NSW National Parks and Wildlife Service

Narran Lake Nature Reserve

Draft plan of management

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Acknowledgement of Country

Narran Lake Nature Reserve is in the traditional lands of the Yuwaalaraay/Euahlayi People. Yuwaalaraay/Euahlayi may also be referred to as Ualarai, Uallaroi, Ullaroi, Yalaroi, Yallaroi, Youalaroi, Yoularoi and Yuwaalayaay. The lakes area is culturally significant for the Yuwaalaraay/Euahlayi Traditional Owners and also people of surrounding nations (including the Barranbinya, Gamilaroi, Kooma, Murrawarri, Ngemba and Wayilwan peoples).

Narran Lake Nature Reserve is part of an area known as Dharriwaa by the Yuwaalaraay/Euahlayi People, people of surrounding nations, Dharriwaa Elders group and the Narran Lake Nature Reserve Joint Management Committee.

Narran Lake Nature Reserve is an integral part of a rich and complex cultural landscape which is of profound significance. The rights of the Aboriginal peoples and their aspirations for their Country are acknowledged and respected.

The Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

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Have your say

Submissions must be lodged before 5 pm on Friday 16 January 2026.

Your submission will help in the preparation of a new plan of management for Narran Lake Nature Reserve. Submissions must be in written form and lodged via one of the following:


the online submission form at www.environment.nsw.gov.au/get-involved/have-your-say


email to npws.parkplanning@environment.nsw.gov.au


post to Manager, Planning and Assessment, National Parks and Wildlife Service, Locked Bag 5022, Parramatta NSW 2124.

We are seeking your comments on this draft plan. The best submissions:

- provide a brief introduction about yourself or the organisation that you represent
- are concise and clear about the points that you raise
- only include the facts and references that relate to your key points
- use respectful and constructive language
- reference the relevant section of the draft plan.

Your submission may be provided to the statutory bodies that have an advisory role under the *National Parks and Wildlife Act 1974* in the preparation of each plan of management. These bodies include the Karst Management Advisory Committee, regional advisory committees and the National Parks and Wildlife Advisory Council.

The Department of Climate Change, Energy, the Environment and Water complies with the NSW *Privacy and Personal Information Protection Act 1998*, which regulates the collection, storage, quality, use and disclosure of personal information.

Summary

Narran Lake Nature Reserve was established in 1988. It is protected in perpetuity through its reservation under the *National Parks and Wildlife Act 1974*. The management of the reserve is designed to achieve the objects of this Act – to conserve the natural and cultural values of the reserve, as well as fostering public appreciation, understanding and enjoyment of those values (Appendix A).

This draft plan of management has been prepared to give members of the public an opportunity to contribute to the preparation of a new plan of management for this nature reserve.

In preparing this plan, the following were considered:

- the cultural principles that guide joint management
- the objects of the National Parks and Wildlife Act (Appendix A)
- the management principles for nature reserves listed under section 30J of the National Parks and Wildlife Act (Appendix B)
- Australian Ramsar management principles listed in the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth) (Appendix C).

Once adopted, this plan will replace the current plan of management, which was adopted in 2000 and amended in 2011. The plan of management will set out those operations that are permitted within the reserve and provide strategic direction for management. The plan will help guide the management of nearby areas vested in the Minister responsible for the National Parks and Wildlife Act that are not dedicated as reserve. These areas are referred to as Part 11 land (see Figure 1).

1. Narran Lake Nature Reserve

Narran Lake Nature Reserve covers 26,480 ha and is located on the upper western plains of New South Wales. The nearby communities of Brewarrina, Walgett and Lightning Ridge are 60–70 km from the reserve (see Figure 2).

Narran Lake Nature Reserve is located in an area traditionally known as Dharriwaa and features a wetland complex of national and international importance.

Gungan (water) is essential for life and is a driver for abundance in the landscape. It also has spiritual value. Historically, the Narran Lakes system would have been inundated in most years, providing an abundance of resources that supported continuous Aboriginal occupation for thousands of years. As a traditional meeting place for surrounding Aboriginal nations, the reserve is rich with material evidence of Aboriginal peoples' occupation. This includes shell middens, hearth sites with clay ovens, stone quarries for tool manufacture, artefact scatters and scarred trees.

The wetlands support significant biodiversity, including water-dependent threatened species and vital feeding and breeding habitat for many waterbird species. This includes one of Australia's largest ibis rookeries and species of migratory waders protected under international agreements.

Narran Lake Nature Reserve is jointly managed through a memorandum of understanding (MoU) between the National Parks and Wildlife Service (NPWS) and the Narran Lake Nature Reserve Joint Management Committee. This draft plan was prepared by NPWS staff in consultation with the joint management committee. The draft plan identifies the strategic direction for reserve management by articulating a vision for the future, priority management objectives and key strategies.

Dharriwaa, meaning 'a meeting place', is the traditional name for the area that includes several major wetlands of the lower Narran River floodplain. The wetland complex consists of open water lakes (Clear Lake, Back Lake and Narran Lake), a large floodplain area dominated by lignum, and ephemeral semi-saline depressions. Some of these lakes and the extensive channel network that connect them to the Narran River are major features of the Narran Lake Nature Reserve. The reserve encompasses Long Arm, Back Lake and Clear Lake, but does not include the largest lake at the very end of the system, known as Narran Lake or Burrul Gungan. See Figure 1 and Figure 2.

Approximately one-third of the reserve (8,477 ha) comprises the Narran Lake Nature Reserve Ramsar site. The reserve is part of a large terminal (closed) wetland system and so plays an important hydrological role in the natural functioning of the Narran River. The Narran Lake wetlands are dependent on river flows and flooding from the Narran River. The Narran River is part of the lower reaches of the Condamine–Balonne River catchment within the Murray–Darling Basin. Upstream development of water management infrastructure and water extraction is impacting the Narran River flow regime. Sustaining the wetlands and their dependent biodiversity relies on water policy and management decisions that ensure adequate water volumes reach the Narran Lakes system, which includes the Narran River, the nature reserve and Narran Lake (Burrul Gungan).

The reserve protects a large area of remnant vegetation within a broader landscape that has been modified through land clearing, cropping, grazing, opal prospecting and mining activities.

Our vision

Narran Lake Nature Reserve will be a place where Country is healthy, looked after with best practice land management, and where Aboriginal culture is lived and passed on.

Key objectives to achieve this vision are:

- Country is healthy
- People are connected to Country
- Culture is strong.

Back Lake during a 2022 flood event. Jo Ocock/DCCEEW

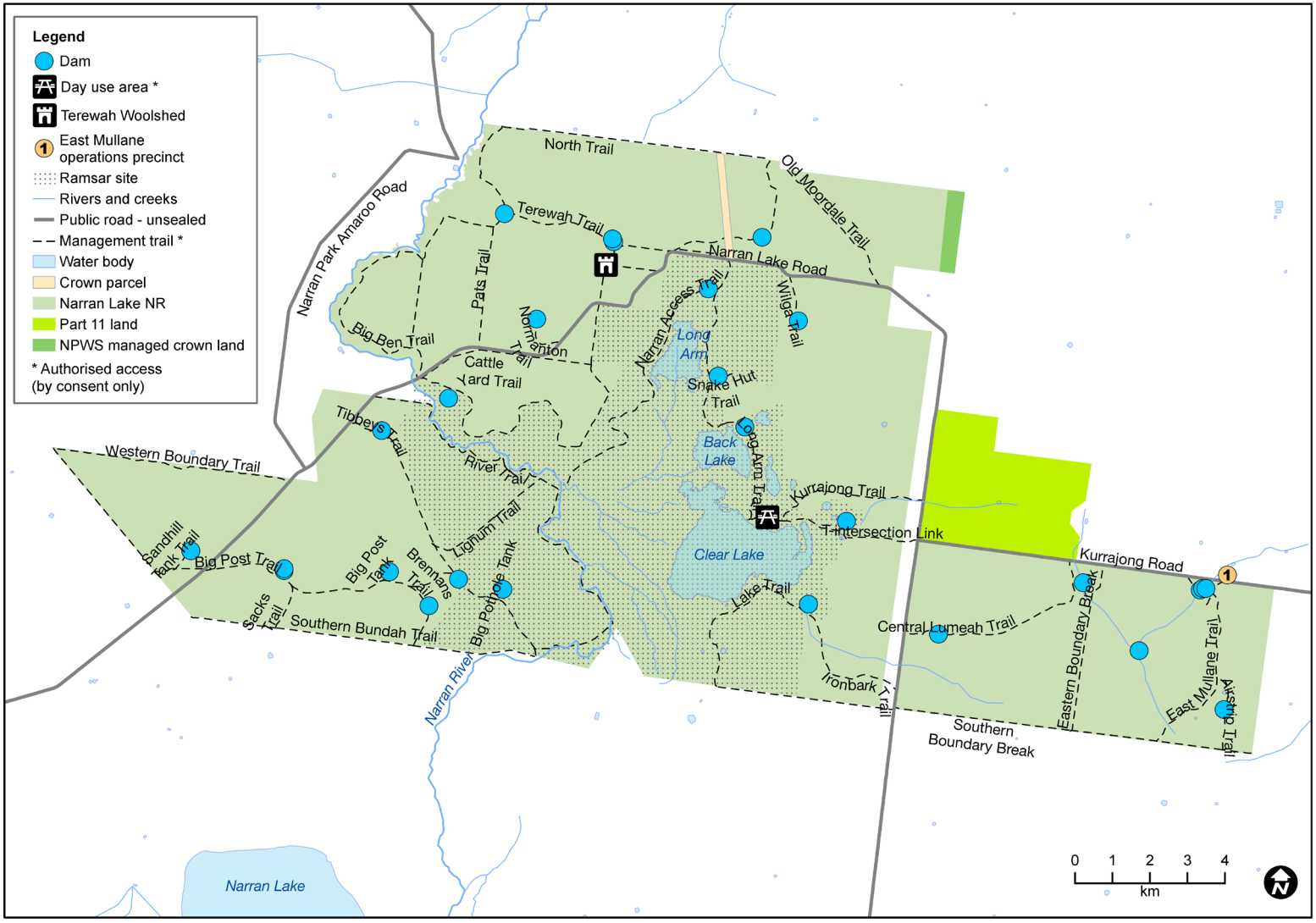


Figure 1 Map of Narran Lake Nature Reserve

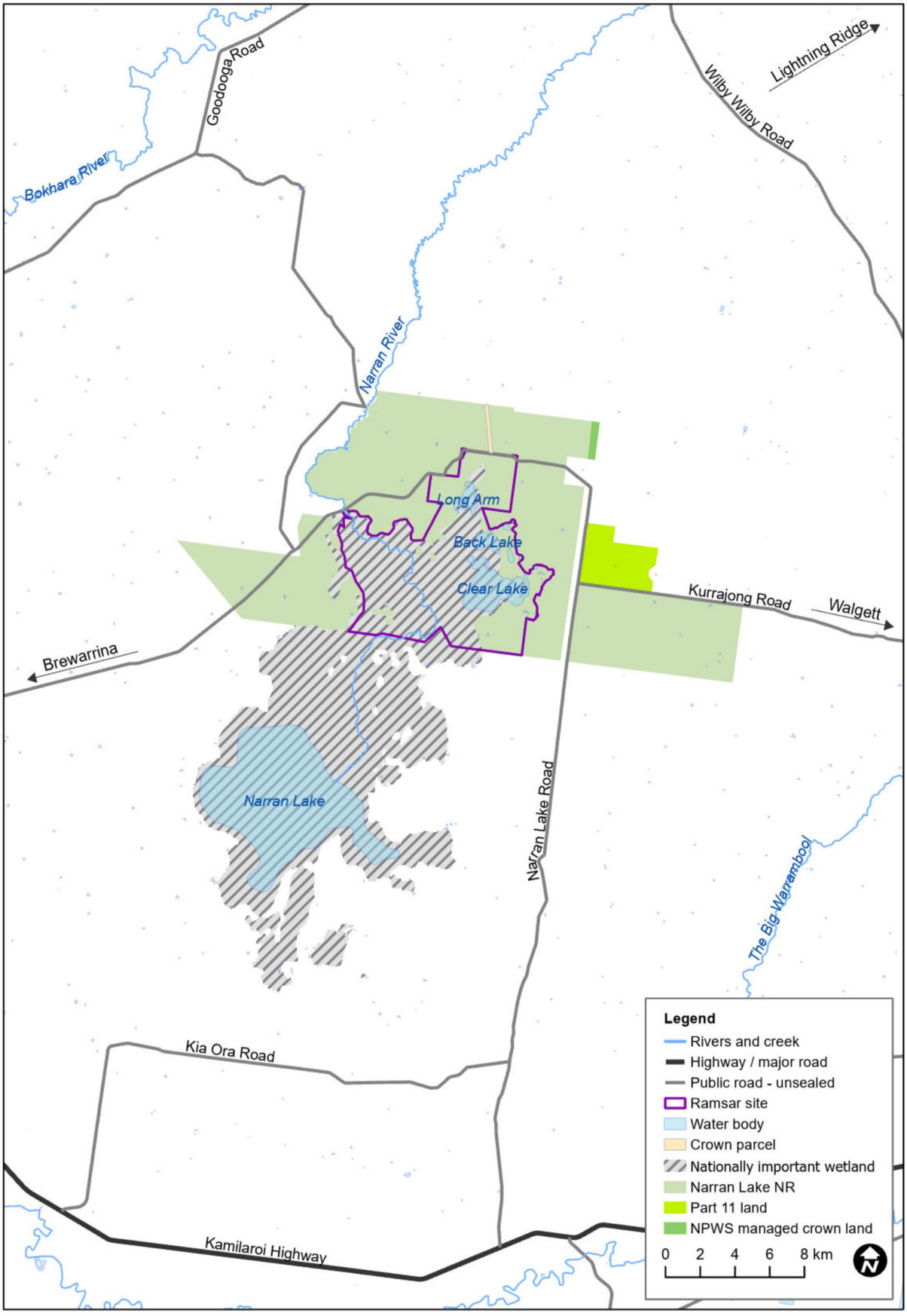


Figure 2 Narran Lake Nature Reserve regional setting

2. Significance of Narran Lake Nature Reserve

Outstanding cultural significance

Narran Lake Nature Reserve has extremely important social and cultural values for Aboriginal peoples. The practice of lore, ceremony and spirituality are directly linked to Country. Cultural significance comes from Burruguu (the beginning, the Dreaming, the lore), and the ongoing relationships between the Country and its peoples. The sequence of springs, waterholes and bends in the Narran River and the terminal wetland complex are part of the Dreaming path of Baayami (the Creator) and his wives Birragnulu and Ganhanbili.

Narran Lake Nature Reserve is part of a broader cultural landscape. There are numerous cultural connections with other features in the landscape, including Baayami's Ngunnhu on the Barwon River (the fish traps at Brewarrina), the Big Warrambool, Bidi-Wambal (the Macquarie Marshes), the Wambool (the Macquarie River), and the Gwydir Wetlands.

The Narran River and lake system supported continuous occupation by Aboriginal people for thousands of years. Although Narran Lake Nature Reserve is in the traditional lands of the Yuwaalaraay/Euahlayi People, the lakes area is culturally significant for the Barranbinya, Gamilaroi, Kooma, Murrawarri, Ngemba and Wayilwan peoples (and people of surrounding nations). Physical evidence of Aboriginal people's activities includes a highly significant and extensive complex of Aboriginal sites, such as artefact scatters, shell middens and hearths. There are also numerous intangible values of significance.

Looking north to Clear Lake during a 2022 flood event. Jo Ocock/DCCEEW

A wetland of national and international importance

The wetlands of Dharriwaa are part of a 30,000-ha wetland of national importance (see Figure 2), one-third of which is in the reserve. The reserve contains considerable diversity of habitats and refuge for a variety of plants and animals, including numerous threatened species and communities. The wetlands have supported breeding by at least 46 species of waterbirds, including Australia's largest ibis breeding event estimated at over 200,000 nests in 1983 (Brandis et al. 2011). The wetlands have historically flooded more frequently and have held water for longer than most wetlands of northern inland New South Wales. The extensive channelised wetlands between and around the lakes are dominated by some of the largest expanses of lignum vegetation in the state.

For these reasons, a large area (8,477 ha) within the reserve containing most of the wetlands and wider floodplain are listed under the *Convention on wetlands of international importance* (more commonly known as the Ramsar convention). Ramsar listing ensures the site is recognised for its natural values and has additional protection under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Diversity of species, vegetation and ecological communities

Populations of more than 200 native vertebrate animals and over 400 plant species have been recorded at Narran Lake Nature Reserve (NSW BioNet database, accessed 20 May 2021). The wetlands and vegetation communities in the nature reserve are important habitat for at least 175 bird species (including 26 threatened and migratory birds), 17 mammals (including koalas [*Phascolarctos cinereus*] and 2 threatened bats), 8 frogs and 28 reptiles.

Eleven plant communities occur at Narran Lake Nature Reserve. Most of the woodland is white cypress-pine (*Callitris glaucophylla*), wilga (*Geijera parviflora*) and poplar box (*Eucalyptus populnea*). Lignum shrublands (*Duma florulenta*) dominate the frequently flooded areas in and around Clear Lake, Back Lake and the Narran River. River red gum (*Eucalyptus camaldulensis*) and coolibah (*Eucalyptus coolabah*) woodland occurs on the banks of the Narran River and some channels of Clear Lake. Patches of poplar box and coolibah woodland occur on the margins of more frequently inundated areas west of the Narran River.

Four ecological communities listed as threatened under the *Biodiversity Conservation Act 2016* occur in the reserve. These are:

- Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregion
- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions
- Brigalow-Gidgee Woodland/Shrubland in the Mulga Lands and Darling Riverine Plains Bioregion
- Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions.

Two ecological communities listed as threatened under the Environment Protection and Biodiversity Conservation Act occur in the reserve. These are Poplar Box Grassy Woodland on Alluvial Plains, and Weeping Myall Woodlands.

The Narran River, its tributaries and wetlands contain potential habitat for threatened aquatic species, populations and communities listed under the *Fisheries Management Act 1994*. These include the endangered aquatic ecological community of the lowland catchment of the Darling River, and the endangered western population of the olive perchlet (*Ambassis*

agassizii). The Narran Lake Nature Reserve Ramsar site also supports populations of other threatened species including Murray cod (*Maccullochella peelii*), Australasian bittern (*Botaurus poiciloptilus*) and winged peppercress (*Lepidium monoplocoides*). See Appendix D for a list of threatened birds and mammals, migratory birds and threatened plants recorded in the nature reserve.

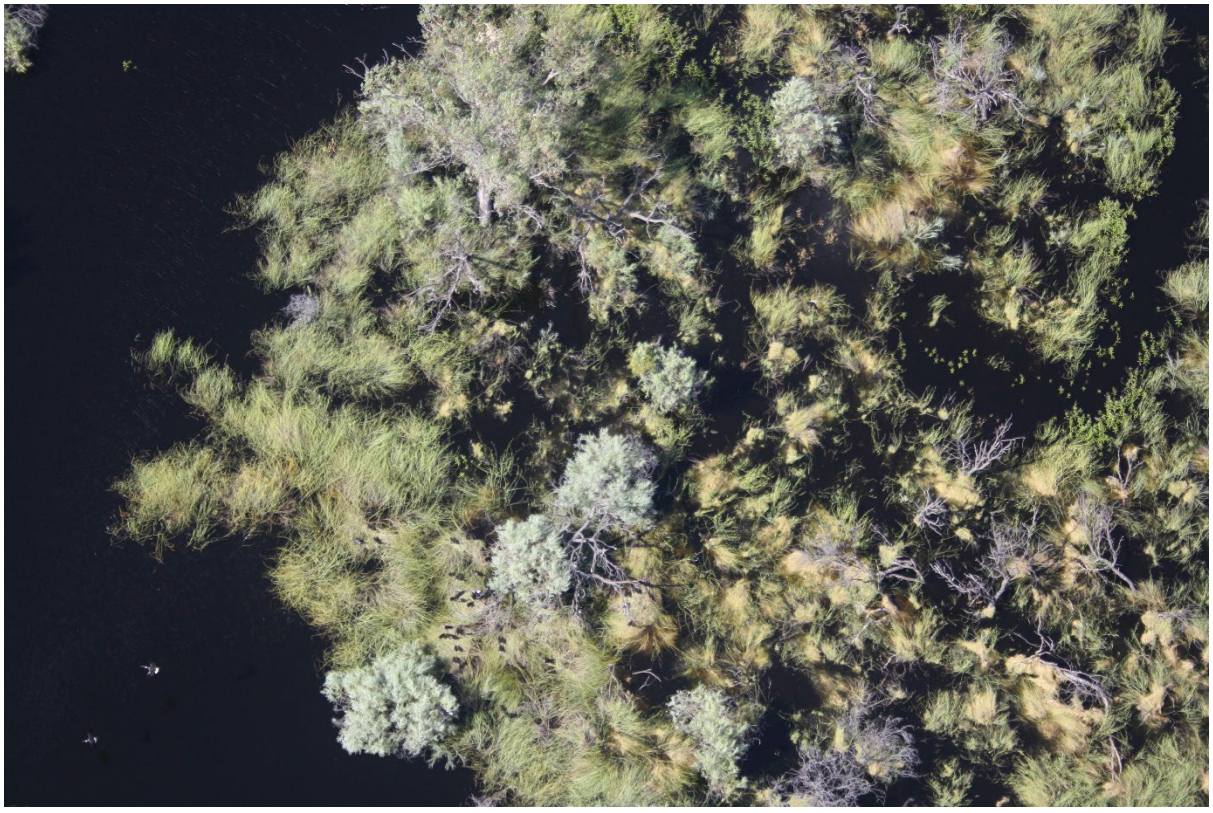
A landscape rich with cultural resources

Narran Lake Nature Reserve is prized by Aboriginal people for its natural abundance of food, medicines and materials. The various parts of native plants (fruits, flowers, leaves, branches, gum, wood, bark and roots) serve a variety of purposes for local Aboriginal people. For example, seeds from nardoo (*Marsilea* sp.) and grasses were traditionally ground into flour for baking. Narran Lake Nature Reserve also provides resources for making tools and objects, such as gundhi (shelters), stone tools, spears, shields, bark canoes, nets, and wooden carrying and digging tools. When flooded, the wetlands support a variety of food resources such as fish, mussels, crayfish and waterbirds.

Traditional Aboriginal land use and management practices sustained essential commodities, retained habitat and biodiversity, and built reverence for lore, Country and cultural practice. Using cultural practices to care for Country keeps culture strong and Country healthy.

A place for teaching and learning

An integral part of caring for Country and cultural heritage is visiting Narran Lake Nature Reserve. Open days in Narran Lake Nature Reserve are opportunities to share cultural and specialist knowledge with community on Country. Teaching and learning occurs through cultural events and activities, and research and monitoring programs. The current day use area near the Clear Lake midden facilitates cultural, educational and research activities in the reserve (see Figure 1).



Aerial view of straw-necked ibis (*Threskiornis spinicollis*) among lignum. Jo Ocock/DCCEEW

3. Planning context

The Narran Lake Nature Reserve is reserved under the *National Parks and Wildlife Act 1974* and is managed in accordance with the objects of the Act (see Appendix A) and management principles for nature reserves (see Appendix B). The objects of the Act include conserving the natural and cultural values of the reserve, while also fostering public appreciation, understanding and enjoyment of these values.

3.1 Memorandum of understanding

In recognition of the importance of the Narran Lakes and surrounding lands to Aboriginal peoples, NPWS jointly manage the Narran Lake Nature Reserve with Aboriginal people under a memorandum of understanding (MoU). The MoU establishes the Narran Lake Nature Reserve Joint Management Committee and facilitates involvement of Aboriginal people in the management of this reserve.

This draft plan of management proposes to integrate cultural principles into reserve management. These principles support Aboriginal land management practices and enable culture to be lived, transformed and passed on to future generations. The principles are:

- we recognise and respect our different world views
- we recognise and respect Aboriginal people's cultural perspective and right to practise culture
- we recognise that cultural practise at Dharriwaa contributes to conserving the natural and cultural values of the reserve, as well as fostering public appreciation, understanding and enjoyment of these values.

3.2 The Narran Lake Nature Reserve Ramsar site

The Narran Lake Nature Reserve Ramsar Site (8,447 ha) is situated within the reserve (see Figure 1). The wetlands on the reserve are part of a 30,000-ha wetland of national importance that extends beyond the reserve boundary, as identified in the Directory of Important Wetlands of Australia (see Figure 2).

The *Convention on wetlands of international importance*, also known as the Ramsar convention, aims to halt global loss of wetlands and conserve those that remain. The Narran Lake Nature Reserve Ramsar site meets 3 of the 9 criteria for listing under the Ramsar convention:

- Criterion 1: The wetland contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
- Criterion 2: The wetland supports vulnerable, endangered or critically endangered species or threatened ecological communities.
- Criterion 4: The wetland supports plant and animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

In particular, the Narran Lake Nature Reserve Ramsar site is of international significance because the wetlands:

- feature one of the largest expanses of relatively intact lignum shrublands in New South Wales (an important vegetation community for waterbird breeding)
- provide critical breeding habitat for waterbird breeding events
- support threatened species (including the endangered Australasian bittern)

- are unique within the Murray–Darling Basin due to the vast areas of channelised floodplain, interspersed with emergent wetland vegetation and open water habitat.

Under the Commonwealth Environment Protection and Biodiversity Conservation Act, a plan for managing a Ramsar wetland must not be inconsistent with Australian Ramsar management principles. The nature reserve is managed consistently with Australian Ramsar management principles (see Appendix C).

The primary purpose of the management of a declared Ramsar wetland must be in accordance with the Ramsar Convention:

- to maintain the ecological character of the wetland
- to conserve the identified wetland values
- to promote the wise and sustainable use of the wetland in a way that is compatible with maintenance of significant natural values.

The ecological character of the Ramsar site is a matter of national environmental significance under the Environment Protection and Biodiversity Conservation Act. A full description of the ecological character of the Narran Lake Ramsar site (Butcher et al. 2011) has been published by the Australian Government and has informed this draft plan of management.

A key Ramsar management principle is to provide for continuing community and technical input into Ramsar site management. Researchers, government agencies and local communities share a strong interest in protecting this landscape, its waterways and wetlands of international significance. There are several avenues for ongoing community and technical input into reserve management, including:

- the Narran Lake Nature Reserve Joint Management Committee
- statutory advisory bodies established under the National Parks and Wildlife Act (the regional advisory committee and National Parks and Wildlife Advisory Council)
- the cross-tenure, interagency partnerships established to achieve the objects of the *Biosecurity Act 2015*
- partnerships with researchers and institutions engaged in environmental and cultural conservation initiatives and monitoring programs at the reserve, within the catchment and across the landscape.

Management activities such as delivery of environmental water that aim to protect and enhance the values of the Ramsar site will also support conservation of the larger wetland of national importance occurring downstream of the nature reserve.

While wetland habitats at Narran Lake Nature Reserve are relatively unmodified, the natural flows of the Narran River have been substantially altered by upstream development of water management infrastructure and water extraction.

Wetland vegetation at the Ramsar site includes lignum, ephemeral herbs, common reed, river red gum, river cooba (*Acacia stenophylla*) and coolibah–blackbox woodlands. All need regular inundation to grow and regenerate. The vast lignum shrubland near Back Lake and Clear Lake is particularly important breeding habitat for waterbirds and native fish.

The wetlands support a variety of waterbirds. All rely on water to feed and initiate breeding. The waterbirds that breed in extensive rookeries among the lignum and river cooba, such as ibis, egrets and herons, require 6 months to fledge their chicks successfully. A drop in water height in the rookery associated with reduced river flows was the main cause attributed to a high (67%) mortality rate during the large straw-necked ibis (*Threskiornis spinicollis*) breeding event of 2007–08. Approximately 74,000 nests had been established.

Royal spoonbills (*Platalea regia*) at Narran Lake Nature Reserve. Nicola Brookhouse/DCCEEW

Recently, the purchase of water licences in the Condamine–Balonne system by the Commonwealth Environmental Water Office has proven an effective mechanism to support successful waterbird breeding in the Narran Lake wetlands. NPWS fully supports Australian Government programs to maintain adequate inundation of the wetlands to improve outcomes for waterbird breeding events.

As flooded areas dry out, the wetlands support large numbers of migratory wading birds that use the lake margins and mud flats for foraging. Eleven migratory birds listed under the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), China–Australia Migratory Bird Agreement (CAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and Japan–Australia Migratory Bird Agreement (JAMBA) have been recorded in the reserve (see Appendix D).

As with waterbirds, fish spawning is triggered by flooding of the wetlands. An adequate flood duration allows juvenile fish to grow to adult stage and swim out of the lakes into the river system.

The ecological character description for the Narran Lake Nature Reserve Ramsar site (Butcher et al. 2011) outlines:

- how the site meets Ramsar criteria
- the critical processes and values that determine the site's ecological character
- the 'limits of acceptable change' for the site (a suite of ecological thresholds that indicate potential change in critical aspects of the site's ecological character)
- potential and actual threats to the site's ecological character.

The natural processes and values that determine the ecological character of the Narran Lake Nature Reserve Ramsar site are:

- hydrology (how water flows)
- vegetation (lignum shrublands, riparian woodlands and ephemeral herb lands)
- fish
- waterbirds
- productivity (energy conversion by photosynthesis or chemosynthesis).

Flows in the Narran River are critical for maintaining the health of Country and flood-dependent ecosystems in the nature reserve. The ecological character of the Ramsar site is primarily threatened by:

- upstream development of water management infrastructure and water extraction (leading to reduced flood frequency, duration and magnitude)
- invasive species (feral animals and weeds)
- climate change (which is expected to result in increased temperature, evaporation and intensity of local rainfall events).

If not addressed, these threats are likely to cause a deterioration in Ramsar values.

From Long Arm, looking south during a flood event in 2022. Jo Ocock/DCCEEW

The NSW and Australian Regional Climate Modelling (NARCliM) project produced climate change projections for the NSW Far West Region (AdaptNSW no date). It suggested that by 2030:

- temperatures will increase (the average number of days above 35°C per year will increase and the average number of nights dropping below 2°C per year will decrease)
- rainfall will decrease in winter and spring but increase in summer and autumn
- severe fire weather days (and fire risk) will increase, particularly in spring and summer.

These projections indicate there is potential for prolonged drought and increased frequency of fire in the region resulting from climate change. Prolonged drought severely impacts aquatic ecosystems. Impacts of drought are exacerbated by other threatening processes, particularly in catchments where upstream water extraction is extensive, such as the Condamine–Balonne.

Cumulative ecosystem disturbances will likely impact the ecological character of the Ramsar site and surrounding nature reserve. The consequences of increased temperatures, prolonged drought and increased fire frequency may include:

- degradation of riparian, wetland and floodplain habitats and vegetation communities
- loss of long-term refugia for aquatic biota and long-lived species (such as fish and turtles)
- decline in surface water quality, increased risk of algal blooms, fish kills and loss of macroinvertebrates
- reduced groundwater recharge and elevated nutrients in groundwater
- depletion of invertebrate egg bank on the floodplain
- increased competition between organisms for confined habitat
- increased predation of prey species that rely on habitat structure to avoid predation
- increased stress of fauna and flora, reduced growth and recruitment
- local species extinctions.

This draft plan of management proposes a suite of conservation and threat mitigation activities to protect and conserve the health of Country, the wetlands and their ecological character (see Section 4.1). All strategies listed under management outcome ‘Country is healthy’ contribute to maintaining the ecological character and Ramsar listing of the wetland.

Consistent with Ramsar management principles, progress towards achieving Ramsar site protection and conservation is reviewed every 7 years. NPWS will continue to contribute to Ramsar management reporting and evaluation.

3.3 Water management

There are a variety of government plans and programs related to water management and river restoration in the Murray–Darling Basin.

On a national level, the Murray–Darling Basin Authority (MDBA) has prepared the *Murray–Darling Basin Plan* (MDBA 2012a; the Basin Plan), as part of the *Water Act 2007* (Cth). The Basin Plan is a framework for setting environmentally sustainable limits on the amount of surface water and groundwater that can be taken from the Basin. The Basin Plan seeks to protect and restore key environmental assets, including the Narran Lakes system (MDBA 2012a).

The Commonwealth Environmental Water Office delivers water for the environment annually. The Commonwealth Environmental Water Holder has purchased water harvesting licences (to 68 gigalitres [GL]) and overland flow licences (to 97 GL) in the Condamine–Balonne River system, to enable water to flow into the Narran Lake wetlands.

The Queensland *Condamine–Balonne water resource plan* (DNRME 2019) seeks to address water management issues and achieve environmental outcomes in the Condamine and Balonne catchments of Queensland. The plan recognises the Narran Lake Nature Reserve Ramsar site as an environmental asset and aims to maintain and, if possible, improve flows of water to the Narran Lakes system.

In New South Wales, water sharing plans aim to share water between competing interests. The *Water Sharing Plan for the Intersecting Streams Unregulated and Alluvial Water Sources 2011* under the NSW *Water Management Act 2000* regulates the sharing of water in the Narran River and tributaries in New South Wales, and prescribes rules for extraction and environmental water flows. The objectives of this plan include protection, preservation, maintenance and enhancement of important river flow–dependent ecosystems and Aboriginal cultural and heritage values. The water sharing plan does not explicitly identify Narran Lake Nature Reserve or the Ramsar site as assets of environmental and cultural significance.

Water for the environment is targeted in 5 major catchments (the Gwydir, Wambool/Macquarie, Lachlan, Murrumbidgee, Murray – Lower Darling) in New South Wales. An environmental water advisory group is established for each of these 5 major catchments, providing a mechanism for ongoing community and technical input into environmental water management in New South Wales. An advisory group has not been established for the Narran River catchment in New South Wales.

NPWS and the joint management committee do not have any direct control over water management, flow regimes and water recovery in the Narran River and broader Condamine–Balonne catchment, however, the consideration of the reserve's environmental water requirements during any future planning within the catchment will continue to be encouraged.

Looking to Clear Lake from the Narran River during flood. Jo Ocock/DCCEEW

3.4 Public access

Kurrajong Road and Narran Lake Road provide public access through the reserve (see Figure 1). Open days provide opportunities for public access into the reserve and for cultural and specialist knowledge to be shared on Country. Otherwise, consent is required for visitor access to the nature reserve, including to the day use area near Clear Lake (Figure 1) for the following reasons:

- To minimise risk of harm to Aboriginal cultural heritage values. Extensive Aboriginal cultural heritage values and sites have been recorded in the reserve and surrounding lands. Many sites of cultural significance have not been recorded in Aboriginal heritage databases. Without guidance, visitors to the reserve may unintentionally harm Aboriginal cultural heritage values.
- To minimise risk of harm to ecological values. Frequent visitation and inappropriate visitor behaviours may have detrimental impacts on wetland values, particularly waterbird breeding. Without guidance, visitors to the reserve may unintentionally harm wetland values.
- To minimise risks to the public. The reserve is remote and management trails, Kurrajong Road and Narran Lake Road are unsealed and can become impassable after 5 mm of rainfall. Temperatures can also get extremely high in spring, summer and autumn. The flat terrain can make navigation difficult. Without guidance, there is risk visitors could get into life-threatening situations.

Management trails in the reserve are used for reserve management, cultural activities and research purposes. New visitor facilities would connect more Aboriginal people with Country more often, improve visitor access and provide a place where people can enjoy the reserve and gain a greater appreciation of its values (see Section 4.2).

3.5 Opal prospecting

Opal prospecting is a feature of the red ridges surrounding the reserve. Parts of Narran Lake Nature Reserve and Part 11 land adjacent to the reserve are within a designated ‘opal prospecting area’ under the *Mining Act 1992*. However, opal prospecting is not an activity that may be permitted in an area reserved under the National Parks and Wildlife Act as a nature reserve.

There are several areas on Part 11 land adjacent to Narran Lake Nature Reserve pending designation as ‘opal prospecting blocks’ under the Mining Act. Opal prospecting licences may be granted over these areas once designated.

4. Management themes

The future of Narran Lake Nature Reserve is in the Dreaming — the continuous connections between people, lore, Country, kinship and culture, the past and present. All of the management objectives in this plan — Country is healthy, People are connected to Country, and culture is strong — contribute to the continuation of these connections. All of the strategies proposed in this plan will contribute to achieving the vision for Narran Lake Nature Reserve.

As the plan aims to retain a strategic focus, the strategies described in this section are broad in nature. They do not detail every strategy to achieve the plan's objectives. Additional strategies will be implemented as necessary. NPWS will implement this plan in collaboration with the joint management committee.

4.1 Country is healthy

The Aboriginal concept of Country is complex. Aboriginal people consider the health of Country is related to people's connections to Country. Caring for Country using cultural practices is part of keeping Country healthy, connecting people with Country and keeping culture strong.

There is overlap between the Aboriginal concept of caring for Country and the scientific concept of ecosystem health. Maintaining the health of Country includes actions to protect ecosystem health and the ecological character of the Ramsar site. Key threats to Country include invasive species, climate change, inappropriate fire, land degradation and upstream water extraction. Maintaining ecosystem health also requires research and monitoring to improve our understanding of the effectiveness of management actions.

4.1.1 Managing threats on Country to maintain ecosystem health

Under the Biodiversity Conservation Act, the Biodiversity Conservation Program establishes priorities and strategies to conserve threatened species and threatened ecological communities in New South Wales. Conservation programs and associated threat mitigation activities will protect significant values in the reserve, including the ecological character of the Ramsar site. NPWS will deliver recovery actions and threat mitigation activities for threatened species and communities across the nature reserve through the Biodiversity Conservation Program and associated Saving Our Species program.

The National Parks and Wildlife Act also provides for the protection of threatened species and communities through the declaration of lands in the national parks estate as an asset of intergenerational significance. The declaration of environmental assets is part of the NPWS threatened species (zero extinctions) framework (NPWS 2021) that aims to secure and restore those threatened species and ecological communities on the national parks estate that are at most risk of being lost to the reserve network. NPWS prepares and implements a conservation action plan for each declared asset of intergenerational significance. Conservation action plans outline the conservation activities required to control, abate or mitigate the key risks to an asset and to maintain, restore and remediate the values of the land.

The condition of native vegetation communities in the nature reserve has been negatively impacted by past land use, feral animals and weeds. NPWS develops annual pest operation plans for the management of feral animals, weeds, pathogens and diseases aimed at reducing the impacts of these threatening processes and to meet its responsibilities under the Biosecurity Act.

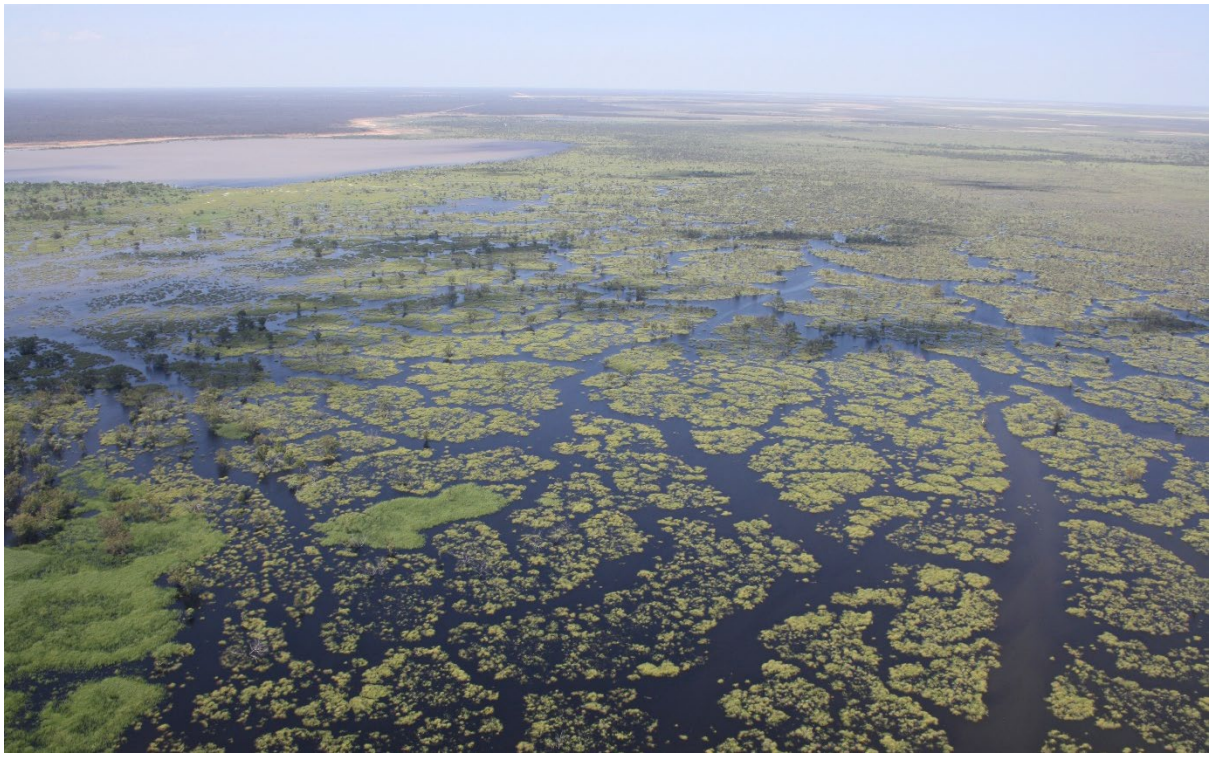
The primary objective of weed and feral animal management at Narran Lake Nature Reserve is the protection of the Ramsar site and its values. Priorities for feral animal management in the nature reserve include controlling populations of feral pigs (*Sus scrofa*), goats (*Capra hircus*), foxes (*Vulpes vulpes*), cats (*Felis catus*) and wild dogs (*Canis familiaris*). The priority for weed management in the nature reserve is Hudson pear (*Cylindropunta pallida*). NPWS will implement the annual pest operations plan and support cross-tenure partnerships to manage feral animals and weeds across the broader landscape. Priorities in the annual pest operations plan may change in response to emerging threats and to include other feral animal or weed species that occur in the reserve. Invasive native plant species may be cleared in order to reduce fire hazard, protect visitor facilities and operational assets, or to conserve other native species and habitat. Dams and water points that are not required for reserve management will be decommissioned. Remaining dams will be fenced to discourage their use by feral animals.

Climate change modelling for the Narran Lake Nature Reserve was undertaken by the CSIRO as part of the Sustainable Yields Project (CSIRO 2008). It is suggested that by 2030 the interval between floods will increase and the area and volume of floods will be reduced. As a result, optimal waterbird breeding habitat at Clear Lake, Back Lake and Narran Lake will be available in fewer years. These changes present a significant threat to the persistence of floodplain vegetation communities and waterbird populations. At a local scale, actions that minimise the impacts of threatening processes such as invasive species and inappropriate fire will improve the reserve's resilience to climate change.

NPWS will participate in bush fire management committees and maintain cooperative arrangements with the Rural Fire Service, its brigades and other relevant agencies. Bushfire planning will establish an appropriate fire regime that protects life and property while prioritising protection of natural and cultural assets, promoting diversity in fire-dependent species and protecting other values that are sensitive to fire. Bushfire planning will incorporate Aboriginal cultural knowledge and practices to ensure ecologically and culturally sound fire management in the landscape. Strategies to achieve fire management objectives in the nature reserve need to:

- account for the boom-and-bust nature of ecological processes occurring in the reserve
- enable a combination of broad strategic burns and local-scale cultural burns
- ensure fuel around the reserve boundaries can be managed to reduce the likelihood of large, running fires.

Parts of the reserve are affected by previous livestock grazing and land clearing which resulted in erosion and degradation of soils. Degraded land in the red country and lunettes needs to be rehabilitated or stabilised by erosion control structures, where appropriate. Some management trails will require realignment to prevent ongoing erosion. Maintenance of stock-proof boundary fencing is also a priority to prevent livestock access, which can lead to further degradation.



Flooded lignum swamp between Clear Lake and Back Lake in 2022. Jo Ocock/DCCEEW

4.1.2 Respecting gungan (the water)

Flows in the Narran River are critical for filling the wetlands and maintaining:

- the cultural and spiritual associations between the gungan and the people of Dharriwaa
- the persistence and abundance of culturally valuable resources in the reserve
- the health of flood-dependent ecosystems in the reserve
- the ecological character of the Ramsar site.

Alteration of natural flow regimes is a key threatening process to rivers, streams and floodplains. The primary threat to the flow regime of the Narran River is the capacity for water managers to divert water upstream. Upstream water extraction is enabled by water management infrastructure, including increasingly large off-channel water storages. Collectively, the water infrastructure and water extraction mean that much of the potential flow of the Narran River is either diverted or extracted. As the Narran wetlands occur at the end of the system, upstream water management infrastructure and water extraction are the most serious threats to the persistence of the wetlands.

The Narran River catchment extends across Queensland and New South Wales. Narran River flows have been significantly altered by upstream development and land use in Queensland's Condamine–Balonne catchment. On average, just over half of the available surface water in the Condamine–Balonne catchment is extracted annually, which is extremely high when compared with other catchments in the Murray–Darling Basin (MDBA 2012b). The high level of water use in the Condamine–Balonne has significantly reduced flows into the Narran Lakes system (Brandis et al. 2018).

An integrated catchment management approach to state and national water policy and management is required to ensure more water reaches the Narran Lakes system. NPWS will continue to advocate for environmental watering outcomes beneficial to the Narran Lake Nature Reserve and the associated Ramsar site. This includes supporting Australian and

NSW government programs that ensure adequate inundation of the wetlands, particularly during waterbird breeding events.

NPWS has developed the Narran Lake Nature Reserve wetland management plan 2020–2025 (NPWS no date). This plan describes the reserve's hydrology, identifies the location of WaterNSW infrastructure (stream gauges), identifies significant wetland values and provides operational guidance to protect these values. The wetland management plan identifies modifications to water management infrastructure that will improve the condition of wetland values. This draft plan of management provides for establishing water management infrastructure to maintain or improve the ecological and cultural values of the reserve (see Section 5, Table 1 for a summary of permitted operations).

4.1.3 Research and monitoring

Research at Narran Lake Nature Reserve has focussed on wetland and floodplain ecology. In particular, the influence of water regimes on the soil seedbank and vegetation communities (James et al. 2007), zooplankton (James et al. 2008), and waterbird breeding (Brandis et al. 2011, 2018). Research contributes to an improved understanding of wetland ecology, the water requirements for maintaining internationally recognised Ramsar values and continues to inform government decisions about Narran River flows. NPWS will continue to support research and monitoring in the reserve.

Objective

- Country is healthy

Strategies

- Undertake or support actions to promote the conservation and recovery of threatened species, populations and ecological communities, and any assets of intergenerational significance in the reserve.
- Implement the annual pest operations plan and support cross-tenure partnerships to manage feral animals and weeds in the landscape. This may include decommissioning dams and water points that are not required for reserve management, and fencing remaining dams.
- Implement fire management strategies and bushfire risk management plan treatments consistent with strategic management planning and relevant legislation. This will include maintaining the fire access and fire trail network, establishing management vehicle access around the perimeter of the reserve, and maintaining an effective boundary break where practical.
- Rehabilitate degraded land and address erosion. This may include the use of erosion control structures, the realignment of management trails and the maintenance or construction of stock-proof fencing.
- Support research and monitoring that informs management of the reserve, the Ramsar site, threatened species and communities.
- Advocate for environmental watering outcomes beneficial to the Narran Lake Nature Reserve and the associated Ramsar site. Continue to support Australian and NSW government programs to maintain and improve water quality and flows in the Narran River and the wetlands, particularly during waterbird breeding events.

Great egret (*Ardea alba*) at Narran Lake Nature Reserve. Nicola Brookhouse/DCCEEW

4.2 People are connected to Country

In Aboriginal tradition, Narran Lake Nature Reserve is a meeting place where people come to camp, share and celebrate abundance. Traditional gatherings varied from a few families to thousands of people. Contemporary gatherings vary from a few families to large groups from local townships and are important opportunities to continue cultural business. Dual-naming of the nature reserve, to include the name Narran Lake together with the traditional name Dharriwaa, would acknowledge both the traditional and contemporary significance of this landscape to Aboriginal people.

It is also important that opportunities are provided for non-Aboriginal visitors to develop an understanding of the reserve's values and develop a connection to the nature reserve.

Unlike national parks, nature reserves do not have sustainable visitor or tourist use and enjoyment as one of their purposes. However, appropriate reasons for visitor access to the nature reserve are Aboriginal cultural practice, low-impact recreation and nature-based experiences, education, research and monitoring.

Kurrajong Road and Narran Lake Road provide public access through the reserve. Locked gates and signage will continue to ensure visitor access to the reserve minimises risk of harm to Aboriginal cultural heritage values, ecological values and the public. The reserve access strategy identifies public and management access routes and will be updated to reflect additions to the reserve or as needed.

Visitor access protocols will be established to set seasonal, location-specific and activity-specific conditions. The protocols will:

- ensure the wellbeing, physical and cultural safety of all visitors
- ensure the protection and conservation of the natural and cultural values of the reserve
- provide guidance for the consideration of access requests.

4.2.1 Supporting Aboriginal cultural practice

Narran Lake Nature Reserve is a place for developing, renewing and maintaining connections to culture, Country and community. It is an important place for cultural business, where many Aboriginal nations come together for ceremony, to exchange valuable items, arrange marriages and renew social bonds (Coleman et al. 2017). Aboriginal people gather for a range of traditional practices and contemporary activities, including:

- culture camps, ceremony, ritual and rites of passage
- non-commercial harvest of culturally valuable resources for traditional and contemporary uses
- teaching and learning about culture, land management, bush tucker and medicines, language and storytelling.

Culture can also be shared with visitors and this could include cultural awareness training and guided tours. Aboriginal cultural values and languages will be acknowledged and incorporated into signs, visitor information, and the naming of visitor facilities. Improved interpretation of cultural values will help raise awareness and understanding of the cultural significance of the reserve.

The Clear Lake shell midden (and nearby day use area) is a focus for Aboriginal cultural and educational events. While protection of Aboriginal sites in this area is a high priority, it is also important the area continues to be used for cultural activities and sharing knowledge between generations. To prevent harm to Aboriginal cultural heritage sites and values, visitor access protocols will guide how people interact with these sites. To protect Aboriginal cultural heritage sites from vehicle damage and inappropriate access, it may be necessary to close or realign some management trails.

Broad-leaf parakeelya (*Calandrinia balonensis*) flowering at the nature reserve. Nicola Brookhouse/DCCEEW

4.2.2 Providing for low-impact recreation and nature-based experiences

As a remote nature reserve of outstanding natural beauty and diversity, the wetlands and surrounding woodlands are appealing to visitors for bushwalking, cycling, birdwatching and photography. Consent from NPWS to access the reserve for recreation will be guided by visitor access protocols that set seasonal, location- and activity-specific conditions. Consent is required to protect the cultural and ecological values of the reserve, and for public safety.

Guided group activities are an appropriate way for people to experience Narran Lake Nature Reserve and learn about its cultural and natural significance. Guided experiences could include:

- 4-wheel-driving tours on select management trails
- water-based recreation (canoeing, kayaking and swimming)
- outdoor education and research activities
- appropriate interpretation of Aboriginal cultural and historic heritage.

A licence is required for commercial operators to bring visitor groups into all parks and reserves in New South Wales. As this reserve is managed under a joint management agreement, the joint management committee is required to review and approve licence applications. Licences may include conditions to ensure activities occur in a manner that minimises unintended impacts to natural and cultural values. Commercial tour operators are required to comply with the conditions of licences. This includes conditions relevant to Aboriginal cultural heritage interpretation. Commercial tour operators may be required to participate in Aboriginal cultural heritage awareness training. Before delivering Aboriginal cultural heritage interpretation in the reserve, licensed operators need to submit material to the joint management committee for approval. The only Aboriginal cultural heritage information that can be shared by non-Aboriginal commercial tour operators at the reserve is the traditional placename (Dharriwaa) and Traditional Custodians' name (Yuwaalaraay/Euahlayi). The same conditions apply to organised non-commercial activities that involve interpretation or information about Aboriginal cultural heritage values in the reserve. This process is in place to protect the intellectual property rights of Aboriginal peoples and to share cultural information appropriately.

Approval to use supporting equipment, such as marquees, amplified sound or drones, will be determined on a case-by-case basis subject to an assessment of potential impacts on reserve values and other reserve users. Use of any supporting equipment will be subject to consent conditions.

Activities that may be permitted in the reserve are listed in Section 5 of this plan, however, this is not intended to be a definitive list.

4.2.3 Establishing new visitor facilities

There is an existing day use area near Clear Lake (see Figure 1). This site is suited to self-guided visitors and small groups that have consent to access the reserve.

Establishing new visitor facilities in the reserve is an important part of connecting more Aboriginal people with Country more often, while managing potential impacts of larger visitor groups and events in the future. Facilities may include a Keeping Place, amenities, a communal fire pit, galley, tables and shelters, a camping area and roofed accommodation.

All infrastructure development and works are subject to environmental assessment and approvals. The most suitable site for new visitor facilities will be determined after further planning and impact assessment.

4.2.4 Managing reserve assets

Operational management of the reserve (including emergency response) requires a range of infrastructure, including management trails, hard-roofed accommodation, car parks, walking tracks, water and sewage systems, work depot and associated storage.

NPWS assets and infrastructure are managed and maintained through the NPWS asset management system. This system provides the framework for delivering, maintaining and replacing NPWS assets as necessary to support safe and sustainable visitor experiences and park management operations, and to minimise impacts on park values. Management and maintenance of existing and future assets at the reserve will be informed by the relevant asset management plans.

The East Mullane operations precinct (see Figure 1) and associated built assets will be maintained primarily for reserve management operations and staff accommodation. Limited accommodation to support joint management committee business and reserve management activities will continue to be provided at East Mullane Shearers Quarters. All use of East Mullane Shearers Quarters requires NPWS consent.

Objective

- People are connected to Country

Strategies

- Acknowledge and support the creation of a dual name for the nature reserve that incorporates the name Narran Lake and the traditional name Dharriwaa.
- Establish visitor access protocols to guide appropriate access to the reserve.
- Ensure the reserve access strategy identifies access points needed for management and visitor access and is updated to reflect additions to the reserve or as needed.
- Acknowledge Country, promote awareness of Aboriginal cultural values and languages in reserve signs, visitor information, visitor facilities and reserve-based visitor experiences.
- Facilitate the renewal of cultural practices, stories and ceremony by supporting events at Narran Lake Nature Reserve.
- Establish protocols for how to share knowledge and information about sites safely, enhance and renew cultural heritage sites and values, and prevent harm to Aboriginal cultural heritage sites and values.
- Realign management trails to protect Aboriginal cultural heritage sites from vehicle damage.
- Establish new visitor facilities that provide infrastructure to support Aboriginal cultural practice, low-impact nature-based recreation, education, research and monitoring activities.

Narran Lake Nature Reserve in flood, June 2021. Jo Ocock/DCCEEW

4.3 Culture is strong

The Yuwaalaraay/Euahlayi People and Aboriginal people of neighbouring nations have a strong interest in the management of the reserve. The joint management committee is the main way local Aboriginal people are involved in reserve management. As representatives of local Aboriginal communities, the joint management committee will lead discussions with the wider Aboriginal community about management of cultural heritage and cultural values in the reserve. This plan will be implemented through the adoption of cultural practices such as Guwiinbarraan (sitting around the fire, talking on Country).

4.3.1 Strengthening culture through participation in land management

The participation of Aboriginal people in reserve management is necessary to keep Country healthy and culture strong. The use of fire by Aboriginal people, for example, is an important cultural land management practice that enhances and protects natural and cultural values, and helps to express and maintain culture, kinship and identity. Traditional Aboriginal fire regimes that create habitat mosaics in the landscape are important products of Aboriginal cultures and knowledge systems. Participation in cultural burning can enable Aboriginal people to practise culture on Country while also helping to keep Country healthy.

The committee is committed to building relationships with partners through culturally appropriate engagement. For example, Guwiinbarraan is a cultural ceremony of special importance for Aboriginal communities connected to Narran Lake Nature Reserve. Participation in Guwiinbarraan offers an inclusive way of connecting to culture, sharing knowledge, understanding kinship responsibilities and making binding decisions with partners.

The knowledge of Aboriginal people, together with archaeological studies undertaken over many years have provided an understanding of past relationships between Aboriginal people and the reserve. There is now an opportunity to build on this by gaining an understanding of how the involvement of Aboriginal people in land management is contributing to healthy culture and the wellbeing of Aboriginal people.

4.3.2 Managing historic sites and heritage assets

There are a number of historic items of local interest in the reserve, however, none are heritage listed. These include Terewah Woolshed, huts, a loading ramp, fences, a windmill, sheep and cattle yards, a steel trough and a sheep dip. An assessment of heritage assets at Terewah concluded none were of significance (Hall 2010) and Snake Hut was assessed as being of local interest only (NPWS 2002). Terewah Homestead and several huts previously occupied by James Pym, Howlett and unknown shepherds are now vacant sites.

Objective

- Culture is strong

Strategies

- Support continuation of cultural practices (such as Guwiinbarraan) that engage the Aboriginal community in reserve management.
- Encourage projects that foster the wellbeing of Aboriginal people through participation in the conservation of natural and cultural values, including cultural burning and the ceremonial use of fire.
- Encourage research and evaluation of the cultural health and wellbeing impacts of Aboriginal people’s participation in reserve management.

5. Management operations

All activities undertaken by NPWS, contractors, licensed businesses, visitors and other organisations within parks are considered by the *National Parks and Wildlife Act 1979* to be operations. The Act specifies that operations may not be undertaken in a park with a plan of management unless those operations are in accordance with that plan.

The National Parks and Wildlife Regulation 2019, together with this plan specify the operations that are prohibited in Narran Lake Nature Reserve. This plan also specifies the operations that will be permitted in the reserve and the conditions that will apply.

NPWS undertakes a broad range of routine management operations necessary to manage the reserve and achieve this plan's objectives. These include, but are not limited to, erosion control works, feral animal control, weed control, asset maintenance and refurbishment, fence construction, fire management and suppression, water flow management, revegetation and asset removal. All routine park management necessary to manage the reserve and achieve the objects of the National Park and Wildlife Act are permitted.

Table 1 outlines the key operations that are not permitted, those that are permitted and the conditions that will apply to permitted operations. NPWS may set additional conditions at any time if necessary to facilitate the effective management of the reserve or to help achieve the objects of the Act.

Permitted operations that meet the definition of development under the *Environmental Planning and Assessment Act 1979* are also subject to the planning and approval requirements of the Environmental Planning and Assessment Act. This may include the preparation of a review of environmental factors or other forms of environmental assessment.

Narran Lake Nature Reserve. Nicola Brookhouse/DCCEEW

Table 1 Summary of management operations

Operations	Conditions
Cultural practices	
Harvest of culturally important plants and animals	Cultural harvest of non-threatened plant and animal species for domestic (non-commercial) purposes may be authorised under the National Parks and Wildlife Act.
Cultural burning	May be implemented after collaboration with the joint management committee consistent with NPWS policies.
Visitor activities	
Public access	Kurrajong Road and Narran Lake Road provide public access through the reserve, however, to protect the cultural and ecological values of the reserve, and for public safety, all public access into the nature reserve (other than on Narran Lake Road) requires consent. Consent may be granted to access the reserve for scientific research, low-impact nature-based recreation, cultural and educational purposes or organised group activities. In the future, public access to parts of the reserve may no longer require consent if the risk to public safety, cultural or natural values can be adequately mitigated.
Vehicle access	Narran Lake Road is a public road. Visitor vehicle access to management trails requires consent to protect the cultural and ecological values of the reserve, and for public safety. Vehicle access to management trails is restricted by locked gates. When consent is granted, vehicle use is generally not permitted off trail.
Barbecues	The use of portable gas and liquid stoves for events is allowed at the day use area and new visitor facilities (once established). Use of portable gas and liquid stoves elsewhere in the reserve is subject to consent.
Wood fires	Wood fires are prohibited during total and NPWS park fire bans. Woodfires are allowed in fire pits at the day use area and new visitor facilities (once established), or for events in areas designated by signage.
Model aeroplanes and drones	Drones may be used for reserve management and emergency or law enforcement purposes. The use of drones for activities that support reserve management objectives (e.g. scientific monitoring) may be authorised through a consent (conditions, exclusion areas and civil aviation regulations apply). Recreational use of drones and model aeroplanes is not permitted.
Horse riding	Not allowed.
Dog walking	Visitors to NSW national parks cannot be accompanied by pets. A person may be accompanied by their trained assistance animal provided they meet the requirements of proof and other conditions set out in the NPWS *Pets in parks policy*.
Camping	Consent required from NPWS and the joint management committee. Consent may be subject to conditions and numbers may be capped. Camping is not permitted at the day use area. Camping for events is allowed in areas designated by signage or at the future visitor facilities (once established).
Fossicking	Not allowed.

Operations	Conditions
Non-commercial events, functions and group gatherings	Consent is required for groups of more than 40 people, according to the National Parks and Wildlife Regulation 2019. Public events and ceremonies may be allowed under a consent.
Consumption of alcohol	Permitted at East Mullane operations precinct. Not permitted elsewhere in the reserve.
Other forms of low-impact nature-based recreation	Consent required for access. Consent may be subject to conditions and numbers may be capped. Permissible low-impact nature-based recreation activities may include birdwatching, photography, walking, hiking, swimming, canoeing, kayaking and cycling.
Recreational fishing	Consent required. In addition, recreational fishing is subject to a licence under the Fisheries Management Act.
Commercial activities	
Filming and photography	Commercial filming and photography may be allowed subject to the NPWS *Filming and photography policy* and with written approval from NPWS.
Commercial tours, events and functions	Commercial tours, events and functions may be allowed under a consent or licence.
Commercial fishing	Not allowed.
Research and monitoring	
Research and monitoring	NPWS may undertake research and monitoring. Appropriate research to be undertaken by qualified individuals and organisations may be approved through a consent. Additional permissions by also be required under other legislation.
Management of utilities	
Development and maintenance of utility infrastructure	The development of utility infrastructure that is in the public interest and consistent with the provisions of the National Parks and Wildlife Act may be considered and authorised in accordance with the Act. Approval will be subject to necessary assessments and confirmation that alternative locations outside the park are not feasible.
Easements and rights of way	Where existing access interests exist, reserve boundary adjustments, easements or rights of way may be established to provide ongoing access.
Management of reserve management infrastructure	
Infrastructure development and operation	The development and operation of visitor facilities may be authorised for the purpose of enabling Aboriginal cultural practice and promoting public appreciation, enjoyment and understanding of the nature reserve.
East Mullane Shearers Quarters	All use of East Mullane Shearers Quarters requires NPWS consent.
Water management structures	Water management infrastructure may be established or decommissioned by NPWS to maintain or improve the ecological and cultural values of the reserve. WaterNSW access to non-reserve infrastructure will continue to be managed in accordance with a service-level agreement between NPWS, the joint management committee and WaterNSW.
Fire access and management trails	Fire access trails and associated infrastructure may be established or modified for bushfire preparedness and response activities. Other management trails may be maintained where required for reserve

Operations	Conditions
	management purposes. Any trails not required for reserve management or cultural purposes may be closed and rehabilitated.
Communications infrastructure	New infrastructure for emergency and reserve management communications may be established. This will be limited to infrastructure that is essential for the state's public safety radio network.

6. Appendices

Appendix A: Objects of the *National Parks and Wildlife Act 1974*

The objects of the National Parks and Wildlife Act, set out in section 2A of the Act are:

(a) The conservation of nature, including, but not limited to, the conservation of:
  (i) habitat, ecosystems and ecosystem processes, and
  (ii) biological diversity at the community, species and genetic levels, and
  (iii) landforms of significance, including geological features and processes, and
  (iv) landscapes and natural features of significance including wilderness and wild rivers,

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
  (i) places, objects and features of significance to Aboriginal people, and
  (ii) places of social value to the people of New South Wales, and
  (iii) places of historic, architectural or scientific significance,

(c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation,

(d) providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation.

Appendix B: Management principles for nature reserves

The purpose of reserving land as nature reserve and the management principles for nature reserves are set out in section 30J of the National Parks and Wildlife Act as follows:

1) 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 in accordance with subsection (2).
2) A nature reserve is to be managed in accordance with the following principles-
    a) The conservation of biodiversity, the maintenance of ecosystem function, the protection of geological and geomorphological features and natural phenomena,
    b) The conservation of places, objects, features and landscapes of cultural value,
    c) The promotion of public appreciation, enjoyment and understanding of the nature reserve's natural and cultural values,
    d) Provision for appropriate research and monitoring,
    e) Provision for the carrying out of development in any part of a special area (within the meaning of the *Hunter Water Act 1991*) in the nature reserve that is permitted under section 185A having regard to the conservation of the nature reserve's natural and cultural values.

Appendix C: Australian Ramsar management principles

Ramsar management principles are set out in Schedule 6 of the Environment Protection and Biodiversity Conservation Regulation 2000, as follows.

A management plan for a declared Ramsar wetland should:

(a) describe its ecological character

(b) state the characteristics that make it a wetland of international importance under the Ramsar Convention

(c) state what must be done to maintain its ecological character

(d) promote its conservation and sustainable use for the benefit of humanity in a way that is compatible with maintenance of the natural properties of the ecosystem

(e) state mechanisms to deal with the impacts of actions that individually or cumulatively endanger its ecological character, including risks arising from:

(i) physical loss, modification or encroachment on the wetland; or

(ii) loss of biodiversity; or

(iii) pollution and nutrient input; or

(iv) changes to water regimes; or

(v) utilisation of resources; or

(vi) introduction of invasive species; and

(f) state whether the wetland needs restoration or rehabilitation

(g) if restoration or rehabilitation is needed--explain how the plan provides for restoration or rehabilitation

(h) provide for continuing monitoring and reporting on the state of its ecological character

(i) be based on an integrated catchment management approach

(j) include adequate processes for public consultation on the elements of the plan

(k) be reviewed at intervals of not more than 7 years.

Appendix D: Threatened animals, migratory birds and plants

Table 2 Threatened animals

Common name	Scientific name	EPBC Act status	BC Act status
Magpie goose	*Anseranas semipalmata*	–	V
Blue-billed duck	*Oxyura australis*	–	V
Freckled duck	*Stictonetta naevosa*	–	V
Black-necked stork	*Ephippiorhynchus asiaticus*	–	E
Australasian bittern	*Botaurus poiciloptilus*	E	E
White-bellied sea-eagle	*Haliaeetus leucogaster*	–	V
Black-breasted buzzard	*Hamirostra melanosternon*	–	V
Brolga	*Grus rubicunda*	–	V
Australian bustard	*Ardeotis australis*	–	E
Sharp-tailed sandpiper	*Calidris acuminata*	–	–
Red-necked stint	*Calidris ruficollis*	–	–
Latham's snipe	*Gallinago hardwickii*	–	–
Bar-tailed godwit	*Limosa lapponica*	–	–
Black-tailed godwit	*Limosa*	–	V
Wood sandpiper	*Tringa glareola*	–	–
Common greenshank	*Tringa nebularia*	–	–
Marsh sandpiper	*Tringa stagnatilis*	–	–
White-winged black tern	*Chlidonias leucopterus*	–	–
Gull-billed tern	*Gelochelidon nilotica*	–	–
Caspian tern	*Hydroprogne caspia*	–	–
Major Mitchell's cockatoo	*Lophochroa leadbeateri*	–	V
Barking owl	*Ninox connivens*	–	V
Brown treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	–	V
White-fronted chat	*Epthianura albifrons*	–	V
Grey-crowned babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	–	V
Hooded robin (south-eastern form)	*Melanodryas cucullata cucullata*	–	V
Koala	*Phascolarctos cinereus*	V	V
Yellow-bellied sheathtail-bat	*Saccolaimus flaviventris*	–	V
Little pied bat	*Chalinolobus picatus*	–	V

Source: NSW BioNet database, accessed 20 May 2021.
EPBC Act = Environment Protection and Biodiversity Conservation Act
BC Act = Biodiversity Conservation Act
Legal status:
V = vulnerable
E = endangered

Table 3 Migratory birds

Common name	Scientific name	IMBA
Sharp-tailed sandpiper	*Calidris acuminata*	C,J,K
Red-necked stint	*Calidris ruficollis*	C,J,K
Latham's snipe	*Gallinago hardwickii*	J,K
Bar-tailed godwit	*Limosa lapponica*	C,J,K
Black-tailed godwit	*Limosa*	C,J,K (V)
Wood sandpiper	*Tringa glareola*	C,J,K
Common greenshank	*Tringa nebularia*	C,J,K
Marsh sandpiper	*Tringa stagnatilis*	C,J,K
White-winged black tern	*Chlidonias leucopterus*	C,J,K
Gull-billed tern	*Gelochelidon nilotica*	C
Caspian tern	*Hydroprogne caspia*	J

Source: NSW BioNet database, accessed 20 May 2021.
IMBA = International migratory bird agreements:
C = Listed on China–Australia Migratory Bird Agreement
J = Listed on Japan–Australia Migratory Bird Agreement
K = Listed on Republic of Korea–Australia Migratory Bird Agreement
(V) = Listed as vulnerable under the NSW *Biodiversity Conservation Act 2016*

Table 4 Threatened plants

Common name	Scientific name	EPBC Act status	BC Act status
Winged peppercress	*Lepidium monoplocoides*	E	E

Source: NSW BioNet database, accessed 20 May 2021.
EPBC Act = Environment Protection and Biodiversity Conservation Act
BC Act = Biodiversity Conservation Act
Legal status:
E = endangered

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