Reserve must hold a suitable Australian Maritime Safety Authority vessel certificate of survey to undertake transportation of passengers and tourism operations at this offshore island.

#### **3.4.1 Management consideration and opportunities**

In order to ensure safe vessel access and limit structural damage and rigging failure to the Barunguba Montague Island jetty, NPWS licence conditions for commercial operators identify a vessel size limit. Under the present jetty configuration, vessels accessing the island and licensed to land visitors are restricted to a maximum length overall (or LOA) of 14 m.

Setting maximum size limits for licensed commercial boats is also important to limit impacts on marine life, especially seals. Licensed commercial boats landing visitors on the island also conduct viewing or snorkelling/diving with seal activities in waters adjacent to the island under licence to the NSW Marine Park Authority.

Currently, all guided tours on the island are led by NPWS staff and volunteers. Subject to operational requirements, NPWS may move to a visitation model that authorises commercial operators to lead tours on the island, including lighthouse tours. Any commercial operators

leading tours on the island would require a licence from NPWS and be subject to licensing conditions.

## 3.5 Interpretation

Public visitation to Barunguba Montague Island Nature Reserve provides an excellent opportunity to promote public appreciation, enjoyment and understanding of the natural and cultural values of the park. Interpretation of aspects of interest can be done directly by taking visitors on authorised tours led by NPWS authorised guides, and indirectly through park signs, webpages and other materials, including via emerging and innovative technologies.

### 3.5.1 Management considerations and opportunities

There are significant opportunities for the local Aboriginal community to be involved in the development and delivery of material and programs interpreting Aboriginal culture and heritage.

Preparing and implementing a simple **education and interpretation plan** would help to guide the development of opportunities for visitors to learn about the significant natural and cultural values of the park.

The plan could identify appropriate media, including digital media, and emphasise a range of key themes including:

- the importance of the island for seabird breeding including bird nesting ecology, the vulnerability of nests to human disturbance, and the role of the Seabird Habitat Restoration project
- the importance of the seal colony and the vulnerability of the seals to disturbance from a range of factors, including land- and water-based tourism
- Aboriginal use and cultural significance of the island, including recognising that the island is an Aboriginal place, the longstanding and ongoing connection to Country and the important connections with mainland landscape features, particularly Gulaga and Najanuka
- European history of the island, particularly the role of the lighthouse and the lifestyle of the lightkeepers
- management of the park and the reasons for strict control of public visitation.

## 3.6 Research and monitoring

Under the National Parks and Wildlife Act, one of the management principles for nature reserves is that they be managed to provide for appropriate research and monitoring.

As an island ecosystem, an important seabird breeding area and the northernmost fur seal colony in eastern Australia, Barunguba Montague Island Nature Reserve provides unique and valuable research opportunities. The cultural heritage of the island also offers opportunities for research into Aboriginal use of offshore islands and past use of the island for navigation, naval purposes and associated living patterns.

The park has an extended history of environmental research, including long-term monitoring programs for shearwaters and extensive research on little penguins. Research and monitoring of the island's plants and animals is necessary to track their populations, to understand factors that may be influencing changes, determine impacts of threats more comprehensively, and to identify appropriate and effective measures to protect them from existing and potential threats.



### **3.6.1 Management considerations and opportunities**

Research in the park is subject to relevant legislation and departmental policy including animal ethics. Priority topics for research and monitoring in the park are focussed on the park's biodiversity and include Gould's petrel, white-faced storm-petrel, shearwaters, little penguins, terrestrial birds as well as the recovering fur seal populations. Climate change will also be a key research and monitoring topic in its own right and a critical component of many other research programs. The effectiveness and utility of climate change mitigation measures may also be a focus of research.

Preparation of a **research and monitoring strategy** that identifies key areas for future research would help enhance our understanding of the natural and cultural values of the park and guide their management. Developing partnerships with universities and other research institutions would assist delivery of a research and monitoring strategy. NPWS currently works closely with the research group Montague Island Partners.

Researchers can access all areas of the park as described in their scientific licence or as otherwise agreed to by the park manager.

## 4. Park infrastructure and services

### 4.1 Park infrastructure

NPWS manages and maintains a range of visitor and management facilities in the park, including heritage and other buildings at the lightstation complex, jetty infrastructure including a boatshed and loading crane, management trails, power, water and sewerage assets, a plant nursery and a workshop. All infrastructure assets, including all management trails, are located on the south island.

These facilities are managed and maintained through the NPWS asset management system. This system helps NPWS maintain and renew assets necessary to support safe and sustainable visitor use, park management operations and enhance heritage conservation.

#### 4.1.1 Management considerations and opportunities

Many of the NPWS assets associated with the lightstation complex are heritage listed. These buildings require ongoing maintenance to maintain their heritage values. A **conservation management plan** (HLCD 2008, 2009) has been prepared for the park.

NPWS staff and tour guides are stationed on the island to provide park management and visitor services. They are housed in the heritage-listed residences, which also provide accommodation for other park visitors, including other agency staff, contractors, volunteers, researchers and pre-booked commercial overnight guests.

Accommodation in the park is limited and in peak research and visitor periods existing accommodation options struggle to meet demand. If additional accommodation is required NPWS may adaptively reuse other buildings in the lightstation complex for accommodation or other suitable purposes.

While it is preferable that existing buildings or spaces are sympathetically reused to adapt to changing circumstances, NPWS **may construct additional accommodation and research facilities** for NPWS and other agency staff, researchers and other non-public visitors, designed in a simple contemporary manner, but sympathetic to the existing heritage values. Any new development would be sited in the cleared area at the Nursery precinct, which was identified as a potential site for new development in the conservation management plan (HLCD 2008, 2009). Any new development must not impact on views to and from the significant structures and natural features.

Some existing buildings, such as the boatshed and the nursery shed, are used to store and maintain a range of park management equipment.

Jetty infrastructure is critical for park management and for providing safe access for visitors. The **jetty and vessel landing facilities** may be upgraded to improve accessibility, reduce risks to those landing on the island, or to better protect native plants and animals and heritage values. The impacts of climate change, including rising sea levels and increasing frequency and intensity of storms, may necessitate changes to the jetty infrastructure to enable continuing access to the island, ensure the safety of visitors as they disembark/embark and limit adverse impacts on natural and cultural heritage values (see also Section 1.3.1).

Similarly, **management trails** provide access for park management activities and some also function as walking tracks for visitors (see Figure 1 and Photos 20 and 21). Management trails are maintained to the fire trail standards identified in the park fire management strategy. Generally, management trails are maintained as slashed grass tracks, except the

high-use Jetty Track, linking Jetty Bay and the lightstation precinct, which has sections of concrete hardstand.

Assets no longer necessary for park management or visitor use may be decommissioned or removed and the site rehabilitated after relevant heritage and environmental impact assessments and approvals.



**Photo 17 Aerial view of the island looking north showing management trails being maintained as grass tracks. Daniel Tran/DPE**

The **viewing platform at Jetty Bay** enables visitors to watch the spectacle of little penguins returning to the island at the end of the day and commencing their overland journey to their burrows. The viewing platform has a physically constrained footprint and has been configured to minimise impact on the surrounding little penguin landing site, pathways and nesting habitat. Over-capacity evening tours spill out from the platform across uneven and unlit ground, potentially impacting the little penguin parade and nesting habitat and posing a safety risk to visitors. Upgrades may be made to the viewing platform to better protect little penguins, other native plants and animals and heritage values, or to improve access and visitor safety.

The park is self-sufficient regarding **water** and largely self-sufficient regarding **power**. Water is provided through the collection and storage of rainwater. Available water storage is approximately 180,000 litres, with pressure generated via independent electrical pumps. Generation and storage of electricity is via a 20 kilowatt solar system and battery bank which is supported by a 13 kilo-volt-ampere diesel generator. Electricity powers essential services, including water pumps, sewage pumps, communications and meteorological equipment and a range of domestic functions including lighting and refrigeration. LPG gas is used for cooking and hot water services. LPG gas and other supplies such as diesel fuel, food and other management requirements are shipped to the park as required.

The current sewerage system, installed in 2003, is a 3-stage connected tank system with post-treatment water dispersed via linear line. The system is sited in a strategic location



which allows an effective gradient from the lightstation and minimal impact to the values and aesthetics of the precinct.

Technology around self-reliant power, water and sewerage systems is changing rapidly, with significant advances in environmentally friendly options. The existing systems in the park may be upgraded in the future to reflect increasing demand, more efficient technology or better environmental outcomes. For instance, while there is no opportunity to increase capacity of the existing sewerage system based on physical and environmental constraints, there might be an opportunity to install a more energy or water efficient sewerage treatment system in the same footprint as the existing system.



Photo 18 NPWS vessel coming alongside at Jetty Bay on Barunguba. Amy Harris/DPE



## 5. Non-park infrastructure and services

The park contains infrastructure and other assets which are owned, operated or used by other organisations.

### 5.1 Non-park infrastructure

The lighthouse is owned by NPWS and leased to Australian Maritime Safety Authority who are responsible for its continuing operation and maintenance, including the maintenance of its solar power system that is independent of other power supply systems on the island. The lease of the lighthouse to the authority was renewed on 1 July 2022 for a 25-year lease period expiring on 30 June 2047.

Other non-NPWS infrastructure on the island includes weather recording equipment owned and maintained by the Bureau of Meteorology, and communications equipment owned and maintained by various government agencies and emergency services, including NSW Police, NSW Ambulance, NSW Rural Fire Service and Surf Life Saving NSW.

In 2010 all communications equipment was moved to a new site immediately to the south of the solar array to minimise interference with the heritage fabric of the lightstation complex. Existing and new communications equipment would be sited on the existing single tower and interlink to the small radio equipment hut nearby. The Bureau of Meteorology anemometer is maintained unobtrusively on the historic flagstaff, and their Stevenson screen meteorological shelter is on the eastern side of the residences.

#### 5.1.1 Management considerations and opportunities

Access is required for the use, operation, maintenance and repair of non-park infrastructure. Negotiation of formal access agreements will help to ensure safe access to, and environmentally sustainable management of, non-park infrastructure.

Any new non-park infrastructure would be subject to heritage and environmental assessment and approvals. The open landscape and views to and from the lightstation complex contribute substantially to the cultural landscape significance of the site and as such views from or to the site should not be dominated by any new park or non-park infrastructure.

# Appendices

## Appendix A Legislation and policy

The following laws and policies apply to how we manage our parks (this is not a complete list):

### NSW legislation

- National Parks and Wildlife Act 1974 and National Parks and Wildlife Regulation
- Environmental Planning and Assessment Act 1979
- Heritage Act 1977
- Biodiversity Conservation Act 2016
- Biosecurity Act 2015
- Local Land Service Act 2013
- Marine Estate Management Act 2014

Other NSW laws may also apply to park management:

- Work Health and Safety Act 2011

### Commonwealth legislation and policy

- Environment Protection and Biodiversity Conservation Act 1999
- Disability Discrimination Act 1992
- Building Code of Australia

### NPWS policies and strategies

A range of NPWS policies and strategies may also apply to park management:

- [park management policies](#)
- [managing pests and weeds in national parks](#)
- [fire management strategies](#)

Other laws, policies and strategies may also apply. Please contact NPWS for advice.

## Appendix B Scientific plant and animal names

The following table shows the scientific name for common plant and animal names used in this plan. It is not a comprehensive list of species known to occur or recorded on the island.

**Table 4 Common and scientific names**

Common name	Scientific name
<b>Plants</b>	
Bangalay	<i>Eucalyptus botryoides</i>
Blady grass	<i>Imperata cylindrica</i>
Bracelet honey-myrtle	<i>Melaleuca armillaris</i>
Bracken	<i>Pteridium esculentum</i>
Coast banksia	<i>Banksia integrifolia</i>
Coast tussock grass	<i>Poa poiformis</i>
Coastal rosemary	<i>Westringia fruticosa</i>
Coastal wattle	<i>Acacia longifolia</i> subsp. <i>sophorae</i>
Commelina	<i>Commelina cyanea</i>
Common reed	<i>Phragmites australis</i>
Drooping sheoak	<i>Allocasuarina verticillata</i>
Dusky coral pea	<i>Kennedia rubicunda</i>
Kangaroo grass	<i>Themeda triandra</i>
Kidney weed	<i>Dichondra repens</i>
Lovegrass	<i>Eragrostis leptostachya</i>
Milk vine	<i>Marsdenia rostrata</i>
New Zealand spinach (or warrigal greens)	<i>Tetragonia tetragonioides</i>
Prickly couch	<i>Zoysia macrantha</i>
Rock isotome	<i>Isotoma axillaris</i>
Sand couch	<i>Sporobolus virginicus</i>
Sea berry saltbush	<i>Rhagodia candolleana</i>
Sea box	<i>Alyxia buxifolia</i>
Spiny-headed mat-rush	<i>Lomandra longifolia</i>
Swamp oak	<i>Casuarina glauca</i>
Pigeon-berries	<i>Monotoca elliptica</i>
White correa	<i>Correa alba</i>
<b>Birds</b>	
Australian pipit	<i>Anthus australis</i>
Australasian bittern	<i>Botaurus poiciloptilus</i>
Bar-shouldered dove	<i>Geopelia humeralis</i>
Black-shouldered kite	<i>Elanus axillaris</i>

Common name	Scientific name
Buff-banded rail	<i>Gallirallus philippensis</i>
Brown goshawk	<i>Accipiter fasciatus</i>
Brown quail	<i>Coturnix ypsilophora</i>
Caspian tern	<i>Hydroprogne caspia</i>
Crimson rosella	<i>Platycercus elegans</i>
Dusky woodswallow	<i>Artamus cyanopterus cyanopterus</i>
Golden-headed cisticola	<i>Cisticola exilis</i>
Gould's petrel	<i>Pterodroma leucoptera</i>
Great cormorant	<i>Phalacrocorax carbo</i>
Greater crested tern	<i>Thalasseus bergii</i>
Little grassbird	<i>Megalurus gramineus</i>
Little pied cormorant	<i>Microcarbo melanoleucos</i>
Little penguin	<i>Eudyptula minor</i>
Nankeen kestrel	<i>Falco cenchroides</i>
New Holland honeyeater	<i>Phylidonyris novaehollandiae</i>
Peregrine falcon	<i>Falco peregrinus</i>
Pink robin	<i>Petroica rodinogaster</i>
Rose robin	<i>Petroica rosea</i>
Ruddy turnstone	<i>Arenaria interpres</i>
Rufous fantail	<i>Rhipidura rufifrons</i>
Sacred kingfisher	<i>Todiramphus sanctus</i>
Scarlet honeyeater	<i>Myzomela sanguinolenta</i>
Sharp-tailed sandpiper	<i>Calidris acuminata</i>
Short-tailed shearwater	<i>Ardenna tenuirostris</i>
Silvereye	<i>Zosterops lateralis</i>
Silver gull	<i>Chroicocephalus novaehollandiae</i>
Sooty oystercatcher	<i>Haematopus fuliginosus</i>
Sooty shearwater	<i>Ardenna grisea</i>
Spotted harrier	<i>Circus assimilis</i>
Swamp harrier	<i>Circus approximans</i>
Wedge-tailed shearwater	<i>Ardenna pacifica</i>
Welcome swallow	<i>Hirundo neoxena</i>
Whimbrel	<i>Numenius phaeopus</i>
White-bellied sea eagle	<i>Haliaeetus leucogaster</i>
White-faced heron	<i>Egretta novaehollandiae</i>
White-faced storm-petrel	<i>Pelagodroma marina</i>
White-fronted tern	<i>Sterna striata</i>



Common name	Scientific name
Willy wagtail	<i>Rhipidura leucophrys</i>
Yellow-faced honeyeater	<i>Caligavis chrysops</i>
<b>Mammals</b>	
Australian fur seal	<i>Arctocephalus pusillus doriferus</i>
Long-nosed fur seal	<i>Arctocephalus forsteri</i>
White-striped free-tailed bat	<i>Tadarida australis</i>
<b>Frogs</b>	
Striped marsh frog	<i>Limnodynastes peronii</i>
<b>Reptiles</b>	
Grass sun-skink	<i>Lampropholis guichenoti</i>
White's skink	<i>Liopholis whitii</i>
<b>Fish</b>	
Grey nurse shark	<i>Carcharias taurus</i>
<b>Other</b>	
Humped golden orb-weaving spider	<i>Nephila plumipes</i>

Common plant names from PlantNET (The NSW Plant Information Network System), Royal Botanic Gardens and Domain Trust, Sydney.

## Appendix C Pests and weeds in the park

Following extensive work controlling pests, the park was declared vertebrate pest-free in 2009 and remains so at time of publication. Current information on the status of pests and whether they have a threat abatement plan can be found on the department's website. Further pest information on the park is also available on the department's *Managing pest animals and weeds in our national parks* webpage. The *Local Land Service Act 2013* declares certain animals to be pests.

The following table summarises key information on weeds in the park at the time of publication.

### Priority weeds

**Table 5 Priority weeds for management**

Common name	Scientific name	WONS	LLS	KTP
Cape ivy	<i>Delairea odorata</i>	N	Y <sup>2</sup>	Y
Coastal morning glory	<i>Ipomoea cairica</i>	N	Y <sup>2</sup>	Y
Dolichos pea	<i>Dipogon lignosus</i>	N	Y <sup>2</sup>	Y
Inkweed	<i>Phytolacca octandra</i>	N	N	N
Kikuyu grass	<i>Pennisetum clandestinum</i>	N	N	N
Madeira vine	<i>Anredera cordifolia</i>	Y	Y <sup>1</sup>	Y
Rambling dock (Turkey rhubarb)	<i>Rumex sagittatus</i>	N	Y <sup>2</sup>	N

Notes:

WONS = Weed of National Significance.

LLS = species listed in the South East regional strategic weed management plan 2017–2022 (South East LLS 2017).

KTP = key threatening process listed under the Biodiversity Conservation Act and/or Environment Protection and Biodiversity Conservation Act.

1. State-level priority weed under South East regional strategic weed management plan 2017–2022 (South East LLS 2017).

2. Weed subject to local management programs under South East regional strategic weed management plan 2017–2022 (South East LLS 2017).

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## More information

- [Australian Heritage Database](#)
- [Barunguba Montague Island Nature Reserve Draft Plan of Management](#)
- [Biodiversity Conservation Program](#)
- [Department of Environment and Heritage website](#)
- [Department of Planning and Environment's privacy and security webpage](#)
- [Fire management strategies](#)
- [Key threatening processes webpage](#)
- [Managing pest animals and weeds in our national parks](#)
- [National Parks and Wildlife Service \(NPWS\) website](#)
- [NPWS park policies \(webpage\):](#)
  - [Drones in park policy](#)
  - [Filming and photography policy](#)
  - [Fossicking policy](#)
  - [Geocaching policy](#)
  - [Visitor safety policy](#)
  - [Walking tracks policy](#)
- [NSW BioNet](#)
- [NSW Legislation, NSW Government website](#)
- [Saving our Species program](#)
- [State Heritage Register database](#), Heritage NSW, Sydney