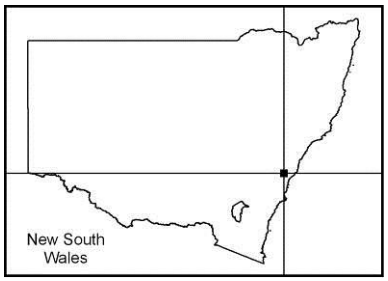
Office of Environment & Heritage
NSW National Parks & Wildlife Service

Plan of Management

William Howe Regional Park



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Plan of Management

NSW National Parks and Wildlife Service

October 2015

This plan of management was adopted by the Minister for the Environment on the 21 October 2015.

Acknowledgements

The NSW National Parks and Wildlife Service (NPWS) acknowledges that William Howe Regional Park is in the traditional Country of the Dharawal Aboriginal People.

This plan of management was prepared by staff of the Park Strategy and Services Branch, and the Metro and Mountains Branch of the NSW National Parks and Wildlife Service (NPWS), part of the Office of Environment and Heritage (OEH).

NPWS would like to sincerely thank the representatives of Camden Council, The Royal Botanic Gardens and Domain Trust, Sydney Water and Tharawal Local Aboriginal Land Council who participated in the stakeholder working group established for the preparation of this plan.

For additional information or any inquiries about this park or this plan of management, contact the NPWS Nattai Area Office at Bents Basin State Conservation Area, Wolstenholme Avenue, Greendale NSW 2745, or by telephone on (02) 4774 6800.

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Foreword

William Howe Regional Park is located between Camden and Campbelltown, approximately 70 kilometres south-west of the Sydney central business district. The park was reserved in 1998 and is located on 43 hectares within the former estate granted to William Howe in 1818.

William Howe Regional Park provides informal recreation opportunities including walking, picnicking, on-leash dog walking and cycling. A lookout in the park gives visitors panoramic views. According to some Aboriginal descendants, the hills were used by Aboriginal people as lookouts, for communication and for large gatherings. Together with the adjoining Gundungurra Reserve, the park's grassland areas preserve a cultural landscape of the European colonial period. The native vegetation that is present within the park includes a small pocket of critically endangered Cumberland Plain Woodland and provides habitat for many native plants and animals. Habitat values are, and will continue to be, enhanced by the park's location within the Narellan and Spring Farm Bush Corridor. This corridor links the Nepean River to the Australian Botanic Garden via various reserves, providing an important biodiversity link across an increasingly urbanised landscape.

The NSW *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each regional park. A draft plan of management for William Howe Regional Park was placed on public exhibition from 10 May to 19 August 2013. The submissions received on the draft were carefully considered when adopting the plan.

This plan contains actions to protect our natural environment including rehabilitation of disturbed areas and conservation of threatened ecological communities and species. Increased opportunities for public stewardship of the park will be provided through bush regeneration programs and community engagement.

The plan also seeks to foster opportunity and partnership with Aboriginal people though recognition of cultural values, consultation with the Aboriginal community and their ongoing involvement in the park's management.

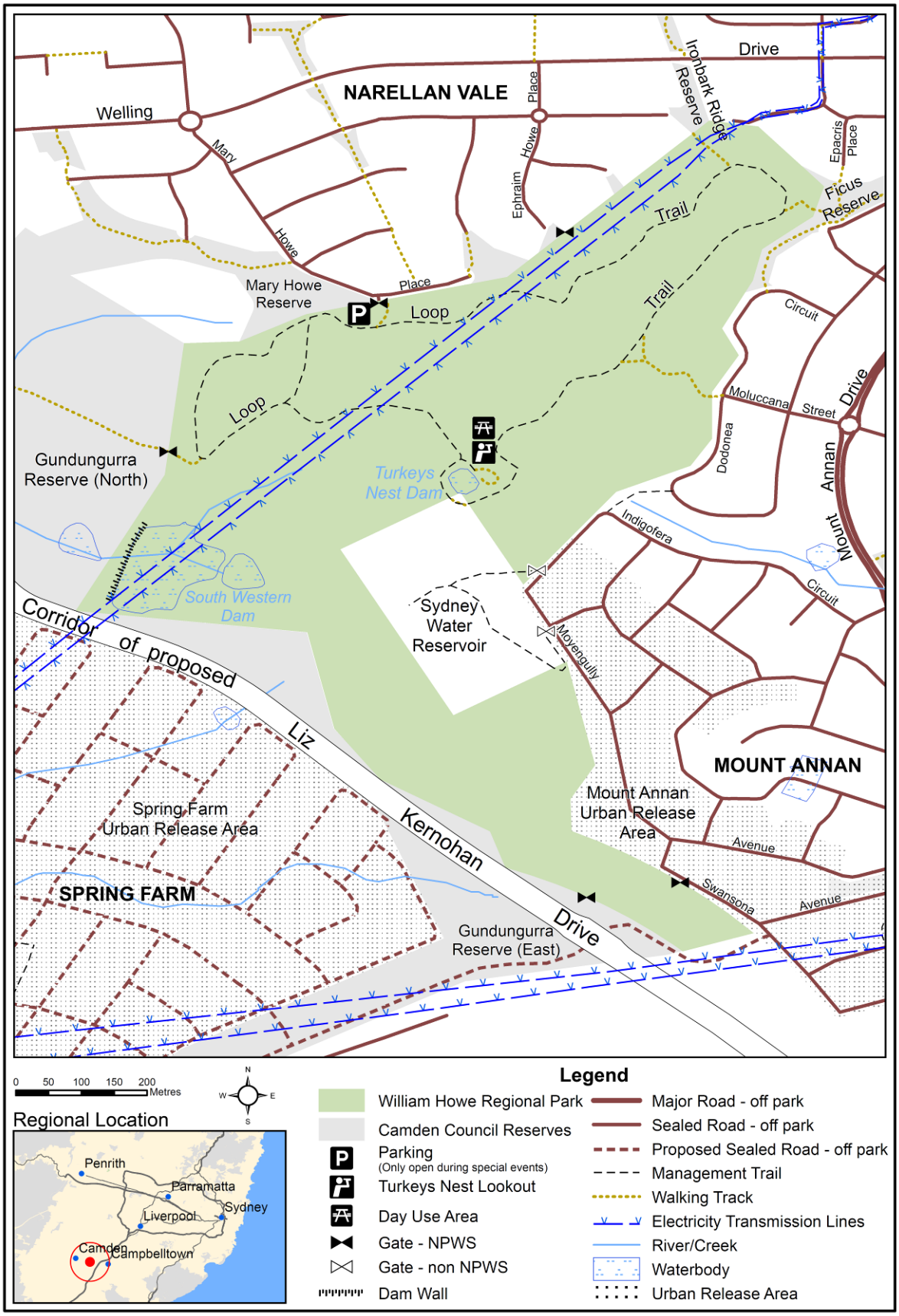
To enhance recreation opportunities, the plan recognises the potential for new linkages to the park and the need to integrate with regional cycle and pedestrian routes where possible. A recreation needs analysis and corridor precinct plan will be prepared to inform future facilities in the context of the Narellan and Spring Farm Bush Corridor.

This plan of management establishes the scheme of operations for William Howe Regional Park. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

Mark Speakman
Minister for the Environment

Contents

Map 1: William Howe Regional Park

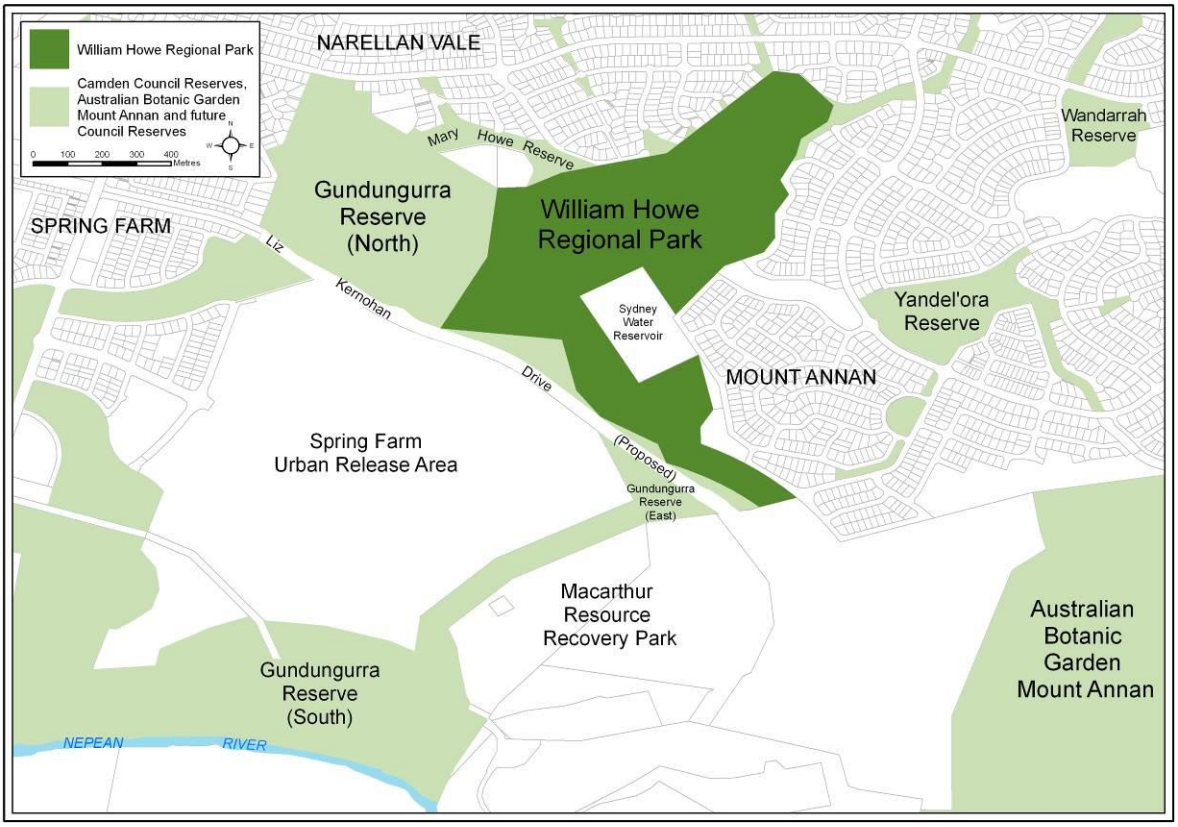


1. Introduction

1.1 Location, reservation and regional setting

Features	Description
William Howe Regional Park	
Location	William Howe Regional Park (referred to as 'the park' in this plan) is located 70 kilometres south-west of Sydney's central business district, between Camden and Campbelltown, in the suburb of Mount Annan and adjacent to Narellan Vale (see Map 1).
Area	The park covers 43.04 hectares. There is a significant indentation of 4.8 hectares on the park's eastern side that is owned by Sydney Water for reservoir purposes.
Reservation date	The park was reserved as a regional park in 1998 by gazette notice.
Previous tenure	William Howe Regional Park is part of the original 1214-hectare parcel of land granted to William Howe in 1818, a property that became known as Glenlee. In the late 1970s, the Macarthur Land Corporation (a NSW Government body) acquired the former Glenlee estate. The Corporation set aside the elevated areas and sold off large portions of lower lying land for urban development. In the early 1980s the elevated areas were placed under the control of the Department of Urban Affairs and Planning. In 1998, the ridge top and surrounds were reserved as William Howe Regional Park.
Regional context	
Biogeographic region	The park is situated within the Cumberland subregion of the Sydney Basin Bioregion. The park is part of a larger network of protected lands in south-west Sydney that includes Gulguer Nature Reserve, Leacock Regional Park, Bents Basin State Conservation Area, Kemps Creek Nature Reserve, Mulgoa Nature Reserve and Western Sydney Regional Park. The Australian Botanic Garden at Mount Annan also contributes to the network of conservation lands in the area.
Surrounding land use	The park is bounded by the new residential areas of Narellan Vale, Mount Annan and Spring Farm to the north, east and south, respectively; Gundungurra Reserve and Mary Howe Reserve to the north-west, west and south; and the Sydney Water reservoir lands to the east (see Map 1). Macarthur Resource Recovery Park (also known as Jacks Gully Landfill) lies on land to the south-east of the park, south of the corridor of the proposed Liz Kernohan Drive (see Map 2). Strategic land-use planning for the development of the surrounding urban areas includes a biodiversity corridor called the Narellan and Spring Farm Bush Corridor. The park forms part of this proposed corridor (see Map 2) that will extend from the Nepean River at Spring Farm, through Gundungurra Reserve and William Howe Regional Park to the Australian Botanic Garden.
Other authorities	The park is situated within the administrative areas of Tharawal Local Aboriginal Land Council, Greater Sydney Local Land Services and Camden Council.

Map 2: Proposed Narellan and Spring Farm Bush Corridor



In 2012, stakeholders along the Narellan and Spring Farm Bush Corridor began to work collaboratively in addressing issues of common interest and to promote integrated and sustainable planning. Stakeholders include NPWS, Camden Council, Sydney Water, the Australian Botanic Garden and the Tharawal Local Aboriginal Land Council.

The stakeholders have agreed to work towards providing an open space corridor that meets the recreation needs of the growing population while conserving natural and cultural values. Conservation outcomes are to be optimised by integrating, where practicable, pest and weed management planning, revegetation, fire management and habitat restoration across respective tenures, and creating potential for native animal movement.

The stakeholders will also work together to seek funding opportunities, engage with the community and investigate opportunities for research and monitoring partnerships with selected institutions. Synergies will be formed particularly with Camden Council in relation to the adjoining Gundungurra Reserve because the reserve and the park have similar management objectives and management challenges. A ‘seamless’ boundary between the park and Gundungurra Reserve (North) and Mary Howe Reserve will improve the visitor experience and land management outcomes (see Section 3.6).

1.2 Statement of significance

William Howe Regional Park is significant because of its natural and cultural values, including:

Landscape values

- The park has high scenic value. The prominent hills within the park — which include the second highest point in the Camden Local Government Area — are largely vegetated and visible from the surrounding area.

- From the Turkeys Nest Lookout (the main attraction of the park) visitors have unobstructed panoramic views to the Razorback Range, the Blue Mountains, the Nepean River and prominent surrounding peaks.

Biological values

- The park is part of an important wildlife corridor that links to the Nepean River, nearby reserves and other vegetation through Narellan, Mount Annan and Spring Farm.
- It provides a range of habitats for native plants and animals, including a small pocket of critically endangered Cumberland Plain Woodland, native grasses and two dams.
- Native animals recorded from the park include at least two bat species listed as vulnerable under the NSW *Threatened Species Conservation Act 1995* (TSC Act).

Aboriginal heritage values

- The park is within the traditional lands of the Dharawal[1] People who continue to value their association with their Country.
- The elevated areas of the park, with their commanding views over the region, were important for communication, large gatherings and spotting animals.
- Turkeys Nest Dam at the lookout was originally a soak used as a source of water and food for Aboriginal people.

Historic heritage values

- The park formed part of the original lands granted to William Howe in 1818. It retains relics from past farming practices including the spring-fed Turkeys Nest Dam located close to the highest point of the park.
- Together with Gundungurra Reserve, the park's grassland areas form a cultural landscape of the European colonial period. This landscape is becoming increasingly rare in the Cumberland Plain due to urban development.

Recreation and tourism values

- The park provides informal recreation opportunities in a growing urban area including a lookout for view appreciation, picnic facilities, walking and cycling tracks, and places for on-leash dog walking.

[1] Also known as Tharawal or Dariwal (AIATSIS 2012). Other spellings: Turuwal (Ridley 1875); Thurrawal (Mathews & Everitt 1900); Thur'rawal (Mathews 1902); Dharawal (Eades 1976).

2. Management context

2.1 Legislative and policy framework

The management of regional parks within New South Wales is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act) and Regulation, the TSC Act and the policies of the NSW National Parks and Wildlife Service (NPWS).

Other legislation, international agreements and strategies may also apply to management of the area. In particular, the *Environmental Planning and Assessment Act 1979* may require assessment of environmental impact of works proposed in this plan. The NSW *Heritage Act 1977* may apply to the excavation of known archaeological sites or sites with potential to contain historical archaeological relics. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) may apply in relation to actions that impact matters of national environmental significance, such as migratory and threatened species listed under that Act.

A plan of management is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within William Howe Regional Park except in accordance with this plan. This plan will also apply to any future additions to William Howe Regional Park. Should management strategies or works be proposed for the park that are not consistent with this plan, an amendment to the plan or a new plan will be prepared and exhibited for public comment.

2.2 Management purposes and principles

Regional parks are reserved under the NPW Act to protect and conserve areas in a natural or modified landscape that are suitable for public recreation and enjoyment.

Under the NPW Act (section 30H), regional parks are managed to:

- provide opportunities for recreation and enjoyment in natural or modified landscapes
- identify, interpret, manage and conserve the park so as to maintain and enhance significant landscape values
- conserve natural and cultural values
- promote public appreciation and understanding of the park's natural and cultural values
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of natural and cultural values
- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of natural and cultural values.

2.3 Specific management directions

In addition to the general principles for the management of regional parks (see Section 2.2), the following specific management directions apply to the management of William Howe Regional Park:

- Work collaboratively with the major landowners along the proposed Narellan and Spring Farm Bush Corridor to promote integrated and sustainable planning; to maximise provision of recreational facilities and linkages to recreation areas; and to facilitate community engagement, land management and conservation outcomes.
- Promote and facilitate use of the park for short day use visits and as a thoroughfare for walking and cycling.

- Enhance the park's natural heritage values through the re-establishment of locally occurring native plants within the park landscape.
- Recognise and protect traditional and contemporary Aboriginal heritage, landscape and spiritual values in consultation with the local Aboriginal community.
- Protect and enhance the park's colonial cultural landscape, the lookout and associated view corridors.
- Work with relevant authorities to ensure the park is a safe environment, free of vandalism and antisocial behaviour.

3. Values

This plan aims to conserve the natural, cultural and recreational values of William Howe Regional Park. The location, landforms and plant and animal communities of an area have determined how it has been used and valued by both Aboriginal and non-Aboriginal people. These values may be attached to the landscape as a whole or to individual components of the landscape, for example to plants and animals used by Aboriginal people. To make the document clear and easy to use, various aspects of natural heritage, cultural heritage, threats and ongoing use are dealt with individually but their interrelationships are recognised.

3.1 Landscape, geology and hydrology

William Howe Regional Park is located on the Cumberland Plain in the Sydney Basin among rolling hills adjacent to the floodplain of the Nepean River, the main drainage line for the Camden region. The topography of the park comprises six hills, one being the second highest hill in the Camden Local Government Area, reaching 176 metres AHD (Australian Height Datum). Some hillside slopes within the park are steep, at approximately 20–30 degrees (Spackman & Mossop 1999a). The hills that form the main northern ridge line in the park create a visually prominent skyline from surrounding areas. Their landscape value is enhanced by their vegetated state (see Section 3.2). The park also contains areas of artificial landforms including berms, roadways and dams.

The park is underlain by Triassic Bringelly Shales, the uppermost formation of the Wianamatta Group. These in turn overlie the Illawarra Coal Measures that contain significant coal seam gas. The Blacktown soil landscape occurs in the park and typically comprises shallow to moderately deep red and brown podzolic soils on undulating rises grading to deeper yellow podzolic soils on lower slopes and drainage lines. These soils have a moderate to high erosion hazard when exposed to concentrated flows and slight to moderate erosion hazard when subjected to non-concentrated flows. They are reactive (i.e. they shrink and swell) and are of low fertility. Generally the subsoils are saline and sodic (Chapman & Murphy 1989).

The park is part of the Nepean River catchment. Little surrounding land drains through the park because it is high in the landscape. There are a number of intermittent drainage lines in the steep gullies on both the eastern and western sides of the park. Slopes on the eastern side drain into an artificial lake in the suburb of Mount Annan and then into Narellan Creek. Slopes on the western side drain predominately to the west into Gundungurra Reserve (North) and then south-west to the Nepean River. A large farm dam — the South Western Dam (see Map 1) — disrupts the natural flow and drainage of water from the park. Turkeys Nest Dam, located near the lookout, is small and partly fed by groundwater. Both dams were constructed for agricultural purposes. Turkeys Nest Dam has potential heritage significance (see Section 3.5).

The park is located in an area of significant coal deposits and is within the South Campbelltown Mine Subsidence District that includes the surrounding suburbs of Narellan Vale, Elderslie, Mount Annan and Spring Farm (Camden Council 2011). The coal seam gas mining industry is rapidly growing in the surrounding area as part of AGL Energy Limited's Camden Gas Project. Coal seam gas wells are being established close to the south-west boundary of the park and one has been established within Gundungurra Reserve (North). No mining is permitted under the park, however a subterranean easement has been created in the park to construct pipelines for the AGL Camden Gas Project (see Section 5.2).

Issues

- The soils within the park are highly erodible.
- Failure of dam walls could result in seepage and inundation of low-lying properties.

- Activities relating to the extraction of natural gas, such as the contamination and depletion of groundwater, may result in environmental impacts in the nearby area and within the park.
- There is potential for salinity in the lower slopes and drainage lines of the park where water accumulation is high. Salinity can impact infrastructure and vegetation (DIPNR 2003).

Desired outcomes

- Soil erosion, siltation and salinity are minimised.
- Landscape values of the park are maintained.
- Catchment values and water quality are improved.
- View corridors are maintained, especially from Turkeys Nest Lookout.

Management response

3.1.1 Design and undertake all works in a manner which minimises soil erosion and ensures catchment values and water quality are protected and maintained. Appropriately treat areas of erosion if they arise.

3.1.2 Investigate drainage management in association with Camden Council to assess and manage runoff from William Howe Regional Park onto Gundungurra Reserve.

3.1.3 Engage with other authorities as needed to address issues that affect catchment values, water quality and groundwater resources within the park.

3.1.4 Undertake a risk assessment of the farm dams and determine the appropriate management approach; this may include removal of dam wall structures.

3.1.5 Seek necessary approvals from the Mine Subsidence Board, Picton when undertaking relevant development within the park.

3.1.6 Engage with relevant authorities as needed to address potential impacts of coal seam gas development works on park values.

3.1.7 Prepare and implement a view management plan guiding vegetation management to maintain important view corridors from vantage points within the park.

3.2 Vegetation communities and native plants

Before European settlement, the park area was probably covered by open woodland or open forest. Following the first land grant in 1818, it was used for agricultural purposes and timber-getting, resulting in extensive clearing of native vegetation and an altered fire regime. Small pockets of disturbed Cumberland Plain Woodland dominated by grey box (*Eucalyptus moluccana*) (Tozer 2003), with less than 10 per cent canopy cover, are mapped within the park to the west of Turkeys Nest Lookout and around the South Western Dam (NPWS 2002). Some of this vegetation may actually be part of a previous revegetation attempt.

Cumberland Plain Woodland in the Sydney Basin Bioregion is listed as a critically endangered ecological community under both the TSC Act (NSW SC 2010a) and EPBC Act (TSSC 2008)[2]. Cumberland Plain Woodland is facing an extremely high risk of extinction in the immediate future due to a loss of geographic distribution from land clearing, a key threatening process; a very large reduction in ecological function due to a change in

[2] Cumberland Plain Woodland is defined as 'Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest' under the EPBC Act (TSSC 2008).

community structure and species composition; a disruption of ecological processes including altered fire regimes; invasion and establishment of exotic species; and degradation and fragmentation of habitat (NSW SC 2010a).

Around eight per cent remains in small fragments scattered across the western suburbs of Sydney, of which only a small percentage is protected within national parks and other reserves. Within the Camden Local Government Area, other reserves containing Cumberland Plain Woodland include George Caley Reserve, Gundungurra Reserve and the Australian Botanic Garden. Other remaining fragments occur in areas subject to intense pressure from urban development.

Strategic planning for the development of the surrounding urban areas includes allocations for a biodiversity corridor called the Narellan and Spring Farm Bush Corridor for the purposes of this plan. Ultimately, the corridor will extend from the Nepean River to the Australian Botanic Garden via Spring Farm, Gundungurra Reserve and William Howe Regional Park. Provisions have been made in the Master Plan for Spring Farm (Context Landscape Design 2003) as well as the *Gundungurra Reserve Plan of Management* (Environmental Partnership 2009) to protect and enhance the existing vegetation communities through conservation and regeneration measures.

There have been no systematic plant surveys within the park, however Ian Perkins Consultancy Services recorded 37 indigenous native plants in 1999 (Spackman & Mossop 1999b). Data from plant surveys of the adjoining Spring Farm Urban Release Area, surrounding infrastructure works and from the *Gundungurra Reserve Plan of Management* also provide information on species likely to occur within the park (Anne Clements & Associates 2002; HLA 2007; UBMC 2002).

The spiked rice-flower (*Pimelea spicata*) is the only threatened plant that has a high potential to exist within the park; it has been located on the adjoining Gundungurra Reserve (North) (Environmental Partnership 2009). This species is listed as endangered under the TSC Act and the EPBC Act. Brown pomaderris (*Pomaderris brunnea*), listed as endangered under the TSC Act and vulnerable under the EPBC Act, has been recorded in Gundungurra Reserve (South) near the Nepean River (OEH 2011b). As this species is generally found on floodplains and creek lines, it has a lower probability of occurring within William Howe Regional Park.

In the 1980s, before the park's reservation as a regional park under the NPW Act, a replanting program was carried out along the northern ridge line. Although many non-endemic species were used, it provides a woodland habitat that contrasts with the open grasslands and shrubs that dominate the rest of the park. The main species planted include spotted gum (*Corymbia maculata*), lemon-scented gum (*C. citriodora*), tallowwood (*E. microcorys*) and grey box. The understorey is mainly native grasses, including kangaroo grass (*Themeda triandra*), weeping grass (*Microlaena stipoides*) and native tussock grasses (*Poa* spp.) (Woolacotts Consulting Engineers 2000). Some species present within the replanted area are typical of those found in Cumberland Plain Woodland, such as grey box, forest red gum (*E. tereticornis*), narrow-leaved ironbark (*E. crebra*) and spotted gum. The natural habitat values of the planted area can be enhanced by developing the ground and shrub layer, and selectively removing the non-endemic canopy trees (such as the tallowwoods and lemon-scented gums) in a staged process, replacing them with locally sourced species.

Open pasture is found extensively in the south-west corner of the park and along the narrow strip of land in the south-east of the park. These grasslands comprise various native species including weeping grass and kangaroo grass, as well as many exotic grasses and herbs.

Shrublands within the park are limited, often represented by exotic woody weed species. Thickets of blackthorn/kurwan (*Bursaria spinosa* subsp. *spinosa*) occur within the park and provide important bird habitat.

The western side of the park adjoins Gundungurra Reserve (North), combining to create one large open space for recreation and land conservation. Gundungurra Reserve (North) contains a substantial area of Cumberland Plain Woodland on its western side. The eastern side of Gundungurra Reserve (North) is in the same condition as the western side of William Howe Regional Park — it is mostly grassland that contains isolated trees and shrubs of species characteristic of Cumberland Plain Woodland. The dominant native canopy trees include grey box and forest red gum. The shrubs include blackthorn and the ground covers include wiregrass (*Aristida* sp.), short-awn wallaby-grass (*Rytidosperma tenuius*), tall chloris /durawigura (*Chloris ventricosa*), *Einadia* spp., weeping grass, kidney weed/yilibili (*Dichondra repens*), kangaroo grass and tussock grass (*Poa labillardierei*). It has been defined as being in 'very poor' or 'poor' condition in the *Conservation Management Plan for the Restoration of Bushland at Gundungurra Reserve* (Camden Council 2005b) due to a limited canopy layer and deficient revegetation of native trees and shrubs.

In the Gundungurra Reserve Conservation Management Plan, it is noted that best practice guidelines for recovery of threatened species and ecological communities present in the reserve will be used in this area because it is weed infested, particularly with African boxthorn (*Lycium ferocissimum*). In 2006, following preparation of the Conservation Management Plan, Camden Council removed one hectare of African boxthorn in the eastern half of Gundungurra Reserve (North) and targeted the remaining plants in the rest of the reserve. As part of National Tree Day events in July 2006 and 2007, 5000 Cumberland Plain Woodland trees and shrubs were planted in the reserve.

Several native aquatic plants are found in both dams within the park and need to be considered in association with any management strategies or future uses for the dams (see Section 3.1). These dams provide habitat for regionally significant species such as the eastern snake-necked turtle (*Chelodina longicollis*) as well as for waterbirds, including potentially migratory species (see Section 3.3). Any vegetation management strategies developed for the park should consider plantings that enhance the value of these dams as wildlife habitat.

Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide *Threatened Species Priorities Action Statement* (DECC 2007). These actions are currently prioritised and implemented through the Saving our Species program which aims to maximise the number of threatened species that can be secured in the wild in New South Wales for 100 years (OEH 2013c). Individual recovery plans may also be prepared for threatened species to consider management needs in more detail. A recovery plan has been prepared for the spiked rice-flower (DEC 2005a) which will provide management guidance if the species is found within the park. Best practice guidelines for the management and restoration of bushland on the Cumberland Plain have also been prepared (DEC 2005b).

An active volunteer bush regeneration group, formed in 2011–12, conducts bushland restoration works in the park.

Issues

- The critically endangered Cumberland Plain Woodland within the park is degraded and capable of only limited recovery because it is small and isolated, and located in an area where disturbance from earthworks relating to dam construction, cultivation, fertiliser application and nutrient and moisture enrichment has occurred over the past 150 years. Furthermore, the planting of non-endemic species in the park as well as

the widespread growth of woody weeds provide significant challenges to recovery. Best practice measures for the recovery of Cumberland Plain Woodland will need to be applied. Based on monitoring and evaluation of previous attempts to revegetate pasture in the Cumberland Plain, assisted natural restoration will be challenging and experimentation with alternative restoration technologies is required (NSW SC 2010a).

- All plans for revegetation, weed management and conservation works in William Howe Regional Park will need to be prepared in the context of the larger landscape planning framework of the Narellan and Spring Farm Bush Corridor, and in particular with Gundungurra Reserve (North). Consultation and collaboration will be necessary with stakeholders along the Narellan and Spring Farm Bush Corridor. It is anticipated that the section of corridor within the Spring Farm Urban Release Area will be regenerated by 2025. The corridor will however be severed between Spring Farm and the park by the proposed Liz Kernohan Drive (see Section 3.3).
- The density of planting in the revegetated woodland area is high and may adversely affect the health of the planting over time. Introduced non-endemic native species such as tallowwood and lemon-scented gum can be particularly invasive through seed spread. Unless managed, these species will continue to have a negative impact on native vegetation communities in the park.
- Previous clearing and the current lack of structural elements found in natural bushland, such as tree hollows, fallen dead timber and a shrub layer, reduces the value of the park as wildlife habitat (see Section 3.3).
- The extent of the weed problem in the park is such that weed control and bush regeneration will need to be an ongoing management priority (see Section 4.1). Resources are required to manage and expand the membership of the William Howe Regional Park community bush regeneration group.
- Lawn mowing is a management activity that favours introduced grasses over native grassland species. Other activities that damage native vegetation in the park include vandalism, and vegetation and soil disturbance from rubbish dumping, bicycles, trail bikes, walkers and dogs (see Section 4.3). Suppression of the natural fire regime has also likely affected the health and natural regeneration potential of the native vegetation in the park (see Section 4.2).

Desired outcomes

- The habitat and populations of threatened plants and threatened ecological communities are identified, protected and maintained, and negative impacts minimised.
- Biodiversity restoration works within the park improve native vegetation linkages along the Narellan and Spring Farm Bush Corridor.
- Structural diversity and habitat values are restored in degraded areas.
- The park's recreation values, cultural landscape and view corridors are considered and retained where suitable when revegetating and weeding.
- Vegetation restoration programs are conducted in consultation with the Tharawal Local Aboriginal Land Council and other relevant Aboriginal groups and organisations.

Management response

3.2.1 In consultation with stakeholders, prepare and implement a landscape master plan for the park that encourages the creation of vegetation linkages of locally occurring

native species; protects cultural landscapes and identified view corridors; follows best management practice for ecological restoration of native plant communities; retains some open recreation areas; and improves the natural value of the woodland area in terms of structure, plant composition and area of vegetation coverage. Consideration must be given to fire buffer, access and public safety requirements; and improving the habitat quality of the park for native animals. In addition, consideration should be given to the staged removal of planted overstorey species which are not native to the local area; and experimentation with alternative restoration techniques, including ecological burns, to maximise the possibility of successfully restoring native vegetation.

3.2.2 Undertake targeted surveys for threatened plants likely to occur in the park.

3.2.3 Implement relevant actions and strategies in the *Priorities Action Statement*, for threatened plant species, populations and communities in the park.

3.2.4 Where appropriate, work with the other land managers within the Narellan and Spring Farm Bush Corridor, as well as other neighbours, community groups and Aboriginal organisations to undertake strategic weeding, bush regeneration, planting and monitoring to facilitate coordinated land management, optimise conservation outcomes, and increase community awareness and shared ownership.

3.2.5 Reduce mown areas where appropriate and increase the height of the mown areas where a high native species component exists. Rest mown areas periodically to allow native grass seed to set and establish.

3.2.6 Investigate and encourage opportunities for research and monitoring partnerships with selected institutions and expert volunteers such as natural history groups.

3.3 Native animals

Much of western Sydney's biodiversity has been lost since European colonisation. The decline in native animals continues and can be attributed to: loss of habitat and habitat fragmentation due to clearing; competition with introduced animals for food and shelter; and predation by introduced species. However, the isolated pockets of native vegetation that remain in western Sydney still sustain a number of species including threatened species (NPWS 1997).

The *1995–96 Western Sydney Urban Bushland Survey* found that, before colonisation, western Sydney would have supported at least 336 species of native birds (of which 38 have either disappeared from western Sydney or their numbers have greatly reduced); 60 species of native mammals (of which only 17 continue to exist in the region); at least 53 species of native reptiles and at least 31 native species of frogs (NPWS 1997). Some species which persist are struggling to survive in fragmented areas where pockets of habitat are smaller than the species' natural range requirements.

The current habitat value of the park and adjoining Gundungurra Reserve (North) is not high, however the environments that have been created — including dams, the revegetated area and the woody weeds — provide habitat for native animals. The habitat value of the park will improve over time through revegetation and weed management of the Narellan and Spring Farm Bush Corridor, as long as landscape connectivity is maintained along the corridor.

A native animal study of William Howe Regional Park was undertaken in 2007 (Leary 2007). From this study and other observations, 35 native bird, 9 mammal, 8 amphibian and 6 reptile species have been recorded in the park (OEH 2011b). A native animal habitat study by Conacher Travers (2002) for Gundungurra Reserve found that 134 species had been

recorded within or adjacent to the reserve. This consisted of 87 bird, 27 mammal, 10 reptile, 6 amphibian and 4 mollusc species, including some introduced species (Environmental Partnership 2009).

Threatened animals recorded within a 5-kilometre radius of the park are listed in Table 1. Two of these — the grey-headed flying-fox (*Pteropus poliocephalus*) and the eastern freetail-bat (*Mormopterus norfolkensis*) — have been recorded in the park itself.

Table 1: Threatened animals recorded within 5 kilometres of William Howe Regional Park

Common name	Scientific name	Status
Cumberland Plain land snail	*Meridolum corneovirens*	TSC Act: endangered
Curlew sandpiper	*Calidris ferruginea* *	TSC Act: endangered
Speckled warbler	*Chthonicola sagittata*	TSC Act: vulnerable
Spotted harrier	*Circus assimilis*	TSC Act: vulnerable
Varied sittella	*Daphoenositta chrysoptera*	TSC Act: vulnerable
Little lorikeet	*Glossopsitta pusilla*	TSC Act: vulnerable
Little eagle	*Hieraaetus morphnoides*	TSC Act: vulnerable
Hooded robin	*Melanodryas cucullata cucullata* *	TSC Act: vulnerable
Black-chinned honeyeater	*Melithreptus gularis gularis* #	TSC Act: vulnerable
Turquoise parrot	*Neophema pulchella* #	TSC Act: vulnerable
Powerful owl	*Ninox strenua*	TSC Act: vulnerable
Blue-billed duck	*Oxyura australis* #	TSC Act: vulnerable
Scarlet robin	*Petroica boodang* *	TSC Act: vulnerable
Flame robin	*Petroica phoenicea* *	TSC Act: vulnerable
Diamond firetail	*Stagonopleura guttata* #	TSC Act: vulnerable
Freckled duck	*Stictonetta naevosa* #	TSC Act: vulnerable
Large-eared pied bat	*Chalinolobus dwyeri*	TSC Act: vulnerable EPBC Act: vulnerable
Eastern false pipistrelle	*Falsistrellus tasmaniensis*	TSC Act: vulnerable
Eastern bentwing-bat	*Miniopterus schreibersii oceanensis*	TSC Act: vulnerable
Eastern freetail-bat ^	*Mormopterus norfolkensis*	TSC Act: vulnerable
Southern myotis	*Myotis macropus*	TSC Act: vulnerable
Grey-headed flying-fox ^	*Pteropus poliocephalus*	TSC Act: vulnerable EPBC Act: vulnerable
Yellow-bellied sheathtail-bat	*Saccolaimus flaviventris* *	TSC Act: vulnerable
Greater broad-nosed bat	*Scoteanax rueppellii*	TSC Act: vulnerable

Sources: Leary 2007; OEH 2011b. #Very rare visitor. * Migratory, seasonal visitor. ^ These species have been recorded in the park.

The blue-billed duck and freckled duck are only occasional visitors to western Sydney and are unlikely to occur within the park (NPWS 1997). The yellow-bellied sheathtail-bat would only be a visitor during the summer months. The three species of robin are rare winter

visitors and the diamond firetail is also unlikely to be recorded in the park as its numbers have declined across the Cumberland Plain. The dams would provide suitable foraging habitat for both the greater broad-nosed bat and the southern myotis, and it is possible that these two species are occasional visitors to the park. Powerful owls forage over large areas and it is also possible that they occasionally use the park, although the availability of suitable prey is likely to be low.

Three migratory species listed under the EPBC Act could occur in the park. These are the cattle egret (*Ardea ibis*) and fork-tailed swift (*Apus pacificus*) — both listed under the Japan–Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA) — and the white-bellied sea-eagle (*Haliaeetus leucogaster*), listed under CAMBA.

In addition to threatened and migratory species, six regionally significant species have been recorded in the park (Leary 2007). The *1995–1996 Western Sydney Urban Bushland Biodiversity Survey* (NPWS 1997) identified an additional nine regionally significant species known from south-west Sydney which could occur within the park. See Table 2.

Table 2: Regionally significant animals that could occur in William Howe Regional Park

Common name	Scientific name
Eastern snake-necked turtle	*Chelodina longicollis* ^
Bearded dragon	*Pogona barbata* #
Lace monitor	*Varanus varius* #
Yellow-rumped thornbill	*Acanthiza chrysorrhoa* #
Wedge-tailed eagle	*Aquila audax* #
Swamp harrier	*Circus approximans* ^
Golden-headed cisticola	*Cisticola exilis* ^
Brown quail	*Coturnix ypsilophora* ^
Crested shrike-tit	*Falcunculus frontatus* #
Whistling kite	*Haliastur sphenurus* #
Common bronzewing	*Phaps chalcoptera* #
Weebill	*Smicrornis brevirostris* ^
Zebra finch	*Taeniopygia guttata* #
Short-beaked echidna	*Tachyglossus aculeatus* #
Swamp wallaby	*Wallabia bicolor* ^

^ Recorded in William Howe Regional Park (Leary 2007).
# Species that may occur in the park (NPWS 1997.

Strategies for the recovery of threatened species and populations have been set out in the statewide *Priorities Action Statement* (DECC 2007). Individual recovery plans may also be prepared for threatened species to consider management needs in more detail. Recovery plans for the large forest owls (DEC 2006a) and the grey-headed flying-fox (DECCW 2009) may be relevant to William Howe Regional Park.

Issues

- The current low habitat value of the park and adjoining Gundungurra Reserve is due to vegetation fragmentation and the lack of structural elements found in natural

bushland (e.g. tree hollows, fallen dead timber and a shrub layer) caused by previous clearing activity and altered fire regimes. Loss of hollow-bearing trees, and the removal of dead wood and dead trees, are both listed as key threatening processes under the TSC Act (NSW SC 2007, 2003b respectively).

- Habitat values in the park will be enhanced by the park's presence in the Narellan and Spring Farm Bush Corridor and the revegetation works proposed to occur in this corridor. However, this corridor will be cut by the proposed Liz Kernohan Drive abutting the park's south-west boundary which, when constructed, will create a dangerous obstacle for animals crossing the road, for example, the regionally significant swamp wallaby.
- Several woody weeds in the park, particularly African boxthorn, provide important habitat for some small native birds, predominantly the wrens (*Maluridae* spp.) and finches (*Estrildidae* spp.) that are common in the area. This needs to be considered when implementing weed control programs (see Section 4.1).
- Visitors can impact native animal populations through disturbance, the presence of dogs (*Canis lupus familiaris*), and removal of habitat through illegal firewood and bushrock collection (see Section 4.3). European red foxes (*Vulpes vulpes*) and cats (*Felis catus*) are also known to exist within the park and can suppress native animal numbers (see Section 4.1).

Desired outcomes

- The habitat and populations of native animals in the park are identified and conserved, and negative impacts on threatened animals are minimised.
- Habitat values are restored in degraded areas.
- A diversity of habitat types is maintained in the park.
- Conservation programs for native animals within the park are undertaken in consideration of the wider Narellan and Spring Farm Bush Corridor.

Management response

3.3.1 Implement relevant recovery actions and strategies for threatened animal species and populations in the park.

3.3.2 Develop and implement protocols for mowing and weed management that are sensitive to and protect habitat requirements of native animals.

3.3.3 Work collaboratively with other land managers within the Narellan and Spring Farm Bush Corridor to improve habitat corridor linkages. In particular, consult Camden Council regarding proposed weed management and habitat restoration works in the park near Gundungurra Reserve.

3.3.4 Formulate and implement a monitoring and evaluation program to periodically assess and better understand changes in animal populations, habitat values and management requirements of the park and, where possible and in conjunction with Camden Council, of Gundungurra Reserve.

3.3.5 Work collaboratively with Camden Council to promote responsible pet ownership and management through signage and education programs.

3.3.6 Liaise with Camden Council, Roads and Maritime Services, and the Department of Planning and Environment to ensure that the design of Liz Kernohan Drive allows for the safe movement of terrestrial and arboreal animals, and that there is provision for ongoing monitoring of animal movements in the vicinity of the road.

3.3.7 Investigate and encourage opportunities for research and monitoring partnerships with selected institutions and expert volunteers such as ornithological groups.

3.3.8 Ensure that the landscape master plan for the park considers options for the improvement of native animal habitat quality through such means as the provision of artificial tree hollows, augmentation of coarse woody debris (addition of logs) and sympathetic planting on the fringes of dams to improve habitat.

3.4 Aboriginal heritage

The land, water, plants and animals within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. 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.

Aboriginal sites are places with evidence of Aboriginal occupation or other aspects of Aboriginal culture. They are important as evidence of Aboriginal history and as part of the culture of local Aboriginal people. While the NSW Government has legal responsibility for the protection of Aboriginal sites and places, it acknowledges the right of Aboriginal people to make decisions about their own heritage. It is therefore policy that Aboriginal communities be consulted and involved in the management of Aboriginal sites, places and related issues, and in the promotion and presentation of Aboriginal culture and history.

The region in which William Howe Regional Park is situated has a long history of Aboriginal occupation. Groups were drawn to the area because of its proximity to the Nepean River and the plentiful supply of food and water (Camden Council 2010).

The park is situated within the boundaries of the Tharawal Local Aboriginal Land Council and within the area originally occupied by the Dharawal People. The Dharawal clans, including the Cubbitch Barta, the coastal Gweagal and the Wodi-Wodi of the Illawarra, travelled through and used the rich resources of this landscape (Dallas & Corby 2005).

According to some Aboriginal descendants, the most elevated parts of William Howe Regional Park were used as lookouts, for communication and for large gatherings. Turkeys Nest Dam was previously a soak fed by groundwater and was probably used as a water supply and to source food such as ducks and frogs.

In the first decades after the arrival of Europeans, many Dharawal lives were lost to introduced diseases, as well as armed conflict with European soldiers and settlers, land dispossession, drought and food shortages (Royal Botanic Gardens & Domain Trust 2013). Though reduced in number, Dharawal People remained in the area throughout the 19th century, living and working on local farms and their own settlements. The descendants of some of these people continue to live in the Sydney region today.

In 2010 an archaeological study was conducted within William Howe Regional Park as part of the environmental assessment for the Sydney Water Trunk Main that connects the reservoir located on the park's eastern boundary to Spring Farm. No sites were identified within the narrow strip of the park that was under investigation (Biosis 2010) and no records of relics from the park exist to date. However, numerous Aboriginal sites have been located in the surrounding area as part of studies conducted for the urban release areas and associated infrastructure (Barton 1996; Byrne 1994; Dallas & Corby 2005; Dallas & Irish 2001; Haglund 1989; Hanranhan 1981). These sites are largely isolated finds, low concentration artefact scatters of stone tool manufacture, discarded tools (open camp sites) and scarred trees (Dallas & Corby 2005; HLA 2007). Consultation with Aboriginal custodians

during the 2010 study for the Sydney Water Trunk Main revealed that Gundungurra Reserve is an area of significance. William Howe Regional Park was also identified as having a high level of significance however this significance was not defined (Biosis 2010).

Ten open camp sites were located in Gundungurra Reserve as part of a specific Aboriginal heritage survey in areas where a 1.5-kilometre long pathway was constructed and associated bushland restoration occurred in 2005 and 2006 (Dallas & Corby 2005; Dallas & Irish 2001). Only a small area of Gundungurra Reserve has been surveyed, and the Aboriginal archaeological value of the full reserve is still largely unknown. The majority of the sites identified in Gundungurra Reserve were in disturbed, degraded contexts and were considered not to be in situ deposits but, rather, were deposits due to movement from erosion and human activity. While they have been assessed as having little or no archaeological research potential (Dallas & Corby 2005), they have educational value as they indicate a pattern of local Aboriginal occupation on elevated landscape with expansive district views for communication, camping and spotting animals (Dallas & Corby 2005).

Issues

- The Aboriginal heritage values of the park are not fully known, partly due to a lack of archaeological investigation.
- The potential exists to find archaeological artefacts but not necessarily in situ. Sites may have been disturbed by past land uses, erosion and artefact collection.
- There is potential for Aboriginal sites to be impacted by development, bush regeneration, informal trails and associated remedial works.
- Given the Aboriginal significance of elevated areas, any proposal to install telecommunications towers in the park may significantly impact the Aboriginal heritage values of the park.

Desired outcomes

- Aboriginal sites and places are identified, recorded and protected, and negative impacts on Aboriginal heritage values are minimised.
- Aboriginal people are involved in management and interpretation of the park's Aboriginal heritage values.
- Understanding of the park's Aboriginal heritage values is improved.

Management response

3.4.1 Continue to consult and involve the Tharawal Local Aboriginal Land Council, the Cubbitch Barta Native Title Claimant Aboriginal Corporation and other interested Aboriginal community groups in the management of the park, including the management and interpretation of Aboriginal sites and places as well as natural values.

3.4.2 Undertake an archaeological survey and cultural assessment in consultation with the Aboriginal community before conducting any works with the potential to impact Aboriginal sites or values.

3.4.3 Investigate Aboriginal sites or artefacts found within the park, and ensure details are appropriately recorded.

3.4.4 In partnership with Aboriginal and land management stakeholders, encourage a coordinated approach to the interpretation of Aboriginal culture and heritage along the Narellan and Spring Farm Bush Corridor.

3.5 Historic heritage

Heritage places and landscapes are made up of living stories as well as connections to the past which can include natural resources, objects, customs and traditions that individuals and communities have inherited and wish to conserve for current and future generations. Cultural heritage comprises places and items that may have historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance. NPWS conserves the significant heritage features of NSW parks.

In 1812 Governor Macquarie began to grant large tracts of land around Camden for farming (Camden Council 2010) that included a 1214-hectare land grant to William Howe in 1818. William Howe was a Scottish free settler who had migrated to Sydney with his family in 1816. The property was first named Eskdale but later became known as Glenlee and was largely used for dairy farming as well as other agricultural uses. William Howe Regional Park is located within this original land grant (Spackman & Mossop 1999a). By 1820, William Howe's estate had expanded to 2832 hectares (OEH 2013a), by which time he was shipping wool to London. He also produced wheat and meat for the government stores and dairy products for the Sydney market in the 1820s (OEH 2013a). Howe held eminent positions in the community including magistrate and superintendent of the Campbelltown Police (Parsons 2013). In 1823, he constructed the Glenlee homestead, which still stands in present-day Menangle Park (OEH 2013a).

In 1849 the Glenlee estate was conveyed to executors as payment for mortgage default. William Howe died in 1855 and his wife eventually sold the property to James Fitzpatrick in November 1859. James Fitzpatrick continued to expand the estate in the following years, making it one of the largest holdings in the district. The property remained in the Fitzpatrick family until the late 1960s (OEH 2013a).

In the late 1970s the NSW Government's Macarthur Land Corporation acquired extensive amounts of land in the Camden area, including some former lands of the Glenlee estate. The corporation sold large portions of the lower lands for urban development. In 1998 the area that now forms William Howe Regional Park was transferred to the Minister for the Environment and in the same year the land was reserved as William Howe Regional Park.

Camden Development Control Plan (Camden Council 2011) has identified that William Howe Regional Park contains important view corridors and colonial cultural landscapes that are iconic in the Camden Local Government Area. The native grasslands and rural pasture present in the park are noted as one of the few open pastures planned to remain in this part of Camden. Important views that have been identified in the development control plan include the view from Turkeys Nest Lookout south to Macarthur Resource Recovery Park and west over the urban release areas to the Blue Mountains.

Turkeys Nest Dam was constructed prior to 1947 and is a unique dam structure with walls on all four sides. Built on a natural soak at the highest point of the park next to the lookout, the dam was used as a gravity-feed water supply for the surrounding rural lands to irrigate the property and fill stock troughs. The dam is an intact example of an earth dam and demonstrates early small agricultural dam-building practices (Tropman & Tropman 2004). The infrastructure that supported its function as a water supply is now either buried or has been removed. Turkeys Nest Dam is identified in the development control plan as having potential heritage significance to Camden in a cultural and visual landscape context (Camden Council 2011). This potential heritage significance needs to be considered in any assessment of future management options for the dam (see Section 3.1).

Besides the rural landscape, the park contains limited visible remnants of prior European agricultural land use. These include evidence of old tracks, berms and dams (Spackman & Mossop 1999a).

Issues

- The surrounding rural cultural landscape is gradually diminishing as it is replaced with urban development. Urbanisation is further isolating the park from the Nepean River valley and fragments of former agricultural lands in the area such as the Australian Botanic Garden (Spackman & Mossop 1999a). Within the park, woody weed invasion is threatening its rural cultural landscape values.
- The park and the adjoining eastern portion of Gundungurra Reserve form part of the same rural cultural landscape. NPWS and Camden Council need to plan and coordinate land management practices, including revegetation and weed management, to preserve the cultural landscape where appropriate across both land tenures.
- There is a lack of information on the history of the artificial landforms within the park including the berms and old tracks. Former agricultural tracks need to be investigated for their potential to form part of the formal park track and trail system (see Section 3.6).
- Any proposal to install visible utility infrastructure in any part of the park may significantly compromise its cultural and visual importance to visitors and to those viewing the park from the surrounding urban areas (see Section 5.2).

Desired outcomes

- The cultural heritage and visual landscape values of the park are identified, recorded, protected and interpreted for public education.
- Negative impacts on historic heritage values are minimised.

Management response

3.5.1 Ensure identified historic sites features and values are recorded appropriately, and protected and managed according to their significance.

3.5.2 Investigate the opportunity to undertake archaeological research, particularly on Turkeys Nest Dam, the agricultural berms and old tracks.

3.5.3 Undertake an archaeological survey and cultural assessment before any works with the potential to impact historic sites and places.

3.5.4 Liaise with land managers along the Narellan and Spring Farm Bush Corridor to manage historic heritage collaboratively and strategically, to retain the colonial cultural landscape and view corridors identified in the *Camden Development Control Plan*.

3.6 Visitor use

NPWS parks provide a range of recreation opportunities. NPWS aims to ensure that visitors enjoy, experience and appreciate the parks while park values are conserved and protected.

According to the 2005 *Camden Recreation and Leisure Strategy*, walking is the most popular of all physical activities in Camden closely followed by cycling (Camden Council 2005a). William Howe Regional Park is well placed to facilitate these activities — current recreation activities in the park are centred around low-impact, self-reliant, nature-based recreation such as bushwalking, jogging, birdwatching and on-leash dog walking. In accordance with NPWS policy and the *Sustainable Mountain Biking Strategy* (OEH 2011d) cycling is permitted on Loop Trail.

Turkeys Nest Lookout, situated on the second highest hill in the Camden Local Government Area, is the most popular destination within the park for walkers and cyclists. It offers

spectacular views of the Camden Valley and Razorback Range. Visitors can also enjoy visual relief from the surrounding urban areas by the presence of the two dams, the woodland, rural landscapes and associated plants and animals in the park. A knoll on Sydney Water land is popular for the launching of remote-controlled model gliders that fly over the park, particularly in late winter when the favourable westerly winds occur.

The park is primarily used by residents from the adjoining suburbs of Narellan Vale and Mount Annan. The park also services the growing demand for informal recreation areas in western Sydney, particularly within a 30-minute travel time from home (DECC 2008a). The majority of visitor use occurs on weekends but the park is also popular during the week in the early morning and late afternoon.

The main entrance to the park is currently located at the carpark off Mary Howe Place, Narellan Vale. The carpark can accommodate approximately 10 vehicles but is only open during special events. Vehicle access to the carpark at other times is restricted due to inappropriate behaviour, particularly after hours (see Section 4.3). Current parking needs are satisfied by unlimited on-street car parking around the periphery of the park. Other than the carpark, public vehicle access within the park is prohibited.

There are other entry points to the park via neighbouring council reserves (see Map 1). These include from Ficus Reserve, Mount Annan and from Mary Howe Reserve, Narellan Vale. There is also an entry point from the intersection of Dodonea Circuit and Moluccana Street, Mount Annan. An off-road combined pedestrian and cycle path circulates from Welling Drive, Narellan Vale, through Gundungurra Reserve (North) and onto Loop Trail within William Howe Regional Park.

There is limited access to the park for people with disabilities. There is only a small section of sealed trail within the park near the carpark that connects to council pathways that link the end of Mary Howe Place with Henry Place, Narellan Vale. This path also links to Welling Drive via council land.

Loop Trail, the unsealed management trail in the park, is approximately 2.2 kilometres long. It begins at the main park entrance on Mary Howe Place and loops around the northern section of the park via Turkeys Nest Lookout, taking approximately 45 minutes on foot. Loop Trail also links with a walking/cycling track through Gundungurra Reserve, making a seamless connection for visitors with additional trail options of varying length. Other short tracks and trails link with Loop Trail at various locations from different entry points to the park (see Map 1).

Turkeys Nest Lookout is a formal viewing area located at the highest point in the park. It comprises a level circular area bounded by low concrete and porphyry-clad walls that provide seating. The aim of the lookout was to enhance experience of the views, accessibility and the presentation of interpretative information. A ramped concrete pathway and a separate pathway with stairs lead to low-key picnic facilities in a sheltered area at the lookout. Originally three picnic tables were provided but currently there is only one. An informal picnic area is also located in an open grassed area on the adjacent ridge line to the west of the lookout and includes three benches. Picnic facilities and signage are limited in the park because they are regularly damaged due to vandalism (see Section 4.3).

During consultation undertaken since the 1990s (e.g. Spackman & Mossop (1999b); and NPWS surveys in 2011 and 2012), local residents and park users indicated their appreciation of the park's natural and peaceful setting, its walking tracks and the opportunities it provides for less-structured activities, its lack of development and its closeness to home. Residents generally supported on-leash dog walking and cycling but desired more seating and picnic areas, interpretative signage, accessible paths, separate trails for active and passive

recreation, children's play areas, and more ranger interaction through community education and surveillance.

These surveys did not identify any demand for horse riding in the park. Horse riding is a popular recreational activity that has cultural associations for many Australians. The NPWS *Strategic Directions for Horse Riding in NSW National Parks* (OEH 2012a) provides a framework to improve riding opportunities in eight priority regions in New South Wales. The Metro South East Region, where the park is located, is not one of the priority regions. Horse riding is not considered suitable in the park due to its small size and the potential for the activity to disturb other users. Furthermore, there is a lack of connectivity to existing horse trails and limited access for horse trailers.

Future use and access

Stakeholders who are land managers along the Narellan and Spring Farm Bush Corridor are working towards the preparation of a strategic recreational needs analysis and corridor precinct plan that will determine what recreational facilities and opportunities are required as the population increases, and which land is most suitable to provide for active and passive recreation. In this context, consideration may be given to working with commercial operators to provide visitor services in the park, including opportunities for recreational or sporting activities.

The corridor precinct plan may identify the need for new facilities in the corridor. Facilities may include new sections of track for cycling, mountain biking and walking tracks (potentially including boardwalks near South Western Dam). New picnic areas and seating, children's play areas, new access points and a new carpark may also be considered. The location of coal seam gas wells in Gundungurra Reserve will need to be considered in the development of the corridor precinct plan.

Council is planning to improve cycling access to near the park's boundary. The Macarthur Regional Recreation Trail, which is designed for recreational and commuting purposes, will eventually link the existing Nepean River Cycleway from Camden to Macarthur Square train station in Campbelltown through the Spring Farm and Mount Annan residential areas, the Australian Botanic Garden and the University of Western Sydney campus. Sections will lie adjacent to the park. Plans also exist for a pedestrian and cycle path to link Spring Farm to the existing walking and cycle trails in Gundungurra Reserve (North) and there is the potential for pedestrian and cycling linkages to the north of the park to Birriwa Reserve and the Mount Annan market place.

A site facilities plan will be prepared for the park, informed by the strategic recreational needs analysis and corridor precinct plan. The site facilities plan will be exhibited. Elements of this site facilities plan may be developed in the park, including boardwalks, small shade shelters, seating and picnic tables, new shared pedestrian and cycle trails, new walking tracks, and upgrades or realignments of existing walking track so they conform to the standards for shared use with bicycles. It is recognised that the park contains evidence of many old tracks which were formed and used under its previous tenures, including when the land operated as a farm (see Section 3.5). Currently these tracks are not maintained, however they are still highly visible and are used by NPWS for fire and other management purposes (see Section 4.2). Some may have a suitable alignment to create the additional connections for walking and/or cycling.

Any major facility developments recommended in the site facilities plan, including any structures other than boardwalks and small shade shelters, would be subject to an amendment to this plan of management. Construction of any new facilities will also be subject to environmental impact assessment.

Until such time as amendments to this plan of management are made, the park will continue to facilitate a day use, urban respite experience for the 'families, friends and community' visitor segment as well as a regional open space link for the 'outdoor pursuits' visitor segment through provision of walking and cycling opportunities on Loop Trail to the picnic area at Turkeys Nest Lookout. A tap at the carpark provides drinking water for visitors. Toilet facilities and barbecues are not warranted at this stage.

Issues

- Camden Council is one of the fastest growing areas in Australia, with its population forecast to more than triple to 212,655 by 2036 (Information Demographics 2014). Park management will need to respond to a rapid growth in visitation and changes in recreation needs over the coming decades. NPWS will need to work in collaboration with other public open space land managers in the Narellan and Spring Farm Bush Corridor to create a well-defined recreation corridor that is a positive contribution to the recreation assets of south-west Sydney. New tracks and trails will be required in the park to link with new or improved access points from the surrounding urban areas.
- A strong partnership with Camden Council is required to deliver a seamless visitor experience for William Howe Regional Park and Gundungurra Reserve, particularly in terms of providing and maintaining shared tracks and trails, fencing, access and visitor facilities. The need for this cooperative relationship is emphasised in other strategic planning documents for the area, including the *Open Space Strategy* (Camden Council 2002), the *Camden Recreation and Leisure Strategy* (Camden Council 2005a), and the *Gundungurra Reserve Plan of Management* (Environmental Partnership 2009). The latter, in particular, contains integrated proposals such as joint trails, carpark areas, new picnic areas and a boardwalk, with a focus around South Western Dam. Once boundary fences have been established around Gundungurra Reserve (North), internal fences between William Howe Regional Park and Gundungurra Reserve can be removed to improve connectivity for visitors.
- Visitor use levels are currently below capacity, partly because of a general lack of information about the park (see Section 3.7) and a perception that the park is not available to the public due to limited access points, signage and facilities (Spackman & Mossop 1999a). The main entrance to the park is off Mary Howe Place, a residential cul-de-sac — a location which limits public access and knowledge of the park's existence. Opportunities may arise to create an alternative, more noticeable entrance to the south-west of the park via Gundungurra Reserve (North) — in accordance with the *Gundungurra Reserve Plan of Management* — once the proposed Liz Kernohan Drive has been constructed.
- The park currently has limited access by public transport. This is not likely to improve in the future. No bus stops are planned along the proposed Liz Kernohan Drive (Camden Council 2011), a major arterial road planned immediately south of the park.
- Arson, graffiti, vandalism and illegal use of trail bikes and undertaking illegal or inappropriate activities in the carpark are serious problems that limit visitor enjoyment and the sustainability of providing facilities in the park (see Section 4.3). Closure of the carpark (except during special events) has helped address these issues.
- Dog waste is currently unmanaged. It can detract from the visitor experience if left on walking trails as well as increase nutrient content in the soil and dams, promote weed growth and disturb native wildlife (see Section 4.1).
- The odour from the Macarthur Resource Recovery Park to the south of the park can be offensive to park visitors when the wind blows from the south-east. An odour buffer zone has been included in the *Camden Development Control Plan* (Camden Council 2011) to reduce impacts on the Spring Farm Urban Release Area. The buffer zone

includes Gundungurra Reserve (East) up to the southern boundary of William Howe Regional Park (see Section 5.2).

- Electricity transmission lines from Spring Farm, over South Western Dam and towards the lookout impact views (see Section 5.2).

Desired outcomes

- The park forms part of the recreation corridor along the Narellan and Spring Farm Bush Corridor, as described in the Camden *Open Space Strategy* and the Camden *Recreation and Leisure Strategy*, to meet the needs of the growing population.
- Visitation is increased through improved access to the park.
- The park and Gundungurra Reserve are managed in a seamless way to maximise the visitor experience.
- The park provides a safe and enjoyable experience for visitors wishing to undertake day-use activities, such as picnics, cycling, walking, cross-country running and on-leash dog walking.
- Recreational facilities and activities in the park do not conflict with the natural or cultural values of the park, or compromise the enjoyment of other visitors and neighbours.
- Suitable commercial operators provide services to improve the visitor experience.

Management response

3.6.1 Work with land managers along the Narellan and Spring Farm Bush Corridor to prepare a strategic recreational needs analysis and corridor precinct plan. Based on this precinct plan, prepare and exhibit a site facilities plan for the park.

3.6.2 As part of the site facilities plan, review the connectivity of tracks and trails within the park and between the park and neighbouring lands, and develop and implement a prioritised program for their hardening or closing and the creation of new sections of tracks and trails, to facilitate integration of the park with regional cycle and pedestrian routes.

3.6.3 Install new seating, picnic tables, signage, small shade shelters and boardwalks in the park as identified in the site facilities plan, with priority given to new facilities in the south-west of the park if this becomes a new major access point following development of a new carpark and entry off Liz Kernohan Drive for Gundungurra Reserve (North).

3.6.4 Actively promote public transport options to the park in consultation with Camden Council, Transport NSW, and Roads and Maritime Services.

3.6.5 License commercial operators as appropriate for community and recreation services that are complementary to maintaining the park's natural and cultural values, comply with the NPW Act and increase use of the park.

3.6.6 Encourage use of the park for organised community and sporting events that are suitable near residential areas such as running, cycling and walking events.

3.6.7 Remove the fence between Gundungurra Reserve and the park once boundary fencing has been installed around the northern, western and southern sides of Gundungurra Reserve that prevents trail bike access.

3.6.8 Assess the feasibility of re-using the existing carpark next to Mary Howe Place with a children's cycling safety skills area or similar facility, with shade shelters, picnic tables

and seating, and consult with neighbours and Camden Council on the change in use. Subject to the outcomes of this assessment and consultation, redevelop the site for this new use.

3.6.9 Continue to allow on-leash dog walking, introducing controls as required where it conflicts with the protection of natural and cultural values.

3.6.10 Remove old and damaged park infrastructure and furniture that may cause harm to park visitors. Replacement of damaged infrastructure and furniture will be determined by level of use and potential for vandalism.

3.6.11 If levels of vandalism reduce to a suitable level, seek to improve the sense of place by encouraging public art installations that reflect the park's cultural and natural history.

3.7 Information and education

William Howe Regional Park is not well known within south-west Sydney partly due to a lack of information available to the public on the park and its values. The Narellan and Spring Farm Bush Corridor is also unknown by the public because it is in its formative stage during the land release process. Camden Council, NPWS and the Australian Botanic Garden aim to create community liaison programs over time to improve recognition and use of the corridor and awareness of its natural, cultural and recreational values.

The park's location within proximity to a number of schools makes it potentially available for educational purposes. Although it is already used by local schools, particularly for cross-country sports, there is potential to increase its usage as an educational resource for environmental and physical education.

Landcom's Garden Gates and Spring Farm's community development programs may be able to assist in the promotion and delivery of educational programs aimed at encouraging the local community to use and care for the park. A Bushcare group has been formed for William Howe Regional Park with the assistance of Landcom's community development program. Continued support for the group will need to be provided in order to sustain its interest. A 'Friends of William Howe Regional Park and Gundungurra Reserve' or a 'Friends of the Narellan and Spring Farm Bush Corridor' could also be created to provide advice on park management issues to NPWS and other land managers along the corridor. This group could form part of the community interface.

Issues

- The park currently has low visitation partly due to the lack of public awareness of its existence. There is a lack of identification signage in the local area and a lack of information about the park within the public realm. Furthermore, the NPWS website has little information on the park, its access points, linkages or facilities.
- Due to past and repeated vandalism, no interpretative or directional signage is currently provided in the park (see Section 4.3).

Desired outcomes

- Public appreciation and awareness of the park's natural, cultural and recreational values are improved.
- Visitation is increased through better promotion of the park.
- The park is a useful educational resource for local schools, community organisations and the wider community.

Management response

3.7.1 Develop and implement a community engagement strategy and education program in consultation with major stakeholders including Camden Council, the Australian Botanic Garden, local schools and Aboriginal representatives, with the aim of increasing community awareness, usage and stewardship of the Narellan and Spring Farm Bush Corridor. The strategy should include park signage (subject to a reduction in vandalism) and promotion through a range of media and special events.

3.7.2 Promote the park to the community of south-west Sydney as a destination and thoroughfare for cycling and walking as well as for recreation, sport, community activities and education.

3.7.3 Update information about William Howe Regional Park on the NPWS website to include linkages to the existing and planned regional cycleway and walking trail network, and to promote the park as a destination and thoroughfare as part of the Narellan and Spring Farm Bush Corridor.

3.7.4 Collaborate with stakeholders along the Narellan and Spring Farm Bush Corridor in seeking funding opportunities for community engagement, education and creation of new recreation facilities and infrastructure.

3.7.5 Work with land managers along the Narellan and Spring Farm Bush Corridor to prepare a signage strategy that will enhance public recognition of the corridor and promote a unified image among stakeholders.

3.7.6 Support the park's Bushcare group and any 'Friends of' groups that form to promote community engagement and park stewardship in cooperation with stakeholders along the Narellan and Spring Farm Bush Corridor.

4. Threats

4.1 Pests

Pest species are organisms that have negative health, environmental, economic and social impacts. Commonly they are introduced species. Pests can have impacts across the range of park values, including impacts on biodiversity, cultural heritage, catchment and scenic values.

NPWS prepares regional pest management strategies which identify pest species across that region's parks and priorities for control, including actions listed in the *Priorities Action Statement* (see Sections 3.2 and 3.3), threat abatement plans, and other strategies such as the NSW *Biodiversity Priorities for Widespread Weeds* (DPI & OEH 2011) and the *NSW Biodiversity Strategy 2013-2021* (DPI 2013).

The NPWS *Regional Pest Management Strategy 2012–17, Metro South West Region – A new approach for reducing impacts on native species and park neighbours* (OEH 2012b) identifies pest species and priority programs for this park. The overriding objective of the regional 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 regional pest management strategy also identifies where other site- or pest-specific plans or strategies need to be developed to provide a more detailed approach.

The pest management priorities for the park as identified in the regional pest management strategy are listed in Table 3 with a focus on weeds. These programs and their priority will be regularly reviewed.

Table 3: Prioritised regional pest management programs

Target pest/weed	Asset at risk	Aim of control	Current priority*
Boneseed (*Chrysanthemoides monilifera* subsp. *monilifera*) # ^	-	Eradication	C-NE
Coolatai grass (*Hyparrhenia hirta*) ^	-	Containment	C-NE
Ludwigia (*Ludwigia longifolia*) ^	-	Containment	M-II
African olive (*Olea europaea* subsp. *cuspidata*) Asparagus fern (*Asparagus aethiopicus*) # ^ Blackberry (*Rubus fruticosus* agg.) # ^ Lantana (*Lantana camara*) # ^ Various grasses, vines and scramblers	Cumberland Plains Woodland	Asset protection	L-LP

Source: OEH 2012b.

* C-NE (critical, new and emerging): Programs addressing new occurrences or suppressed populations of highly invasive pest species with potential for significant impacts on park values (subject to risk/feasibility assessment) and programs to control Class 1 and 2 noxious weeds.

M-II (medium, isolated infestation): Medium priority program addressing isolated infestations of highly invasive pest species, widely distributed in other parts of the region, with potential for future impacts on park values.

L-LP (low, localised programs): Programs targeting pests that have localised impacts on natural ecosystems or agricultural lands that promote community skills, awareness and involvement with parks.

Weed of National Significance.

^ Declared noxious under the *Noxious Weeds Act 1993* in the Camden Local Government Area.

Weeds

The park is particularly susceptible to weed infestation due to previous agricultural uses, soil disturbance and infrastructure works over time. As the surrounding area becomes more urbanised, garden escapees from adjoining residential areas (through illegal rubbish dumping and wind and bird dispersal) are likely to increase the variety of weeds in the park. The park is elevated above the surrounding urban area and does not suffer from weeds brought in by stormwater nor higher nutrient content along drainage lines. Although the weeds listed in Table 3 have been identified in the prioritised regional pest programs, many other weeds are known to exist within the park. These include isolated or scattered infestations of African boxthorn, bridal creeper (*Asparagus asparagoides*) and prickly pear (*Opuntia* spp.) which are all Weeds of National Significance.

Woody weed invasion, in particular the growth of African olive and African boxthorn, are threatening the scenic and landscape values of the park. These species also pose a notable threat to the re-establishment of the natural vegetation structure. Historically, African boxthorn was planted in many farms in western Sydney as a hedge. At William Howe Regional Park, African boxthorn, African olive and other woody weeds have been established by bird droppings and do not appear to have any cultural or heritage significance.

'African olive invading Cumberland Plain Woodland' has been identified as a critical priority for pest management in the Metro South West Region (OEH 2012b). Furthermore, invasion of native plant communities by African olive is listed as a key threatening process under the TSC Act (NSW SC 2010b). The recovery plan for Cumberland Plain Woodland includes the need for development and implementation of a coordinated program for African olive removal across all land tenures (DECCW 2010a). Control programs can be guided by *The African Olive Management Plan for the Sydney Region 2008–2013* (Sydney Weeds Committees 2008).

The invasion of native vegetation by several of the weeds known within the park are considered key threatening processes — these include invasion, establishment and spread of lantana (NSW SC 2006b); invasion of native plant communities by *Chrysanthemoides monilifera* (NSW SC 1999a); and invasion and establishment of exotic vines and scramblers (NSW SC 2006a). Although perennial grasses are listed as a key threatening process under the TSC Act (NSW SC 2003a), from a landscape and environmental management perspective, they do not constitute a significant weed management problem in the park at this stage.

Animals impacted by vines and scramblers include the endangered Cumberland Plain land snail as well as threatened owl, bird and bat species, through loss of hollows. Moth vine (*Araujia sericifera*) is particularly well established in the park and requires targeted management.

The absence of substantial levels of native shrubs on the site has resulted in the combination of indigenous and exotic plants providing habitat for native birds. The loss of bird habitat needs to be minimised when planning the progressive removal of woody weeds and restoration with local native plants.

The dams within Gundungurra Reserve are populated by *Typha* plants that have the potential to smother the surface of the dams (Camden Council 2005b). This species may spread to water bodies within William Howe Regional Park, detrimentally impacting aquatic habitats. In the *Gundungurra Reserve Plan of Management* it is recommended that Camden Council and NPWS manage weeds collaboratively across the adjoining reserves (Camden Council 2005b).

Pest animals

Due to the close proximity of the park to urban areas, there are a number of domestic and feral animals present in the park and surrounding areas. These species include predators such as cats and foxes. Domesticated dogs (*Canis lupus familiaris*) are permitted in the park but must be leashed and under control at all times (see Sections 3.3 and 3.6). Although not currently a significant problem in the park, predators such as these have the ability to severely affect populations of native animals.

Foxes and cats have been linked to regional declines and extinctions of a broad suite of medium-sized non-flying mammals, ground-nesting birds and freshwater turtles. Foxes have also been implicated in the spread of a number of weed species such as bitou bush and blackberry. As they are known to prey on domestic stock, including lambs and poultry, European red fox is a declared pest throughout New South Wales under the *Local Land Services Act 2013*. Predation by the European red fox is listed as a key threatening process under the TSC Act (NSW SC 1999b) and under the EPBC Act (TSSC 2000c). A threat abatement plan exists to control the species (OEH 2011c). Predation by feral cats is also listed as a key threatening process under the TSC Act (NSW SC 2000c) and the EPBC Act (TSSC 2000d).

Feral rabbits (*Oryctolagus cuniculus*) are known to occur within the park, with population densities fluctuating seasonally. Competition and land degradation by feral rabbits is listed as a key threatening process under the TSC Act (NSW SC 2002a) and the EPBC Act (TSSC 2000a). Following any future hazard reduction burns or wildfires (see Section 4.2), rabbit numbers should be monitored and controlled if required to ensure adequate post-fire regeneration of native seedlings, particularly in the remnant Cumberland Plain Woodland.

Brown hares (*Lepus capensis*), red-whiskered bulbuls (*Pycnonotus jocosus*), spotted doves (*Streptopelia chinensis*) and common starlings (*Sturnus vulgaris*) are other introduced animals known to exist in the park (Leary 2007).

To maximise effectiveness, feral animal control should be undertaken in cooperation with Camden Council in relation to the adjoining council-owned reserves including Mary Howe Reserve and Gundungurra Reserve, as proposed in the *Gundungurra Reserve Plan of Management*.

Pathogens and diseases

Although no pathogens or plant diseases have been detected within the park, it is likely serious pathogens and diseases could exist because they are present in other reserves in the Sydney Basin. Myrtle rust, a plant disease caused by the exotic fungus *Uredo rangelii*, was first detected in Australia in 2010. It is likely to spread rapidly to the extent of its biological range as the spores are readily dispersed by wind. Eradication is unfeasible. The likely impacts of myrtle rust on biodiversity in Australia are unknown, however it may contribute to the decline and extinction of species and may severely impact the structure and function of natural ecosystems. Establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae is listed as a key threatening process under the TSC Act (NSW SC 2011). *Management Plan for Myrtle Rust on the National Parks Estate* (OEH 2011a) outlines how the disease will be managed in NSW national parks.

Phytophthora cinnamomi is another plant pathogen that is present in the Sydney Basin. It is a microscopic soil-borne organism that causes root rot in a wide range of plants. Infection by *Phytophthora cinnamomi* is listed as a key threatening process under the TSC Act (NSW SC 2002b) and the EPBC Act (TSSC 2000b) resulting in a national threat abatement plan (Commonwealth of Australia 2014) and a statement of intent for New South Wales (DECC 2008b). Only laboratory analysis of soil from the park can determine if the pathogen is present. Infection often results in plant death. Spores can be dispersed by surface and

subsurface water flows and by humans through the movement of contaminated soil, water or plant material (OEH 2012b).

Desired outcomes

- Negative impacts of pest plants, animals and pathogens on the park's natural and cultural values are minimised.
- Pest plants and animals are controlled and where possible eliminated from the park.
- Pests and weeds are managed in a strategic and collaborative way with adjoining land managers within the Narellan and Spring Farm Bush Corridor.

Management response

4.1.1 Manage pest species in accordance with the regional pest management strategy for the park and other strategies as relevant, and in consideration of neighbouring landowners and key stakeholder priorities.

4.1.2 Monitor the park to determine the presence and extent of weed and animal pests and update the regional pest management strategy accordingly to reflect new information. In the monitoring process also identify biodiversity or other values at risk.

4.1.3 Source funds in collaboration with Camden Council and other land managers along the Narellan and Spring Farm Bush Corridor to control pest animals and weeds across the landscape and to undertake restoration works.

4.1.4 After future hazard reduction burns or wildfires occur, monitor rabbit numbers and introduce controls as required to prevent excessive grazing and to promote regeneration of seedlings in the remnant Cumberland Plain Woodland.

4.1.5 If identified within the park, manage pathogens according to best practice guidelines.

4.1.6 Monitor park dams for the presence of *Typha* plants and manage any infestations according to best practice guidelines.

4.2 Fire

The primary objectives of NPWS fire management are to protect life, property, community assets and cultural heritage from the adverse impacts of fire, while also managing fire regimes in parks to maintain and enhance biodiversity. NPWS also assists in developing fire management practices that contribute to conserving biodiversity and cultural heritage across the landscape, and implements cooperative and coordinated fire management arrangements with other fire authorities, neighbours and the community (OEH 2013b).

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 particular plants, animals and communities. High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition is listed as a key threatening process under the TSC Act (NSW SC 2000b).

The fire history in what is now the park is not well documented, however this area has not been subject to frequent fire. Apart from two small grass fires in the north-west section of the park in 2001–02, no other bushfires have been recorded, with the exception of small arson fires at the lookout that have not spread into bushfires (see Section 4.3) (DEC 2006b).

A simple report-based fire management strategy (DEC 2006b) exists for the park that is due to be renewed in line with the NPWS *Fire Management Manual* (OEH 2014a). The *Macarthur Bush Fire Risk Management Plan* (Macarthur BFMC 2012) and *Bush Fire Prone Land Map 4*

(RFS 2014) will be considered in the preparation of the revised strategy. In the strategy, the park is identified as having a medium- to low-level fire risk (DEC 2006b) and the park is predominately zoned as a land management zone for fire management planning purposes. The exceptions are the 5- to 10-metre wide strips adjacent to existing trails and the powerlines, which are maintained as strategic fire advantage zones. The primary fire management objectives of the land management zone are to prevent the loss of remnant plants and animals, and to protect culturally significant sites. The primary fire management objectives of the strategic fire advantage zone are to reduce fire intensity and spotting distance, reduce the probability of bushfires being ignited, strengthen existing fire control advantages and restrict the movement of fires between fire management zones and to or from the park (DEC 2006b).

Asset protection zones are regularly maintained around the perimeter of the park and comprise mown grass areas.

Built assets subject to the effects of fire within the park are limited to picnic tables, signage, fencing and the powerline easement that runs through the park. Endeavour Energy is responsible for vegetation control to assist fire management within the powerline easement (see Section 5.2). Natural assets vulnerable to inappropriate fire regimes include habitat for native plants and animals, and the small area of critically endangered Cumberland Plain Woodland. Vulnerable assets adjacent to the park include residential dwellings, particularly those adjoining the park to the north and east, and the Sydney Water reservoir near the centre of the park. Extreme fire conditions may pose a threat to the built assets of other neighbouring landowners within the surrounding urban areas, including the Macarthur Resource Recovery Park to the south-east.

Loop Trail — the pedestrian and cycle path that begins and ends at the carpark off Mary Howe Place via the lookout — functions as a management trail that can accommodate all categories of firefighting appliances (up to category 1). The loop allows firefighting vehicles to travel in either direction as required. Most other areas within the park can be accessed by firefighting appliances across grassy areas, or along the network of former agricultural tracks and informal trails that are still evident in much of the park. Some of these access points need clearer signage consistent with the Bush Fire Coordinating Committee's policy on fire trails (BFCC 2007) and NPWS *Park Signage Manual* (DECCW 2010c).

NPWS maintains cooperative arrangements with surrounding landowners and the Rural Fire Service and is actively involved with the Macarthur Bush Fire Management Committee. Cooperative arrangements include fire planning, fuel management and information sharing. Hazard reduction programs, ecological burning proposals and fire trail works are submitted annually to the Macarthur Bush Fire Management Committee.

The formation of a fire management plan for the bushland corridor that includes Gundungurra Reserve, William Howe Regional Park, the Narellan and Spring Farm Bush Corridor, and the Macarthur Resource Recovery Park odour buffer is indicated as a high priority in the *Gundungurra Reserve Plan of Management*.

Desired outcomes

- Negative impacts of fire on life, property, community assets and the environment are minimised.
- The potential for spread of bushfires on, from, or into the park is minimised.
- Fire regimes are appropriate for conservation of native plant and animal communities.

Management response

4.2.1 Prepare and implement a new map-based fire management strategy for the park that takes into consideration any fire management plan for the Narellan and Spring Farm Bush Corridor.

4.2.2 Develop and implement an annual program of bushfire hazard reduction works.

4.2.3 Continue to be involved in the Macarthur Bush Fire Management Committee and maintain cooperative arrangements with Fire and Rescue NSW, local Rural Fire Service brigades and surrounding landowners in regard to fuel management and fire suppression.

4.2.4 Install trail identification and orientation signs for fire management at appropriate locations.

4.2.5 Monitor the ability of native plants to recover between fires and review regimes where relevant.

4.2.6 Rehabilitate areas disturbed by fire suppression operations including temporary track control lines as soon as practical after the fire.

4.2.7 Liaise with Landcom to ensure that an appropriate park edge interface is created, as well as adequate fire buffers, for any new residential development abutting the park boundary in the Mount Annan Urban Release Area.

4.3 Illegal activity

Illegal activity has become a serious problem in the park partly due to the lack of visibility of much of the park from nearby residential areas, limited surveillance and the increasing population from surrounding urbanisation. Multiple access and exit points for the park, including from cul-de-sacs and adjoining council pocket reserves exacerbate the problem.

Illegal activity occurring within the park includes arson, graffiti, vegetation removal, wood collecting, vandalism of park furniture and signage, illegal trail bike riding and illegal dumping of rubbish, vegetation and construction material. Illegal activity is more frequent at night after 9 pm, on weekends and during school holidays, and the resultant damage has been an ongoing reactive maintenance issue for NPWS for many years.

Illegal trail bike riding is damaging trail surfaces and vegetation on trails, is dangerous to walkers and creates excessive noise. Trail bike riding is also prohibited in Gundungurra Reserve. Despite barrier controls between Gundungurra Reserve and the park, bikes enter the park via the reserve.

Vandalism occurs regularly at Turkeys Nest Lookout because it provides a secluded meeting place with multiple escape routes. Minor acts of vandalism such as small fires at the lookout structure, wood collection, graffiti and vandalism of park furniture and signage occur regularly. In 2007 the low wall that forms the lookout structure was completely demolished by vandals. It was rebuilt in 2009. The design of the structure, with seating in a circular formation, currently invites the creation of a bonfire in the middle and could be improved.

Regular vandalism limits the potential to provide signage and visitor facilities within the park because they are soon damaged once erected. Two of the three picnic tables at the lookout have now been destroyed. Similarly, no interpretative signage has been installed at the lookout because previous signs have been vandalised. Interpretative signs could be installed at the entrances to the park in more visible areas, or outside the park in a local community

centre where people can access the information in an area less likely to be exposed to vandalism.

The carpark off Mary Howe Place has been used in the past for 'burnouts' and other dangerous driving behaviour and is therefore locked except when there are official activities within the park. All gates into the park are locked at all times to prevent unauthorised vehicles from entering.

The Camden Local Area Commander, NSW Police Force, has been asked by NPWS to assist and conduct night-time patrols to help prevent ongoing antisocial behaviour and further vandalism. NSW Police Force has been allocated a key to the gate at the carpark, and police undertake surveillance on weekends when resources permit or when there has been a report of illegal activity within the park (C Millman [Local Area Command Crime Prevention Officer, NSW Police Force] 2012, pers. comm., 29 March). Visitors to the park and the local community are encouraged to report illegal activity to NPWS, the Local Area Command and Camden Council.

As most offences occur after 9 pm, there is an option to trial closing the park between sunset and sunrise (in accordance with clause 4(1)(b) of the NPW Regulation 2009) to assist in the management of illegal activity. The needs of local users wishing to access the park after dark should be considered before any temporary sunset to sunrise closure of the park proceeds. Signage, providing notification of the closure, will be erected at the park entrances and regularly monitored to ensure it is intact.

Desired outcomes

- Reduce the incidence of illegal activity in the park.
- Provide a safe and enjoyable environment for park visitors.
- Create and maintain good relations with park neighbours and encourage them to report illegal activity within the park.

Management response

4.3.1 Work with NSW Police Force Local Area Command to prepare a crime risk assessment for the park and determine the response required, such as night-time patrols.

4.3.2 During a period of vandalism, close the park at night for a trial period to assist police in responding to illegal activity. Prepare a communications plan and consult the local community prior to enacting the night-time closure. Assess the effectiveness of the trial closure once it has been completed.

4.3.3 Participate with relevant stakeholders in Neighbourhood Watch programs and other responses organised by local authorities and encourage neighbours and the public to report incidents.

4.3.4 Continue to implement management actions, including the erection of barriers, to exclude trail bikes and other unauthorised vehicles from entering the park. Collaborate with Camden Council to prevent trail bikes entering the park through Gundungurra Reserve.

4.3.5 In partnership with Camden Local Area Command, install surveillance cameras to establish patterns and regularity of use when required.

4.3.6 Consider erecting interpretative signs in highly visible areas along the park boundary or outside the park in community spaces where they are less likely to be exposed to

vandalism. Once cases of vandalism reduce, consider installing signage in the park, particularly at Turkeys Nest Lookout.

4.3.7 Devise and implement strategies to minimise rubbish dumping through community education, signage, surveillance, law enforcement and appropriate fencing.

4.3.8 Remove and dispose of rubbish as soon as possible.

4.3.9 Maintain a presence in the park by using ranger patrols during peak visitation periods to deter undesirable behaviour.

4.4 Climate change

Human-induced climate change is listed as a key threatening process under the TSC Act (NSW SC 2000a) and the associated loss of habitat is listed under the EPBC Act (TSSC 2001).

The latest information on projected changes to climate are from the NSW and ACT Regional Climate Modelling (NARClim) project (OEH 2014b). The climate projections for 2020–2039 are described as 'near future' (or as 2030); and projections for 2060–2079 are described as 'far future' (or as 2070). The snapshot shown in Table 4 is for the Metropolitan Sydney Region (OEH 2014b).

Table 4: Metropolitan Sydney climate change snapshot

Projected temperature changes	
Maximum temperatures are projected to **increase** in the near future by 0.3–1.0°C	Maximum temperatures are projected to **increase** in the far future by 1.6–2.5°C
Minimum temperatures are projected to **increase** in the near future by 0.4–0.8°C	Minimum temperatures are projected to **increase** in the far future by 1.4–2.5°C
The number of hot days will **increase**	The number of cold nights will **decrease**
Projected rainfall changes	
Rainfall is projected to **decrease** in spring and winter	Rainfall is projected to **increase** in summer and autumn
Projected Forest Fire Danger Index changes	
Average fire weather is projected to **increase** in spring by 2070	Severe fire weather days are projected to **increase** in summer and spring by 2070

Source: OEH 2014b.

The projected increases in temperature, number of hot days and severe fire weather days (OEH 2014b) are likely to influence bushfire frequency and intensity across Sydney and result in an extension of the bushfire season (DECCW 2010b). The majority of models used in NARCLim agree that autumn rainfall will increase in both the near and far future; and spring rainfall will decrease in the near future (OEH 2014b). Increases in rainfall runoff are likely to impact the stormwater system and, where capacity is reached, cause flooding. Higher rainfalls are likely to accelerate all forms of soil erosion across the region (DECCW 2010b).

Climate change may significantly affect biodiversity by changing the size of populations and distribution of species, modifying species composition and altering the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration

and pressure from introduced animals. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates. Highly cleared and fragmented ecosystems such as those on the Cumberland Plain are likely to be at greater risk than more intact ecosystems.

NPWS will continue to manage threats from climate change to park values in a collaborative way with other land managers along the Narellan and Spring Farm Bush Corridor and with park neighbours. The presence of William Howe Regional Park within the corridor will improve the resilience of natural and cultural values along the whole corridor through the protection of native flora and fauna, and implementation of native revegetation programs to reduce the impacts of habitat fragmentation (DECCW 2010d). Furthermore, programs to reduce the pressures arising from other threats, such as invasive species, bushfires and pollution, will also help reduce the severity of the effects of climate change.

Desired outcomes

- The impacts of climate change on natural systems are minimised.

Management response

4.4.1 Continue existing fire, pest and weed management and bushland restoration programs and adapt where required to minimise climate change–induced threats.

4.4.2 Work with other land managers, particularly Camden Council, and the community to improve habitat resilience against climate change through cross-boundary efforts including the creation of buffers and corridors for native animal movement as well as managing threats within the park and adjoining areas as they arise.

5. Management operations and other uses

5.1 Management facilities and operations

The park has one major management trail (Loop Trail) that provides vehicle access for management purposes as well as cycling and walking. It forms a loop beginning at the carpark at Mary Howe Place then leading up to Turkeys Nest Lookout and back to the main park entrance. At the westernmost point it connects with Gundungurra Reserve via a short walking/cycling track. A short part of the southernmost portion of Loop Trail crosses land owned by Sydney Water. Sydney Water has requested that NPWS enters into a lease or licence agreement for use, management and maintenance of the small portion of Loop Trail within Sydney Water's land.

An informal track departs from Loop Trail and continues into the Sydney Water lands towards the water tank. This may be closed by Sydney Water. Use of this track from within the park and from Loop Trail should be discouraged by NPWS. Sydney Water needs to ensure the security of the reservoir and manage risks associated with allowing access and therefore does not encourage walking tracks through its lands. Sydney Water is willing to work with NPWS on the location of pathways and the most appropriate way to manage access risks (Sydney Water 2013).

Desired outcomes

- Park infrastructure is routinely maintained and managed to benefit a wide range of park users.
- NPWS use, management and maintenance of the portion of Loop Trail on Sydney Water's land is appropriately leased or licenced.
- Management facilities and operations adequately serve management needs and have minimal impact.

Management response

5.1.1 Develop a management agreement with Sydney Water for the short part of Loop Trail that crosses Sydney Water lands.

5.1.2 Work with Sydney Water to close the informal track that extends from Loop Trail towards the water tank.

5.2 Non-NPWS uses and adjoining lands

Easements

There are a number of easements within William Howe Regional Park that cover public utilities managed by state and regional authorities. The easements provide these authorities access to manage, maintain, repair and carry out works on their infrastructure, including transmission lines, water supply mains and gas pipelines.

An easement has been granted to Sydney Water to access, construct and maintain an underground water main connecting the water reservoir with the Spring Farm Release Area. In the environmental impact assessment for the project (NPWS 2008), key objectives included provision of drinking water to the recreational users of the park and provision of additional access to water for bushfire fighting purposes. Although provision of these facilities was not included as a condition of approval, the possibility still exists for Sydney Water to install these facilities in future should the need arise. Other easements held by Sydney Water that cross the park include one located between the Sydney Water reservoir and Mary Howe Reserve; and one from the south-east corner of the Sydney Water land to Moyengully

Avenue for access and water supply. Sydney Water infrastructure within the park is managed in accordance with a statewide agreement (OEH & Sydney Water 2014).

A 400-metre long subterranean easement was created in 2009 for AGL Energy Limited to access the park for the construction of an underground pipeline by directional drill for the AGL Camden Gas Project. Wells are located outside the park in Gundungurra Reserve (North), including one near South Western Dam where a carpark may be built in future to service the reserve and William Howe Regional Park. According to AGL, there are no further plans to establish any additional wells near the park (A Lollback [AGL Energy Ltd] 2011, pers. comm., 8 November).

An easement for transmission lines traverses the northern portion of the park from the South Western Dam to the north-east corner near Ironbark Ridge Reserve, permitting Endeavour Energy access to all structures and for maintenance of adequate safety clearances. A narrow easement has also been created for access purposes across the narrow south-east strip of the park in a north–south direction to allow Endeavour Energy to access powerlines located immediately adjacent to that part of the park.

As the park is located within a rapidly urbanising region of Sydney, there is pressure for additional infrastructure (such as water mains, gas pipelines, electricity lines and telecommunication towers) to be located in the park to provide the required services to the surrounding suburbs. However, the long-term aim is to reduce the number of utility or non-park uses within the park where possible. Due to the narrow configuration of sections of the park and its small size, any further utility developments will potentially significantly impact the values of the park. Hence any future development must be consistent with the protection of the setting and visual amenity of the lookout, its identified view corridors, and the natural, cultural and recreation values of the park.

Adjoining land

Camden Council reserves

Gundungurra Reserve and Mary Howe Reserve adjoin the park and are managed by Camden Council. These reserves have similar management objectives and challenges as William Howe Regional Park. The intention is to create a ‘seamless’ boundary between the park and Gundungurra Reserve (North) and Mary Howe Reserve to improve the visitor experience and land management outcomes (see Section 3.6).

Sydney Water

The adjoining Sydney Water land contains a large reservoir that is very visible from the elevated central and southern areas of the park. However, the existing landform and vegetation limits views of the reservoir from Turkeys Nest Lookout and the reservoir is not located within important view corridors identified in the *Camden Development Control Plan*. Sydney Water proposes to erect another reservoir on the site in future and this will have further visual impacts on the amenity of the park, and potentially on important view corridors (see Section 3.5). Any future vegetative screening of the reservoirs will need to be designed in close consultation with Sydney Water and in consideration of the risk of fire damage to essential infrastructure that provides water for the Camden Local Government Area.

Adjoining urban release areas

Moyengully Avenue and Dodonea Circuit on the eastern boundary of the park separate most of the adjoining Mount Annan Urban Release Area from the park. However, approximately 600 metres of the park’s north-east boundary directly adjoins residential properties. Periodically, residents request access from their properties to the park and some informal access points already exist.

A small patch of land south-east of the Sydney Water reservoir lands has been identified for future residential development. If it is developed, new houses may be constructed along Moyengully Avenue that will back directly onto the park boundary. Negotiations are required between NPWS and Landcom to ensure that an appropriate park edge interface is created and that adequate fire buffers are included in any future development in accordance with legal requirements.

Macarthur Resource Recovery Park

Macarthur Resource Recovery Park, located south-east of the park and Gundungurra Reserve (East), is not visible from the park due to vegetation and topography (see Map 2). An odour buffer exists between the park and the waste centre but, depending on wind direction, odours can still be offensive to park visitors.

Desired outcomes

- There is cooperative land management of publicly owned land along the Narellan and Spring Farm Bush Corridor.
- Service utility uses and activities are managed to minimise impacts on park values and park infrastructure.
- Utility infrastructure unrelated to park operation is reduced over time where possible.
- Boundary impacts from residential development abutting the park are managed through negotiation and effective planning.

Management response

5.2.1 Liaise with utility service providers in relation to easements, maintenance needs and access within the park to ensure compliance with legislation, NPWS policy and agreements.

5.2.2 Investigate whether Sydney Water can provide drinking water and water for firefighting purposes for the park from existing water pipelines that circulate across the park.

5.2.3 Cooperatively manage the park as part of the Narellan and Spring Farm Bush Corridor, in particular with Camden Council in relation to adjoining reserves. This will aim to improve the effectiveness of weed, pest, fire and revegetation management; as well as consistency and connectivity in the provision of recreation infrastructure and experiences.

5.2.4 Liaise with the Macarthur Resource Recovery Park in relation to maintenance of the odour buffer and an appropriate park interface.

6. Implementation

This plan of management establishes a scheme of operations for William Howe Regional Park. Implementation of this plan will be undertaken within the annual programs of the NPWS Metropolitan South West Region and relevant OEH sections.

Activities for implementation are listed in Table 4. Relative priorities are allocated against each activity as follows:

- **High** priority activities are imperative to achieve the plan's objectives and desired outcomes, and must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.
- **Medium** priority activities are necessary to achieve the plan's objectives and desired outcomes but are not urgent.
- **Low** priority activities are desirable to achieve management objectives and desired outcomes but can wait until resources become available.
- **Ongoing** activities are undertaken on an annual basis or are statements of management intent that will direct the response if an issue arises.

This plan of management does not have a specific term and will stay in force until amended or replaced in accordance with the NPW Act.

Table 5: List of management responses

Management response		Priority
3.1 Geology, landscape and hydrology		
3.1.1	Design and undertake all works in a manner which minimises soil erosion, and ensures catchment values and water quality are protected and maintained. Appropriately treat areas of erosion if they arise.	Ongoing
3.1.2	Investigate drainage management in association with Camden Council to assess and manage runoff from William Howe Regional Park onto Gundungurra Reserve.	Medium
3.1.3	Engage with other authorities as needed to address issues that affect catchment values, water quality and groundwater resources within the park	Ongoing
3.1.4	Undertake a risk assessment of the farm dams and determine the appropriate management approach; this may include removal of dam wall structures.	High
3.1.5	Seek necessary approvals from the Mine Subsidence Board, Picton when undertaking relevant development within the park.	Ongoing
3.1.6	Engage with relevant authorities as needed to address potential impacts of coal seam gas development works on park values.	High
3.1.7	Prepare and implement a view management plan to maintain important view corridors from vantage points within the park.	Medium

	Management response	Priority
3.2 Vegetation communities and native plants		
3.2.1	In consultation with stakeholders, prepare and implement a landscape master plan for the park that encourages the creation of vegetation linkages of locally occurring native species; protects cultural landscapes and identified view corridors; follows best management practice for ecological restoration of native plant communities; retains some open recreation areas; and improves the natural value of the woodland area in terms of structure, plant composition and area of vegetation coverage. Consideration must be given to fire buffer, access and public safety requirements; and improving the habitat quality of the park for native animals. In addition, consideration should be given to the staged removal of planted overstorey species which are not native to the local area; and experimentation with alternative restoration techniques, including ecological burns, to maximise the possibility of successfully restoring native vegetation.	High
3.2.2	Undertake targeted surveys for threatened plants likely to occur in the park.	High
3.2.3	Implement relevant actions and strategies in the *Priorities Action Statement*, for threatened plant species, populations and communities in the park.	Ongoing
3.2.4	Where appropriate, work with the other land managers within the Narellan and Spring Farm Bush Corridor, as well as other neighbours, community groups and Aboriginal organisations to undertake strategic weeding, bush regeneration, planting and monitoring to facilitate coordinated land management, optimise conservation outcomes, and increase community awareness and shared ownership.	Medium
3.2.5	Reduce mown areas where appropriate and increase the height of the mown areas where a high native species component exists. Rest mown areas periodically to allow native grass seed to set and establish.	High
3.2.6	Investigate and encourage opportunities for research and monitoring partnerships with selected institutions and expert volunteers such as natural history groups.	Low
3.3 Native animals		
3.3.1	Implement relevant recovery actions and strategies for threatened animal species and populations in the park.	Ongoing
3.3.2	Develop and implement protocols for mowing and weed management that are sensitive to and protect habitat requirements of native animals.	Medium
3.3.3	Work collaboratively with other land managers within the Narellan and Spring Farm Bush Corridor to improve habitat corridor linkages. In particular, consult Camden Council regarding proposed weed management and habitat restoration works in the park near Gundungurra Reserve.	High
3.3.4	Formulate and implement a monitoring and evaluation program to periodically assess and better understand changes in animal populations, habitat values and management requirements of the park and, where possible and in conjunction with Camden Council, of Gundungurra Reserve.	Low
3.3.5	Work collaboratively with Camden Council to promote responsible pet ownership and management through signage and education programs.	Medium

Management response		Priority
3.3.6	Liaise with Camden Council, Roads and Maritime Services, and the Department of Planning and Environment to ensure that the design of Liz Kernohan Drive allows for the safe movement of terrestrial and arboreal animals, and that there is provision for ongoing monitoring of animal movements in the vicinity of the road.	High
3.3.7	Investigate and encourage opportunities for research and monitoring partnerships with selected institutions and expert volunteers such as ornithological groups.	Low
3.3.8	Ensure that the landscape master plan for the park considers options for the improvement of native animal habitat quality through such means as the provision of artificial tree hollows, augmentation of coarse woody debris (addition of logs) and sympathetic planting on the fringes of dams to improve habitat.	High
3.4 Aboriginal heritage		
3.4.1	Continue to consult and involve the Tharawal Local Aboriginal Land Council, the Cubbitch Barta Native Title Claimant Aboriginal Corporation and other interested Aboriginal community groups in the management of the park, including the management and interpretation of Aboriginal sites and places as well as natural values.	Ongoing
3.4.2	Undertake an archaeological survey and cultural assessment in consultation with the Aboriginal community before conducting any works with the potential to impact Aboriginal sites or values.	High
3.4.3	Investigate Aboriginal sites or artefacts found within the park, and ensure details are appropriately recorded.	Ongoing
3.4.4	In partnership with Aboriginal and land management stakeholders, encourage a coordinated approach to the interpretation of Aboriginal culture and heritage along the Narellan and Spring Farm Bush Corridor.	Medium
3.5 Historic heritage		
3.5.1	Ensure identified historic sites features and values are recorded appropriately, and protected and managed according to their significance.	Ongoing
3.5.2	Undertake or encourage archaeological research, particularly on Turkeys Nest Dam, the agricultural berms and old tracks.	Medium
3.5.3	Undertake an archaeological survey and cultural assessment before any works with the potential to impact historic sites and places.	High
3.5.4	Liaise with land managers along the Narellan and Spring Farm Bush Corridor to manage historic heritage collaboratively and strategically, to retain the colonial cultural landscape and view corridors identified in the *Camden Development Control Plan*.	High
3.6 Visitor use		
3.6.1	Work with land managers along the Narellan and Spring Farm Bush Corridor to prepare a strategic recreational needs analysis and corridor precinct plan. Based on this precinct plan, prepare and exhibit a site facilities plan for the park.	High

Management response		Priority
3.6.2	As part of the site facilities plan, review the connectivity of tracks and trails within the park and between the park and neighbouring lands, and develop and implement a prioritised program for their hardening or closing and the creation of new sections of tracks and trails, to facilitate integration of the park with regional cycle and pedestrian routes.	High
3.6.3	Install new seating, signage, small shade shelters and boardwalks in the park as identified in the site facilities plan, with priority given to new facilities in the south-west of the park if this becomes a new major access point following development of a new carpark and entry off Liz Kernohan Drive for Gundungurra Reserve (North).	Medium
3.6.4	Actively promote public transport options to the park in consultation with Camden Council, Transport NSW, and Roads and Maritime Services.	Low
3.6.5	License commercial operators as appropriate for community and recreation services that are complementary to maintaining the park's natural and cultural values, comply with the NPW Act and increase use of the park.	Ongoing
3.6.6	Encourage use of the park for community and sporting events that are suitable near residential areas such as running, cycling and walking events.	Ongoing
3.6.7	Remove the fence between Gundungurra Reserve and the park once boundary fencing has been installed around the northern, western and southern sides of Gundungurra Reserve that prevents trail bike access.	Low
3.6.8	Assess the feasibility of re-using the existing carpark next to Mary Howe Place with a children's cycling safety skills area or similar facility, with shade shelters, picnic tables and seating, and consult with neighbours and Camden Council on the change in use. Subject to the outcomes of this assessment and consultation, redevelop the site for this new use.	Medium
3.6.9	Continue to allow on-leash dog walking, introducing controls as required where it conflicts with the protection of natural and cultural values.	Ongoing
3.6.10	Remove old and damaged park infrastructure and furniture that may cause harm to park visitors. Replacement of damaged infrastructure and furniture will be determined by level of use and potential for vandalism.	High
3.6.11	If levels of vandalism reduce to a suitable level, seek to improve the sense of place by encouraging public art installations that reflect the park's cultural and natural history.	Low
3.7 Information and education		
3.7.1	Develop and implement a community engagement strategy and education program in consultation with major stakeholders including Camden Council, the Australian Botanic Garden, local schools and Aboriginal representatives, with the aim of increasing community awareness, usage and stewardship of the Narellan and Spring Farm Bush Corridor. The strategy should include park signage (subject to a reduction in vandalism) and promotion through a range of media and special events.	High
3.7.2	Promote the park to the community of south-west Sydney as a destination and thoroughfare for cycling and walking as well as for recreation, sport, community activities and education.	Ongoing
3.7.3	Update information about William Howe Regional Park on the NPWS website to include linkages to the existing and planned regional cycleway and walking trail network, and to promote the park as a destination and thoroughfare as part of the Narellan and Spring Farm Bush Corridor.	Ongoing

Management response		Priority
3.7.4	Collaborate with stakeholders along the Narellan and Spring Farm Bush Corridor in seeking funding opportunities for community engagement, education and creation of new recreation facilities and infrastructure.	Low
3.7.5	Work with land managers along the Narellan and Spring Farm Bush Corridor to prepare a signage strategy that will enhance public recognition of the corridor and promote a unified image among stakeholders.	Low
3.7.6	Support the park's Bushcare group and any 'Friends of' groups that form to promote community engagement and park stewardship in cooperation with stakeholders along the Narellan and Spring Farm Bush Corridor.	High
4.1 Pests		
4.1.1	Manage pest species in accordance with the NPWS regional pest management strategy and other strategies as relevant, and in consideration of neighbouring landowners and key stakeholder priorities.	High
4.1.2	Monitor the park to determine the presence and extent of weed and animal pests and update the regional pest management strategy accordingly to reflect new information. In the monitoring process also identify biodiversity or other values at risk.	Medium
4.1.3	Source funds in collaboration with Camden Council and other land managers along the Narellan and Spring Farm Bush Corridor to control pest animals and weeds across the landscape and to undertake restoration works.	Medium
4.1.4	After future hazard reduction burns or wildfires occur, monitor rabbit numbers and introduce controls as required to prevent excessive grazing and to promote regeneration of seedlings in the remnant Cumberland Plain Woodland.	High
4.1.5	If identified within the park, manage pathogens according to best practice guidelines.	High
4.1.6	Monitor park dams for the presence of *Typha* plants and manage any infestations according to best practice guidelines.	High
4.2 Fire		
4.2.1	Prepare and implement a new map-based fire management strategy for the park that takes into consideration any fire management plan for the Narellan and Spring Farm Bush Corridor.	High
4.2.2	Develop and implement an annual program of bushfire hazard reduction works.	Ongoing
4.2.3	Continue to be involved in the Macarthur Bush Fire Management Committee and maintain cooperative arrangements with Fire and Rescue NSW, local Rural Fire Service brigades and surrounding landowners in regard to fuel management and fire suppression.	Ongoing
4.2.4	Install trail identification signs for fire management at appropriate locations.	Low
4.2.5	Monitor the ability of native plants to recover between fires and review regimes where relevant.	Low
4.2.6	Rehabilitate areas disturbed by fire suppression operations including temporary track control lines as soon as practical after the fire.	High
4.2.7	Liaise with Landcom to ensure that an appropriate park edge interface is created, as well as adequate fire buffers, for any new residential development abutting the park boundary in the Mount Annan Urban Release Area.	Ongoing

Management response		Priority
4.3 Illegal activity		
4.3.1	Work with NSW Police Force Local Area Command to prepare a crime risk assessment for the park and determine the response required, such as night-time patrols.	High
4.3.2	During a period of vandalism, close the park at night for a trial period to assist police in responding to illegal activity. Prepare a communications plan and consult the local community prior to enacting the night-time closure. Assess the effectiveness of the trial closure once it has been completed.	Medium
4.3.3	Participate with relevant stakeholders in Neighbourhood Watch programs and other responses organised by local authorities and encourage neighbours and the public to report incidents.	Medium
4.3.4	Continue to implement management actions, including the erection of barriers, to exclude trail bikes and other unauthorised vehicles from entering the park. Collaborate with Camden Council to prevent trail bikes entering the park through Gundungurra Reserve.	Ongoing
4.3.5	In partnership with Camden Local Area Command, install surveillance cameras to establish patterns and regularity of use when required.	Medium
4.3.6	Consider erecting interpretative signs in highly visible areas along the park boundary or outside the park in community spaces where they are less likely to be exposed to vandalism. Once cases of vandalism reduce, consider installing signage in the park, particularly at Turkeys Nest Lookout.	Low
4.3.7	Devise and implement strategies to minimise rubbish dumping through community education, signage, surveillance, law enforcement and appropriate fencing.	Low
4.3.8	Remove and dispose of rubbish as soon as possible.	High
4.3.9	Maintain a presence in the park by using ranger patrols during peak visitation periods to deter undesirable behaviour.	High
4.4 Climate change		
4.4.1	Continue existing fire, pest, and weed management and bushland restoration programs and adapt where required to minimise climate change–induced threats.	Ongoing
4.4.2	Work with other land managers, particularly Camden Council, and the community to improve habitat resilience against climate change through cross-boundary efforts including the creation of buffers and corridors for native animal movement as well as managing threats within the park and adjoining areas as they arise.	Ongoing
4.4.3	Align park management with the intent of relevant climate change strategies.	Ongoing
5.1 Management facilities and operations		
5.1.1	Develop a management agreement with Sydney Water for the portion of Loop Trail that circulates through Sydney Water estate.	Medium
5.1.2	Work with Sydney Water to close the informal track that extends from Loop Trail towards the water tank.	High

Management response		Priority
5.2 Non-NPWS uses and operations		
5.2.1	Liaise with utility service providers in relation to easements, maintenance needs and access within the park to ensure compliance with legislation, NPWS policy and agreements.	Ongoing
5.2.2	Investigate whether Sydney Water can provide drinking water and water for firefighting purposes for the park from existing water pipelines that circulate across the park.	Low
5.2.3	Cooperatively manage the park as part of the Narellan and Spring Farm Bush Corridor, in particular with Camden Council in relation to adjoining reserves. This will aim to improve the effectiveness to encourage continuity in of weed, pest, fire and revegetation management; as well as and pest management, revegetation, fire management, consistency and connectivity in the provision of recreation infrastructure and experiences provision and maintenance, standard signage and connectivity for park visitors in terms of linking pathways and cycleways where suitable.	High
5.2.4	Liaise with the Macarthur Resource Recovery Park in relation to maintenance of the odour buffer and an appropriate park interface and buffer.	Ongoing

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