Protecting and restoring Blue Gum High Forest

CMA Sydney Metropolitan Catchment Management Authority

Australian Government

Ku-ring-gai Council

Department of **Environment & Climate Change** NSW

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Introduction

As Sydney has developed, much original native vegetation has been cleared or disturbed. As a result, many native plants and animals have become locally extinct, or there are so few of them living in isolated communities that they are threatened with extinction.

The Department of Environment and Climate Change and Sydney Metropolitan Catchment Management Authority are working with local government and the community to protect endangered remnants of native vegetation in Sydney and the threatened species that live in them.

This booklet explains how you can help preserve the critically endangered blue gum high forest. For example, you may go on an educational bushwalk, build a nest box for a native bird or join a bushcare group. This brochure also lets you know about valuable work already occurring to preserve the St Ives blue gum high forest, which is Sydney's largest surviving remnant of blue gum high forest.

You can obtain other threatened species brochures at www.environment.nsw.gov.au/threatenedspecies or contact the Environment Line on 131 555.

Blue gum high forest
Photo: Alan Kwok

Powerful owl
Photo: David Wilks

What is blue gum high forest?

Blue gum high forest is a unique community of trees, shrubs, grasses and groundcovers that once covered large areas of the shale-capped ridge-tops of Sydney's northern districts.

It is named after the Sydney blue gum (*Eucalyptus saligna*), just one of the common trees in this type of forest. It is called 'high forest' because the trees in this forest type can grow to a height of over 30 metres and are some of the tallest trees in Australia. Blue gums can measure over 8 metres around the base of their trunks.

Blue gum high forest canopy
Photo: David Wilks

Why is it so important?

Blue gum high forest:

- is a unique assembly of plants, from giant trees to tiny ground orchids and grasses
- provides habitat and shelter for a range of native animals, including the grey-headed flying-fox and glossy black cockatoo, that are listed as threatened in the *Threatened Species Conservation Act 1995*
- is part of the distinctive landscape of the Sydney region, and is not found anywhere else in Australia
- provides a living link to ancient Australia – blue gum high forest acts as a window to the past, revealing the native landscape the local Aboriginal Guringai people and early non-Aboriginal settlers would have seen in the eighteenth century
- contains trees that form hollows large enough to shelter animals such as the threatened powerful owl, parrots, possums and tiny insectivorous bats.

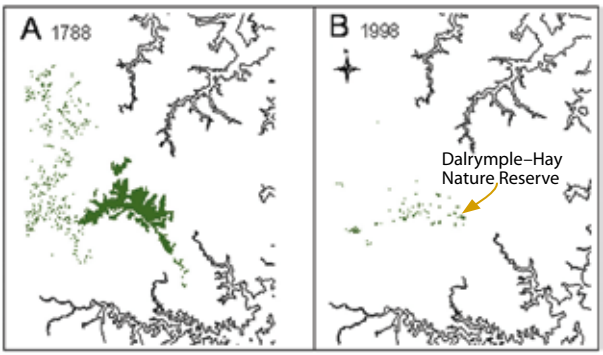
Less than 1% of the total area of this forest type is protected in national parks.

History of blue gum high forest

The first threat to Sydney's blue gum high forest came from people living in early settlements during the 1800s. Settlers logged tall straight trees, and used the timber to build Sydney Town, including its wharves, bridges, roads and tramlines.

After the tallest trees had been removed, for many years the remaining trees were felled to provide Sydney residents with firewood. Orchards were established on the fertile shale soils from as early as 1826. After the railways were constructed in the 1920s, the remaining forests were felled for the development of suburbs.

Today the invasion of weeds, nutrient-rich stormwater run-off, rubbish dumping, inappropriate fire regimes and mowing of plants are causing the forest to decline further.



Past (A) and present (B) distribution of blue gum high forest.

Here today, gone tomorrow?

With **less than 5%** of its pre-1788 distribution remaining, blue gum high forest has been listed as a critically endangered ecological community under the NSW *Threatened Species Conservation Act 1995*. Scientific assessments have concluded that blue gum high forest could soon cease to exist unless people act to preserve it.

St Ives blue gum high forest

Getting there

Visitors can enjoy the majestic tall blue gums and blackbutts of Dalrymple–Hay Nature Reserve and Browns Forest. Entry is via Mona Vale Road, or the corner of Vista Street and Rosedale Road. There is no public transport to the site.

Ringtail possum
Photo: Cheyne Ramsay

St Ives Blue Gum High Forest is the largest surviving remnant of blue gum high forest consisting of approximately 18.3 hectares of land. It is managed by three agencies: Department of Environment and Climate Change (Dalrymple–Hay Nature Reserve and 100 Rosedale Road), Ku-ring-gai Council (Browns Forest and 102 Rosedale Road) and Sydney Water (Sydney Water Reservoir)

Native cherry (*Exocarpus cupressiformis)*
Photo: Nick Colman

Grey-headed flying-fox
Photo: Alan Kwok

Plants and animals

There is much to see once you start to stroll through blue gum high forest. The following are a few of the plants and animals that live there.

Native cherry (*Exocarpus cupressiformis*)
The native cherry is a 2–6 metre tall tree. When ripe, its fruit has a sweet flavour that was popular with local Aboriginal people and early colonists (Robinson 1994). Aboriginal people used the wood to make spear throwers and bull roarers. Bull roarers were used to announce ceremonies or to ward off evil spirits (Nash 2004).

The native cherry is a parasitic plant. As it taps into the root systems of host plants, no weeds can be poisoned near this tree. Weeds have to be pulled out or cut down and covered with a tin to prevent regrowth.

Powerful owl (*Ninox strenua)*
The St Ives blue gum high forest forms part of the habitat of a pair of powerful owls. When they enter the forest, they become the top native predators, preying on ringtail possums. While their call – a slow, deep and resonant double hoot – may be heard in the reserve at any time of year, it is more prevalent during the winter breeding season. Powerful owls face two major threats: destruction of hollow bearing trees used for nesting and habitat fragmentation (Department of Environment and Conservation 2005).

Sugar glider (*Petaurus breviceps)*
Sugar gliders prefer mature forests with lots of tree hollows to nest in, such as those found in St Ives blue gum high forest. They are active at night, gliding from tree to tree and feeding on nectar, pollen and the sap of certain eucalypt and wattle trees (Department of Environment and Conservation 2004a). Domestic cats have been reported to be preying on sugar gliders in the forest.

Grey-headed flying-fox (*Pteropus poliocephalus*)
The grey-headed flying-fox is Australia's largest bat. When the smooth-barked apple (*Angophora costata*), blackbutt (*Eucalyptus pilularis*) and Sydney blue gum (*Eucalyptus saligna*) come into flower, you can hear the calls of flying-

foxes at night as they feed. Blossoms containing pollen and nectar are their main diet.

Each night flying-foxes can travel up to 50 km to forage on the nectar, pollen and fruits of native trees. Flying-foxes are effective pollinators of fruit-producing trees. By dispersing their seeds, flying-foxes play an essential role in maintaining forest ecosystem health and biodiversity (Department of Environment and Conservation 2005).

Glossy black cockatoo (*Calyptorhynchus lathami)*
Glossy black cockatoos can often be seen feeding on seeds extracted from the wooden cones of casuarina and allocasuarina trees in blue gum high forest. The bird uses its bill to remove the tough outer hull while rotating the cone in its left foot. The exposed seeds are then stripped away and eaten.

The art of opening a casuarina cone is apparently learned behaviour, as young birds frequently have trouble manipulating the cones into the correct position (Crome and Shields 1992). Glossy black cockatoos rely on tree hollows in live or dead eucalypt trees for nesting. The destruction of these trees and their casuarina food trees are threatening the glossy black cockatoo (Department of Environment and Conservation 2004a).

Swamp wallaby *(Wallabia bicolour)*
The swamp wallaby is not as common in Sydney as it once was but it can still be found in its preferred habitat of thick forest undergrowth, such as the undergrowth found in the St Ives blue gum high forest. It feeds on various plants including introduced and native shrubs, grasses and ferns (Australian Museum 2007).

Brush-turkey (*Alectura lathami*)
Brush-turkeys feed on insects, seeds and fallen fruits, which they expose by raking up leaf litter. This gentle disturbance promotes seed germination (Australian Museum 2003). For example, blackbutt seedlings can grow in bare and sunny areas (Buchanan 1989). Therefore, raking up leaf litter and exposing bare soil under mature blackbutt trees will promote the germination of their seeds.

Swamp wallaby (*Wallabia bicolour*)
Photo: Ken Stepnell DECC

Glossy black cockatoos
Photo: Adam Hend

Smooth-barked apple
Photo: Cheyne Ramsay

History of the St Ives blue gum high forest

Aboriginal history

The Guringai territory stretched from the northern shore of Sydney Harbour to Broken Bay (Department of Environment and Conservation 2004b). The local Guringai Aboriginal people may have eaten the flora and fauna of the forest (Blue Gum High Forest Group 2007). There are no known relics of the Guringai people in the St Ives blue gum high forest.

Non-Aboriginal history

The St Ives blue gum high forest has a rich history.

- **16 April 1788**: Governor Phillip, with a small exploratory party, passed very close to, if not through, St Ives blue gum high forest. John White, a member of the exploratory party, wrote: 'The land here was better than the parts which we have already explored'. However, the forest was too immense to penetrate and they returned to camp (Benson and Howell 1995).
- **1867**: Thomas Brown purchased the land now known as Browns Forest. He chose not to develop it, but willed it to his children (Blue Gum High Forest Group 2007).
- **1920**: The first Commissioner of Forests, Richard Dalrymple-Hay, purchased the forest for its historic interest and environmental educational purposes (Blue Gum High Forest Group 2007).
- **1931**: Ku-ring-gai Council, after a struggle with development proposals, purchased the land known as Browns Forest as a 'forest reserve for all time' (Blue Gum High Forest Group 2007).
- **1972**: Dalrymple–Hay was gazetted as a nature reserve (Department of Environment and Conservation 2004a).

Domestic animals have never grazed in the St Ives Blue Gum High Forest, and only the largest trees were selectively logged. Some parts of the forest, are composed of the same vegetation that existed before 1788 (Blue Gum High Forest Group 2007).

Help preserve the St Ives blue gum high forest

Be a blue gum high forest custodian

Contact your local council for information on blue gum high forest species and for the contact details of a nursery that can supply native plants from your local area.

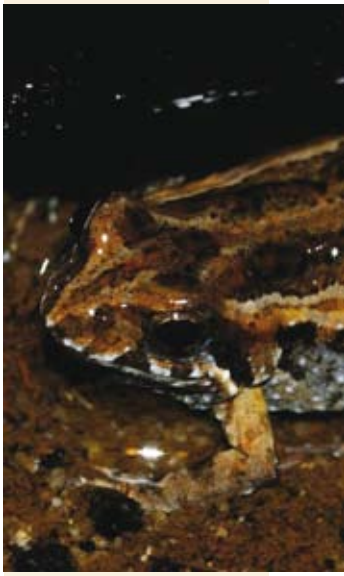
- Was your backyard once blue gum high forest?
- Are there any local native trees or plants left that you can nurture and protect?
- Can you replant some blue gum high forest plant species in your garden? By doing so, you will attract local native birds, mammals and butterflies to your garden. For example, planting casuarina and allocasuarina trees may attract the glossy black cockatoo.

Of course you cannot fit the entire forest ecosystem into your backyard, but there might be room for a selection of grasses, shrubs or trees. A group of backyards can form a forest.

Ku-ring-gai Council has introduced a **Backyard Bushcare Program**. This program focuses on regenerating native vegetation on private land to help create bushland corridors. Ku-ring-gai residents can ask for help to protect and regenerate blue gum high forest species in their backyards. Bushcare officers visit participating residents and offer:

- free expert advice
- practical training
- realistic action plans
- help with regeneration work
- ongoing support.

To get involved or find out more, call the Backyard Bushcare team on 9424 0933 or email backyardbushcare@kmc.nsw.gov.au.



Common eastern toadlet
Photo: Cheyne Ramsay

Narrow-leaved geebung
Photo: Cheyne Ramsay

Mowed understorey
Photo: Nick Colman

Protect blue gum high forests from weeds and other threats

Blue gum high forests are threatened by weeds, increased stormwater runoff, fertilisers, rubbish dumping and clearing. These are worst at the edges of the forest where the bush meets roads, industry or backyards. Helpful neighbours can protect blue gum high forests from threats by:

- **Being careful when mowing lawns** – mowing underneath blue gum high forest species in residential gardens prevents their seedlings from establishing. By not mowing lawns and by hand weeding rather than poisoning weeds, you will promote the growth of blue gum high forest vegetation that may still be in the soil seedbank.
- **Weeding the garden** – removing weeds from local gardens will prevent them spreading into blue gum high forest. Birds can transport weed seeds large distances, so it is important to keep a weed-free garden even if you live a long way from a blue gum high forest.
- **Keeping stormwater out of the bush** – install a rainwater tank to minimise the impacts of stormwater, and if reusing greywater for watering gardens, use low phosphorus detergents.
- **Not dumping rubbish** – never dump garden refuse into bushland, as this helps weeds to spread into the bush.

Go on an educational guided walk

The Walks and Talks Program run by DECC and Blue Gum High Forest Group conducts educational guided walks through the St Ives blue gum high forest. To date, more than 2000 people have been on these walks.

Join a bushcare group

Bushcare volunteers work in the St Ives blue gum high forest on the second and fourth Sundays of each month from 9 am to 12 noon. For details of their work see 'Bush regeneration 1983 – present' on page10. Anyone is welcome to join the group and lend a hand. For more information on walks and talks and potential volunteer bushcare days, visit:

- www.environment.nsw.gov.au/youcanhelp/
- www.step.org.au
- www.kmc.nsw.gov.au.

Conserve habitat for native animals

- Report any sightings of foxes to DECC or your local council.The regional fox baiting program run by Ku-ring-gai Council and DECC is already helping animals such as bandicoots and lyrebirds to survive.
- Keep pet cats and dogs under control, never let them wander into the bush, and keep them indoors at night. Train your dog not to chase or harass native wildlife.
- Leave some scrubby tangles and dense, shrubby areas of vegetation on your land for ringtail possums and native birds.
- Leave fallen timber, leaf litter and dead trees with hollows on your land for lizards, sugar gliders, brush-turkeys and small birds.

Build a nesting box

Many of Australia's bird and mammal species require tree hollows for nesting. Unfortunately, the natural tree hollow forming process is very slow. On average it takes over 60 years for a tree to begin forming hollows.

Installing artificial nest boxes in your own backyard can provide a safe place for native animals to escape the elements and to raise a family. If you install a nest box you can potentially attract sugar gliders, parrots, kingfishers, microbats and possums to your garden. Always ensure cats and dogs cannot gain access to the nest box, and place it in a tree at least three metres above the ground. If introduced birds such as Indian mynas colonise the nest box, evict them.

Several websites contain information on building and placing nest boxes, and some organisations sell them. Search the internet using the following terms: 'nest', 'box', 'native', 'animals' and 'birds'.

Blue gum high forest
Photo: Alan Kwok

Bush regeneration in progress
Photo: David Wilks

Bushcare in the St Ives blue gum high forest

Bush regeneration 1983–present

Weeds are introduced plants that spread uncontrollably and threaten native plants. The survival of blue gum high forest depends on the ability of trees to regenerate. In a healthy blue gum high forest, this process continues unhindered. However, in St Ives, weeds such as lantana (*Lantana camara)*, corky passion fruit *(Passiflora suberosa)*, privet *(Ligustrum lucidum)*, Mickey Mouse plant (*Ochna serrulata*), honeysuckle (*Lonicera japonica*), asparagus fern (*Asparagus densifloras*), fishbone fern *(Nephrolepis cordifolia)* and trad, also known as wandering Jew *(Tradescantia fluminensis)* smother native species.

Without bush regeneration, weeds would eventually dominate blue gum high forest. Over the next 100–200 years, weeds would threaten successive generations of native plants. For example, the Sydney blue gum and blackbutt trees would eventually die and not be replaced.

Bush regeneration involves manually removing weeds from relatively weed-free areas and working slowly towards areas with many weeds. This technique gives native vegetation time to regenerate. Over the past 24 years, the volunteer Blue Gum High Forest Group, Ku-ring-gai Council and rangers from Lane Cove National Park have worked to successfully restore large sections of the St Ives blue gum high forest.

The secret is in the seedbank

Many blue gum high forest plants can survive for decades as seeds stored in soil. Even if the forest appears weedy and degraded, it may still have native seed that can regrow. The soil seedbank is the key to regeneration. Controlled fire and weed removal kick-start the seedbank and help the forest to recover. Mulching should not be used as it prevents the seedbank from germinating.

When the seedbank has gone and the forest cannot regenerate, planting helps recover some of what was lost. Plants are grown from seeds collected from the blue gum high forest. If land is available, corridors can be created to link isolated forest remnants, or native plants can be regrown in areas taken over by weeds where only the native trees remain.

Using fire to control weeds and encourage native vegetation growth

If blue gum high forest does not burn occasionally, many native plants, including the Sydney blue gum, gradually disappear. Many remaining blue gum high forests have not had fire through them for more than 30 years and seeds stored in the soil are diminishing. Forest managers of the St Ives blue gum high forest have implemented prescribed ecological burns since 1997.

Prescribed burns promote native regeneration, especially the growth of blue gum high forest plants, by:

- increasing the amount of sunlight reaching the soil
- encouraging new growth of fungi that aids the germinating seedlings
- releasing nitrogen and phosphorus into the soil (Buchanan 1989).

Preparing the area for a prescribed burn involves weeding it, then placing the weeds in piles. This technique encourages a high intensity fire which burns the area to an ash bed. Failure to achieve a high intensity fire will allow weeds to persist in unburnt patches of vegetation that will quickly recolonise the area.

After fires, skilled staff can easily target weeds without harming regenerating native plants.

Weed exclusion fence
Photo courtesy of BARRC

Prescribed ecological burn
Photo courtesy of BARRC

Sandstone boulders downstream of the gross pollutant trap
Photo: Alan Kwok

Monitoring, maintenance and stormwater control

There are many ecological processes taking place in a bushland area. The St Ives blue gum high forest is continually monitored to measure how it is responding before, during and after restoration work, to find out which techniques are the most effective and to fine-tune these techniques.

Regenerated areas need ongoing management as it will take them years to be self-sustaining. Also, windblown weed seeds and seeds introduced by bird droppings mean that some form of maintenance will always be necessary to keep the St Ives blue gum high forest healthy.

Stormwater flows directly into the St Ives blue gum high forest, eroding creek banks and bringing refuse such as silt, nutrients and weeds into the area, creating ideal conditions for weed invasion. To prevent weeds from taking over, a gross pollutant trap has been installed to help filter stormwater.

The trap collects sediment, weeds and rubbish, and slows the velocity of water.

Sandstone boulders have been placed below the gross pollutant trap to minimise further creek bank erosion. These rocks slow down water pressure, permitting natural litter traps to form in the creek below. Natural litter traps consist of sand, silt and fallen branches that slow the water down even more and filter it.

Help injured wildlife
Native wildlife can suffer injuries through encounters with domestic animals, motor vehicles or misadventure.
If you come across injured wildlife, immediately contact Sydney Metropolitan Wildlife Service on (02) 9413 4300 or WIRES on (02) 8977 3333.

Further reading

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