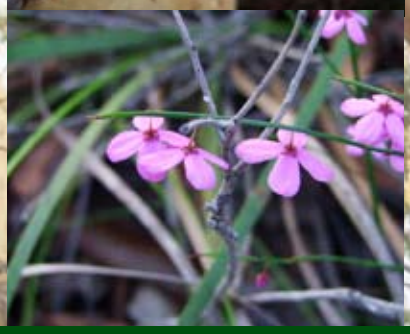

PROTECTING BIODIVERSITY IN WESTERN LAKE MACQUARIE:

A Conservation Proposal

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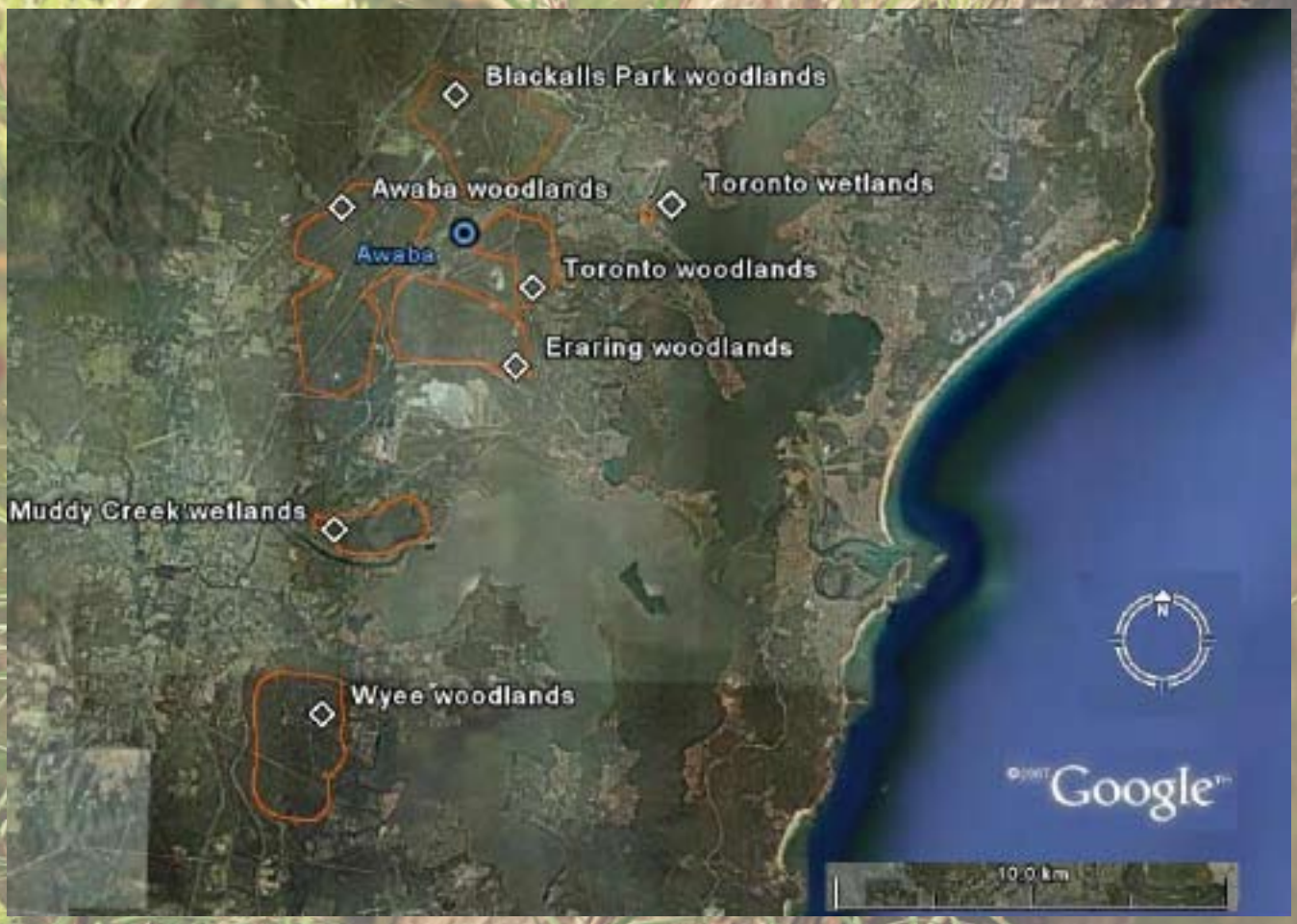
Conserve West Lake Macquarie Now, c/o Robyn Charlton @ westlakewrens@gmail.com

For scientific comment, contact:
Chris Mclean @ macca_1985@yahoo.com.au

Figure 1: Proposed Conservation Areas in Western Lake Macquarie



Protecting Biodiversity in Western Lake Macquarie: A Conservation Proposal

A plan to ensure the long term viability of biodiversity in Lake Macquarie through new conservation reserves

February 2011

Authors

Chris McLean is a local ecologist. He has held a number of positions in government agencies and NGOs, working primarily on ecological management and restoration. He is currently undertaking doctoral research on the impact of fire regimes and logging on threatened gliding possums and their habitat.

Robyn Charlton is a long-term resident and local conservationist who is deeply committed to the protection of Lake Macquarie's environment.

Warrick Jordan is The Wilderness Society Newcastle's Campaigns Manager.

Contents

1. Executive Summary

Western Lake Macquarie contains some of the largest and most biologically-diverse areas of unprotected native vegetation in the Sydney Basin bioregion. The area provides crucial habitat for a host of iconic species, such as the Powerful Owl and the EPBC-listed Tetratheca juncea, contains several threatened ecological communities, and is an important community asset.

This proposal identifies around 10,000 hectares of unconserved native vegetation in the Western Lake Macquarie area as containing high conservation values (HCV). The majority of the identified HCV areas occur under 'vacant crown land' tenure. Transfer to the NSW National Parks and Wildlife Service (NPWS), and subsequent vesting under secure reservation tenure, would thus not require purchase expenditure by the Government.

Protection is required in order to address a number of key threatening processes that are ensuring the continued degradation of the area's biodiversity. These processes include continued habitat modification, uncontrolled vehicle access resulting in increased tracks, illegal dumping, erosion issues, and a general absence of conservation management.

The authors assert that a transfer of land to conservation tenure, in concert with appropriate management, will greatly increase the maintenance of the area's biodiversity, and secure a key asset for the community of Lake Macquarie.

2. Recommendations

In order to conserve the long term viability of ecological communities and species populations in the Western Lake Macquarie area, in addition to securing the area for the local community, the authors recommend the following:

- The state government to transfer of vacant crown land areas identified in this report as containing high conservation values to secure reservation tenure administered by the National Parks and Wildlife Service. This is aligned with the aims of the The Lower Hunter Regional Conservation Plan (DECCW 2009). The Plan identified that the protection of "additional conservation areas in West Lake Macquarie [is]… clearly the next highest priority for the future" at a regional scale (DECCW 2009:32);

- That reservation tenures be a combination of Regional Parks, in areas adjacent to residential areas, and State Conservation Areas in other areas;

- Community input to be sought in regards to both reservation tenures and the creation of management plans; and

- Management plans to be implemented that mitigate or eliminate the threatening processes identified both in this report, by other stakeholders, and subsequent to further investigations.

3. Location and current land tenure

The area addressed in this report is located in Western Lake Macquarie, approximately 30 kilometres from Newcastle, and sits west of Toronto and east of Freemans Drive. It is contiguous to the present Sugarloaf State Conservation area and extends south to the Lake Macquarie Local Government Area boundary at Wyee. The site is predominantly vacant crown land with some small freehold properties on the periphery.

A map of the areas can be seen on the inside cover.

4. A Brief conservation history of Western Lake Macquarie

Traditionally the forested areas of Western Lake Macquarie were used for pit propping, especially in areas close to mines. Propping was discontinued, however, when roof-bolting became popular in the 1970s. The National Trust first proposed a western Lake Macquarie National Park in the mid-1970s; however this proposal never came to fruition. In the 1970s and 1980s significant areas of native vegetation were removed for urban development, and for the construction of the Eraring Power Station in the early 1980s and the Awaba Refuse Facility in the early 1990s.

In 1994 Lake Macquarie City Council funded a study to examine the biodiversity values and the need for the creation of an Awaba Nature Reserve. The study undertaken detected a range of threatened species, including the Spotted Tail Quoll. The proposal included large tracts of crown land and contained considerable mineral extraction potential. Protection was ultimately not delivered.

In 2005, a large open cut mine was proposed for the area of bushland near Awaba, with the proposal being defeated by strong community opposition. The following year, small tracts of the former Awaba State Forest were transferred to the Sugarloaf State Conservation Area. However, the vast majority of the area remains unprotected and at risk of future exploitation.

The NSW Government's 2007 decision to prohibit open cut coal mining in Lake Macquarie, has created an opportunity to conserve public lands in the West Lake Macquarie area. The need for further protection in West Lake Macquarie has been identified in the publication of the "Lower Hunter Regional Conservation Plan" (NSW DECCW 2009):

> Given the major conservation gains already being put in place via the new reserves that the Government has legislated or is negotiating to put in place in other parts of the Lower Hunter plan area, additional conservation areas in West Lake Macquarie are clearly the next highest priority for the future. DECC will be actively working to improve conservation of priority lands in the West Lake Macquarie area by improved conservation practices on other crown tenures, through private land partnerships or as the sites for conservation offsets. DECC will also be working with Council and the Department of Planning to ensure appropriate protective land-use zonings apply in high conservation areas, as a basis for biodiversity certification of new LEPs. (DECCW 2009:32)

5. Values

Numerous threatened fauna species occur within the Western Lake Macquarie region. These include a state-significant population of threatened Squirrel Gliders (Petaurus norfolcensis) (Smith and Murray 2003) and significant populations of Masked (Tyto novaehollandae), Sooty (T. tenebricosa) and Powerful forest (Ninox strenua) owl species, along with the threatened Barking Owl (N. connivens) (NSW DECCW 2009). A population of Masked Owl in the Awaba woodlands has been subject to scientific study, in particular its breeding biology and diet (Todd 2006).

Records in the area (NSW DECCW 2011) and professional field surveys (Shortland Wetlands Centre Consultancy 1995) confirm the presence of threatened diurnal birds within the identified habitats, including the Glossy Black Cockatoo (Calyptorhynchus lathami), Brown Treecreeper (Climacteris picumnus), Gang Gang Cockatoo (Callocephalon fimbriatum), and Little Lorikeet (Glossopsitta pusilla). The nationally-endangered Swift Parrot (Lathamus discolor) and Regent Honeyeater utilise winter-flowering species in the area (Spotted Gum; Corymbia maculata, Swamp Mahogany; Eucalyptus robusta and Forest Red Gum; E. tereticornis) during their winter migration.

Several threatened microbat species have been recorded within or adjacent to the identified habitats, including the Broad-Footed Myotis (Myotis macropus), Large Eared Pied Bat (Chalinolobus dwyeri), and Golden Tipped Bat (Kerivoula papuensis) (NSW DECCW 2011), with the nationally-endangered Spotted Tail Quoll also recorded in the Awaba woodlands in 1994 (Shortland Wetlands Centre Consultancy 1995). Roadkill of this species has been found near the Eraring Power Station within the past five years (pers.comm., Audrey Koosman, Native Animal Trust Fund 2008).

At least five nationally threatened flora species occur within the identified habitats (NSW DECCW 2011). The majority of the extent of the nationally-threatened herb Tetratheca juncea occurs in Western Lake Macquarie (Payne 2000). At present the major population of T. juncea is outside of conservation reserves, with only limited populations reserved in Western Lake Macquarie in the Sugarloaf SCA and Lake Macquarie SCA. Adoption of this proposal would see the adequate conservation of the species.

The area is also home to the nationally-threatened tree, Angophora inopina (Bell 2004). The majority of the distribution of A. inopina occurs within the Wyee woodlands. Thus, the reservation of this area would see a massive increase of individuals in conservation reserves.

The work of Smith and Murray (2003) identified the population density of Squirrel Gliders in the local area as very high. Density was found to be over 0.7 individuals/ ha in Scribbly Gum forest, with some study sites occurring within the reserve proposal. Densities that averaged 0.37 individuals/ ha occurred in Coastal Plains Smooth Barked Apple Woodland, found throughout the Awaba, Blackalls Park and Toronto Woodlands. The lowest density of individuals found in this study was 0.3 individuals per hectare. Extremely conservative estimations of the number of individuals that the proposed reserve could conserve, if using a population density of 0.3 individuals/ ha, suggest that the habitat of over 3000 additional Squirrel Gliders could be protected

This species is threatened throughout its range. The implementation of the recommendations of this document would assist considerable in the future conservation of this species in the medium to long term. Additionally, several state-significant Endangered Ecological Communities also occur throughout the proposed reserve. Gazettal of the conservation area would see a considerable increase in the reservation rate of these species and communities, significantly enhancing their long term viability.

6. Threats

The Western Lake Macquarie area is subject to a number of threatening processes. Several of these could be controlled by the instigation of effective management regimes for the forested area. The lack of existing active management has resulted in a number of preventable threats to the area's biodiversity.

The absence of a management regime has allowed the illegal dumping of waste at a number of sites. This generates potential for soil and groundwater pollution. Similarly, the unmanaged use of a number of areas by trail bikes and 4WD vehicles has resulted in the formation of eroded areas, and the absence of management has allowed existing erosion issues to be exacerbated. Invasive species also present a problem that may be solved by the instigation of management regimes. At present, there exist limited incentives and mechanisms for better environmental management of the area. This could be remedied by transfer to secure reservation tenure.

Increased habitat fragmentation, due to development pressures (such as haul roads and electricity easements) and lack of management (unauthorised vehicle trails) also provides a key threat to the maintenance of the areas ecological integrity. Within the Australian landscape, an absence of connectivity is considered to have a significant effect on the long term viability of populations of biota (Goldingay and Possingham 1995).

The Threatened Species Conservation Act 1995 (NSW) identifies fragmentation as a significant threat to the viability of populations. This has been tested in a legal setting. In assessing the impact of a highway near Nowra in southern New South Wales, the resulting fragmentation was found to be a threat to the long term viability of threatened species, specifically the Yellow Bellied Glider (Petaurus australis) and Giant Burrowing Frog (Heleioporus australiacus). Approval for the highway subsequently did not occur (Leatch vs. Leatch v. Director-General of National Parks & Wildlife Service and Shoalhaven City Council [1993] NSWLEC 191, No. 10376 of 1993 (1993.11.23) (Land and Environment Court of New South Wales) (Judgment).

Several specific development processes also present threats to the area. In Lake Macquarie City Council's (LMCC) 2009/10 Annual Report (2010:63), it is recognised that "demand for land is placing pressure on rural and bushland areas." The expansion of housing and light industrial development in the Western Lake Macquarie region presents an ongoing threat, with developments such as the expansion of the Toronto Industrial Estate and housing developments at Blackalls Park, Toronto and Buttaba all requiring bushland clearance.

The threat of bushland clearance from these developments can be mitigated by the protection of the areas in question under secure conservation tenure. This approach is consistent with the LMCC's response to development pressure, that is, to review planning controls "to ensure they are not discouraging medium density infill redevelopment that reduces pressure for new greenfield development (LMCC 2010: 63)".

A high-profile threat to the bushland of Western Lake Macquarie, and the surrounding environment and community, is surface coal-mining. Strong community opposition resulted in the defeat of a proposed open-cut mine at Awaba in 2007, followed by the creation of a State

Environmental Planning Policy that explicitly bans open-cut mining in the Lake Macquarie area. Subsequently, however, a proposal for an 'auger' mine, a modified form of open-cut, was pursued, although the proponent abandoned the project in 2009.

The ongoing possibility of similar proposals provides uncertainty as to the future of the area's bushland, and reservation would provide security for the community of Lake Macquarie, and ensure that the ecological systems of the area remain intact.

The LHRCP identifies the biodiversity values of the area, however fails to protect them. This produces a serious threat to the area

7. Areas of high conservation value in Western Lake Macquarie

The total area of high conservation value native vegetation in Western Lake Macquarie equals around 10,000 ha, with over 90% of this excluded from conservation reserves. The small extent that occurs within the Sugarloaf SCA is an excellent start to conservation, however additional work needs to be done if the biodiversity values of this area are to be maintained or enhanced in the medium to long term. Specific high conservation value areas identified below are proposed for protection.

Toronto woodlands (~500 ha)

The Toronto woodlands are an area of remnant forest and woodland that includes the Toronto ridgeline and connecting vegetation to the west, bordered by Wilton Road to the southwest and Forest Lake Estate to the northeast.

This area of remnant vegetation is dominated by Coastal Plains Smooth Barked Apple Woodland (vegetation units after Somerville 2006), but also includes Coastal Sheltered Apple-Peppermint in gullies and drainage lines, along with an area of Coastal Plains Scribbly Gum Woodland to the southeast of Awaba Dump. Coastal Foothills Spotted Gum Ironbark Forest occurs in isolated stands, for example along the Toronto ridgeline. The area contains high densities of T. juncea (Shortland Wetlands Centre Consultancy 1995) along with significant populations of A. inopina (C McLean, pers. obis) and A. bynoeana (C McLean pers. obs). All vegetation types in these woodlands are suitable for high density populations of Squirrel Glider (Smith and Murray 2003), along with large forest owls.

The remnant is approximately 500 ha in size and is relatively unfragmented with the exception of two 30 metre-wide electricity easements. Tenure of the Toronto woodlands is understood to be vacant Crown Land with isolated private land holdings, for example along the Toronto ridgeline. The remnant was proposed for conservation in the 1994 Awaba Nature Reserve proposal (SWC Consultancy 1995) and is predominantly zoned as conservation secondary: 7(2) in the current Lake Macquarie local environmental plan, with some areas zoned conservation primary: 7(1) in endangered ecological communities along streamsides.

Eraring woodlands (~2000 ha)

The Eraring woodlands are an area of remnant forest and woodland located to the west of Wangi Road in the east, the Eraring Power Station to the southeast, Wilton Road to the north and the Main Northern Railway to the west.

The woodlands have a similar vegetation structure to the Toronto woodlands and also contain similar threatened species, yet are a larger block of approximately 2000 ha in size. The area is of very high conservation value.

The tenure of the Eraring woodlands is understood to be vacant Crown Land along with some freehold land held by Eraring Energy. As with the Toronto woodlands this remnant was proposed for conservation in the 1994 Awaba Nature Reserve proposal (SWC Consultancy 1995) and is predominantly zoned as conservation secondary: 7(2).

Awaba woodlands (~4000 ha)

The Awaba woodlands are a diverse area of remnant forest and woodland located to the west of the township of Awaba the Main Northern Railway and to the east of Freeman's Drive. The area is bisected by Hawkmount Road, a two wheel drive accessible road.

The Awaba woodlands contain diverse ecological communities including Coastal Plains Smooth Barked Apple Woodland along ridgelines, Coastal Sheltered Apple- Peppermint Forest in gullies and sheltered mid slopes, and Coastal Foothills Spotted Gum Ironbark Forest near the township of Awaba. Coastal Plains Scribbly Gum Woodland occurs in the southeast of the site with a diverse midstorey of including Drumsticks (Isopogon sp), Christmas Bells (Blandfordia grandiflora) and Crinklebush (Lomatia silicifolia). Many of these species have disappeared from other areas in Lake Macquarie due to disturbance regimes (picking, clearing and frequent fire) that are incompatible with their conservation.

Masked Owl populations in the area were studied by Todd (2006) and have previously identified successfully-fledged chicks in 2005, indicating high prey abundance and a relatively intact ecosystem.

Along Lords Creek, a major permanent tributary occurring throughout the site, Alluvial Tall Moist Forest dominated by Coastal Blackbutt (Eucalyptus pilularis) and Forest Red Gum (Eucalyptus tereticornis) occur as the canopy species, with a mesic midstorey of Cheese Tree (Glochidion ferdinandi) and Sandpaper Fig (Ficus coronata). This community is an Endangered Ecological Community (River Flat Eucalyptus Forest) and contains Sooty, Powerful and Masked Owl populations. It has been estimated that at least 2000 individuals of T. juncea occur within the area (Shortland Wetlands Centre Consultancy 1995) along with records of G. parviflora and A. bynoeana (NSW DECCW 2011).

Tenure in the Awaba woodlands includes a small area of the Sugarloaf State Conservation Area to the north of Hawkemount Road. To the south of the Ryhope Crematorium, there exists vacant Crown Land, Centennial Newstan freehold, and crown leasehold, along with private land holdings. The area is predominantly zoned as natural resources, permitting mining and other extractive industries. Some small areas are zoned conservation secondary: 7(2).

In autumn 2009 a Centennial Coal haul road was approved. The Haul Road resulted in the removal of over 3.5 km of native vegetation and the removal of numerous individuals of several threatened flora species. Numerous hollow bearing trees, being required habitat features for the conservation of a range of threatened mammalian species such as the Squirrel Glider, were also removed.

Blackalls Park woodlands (~4000 ha)

The Blackalls Park woodlands have a similar floristic composition to those of the Toronto woodlands, dominated by Coastal Plains Smooth Barked Apple Woodland along ridges and mid slopes, with Coastal Sheltered Apple- Peppermint Forest occurring in gullies and drainage lines. Significant areas of T. juncea occur within these woodlands.

The Blackalls Park woodlands occur to the west of Blackalls Park and continue to the F3 Freeway.

The tenure of the Blackalls Park woodlands is mainly freehold land with some vacant crown land occurring. A significant (~1000 ha) area directly to the east of the F3 Freeway is contained with the Sugarloaf State Conservation Area. This bushland, with the exception of the conservation area, is zoned natural resources, permitting mining and other extractive industries.

In 2009 Centennial Coal proposed an auger mine in the Blackalls Park woodlands that had the potential to remove a significant amount of native vegetation and to detrimentally impact upon the aquatic environments of LT Creek. Fortunately community opposition saw the withdrawal of this proposal, however in the future further proposals can still occur.

Wyee Woodlands (>2000 ha)

The Wyee Woodlands are dominated by Coastal Plains Scribbly Gum Woodland, and are rich in threatened flora species including Charmhaven Apple (Angophora inopina), Leafless Tongue Orchid (Bell 2001), Bynoe's Wattle (Bell 2002), Black Eyed Susan (Payne 2000) and Grevillea parviflora ssp parviflora. The vegetation structure in the Wyee woodlands, having high densities of Hairpin Banksia (Banksia spinulosa), has been shown to support densities of up to 0.71 Squirrel Gliders/ ha (Smith and Murray 2003). With such high densities of Squirrel Gliders, the long term conservation of the Wyee woodlands should be considered of paramount importance if viable populations of this threatened species are to remain in the local area.

The Wyee Woodlands are expansive, covering several thousand hectares, including areas held by the Koompahtoo Local Aboriginal Land Council as a result of a successful land claim. It appears that at least 2000 ha of woodland are vacant crown land, in particular those along Wyee Road. The Wyee Woodlands are contiguous to the Morisset section of the Lake Macquarie SCA, which if protected would allow lakeside connectivity. The zoning of the Wyee Woodlands is predominantly 7(1), due to the extent of threatened species occurring in the area, yet proposals that may degrade the biodiversity values of this area are extant. These include housing development plans by Koompahtoo Local Aboriginal Land Council, along with previous development plans by Morisset Golf Club.

State Significant Wetlands in Western Lake Macquarie

There are several State Significant Wetlands, (identified under State Environmental Planning Policy 14) in Western Lake Macquarie that are of a high conservation value. In particular, wetlands along Dora Creek, including Muddy Lake, are of a high conservation value due to

breeding avifauna. The Toronto Wetlands also support significant populations of breeding waterfowl. These wetlands are crown land and are currently unmanaged.

The vegetation type in the area's wetlands is predominately Swamp Oak forest. This community is listed as an Endangered Ecological Community under the Threatened Species Conservation Act 1995 (NSW), due to its limited remaining distribution and low representation in conservation reserves (DECCW 2008). The wetland supports a breeding colony of Cattle (Ardea ibis), Intermediate (Egretta intermedia) and Great Egret (A. alba), one of only two in Lake Macquarie and of only one of six in the Hunter Region.

Current threats to the wetlands include weed invasion by species such as Lantana (Lantana camara). While volunteer Landcare groups attempt to manage some of these reserves, weed invasion is a serious threat to the conservation of indigenous biota, and the management of public lands should see volunteer efforts accompanied by government support.

Conclusion

The bushlands of Western Lake Macquarie provide unique and valuable refugia for a number of threatened species and ecological communities. Many local residents also have strong attachments to and appreciation of the natural values of the area.

There exist a range of threats that threaten to undermine both the ecological integrity and health of the bushland and wetland areas, and, consequently, the attachments and appreciation of the area held by local residents. Existing and previous efforts to safeguard this valuable area have to-date failed to comprehensively address the range of threats.

A long-term solution that protects both natural ecosystems and the flora and fauna that depend on them, and satisfies community desires for stronger protection of their communal backyard, is to institute conservation of the area. This could be achieved easily and with minimal cost by the transfer of areas of unallocated crown land to Regional Park and State Conservation Area tenure administered by the National Parks and Wildlife Service.

It is the authors' firm belief that such protection would be widely appreciated and applauded by the local community, and would go a long way towards ensuring the protection of the area's valuable biodiversity.

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Powerful Owl *(Ninox strenua)*

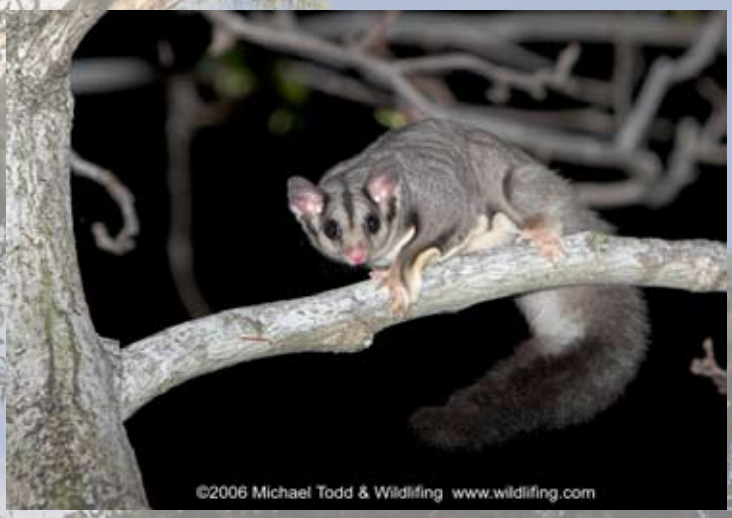
- Found thoughout the reserve proposal area
- Requires up to one Ringtail Possum a day as prey
- Needs a tree at least 250 years old to breed
- Threatened in New South Wales

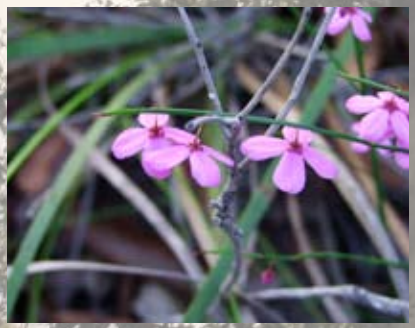
Photo: C. Mclean, Powerful Owl in Lords Creek.

Squirrel Glider (*Petaurus norfolcensis*)

- Requires hollows in trees of at least 120 years old
- Threatened through out its range
- Can glide up to 90 metres
- The Central Coast/Lake Macquarie region has the highest density of Squirrel Gliders anywhere on the planet

Photo: Mick Todd





Black-Eyed Susan (*Tetratheca juncea***)**

- Low growing, usually leafless plant with deep lilac-pink or occasuinally white flowers
- The majority of the extent of this nationally-threatened herb occurs in Western Lake Macquarie (Payne 2000).
- At present the major population of *T. juncea* is outside of conservation reserves, with only limited populations reserved in Western Lake Macquarie.

Photo: C. Mclean

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