NSW NATIONAL PARKS & WILDLIFE SERVICE

Bents Basin State Conservation Area and Gulguer Nature Reserve

Planning Considerations

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How to use this document

This planning considerations document outlines the matters considered in preparing the Bents Basin State Conservation Area and Gulguer Nature Reserve Plan of Management, including the parks' key values, management principles and management considerations. Further information, including scientific names for common names of species, is provided in the appendices.

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

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

- the values of the park (e.g. new threatened species)
- management approaches (e.g. new pest management techniques)
- new programs.

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

Acknowledgements

Bents Basin State Conservation Area and Gulguer Nature Reserve are in the traditional Country of the Dharug, Dharawal and Gundungurra language groups.

This planning considerations report was prepared by staff of NPWS.

Contact us

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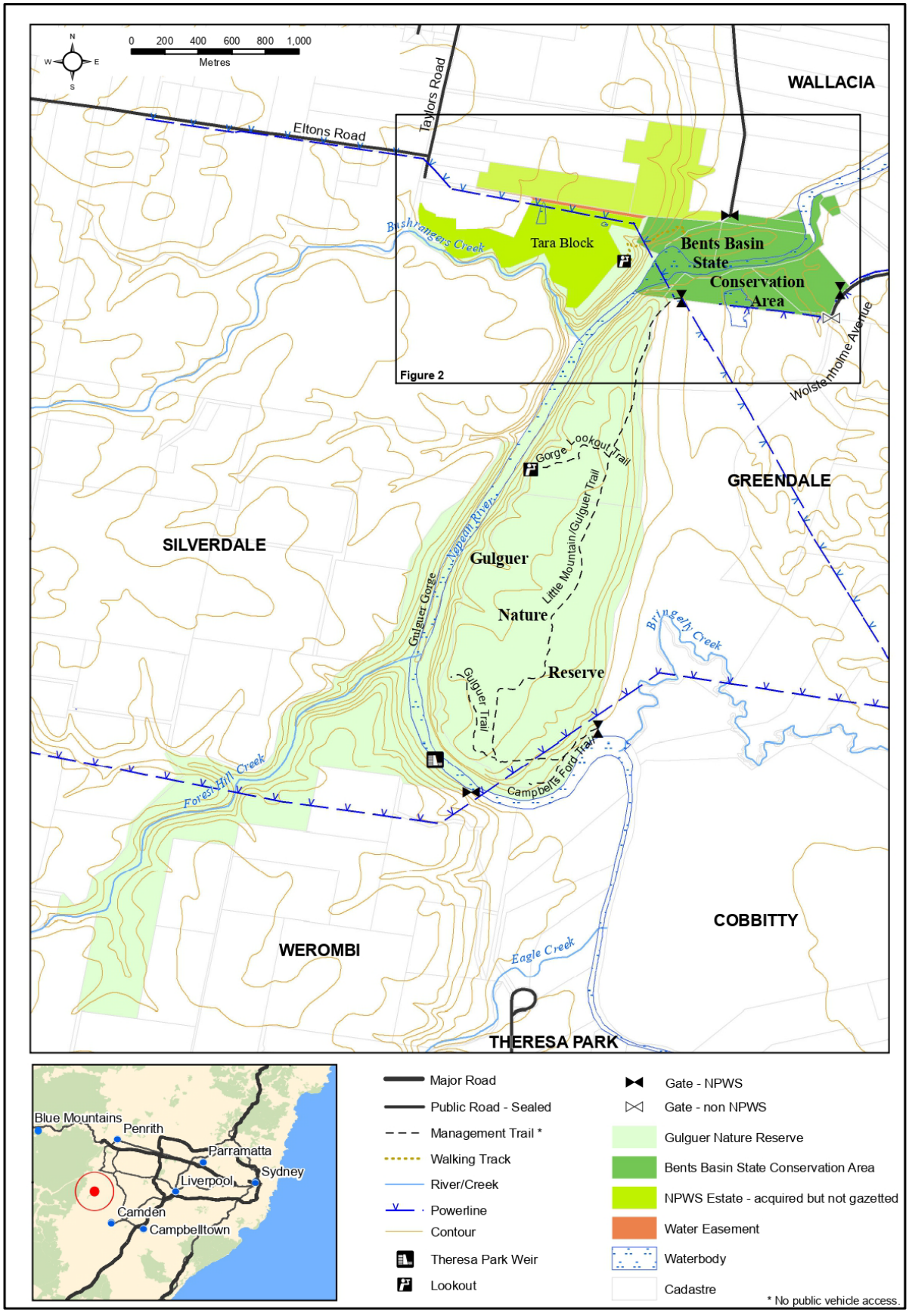


Figure 1 Map of Bents Basin State Conservation Area, Gulguer Nature Reserve and Tara block addition

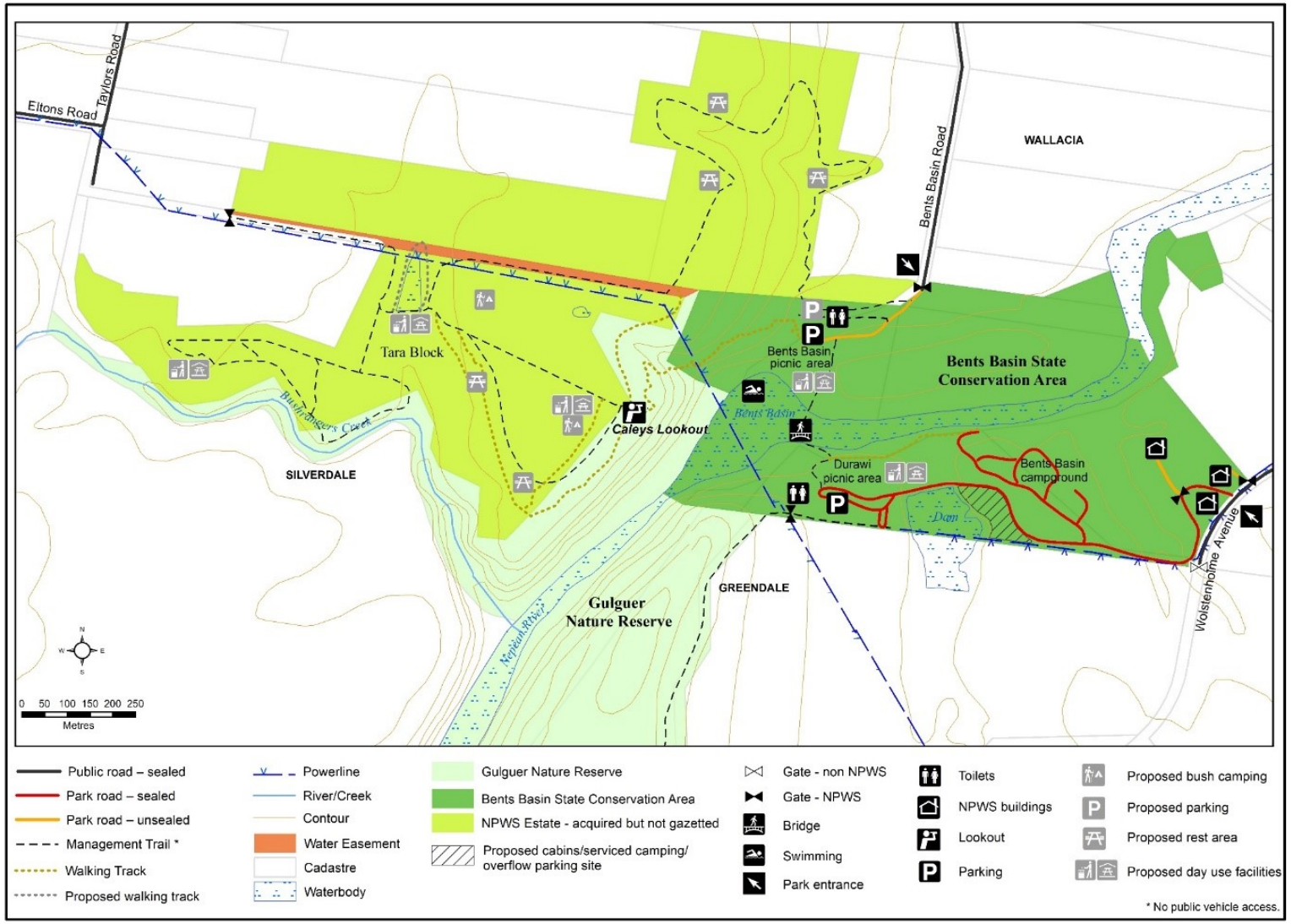


Figure 2 Map of Bents Basin State Conservation Area and Tara block additions

1. Bents Basin State Conservation Area and Gulguer Nature Reserve

Bents Basin State Conservation Area and Gulguer Nature Reserve are located on the Nepean River near Wallacia in western Sydney, approximately 34 kilometres west of Liverpool, 33 kilometres south of Penrith and 28 kilometres north-west of Camden. The Tara block addition adjoins the nature reserve and state conservation area to the north-west. These 3 areas are referred to as 'the parks' in this plan (see Figures 1 and 2).

The parks are located on the edge of the Cumberland Plain and the Blue Mountains uplift. The geomorphological processes and actions of the Nepean River have resulted in a diverse range of landforms including plateaus, deeply incised gorges, scour pool and riverine floodplains.

Bents Basin State Conservation Area is approximately 48 hectares and adjoins the 359-hectare Gulguer Nature Reserve. In addition to these formally reserved areas, the parks also includes an additional 62 hectares to the north-west of Gulguer Nature Reserve, known as the Tara block, which are lands acquired under the *National Parks and Wildlife Act 1974* for future reservation.

The Bents Basin State Recreation Area was originally proclaimed in 1980 under the *Crown Lands Consolidation Act 1913* and was managed by the Bents Basin State Recreation Area Trust. In 1984, state recreation areas became a category of park under the National Parks and Wildlife Act, the Trust was disbanded and management responsibility for Bents Basin State Recreation Area was transferred to the National Parks and Wildlife Service (NPWS). Small areas of land were added to the park in 1985, 1986, 1988 and 1989. These additions were mainly made up of closed roads and Crown lands along the Nepean River corridor and associated creeks. In 1994, part of the state recreation area was revoked and subsequently reserved as Gulguer Nature Reserve. In 2002 when the National Parks and Wildlife Act was amended, all state recreation areas managed by NPWS became state conservation areas.

Subject to the periodic review of state conservation areas Bents Basin State Conservation Area may be recommended for reservation under a new reserve category. Once recommended for reclassification and subject to the provisions of the National Parks and Wildlife Act and agreement of the Minister administering the *Mining Act 1992,* Bents Basin State Conservation Area may be categorised as a national park.

The Tara block addition was acquired by the Roads and Maritime Service (now Transport for NSW) as compensatory habitat for the M7 motorway and in 2017 was acquired under Part 11 of the National Parks and Wildlife Act for future reservation.

The parks are part of a network of protected lands in western Sydney including:

- Kemps Creek Nature Reserve, Western Sydney Parklands, Leacock Regional Park, William Howe Regional Park and Edmondson Park Regional Park to the east and north-east
- Mulgoa Nature Reserve, Scheyville National Park, Wianamatta Regional Park and Agnes Banks, Windsor Downs, Pitt Town and Castlereagh nature reserves to the north and north-west.

Five kilometres to the west lies the Burragorang State Conservation Area and the Greater Blue Mountains World Heritage Area, which includes Blue Mountains, Nattai and Kanangra-Boyd national parks, water storage catchment areas and declared wilderness areas.

The parks are within the Cumberland subregion of the Sydney Basin Bioregion. The Cumberland subregion is one of the least protected subregions in New South Wales with 3.13% reserved (CAPAD 2020).

Box 1. The Sydney Basin Bioregion

Australia is divided into bioregions. Bioregions are relatively large land areas characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems. The Sydney Basin Bioregion covers about 4.53% of New South Wales. It is one of the most species-diverse bioregions in Australia because of its variety of rock types, topography and climates.

The land immediately surrounding the parks to the north, east and south is mainly used for intensive, small-scale agriculture. It includes significant remnant vegetation along the river corridor. Land to the west of the parks includes grazing lands and significant remnant native vegetation that provides a corridor between the parks and the Burragorang State Conservation Area. This area has been under consideration for higher density urban development.

Over the next 10 years, urban development as part of Sydney's South West Growth Centre will extend to Bringelly, 5 kilometres to the east of the parks. The second international airport at Badgerys Creek is expected to be completed around 2026 and is 10 kilometres from the parks. Many areas around the parks are likely to be developed.

The parks are located within the administrative areas of the Tharawal and Gandangara Local Aboriginal Land Councils, Greater Sydney Local Land Services, and Wollondilly Shire and Liverpool City local government areas.

2. Protecting the natural environment

2.1 Geology, landform and hydrology

The parks are located on the western edge of the Cumberland Plain where it meets the Blue Mountains uplift known as the Lapstone Monocline. The Lapstone Monocline was created by an upfolding of the sedimentary strata of the Sydney Basin that took place between 15 and 22 million years ago (OEH 2013). At this junction the gently undulating plains and low hills of the Cumberland Plain give way to the sharp upward cliff edges of the Blue Mountains Plateau. These geological processes are reflected in the parks' varied landforms, including plateaus, gorges and floodplain features, and provide significant evidence of the geomorphic evolution of the regional landscape (Heritage Council of NSW 2013). Elevation in the parks ranges from 170 metres above sea level at Forest Hill Creek Gorge in Gulguer Nature Reserve to just over 20 metres above sea level along the Nepean River in Bents Basin State Conservation Area.

The contrast of landscape features produces scenery described as having 'great charm and appeal' (National Trust 1986). These scenic values were remarked upon in documents and letters of early European visitors, including the botanist George Caley and the Governor of the Colony of New South Wales, Lachlan Macquarie (Kass 1988). The artist Conrad Martens captured the natural beauty of Bents Basin in a watercolour dated about 1835. The area's scenic values were included in the justification for listing Bents Basin on the Register of the National Estate in 1992 (Australian Heritage Database 2012).

The Cumberland Plain is of sedimentary origin and is dominated by the Wianamatta group of shales and sandstones, which were laid down during the middle Triassic period (Tozer 2003). Soil types in the parks closely reflect the underlying parent material and the action of the Nepean River (Department of Lands 1980). They vary from rich alluvial soils on the margins of the river at Campbells Ford and below Bents Basin on the Wallacia Alluvial Reach to sandier, less fertile soils of the sandstone/shale transition zone on the slopes and highly erodible sandstone-based soils on the ridge tops.

An oval-shaped sandstone plateau (Little Mountain) dominates Gulguer Nature Reserve, stretching 3 kilometres in a north–south direction and reaching 1 kilometre in width. The Nepean River has cut a deep gorge along the southern and western edges of this plateau. To the north where the Nepean River leaves the gorge a large scour pool (Bents Basin) has formed where the softer Wianamatta shale rock has been eroded. The south-west section of the parks includes a deep gorge along Forest Hill Creek. The north-west section of the parks includes a sandstone plateau bounded by Bushrangers Creek and steep slopes rising from the floodplains of the Nepean River in the east (see Figure 1).

The Nepean River is the primary waterway in the Hawkesbury–Nepean River System. The natural flow of many rivers and streams in the system has been significantly altered by water storages such as dams and weirs. The system is defined as an 'unregulated' system because the water storages do not regulate flows downstream by capturing and releasing water for extraction purposes (DPI Water n.d.).

The parks fall within the Lower Nepean River Management Zone under the Greater Metropolitan Regional Unregulated River water sharing plan. This plan establishes an environmental water allocation for the river (a proportion of the available water that is reserved for fundamental ecosystem health). The plan also establishes water sharing rules for stakeholders to ensure levels of extraction are sustainable.

The Nepean River and its tributaries, Forest Hill Creek and Bushrangers Creek, are the main natural hydrological features of the parks, and flow in a generally northerly direction. Their erosive forces have produced the distinctive landscape features of Bents Basin, Forest Hill

Gorge, Gulguer Gorge and the riverine floodplains at Campbells Ford and downstream of Bents Basin.

Bents Basin is the major drawcard for visitors to the parks. It is 22 metres at its deepest point and has a mean depth of 9 metres (Turner and Erskine 1997). During periodic flooding of the Nepean River, the water of the basin becomes very turbid and hazardous whirlpools form as the water rises. The water quality in Bents Basin is also influenced by activities upstream in the largely cleared and developed Nepean River catchment.

The groundwater resources in the parks include a shallow sand aquifer (approximately 20 metres below ground level) overlying deeper Hawkesbury Sandstone aquifers (approximately 100 metres below ground level). The shallow sand aquifer is in direct contact with the underlying Hawkesbury Sandstone aquifer. The parks are also on the Nepean Fault line where the folding associated with the formation of the fault line has produced increased fracturing of the host bedrock. Increased fracturing of the bedrock is likely to produce higher flows from groundwater bores.

In 2007, at the peak of the Millennial drought, 4 groundwater bores comprising 2 production test bores and 2 monitoring bores were drilled in the state conservation area as part of investigations into the options to supplement existing water supplies during severe drought. The investigation ended in 2008 when drought conditions eased.

Artificial hydrological features in the parks include several dams and the Theresa Park Weir (see Figure 1). The weir was constructed in Gulguer Gorge in 1975 (DPI 2016) about 600 metres upstream of where Forest Hill Creek flows into the Nepean River. It is one of 9 weirs constructed on the Nepean River between Menangle and Wallacia to provide access to water for domestic, stock and irrigation purposes and to offset the interruption of flows from the construction of town water supply dams on the upper Nepean River (NSW Office of Water 2011). The weir has been modified to allow environmental flows under the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Sources* 2011. A fish ladder was added in 1998 and upgraded in 2010 (DPI 2016) to improve movement of fish and reduce the environmental impact of the weir on the ecology of the Nepean River.

Photo 1 The Nepean River flowing out of Bents Basin. Photo: Lyndal Kaye/DPE

A dam constructed by the Australian Army in the mid-1980s straddles the boundary between the parks and private property to the south of the Bents Basin Campground. The parks and part of the private property form the catchment of the dam. This dam has been identified as a water source for firefighting purposes (DEC 2006). Two small dams in the Tara block addition were built to capture water from natural drainage channels (see Figure 2). These dams provide habitat for a range of birds and other animals.

2.1.1 Management considerations and opportunities

The parks receive runoff from market gardens on neighbouring properties, and this contributes chemical and nutrient pollution and sediment to the parks' watercourses, including the Nepean River and Bents Basin. Runoff from outside the parks can introduce and disperse weeds.

The Nepean River periodically experiences adverse water quality conditions, particularly after major rain events. *Escherichia coli* and other faecal coliforms have been present at elevated levels for 3–5 days after rainfall. Bents Basin may be closed to water-based recreational activities under these conditions and when the Basin is not flushed due to prolonged dry conditions, following the ANZECC water quality guidelines (Turner and Erskine 1997; ANZECC 2000). The water quality of dams in the Tara block addition has not been assessed but is unlikely to meet required standards for swimming.

Erosion and rockfalls have occurred on steep slopes above the gorges and other areas with highly erodible soils. Fallen rock and mass soil movement can lead to greater instability and increase safety risk. Management trails in the parks need to be monitored, and cross drainage maintained to prevent erosion on steep slopes. The design of new tracks and trails and realignment of existing tracks and trails should minimise erosion risks.

The riverbanks and foreshore near the Basin outlet form a key focus of visitor activity. Erosion of the riverbanks and approaches to the water's edge of the Basin is increasing due to high levels of visitor activity. High water flows also weaken bank structure and contribute to scouring. Efforts to stabilise this area before management by NPWS included installation of rock armour on the riverbanks, but it appears the placement of rocks on the riverbank has resulted in increased pressure on the river channel during large flows and increased scouring in places. A key priority is determining the best way to stabilise and harden the area to prevent further erosion and support continued high visitor use.

Flooding and high flows are gradually eroding the outlet and area immediately downstream of the Basin and have resulted in riverbank erosion, scouring, loss of soil and destabilisation of foreshore vegetation, including old-growth casuarina trees at Bents Basin and downstream. Eroded sediments are deposited downstream, degrading significant riparian vegetation and impacting platypus and wombat habitat.

The low-lying areas of Bents Basin State Conservation Area and Tara block additions are on the Hawkesbury–Nepean Floodplain. The Hawkesbury–Nepean flood risk management strategy (Infrastructure NSW 2017) identifies this section of the Nepean River as one of the highest risk areas for floods on the floodplain.

Periodic flooding is a natural occurrence along the Nepean River, but predicted increased frequency and severity of flooding due to climate change (Box 4) may reduce opportunities for riparian environments to recover and result in habitat loss.

The low-lying areas adjoining the Nepean River near Campbells Ford and downstream of Bents Basin are flood prone (Liverpool City Council 2008). The picnic and camping areas, NPWS depot, amenities blocks and other park infrastructure are at risk of flood damage. Occasionally the lower terraces adjoining the Nepean River, the road between the NPWS office and the camping area have flooded, cutting access to the parks.

Large sections of the riverbank below the Durawi Picnic Area collapsed as a result of flooding in 2016, and the parks were closed for extended period in 2020 and again in 2021 due to flooding and flood damage. The parks will continue to be closed when conditions present a high safety risk for visitors and allow the landscape to recover and any damage to be repaired.

WaterNSW owns and maintains the Theresa Park Weir. The operation of the weir and use of water is managed in accordance with the provisions of the *Water Management Act 2000* and the Water Sharing Plan for the Greater Metropolitan Region Unregulated Water Sources. NPWS also holds a licence to use water from the dam south of the Bents Basin loop road under the Water Management Act.

WaterNSW is investigating groundwater resources in the Leonay-Emu Plains and Wallacia areas. The investigation aims to increase knowledge of the extent, size and quality of the groundwater resource in western Sydney and its suitability for use as a raw water supply to augment Sydney's existing water supplies during periods of severe drought.

As part of this investigation WaterNSW applied to install a new test bore and 2 new monitoring bores in Bents Basin State Conservation Area to assess whether there is any connection between the surface water in the river, the shallow sand aquifer and the Hawkesbury Sandstone aquifer. WaterNSW proposed to use the information gathered from the investigation to develop a groundwater model and design new borefields. NPWS will work with WaterNSW to ensure that the investigation bores and any borefield projects do not negatively impact groundwater-dependent vegetation communities and other park values.

2.2 Native plants and animals

Much of western Sydney's biodiversity has been lost since European colonisation. Clearing and urban development have reduced native vegetation on the Cumberland Plain to 13% of its pre-European extent (Tozer et al. 2010). Much of the remaining vegetation is in highly fragmented patches of varying size, condition and level of protection. The decline in native animals continues due to habitat loss, habitat fragmentation, and predation by and competition from introduced animals (DEC 2005).

The location of the parks in the transition zone between the Cumberland Plain shales and the Blue Mountains sandstones has given rise to a variety of habitats and a high level of species richness (Benson et al. 1990). The parks provide habitat for a broad range of forest and woodland animals and forms part of a wildlife corridor linking to the vast reserves of the Blue Mountains. This corridor has high conservation value for supporting biodiversity in the priority conservation lands of the Cumberland Plain and for providing connectivity to other remnants.

More than 280 native plant species and 200 native animal species have been recorded in the parks (Craven 1983; Leary 2004, 2005; NPWS 2002; OEH 2018a). The vegetation communities around Little Mountain and Forest Hill Creek in Gulguer Nature Reserve are particularly structurally and floristically diverse due to an absence of frequent fire and logging (Craven 1983).

The following native vegetation communities occur in the parks (Table 1 and Figure 3):

- Cumberland Dry Sclerophyll Forests
- Sydney Coastal Dry Sclerophyll Forests
- Coastal Valley Grassy Woodlands
- Eastern Riverine Forests
- Sydney Hinterland Dry Sclerophyll Forests
- Dry Rainforests.

Table 1 Vegetation communities in the parks

Vegetation class and description	Associated vegetation communities
Cumberland Dry Sclerophyll Forests Narrow-leaved ironbark – broad-leaved ironbark – grey gum open forest of the edges of the Cumberland Plain	Shale Sandstone Transition Forest (High Sandstone Influence) Shale Sandstone Transition Forest (Low Sandstone Influence)
Sydney Coastal Dry Sclerophyll Forests Smooth-barked apple – red bloodwood – Sydney peppermint heathy open forest on slopes of the dry sandstone gullies of western and southern Sydney	Western Sandstone Gully Upper Georges River Sandstone Gully
Coastal Valley Grassy Woodlands Forest red gum – rough-barked apple grassy woodland on alluvial flats of the Cumberland Plain	Alluvial Woodland Riparian Forest Shale Hills Woodland
Eastern Riverine Forests Water gum – coachwood riparian scrub along sandstone streams	Riparian Scrub
Dry Rainforests Grey myrtle dry rainforest	
Sydney Hinterland Dry Sclerophyll Forests Red bloodwood – grey gum woodland on the edges of the Cumberland Plain	

Source: OEH 2013b VIS_ID 4207)

There are 3 threatened ecological communities in the parks. See Table 2 and Appendix C. These provide important habitat for threatened species. For example, the threatened Cumberland Plain land snail has been recorded in the parks. This species was formerly common but has been reduced to small disjunct populations, and only 5% of its distribution occurs on NPWS reserves (OEH 2013a). It primarily inhabits Cumberland Plain Woodland but also Shale-Gravel Transition Forest and the margins of River-flat Eucalypt Forest.

The stand of Camden white gum in Bents Basin State Conservation Area and on neighbouring land is one of only 2 known naturally occurring populations. This population consists of 300 trees that are approximately 60 to 225 years old, including about 100 mature trees that are more than 100 years old. Approximately 100 of these trees are within the state conservation area (Benson 1985) and the remainder are on neighbouring freehold property (Thomas et al. 1984). The other population of about 2,000 trees occurs in Kedumba Valley in the Blue Mountains National Park. Recent molecular genetic analysis comparing trees from both locations showed that they are distinct populations. The importance and significance of the population in and around Bents Basin State Conservation Area would increase if the Kedumba Valley population were lost.

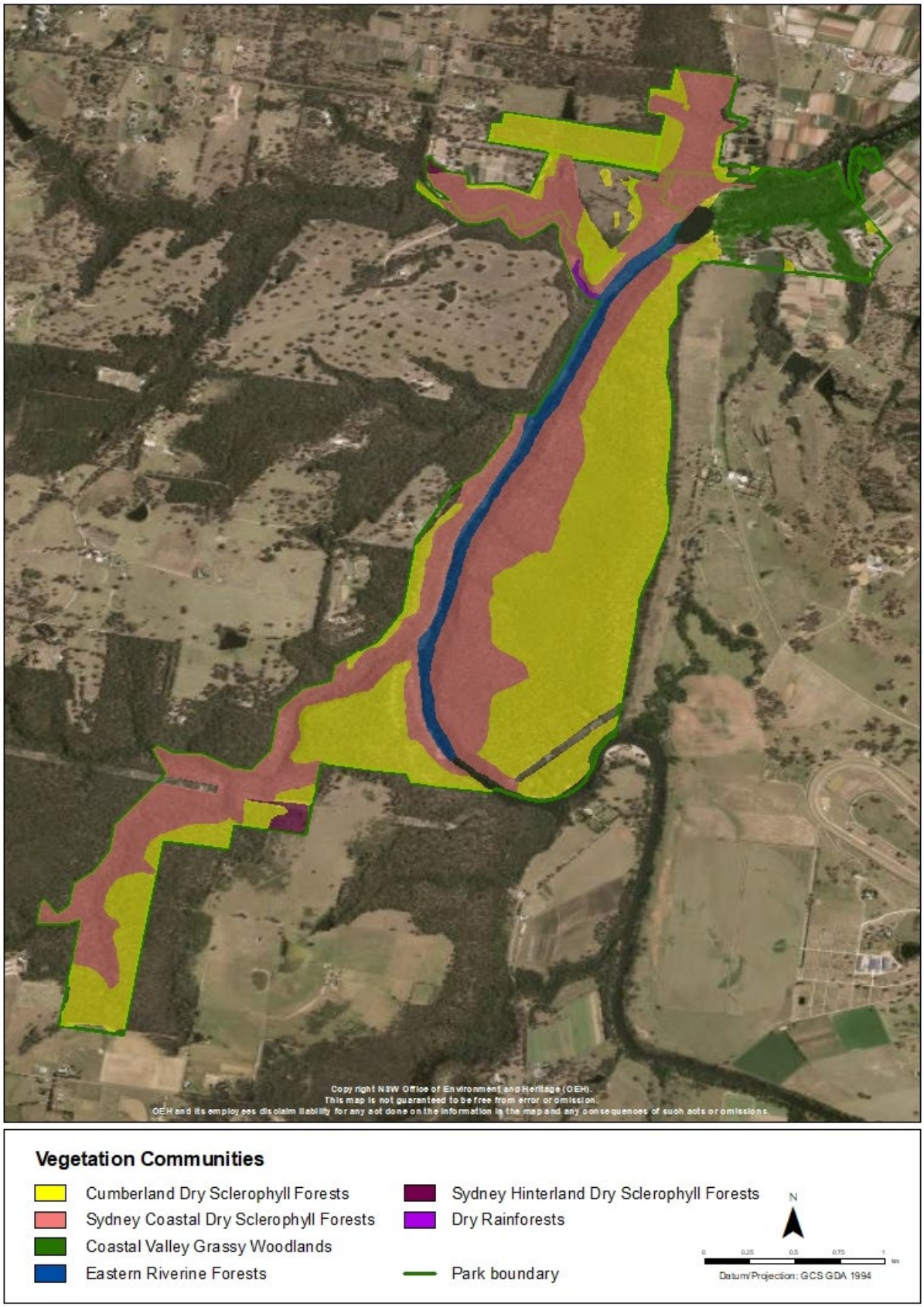


Figure 3 Map of vegetation communities in the parks

Table 2 The occurrence and status of threatened ecological communities in the parks

Threatened ecological community (associated vegetation class)	Occurrence	Status [1]	
		BC Act	EPBC Act
Shale Sandstone Transition Forest in the Sydney Basin Bioregion (Cumberland Dry Sclerophyll Forests)	Occurs just south of Bents Basin and extends almost the full extent of Little Mountain plateau in Gulguer Nature Reserve. A patch of 10 hectares also occurs in the Tara block.	CEEC	EEC
Cumberland Plain Woodland in the Sydney Basin Bioregion [2] (Coastal Valley Grassy Woodlands)	Occurs in small pockets in areas of undulating terrain around the Bents Basin Camping Area and depot in Bents Basin State Conservation Area.	CEEC	CEEC
River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (Coastal Valley Grassy Woodlands)	Occurs in Bents Basin State Conservation Area downstream of the Basin, mainly on the northern sheltered side of the Nepean River flats and in a narrower band and along minor drainage lines on the southern side of the river. A small area of tall open forest at Campbells Ford in Gulguer Nature Reserve is probably also this community.	EEC	

Source: NPWS 2002; Tozer et al. 2010; NSW SC 2010, 2011, 2014; TSSC 2009, 2014, 2014a; OEH 2013b.

Notes:

1. BC Act = Biodiversity Conservation Act; EPBC Act = Environment Protection and Biodiversity Conservation Act;
   EEC = endangered ecological community; CEEC = critically endangered ecological community.
2. Listed as Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest under the EPBC Act.

Table 3 Threatened and rare plant species recorded in the parks

Plant name	Occurrence	Status [1]	
		BC Act	EPBC Act
Camden white gum	Part of River-flat Eucalypt Forest EEC in Bents Basin SCA	V	V
Epacris purpurascens var. purpurascens [2]	Occurs in Shale Sandstone Transition Forest CEEC in Gulguer Nature Reserve (NR)	V	V
Hibbertia hermanniifolia	Occurs in the northern section of Gulguer Gorge in Gulguer NR		
Gonocarpus longifolius [2]	Occurs in Shale Sandstone Transition Forest CEEC in Gulguer NR		
Native cranberry	Gulguer NR		
River mat-rush	Gulguer NR		

Source: OEH 2018a; Leary 2004, 2005; Thomas et al. 1984; NSW SC 2011, 2014.

Notes:

1. BC Act = Biodiversity Conservation Act; EPBC Act = Environment Protection and Biodiversity Conservation Act; V = vulnerable.
2. Species listed as a Rare or Threatened Australian Plant (ROTAP) according to Briggs and Leigh (1996).

Table 4 Threatened animal species recorded within the parks

Common name	Status [1]	
	BC Act	EPBC Act
Invertebrates:		
Cumberland Plain land snail	E	
Frogs:		
Giant burrowing frog	V	V
Red-crowned toadlet [2]	V	
Birds:		
Black-chinned honeyeater (eastern subspecies) [2 3]	V	
Brown treecreeper (eastern subspecies) [2]	V	
Diamond firetail [2 3]	V	
Dusky woodswallow	V	
Gang-gang cockatoo	V	
Flame robin [2 4]	V	
Glossy black-cockatoo	V	
Hooded robin (south-eastern form) [2]	V	
Little lorikeet [2]	V	
Olive whistler [2]	V	
Powerful owl	V	
Regent honeyeater [2]	CE	E
Scarlet robin [4]	V	
Square-tailed kite [2]	V	
Varied sittella	V	
White-bellied sea-eagle	V	
Mammals:		
Eastern coastal free-tailed bat	V	
Greater glider		V
Grey-headed flying-fox	V	V
Large bent-wing bat	V	
Large-eared pied bat	V	V
Southern myotis	V	

Source: BioNet (OEH 2018a).

Notes:

1. BC Act = Biodiversity Conservation Act; EPBC Act = Environment Protection and Biodiversity Conservation Act; V = vulnerable; E = endangered; CE = critically endangered.
2. Unconfirmed records.
3. Very rare visitor.
4. Migratory, seasonal visitor.

2.2.1 Management considerations and opportunities

The main threats to native plants and animals in the parks include weeds and pest animals (Appendix D), habitat fragmentation, inappropriate fire regimes (see Box 2) and inappropriate visitor activities. Climate change (see Box 4) has also been identified as a threat to park values as it intensifies the effects of threats such as fire and weeds and leads to increased frequency and intensity of flooding.

The vegetation communities in the parks are of high conservation significance as one of the few reserved areas of Cumberland Plain vegetation and wildlife habitat. The corridors of remnant vegetation surrounding the parks are also important for the movement of wildlife and maintaining genetic diversity. These corridors are mostly on private lands managed and used for other purposes.

The vegetation in the parks is currently well-connected along Bushrangers and Forest Hill creeks to the protected water catchment area of the Burragorang Valley and state conservation area, and the extensive protected areas of the Blue Mountains in the west. To the east of the parks, native vegetation corridors have been fragmented by agricultural uses and increasing urban development.

The vegetation and wildlife habitat at the edges of the picnic areas and camping area has been damaged by visitors collecting firewood. Poaching of wildlife has also occurred.

Strategies for the conservation of threatened species, populations and ecological communities have been set out in a statewide Biodiversity Conservation Program (OEH 2016). Actions listed in each of these strategies are prioritised and implemented through the *Saving our Species* program, which aims to maximise the number of threatened species that are secured in the wild in New South Wales for 100 years (OEH 2013b).

Many recovery plans for NSW threatened species have previously been prepared and may still provide useful information, but they no longer determine the actions required for the conservation of threatened species in New South Wales. Recovery strategies for threatened species are now prepared under the *Saving our Species* program. The Commonwealth may prepare recovery plans for nationally listed threatened species under the *Environment Protection and Biodiversity Conservation Act 1999*. These plans do apply to nationally listed threatened species occurring in the park.

The Cumberland Plain Recovery Plan (DECCW 2010a) was prepared under Commonwealth and state legislation to promote the recovery of threatened species, populations and ecological communities on the Cumberland Plain. The plan lists the parks as priority conservation lands, which are the largest, most intact remnants of native vegetation and the highest priority for future recovery efforts of the threatened biodiversity of the Cumberland Plain (DECCW 2010a). The plan also identifies the surrounding remnant vegetation as regional corridors that are important in linking priority conservation lands and supporting the movement of wildlife. The recovery plan is being addressed as part of the NSW Cumberland Plain conservation plan, which aims to protect biodiversity while accommodating urban growth.

The Cumberland Plain land snail is included as a landscape species under the *Saving our Species* program. The main threats to the snail are clearing and degradation of remnant vegetation, heavy grazing by domestic stock, inappropriate fire regimes and weeds that alter the composition of preferred habitat (NSW SC 1997).

Camden white gum has been identified as a site-managed species under the *Saving our Species* program. The main threats to this species include changes to flooding regimes, increased nutrient levels from agricultural practices, inappropriate revegetation works and increased fire intensity from the build-up of debris around individual trees. The small population size also increases the chances of inbreeding, which may result in small seed set and viability due to low genetic variability. Off-site propagation and planting of propagated

seedlings may be the most effective way to increase the population size and species viability. Bents Basin State Conservation Area has been proposed as a key management site where this species will be actively managed as part of a recovery strategy.

Box 2: Fire in the park

The ecological impact of high-frequency fires has been listed as a key threatening process under the *Biodiversity Conservation Act 2016* (NSW SC 2000b). The endangered ecological communities in the parks are vulnerable to the effects of too frequent fire. Fire should be excluded from the River-flat Eucalyptus Forest on Coastal Floodplains endangered ecological community due to the limited ability for this vegetation community to recover (DEC 2006). The vulnerable Camden white gum, *Epacris purpurascens var. purpurascens*, *Hibbertia hermanniifolia*, native cranberry and *Gonocarpus longifolius* are threatened by too frequent fire (OEH 2013a).

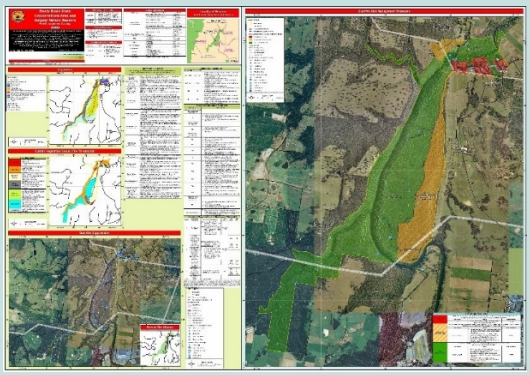
Assets including visitor facilities, NPWS works depot, residence and office in Bents Basin State Conservation Area and houses, machinery, infrastructure, animals and crops adjacent to the park are also threatened by fire.

The fire history of the park is not well-documented, but it is prone to frequent fires (Wollondilly Bush Fire Management Committee 2011). Most ignitions are caused by arson and deliberate misuse of fire (Macarthur Bush Fire Management Committee 2012).

The last major fire is recorded as occurring in 1970 (Craven 1983). In 1979, a major hot fire severely affected the River-flat Eucalypt Forest on Coastal Floodplains endangered ecological community and the stand of vulnerable Camden white gum in Bents Basin State Conservation Area (see Section 3.2). The fire killed the acacia shrub layer within this community. The riverbank trees were not affected by that fire but were burnt by a hot ground fire in 1981 (Benson 1985).

NPWS cooperates with surrounding landowners, the Rural Fire Service and the relevant bush fire management committees on fire planning, fuel management and information sharing.

A fire management strategy that defines the fire management approach for the park has been prepared (DEC 2006) and is scheduled for review and inclusion of the Tara block additions. The strategy sets minimum and maximum fire thresholds to prevent the negative impacts of too frequent fires in the endangered ecological communities. The parks are classified into different fire management zones: asset protection zone (red areas), strategic fire advantage zone (orange areas) and land management zone (green areas).



Snapshot of park fire management strategy showing mapped fire management zones

The parks' greater glider population is significant as the only known population of greater gliders on the Cumberland Plain of Western Sydney (Smith and Smith 2017). The greater glider is classed as a vulnerable species under the Commonwealth Environment Protection and Biodiversity Conservation Act but is not currently listed as threatened under the NSW *Biodiversity Conservation Act 2016*. While greater gliders are not considered threatened in New South Wales, long term monitoring suggests that the population of greater gliders in the parks is in decline. Actions such as supporting initiatives to maintain vegetation corridors, monitoring predation by powerful owls, enhancing habitat, protecting hollow-bearing trees from fire, and regular monitoring may help to maintain the greater glider population in the parks (Smith and Smith 2017).

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

Many weed species arrive in the parks as propagules via the Nepean River and associated tributaries. High weed density occurs along the banks of the river wherever alluvial soils accumulate and provide fertile, moist conditions. Aquatic weeds impact the water quality of the river and Bents Basin. The other major weed source is from neighbouring rural lands and former agricultural uses.

African olive is invading all three of the threatened ecological communities in the parks: Cumberland Plain Woodland; River-flat Eucalyptus Forest on Coastal Floodplains; and Shale Sandstone Transition Forest. Targeted control programs, including regular follow-up operations are being applied to control African olive as required by the recovery plan for Cumberland Plain Woodland (NSW SC 2010) and the *Greater Sydney Regional Strategic Weed Management Plan* (Greater Sydney LLS 2017).

Alligator weed is an aggressive Weed of National Significance that has heavily infested the riparian zone of the Nepean River in the parks and poses a major threat to vegetation communities. It is particularly invasive around Bents Basin and downstream, threatening the River-flat Eucalyptus Forest on Coastal Floodplains endangered ecological community and stands of Camden white gum. Alligator weed is being actively controlled.

Apart from these 2 critical weed species, there are several vines and scrambling plants that are impacting vegetation in the riparian zones in the parks and require ongoing management. They include blackberry, bridal creeper, moth vine and balloon vine. Each of these species is identified as a medium priority in the branch pest management strategy and as target species in the *Sydney-wide Vines and Scramblers Management Plan 2010–2015* (Sydney Weeds Committee 2010).

Vine and scrambler weeds are highly invasive and densely growing species. They impact native vegetation by forming monocultures in riparian zones and by forming dense infestations that block sunlight and smother native canopy species. Invasion and establishment of exotic vines and scramblers is a key threatening process under the Biodiversity Conservation Act (NSW SC 2006). Animal species particularly impacted by vines and scramblers include the threatened Cumberland Plain land snail and threatened bird and bat species. Targeted vine removal is undertaken in the state conservation area, particularly in bush adjoining the picnic and camping areas and within the threatened ecological communities.

Other weeds that have the potential to degrade the native vegetation in the parks include exotic grasses and lantana. Invasion of native plant communities by exotic perennial grasses is a key threatening process under the Biodiversity Conservation Act (NSW SC 2003).

The NPWS Branch pest management strategy identifies pest species and priority programs for Bents Basin State Conservation Area and Gulguer Nature Reserve. The overriding objective of the pest management strategy is to minimise adverse impacts of introduced species on biodiversity and other park and community values while complying with legislative responsibilities. The strategy also identifies when site-specific or pest-specific plans or strategies may be needed to provide a more detailed approach. Reactive programs may also be undertaken in cooperation with neighbouring land managers in response to emerging issues.

Several domestic and feral animal species are present in the parks including fallow deer, red deer, cats, foxes, goats and rabbits. The impacts of these species are identified as key threatening processes under the Biodiversity Conservation Act and/or the Commonwealth Environment Protection and Biodiversity Conservation Act. Deer are the main priority for control (see Box 3).

Domestic dogs occasionally stray into the parks from nearby properties or are abandoned. Cats and foxes are a threat to medium-sized ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles (OEH 2012c). Foxes have been implicated in the spread of weed species such as blackberry and in the spread of mange to native wildlife, especially wombats.

Box 3: Priority pest species – deer

The populations of red and fallow deer have been identified as a significant risk to the threatened ecological communities and species in the parks. Grazing and trampling by deer causes erosion, spreads weeds and degrades habitat through reducing the variety and abundance of native plant species. It has been suggested that all threatened animals and plants within the parks may be at risk from the impacts of deer (De Jong 2006).

The management of deer has been identified in the branch pest management strategy as a critical priority for the parks, and a feral deer pest management program has been prepared and implemented. Deer can also impact activities on surrounding agricultural lands and are listed as a priority species for control in the Greater Sydney Regional Strategic Pest Animal Management Plan (Greater Sydney LLS 2018).

NPWS works cooperatively with surrounding landholders and the relevant local land management agency on deer control programs.

Fallow deer. Steve Parker/DPE

Small numbers of feral goats and rabbits have been recorded in the parks. Their impact is minimal, and they are not currently a priority for control. Native bell miners occur around the NPWS office and works depot and at Campbells Ford. Forest eucalypt dieback associated with over-abundant psyllids and bell miners has been listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2008; OEH 2012c). Although Shale Sandstone Transition Forest is particularly vulnerable to this form of dieback (OEH 2012c), bell miners are not currently identified as an issue in the parks.

NPWS works with adjoining landholders to maximise control efforts of significant environmental weeds and pest animals.

Box 4: Climate Change

Human-induced climate change is listed as a key threatening process under the Biodiversity Conservation Act (NSW SC 2000a) and habitat loss caused by human-induced greenhouse gas emissions is listed under the Environment Protection and Biodiversity Conservation Act (TSSC 2001). The following is a snapshot of the predicted changes to climate for Metropolitan Sydney (OEH 2014):

2020 – 2039

- Maximum temperatures are projected to increase by 0.3–1.0°C
- Minimum temperatures are projected to increase by 0.4–0.8°C
- The number of hot days (i.e. > 35°C) will increase
- Rainfall is projected to decrease in spring and winter
- Average fire weather is projected to increase in spring

2060 – 2079

1. Maximum temperatures are projected to increase by 1.6–2.5°C
2. Minimum temperatures are projected to increase by 1.4–2.5°C
3. The number of cold nights (i.e. < 2°C) will decrease
4. Rainfall is projected to increase in summer and autumn
5. Severe fire weather days are projected to increase in summer and spring.

The projected increases in temperature, number of hot days and severe fire weather days are likely to influence bushfire frequency and intensity across the Metropolitan Sydney Region and result in an earlier start to the bushfire season. Higher rainfall in summer and autumn are likely to accelerate all forms of soil erosion across the region and increase runoff at these times of year. This in turn is likely to impact the stormwater system and possibly increase the incidence of flooding experienced at Bents Basin (DECCW 2010b).

Climate change may change the size of populations and the distribution of species and alter the geographical extent and species composition of habitats and ecosystems. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes, narrow ranges or slow growth rates, such as the Camden white gum.

The potential impact of climate change on the park is difficult to assess since it depends on the compounding effects of other pressures, particularly the cumulative impact of vegetation clearing and urbanisation in western Sydney and impacts on the integrity of the wildlife corridors.

Highly cleared and fragmented ecosystems such as those on the Cumberland Plain are likely to be at greater risk from the effects of climate change than more intact ecosystems. Climate change has been identified by the NSW Scientific Committee to be a potential threat to River-flat Eucalypt Forest on Coastal Floodplains endangered ecological community if it affects future flooding regimes, which are important in the reproduction of plant species (NSW SC 2004a).

The risk of flooding is a significant threat to park values and assets in the park, and this threat is anticipated to increase with the predicted increase in frequency and intensity of flood events due to climate change. This could result in more park closures to ensure visitor safety.

3. Looking after our culture and heritage

3.1 Aboriginal culture and heritage

Bents Basin State Conservation Area and Gulguer Nature Reserve are situated within the Country of the Dharug, Dharawal and Gundungurra language groups (Artefact Heritage 2015). Other Aboriginal people may also have connections to the parks through kinship relationships.

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

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

The parks are part of a traditional meeting and trading place between Aboriginal groups. It is likely that these groups were drawn to the area because of the plentiful supply of food and water provided by the deep permanent water and fertile surrounding lands.

Recorded history includes the memoirs of William (Werriberrie) Russell, a Gundungurra man from the Burragorang Valley who was aged 84 in 1914 (Russell 1914). The Bringelly area was occupied by European settlers from about 1810 onwards. Tensions between the local Aboriginal people and the settlers escalated into open warfare as Aboriginal inhabitants were displaced from their traditional lands (Kass 1988). The mountainous, less accessible area to the west of the Nepean River became a refuge for Aboriginal people for some years until European settlers also settled land in this area (Kass 1988).

Aboriginal connection to the land within the parks continues and is reflected in the name 'Gulguer' from the Gundungurra language group. It is said to mean 'a falling or shooting down or swilling around which causes the water to make a large round hole', which describes the action of the Nepean River at Bents Basin when in flood (Russell 1914).

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

Aboriginal sites have been recorded in the parks (OEH 2012a), and many more have been identified in the near vicinity (Dallas 1982; Kohen 1987). Sites include pigment and engraved rock art, shelters with art and deposits, artefacts, open campsites, axe grinding grooves and a natural mythological (ritual) site for Aboriginal ceremony and Dreaming (OEH 2012a). These sites suggest a settlement pattern that favoured camping and sheltering near creeks that feed into the Nepean River (Dallas 1982). The Aboriginal heritage within the parks is important to Aboriginal people today.

The presence of Aboriginal cultural heritage on the edge of the Cumberland Plain near deep, permanent water makes this an important area for understanding and learning about Aboriginal people's use and management of Country.

3.1.1 Management considerations and opportunities

Although the NSW Government has legal responsibility for the protection of Aboriginal sites and places, NPWS 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.

Aboriginal culture camps have been held at Bents Basin and provide an opportunity for traditional custodians and other Aboriginal people to connect with each other, Country and culture. The Aboriginal community organisations have been involved in management programs such as the wombat sarcoptic mange treatment program. Further engagement with the Aboriginal community is required to develop programs and assess the interests of the Aboriginal community in management of the parks.

The Aboriginal cultural heritage values of the parks are not fully known, and it is likely there are many more unrecorded sites and cultural values present. Only limited surveys have been conducted on the Tara block addition.

Most of the Aboriginal cultural heritage in the parks has been disturbed to some degree (Dallas 1982; Kohen 1987). Some rock shelters containing art sites are particularly sensitive to rock collapse due to the natural processes of exfoliation and weathering and are no longer accessible. Other Aboriginal sites have been impacted by flooding, erosion, informal trails and vandalism. Regular monitoring is needed to assess the condition of known Aboriginal cultural heritage in the parks.

Photo 2 The parks are a significant cultural landscape. Photo: Brian Everingham

3.2 Shared cultural heritage

History has taken place across the landscape. This includes the history of the first Australians – Aboriginal people – and our **shared history** since European settlement. 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.

Bents Basin was unknown to Europeans until the botanist and explorer George Caley visited the area in December 1802 while surveying the government cow pastures (Else-Mitchell 1966). Caleys Lookout in Bents Basin State Conservation Area is named after him.

The coach road between present-day Camden and Penrith is the earliest known development in the area. This road crossed Campbells Ford on the south-east boundary of what is now Gulguer Nature Reserve and headed north along the east side of Little Mountain to Bents Basin (National Trust of Australia 1986). The coach road was in use from about 1810 until the 1900s.

The first land grants in the area were made by Governor Macquarie and the area became known as Bents Basin after Justice Ellis Bent, judge advocate of the Australian Colony of New South Wales, was granted 1265 acres on the south side of the basin in 1811 (Currey 1966; Fairley and Waterhouse 2005; National Trust of Australia 1986). The remainder of what is now the state conservation area was granted to John Thomas Campbell, Governor Macquarie's secretary (Kass 1988). Governor Macquarie visited Bents Basin in 1815 and described it as 'a large and deep beautiful basin'. Justice Bent died in 1815 and his property at Bents Basin passed to D'Arcy Wentworth (the father of William Charles Wentworth, the explorer and parliamentarian).

The escaped convict turned bushranger Jack Donohue was known to hide in the Bringelly area and was killed by a soldier near Bents Basin in September 1830. Local folklore suggests that Donohue may have hidden in a sandstone cave near Campbells Ford, although this has not been proven (Higginbotham 1987).

There are records from the 1830s of Bents Basin being used as a scenic picnic destination (Kass 1988). The famous landscape painter Conrad Martens was impressed by the area's natural beauty and painted a watercolour of the basin following an expedition to the Blue Mountains and the Nepean in 1835.

In the 1860s an inn was built on the coach road within the current boundaries of the state conservation area (Heritage Council of NSW 2013). It was probably built as much to service weekend picnickers as the coach road (Kass 1988). The inn building was destroyed in the 1950s. Today the site of the inn is identifiable by an old peppercorn tree.

In 1908, 400 acres of steep rugged plateau, which is now Gulguer Nature Reserve, was reserved from settlement (Kass 1988). In 1947 these lands were taken up by James Wade as Crown leases prior to conditional purchase. Wade had an appreciation for the Australian bush that was unusual at the time and was instrumental in preserving the plateau in its natural state (Kass 1988). He built a hut on the ridgeline and later a dwelling near Campbells Ford with an elaborate rock garden. The hut and dwelling were demolished in the 1960s, but remnants of the rock garden can still be seen. In 1954 this area was declared a Fauna Protection District under the *Fauna Protection Act 1948*.

Richard Venables, a nearby landowner since the 1930s, took great interest in preserving the history and natural values of the area. He lobbied the government to preserve the natural environment at Bents Basin and in 1980 Bents Basin State Recreation Area was reserved under the National Parks and Wildlife Act. An education centre was constructed adjacent to the Durawi Picnic Area and named in Venables' honour. The education centre also housed a kiosk. The building fell into disuse and was demolished in 2016.

Part of the state recreation area was revoked in 1994 and subsequently reserved as Gulguer Nature Reserve in response to calls for stronger recognition and protection of the plateau's biodiversity and concern about potential conflicts between conservation objectives and increased recreational use.

The state recreation area was managed by the Bents Basin Trust. Basic recreation facilities were constructed to complement others in the district including the former Tara Girl Guides Camp, Silverdale Rifle Range and former Silverdale Hill Climb car race circuit (Crown Lands Office 1980). The site of the Tara Girl Guides Camp and part of the Silverdale Hill Climb race circuit are within the Tara block addition.

The hill climb racecourse opened in September 1957 and operated until September 1987. The official's box at the top of the climb and some sections of the asphalt track are still visible. The Silverdale Hill Climb circuit is an important part of the local heritage. The Tara Girl Guides Camp operated in the western part of the Tara block addition. Walking tracks and an outdoor chapel remain from this period.

A range of moveable heritage items related to the parks are kept by NPWS (Broomhead 2013).

Photo 3 **Peppercorn tree marking the location of the Bents Basin Inn. Photo: Brian Everingham**

3.2.1 Management considerations and opportunities

The Bents Basin Inn site is listed as an item of local significance under the Liverpool Local Environmental Plan and the NSW State Heritage Inventory (No. 1970075). The peppercorn tree marking the site of the inn is in poor health and a new way of marking the site may be required.

The shared history and heritage of the parks has been documented, providing recommendations on the management of heritage sites within the parks.

Interpretation of shared heritage values of the parks is limited. Potential historic sites of interest such as the old inn site and the site of James Wade's hut are not signposted. Opportunities exist to interpret the heritage values and acknowledge past use of the parks.

The parks are also listed on the (now closed) Register of the National Estate and as a landscape conservation area on the National Trust Register (Site ID S6756). While these listings have no legal effect on the management of the parks, they provide useful descriptions of the natural and cultural heritage values of the parks.

4. Providing for visitor use and enjoyment

A range of visitor opportunities are provided in the parks. NPWS aims to ensure that visitors enjoy, experience and appreciate the parks at the same time as protecting park values. The picnic and camping areas receive high levels of visitation across the summer and adjoining shoulder seasons. Visitation is growing steadily, reflecting the increasing population growth in the region.

The key attractions for visitors are the large area of informal open space and the presence of a natural open waterbody, both of which are rare in the increasingly urbanised environment of western Sydney. The natural bush setting of Bents Basin and the backdrop of the rugged Gulguer Gorge add to the other attractions of the parks for visitors.

The most popular activities in the parks are swimming, picnics, barbecues, socialising, relaxing and taking short bushwalks (NPWS 1999, 2009, 2012). Peak use occurs in the parks during the warmer month, on long weekends, public holidays and during school holiday periods. Day visitors often visit in large family groups. The Bents Basic Camping Area is also popular with large groups and is often fully booked. Bushwalking and birdwatching occur along management trails in Gulguer Nature Reserve and the track to Caleys Lookout.

Visitor access to the parks is along Wolstenholme Avenue in Greendale from the east or via Bents Basin Road in Wallacia from the north. Parking is available near the parks' entrances and at the Bents Basin and Durawi picnic areas and in the camping area. Bus parking is also provided at the Durawi Picnic Area. Overflow parking areas are opened to accommodate vehicles on high use days. There is currently no public transport to the parks.

4.1 Picnicking and day use

Picnicking is the most popular day use activity in the parks, particularly for large family and social groups. The parks' picnic areas include the Bents Basin Road Picnic Area on the north side of the basin and the Durawi Picnic Area on the south-east side (see Figure 2).

During the peak visitation periods carparks, including overflow carparks, can exceed capacity and people park along Bents Basin Road and Wolstenholme Avenue.

Facilities in the picnic areas include toilets, picnic shelters and picnic tables. Portable gas and solid fuel barbecues are permitted. Collection of firewood in the parks is not permitted.

4.2 Camping

Camping is a popular recreation activity in Bents Basin, particularly for families, social groups and those seeking opportunities to camp in a less remote bushland setting. The 14 hectare Bents Basin Camping Area provides unpowered and unmarked sites for tents, caravans and campervans. Camping and booking fees apply. Currently, there is an unmet demand for powered campsites. Opportunities exist to develop powered campsites to meet this demand and build cabins or serviced camping (glamping) sites in the campground or nearby to increase the range of camping styles offered.

Current camping facilities include toilets and hot showers, fireplaces, picnic tables, an electric barbecue and drinking water. Portable gas and solid fuel barbecues. Collection of firewood is not permitted in the parks. During a total fire ban the use of portable barbecues is not permitted.

A camp kitchen and large group shelter may be hired by campers and is popular for large groups. Campsite and kitchen and shelter bookings are managed through an online booking

system. Volunteer camp hosts also help to manage the camping area and facilities during peak periods. Opportunities also exist to negotiate commercial lease or licence arrangements for the management of the camping area and facilities including any cabins or permanent tents that may be developed.

There are opportunities to develop bush camping facilities in the Tara block addition in future.

4.3 Water-based activities

Bents Basin is unique within western Sydney as it provides an open water experience on the Nepean River that is easily accessible by car with good day use facilities. Bents Basin is popular for swimming, fishing and use of non-motorised kayaks, canoes, paddle boats and inflatable devices, particularly by visitors camping or picnicking in the parks. On extreme high temperature days in western Sydney Bents Basin is particularly popular for swimming. The dam on the southern boundary of the state conservation area is also used for paddle craft and fishing. The water quality of the dam is highly variable due to runoff from surrounding lands and is generally unsuitable for swimming.

Fishing activities are regulated under the *Fisheries Management Act 1994*, including licensing, bag and size limits and permitted fishing equipment.

During periods of high flow, Bents Basin can be a hazardous swimming location. A risk treatment plan has been prepared, and information about the risks of swimming are included in on-site signage, the park brochures and on the NPWS visitor website.

Photo 4 Water-based activities are popular in the parks. Photo: John Yurasek/DPE

4.4 Walking

Bushwalking opportunities in the parks include a 1.2-kilometre return walk from the Bents Basin Road carpark to Caleys Lookout in Gulguer Nature Reserve (Figure 2) and informal walks along the Nepean River between the Durawi Picnic Area and the camping area. There are also informal unmarked tracks that provide access to the northern and southern sides of Bents Basin and Gulguer Gorge where the Nepean River enters Bents Basin. The informal tracks should be assessed and formalised or closed to prevent erosion and damage to vegetation.

Gulguer Nature Reserve offers more challenging bushwalking along management trails to interesting landscape features such as Gulguer Gorge Lookout (1.5 kilometres) and Campbells Ford (4 kilometres) (Figure 1).

Bushwalking opportunities may be developed in the Tara block addition along management trails and designated walking tracks.

4.5 Cycling

Cycling including mountain biking is currently permitted on sealed roads in the state conservation area. Cycling along signposted management trails in the Tara block addition may be possible after environment and heritage assessments are completed, and trails are formalised (see 4.9.2). Cycling on management trails in Gulguer Nature Reserve is not permitted due to steep slopes, erosion prone soils and the focus on protection of natural and cultural values consistent with the management objectives for nature reserves.

4.6 Horse riding

The small size and current popularity of the state conservation area for picnicking, camping and water-based recreation make horse riding impractical. Access to the Tara block addition is limited by the steep terrain and highly erodible soils that are not well suited to horse riding. Visitor access to the Gulguer Nature Reserve is on foot to protect reserve values and maintain sustainable use consistent with the management objectives for nature reserves and NPWS policy.

4.7 Non-commercial group activities

The picnic areas and camping area are used by a variety of community groups including religious groups, sporting groups, scouts and school groups. Group activities and events provide opportunities to promote park values and encourage support for conservation of those values in the parks and elsewhere.

These group activities are managed in accordance with National Parks and Wildlife Regulation 2019 and associated NPWS policies and procedures that aim to encourage sustainable use by preventing impacts on the natural and cultural values of the parks and minimising impact on other visitors. NPWS consent is required for group activities involving more than 40 people or for any organised sporting event.

4.8 Commercial activities and events

There are no facilities provided by commercial operators in the parks. Opportunities exist for commercial activities in the parks, including management of camping and associated facilities such as cabins and serviced camping (glamping) accommodation, small-scale businesses such as mobile food and beverage vendors and watercraft hire. Leases and

licences can be issued consistent with the National Parks and Wildlife Act, the parks' plan of management and associated NPWS policies and procedures, including sustainability assessment.

The parks are not currently a common destination for commercial tour operators. There may be increased interest in the parks by tour operators following development of the second international airport at Badgerys Creek. Commercial tour operators must have an Eco Pass licence before entering the parks.

Organised group activities and events of a commercial nature require a licence under National Parks and Wildlife Act. The licence requires activities to be consistent with the National Parks and Wildlife Act, park management principles and protection of natural and cultural heritage values of the parks. Licence applications are assessed in accordance with relevant NPWS policies and procedures and conditions can be applied to minimise any adverse impacts.

Photo 5 Bents Basin Camping Area. Photo: Lyndal Kaye/DPE

4.9 Management considerations and opportunities

In 2018 it was estimated that the parks receive 50,000 visits per year (OEH 2018b). Visitor surveys indicate that most day visitors come from western Sydney, travelling approximately 30 minutes' drive from the major cities of Penrith, Campbelltown and Liverpool.

Park visitation has shown steady growth as more and more people move to the region. It is anticipated that visitor use will continue to grow steadily under the Greater Sydney Region Plan 2018 (Greater Sydney Commission 2018), which is increasing employment and housing supply in the surrounding local government areas. Population and housing projections for the surrounding local government areas are presented in Table 5.

Table 5 Population and household projections for surrounding local government areas 2021–2036

Local Government Area	2021	2026	2031	2036
Wollondilly Shire Council				
Total population	54,140	58,482	66,381	73,477
Total households	18,402	20,231	23,236	26,043
Liverpool City Council				
Total population	251,322	291,187	328,447	380,085
Total households	80,626	95,176	108,857	127,510
Camden City Council				
Total population	127,647	153,299	180,071	236,255
Total households	42,327	50,893	60,047	80,031
Penrith				
Total population	230,289	248,577	292,019	350,906
Total households	80,548	88,007	104,300	126,256

Source: Department Planning Industry and Environment 2019 Population Projections (DPIE 2019)

4.9.1 Information, interpretation and education

Information provided about the parks in signs, printed material and through social media and the internet promotes understanding and appreciation of the values of the parks and informs visitors about safety risks and appropriate behaviour.

Information, interpretation and education programs in the parks are delivered through:

- interpretive signs
- guided activities as part of Discovery ranger programs and opportunistically as part of research projects or management programs conducted in the parks
- directional, regulatory and safety signs that support safe and sustainable use of facilities
- printed brochures
- app-based and web-based information for trip planning, safety and understanding park values.

Visitor safety is an important part of the park information programs. On-site safety signs identify site-specific risks and provide information on how to avoid risks and what to do in an emergency. Existing safety signage in the parks is provided in English but includes international symbols for people from non-English speaking backgrounds. Safety information is regularly reviewed as part of the parks' risk management program to ensure that essential safety messages are communicated effectively. The most significant risk to visitor safety in the parks is associated with water-based activities. Rockfalls and falling trees also present risks to visitor safety.

Opportunities exist to better interpret the natural and cultural values of the parks through a range of media, including app-based and web-based technology, guided activities, displays and signs.

4.9.2 Visitor facilities

Increasing visitation may present opportunities to enhance visitor experiences within the parks through improved facilities and increased commercial opportunities. Consideration will also be given to providing additional recreation opportunities in the Tara block addition.

Precinct and visitor use planning will be an important tool in managing increased use, providing rewarding visitor experiences and establishing sustainable visitor and tourist use. It will also be important to assess future visitor use requirements when considering any additions to the parks and, where appropriate, include cleared or degraded land to accommodate visitor facilities and sustainable visitor use.

A draft Visitor Facilities Concept Plan (Environmental Partnership 2019) has been prepared to guide the development of visitor facilities in the parks. The concept plan considers:

- visitor use, expectations and preferences
- redesigning visitor carparks at Bents Basin Road and Durawi picnic areas to improve visitor flows and minimise congestion
- options to expand the range of camping facilities, improve the visitor experience and take advantage of revenue-raising opportunities
- upgrades to toilet facilities in high visitor use precincts including Durawi Picnic Area, Bents Basin Road Picnic Area, Bents Basin Camping Area and Bents Basin foreshore
- proposed location, type and scale of day use facilities and recreational opportunities in the Tara block addition including cycling, walking and picnicking.

After public exhibition and comment the concept plans will be finalised. Implementation of the concept plan will be subject to environmental and heritage assessment and provisions of the plan of management.

Some park visitors bring their own portable barbecues and fuel stoves for convenience or to meet cultural and religious preferences for food preparation. Heat bead disposal bins and gas barbecues have been installed to reduce the risk of bushfires and illegal gathering of firewood. NPWS monitors compliance with requirements for disposal of burnt coals and other solid fuels to minimise fire risks and negative impacts to park values.

During a total fire ban the use of portable barbecues is not permitted. Opportunities exist to provide gas or electric barbecues that can be used during fire bans and phase out the use of portable barbecues if the impacts on park values and visitor safety become unacceptable.

5. Park infrastructure and services

5.1 Asset management

NPWS provides a range of visitor and management facilities in the parks including gates, fencing, housing, offices, depot buildings, erosion control, bushfire response infrastructure, drinking water, sewerage treatment, walking tracks, management trails, sealed and unsealed roads, and visitor use infrastructure.

These facilities are managed and maintained through the NPWS asset management system (AMS). The AMS is a strategic framework for delivering, maintaining and replacing NPWS assets necessary to support safe and sustainable visitor facilities and park management operations.

5.2 Park access roads and management trails

Figures 1 and 2 show the network of park roads that are open to the public for vehicle use and the management trails used for park management and other authorised purposes. The park roads off Wolstenholme Avenue in the eastern section the state conservation area and the camping area roads are sealed. Due to the large numbers of visitors and hilly terrain, a 20 kilometre per hour speed limit applies throughout the parks.

The management trail immediately east of Bents Basin provides a link between the two park entrances and crosses the Nepean River via a bridge. The trail and bridge are significant assets, conveying water supply and sewerage infrastructure between the picnic areas.

Photo 6 **Managing and maintaining park assets can be challenging – 2016 flooding Bents Basin outlet. Photo: Lyndal Kaye/DPE**

The management trails through Gulguer Nature Reserve are in good condition, but maintenance is regularly required in the Campbells Ford area where the road is prone to erosion and rockfalls. The identified management trails in the newly acquired Tara block will also need upgrading to provide drainage and surface works on steep slopes. Some existing and deteriorating trails in the Tara block addition may be excess to NPWS requirements and will be closed.

The management trails in the parks are an important fire management asset. Management trails in the state conservation area and the nature reserve have been identified as strategic or tactical fire trails. The management trails in the Tara block will also be used for fire management purposes. Under the *Rural Fires Act 1997* the relevant bush fire management committees' fire access and fire trail plans identify access requirements for fire suppression and management purposes, including on land managed by NPWS. In implementing works to establish and maintain trails at the prescribed fire trail standards, NPWS will ensure these works are carried out in a manner that minimises impacts on the parks' environment, including their natural and cultural heritage values. The fire access and fire trail plan may identify the need for new fire trails in the parks. Construction of new trails will require an appropriate level of heritage and environmental assessment, and will be subject to the requirements of the National Parks and Wildlife Act.

Access to the southern parts of the parks is largely via private property in emergencies. A reserve access strategy is required to establish the status of all existing accesses and identify options for securing access for public and management purposes where necessary.

5.3 Buildings

The NPWS office building located near the eastern entrance to Bents Basin State Conservation Area was constructed in the 1980s and internally refurbished and extended in 2012. A staff residence constructed in the same period is located near the Wolstenholme Road entry. The residence is unoccupied and may be suitable for adaptive re-use for administrative purposes such as training, education and accommodation for researchers, or leasing as visitor or campground manager accommodation.

The works depot is located to the north of the office building and supports management operations for the parks and other parks in south-west Sydney.

5.4 Water and sewerage infrastructure and waste management

The parks are provided with a reticulated water supply via a pipeline from Taylors Road through the Tara block. The parks' water supply network includes this pipeline and a 10,000 litre water tank near the toilet block in the Bents Basin Road Picnic Area, a 3,000 litre water tank in the Tara block and a 22,000 litre holding tank in Gulguer Nature Reserve. A second 22,000 litre water tank in Gulguer Nature Reserve is not connected to the water supply network but could be adapted for use as a reserve tank for firefighting purposes.

There are toilets next to the Bents Basin Road carpark and in the Durawi Picnic Area, and the camping area has a toilet and shower block. A new on-site sewage treatment system was installed to service the picnic and camping areas in June 2016.

Waste management is an ongoing issue in the parks and collection and disposal efforts contribute significantly to costs for park management. Options for more effective management of waste are being investigated. Further education is needed to change visitor behaviour and expectations to improve waste management in the parks.

6. Non-park infrastructure and services

6.1 Surrounding communities

The parks are bordered by several properties and landholdings mainly used for small-scale grazing or intensive agriculture. The towns of Wallacia, Silverdale and Warragamba are the closest service centres. Public access to the parks is along Wolstenholme Drive and Bents Basin Road. Management access to the western side of the Tara block addition is along an undeveloped road reserve. The western side of Forest Hill Creek can only be accessed from private property.

NPWS works to maintain intact boundaries and cooperative arrangements with surrounding communities including neighbours. The parks' boundary is fenced to prevent stock from entering the parks and minimise accidental encroachment. Additionally, several locked gates prevent unauthorised access from surrounding properties and regulate vehicle entry to the parks. A park access management plan may be required to confirm the status of park access for fire and management purposes. Boundary surveys may also be necessary to identify encroachments.

Cooperative arrangements with local councils, rural fire brigades, Local Land Services and neighbours are essential to maintain a coordinated response to fire and pest management activities.

6.2 Mining and exploration

Exploration for and production of minerals and petroleum are permissible uses within state conservation areas. Exploration licences and assessment leases may be granted within state conservation areas, however, the approval of the Minister administering the National Parks and Wildlife Act must be obtained before any rights under these leases and licences can be exercised.

NPWS works closely with the NSW Government authorities responsible for mining and petroleum activities, including mineral exploration and mine site rehabilitation, to ensure that exploration and production proposals in state conservation areas comply with all statutory requirements, including any necessary environmental impact assessments and approvals.

Under the statewide review of state conservation areas, Bents Basin State Conservation Area is being considered for reservation under a new reserve category. Reclassification of state conservation areas may only happen with the agreement of the Minister administering the Mining Act and after any mining interests are removed.

6.3 Easements and right of way

The parks are located within the rapidly developing region of western Sydney, which will require supporting infrastructure such as utilities, roads and other services. In future there may be increased pressure for some of this infrastructure to cross the parks. Such requests will need to comply with the National Parks and Wildlife Act and planning and environmental assessment processes before being considered.

Existing easements include the following public utilities managed by state and regional authorities:

- A 330-kilovolt TransGrid overhead powerline crosses Forest Hill Creek and near Campbells Ford and includes 4 large electricity towers.
- A 33-kilovolt overhead transmission powerline owned and operated by Endeavour Energy crosses over Bents Basin, Caleys Lookout Walking Track and the Tara block addition. The easement for the transmission line is approximately 30 metres wide but varies in width in some places. Associated infrastructure includes three power poles in the Tara block.

The transmission lines are managed under separate agreements made between the operators and NPWS.

A water supply easement in favour of surrounding properties is located on the Tara block addition (Figure 2).

There are 5 groundwater bores in the parks. The first was drilled in 1984. In 2007, 4 groundwater bores (2 production test bores and 2 monitoring bores) were drilled in the state conservation area as part of investigations into the options to supplement existing water supplies during severe drought. None of the bores are in use.

A right of carriageway easement crosses Bushrangers Creek and provides access between 2 sections of private property adjoining the parks. The easement was established in 1988 before this section of land was added to the parks. The easement is managed consistent with the National Parks and Wildlife Act and NPWS policies.

Photo 7 **Bridge over the Nepean River in Bents Basin State Conservation Area. Photo: Kevin McGrath/DPE**

Appendices

Appendix A Legislation and policy

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

NSW legislation

- *National Parks and Wildlife Act 1974* and National Parks and Wildlife Regulation
- *Environmental Planning and Assessment Act 1979*
- *Heritage Act 1977*
- *Biodiversity Conservation Act 2016*
- *Biosecurity Act 2015*

Other NSW laws may also apply to park management:

- *Work Health and Safety Act 2011*

Commonwealth legislation and policy

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Disability Discrimination Act 1992*
- *Native Title Act 1993*
- Building Code of Australia

NPWS policies and strategies

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

- Park management policies
- Regional pest management strategies
- Fire management strategies

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

Appendix B Scientific plant and animal names

The following table shows the scientific name for common plant and animal names used in this plan.

Threatened animals

Common name	Scientific name
Invertebrates:	
Cumberland Plain land snail	*Meridolum corneovirens*
Frogs:	
Giant burrowing frog	*Heleioporus australiacus*
Red-crowned toadlet	*Pseudophryne australis*
Birds:	
Black-chinned honeyeater (eastern subspecies)	*Melithreptus gularis gularis*
Brown treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*
Diamond firetail	*Stagonopleura guttata*
Dusky woodswallow	*Artamus cyanopterus cyanopterus*
Flame robin	*Petroica phoenicea*
Gang-gang cockatoo	*Callocephalon fimbriatum*
Glossy black-cockatoo	*Calyptorhynchus lathami*
Hooded robin (south-eastern form)	*Melanodryas cucullata cucullata*
Little lorikeet	*Glossopsitta pusilla*
Olive whistler	*Pachycephala olivacea*
Powerful owl	*Ninox strenua*
Regent honeyeater	*Anthochaera phrygia*
Scarlet robin	*Petroica boodang*
Square-tailed kite	*Lophoictinia isura*
Varied sittella	*Daphoenositta chrysoptera*
White-bellied sea-eagle	*Haliaeetus leucogaster*
Mammals:	
Eastern coastal freetail bat	*Mormopterus norfolkensis*
Grey-headed flying-fox	*Pteropus poliocephalus*
Greater glider	*Petauroides volans*
Large bentwing-bat	*Miniopterus schreibersii oceanensis*
Large-eared pied bat	*Chalinolobus dwyeri*
Southern myotis	*Myotis macropus*

Threatened and rare plants

Common name	Scientific name
Camden white gum	*Eucalyptus benthamii*
	Epacris purpurascens var. purpurascens
Guinea flower	*Hibbertia hermanniifolia*
	Gonocarpus longifolius
Native cranberry	*Lissanthe sapida*
River mat-rush	*Lomandra fluviatilis*

Native plants, non-threatened

Common name	Scientific name
Bangalay	*Eucalyptus botryoides*
Blackthorn	*Bursaria spinosa*
Blue box	*Eucalyptus baueriana*
Broad-leaved apple	*Angophora subvelutina*
Broad-leaved ironbark	*Eucalyptus fibrosa*
Cabbage gum	*Eucalyptus amplifolia*
Coachwood	*Ceratopetalum apetalum*
Flooded gum	*Eucalyptus grandis*
Forest red gum	*Eucalyptus tereticornis*
Grey box	*Eucalyptus moluccana*
Grey gum	*Eucalyptus punctata*
Grey myrtle	*Backhousia myrtifolia*
Kangaroo grass	*Themeda triandra*
Narrow-leaved ironbark	*Eucalyptus crebra*
Red bloodwood	*Corymbia gummifera*
River peppermint	*Eucalyptus elata*
Rough-barked apple	*Angophora floribunda*
Smooth-barked apple	*Angophora costata*
Spotted gum	*Corymbia maculata*
Sydney blue gum	*Eucalyptus saligna*
Sydney peppermint	*Eucalyptus piperita*
Swamp gum	*Eucalyptus ovata*
Thin-leaved stringybark	*Eucalyptus eugenioides*
Water gum	*Tristania neriifolia*
Weeping meadow grass	*Microlaena stipoides var. stipoides*

Common plant names from PlantNET (The NSW Plant Information Network System). Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au (20/12/2019)

Native animals

Common name	Scientific name
Bell miner	*Manorina melanophrys*
Whistling kite	*Haliastur sphenurus*
Common wombat	*Vombatus ursinus*
Platypus	*Ornithorhynchus anatinus*
Sugar glider	*Petaurus breviceps*

Pest animals

Common name	Scientific name
Domestic cat	*Felis catus*
Domestic dog	*Canis lupus familiaris*
Rabbit	*Oryctolagus cuniculus*
Fallow deer	*Dama dama*
Goat	*Capra hircus*
Red deer	*Cervus elaphus*
Red fox	*Vulpes vulpes*

Pest plants

Common name	Scientific name
African olive	*Olea europaea subsp. cuspidata*
Alligator weed	*Alternanthera philoxeroides*
Balloon vine	*Cardiospermum grandiflorum*
Blackberry	*Rubus fruticosus agg.*
Bridal creeper	*Asparagus asparagoides*
Lantana	*Lantana camara*
Moth vine	*Araujia sericifera*
Peppercorn tree	*Schinus sp.*
Willows	*Salix spp.*

Appendix C Description of threatened ecological communities in the park

The following are listed as endangered ecological communities under the Biodiversity Conservation Act.

This information is based on The Native Vegetation of the Sydney Metropolitan Area (OEH 2013).

Cumberland Plain Woodland in the Sydney Basin Bioregion

Typically occurs on heavy clay soils derived from Wianamatta shale and throughout the driest part of the Sydney Basin. Before European settlement, the community was extensive across the Cumberland Plain, western Sydney. Today, only 9% of the original extent remains intact, with the remnants scattered widely across the Cumberland Plain.

The dominant canopy trees of Cumberland Plain Woodland are grey box and forest red gum, with narrow-leaved ironbark, spotted gum and thin-leaved stringybark occurring less frequently. The shrub layer is dominated by blackthorn, and it is common to find abundant grasses such as kangaroo grass and weeping meadow grass.

It is well adapted to drought and fire. The understorey plants often rely on underground tubers or profuse annual seed production to survive adverse conditions.

Cumberland Plain Woodland is habitat for threatened species such as the Cumberland Plain land snail.

Shale Sandstone Transition Forest in the Sydney Basin Bioregion

Occurs at the edges of the Cumberland Plain, where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The boundaries are indistinct, and the species composition varies depending on the soil influences. The main tree species include forest red gum, grey gum, stringybarks and ironbarks. Areas of low sandstone influence (more clay-loam soil texture) have an understorey that is closer to Cumberland Plain Woodland.

Before European settlement, this community was extensive around the edges of the Cumberland lowlands throughout western Sydney, most particularly in the southern half. Today, only 9,950 hectares remains intact (22.6% of its original extent) and the bulk of this occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas. Good examples can be seen at Gulguer Nature Reserve, in the Wilton area and in the Sackville–Maroota area.

It is well adapted to fire, being often close to sandstone areas.

Some species in areas with greater shale influence regenerate from profuse annual seeding and underground tubers.

High sandstone influence sites have poor rocky soils, and many shrubs that rely on nitrogen-fixing root nodules and soil/root fungi to obtain nutrients.

High-shale-influence sites often have a diverse and moderately dense ground cover stratum, with grasses a prominent and diverse component. Shrubs are usually less abundant and less diverse in shale sites.

River-flat Eucalypt Forest on Coastal Floodplains of the Sydney Basin Bioregion

Associated with silts, clay loams and sandy loams on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. It generally occurs below 50 metres elevation but may occur on localised river flats up to 250 metres above sea level. It has a tall open tree layer of eucalypts, which may exceed 40 metres in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include forest red gum, cabbage gum, rough-barked apple and broad-leaved apple. Blue box, bangalay and river peppermint may be common south from Sydney, swamp gum occurs on the Far South Coast, Sydney blue gum and flooded gum may occur north of Sydney, while Camden white gum is restricted to the Hawkesbury floodplain.

Small areas of the community are contained within existing conservation reserves, including Blue Mountains, Cattai, Dharug, Georges River, Marramarra, Morton, Deua and Wadbilliga national parks and Gulguer and Mulgoa nature reserves, but these are unevenly distributed throughout the range and unlikely to represent the full diversity of the community. The reserved examples are on localised, sheltered river flats between hills, rather than the large open floodplains that comprised most of the original habitat.

Given its habitat, the community has an important role in maintaining river ecosystems and riverbank stability.

The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees.

It typically forms mosaics with other floodplain forest communities and treeless wetlands, and often fringe treeless floodplain lagoons or wetlands with semi-permanent standing water.

River-flat Eucalypt Forest on Coastal Floodplains provides habitat for a broad range of animals, including many that are dependent on trees for food, nesting or roosting. These include cormorants and egrets, osprey, whistling kite, white-bellied sea-eagle, brush-tailed phascogale, yellow-bellied glider, squirrel glider, sugar glider and grey-headed flying-fox.

Appendix D Pests and weeds in the park

The following tables summarise key information on pests and weeds in the park at the time of publication of this plan. Current information on the status of pests and weeds and whether they have a threat abatement plan under the Environment Protection and Biodiversity Act can be found at on the department's website. Further pest information is also available in the relevant NPWS Pest Management Strategy and the LLS Greater Sydney Regional Strategic Pest Animal Plan 2018–2023.

Pest animals

Common name	Scientific name	KTP	LLS
Birds			
Common myna	*Sturnus tristis*		
Common starling	*Sturnus vulgaris*		
Eurasian blackbird	*Turdus merula*		
Red-whiskered bulbul	*Pycnonotus jocosus*		
Spotted turtle-dove	*Streptopelia chinensis*		
Mammals			
Black rat	*Rattus rattus*		
Brown hare	*Lepus capensis*		
Dingo	*Canis lupus*	Y	Y
Domestic cat	*Felis catus*	Y	Y
Domestic dog	*Canis lupus familiaris*		Y
European red fox	*Vulpes vulpes*	Y	
Fallow deer	*Dama dama*	Y	Y
Horse	*Equus caballus*		
House mouse	*Mus musculus*		
Rabbit	*Oryctolagus cuniculus*	Y	Y
Red deer	*Cervus elaphus*	Y	Y

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

TAP = threat abatement plan prepared under the Biodiversity Conservation Act.

Priority weeds

Weed	Priority	Asset at risk
Privet spp. [1] Small-leaved privet African olive [1, 2] Honey locust tree Prickly pear [1, 3] Box elder Moth vine Bridal creeper [1] Alligator weed [1, 3]	**Critical** – addressed in programs for weeds that significantly impact or are likely to significantly impact threatened species, populations or communities or addressed in programs targeting new occurrences or suppressed populations of highly invasive weeds with potential for significant impacts on park values	The vulnerable Camden white gum River-flat Eucalypt Forest on Coastal Floodplains endangered ecological community Shale Sandstone Transition Forest critically endangered ecological community The vulnerable southern myotis
Asparagus fern [1, 3] Chilian needle grass [1] Exotic perennial grasses [2] Green cestrum [1] Lantana [1, 2, 3] Mother of millions St John's wort [1] Vines and scramblers [2] Tradescantia Willows [1, 3] Blackberry [1, 3] Ludwigia [1]	**Medium** – addressed in cooperative programs targeting weeds that impact significantly on park values or agricultural production or addressed in programs targeting isolated infestations of likely invasive weeds, widely distributed in other parts of the region, with high potential for future impacts on park values	Cumberland Plains Woodland and Shale Sandstone Transition Forest critically endangered ecological communities River-flat Eucalypt Forest on Coastal Floodplains endangered ecological community The vulnerable Camden white gum

1. Priority in Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (LLS2017).
2. Declared a key threatening process under the Biodiversity Conservation Act.
3. Declared Weed of National Significance (Australian Weeds Committee 2013).

Abbreviations

KTP	Key Threatening Process
NPWS	National Parks and Wildlife Service
NSW	New South Wales

More information

- Bents Basin State Conservation Area and Gulguer Nature Reserve Plan of Management

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