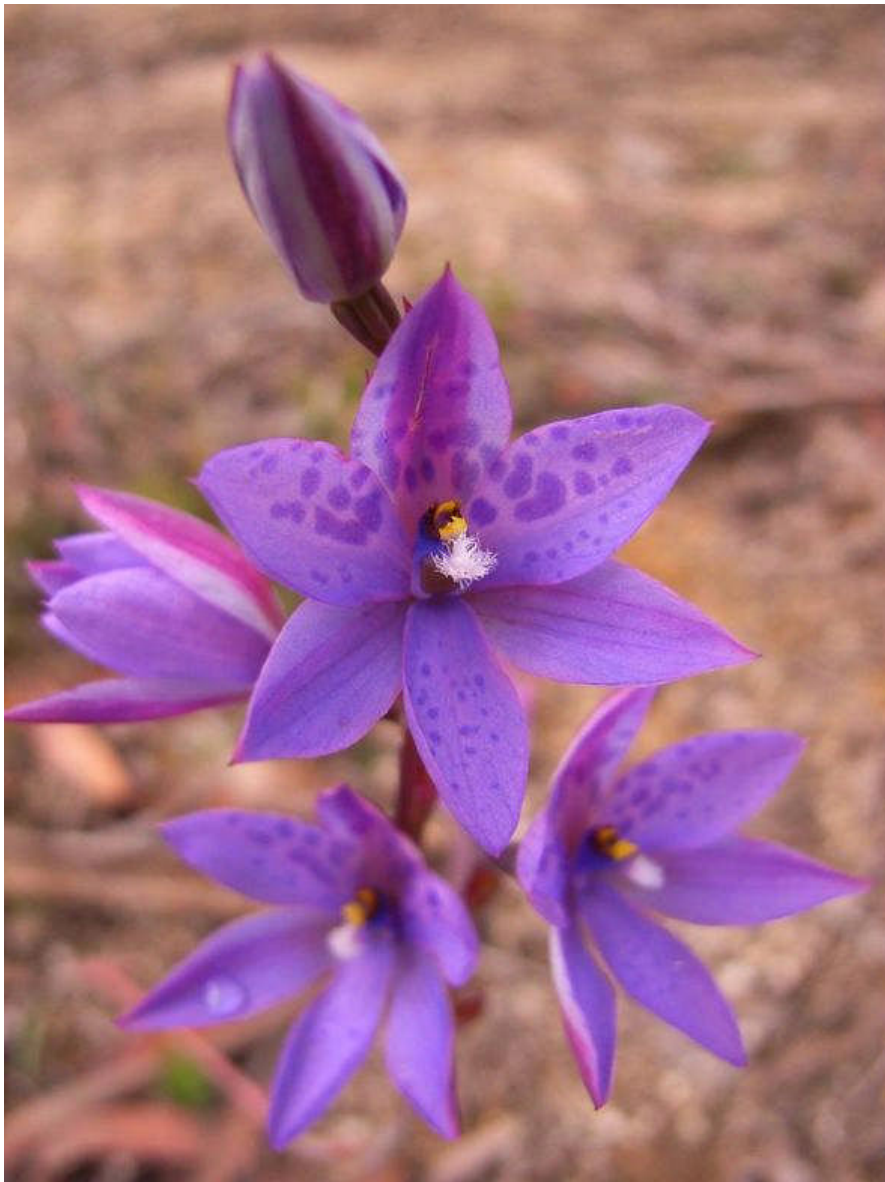


Attachment C
Management Information Notes
for
Bezzants Lease
Conservation Area



Spotted sun orchid

Threatened species and ecological communities profiles

The following profiles are provided with permission from NSW Department of Environment and Climate Change. Profiles of species listed under the commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the NSW *Threatened Species Conservation Act 1995* are sourced from the DECC website:

<http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx>

Some information from these sources has been omitted for the purposes of this plan, full profile information can be found at the above mentioned website. The Nature Conservation Trust is responsible for ensuring the most current profile information available has been sourced from the Departmental websites.

Maps of location records are sourced from the NSW Government Bionet website:

<http://www.bionet.nsw.gov.au/SpeciesFound.cfm?SearchType=Sci&Agency=AMPub%2CNP%2CFishPub%2CStateFPub&AreaName=NSW+incl.+Lord+Howe&MapAreaType=3&MapType=All+NSW&AreaID=2&Kingdom> (accessed 8/1/10).

Conservation status in NSW: Vulnerable**Description**

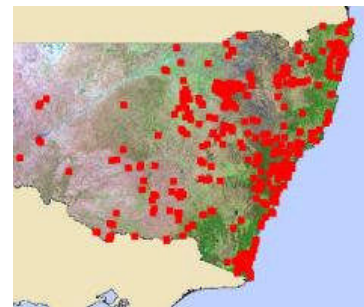
The Barking Owl is a typical hawk-owl, with staring, yellow eyes and no facial-disc. It is grey to greyish-brown above, with white spots on the wings and almost white underneath with greyish-brown vertical streaks. The larger male may be up to 45 cm in length, larger than the Southern Boobook *Ninox novaeseelandiae* and smaller than the Powerful Owl *N. strenua*. It has an unmistakable, quick, dog-like 'wook-wook' territorial call, which it repeats. Pairs of birds perform call-and-answer duets; the male's call is slower and deeper. It also has a rather terrifying, high-pitched tremulous scream, heard early in the breeding season, that has earned it the name 'screaming-woman bird'.

Distribution

The Barking Owl is found throughout Australia except for the central arid regions and Tasmania. It is quite common in parts of northern Australia, but is generally considered uncommon in southern Australia. It has declined across much of its distribution across NSW and now occurs only sparsely. It is most frequently recorded on the western slopes and plains. It is rarely recorded in the far west or in coastal and escarpment forests.

Habitat and ecology

- Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting.
- During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as Acacia and Casuarina species, or the dense clumps of canopy leaves in large Eucalypts.
- Feeds on a variety of prey, with invertebrates predominant for most of the year, and birds and mammals such as smaller gliders, possums, rodents and rabbits becoming important during breeding.
- Live alone or in pairs. Territories range from 30 to 200 hectares and birds are present all year.
- Three eggs are laid in nests in hollows of large, old eucalypts including River Red Gum (*Eucalyptus camaldulensis*), White Box (*Eucalyptus albens*), (Red Box) *Eucalyptus polyanthemos* and Blakely's Red Gum (*Eucalyptus blakelyi*).
- Breeding occurs during late winter and early spring.



Location records in NSW
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Threats

- Clearing and degradation of habitat, mostly through cultivation, intense grazing and the establishment of exotic pastures.
- Inappropriate forest harvesting practices that have changed forest structure and removed old growth hollow-bearing trees.
- Firewood harvesting resulting in the removal of old trees.
- Too-frequent fire which causes degradation of understorey vegetation which provides habitat and foraging substrate for prey species.

What needs to be done to recover this species?

- Apply mosaic pattern hazard reduction techniques to ensure the same areas are not burned too frequently.
- Retain standing dead trees.
- Retain woodland and open forest remnants, especially those containing hollow-bearing trees.
- Retain and enhance vegetation along watercourses and surrounding areas to protect roosting areas and habitat for prey.
- Retain a buffer of native vegetation at least 200 metres radius around known nest sites.
- Fence habitat remnants and protect from heavy grazing.

References

- Garnett, S. and Crowley, G. M. (2000). *The Action Plan for Australian Birds*. Published by Environment Australia. Canberra, ACT.
- Higgins, P.J. (ed), 1999. *Handbook of Australian, New Zealand and Antarctic Birds. Volume 4*. Oxford University Press.
- NSW National Parks and Wildlife Service (2003) *Draft Recovery Plan for the Barking owl (Ninox connivens)*. NSW NPWS, Sydney.
- NSW Scientific Committee (1998) *Barking Owl - Vulnerable species determination - final*. DEC (NSW), Sydney.
- Pizzey, G. and Knight, F. (2003). *The Field Guide to the Birds of Australia 7th Edition*. Menkhorst, P. (ed). HarperCollins.
- Robinson, D. and Traill, B. J. (1996). *Conserving woodland birds in the wheat and sheep belts of southern Australia*. RAOU Conservation Statement No. 10. Birds Australia, Melbourne.

Conservation status in NSW: Vulnerable**Description**

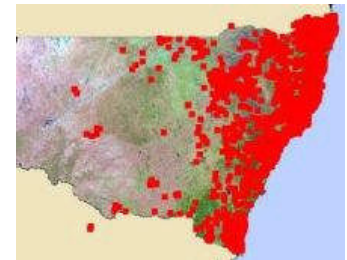
The Koala is an arboreal marsupial with fur ranging from grey to brown above, and is white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows.

Distribution

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the western region. It was historically abundant on the south coast of NSW, but now occurs in sparse and possibly disjunct populations. Koalas are also known from several sites on the southern tablelands.

Habitat and ecology

- Spend most of their time in trees, but will descend and traverse open ground to move between trees.
- Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.
- Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.
- Females breed at two years of age and produce one young per year.
- Inhabit eucalypt woodlands and forests.
- Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.
- Inactive for most of the day, feeding and moving mostly at night.



Record locations in NSW
© NSW Government 2004

Threats

- Loss, modification and fragmentation of habitat.
- Predation by feral and domestic dogs.
- Intense fires that scorch or kill the tree canopy.
- Road-kills.

What needs to be done to recover this species?

- Undertake feral predator control.
- Apply low intensity, mosaic pattern fuel reduction burns in or adjacent to Koala habitat.
- Retain suitable habitat, especially areas dominated by preferred feed-tree species.
- Protect populations close to urban areas from attacks by domestic dogs.

- Identify road-kill blackspots and erect warning signs, reduce speed limits or provide safe crossing points to reduce Koala fatalities.
- Revegetate with suitable feed tree species and develop habitat corridors between populations.

References

- Martin R.W. and Handasyde K.A. (1995). Koala (pp. 196-8) in Strahan, R.(ed.), *The Australian Museum Complete Book of Australian Mammals*. Angus & Robertson, Sydney.
- Martin, R. & Handasyde, K. 1999. *The Koala: natural history, conservation and management*. University of New South Wales Press Ltd, Sydney.
- Menkhorst P.W. (1995). Koala (pp.85-8) in *The Mammals of Victoria - Distribution, Ecology and Conservation*. Oxford University Press, Australia.
- Menkhorst, P. and Knight, F. (2001). *A Field Guide to the Mammals of Australia*. Oxford Uni Press, Melbourne.
- NSW National Parks and Wildlife Service (2003) *Draft Recovery Plan for the Koala (Phascolarctos cinereus)*. NSW NPWS, Sydney.
- Reed, P.C., Lunney, D. and Walker, P. 1990. A 1986-1987 survey of the koala *Phascolarctos cinereus* (Goldfuss) in New South Wales and an ecological interpretation of its distribution. In *Biology of the Koala*. Lee, A.K., Handasyde, K.A. and Sanson, G.D.

Conservation status in NSW: Vulnerable**Description**

The Glossy Black-cockatoo is a dusky brown to black cockatoo with a massive, bulbous bill and a broad, red band through the tail. The red in the tail is barred black and edged with yellow. The female usually has irregular pale-yellow markings on the head and neck and yellow flecks on the underparts and underwing. They are usually seen in pairs or small groups feeding quietly in she-oaks. They are smaller than other black-cockatoos (about 50 cm in length), with a smaller crest.

Distribution

The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.

Habitat and ecology

- Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur.
- In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*).
- Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill.
- Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August.

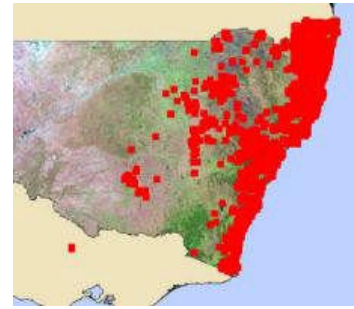
Threats

- Reduction of suitable habitat through clearing for development.
- Loss of tree hollows.
- Excessively frequent fire which reduces the abundance and recovery of she-oaks.
- Illegal bird smuggling and egg-collecting.

What needs to be done to recover this species?

- Reduce the impact of burning to retain diverse understorey species and in particular to permit the regeneration of she-oaks.

- Protect existing and future hollow-bearing trees for nest sites.
- Retain and protect areas of native forest and woodland containing she-oaks.
- Establish forested corridors linking remnant areas of habitat; include local she-oak species in bush revegetation works.
- Report suspected illegal bird trapping and egg-collecting to the DEC.



Location records in NSW
© NSW Government 2004

References

- Foreshaw, J. M. (2003) *Australian Parrots*. CSIRO Publishing.
- Higgins, P.J. (ed), (1999) *Handbook of Australian, New Zealand and Antarctic Birds*. Volume 4. Oxford University Press.
- Pizzey, G. and Knight, F. (2003) *The Field Guide to the Birds of Australia 7th Edition*. Menkhorst, P. (ed). HarperCollins.
- Robinson, D. and Traill, B. J. (1996) *Conserving woodland birds in the wheat and sheep belts of southern Australia*. RAOU Conservation Statement No. 10. Birds Australia, Melbourne.
- Walpole, S.C. and Oliver, D. L. (2000) Observations of Glossy Black-Cockatoos *Calyptorhynchus lathami* feeding on the seeds of Bulloke *Allocasuarina luehmannii*. *Australian Bird Watcher* 18, 284-285.

Conservation status in NSW: Vulnerable**Description**

The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with staring yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juvenile Powerful Owls have a white crown and underparts that contrasts with its small, dark streaks and dark eye patches. The call of this species may be heard at any time of the year, but it is more vocal during the winter breeding season. It has a slow, deep and resonant double hoot, with the female's being higher pitched and expressing an upward inflection on the second note.

Distribution

The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered, mostly historical records on the western slopes and plains. Now uncommon throughout its range where it occurs at low densities.

Habitat and ecology

- The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.
- The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angorhophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.
- The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute



Record locations in NSW
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almost all of the prey for a pair of Powerful Owls. Birds comprise about 10% of the diet, with flying foxes important in some areas. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.

- Pairs of Powerful Owls are believed to have high fidelity to a small number of hollow-bearing nest trees and will defend a large home range of 400-1450 ha.
- Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. During the breeding season, the male Powerful Owl roosts in a "grove" of up to 20-30 trees, situated within 100-200 metres of the nest tree where the female shelters.
- Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days.

Threats

- Historical loss and fragmentation of suitable forest and woodland habitat from land clearing for residential and agricultural development. This loss also affects the populations of arboreal prey species, particularly the Greater Glider which reduces food availability for the Powerful Owl.
- Inappropriate forest harvesting practices that have changed forest structure and removed old growth hollow-bearing trees. Loss of hollow-bearing trees reduces the availability of suitable nest sites and prey habitat.
- Can be extremely sensitive to disturbance around the nest site, particularly during pre-laying, laying and downy chick stages. Disturbance during the breeding period may affect breeding success.
- High frequency hazard reduction burning may also reduce the longevity of individuals by affecting prey availability.
- Road kills.
- Secondary poisoning.
- Predation of fledglings by foxes, dogs and cats.

What needs to be done to recover this species?

- Apply low-intensity, mosaic pattern fuel reduction regimes.
- Searches for the species should be conducted in suitable habitat in proposed development areas and proposed forest harvesting compartments.
- Retain at least a 200 metre buffer of native vegetation around known nesting sites.
- Retain large stands of native vegetation, especially those containing hollow-bearing trees.
- Protect riparian vegetation to preserve roosting areas.
- Protect hollow-bearing trees for nest sites. Younger recruitment trees should also be retained to replace older trees in the long-term.
- Minimise visits to nests and other disturbances, including surveys using call playback, when owls are breeding.
- Assess the importance of the site to the species' survival. Include the linkages the site provides for the species between ecological resources across the broader landscape.

References

- Debus, S.J.S. and Chafer, C.J. (1994). *The Powerful Owl Ninox strenua in New South Wales. Australian Birds* 28 supplement: S21-S38.
- Higgins, P.J. (ed), 1999. *Handbook of Australian, New Zealand and Antarctic Birds. Volume 4*. Oxford University Press.
- Kavanagh, R.P. (1988). The impact of predation by the Powerful Owl, *Ninox strenua*, on a population of the Greater Glider, *Petauroides volans*. *Australian Journal of Ecology* 13: 445-450.
- Kavanagh, R.P. (1992). Reply. The impact of predation by the Powerful Owl *Ninox strenua* on a population of the Greater Glider *Petauroides volans*. *Australian Journal of Ecology* 17: 469-472.
- Kavanagh, R.P. (2002). Comparative diets of the Powerful Owl (*Ninox strenua*), Sooty Owl (*Tyto tenebricosa*) and Masked Owl (*Tyto novaehollandiae*) in southeastern Australia. In Newton, I., Kavanagh, R., Olsen, J. and Taylor, I. (eds.). *Ecology and Conservation*.
- Kavanagh, R.P. and Stanton, M.A. (2002c). Response to habitat fragmentation by the Powerful Owl (*Ninox strenua*), Sooty Owl (*Tyto tenebricosa*) and Masked Owl (*Tyto novaehollandiae*) and other nocturnal fauna in southeastern Australia. In Newton, I., Kavanagh, R., Olsen, J. and Taylor, I. (eds.). *Ecology and Conservation*.
- NSW Department of Environment and Conservation (2005) *Draft Recovery Plan for the Large Forest Owls: Powerful Owl Ninox strenua, Sooty Owl Tyto tenebricosa, Masked Owl Tyto novaehollandiae*. NSW DEC, Sydney.
- Pavey, C.R. (1995). Food of the Powerful Owl *Ninox strenua* in suburban Brisbane, Queensland. *Emu* 95: 231-232.
- Pavey, C.R., Smyth, A.K. and Mathieson, M.T. (1994). The breeding season diet of the Powerful Owl *Ninox strenua* at Brisbane, Queensland. *Emu* 94: 278-284.
- Pizzey, G. and Knight, F. (2003). *The Field Guide to the Birds of Australia 7th Edition*. Menkhorst, P. (ed). HarperCollins.
- Robinson, D. and Traill, B. J. (1996). *Conserving woodland birds in the wheat and sheep belts of southern Australia*. RAOU Conservation Statement No. 10. Birds Australia, Melbourne.
- Soderquist, T.R., Lowe, K.W., Loyn, R.H., and Price, R. (2002). Habitat quality in Powerful Owl (*Ninox strenua*) territories in the Box-Ironbark forest of Victoria, Australia. In Newton, I., Kavanagh, R., Olsen, J. and Taylor, I. (eds.). *Ecology and Conservation*.

Conservation status in NSW: Vulnerable**Description**

The Varied Sittella is a small (10 cm) songbird with a sharp, slightly upturned bill, short tail, barred undertail, and yellow eyes and feet. In flight the orange wing-bar and white rump are prominent. In NSW most individuals have a grey head and are streaked with dark brown, but in the extreme north-east they have a white head, and in the extreme south-west a black cap. Varied Sittellas are more active and acrobatic among branches than the larger treecreepers. They fly into the heads of trees, typically working their way down branches and trunk with constant motion.

V

Distribution

The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.

Habitat and ecology

- Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.
- Feeds on arthropods gleaned from crevices in rough or decorticated bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.
- Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.
- Generation length is estimated to be 5 years.

Threats

- Population viability is sensitive to habitat isolation and simplification, including reductions in tree species diversity, tree canopy cover, shrub cover, ground cover, logs, fallen branches and litter.
- Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement.
- The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches.
- Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection.

What needs to be done to recover this species?

- Retain existing vegetation and remnant stands along roadsides and in paddocks.
- Increase the size of existing remnants by planting trees and establishing buffer zones.
- Where remnants have lost connective links, re-establish links by revegetating corridors or stepping stones.
- Limit firewood collection and retain dead timber in open forest and woodland areas.
- Encourage regeneration of habitat by fencing remnant stands and managing the intensity and duration of grazing.
- Control weeds in areas of known habitat.

References

- Barrett, G.W., Silcocks, A.F., Cunningham, R., Oliver, D.L., Weston, M.A. and Baker, J. (2007) Comparison of atlas data to determine the conservation status of bird species in New South Wales, with an emphasis on woodland-dependent species. *Australian Zoologist* 34, 37-77.
- Higgins, P.J. and Peter, J.M. (Eds) (2002) *Handbook of Australian, New Zealand and Antarctic Birds. Volume 6: Pardalotes to shrike-thrushes*. Oxford University Press, Melbourne.
- NSW Scientific Committee (2010) *Varied *Sitella Daphoenositta chrysoptera*- vulnerable species. Final determination*, DECCW, Sydney.
- Olsen, P., Weston, M., Tzaros, C. and Silcocks, A. (2005) *The State of Australia's Birds 2005: Woodlands and birds*. Supplement to *Wingspan* 15(4).
- Seddon, J.A., Briggs, S.V. and Doyle, S.J. (2003) Relationships between bird species and characteristics of woodland remnants in central New South Wales. *Pacific Conservation Biology* 9, 95-119.
- Watson, J., Freudenberger, D. and Paull, D. (2001) An assessment of the focal-species approach for conserving birds in variegated landscapes in southeastern Australia. *Conservation Biology* 15, 1364-1373.
- Watson, J., Watson, A., Paull, D. and Freudenberger D (2003) Woodland fragmentation is causing the decline of species and functional groups of birds in southeastern Australia. *Pacific Conservation Biology* 8, 261-270.

Conservation status in NSW: Vulnerable**Description**

Scrambling Lignum is a scrambling climber. The low straggling stems are up to 5 m long and have turned up ends. The oval-shaped leaves are 3 - 14 cm long and 1.5 - 9 cm wide. The flowers are spread evenly along the branches and produce black, warty, shiny nuts 2.5 - 3.5 mm long. These are covered by large fleshy flower parts when ripe. Large numbers of seedlings appear following bush fires, with most plants living for only 2 - 3 years. Rare individuals may live for 10 years.

Distribution

Scattered distribution from Queensland to the Blue Mountains in NSW. Records on the New England Tablelands and North West Slopes include Bald Rock north of Tenterfield, Warra and Butterleaf National Parks near Glen Innes and Mt Kaputar.

Habitat and ecology

Grows in coarse sandy soils and peat in heath, mallee and open eucalypt woodland on granite or acid volcanic outcrops at higher altitudes.

Threats

- Inappropriate fire regime.
- Risk of local extinction due to scattered populations.
- Trampling and soil compaction by bushwalkers.

What needs to be done to recover this species?

- Keep to formed tracks when visiting national parks.
- Manage fire in areas of known habitat to maintain and encourage Scrambling Lignum.
- Protect areas of potential habitat from clearing or fragmentation.
- Report any new records of Scrambling Lignum to the DEC.

References

- NSW National Parks and Wildlife Service (2003) *Threatened Species of the New England Tablelands and North West Slopes of NSW*. NPWS, Coffs Harbour.
- NSW Scientific Committee (2002) *Muehlenbeckia costata (a scrambling herb) - Vulnerable species determination - final*. DEC (NSW), Sydney.

***Muehlenbeckia costata* K.L.Wilson & Mackinson m.s. (3VCa; TSC Act Schedule 2, Vulnerable) (information provided by J. Hunter 2011).**

Taxonomy

Type: Not formally described.

Reference: NA.

Family: Polygonaceae

Affinities: *M. rhyticarya*.

Synonymy: none, but informally known as *M. sp.* Mt Norman.

Derivation of name: *Costatus* meaning having more than one primary midrib, presumably in reference to the ribbed stems.

Common name: none apparent.

Changes in conservation status: 3KC- (Briggs and Leigh 1996). Listed as Vulnerable on the TSC Act. Raised to 3VCa by Hunter *et al.* (1998).

Life history

Growth form: Trailing to weakly erect herb to 5 m.

Vegetative spread: none.

Longevity: 1 to possibly 3 years.

Primary juvenile period: 2 months.

Flowers: continuous for the life span of the individual.

Fruit/seed: continuous for the life span of the individual.

Dispersal, establishment & growth: via fruit covered by fleshy sweet calyx. Possibly dispersed by lizards or birds. Seed banks are extremely long lived and fresh seed probably has a dormancy period. Seeds survive temperatures of 120°C for over 10 minutes and subsequently germinate.

Fire response: disturbance ephemeral with explosive population growth after fires and rapid declines. Though fires in quick succession will not germinate seed, requires long interfire period.

Interactions with other organisms: all populations appear to become infested by a rust fungus at around 1 yr of age in both the field and in glasshouse seedlings. The species probably has a low resistance to pathogens due to its increased efforts in reproduction.

Distribution

Botanical sub-regions: Darling Downs, Northern Tablelands and Central Tablelands.

General distribution: generally in areas above 1100 m from Mount Kaputar to Bald Rock, Glen Innes, Backwater and a disjunct distribution in the Blue Mountains.

Distribution within the Mt Kaputar NP: Restricted to the summit of Mt Kaputar.

Habitat

Habitat: wholly restricted to the post disturbance environment on exposed granite, acid volcanic or sandstone surfaces.

Altitude: 500-1500 m.

Annual Rainfall: 600-1400 mm.

Abundance: boom and bust population strategy.

Substrate: Sheet granite and exposed rhyolitic outcrops and sandstone.

Exposure: fully exposed sites.

Management

Population size: many hundreds of individuals seen also growing on rock outcrops after high intensity fire.

Reserved: Mt Kaputar National Park, Girraween National Park, Bald Rock National Park, Butterleaf National Park, Warra National Park, Willala AA and the Blue Mountains National Park.

Threats: inappropriate fire regimes.

Management considerations: appropriate fire regimes is the only management criteria at this stage. Fires may need to have long intervals and be of high temperatures when they do occur.



Plate: Photograph of *Muehlenbeckia costata*.

Montane Peatlands & Swamps

of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands & Australian Alps

Introduction

These guidelines provide background information to assist land managers and approval authorities to identify remnants of Montane Peatlands and Swamps, an Endangered Ecological Community (EEC). For more detailed information refer to the Montane Peatlands and Swamps Profile and the NSW Scientific Committee Final Determination at: threatenedspecies.environment.nsw.gov.au



Keith McDougall

A bog in the Australian Alps bioregion.

What is an Endangered Ecological Community?

An ecological community is an assemblage of species which can include flora, fauna and other living organisms that occur together in a particular area. They are generally recognised by the trees, shrubs and groundcover plants that live there. An Endangered Ecological Community is an ecological community listed as facing a very high risk of extinction in NSW under the *Threatened Species Conservation Act 1995*.

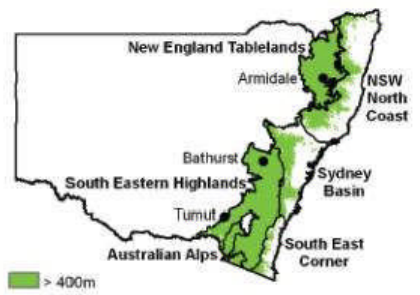
What are Montane Peatlands and Swamps?

Montane Peatlands and Swamps are generally a treeless community of plants with scattered dense shrubs, including Tea-trees (*Leptospermum* species), *Baeckea* species, *Epacris* species, *Callistemon* species and/or *Hakea* species, and a groundlayer of grasses, sedges and herbs. The community often has large amounts of *Sphagnum* moss (the hummock peat forming mosses) in the understorey mixed with a layer of sedges. This community is often referred to as either a Bog or Fen. Fens are found in the wettest part of a site

and consist of mainly herbs and soft leaf sedges/grasses, whilst Bogs consist of more sclerophyllous shrubs.

There are a number of different recognisable structural types within the Montane Peatlands and Swamps community. Particularly, where soils are derived from basalt the community tends to consist of dense soft leaved tussock sedges and grasses with few shrubs and not usually with *Sphagnum* moss. On more siliceous soils, the community consists of more sclerophyllous (hard-leaved) shrubs and rhizomatous sedges (i.e. with horizontal underground stems), although this variation may also be a product of impeded drainage. The community may include more permanently inundated and localised marsh and open-water areas.

Where are Montane Peatlands and Swamps found?



Montane Peatlands and Swamps occur on undulating tablelands and plateaux, above 400m elevation, generally in catchments with soils derived from basalt, fine-grained sedimentary soils, or occasionally, granite or metamorphic sedimentary substrates. They are associated with accumulated peaty or organic-mineral sediments on poorly drained flats in the headwaters of streams. They are found in New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps Bioregions as mapped. This community occurs from above 400m and extends into the sub-alpine (1500-1800m) and alpine areas (>1800m).

Description of the community

The Tree layer

Montane Peatlands and Swamps do not have an overstorey of tree species but will often be surrounded by woodland containing Snow-Gum (*Eucalyptus pauciflora*), Black Sally (*E. stellulata*) and/or Mountain Gum (*E. dalrympleana*) and may contain isolated individuals of small trees such as Black Sally or Blackwood (*Acacia melanoxylon*).

The Shrub layer

The shrub layer of this community is mostly open to very sparse, comprising shrubs 1-5 m tall, and commonly include species of *Baekkea*, *Callistemon* (bottlebrushes), *Leptospermum* (tea-trees), *Epacris* and *Hakea microcarpa*. Denser, closed shrubland or wet heath may also occur in localised swamp areas. Swamp-dwelling *Grevilleas* such as *Grevillea acanthifolia* or *G. rosmarinifolia* may also occur. In some peatlands and swamps, particularly those with a history of disturbance to vegetation, soils or hydrology, the shrub layer comprises dense thickets of *Leptospermum* species. In other peatlands and swamps with a history of grazing by domestic livestock, the shrub layer may be very sparse or absent.

The Ground layer

The community has a continuous groundcover of sedges, grasses, herbs and wildflowers, except where a dense cover of tall shrubs casts deep shade. Soft-leaved species of *Carex* and *Poa* species typically make up most of the groundcover plants, with other common sedge-like plants including *Baloskion* species, *Baumea rubiginosa*, *Empodisma minus*, *Juncus* species, *Xyris* species and *Schoenus apogon*. On some substrates, these sedge-like species may dominate the groundcover. Herbs and wildflowers growing amongst the sedges include *Drosera* species, *Geranium neglectum*, *Gonocarpus micranthus*, *Gratiola* species, *Ranunculus* species, *Viola* species and *Wahlenbergia ceracea*. Hummocks of *Sphagnum* moss may occur amongst other components of the ground layer and sometimes dominate the ground-layer in localised patches. The continuity of the ground layer may be interrupted by disturbances such as erosion, trampling, partial clearing, earthworks, or in localised seepage areas and water-filled depressions.

Degraded sites – conservation significance of remnants

The degree of disturbance (i.e. the site condition) of any remnant of Montane Peatlands and Swamps may vary dependant on past land use, management practices and/or natural disturbance and this should be considered at the time of assessment. Whilst not exhaustive, the following are a number of variations of Montane Peatlands and Swamps you may encounter on your land:

1. Occurrence of regrowth of native understorey species along with herbaceous and/or woody weeds due to prior clearing or fire;



John Harner

A Montane Peatland in Cathedral Rocks National Park with a dominant coverage of sedges and shrubs.

2. Exposed peaty terraces with incised gullies from trampling by stock (sheep, cattle) and feral hard hoofed animals (pigs, brumbies). Combined with lowered groundwater levels this can affect community structure and composition making the community prone to fire;
3. Weed invaded depressions from sedimentation and eutrophication associated with pastoral land uses, and sedimentation from drains, roadways and other developments;

Identifying Montane Peatlands and Swamps

The following are 'Key Indicators' to look for when determining whether Montane Peatlands and Swamps exist on a site:

1. Is the site above 400m in the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands or Australian Alps bioregion (see map)?
2. Is the site on a generally boggy flat area near the headwaters of a stream (refer to topographic maps)?
3. Is the site associated with accumulated peaty or organic-mineral sediments generally in catchments with soil derived from basalt or fine-grained sedimentary substrates or, occasionally, granite and metamorphic sediments (refer to soil maps)?
4. Does the site have a noticeably low number to complete absence of trees?
5. Does the site contain more than trace amounts of *Sphagnum* moss (if the community is highly stressed from drought or otherwise *Sphagnum* may be rare on site to completely absent)?
6. Is there a reasonable representation of the shrubs and groundcover species present from those listed as characteristic of Montane Peatlands and Swamps in the table (check with local botanist, consult reference books or go to plantnet.rbgsyd.nsw.gov.au)?

If you answered yes to the above questions your site is likely to consist of Montane Peatlands and Swamps and you should seek expert advice.

Characteristic Species List

Montane Peatlands and Swamps are characterised by the species listed in table below. They have been identified by the NSW Scientific Committee and from the scientific literature. The species present at any site will be influenced by the size of the site, recent rainfall or drought conditions and by its disturbance (including fire and grazing) history. Note that NOT ALL the species listed below need to be present at any one site for it to constitute Montane Peatlands and Swamps.

Scientific Name	Common Name (range)	Scientific Name	Common Name (range)
Tree Canopy Species >6m		Ferns	
<i>Eucalyptus dahrympleana</i>	Mountain Gum	<i>Blechnum nudum</i>	Fishbone Waterfern
<i>Eucalyptus ovata</i>	Swamp Gum (S - Oberon)	<i>Blechnum penna-marina</i>	Alpine Waterfern
<i>Eucalyptus pauciflora</i>	Snow Gum	<i>Gleichenia dicarpa</i>	Tangle Fern
<i>Eucalyptus stellulata</i>	Black Sally	<i>Previdium esculentum</i>	Bracken
Shrub Species (~1.5-6m)		Herbs and wildflowers	
<i>Asperula gunnii</i> +	Mountain Woodruff (S-Dor)	<i>Acaena novae-zelandiae</i>	Bidgee-Widgee
<i>Baeckea gunniana</i> +	Alpine Baeckea	<i>Arthropodium milleflorum</i>	Pail Vanilla-lily
<i>Baeckea utilis</i> +	Mountain Baeckea	<i>Brachyscome graminea</i>	Daisy
<i>Boronia Boroniadeanii</i>	Dean's Boronia (T)	<i>Chionogentias cunninghamiana</i>	Snow Gentian
<i>Callistemon pityoides</i>	Alpine Bottlebrush	<i>Drosera binata</i>	Forked Sundew
<i>Comesperma retusum</i>	Mountain Milkwort	<i>Drosera peltata</i>	Sundew
<i>Epacris breviflora</i>	Small Leaved Heath	<i>Epilobium billardierianum</i>	Willowherb
<i>Epacris microphylla</i>	Coral Heath	<i>Epilobium gunnianum</i>	Gunns Willow Herb (S-Arm)
<i>Epacris paludosa</i> +	Swamp Heath (S - B-Mtns)	<i>Geranium neglectum</i> +	Cranes Bill
<i>Grevillea acanthifolia</i>	Bog Grevillea	<i>Gonocarpus micranthus</i> +	Creeping Raspwort
<i>Grevillea rosmarinifolia</i>	Rosemary Grevillea	<i>Gratiola peruviana</i>	Australian Brooklime
<i>Hakea microcarpa</i> +	Small fruited Hakea	<i>Hydrocotyle peduncularis</i>	Pennywort
<i>Leptospermum juniperinum</i>	Prickly Tea-tree	<i>Hypericum gramineum</i>	Small St Johns Wort
<i>Leptospermum lanigerum</i>	Woolly Tea-tree (S - Mitta)	<i>Hypericum japonicum</i> +	Matted St John's Wort
<i>Leptospermum myrtifolium</i>	Myrtle Tea-tree (S - Ora)	<i>Isotoma fluviatilis</i>	Swamp Isotome
<i>Leptospermum obovatum</i>	A Tea-tree (S - Lith)	<i>Lagenifera stipitata</i>	Slender Lagenophora
<i>Leptospermum polygalifolium</i> subsp. <i>polygalifolium</i>	Tantoon (N - B-Tops)	<i>Lepyrodia anarthria</i>	Lepyrodia
Groundcover species (~0-1.5m)		<i>Lythrum salicaria</i>	Purple Loosestrife
Sedges		<i>Mitrasacme serpyllifolia</i>	Thyme Mitrewort
<i>Baloskion australe</i> +	Southern Cordrush	<i>Myriophyllum pedunculatum</i>	Water Milfoil
<i>Baloskion stenocoleum</i>	Cordrush	<i>Neopaxia australasica</i>	White Purslane
<i>Baumea rubiginosa</i>	Twigrush	<i>Oreomyrrhis ciliata</i>	Bog Caraway (S - B-Tops)
<i>Eleocharis acuta</i>	Spike-sedge	<i>Phragmites australis</i>	Common Reed
<i>Eleocharis pusilla</i>	Spike-sedge	<i>Prasophyllum canaliculatum</i>	Summer Leek Orchid (T)
<i>Eleocharis sphacelata</i>	Spike-sedge	<i>Pratia pedunculata</i>	Trailing Pratia
<i>Empodisma minus</i> +	Empodisma	<i>Prunella vulgaris</i>	Heal All
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge	<i>Ranunculus lappaceus</i>	Common Buttercup
<i>Juncus falcatus</i>	A Rush (S - Arm)	<i>Ranunculus pimpinellifolius</i>	Buttercup
<i>Juncus planifolius</i>	A Rush	<i>Sphagnum cristatum</i> +	Sphagnum
<i>Juncus sarophorus</i>	A Rush	<i>Sphagnum novo-zelandicum</i>	Sphagnum
<i>Schoenus apogon</i>	Common Bog Rush	<i>Spiranthes sinensis</i> subsp. <i>australis</i>	Ladies Tresses
<i>Scirpus polystachyus</i>	Large-headed Club Rush	<i>Stellaria pungens</i>	Pricky Starwort
Grasses		<i>Stylidium graminifolium</i>	Grass Trigger-plant
<i>Carex appressa</i>	Tall Sedge	<i>Utricularia dichotoma</i>	Fairy Aprons
<i>Carex fascicularis</i>	Tassell Sedge	<i>Scaevola hookeri</i>	Creeping Fan Flower
<i>Carex gaudichaudiana</i> +	Stream Sedge	<i>Viola betonicifolia</i>	Native Violet
<i>Deyeuxia gunniana</i>	Bent-grass	<i>Viola caleyana</i>	Swamp Violet
<i>Deyeuxia quadriseta</i>	Bent-grass	<i>Viola hederacea</i>	Ivy-leaved Violet
<i>Hyopxis hygrometrica</i>	Golden Weather Grass	<i>Wahlenbergia ceracea</i> +	Waxy Bluebell
<i>Poa costiniana</i>	(S - Glen Innes)		
<i>Poa labillardieri</i>	Tussock Grass		
<i>Poa sieberiana</i> var. <i>sieberiana</i> +	Snow Grass		

+ = Key Indicator Species*; N = North of; S = South of; Arm = Armidale; B-Mtns = Blue Mountains; B-Tops = Barrington Tops; Dor = Dorrigo; Lith = Lithgow; Mitt = Mittagong; Ora = Orange; (T) = Threatened Species. For further help with plant identification see: plantNET.rbgsvd.nsw.gov.au/search/simple.htm

* Key indicator species occurred in >20% of sites in [Whinam and Chilcott \(2002\)](#)



4WD vehicle tracks destroy soft peat soils and expose them to drying out, fire and weed incursion. Photo: Lucas McKinnon



A Montane Peatland and Swamp heavily impacted upon by fire. Photo: Ian Baird



Grazing in Montane Peatlands destroys soil structure and kills sensitive species such as *Sphagnum*. Photo: Lucas McKinnon



Fragile peat soils trampled by cattle on the edge of Wingecarribee Swamp. Photo: Lucas McKinnon

4. Extensive pine tree (*Pinus* species) and Pussy Willow (*Salix cinerea*) invasion around and within swamps which leads to altered community structure and shading out of native plants.
5. Some Montane Peatlands and Swamps may have lost their *Sphagnum* moss element due to a prolonged period of disturbance. Consider the other indicators outlined in this guideline before deciding whether or not you are within a remnant of this EEC.

Even where a remnant is considered to be heavily degraded and in poor condition, it may still have conservation value for a number of reasons including:

1. Swamps play an important role of filtering and slowly releasing water into the environment;
2. It may provide important habitat for threatened fauna such as Corroboree Frogs (*Pseudophryne pengilleyi* and *P. corroboree*) and Giant Dragonflies (*Petalura gigantea*);
3. It may contain threatened species of flora (e.g. Dean's Boronia or Summer Leek Orchid);
4. It may be part of a wildlife corridor that has connective importance at local and/or regional scales;
5. It may maintain a healthy native seed bank, very important in highly cleared landscapes;
6. It may have good restoration potential, requiring only minimal or moderate levels of intervention.

It is important to take these factors into account when determining the conservation significance of remnants.

For further assistance

This and other EEC guidelines are available on DECC Threatened Species website:

threatenedspecies.environment.nsw.gov.au

The references listed below also provide further information to aid in identifying EECs.

- Botanic Gardens Trust plant identification assistance: rbgsyd.nsw.gov.au/information_about_plants/botanical_info/plant_identification
- Botanic Gardens Trust PlantNET: plantnet.rbgsyd.nsw.gov.au/search/simple.htm
- Keith, D. (2004) *Ocean Shores to Desert Dunes. The Native Vegetation of NSW and the ACT*. Dept of Environment and Conservation.
- Harden, G. (ed) *Flora of NSW Vols 1 – 4* (1990-2002). NSW University Press.
- Montane Peatlands and Swamps EEC profile: threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10936
- NSW Scientific Committee Determinations: environment.nsw.gov.au/committee/FinalDeterminations.htm
- Thackway, R. and Cresswell, L. (1995) (eds) 'An interim biogeographic regionalisation of Australia: a framework for establishing the national system of reserves.' (Australian Nature Conservation Agency: Canberra).
- Whinam, J. Chilcott, N. and Morgan, J.W. (2002) *Floristic composition and environmental relationships of Sphagnum dominated communities in NSW & ACT*. Cunninghamia. Vol 7 (3), pp. 463-500.

Disclaimer: The Department of Environment and Climate Change has prepared this document as a guide only. The information provided is not intended to be exhaustive. It does not constitute legal advice. Users of this guide should do so at their own risk and should seek their own legal and other expert advice in identifying endangered ecological communities. The Department of Environment and Climate Change accepts no responsibility for errors or omissions in this guide or for any loss or damage arising from its use.



Sphagnum cristatum, stressed by the drought is normally a lush green colour. Photo: Lucas McKinnon



Small-leaved Hakea and Swamp Heath, shrub species common to Montane Peatlands & Swamps. Photos: Lucas McKinnon & Anne Carey



Empodisma (*Empodisma minus*). Photo: Lucas McKinnon

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New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion

Conservation status in NSW: Endangered Ecological Community

National conservation status: Critically Endangered Ecological Community

Description

This woodland community is dominated by trees of New England Peppermint *Eucalyptus nova-anglica* and occasionally Mountain Gum *E. dalrympleana* subsp. *heptantha*, and is usually 8-20 metres tall. The woodland has a predominantly grassy understorey with few shrubs. The species present at a site will vary according to recent rainfall or drought condition and the degree of disturbance (including fire).

Distribution

In NSW all sites are within the New England Tablelands. This community is or has been known to occur in the Armidale Dumaresq, Guyra, Inverell, Severn and Tenterfield Local Government Areas, but may occur elsewhere on the New England Tablelands. It has recently been identified in eastern portions of Namoi CMA on the tablelands. Reserves containing the community include Bolivia Hill, Boorolong, Mount Duval, Yina and Imbota Nature Reserves and Warra National Park.

Habitat and ecology

The community occurs primarily in valley flats subject to cold air drainage. The valley flats are composed of basaltic soils, fine-grained sedimentary and acid volcanic substrates with poorly drained loam-clay soils.

Threats

- Clearing for grazing and agricultural development.
- Clearing for infrastructure such as roads and powerlines.
- Pasture improvement.
- Weed invasion.
- Dieback.

What needs to be done to recover this species?

- Support local landcare groups and catchment management initiatives.
- Assist with the control of feral animals.
- Retain fallen timber in New England Peppermint woodlands.
- Fence off remaining remnants and encourage regeneration of the understorey.
- Assist with the control of introduced weeds such as blackberry, rosehip and introduced grasses.
- Protect areas of New England Peppermint on basalt and sediments from clearing, pasture improvement, and grazing.
- Protect areas of New England Peppermint on basalt and sediments from roadworks and powerline installation.
- Expand and reconnect isolated remnants of this community.

References

- Benson, J.S. and Ashby, E.M. (2000) Vegetation of the Guyra 1:100 000 map sheet New England Bioregion, New South Wales. *Cunninghamia* **6**: 747-872.
- NSW Scientific Committee (2003) *New England peppermint woodland on sediments in the New England Tableland Bioregion - Endangered ecological community determination - final*. DEC (NSW), Sydney.

Pest animal fact sheets

The information and photograph in the following fact sheet are sourced from the Department of Environment, Climate Change and Water, accessed 20/12/2010 from <http://www.environment.nsw.gov.au/pestsweeds/FeralPigFactsheet.htm>.

Feral Pig

Sus scrofa

History

Feral pigs originated from domestic stock brought to Australia by the early European settlers. By the 1880s feral pig populations were fully established in NSW and they can now be found across about 38 per cent of the continent. As a result, by August 2004, 'predation, habitat degradation, competition and disease transmission by feral pigs' had been listed as a key threatening process by both the federal and NSW governments.

Distribution in NSW today

Medium-to-high densities of feral pigs are most prevalent in western and northern NSW. They prefer wetlands, floodplains and watercourses. About 30 million hectares in NSW is free of feral pigs with around 10 per cent of this area in national parks.

This means that NSW national parks have relatively more areas free from this pest animal than other land tenures. In fact, the NSW National Parks and Wildlife Service (NPWS), now part of the Department of Environment and Conservation, has over 600,000 hectares more pig-free land than would be expected for the proportion of land it manages (about 8 per cent of the state).

Impact on the environment and agriculture

Feral pigs cause severe environmental degradation by:

- feeding selectively on plant communities;
- creating drainage channels in swamps;
- eroding soil and fouling watering points with their wallowing;
- eating frogs, reptiles, birds and small mammals;
- spreading weeds and possibly disease.

Damage by feral pigs is estimated to cost Australian agriculture over \$100 million a year. Feral pigs can kill and eat young lambs, compete with livestock for pasture and drought feed, and damage fences and waterholes. They are also a major potential host of a number of exotic diseases such as foot-and-mouth disease.

Management by NPWS

NPWS has control programs for all parks and reserves where feral pigs pose a significant problem. Many of these are in conjunction with local landholders and other government or non-government agencies such as rural lands protection boards (RLPBs). NPWS also directs considerable resources to tackling illegal pig hunting, which disrupts pig control programs and often allows dogs to escape into parks. Illegal hunters may also release pigs and vandalise or steal NPWS traps.

Control techniques

Aerial shooting of feral pigs is most commonly used by NPWS because it is more efficient than shooting from the ground. However ground shooting is used where trees obscure vision from the air. Pigs fitted with radio collars are sometimes used to guide shooters to the location of other feral pigs, a control method known as the 'Judas pig' technique. Trapping and 1080 baiting are also used in some areas.

Weed information

The following information sheet on Blackberry control is extracted from the Glen Innes Severn Council Weeds Management Plan, accessed on 11/2/2011 from:

http://www.gisc.nsw.gov.au/files/53444/File/Class_4_Weeds_Management_Plan_Booklet.doc. The Weeds Management Plan is under review at the time of writing this Plan. Updated weed management information should be sought from the above website.

For more information on blackberry and control methods see the Weeds Australia website: <http://www.weeds.org.au/WoNS/blackberry/>.

The following information on coolatai grass control was accessed on 2/6/2011 from:

http://www.northwestweeds.nsw.gov.au/coolatai_grass.htm.



GLEN INNES SEVERN COUNCIL WEEDS MANAGEMENT PLAN

BLACKBERRY

(*Rubus fruticosus* aggregate species)

Declaration: Blackberry is classified as a Class 4 noxious weed in the Glen Innes Severn Council Area, under the Noxious Weed Act 1993. Declaration of this weed is for a **5-year period Starting 1-3-2006 and Finishing 1-3-2011.**

Why Blackberry is a Class 4 Noxious Weed:

- It is a major problem of pastures and native forests, along streams, gullies and roadsides.
- It is invasive, covers large areas and excludes light from the soil surface;
- Completely dominates the vegetation of an area in a very short time.
- Impedes the re-vegetation of native plants.
- Sheep can become entangled in thickets and die of thirst and hunger.
- It can harbour pest animals, particularly foxes and rabbits.

Class 4 noxious weeds control objectives:

- They must be managed in such a way as to 'minimise the negative impact of the weed on the economy, community or the environment of New South Wales'.
- The growth and spread of the plant must be controlled according to the measures specified in this Management Plan published by the Glen Innes Severn Council.
- The plant may not be sold, propagated or knowingly distributed.

REQUIREMENTS & CONTROL MEASURES

The Glen Innes Severn Council will control Blackberry growing on all land for which it has responsibility under the *Noxious Weed Act 1993*, using herbicides registered for the control of Blackberry.

Owners/Occupiers of land are obligated and required to actively control Blackberry to prevent it from spreading, and its numbers and distribution must be reduced.

Owners/Occupiers of infested land are obligated and required to control Blackberry using all or any of the following methods:

- a. **Chemical-** Blackberry is to be treated effectively with a herbicide registered for the control of Blackberry, in the manner specified on the label.
- b. **Mechanical-** Blackberry maybe removed by grubbing, hoeing or ploughing to remove the crowns, or slashed to prevent spreading.
- c. **Cultural-** Blackberry maybe strategically grazed with either goats or sheep to consistently defoliate the plants and control emerging seedlings. This method is only acceptable when the plant is effectively prevented from flowering and setting fruit with an overall reduction in bush size.

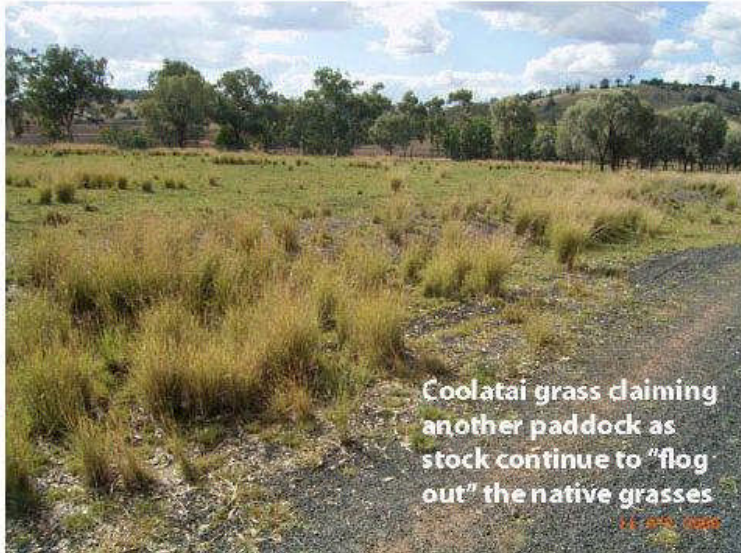


North West Weeds

NOXIOUS WEED CONTROL UNIT FOR GWYDIR AND INVERELL SHIRES

Please address all correspondence to the General Manager, Gwydir Shire Council, Locked Bag 5, BINGARA, NSW, 2404 - Phone 02 6729 1016, faxes 02 6729 1400, email tannerl@northnet.com.au

Coolatai Grass



Coolatai grass claiming another paddock as stock continue to "flog out" the native grasses

Coolatai grass (*Hyparrhenia hirta*) has taken over large areas of the north west and is still spreading. Generally regarded as a weed, it is usually avoided by stock because of its low digestibility. During drought conditions, however, it can and does supplement stock feeding programs.

According to research being carried out by NSW Dept of Primary Industries, grazing management, soil nutrition and legume species can improve the value of Coolatai grass.

For information on these management options contact NSW Dept of Primary Industries agronomists at Tamworth ([Lester McCormick](#)) or at Inverell ([Bob McGufficke](#)). Or, go to the NSW Dept of Primary Industries weeds website to download a copy of [Management of Coolatai Grass on the North West Slopes of NSW](#)



Coolatai grass seeds - very small and sticky! Bingara 29/6/03 (LRT)

Photo (right) shows seed attached to the front number plate of a motor vehicle driven 50 metres along a track covered with (wet) Coolatai grass!

Coolatai grass can spread to new areas very quickly!

Coolatai grass has an amazing capacity to spread. During its seeding phase, the plant produces thousands of tiny, sticky seeds which adhere readily to animals, farm machinery and motor vehicles.



MORE INFORMATION? PLEASE CONTACT YOUR LOCAL WEEDS OFFICER:

Stephen Kneller Bingara 0427 240 061	Clem McLeod Inverell 0427 453 052	Doug Stieger Warialda 0427 291 912	Les Tanner Head Office 0427 241 806
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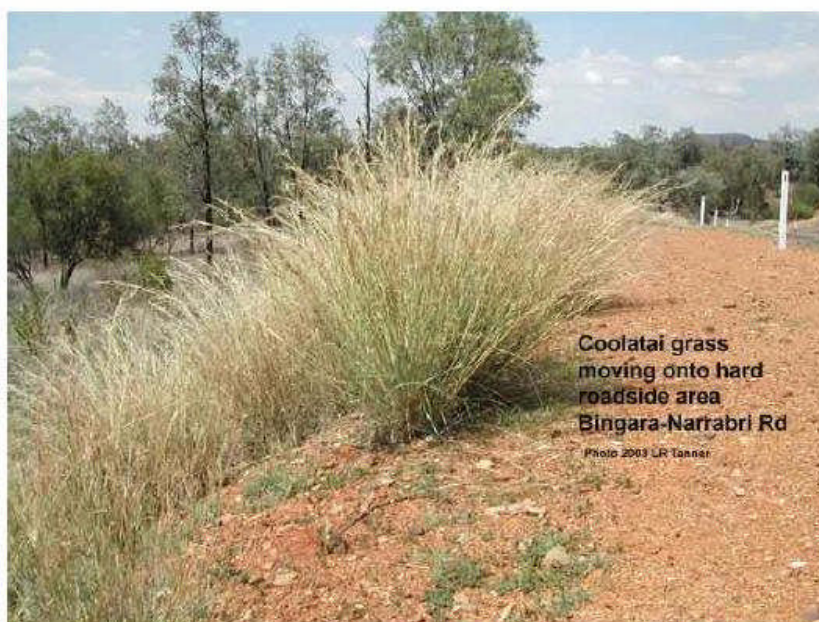
OR check out our website on www.northwestweeds.nsw.gov.au

Control methods:

Coolatai grass is NOT a declared noxious weed within Inverell and Gwydir Shires. However, all landholders are urged to discourage entry of this invasive plant onto their properties!

Every effort should be made to prevent Coolatai grass from becoming established in new areas. It doesn't take long for one plant to contaminate a roadside or an individual property.

Treatment - either manual removal or herbicide application - should be carried out before the plant has a chance to produce seed. Regular follow-up is essential to prevent further establishment.



Herbicides?

No herbicides are registered in NSW for boom spraying of Coolatai grass. There is one permit for spot spraying of Coolatai grass (NSW)

[Permit PER7883](#)

In force 25 Oct 2004 to 30 September 2009

PLEASE READ AND FOLLOW PERMIT DIRECTIONS

The permit sets out conditions for the use of glyphosate and flupropanate products for treatment of Coolatai grass in native pastures and non-crop situations including rights-of-way, bushland, forests, reserves and roadsides.

Chemical	Rate: Spot	Comments
Glyphosate 360 g/L various trade names	2.0 L in 100 L of water	Apply to actively growing plants before flowering. Wet to run-off, ie. 1000-2000 L/ha. Spray 2 - 3 times Sep to May Only use the tankmix once per season.
Glyphosate 360 g/L Various trade names PLUS Flupropanate 745 g/L eg Tussock Herbicide®	2.0 L glyphosate PLUS 200 mL flupropanate in 100 L of water	Apply to actively growing plants before flowering. Wet to run-off, ie. 1000-2000 L/ha. Spray Jul to Oct (addition of flupropanate is most effective during spring). Only use the tankmix once per season.

DISCLAIMER: The information contained herein is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of North West Weeds or the user's independent adviser.

(LRT 15/06/06)

DECC NPWS Checklist for Bush Regeneration Activities

The following checklist has been provided to assist Landholders to understand ecological issues when conducting bush regeneration and weed control works in Conservation Areas. The checklist is intended to be a guide and is not a list of conditions which must apply.

The Trust encourages Landholders to apply for a Section 132C licence under the *National Parks and Wildlife Act 1974* or a licence granted under Section 91 of the *Threatened Species Act 1995* (flora and ecological communities). The Trust also encourages Landholders to require commercial Bush Regenerators working in their Conservation Areas to hold a licence as above.



Checklist For Bush Regeneration Activities In The Habitat Of Threatened Species, Endangered Populations And Endangered Ecological Communities

Background

Threatened species, endangered populations and endangered ecological communities are protected in NSW under the *Threatened Species Conservation Act 1995* (TSC Act).

It is an offence to “harm” or “pick” threatened species, populations or ecological communities, or cause “damage” to critical habitat or the habitat of threatened species, populations or ecological communities¹.

“Harm” refers to native fauna, and is defined as to: hunt, shoot, poison, net, snare, spear, pursue, capture, trap, injure, or kill.

“Pick” refers to native flora, and is defined as to: gather, pluck, cut, pull up, destroy, poison, take, dig up, remove or injure the plant or any part of the plant.

“Damage” is not defined but the common dictionary definition would apply.

It is a defence to a prosecution if the action was:

- authorised in accordance with a Section 120 licence or a Section 132C licence under the *National Parks and Wildlife Act* or a licence granted under Section 91 of the TSC Act (flora and ecological communities);
- authorised in accordance with a development consent under the *Environmental Planning & Assessment Act 1979*; or
- authorised by or under the Rural Fires Act 1997, or the State Emergency and Rescue Management Act 1989.

Bush regeneration activities

Areas where bush regeneration is undertaken are often the habitat of threatened species or may be an endangered ecological community (e.g. Lowland Rainforest on Floodplain). It is understood that the intention of bush regeneration activities is to have a positive impact, however, there is a chance that

these activities may adversely impact on threatened species, populations or ecological communities. This may occur where:

- a species (flora or fauna) is not known to exist on the site (e.g. cryptic species such as orchids);
- a species may be accidentally harmed or picked (e.g. by spray drift or accidental cutting).
- a species may be misidentified and is thought to be either an exotic or common native species and therefore may be removed or damaged;
- the requirements of the species, including habitat structure and components, may be temporarily adversely impacted (e.g. maintaining microclimatic conditions, connecting or sheltering habitat for fauna);

Licensing

Those undertaking bush regeneration activities may consider applying for a Section 132C licence under the NPW Act.

A Section 132C licence is issued where the NPWS considers that the proposed work is for conservation purposes.

Licence Conditions

Generally, licences are issued on an annual basis; however, shorter or longer term licences are also issued where appropriate.

The NPWS may prohibit, condition, or limit bush regeneration works in some areas where it may affect research plots. Other licence conditions may be applied after consideration of population estimates, age structure, viability and health of the population or individuals.

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The Bush Regeneration Checklist

The intention of the checklist is to ensure that bush regeneration activities will **not** have a significant impact on threatened species, populations or ecological communities and their habitats.

Applicants should consider attaching this standard checklist to any Section 132C licence application to assist the NPWS in assessing the significance of the proposed activity. The NPWS will assume the applicant is prepared to adhere to the guidelines in the checklist where they form part of the licence application. Detail of any proposed work additional or contrary to that described in the checklist must be provided. The NPWS then assesses the likely significance of the impact of the proposal² using the information provided in the licence application.

For the purposes of the checklist, bush regeneration is considered as all types of habitat restoration and may include such activities as manual weed removal, herbicide use, temporary damage to, or removal of native plants, planting, track work or maintenance and habitat removal or modification.

1. Threatened Species are listed under two schedules on the *Threatened Species Conservation Act*: Schedule 1 includes Endangered Species, Endangered Populations and Endangered Ecological Communities and Schedule 2 includes Vulnerable species. The *Threatened Species Conservation Act* Schedules are maintained by the NSW Scientific Committee. The most recent versions of these schedules may be obtained on the NPWS Web Site: www.nationalparks.nsw.gov.au.
2. A Species Impact Statement must be prepared where a proposed activity is assessed as likely to have a significant impact on threatened species, populations or ecological communities.
3. The Wildlife Atlas is the NPWS statewide flora and fauna database.

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NPWS Checklist For Bush Regeneration Activities:

Please Note:

- 1) The checklist is provided to facilitate licence applications and to draw attention to NPWS issues of concern.
- 2) There is no requirement to use the checklist when applying for a licence. You may alternatively choose to provide details of your project and an explanation of how you will ensure there will not be a significant impact on threatened species, their habitat or on endangered ecological communities.
- 3) If you provide a negative answer using the checklist this does not necessarily mean your application will be unsuccessful. You will however need to provide a satisfactory explanation as to why you do not wish to comply with the guideline and how you will ensure there is unlikely to be a significant impact on threatened species, their habitat or on endangered ecological communities.
- 4) You may wish your licence application to cover the collection of Voucher Herbarium Specimens and Plant Material for Identification. Guidelines to cover those activities are also attached.

Management Planning:	yes	no	more info attached
The proposed activities will be in accordance with a management plan or site plan (map). <i>Please attach the plan or relevant sections of the plan or strategy to the licence application.</i>			
The project has been discussed with the relevant Landcare coordinator. <i>If not, provide details of any other professional advice you have sought, e.g. from a qualified bush regenerator.</i>			
A NPWS Wildlife Atlas database search of a 5km radius of the site has been undertaken to identify threatened flora/fauna species known or likely to occur on the site. <i>The Wildlife Atlas is accessible on the NPWS Web Site www.nationalparks.nsw.gov.au.</i>			
Prior to commencing any works on site, a permit or permission will be obtained from the relevant landowner(s) or land manager(s).			
Training and supervision:			
All workers carrying out bush regeneration and associated works will be supervised by a trained and experienced co-ordinator who has completed a recognised bush regeneration course (e.g. the Certificate of Bushland Regeneration) or a minimum of 2 years bush regeneration experience. <i>If 'yes', please provide below the name and qualifications of the co-ordinator.</i> Name: Qualifications/experience:.....			
Other members of the group that have bush regeneration training or experience. Name: Qualifications/experience: Name: Qualifications/experience:..... Name: Qualifications/experience:..... Name: Qualifications/experience:..... Name: Qualifications/experience:.....			
All activities by workers will be regularly checked and approved by the co-ordinator.			
All workers will be informed of any threatened species or endangered ecological communities known from the area or which may occur in the area and the potential impacts of activities on these species/communities. <i>e.g. vines on the edge of a littoral rainforest remnant may protect the remnant from salt-bearing winds.</i>			
All workers have adequate weed and native plant identification skills. <i>i.e. all workers can identify and differentiate between weeds and native plants that occur on the site.</i>			

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	yes	no	more info attached
Workers will be familiar with the identifying features of threatened flora that are known or likely to occur in the project area. Where threatened species known from the area are similar to weed species, the distinguishing features between these will be understood prior to commencing the work.			
Access to sites			
All vehicular access to sites will be restricted to formed roads.			
Unnecessary damage to sites will be avoided. <i>e.g. avoid working in wet weather to lessen soil compaction.</i>			
To reduce the possibility of introducing plant diseases and weeds the following measures will be applied: 1. Secateurs will be sharp and cleaned with methylated spirits. 2. Footwear will be cleaned of loose soil and preferably treated with bleach between sites.			
Impacts on flora:			
Prior to any works being undertaken, the presence or absence of threatened flora will be determined by a thorough walking search of the area.			
All threatened flora will be tagged with highly visible flagging tape before work commences. If a number of individuals occur in a clump, the area should be marked out with flagging tape.			
Cutting or damaging of threatened flora will be avoided.			
All plants will be positively identified before they are removed (pulled, cut, poisoned etc).			
Weed removal within 2m of a threatened species will be undertaken by hand.			
Impacts on fauna:			
All workers will be aware of any threatened fauna that are known or likely to occur on site, and the potential impacts of the proposed activities on those species.			
The habitat and refuge potential of weeds and rubbish will be considered prior to removal. <i>e.g. Lantana can provide cover for threatened fauna such as the Bush-hen. Dead Lantana and poisoned Camphor Laurels should, where possible, be left in situ.</i>			
Weeds will be removed gradually in areas where an infestation is extensive. <i>Ideally, 50% of weeds that may provide habitat should be left until native plant species have re-established and provide alternative refuge.</i>			
Disturbance to, and removal of rocks, logs and other potential refuge sites will be avoided.			
A herbicide registered for use near waterways will be used within 5m of waterways.			
Herbicide spraying will be restricted to a distance greater than 5 metres from watercourses where threatened frogs are known or likely to occur and within a 10m radius of records of threatened frogs.			
A buffer of 1m along other watercourses will be maintained in which no herbicide will be sprayed.			
Care will be taken to minimise disturbance to shy or cryptic species. <i>e.g. the Marbled Frogmouth roosts in vine 'curtains'.</i>			
Care will be taken to minimise disturbance to the leaf litter layer.			
Reconstruction through revegetation: This section does not address propagation or planting of threatened species – this activity would need to be separately addressed.			
Seed collection or cuttings will be from species, populations or ecological communities other than those listed as threatened (unless licensed by NPWS).			
Prior to collecting any seed or cuttings permission will be obtained from the relevant landholder or manager of the site. <i>e.g. a licence is required to collect native plants on National Parks estate.</i>			
Seed collection from any one species will be limited to less than 10% of the available crop at that site.			
Seed collection from any individual plant will be limited to less than 10% of the available crop.			

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	yes	no	more info attached
If your seed source is used by other seed collectors, has consideration been given to minimising any cumulative impacts to the source plants? <i>Some individual plants are known as a reliable seed source and their seed is collected extensively. This may result in – (i) a reduction in genetic diversity); (ii) an impediment to the individual’s natural ability to regenerate.</i>			
When collecting propagation material from a wild population, collection will be random from as many individuals as possible across the population to ensure a representative range of genetic material is collected. Collectors will avoid selection of propagation material on the basis of physical attributes. <i>e.g. tallest, most attractive, greatest amount of seed or flowers.</i>			
Plantings will be sourced from stock of local provenance.*			
Will propagated material collected only be used at the subject site? <i>i.e. excess material will only be used at other sites if it meets the provenance criteria.</i>			
A buffer of 5 metres will be maintained around all threatened plant specimens. Planting will only be undertaken outside this buffer. <i>This requirement is intended to protect the roots of the threatened plant from damage or introduction of disease.</i>			
Care will be taken to ensure that mulch does not introduce weeds or impede natural regeneration at the site.			
Care will be taken to ensure that weeds and/or phytophthora are not introduced to a site from pots of cultivated plants.			
Consideration will be given to the possible impacts of plantings on the ecological requirements of threatened species at the site <i>e.g. reduced light, competition, etc.</i>			
Species will be planted within their natural habitat and range. Plantings will be guided by the plants’ local habitat preferences. <i>e.g. the species used for plantings along watercourses should be those that naturally occur in that habitat in your local area.</i>			
Herbicide use: <i>A permit from the National Registration Authority for Agricultural and Veterinary Chemicals PO Box E240, Kingston ACT 2604 may be required for herbicide use that is not consistent with conditions specified on the label.</i>			
A buffer of 2m will be maintained around all threatened plant specimens. Herbicide use will only be undertaken outside this buffer.			
Herbicide use will cease where there are any signs of threatened species being affected by herbicide. <i>e.g. browning off, wilting, deformed growth.</i>			
All herbicide spray operators will be capable of undertaking precise and effective weed control.			
Spray will be directed away from threatened flora.			
Herbicide will only be sprayed in suitable weather conditions when the impact of spray drift (windy) or run-off (wet) on threatened flora is minimised.			
Marker dyes e.g. white field marker’ will be mixed with herbicide before use. <i>Marker dye enables the worker to see where the spray is landing.</i>			
Reporting and data records:			
Any new records of threatened species will be provided within three months to NPWS. These records will be in a format appropriate for entry into the Wildlife Atlas, once identification of a threatened species is confirmed by a recognised authority. <i>Wildlife Atlas cards available on request.</i>			

*Local provenance species should be regarded as those species propagated from material that has been collected from a natural wild population as close as possible to a site. For example, within the local catchment – which may be based on a local creek.

Please sign below, keep a copy for your records and attach all original pages of checklist, and any additional information, to your application form.

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I, the undersigned, agree that the proposed bush regeneration activities are in accordance with all items checked above, additional information attached and the licence application form.

Name (please print)

Signature

Date

Further reading

- Buchanan, R. (1989) *Bush Regeneration: Recovering Australian Landscapes*. TAFE Student Learning publication, Sydney.
- Buchanan, R. (1992) "Site assessment – a vital part of bush regeneration" in *Urban Bushland in Western Sydney*. Seminar Proceedings, Nature Conservation Council of NSW, 1992.
- FloraBank (1999) *Guidelines 5: Seed collection from woody plants for local revegetation*. FloraBank, ACT.
- FloraBank (1999) *Guidelines 6: Native seed collection methods*. FloraBank, ACT.
- FloraBank (2000) *Guideline 10: Seed Collection ranges for revegetation*. FloraBank, ACT
- Greening Australia NSW (1999) *Management principles to guide the restoration and rehabilitation of indigenous vegetation*. Greening Australia NSW, Sydney.
- Harden, G. (1990-1993; 2002) *Flora of NSW*, Vols 1-4. University of NSW Press, Kensington.
- Joseph, R. (1999) An integrated, systematic approach to rainforest remnant restoration. In *Rainforest Remnants – A Decade of Growth*. Proceedings of a conference on rainforest regeneration., NSW National Parks and Wildlife Service, Alstonville.
- McDonald, T. (1993) Strategic plans for bush regeneration. in *Bushland in Our Cities and Suburbs Part 1: Making Planning Work*. Seminar Proceedings, Nature Conservation Council of NSW, 1993.
- McDonald, T. (1994) What are we doing with ecosystem resilience and the restoration of damaged plant communities. in *Bushland in Our Cities and Suburbs Part 2: Making Bush Regeneration Work*. Seminar Proceedings, Nature Conservation Council of NSW, 1994.
- NSW National Parks and Wildlife Service. (2000) *Threatened species of the lower north coast of NSW*. NSW NPWS, Coffs Harbour
- NSW National Parks and Wildlife Service. (2002) *Threatened species of the upper north coast of NSW*. Vol 1. Fauna. Vol 2. Flora. NSW NPWS, Coffs Harbour

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Guidelines for the Collection of Voucher Herbarium Specimens and Plant Material for Identification and Research

Introduction

The following guidelines have been prepared by the NPWS to ensure that survey for and collection of threatened flora species will not further threaten the survival of a species or population of that species. Adherence to these guidelines will ensure that the collection of voucher herbarium specimens is unlikely to have a significant effect on threatened species or their habitats.

In order to achieve this, any collection must not further threaten the survival of a species or an individual wild population of that species. Potentially damaging collecting would include the removal of plants from populations of very low numbers, taking cuttings from plants that are unlikely to survive such action or the collection of reproductive material that might significantly alter reproductive viability or fecundity of individuals.

Basic guidelines

1. Know the threatened species, populations and ecological communities likely to be in the area.
2. Prior to commencing any collecting of threatened plants on lands controlled by the NPWS, permission will be obtained from the relevant Area Office.
3. Prior to commencing any collecting of threatened plants on lands other than those controlled by NPWS permission should be obtained from the relevant landowner or land manager.
4. Avoid unnecessary damage to sites or plants. Beyond any existing formed roads, access to sites must be by foot. Avoid frequent visits to the same sites.
5. Where collections of specimens for a site or population lodged with an authorised herbarium are less than ten years old, samples will not be taken. Alternative recording, such as photography and detailed site documentation should be undertaken in such circumstances.
6. No repeat collections from populations sampled within ten years will be

conducted, unless it is part of a specific program approved by the NPWS.

Collecting samples for voucher herbarium specimens and identification and research

1. Specimens are to be removed using clean and sharp secateurs to ensure a clean and neat cut scar is left on sampled plants and that the possibility of transferring plant diseases is reduced.
2. Unless special requirement for the identification of the species is necessary, when collecting cutting, do not take more than 5% of the individual and specimens from no more than two individuals in any discrete population.
3. Only small branchlets or stem sections or whole plants of annuals sufficient to make a standard size herbarium specimen are to be removed.
4. When collecting reproductive material (ie. seeds, fruits or flowers) do not take more than 5% of reproductive material from any individual plant.
5. When collecting entire herbaceous plants, no more than 5% of the total population is to be collected, and no specimens are to be taken if the population to be sampled is less than 20 individuals.
6. Avoid collecting from small populations. When essential to verify a possible new record for an area, or to obtain a scientific voucher, collect only a single specimen. Do not collect samples so large as to adversely affect the population's reproduction and survival.
7. Do not collect whole plants when plant parts are sufficient.
8. Never collect the only plant at a site.
9. Where cuttings are required for the purpose of genetic analysis, no more than 10 specimens per individual will be taken, and no more than 5% of the individual plant's foliage.

Data Records

1. Once identification has been confirmed, any records of threatened species will be provided to the NPWS in a format appropriate for entry into the NPWS Atlas of NSW Wildlife within three months of collection.
2. Any person who becomes aware of new plant species records for NSW or populations considered