

Saving the
SWIFT PARROT

A CONSERVATION AND MANAGEMENT GUIDE



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Swift Parrot cartoon
©First Dog on the Moon

Image on page 1: Swift Lorikeet (*Lathamus discolor*) illustrated by Elizabeth Gould for John Gould's Birds of Australia. National Library of Australia, RB Nef F4773.



"No one of the Australian birds will be more deeply imprinted upon my memory than the Swift Lorikeet, associated as it is with many of the most pleasing recollections connected with my visit to that part of the world."

"During September and the four following months, it is not only abundant in all the gum-forests of Van Diemen's Land, but is very common in the shrubberies and gardens at Hobart Town, small flights being constantly seen passing up and down the streets, and flying in various directions over the houses."

John Gould, Birds of Australia (1865)

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INTRODUCTION

The Swift Parrot is a medium-sized, predominantly green, fast-flying parrot with a long, maroon pointed tail. In summer, Swift Parrots breed in the tall eucalypt forests of Tasmania. The whole population then flies north across Bass Strait to spend the autumn and winter months foraging across the south-eastern Australia mainland, before returning to Tasmania in spring. The Swift Parrot is one of only two species of truly migratory parrot in the world, the other being the Orange-bellied Parrot *Neophema chrysogaster* that also migrates across Bass Strait.

The Swift Parrot is in the family Psittacidae and is the sole member of its genus *Lathamus*.

The scientific name – *Lathamus discolor* – refers to 'Latham's bird of different colours' for John Latham, the English naturalist and ornithologist, and from the Latin *discolor*, meaning variegated (of different colours).

This booklet gives an overview of the life history and conservation status of this highly endangered bird and explains the threats that have caused the decline in the range and population of the species. It also outlines the management actions that are being undertaken and highlights the organisations and some of the individuals that are involved in trying to save the Swift Parrot from extinction.

Scientific Name
Lathamus discolor

Size
23 – 26cm

Lifespan
~10 years

Population
<1000 birds

Status
Critically Endangered

Main Threats
Habitat loss and predation



DID YOU KNOW?

The Swift Parrot has been known by many different names in the past, including 'Red-shouldered Parrakeet', 'Swift-flying Lorikeet', 'Clink' (for its call), and 'Red-faced or Red-shouldered Parrot'.

A Swift Parrot reaches for a lerp (Chris Tzaros).



Swift Parrot breeding habitat on South Bruny Island, Tasmania (Chris Tzaros).



Swift Parrot winter foraging habitat, Killawarra Victoria (Chris Tzaros).

WHERE DOES THE SWIFT PARROT OCCUR?

Range and Population Size

The Swift Parrot is endemic to south-eastern Australia, meaning it is found nowhere else in the world. Furthermore, it breeds only in Tasmania. During the non-breeding season, it migrates to the mainland where it occurs mainly in southern and central Victoria and in eastern New South Wales. The most recent assessment for the species indicates a population size of approximately 750 mature individuals. This is down from 2,000 individuals in the early 2000s, and is due to persistent and increasing threats across its range. Recent research in Tasmania suggests that the population could be even lower. The breeding population of Swift Parrots is believed to have once numbered more than 10,000 pairs.

The breeding range of the Swift Parrot is largely restricted to the east and south-east coast of Tasmania, including Bruny and Maria islands, with some sporadic breeding occurring in the north-west of the state between Launceston and Smithton. Nesting has also very infrequently been recorded in western Tasmania. The core breeding range covers an area of less than 500 km². The distribution of nesting Swift Parrots varies between breeding seasons and is largely determined by the distribution and flowering intensity of Tasmanian Blue Gum *Eucalyptus globulus* and Black Gum *E. ovata*. The flowering patterns of these species vary dramatically in location and extent between years.

The post-breeding foraging habitat used by Swift Parrots in late summer-autumn before their return to the mainland is not well known, but is thought to be mainly concentrated in western and north-western Tasmania.

Whilst on the mainland the Swift Parrot disperses widely and can be found foraging on flowers and lerps in Eucalypt species through many regions of Victoria and New South Wales (including the Australian Capital Territory). Swift Parrots are also irregularly recorded in south-east Queensland and rarely in south-eastern South Australia.

In Victoria, Swift Parrots are predominantly found in the dry forests and woodlands of the box-ironbark region on the inland slopes of the Great Dividing Range. The most frequently used regions include the broad area between Bendigo, Stawell and St Arnaud; the forests and woodlands between Rushworth and Heathcote; and north-east Victoria around Warby-Ovens and Chiltern-Mt Pilot National Parks. In most years, and in greater frequency in recent years, the species has been recorded in the Melbourne and Geelong districts, whilst south of the divide in the Gippsland region they are recorded less frequently. Historically the species was found further west into the Wimmera, and south-west Victoria; however, these days it is seen very infrequently in these regions.

In NSW, Swift Parrots are mainly recorded on and east of the Great Dividing Range, in the Central and Southern Tableland regions, and coastal areas south of the Macleay River. There are occasional records

from further west, mainly in the South West and Central West Slopes regions (e.g. Coonabarabran, Parkes, Temora, Cootamundra), the Riverina (e.g. Cocoparra NP) and along the Murray River Valley.

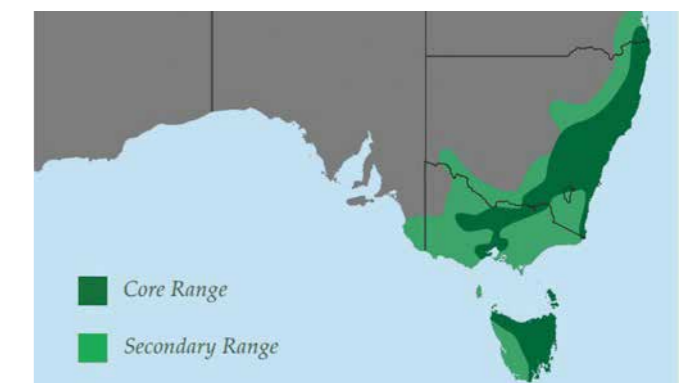
Historically, Swift Parrots were recorded from all regions of NSW except the Upper Western district. They were once found north to Murwillumbah and Moree, and west to Ivanhoe and near Wentworth. Swift Parrots were a regular visitor to Sydney at the start of the 20th century but seldom observed in great numbers by the 1930s, except for irruptions in 1938 and 1958. In 1938 flocks of more than 100 birds were recorded around Sydney between April and June, and in 1958 parties of up to 2,000 birds were recorded around the Sydney area, with maximum numbers in June and July.

'Close to Sydney it was not uncommon to note ... groups of 200 or more birds. A flock of between five and six hundred individuals was recorded at west Pymble and it was estimated that, in some localities, thousands of birds were present throughout June and July. One of us ... watched a movement at Lane Cove on June 29, and considered that more than 1,000 individuals passed between two clumps of trees, in which they were feeding, during a period of not more than twenty minutes.'

Hindwood, K.A. and Sharland, M. "The Swift Parrot"; reference to observations made in 1958 (published in the journal *Emu* in 1964).

The Swift Parrot is irregularly recorded north of the Macleay River (NSW) into southern Queensland, with small numbers occurring there in most years. The species formerly occurred north to Coomboolaroo Station, near Duaringa, and west to Texas and Rockwood, near Chinchilla.

The Swift Parrot was also a regular visitor to South Australia until the mid-1940s but is now considered a vagrant, occasionally observed in the Southern Mount Lofty Ranges and the Bordertown-Naracoorte area in south-eastern South Australia.



Current distribution of the Swift Parrot.



DID YOU KNOW?

John Gould (the renowned English ornithologist and bird artist) was smitten with the Swiftie when he saw it for the first time on his expedition's arrival into Hobart in September 1838. He described small flocks of them flying over Hobart 'chasing each other with the quickness of thought'.

Conservation Status

Due to the rapid decline in the population estimate for the species, the Swift Parrot is listed as 'Critically Endangered' under the International Union for Conservation of Nature (IUCN) Red List, and as Critically Endangered within the draft Action Plan for Australian Birds (2020). Further, it is listed as Critically Endangered under the Federal *Environment Protection and Biodiversity Conservation Act 1999* and is listed as a threatened species in every state where it occurs.

Jurisdiction*	Federal	NSW	ACT	QLD	SA	TAS	VIC
Conservation Status	Critically Endangered	Endangered	Critically Endangered	Endangered	Endangered	Endangered	Endangered

*Swift Parrots are not found in the Northern Territory or Western Australia.

The decline in a decade – a personal note

Julie Morgan, long-time local of the NSW south coast and chair of the Eurobodalla Natural History Society (ENHS), became heavily involved in Swift Parrot searches over the past decade. In that time she has become a fantastic observer and champion for the species, but sadly has watched on as habitat has disappeared and the number of birds has declined.

In May 2012, Chris Tzaros and Dean Ingwersen from BirdLife Australia visited the south coast of NSW in an effort to find where the Swift Parrots were hiding on the mainland. The Spotted Gum was flowering profusely but local efforts had only discovered a handful of birds. They offered to train members of the ENHS in how to find these elusive parrots on their migration over the mainland and a number of us took up the opportunity. The surveys with Chris and Dean were successful and we located hundreds of Swift Parrots from South Brooman in the north to Tilba in the south.

I learned a lot about where to find Swift Parrots as they moved through our landscape. They preferred quieter and less populated areas west of the Princes Highway, and within these forests, at the outer margins of flowering Spotted Gum where there were fewer birds. The training was invaluable and a few months later it would pay off when we found the single largest group of Swift Parrots ever recorded. On a very cold August morning, Dianne Deans, Lucy Gibson and I surveyed along a forestry road south of Bodalla and we were very excited to find a group of Swift Parrots. As we walked along the road, we continued to hear and see more birds and it became one of the moments when one could hardly believe what one was experiencing. We estimated at least 800 Swift Parrot initially, but when we returned to the site the next day, we counted 1,200 birds roosting in this forest. Their calls were deafening...not something you hear often to describe Swift Parrots!

The surveys have continued but with each year, fewer Swift Parrots are being recorded. Some of that is due to habitat condition - we have not had the same intensity of flowering of Spotted Gum since 2015 - but logging continues to reduce the area of suitable habitat. Further, the 2019/20 bushfires have resulted in a loss of up to 80% of these forests on the south coast. Hopefully these gorgeous birds are finding new routes on their mainland journey and I will hear their wonderful calls again soon.



Julie Morgan surveys the NSW south coast forests for Swift Parrots

ECOLOGY

Diet and Foraging

Across both their breeding and overwintering range, Swift Parrots predominantly feed upon the nectar and pollen of eucalypts, using their specialised brush-like tongues. Individuals are capable of consuming large quantities of this food when it is in abundance. The Swift Parrot preferentially uses eucalypts with a large diameter for foraging; large, mature trees are considered to provide the most reliable foraging opportunities as they produce larger amounts of flowers (and hence nectar) more often. The Swift Parrot also takes nectar less frequently from other sources such as Coast Banksia *Banksia integrifolia*.

Besides nectar and pollen, Swift Parrots also commonly feed on lerps (sugar-rich excretions from psyllid insects found on leaves; see breakout box below). From analyses of gut contents, Swift Parrots are known to consume psyllids along with the lerp they produce, and these insects are likely an important source of protein in their diet. Swift Parrots can also consume large quantities of eucalypt pollen (another good protein source), fruits such as the Native Cherry *Exocarpos cupressiformis*, the buds found on Golden Wattle *Acacia pycnantha*, as well as seeds.

Key tree species for the Swift Parrot on the mainland include:

- Yellow Gum *Eucalyptus leucoxylon*
- Red Ironbark *Eucalyptus tricarpa*
- Mugga Ironbark *Eucalyptus sideroxylon*
- White Box *Eucalyptus albens*
- Swamp Mahogany *Eucalyptus robusta*
- Forest Red Gum *Eucalyptus tereticornis*
- Spotted Gum *Corymbia maculata*
- Red Bloodwood *Corymbia gummifera*
- Yellow Box *Eucalyptus melliodora*
- Inland Grey Box *Eucalyptus microcarpa*
- Coastal Grey Box *Eucalyptus moluccana*
- Blackbutt *Eucalyptus pilularis*

Key tree species for the Swift Parrot in Tasmania include:

- Tasmanian Blue Gum *Eucalyptus globulus*
- Black Gum *Eucalyptus ovata*
- Brooker's Gum *Eucalyptus brookeriana*



A Swift Parrot feeds on lerps in a eucalypt (Chris Tzaros).

Lerp – what is it?

Lerp are the sugar-rich casings formed by secretions from psyllids, sap sucking insects commonly associated with eucalypts. These casings are regularly consumed by Swift Parrots using a foraging technique known as 'gleaning', whereby they detach these casings from the surface of eucalypt leaves. These casings are typically white in colour and are made up of solidified honeydew and wax, offering a sugar-rich food source to fuel Swift Parrots on their long-distance flights.



Psyllid and lerp (Dean Ingwersen).



Swift Parrot gleaning (Mick Roderick).



"The Swift Parrot has been observed to be voracious when eating nectar, and will sometimes overeat and become distressed, or its plumage can become matted with nectar."
- Higgins, 1999

Swift Parrot foraging in Tasmanian Blue Gum (Chris Tzaros).



A flock of 30 Swift Parrots assembled just before roosting in Corunna State Forest, NSW (Dean Ingwersen).



An adult male Swift Parrot alongside a nest hollow in a spout (Dejan Stojanovic).



Swift Parrot nestling (Chris Tzaros).

Roosting

During the non-breeding season, Swift Parrots roost communally amongst dense clumps or stands of eucalypts, often using the same tree each night. Swift Parrots return to the same roosting sites repeatedly, although not every year. They may also remain at the same site for prolonged periods if conditions are good. Researchers have defined two types of Swift Parrot roosts:

- Foraging roosts containing up to 15 birds, typically within 1 kilometre of daytime foraging sites; and
- Mass roosting sites that may contain hundreds or (historically) even thousands of birds in a radius of 6 kilometre from foraging sites.

Flocks and roosts may comprise a significant proportion of the entire Swift Parrot population. A roost containing 1,200 birds was recorded in Bodalla State Forest in 2012 (60% of the then estimated total Swift Parrot population of 2,000).

Breeding and Life Cycle

The Swift Parrot breeding season occurs between September and January, beginning once the birds have arrived back in Tasmania. The male and female of a pair both help to search for and prepare suitable nest hollows, with nesting typically commencing anywhere between late September and November. Nests are located in a deep hollow within the trunk, a branch or spout of a living or dead eucalypt. Hollows used are located a minimum of six metres above ground level. Nest sites have been recorded in a variety of different dry and wet eucalypt forest types (more information can be found under 'Habitat Types').

Pairs may nest near each other in loose colonies, and even in the same tree. At times, the species can nest at low densities, while at other times groups of more than 50 nests can be found in less than 100 ha, depending on the availability of flowers and tree hollows. Pairs may return to the same nesting site and even reuse the same nest hollow, but not necessarily in successive years.

Swift Parrot eggs are laid in a shallow cup formed in rotten wood at the bottom of the hollow. The usual clutch size is three to five eggs, but up to six may be laid. The eggs are white, glossy and oval-shaped, rounded at both ends. The female undertakes all the incubation duties as well as brooding the chicks for the first two weeks. During incubation, which lasts approximately 25 days, the male visits the nest every few hours to feed the female. The male also provisions the young nestlings every 1-2 hours once the eggs have hatched, using food resources typically collected from within 5 kilometres of the nest. Both parents feed nestlings from the time they are two weeks old. The young birds leave the nest around six weeks after hatching but are not independent from their parents for another three weeks after fledging.

It remains unknown exactly when Swift Parrots reach sexual maturity in the wild, but a minimum breeding age of two years has been estimated. Historically regarded as a monogamous species, a recent study by ANU detected a considerable proportion of breeding events where multiple males fathered a single brood in a given year. This tendency towards shared paternity was observed across their breeding range, reported at 50% of monitored sites. Despite polygamous behaviour during the breeding season, birds remained otherwise socially monogamous.



FUN FACT

Swift Parrots are the fastest parrot in the world! Scientists attached GPS trackers to several of these speedy birds, revealing that they often exceed suburban speed limits - one male was clocked at 88 kilometres per hour!

Nest Sites

Swift Parrots are a hollow-dependent species, reliant upon the availability of cavities formed within the trunks and branches of large eucalypts for use as nesting sites. Tasmanian eucalypts generally require a period of at least 140 years for suitable hollows to form, with Swift Parrots typically breeding in trees more than 150 years old. Research conducted by the Difficult Bird Research Group (DBRG) at the Australian National University (ANU) characterises Swift Parrot nest trees as those with a trunk diameter at breast height (DBH) of 80 cm or more, containing multiple hollows, and showing visible signs of senescence. Nest sites most often occur within hollows situated in tree branches as opposed to the trunk, with hollows formed around branch knots and stubs more commonly occupied than those in the form of a spout or fissure.

However, for a hollow-bearing tree to be a suitable candidate for breeding, stands of flowering eucalypts must be situated within the maximum foraging range of adult birds (estimated to be 5-9km) in order for them to successfully feed and return to their chicks with food. Nests have been recorded in both wet and dry sclerophyll eucalypt forests, with the majority of known nest sites in eastern Tasmania occurring within 30 kilometres of the coast.

Movement

The Swift Parrot flyway extends from its breeding areas in south-east Tasmania to the forests and woodlands of Victoria, NSW and as far as south-east Queensland. Capable of travelling nearly 2,000 kilometres north of southern Tasmania in some years, the Swift Parrot undertakes the longest migration of any parrot in the world!

Swift Parrots typically begin their migration across Bass Strait from late February onwards. It is thought that birds make the crossing in small flocks during daylight hours, a journey which is estimated to take them about five hours. The paucity of sightings of perched birds from Bass Strait islands suggests that Swift Parrots typically make this flight between Tasmania and the mainland in a single non-stop effort. By late May, the vast majority of the population is distributed across its wintering mainland range. The return journey to the breeding areas of Tasmania begins in mid-August to September with virtually all birds departed from the mainland by mid-October in most years.

While on the mainland, Swift Parrots are somewhat nomadic, spending weeks or months at some sites and only a few hours at others, determined by the supply of food resources available. During years when eucalypt flowering or lerp availability is poor, birds are forced to travel far and wide to find sufficient food and may congregate into large flocks at sites where it is available.

As both a migratory and nomadic species, Swift Parrots require specific resources in the regions through which they move. The location and suitability of these resources can vary both within and between years in response to climatic factors such as rainfall, as well as environmental disturbances including fire and logging. Managing the species poses substantial challenges because of this variability in their annual movements, along with their drastically reduced numbers and their dependence on habitats in modified landscapes.



An adult Swift Parrot sitting outside a nest in a dead branch (Chris Tzaros).

Parrot in paradise – an unusual visitor to Lord Howe Island!

In late May 2020, a Lord Howe Island local got a big surprise when a Swift Parrot turned up in his chook shed! Lord Howe Island is located about 600 kilometres east of Port Macquarie — far from the Swift Parrot's migratory pathway. This was the second record of a Swift Parrot on Lord Howe Island, with just one previous sighting, in 1968.

The wayward bird was nicknamed 'Houdini' after escaping twice as locals tried to catch it. Houdini was eventually captured and flown back to the mainland, where it was taken to Sydney's Taronga Wildlife Hospital to recover from its epic journey. The bird was very thin and exhausted, and it spent five weeks recovering at the zoo.

The search then began for somewhere to release the bird where there was suitable habitat and, ideally, a wild flock of Swift Parrots it could join. With such a small population left in the wild and few flocks reported in the 2020 mainland season, this was a difficult task. Eventually a small flock was located in Werakata State Conservation Area in the Lower Hunter Valley of NSW.

A team from Taronga Zoo and BirdLife Australia released the Swift Parrot at the site and watched as it started feeding straight away and calling, then flew off to join the other birds in the flock. With each individual Swift Parrot so significant to the long-term survival of this species, the rescue of the Lord Howe Island swiftie was a real success story.



'Houdini' the Swift Parrot, found inside a chicken coop on Lord Howe Island (Jack Shick).



'Houdini' is transported to the release site in NSW (Stephanie Owen).

HABITAT TYPES

Being a highly nomadic species that seeks out patchily distributed food sources throughout a vast breeding and over-wintering range (a combined area of more than one million square kilometres), naturally the Swift Parrot inhabits a wide variety of vegetation communities and habitats. The following section outlines a number of key vegetation communities which provide vital breeding and foraging resources during their seasonal movements.

Tasmanian Habitat

Habitat for Swift Parrot during the breeding season broadly includes the following elements: flowering Tasmanian Blue Gums and Black Gums (foraging habitat) and any eucalypt forest containing hollow-bearing trees (nesting habitat). The importance of breeding habitat in any one year varies depending on its location in relation to foraging habitat (i.e. Blue Gum or Black Gum in flower).

Breeding Season Habitat

Swift Parrot breeding habitat is largely restricted to the east and south-east coast of Tasmania (including Bruny and Maria islands) and is closely associated with the occurrence of two flowering eucalypt species: the Tasmanian Blue Gum *Eucalyptus globulus* and Black Gum *E. ovata*. Swift Parrots also occasionally breed in Tasmania's north-west; however, suitable breeding habitat in this region is limited and fragmented.

The nectar of the Tasmanian Blue Gum in particular forms a core part of the Swift Parrot's diet throughout much of its breeding range, and thus is considered a critical element of the species' breeding habitat. Black Gum nectar also serves as an important foraging resource for Swift Parrots during the breeding season, most notably during the early stages following their return to Tasmania, and in years when Blue Gum flowering is poor.

Recent research indicates that Brooker's gum *E. brookeriana* may also be an equally important food resource during the breeding season, a species has previously been overlooked due to its similarity in appearance to *E. ovata*. In particular, Swift Parrots have been observed utilising *E. brookeriana* in the Eastern Tiers region of Tasmania, an important breeding area where there is very little Blue Gum

Post-breeding Foraging Habitat

Though understudied, foraging habitat utilised by Swift Parrots during the post-breeding period (late summer-autumn) leading up to their annual return to the mainland is thought to be largely concentrated in the western and north-western extent of Tasmania. With Blue Gum and Black Gum having ceased flowering by the time the breeding season is finished, Swift Parrots rely on other Eucalypts occurring in these regions to provide foraging opportunities. Eucalypt species utilised during the post-breeding period include Messmate Stringybark *E. obliqua*, White-topped Stringybark *E. delegatensis*, White Gum *E. viminalis*, Mountain Gum *E. dalrympleana*, Cabbage Gum *E. pauciflora* and Smithton Peppermint *E. nitida*.

Mainland Foraging Habitat



Box-Ironbark habitat in Victoria (Chris Tzaros).

Box-Ironbark Woodland

Box-Ironbark woodland occurs predominantly in Victoria and southern NSW, though variants of this broad vegetation community occur elsewhere (e.g. northern NSW and SE Qld). Dominant and favoured trees include Mugga Ironbark *Eucalyptus sideroxylon*, Red Ironbark *E. tricarpa*, Inland Grey Box *E. microcarpa*, White Box *E. albens* and Yellow Gum *E. leucoxylon*. As Box-Ironbark woodland is often highly fragmented where it occurs, Swift Parrots will also use remnant patches of this habitat type in farmland, roadside reserves and travelling stock routes.



Spotted Gum habitat on the south coast of NSW (Chris Tzaros).

Spotted Gum Forest

Forests dominated by Spotted Gum *Corymbia maculata* occur on poor soils in sub-coastal areas along the NSW and southern Qld coast. A range of other eucalypts occur as co-dominants (varying depending on location), such as Forest Red Gum *E. tereticornis*, Broad-leaved Ironbark *E. fibrosa* and Grey Gum *E. punctata*. Several species of stringybarks and other box/mahogany/ironbark species also occur. This is the dominant habitat in the Lower Hunter Valley and the south and north coast regions of NSW.



Grassy White Box-Yellow Box habitat in the Capertee Valley, NSW (Dean Ingwersen).

Grassy White Box-Yellow Box Woodland

Grassy White Box-Yellow Box woodland (also referred to as 'Box-Gum Woodland') occurs mostly on the western slopes of south-eastern temperate Australia, as well as in some drier coastal catchments. Recognised as a critically endangered vegetation community, the dominant trees include White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*.



Swamp Mahogany forest on the central coast of NSW (Stephen Bell).

Swamp Mahogany Forest

Swift Parrots will also utilise lowland coastal forests when prolific blossom is available in flowering Swamp Mahogany *Eucalyptus robusta*. Although Swamp Mahogany is the predominant tree species in this habitat type, other eucalypts which can provide important foraging opportunities within these systems include Forest Red Gum *E. tereticornis* and Blackbutt *E. pilularis*. This habitat occurs in the coastal zone from the NSW south coast to the Sunshine Coast in Qld.

Other Habitat

In addition to the habitats above, each year a handful of Swift Parrots are observed feeding on lerp within River Red-gum (*Eucalyptus camaldulensis*) dominated floodplains, riparian areas and wetland complexes (e.g. near / Echuca and Chiltern in Victoria).

Swift Parrots can also use urban areas, including parks and gardens, planted street trees and golf courses. For example, in 2002 most of the population was present in urban Swamp Mahogany on the Central Coast of NSW. They also utilise farmland with remnant patches of eucalypt woodland.

Occasionally Swift Parrots occur in vegetation communities that are not eucalypt-dominated; for example, in coastal areas they may feed in Tea Tree *Leptospermum* spp. or Banksia thickets, or in open heathland. Rarely, they may be found in mallee shrubland or dry heathland in semi-arid areas.



An adult Swift Parrot foraging in coastal banksia woodland (Chris Tzaros).

Swift Parrot breeding habitat shrouded in fog in Tasmania (Chris Tzaros).

Preferred Eucalypt Species Guide: **Key Mainland Feed Trees**

Yellow Gum
Eucalyptus leucoxylon



Tree to 25m tall. Occurs in open forest and woodland in western Victoria, South Australia and south-western NSW.



Bark mainly smooth grey / yellow with cream patches. May also have grey-brown fibrous-flaky ('box') bark persisting on lower trunk, shedding irregularly.



Flowering occurs mainly in autumn and winter. Flowers in clusters of three, may be white, cream, pink or red.



Adult leaves 8–15 cm long, 1–1.8 cm wide, green, grey-green or yellow-green, dull, densely veined.



Buds egg-shaped to globular, waxy white, 8–14 mm long, 5–6 mm wide. Fruit is cup-shaped to spherical, 8–11 mm long, 8–10 mm wide.

Red Ironbark
Eucalyptus tricarpa



Tree to 35 m high. Grows in dry sclerophyll forest or woodland on shallow, poorer soils south from Araluen NSW to coastal and subcoastal areas of Victoria.



Bark persistent throughout: red-brown to brown-black, deeply-furrowed 'ironbark'.



White (rarely pink) flowers in clusters of 3. Flowering has been recorded between February – November.



Adult leaves 9–19 cm long, 1.4–2.4 cm wide, dull green.



Buds egg-shaped, 10–14 mm long, 5–7 mm wide. Fruit spherical or hemispherical, 10–14 mm long, 10–15 mm wide.

Mugga Ironbark
Eucalyptus sideroxylon



Tree to 35m, found in woodland on lighter, poorer soils. Widespread on the western slopes and plains from south-eastern Qld through NSW, extending south into northern Victoria.



'Ironbark' – bark is red-brown to brown-black and deeply furrowed. Bark persistent over most of tree to the smaller branches.



Flowers white, red, pink, yellow or lemon. Flowering March – November (varying greatly across regions).



Adult leaves 7–14 cm long, 1.2–1.8 cm wide, dull green or grey-green.



Buds are egg- or diamond-shaped, 0.6–1.5 cm long, 0.4–0.6 cm wide, green, creamy or waxy white. Fruit spherical to egg-shaped, 5–11 mm long, 5–9 mm wide.

Preferred Eucalypt Species Guide: **Key Mainland Feed Trees**

White Box
Eucalyptus albens



Tree to 25m tall. Occurs from south-eastern Qld throughout the western slopes of NSW to eastern Victoria.



Bark rough over trunk and to base of large branches, fibrous, becoming tessellated, with pale grey and white patches. Upper branches smooth and white.



Flowers white, in clusters of 7. Flowering occurs May–February (varying across regions).



Adult leaves 10–16 cm long, 1.7–3 cm wide, dull blue-grey and densely veined.



Buds up to 18 mm long and 6 mm wide. Usually waxy white, with a conical cap. Fruit barrel-shaped to slightly urn-shaped. Up to 15 mm long and 10 mm wide.

Swamp Mahogany
Eucalyptus robusta



Tree to 25 m high; found on low swampy sites on sandy soils. Occurs in coastal NSW north from Moruya to north-west of Bundaberg in Qld.



Bark persistent over whole tree, red-brown, fibrous, thick and spongy.



White flowers in clusters of 7–11+. Flowering occurs May–October.



Adult leaves 10–17 cm long, 2–4.5 cm wide, dark green, glossy, different colour on either side, densely veined.



Buds tapered, 16–24 mm long, 6–8 mm wide. Fruit cylindrical, 10–18 mm long, 6–11 mm wide.

Forest Red Gum
Eucalyptus tereticornis



Tree to 50 m high growing in grassy wet or dry forest or woodland on soils of medium to high fertility. Widespread in eastern Australia from Victoria to Qld.



Bark smooth, white or grey, shedding in large plates or flakes. Sometimes with persistent dark grey flakes of rough bark on base of larger trunks.



White flowers in clusters of 7–11. Has been recorded in flower over most of the year.



Adult leaves 10–20 cm long, 1–3 cm wide, dull green.



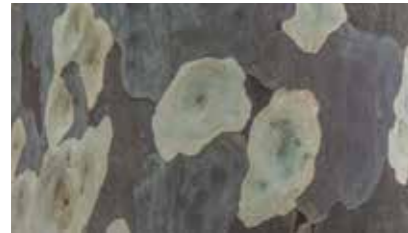
Buds cylindrical or spindle-shaped, 10–20 mm long, 4–8 mm wide. Fruit spherical or egg-shaped, 4–6 mm long, 4–8 mm wide.

Preferred Eucalypt Species Guide: **Key Mainland Feed Trees**

Spotted Gum
Corymbia maculata



Tree to 45 m high. Found in open forest on often infertile and drier sites on shales and slates. Grows on coastal plains and hills of NSW with isolated patches elsewhere.



Bark smooth, powdery, white, grey or pink, often spotted, sheds in small polygonal flakes.



White flowers in clusters of 3. Flowering May-September.



Adult leaves 10–21 cm long, 1.5–3 cm wide, deep green.



Buds egg-shaped, 10–11 mm long, 6–7 mm wide. Fruit barrel- or urn-shaped, 10–14 mm long, 9–11 mm wide.

Red Bloodwood
Corymbia gummifera



Tree to 30 m high found in dry sclerophyll forest or woodland on low fertility sand or sandstone. Found from far eastern Victoria north along the coastal plains and subcoastal ranges to south-eastern Qld.



Bark persistent to smaller branches, red-brown or grey-brown, tessellated. Wounds exude thick resinous red sap.



White/cream flowers in clusters of 7. Flowering may occur from December to June.



Adult leaves 10–16 cm long, 2–4 cm wide, thick, dark green, different colour on each side.



Buds egg-shaped to pear-shaped, 9–11 mm long, 5–6 mm wide. Fruit urn-shaped, 12–20 mm long, 10–15 mm wide.

Yellow Box
Eucalyptus melliodora



Tree to 30 m tall, growing in grassy woodland on moderately fertile and often sandy or alluvial soils. Occurs on plains and tablelands from western Victoria, through NSW to south-central Qld.



'Box' type bark, grey, pale brown or yellow-brown, fibrous-flaky, shedding in short ribbons. Upper branches are smooth and pale.



Flowers white-cream, in clusters of 3-7. Flowering occurs September-February.



Adult leaves 6–14 cm long, 0.8–3 cm wide, dull grey-green, densely veined.



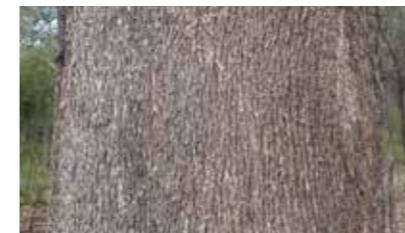
Buds very small: 5–8 mm long and 3–4 mm wide, sometimes waxy white. Small, stalked fruit 3–8 mm long, 3–7 mm wide.

Preferred Eucalypt Species Guide: **Key Mainland Feed Trees**

Inland Grey Box
Eucalyptus microcarpa



Tree to 25 m high. Occurs in grassy woodland on loamy soils of moderate fertility on the drier side of the Dividing Range. Found from south-east South Australia to south-eastern Qld.



Bark persistent on trunk and larger branches, grey with whitish patches, fibrous-flaky ('box'). Upper branches smooth, grey, shedding in short ribbons.



White flowers in clusters of 7–11. Flowers from February-June.

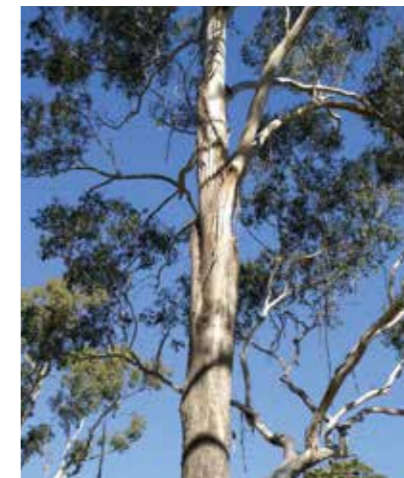


Adult leaves 8–15 cm long, 1–2 cm wide, dull green.



Buds egg-shaped to diamond-shaped, 4–7 mm long, 2–4 mm wide. Fruit cylindrical to hemispherical, 3–7 mm long, 3–5 mm wide.

Coastal Grey Box
Eucalyptus moluccana



Tree to 25 m high. Widespread in grassy woodland or forest on loamy soils of moderate to high fertility. Occurs on coastal plains and lower slopes of ranges, north from Nowra NSW to the Atherton Tableland in Qld.



Bark persistent on lower or full trunk, grey with whitish patches, fibrous-flaky ('box' type bark). Branches smooth and white.



Flowers in clusters of 7+. Flowering has been recorded in most months of the year.



Adult leaves 8–14 cm long, 2–3.3 cm wide, glossy green.



Buds spindle-shaped to diamond-shaped, 5–9 mm long, 3–4 mm wide. Fruit cup-shaped to barrel-shaped, 5–9 mm long, 4–6 mm wide.

Blackbutt
Eucalyptus pilularis



Tree to 70 m high. Grows in wet sclerophyll or grassy coastal forest on fertile south-east coastal plains and hills north from Eden NSW to Fraser Island in south-east Qld.



Bark rough on lower half of trunk, grey-brown, finely fibrous to stringy. Upper trunk smooth, white to grey, often with scribbles, shedding in long ribbons.



Flowers in clusters of 7-15. Flowering has been recorded in most months of the year.



Adult leaves 9–16 cm long, 1.5–3 cm wide, glossy green.



Buds egg-shaped to diamond-shaped, 7–10 mm long, 3–5 mm wide. Fruit spherical or hemispherical, 6–11 mm long, 7–11 mm wide.

Preferred Eucalypt Species Guide: Key Tasmanian Feed Trees

Tasmanian Blue Gum
Eucalyptus globulus



Tree to 70 m tall. Found mainly in lowland areas of Tasmania as well as coastal and subcoastal areas at the southernmost extremities of Victoria.



Bark smooth apart from base which has persistent slabs, shedding in large strips. The smooth bark can be white, cream, grey, yellowish or pale creamy orange, often with ribbons of decorticated bark in the upper branches.



White solitary flowers. Flowering May through to January, with a peak in September to November.



Adult leaves 12–30 cm long, 1.7–3 cm wide, bright glossy green. Young saplings have notably square stems.



Usually a single large, waxy white, warty bud per leaf axil, 1.4–2.5 cm long, 1.4–2 cm wide with 4 longitudinal ribs. Fruit solitary, waxy white, hemispherical or conical, 1–1.5 cm long and 1.4–2.7 cm wide.

Black Gum
Eucalyptus ovata



Tree to 30 m high. Occurs in woodland in low and damp sites in south-east SA, eastern Tasmania, southern Victoria and the NSW south coast, southern tablelands, and south-west slopes.



Bark persistent on lower trunk, grey-black, shortly fibrous, compact, platy. Smooth on upper trunk, white, pink or yellow, shedding in long broad ribbons.



White flowers in clusters of 7. Flowering has been recorded between March - November.



Adult leaves 6–15 cm long, 1.5–5 cm wide, green, glossy.



Buds egg-shaped or spindle-shaped, 6–11 mm long, 3–6 mm wide. Fruit conical or bell-shaped, 3–8 mm long, 4–8 mm wide.

Brooker's Gum
Eucalyptus brookeriana



Tree to 40 m high. Widely distributed in Tasmania (except the south-west) and on King Island; in Victoria restricted to northern foothills of the Otway Ranges and the Daylesford-Trentham area.



Bark rough, brown/grey and fibrous on lower 1–6 m, with smooth upper trunk and branches, often with ribbons of decorticated bark in the upper branches.



Flowers white, in clusters of 7. Flowering summer-autumn.



Adult leaves 6.5–16 cm long, 1.3–5.5 cm wide, glossy green, densely veined, with numerous oil glands.



Buds oval-shaped to diamond-shaped, 6–10 mm long, 3–6 mm wide. Fruit cup-shaped to bell-shaped, 4–8 mm long, 5–7 mm wide.

IDENTIFICATION OF SWIFT PARROTS

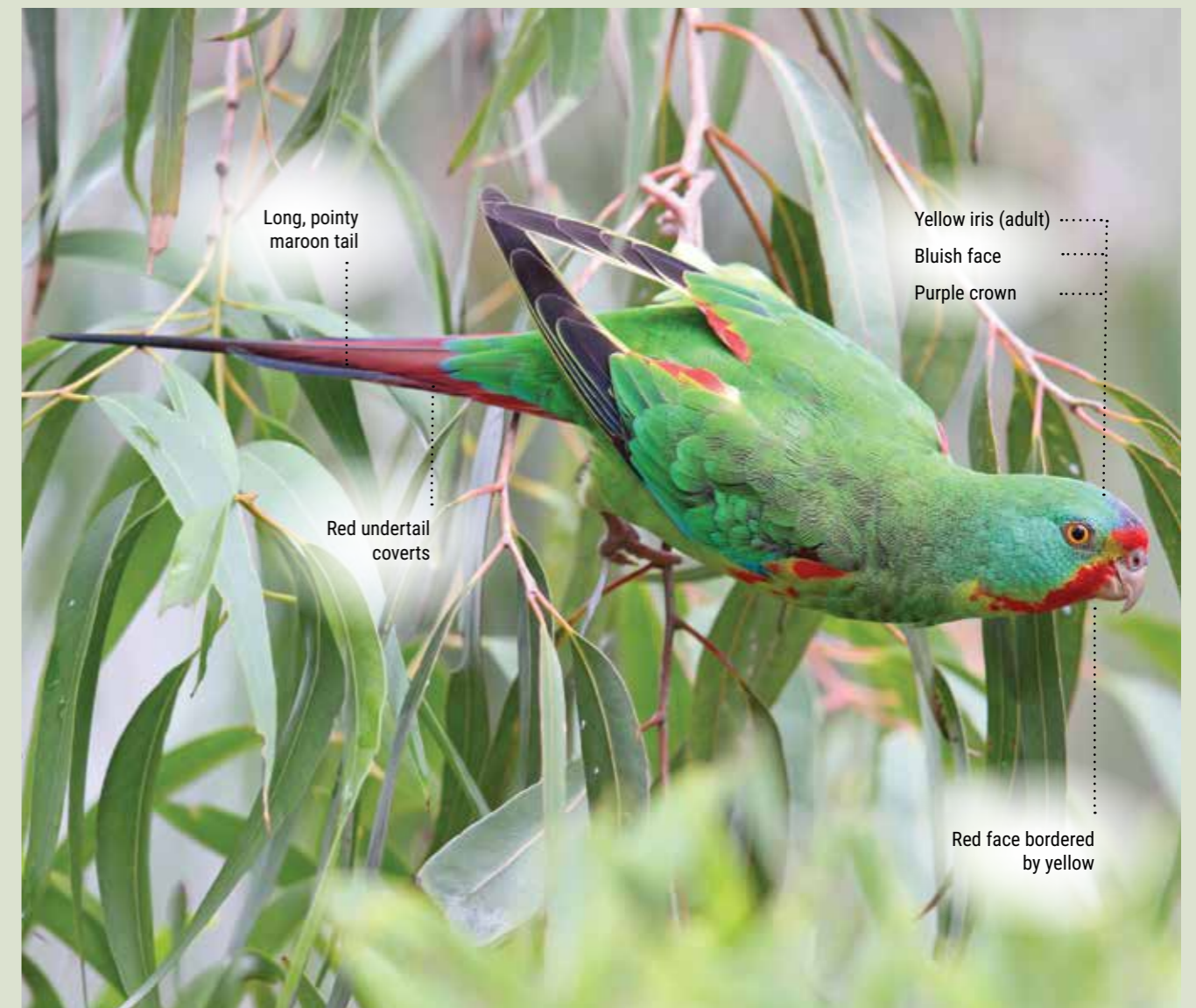
Appearance

The Swift Parrot is a slim, medium-sized parrot with a streamlined shape in flight, angular pointed wings and a long, pointed maroon tail. It is approximately 25 cm in length, with a wingspan of 32 to 36 cm. The body is mostly bright green, with light blue cheeks and a purple patch on the crown. Markings extending from the forehead to the throat are crimson and gold in colour, with similar markings often found on the upper chest near the bend of the wing. The female is slightly duller than the male, with a creamy underwing bar. In flight, the bright green body, dark flight feathers and scarlet underwing coverts are spectacular.

Adults birds are most clearly identified by eye colour, having a yellow iris. Juvenile Swift Parrots are very similar to adult females but are duller, with purple on the crown reduced to a smaller and duller patch (almost lacking in some) and their cheeks are only faintly washed with blue. They usually have less red on the flanks than in an adult female, often reduced to a few spots. Juveniles are best aged by a pale-orange bill and dark-brown iris. A few birds, possibly juvenile females, have wholly yellow-green throats with no red or only a few red spots.



Immature Swift Parrot - note the pale orange bill and dull colouration (Beau Meney).





Swift Parrot taking flight (Chris Tzaros).

Behaviour

Swift Parrots are gregarious and usually observed in small parties, or occasionally in large flocks. Swift Parrots will often associate with smaller lorikeets and honeyeaters at abundant sources of food. They are active and agile when feeding, typically seen clambering among foliage and often hanging upside down to reach blossom. When feeding they are typically noisy, active and conspicuous, but can also be observed feeding rather silently. Swift Parrots are almost entirely arboreal but will come to the ground to drink.

Swift Parrots will typically allow observers to approach closely when feeding in the safety of trees, but are also wary and alert, moving to neighbouring trees or flying off if disturbed or approached too closely. They will often dart from tree to tree but can also flutter between trees (but with shallower wingbeats than Musk Lorikeet and without the loud whirring sound that Musk Lorikeets make).

When seen flying overhead, their flight is very fast and usually direct, with rapid shallow wing-beats. Flocks are typically seen weaving through woodlands at great speed or flying high overhead, with random and sudden changes in direction. Flocks will often settle on a high bare branch before continuing. Their usual contact call, uttered in flight, is a loud disyllabic, metallic "chit chit" repeated 3-4 times in succession. They also utter soft chattering notes while feeding.

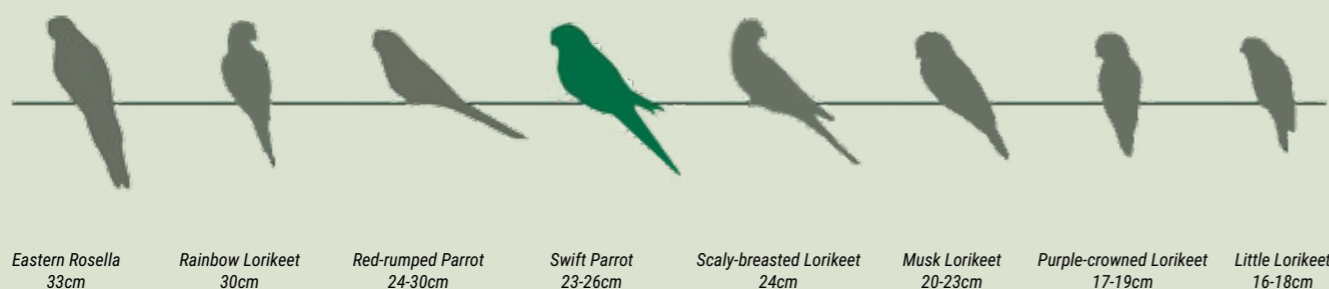
You can hear the Swift Parrot's calls by visiting the website below:
www.birdlife.org.au/bird-profile/swift-parrot



Swift Parrots are active and agile foragers and will often hang upside down to feed (Chris Tzaros).

Similar Species

The Swift Parrot is similar in size to the Scaly-breasted Lorikeet *Trichoglossus chlorolepidotus* and the Musk Lorikeet *Glossopsitta concinna*, but the slimmer build, prominent red patches under the wing, long pointed dusky red tail and bright green body are distinctive. Swift Parrots can also be distinguished by their calls, all of which are quite different from the harsh screeching or buzzing calls of lorikeets.



Common Misidentifications

Like the Swift Parrot, the five lorikeets pictured below nest in tree hollows and feed mainly on nectar and lerp. They will often use the same habitat, and may even be in the same trees, as Swift Parrots. All occur on the mainland, with Musk and Rainbow Lorikeets also found in Tasmania. Another two species commonly misidentified as Swift Parrots are the Red-rumped Parrot and Eastern Rosella which, unlike the Swift Parrot, often feed on the ground. Both species are found on the mainland, with the Eastern Rosella also occurring in Tasmania.

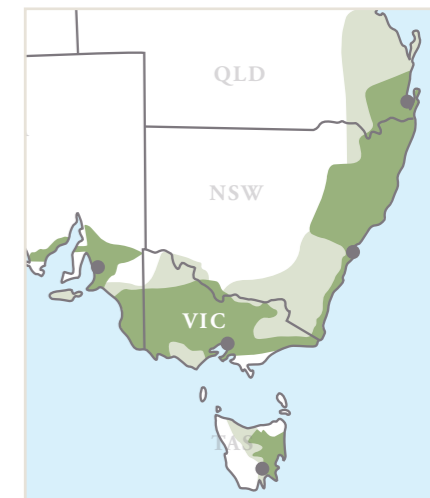


Musk Lorikeet *Glossopsitta concinna*

Habitat: Dry open forests, woodlands, orchards, urban plantings.

Notes: The Musk Lorikeet is the species most commonly misidentified as a Swift Parrot. Differs from Swift Parrot in having long red ear patches/cheek, and no red on wings and tail. Sociable, with large foraging flocks. Metallic screeching call made when in trees and in flight. **Could occur in any region where Swift Parrots occur.**

Image: Steve Mantle

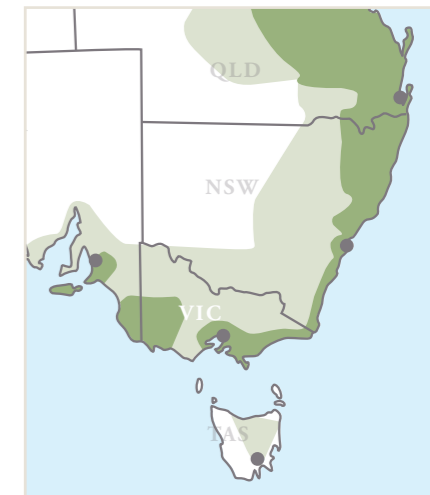


Rainbow Lorikeet *Trichoglossus moluccanus*

Habitat: Open forests, woodlands, urban areas, heaths. Expanding range.

Notes: Strikingly coloured lorikeet. Its underwing pattern and colour somewhat similar to Swift Parrot but differs in having a blue head and yellow on the undertail. Constantly screeching call, particularly in flight. Noisy and sociable, often in large flocks. **Could occur in any region where Swift Parrots occur.**

Image: Jan Wegener

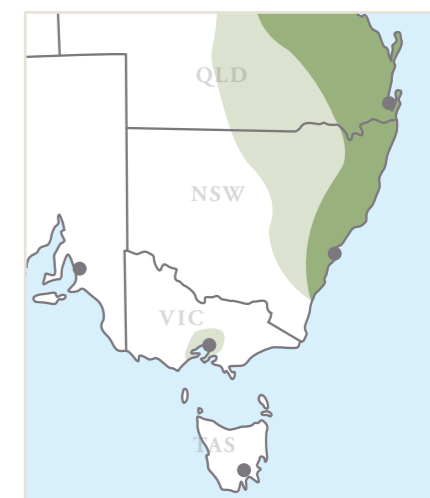


Scaly-breasted Lorikeet *Trichoglossus chlorolepidotus*

Habitat: Open forests, woodlands, urban areas.

Notes: Occurs along mostly in coastal areas of NSW and Qld, with small population around Melbourne. Red beak and underwing somewhat similar to Swift Parrot but differs having an all green tail and head. Noisy screeching call. **Could occur in any region on the mainland where Swift Parrots occur, from the Illawarra region north. Small population around Melbourne.**

Image: Rebecca Citroni



Common Misidentifications



Little Lorikeet *Glossopsitta pusilla*

Habitat: Open forests, woodlands, and sometimes urban plantings.

Notes: Broadly similar red pattern on head to the Swift Parrot but lacks blue and yellow colours. Also has no red on wings, has a short, stubby tail and is considerably smaller than the Swift Parrot. Call is a shrill, high-pitched 'zzit'. Rarely in large flocks. **Could occur in any region on the mainland where Swift Parrots occur.**

Image: Jan Wegener



Purple-crowned Lorikeet *Glossopsitta porphyrocephala*

Habitat: Drier open forests, woodlands, mallee.

Notes: Widespread in Victoria, but few records further north. Dark-purple crown and yellow-red ear patch. In flight, underside of chest and abdomen are pale blue, short all green tail, red on underwing like Swift Parrot. Noisy call is a short harmonious 'zit-zit-zit'. Mostly in small flocks. **Overlaps with the Swift Parrot's range in Victoria, with the exception of the wetter, eastern corner.**

Image: Dean Ingwersen

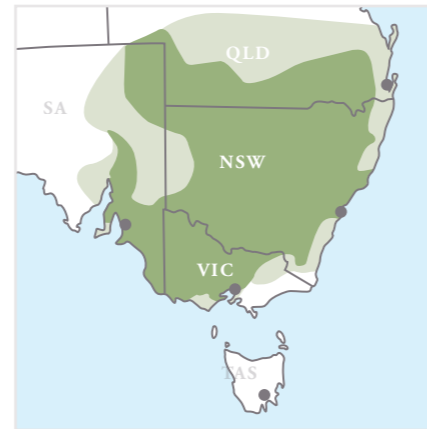


Red-rumped Parrot *Psephotus haematonotus*

Habitat: Lightly timbered woodlands with grassy understory, partly cleared farmland, parks and gardens.

Notes: Medium-sized, slender parrot. Adult male is bright green, with a blue-green head, a red rump, and yellow shoulders and belly. Lacks the red markings on the face of the Swift Parrot and has a blue-green, rather than a red, pointed tail. Unlike Swift Parrots, often seen feeding on the ground in pairs or small flocks. **Could occur in any region on the mainland where Swift Parrots occur.**

Image: Jan Wegener



Eastern Rosella *Platycercus eximius*

Habitat: Open woodlands, grasslands, farmlands and remnant bushland. Often found in urban parks, gardens and golf courses.

Notes: The Eastern Rosella can be distinguished by its red head, neck and breast, combined with white cheek patches. It has yellowish to greenish upper parts, and a yellow-green to blue-green rump and tail, with a red undertail. **Could occur in any region where Swift Parrots occur.**

Image: Dean Ingwersen



Swift Parrots habitat is still being actively logged in areas like the south coast of NSW (Chris Tzaros).



Extensive areas of former Swift Parrot habitat are now lost to farmland and other land uses (Dean Ingwersen).

THREATS

The primary cause for the dramatic decline in Swift Parrot numbers has been the historic and on-going removal of habitat throughout their entire range since European colonisation. The most significant threat to the species' survival today is the continued removal of habitat through commercial logging, which is exacerbated by nest predation from the introduced Sugar Glider *Petaurus notatus* (recently renamed "Krefftt's Glider") in Tasmania. Numerous other threatening processes amplify the impacts of these two key threats, accelerating the species' worrying trajectory towards extinction. Modelling projections by ANU estimate that the Swift Parrot could become extinct as soon as 2031 if urgent conservation actions aren't taken.

Habitat Loss and Fragmentation

Commercial Logging

The practice of commercial logging within the Swift Parrot's range, in both Tasmania and mainland south-eastern Australia, has resulted in a reduction of available suitable habitat for the species. The detrimental impacts of commercial logging have been most acutely felt within known breeding areas in Tasmania and offshore islands such as Bruny Island. Commercial logging in Tasmania typically impacts Swift Parrot habitat through either the direct harvesting and clearing of suitable forest, or the conversion of suitable native forest to timber plantations. Tasmanian Blue Gum – a key provider of nectar for Swift Parrots during the breeding period – is a preferred tree species for timber harvesting in Tasmania, thus placing direct pressure on much of the remaining optimal habitat for this critically endangered species.

Despite its critically endangered status and protection under the federal EPBC Act, as well as being listed as a threatened species across all states throughout its range, known areas of critical Swift Parrot breeding habitat continue to be logged today. This includes substantial areas of breeding habitat contained within designated Swift Parrot Important Breeding Areas (SPIBAs), which contain much of the best remaining Swift Parrot breeding habitat (see Forestry Management section). Recent research found that between 1997 and 2017, logging within the Southern Forests SPIBA (known to support a high proportion of the breeding population in a given season) reduced the extent of Swift Parrot habitat by 33% (15,271 hectares).

The impacts of commercial logging on Swift Parrots are significant and long-term, with logged nesting sites potentially remaining unsuitable for breeding for centuries. Furthermore, current rotational time-frames under which forest stands are subject to logging will typically prevent once-suitable breeding sites from ever reaching an age where suitable nesting hollows could form (more than 140 years), and would at best only provide foraging opportunities before logging were to re-occur at these same sites in subsequent decades. Foraging habitat is also severely impacted, with post-logging regeneration taking several decades, and up to 100 years before affected stands can again provide optimal foraging conditions.

Similar impacts from commercial logging are occurring within key Swift Parrot foraging habitat on the mainland. Suitable habitat occurring in coastal areas of southern New South Wales is considered most vulnerable to commercial logging, with Spotted Gum a key species targeted for wood production. Spotted Gum forest is among the most important mainland habitats for Swift Parrots. In years when foraging resources in Spotted Gum forests are plentiful, a large proportion of the entire Swift Parrot population can be found in this habitat type. These Spotted Gum forests were severely impacted during the 2019-20 bushfires, so the unburnt sections of these forests are now even more important to the species.

Aside from direct habitat loss, another long-term consequence of native forest logging is increased risk of fire in areas where timber harvesting occurs. The adverse relationship between logging and fire is largely driven by the large amounts of woody debris that is left on the forest floor post-harvesting, and the subsequent regeneration of dense, flammable stands of saplings. Moreover, logging also changes the structure of native forests, and in turn the climatic conditions within forests, resulting in the drying of soils and fuels, and allowing stronger winds to penetrate forest areas and further exacerbate fires when they occur. This elevated fire severity risk caused by logging is most severe within 40 years post-logging, and can persist within disturbed areas for up to 100 years post-logging. This means that important Swift Parrot habitat remains at risk long after logging has ceased.

Agricultural Expansion

Since European settlement, vast tracts of Swift Parrot habitat have been cleared and converted to agricultural land-uses. The impacts of extensive habitat loss have been felt across the entire range, though the largest losses have occurred in rural Victoria and New South Wales. Approximately 83% of the original extent of box-ironbark woodland has been removed from central Victoria, whilst 70% of this habitat type has also been lost in NSW. Moreover, just 4% of the original box-gum woodlands found on the south-western slopes of the NSW Southern Tablelands remain today. The most fertile examples of both of these habitat types have been disproportionately removed to make way for agriculture. Therefore, much of the remaining box-ironbark and box-gum woodlands are subtypes with less value to Swift Parrots. Similar impacts have occurred in Tasmania, with approximately 70% of all grassy Tasmanian Blue Gum forest, and 90% of Black Gum forests removed.

As a result of such extensive clearing and disturbance in the past, remaining areas of Swift Parrot habitat within agricultural regions are often severely fragmented and degraded. Habitat fragmentation means that birds must fly further across the landscape between habitat patches in search of optimal foraging sites, a problem which is magnified by the considerable natural variability in the availability of food resources over space and time.

The remaining stands of suitable habitat in agricultural landscapes are typically large, old remnant trees. These trees continue to be lost today due to dieback and natural senescence, often in the absence of younger trees that would normally replace them. The process of tree dieback is often accelerated by other factors associated with landscape modification. For example, over-grazing by livestock (leading to soil compaction and little to no tree recruitment), overly nutrient-rich soils due to livestock manure and fertiliser inputs, and salinity can all contribute to tree decline and mortality. Moreover, remnant paddock trees also continue to be felled to make way for further expansion of farming practices.



Clearing of Swift Parrot habitat for an industrial estate, Lower Hunter Valley NSW (Mick Roderick).



The aftermath of a fire in Box-Ironbark habitat in north-east Victoria (Chris Tzaros).

Urban Development

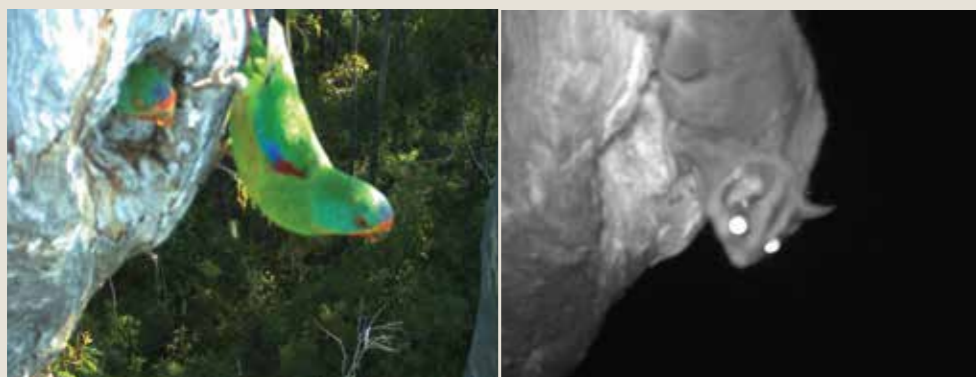
The expansion of urban landscapes within both metropolitan and rural areas poses a serious threat to Swift Parrots throughout much of their range. Urban development has resulted in significant losses of Swift Parrot habitat in the past, and is rapidly increasing across many regions which support areas of suitable habitat for the species. This is occurring most notably in growth areas such as central Victoria, the central coast and north coast of NSW, and south-east Queensland. The direct impacts of urbanisation, such as habitat clearance for buildings and expanded road networks, are compounded by the inevitable conflicts which arise between humans and wildlife in urban landscapes. For Swift Parrots, collision mortality associated with urban development is a particular threat (see section opposite).

Predation by Sugar Gliders

Within the last decade, research has revealed that Sugar Gliders are responsible for a significant level of nest failure among Swift Parrots. Camera trap studies have repeatedly shown Sugar Gliders feeding upon eggs, hatchlings, and even adult female Swift Parrots within nesting hollows. The impact of gliders is now considered the second most significant threat to the ongoing survival of the Swift Parrot, after logging.

The Sugar Glider was introduced to Tasmania from the mainland in the 1800s. It has become widespread and common throughout the island state but has not yet become established on neighbouring offshore islands. Research by the DBRG has demonstrated that as few as 17% of Swift Parrot nests are successful in the presence of Sugar Gliders. Contrastingly, breeding success on glider-free islands such as Bruny Island is dramatically higher (over 90%), with zero instances of nest predation.

Nest predation is most severe in disturbed areas where tree cover is fragmented, with areas supporting less than 20% tree cover sometimes experiencing total nest failure solely due to glider predation. Predation by gliders was found to be substantially less frequent within intact areas of mature forest. These findings further highlight the importance of retaining large, intact areas of suitable eucalypt forest.



Remote camera images of Swift Parrot nest being visited by a Sugar Glider during the night (Dejan Stojanovic).

Fire

Fire, in particular any relative increase in fire frequency and intensity, is a very real threat to Swift Parrots. Past bushfire events have resulted in the loss of known nest trees, and the temporary loss of suitable foraging habitat. Fuel reduction burns can result in similar impacts to habitat, particularly if they get out of control. When too frequent, fire can also have flow-on consequences for the production and availability of eucalypt nectar and leaf-borne food sources. This would not only result in reduced foraging opportunities for Swift Parrots, but also potentially lead to greater competition between Swift Parrots and other birds for resources.

A contemporary example is the fires of 2019/20, particularly on the south coast of NSW. Extensive areas of suitable foraging habitat, including sites known to be used by large numbers of Swift Parrots during the past decade, were razed during these fires, and will not be in a state to be used by the species for years to come.

In an attempt to reduce fire risk near homes, laws regarding the removal of native vegetation have recently been weakened in both NSW and Victoria. Landholders now have greater freedom to clear native vegetation around homes and infrastructure, and impacts of these legislative changes are already evident in areas of known Swift Parrot habitat. The easing of restrictions around native vegetation removal will enable the further depletion of the species' remaining habitat.

Firewood Collection

Firewood collection in any form can negatively impact Swift Parrots when conducted in areas of suitable breeding or foraging habitat. Large, mature trees – which are most likely to provide suitable reliable foraging opportunities or nesting hollows for the Swift Parrot – are often selected for firewood harvesting. Illegal firewood collection is of particular concern as it conducted covertly, making it inherently difficult to quantify its impact on the Swift Parrot. Illegal firewood collection in Tasmania has resulted in the loss of multiple Swift Parrot nest trees on several occasions at routine monitoring sites.



Felling of mature Mugga Ironbark for firewood on the New England Tablelands, NSW (Dean Ingwersen).



The native Noisy Miner is an aggressive competitor for nectar resources (Dean Ingwersen).

Competition

Swift Parrots are known to compete with a number of other species for habitat resources, which may hinder the species' ability to both forage and breed. Importantly, competition for resources has been found to be higher in areas of modified habitat.

In their search for productive areas of eucalypt blossom, Swift Parrots will often compete with aggressive species honeyeaters and lorikeets for available food. Despite this being a natural occurrence, Swift Parrots are now limited in their ability to 'dominate' flowering eucalypts against larger, more prolific species, due to their reduced population size. This can mean reduced foraging opportunities, and Swift Parrots may even avoid certain areas due to the heavy abundance of other aggressive competitors such as Noisy Miners, Musk Lorikeets and Rainbow Lorikeets.

The modification of forested habitats for agriculture and urban development has particularly aided the highly territorial and aggressive Noisy Miner, a species which has been implicated in the decline of many woodland bird species. Noisy Miners aggressively exclude other birds such as Swift Parrots from feed trees, and have even been known to kill individuals of other species. Noisy Miners have expanded their range and become increasingly abundant in areas of once-intact woodland where Swift Parrots would not have previously encountered them in such large numbers; the species is now abundant across the vast majority of the Swift Parrot's range.

Competition for flowering resources with the introduced European Honey Bee *Apis mellifera* and European Bumblebee *Bombus terrestris* may also affect the ability of Swift Parrots to access available blossom. Although this impact is likely minimal at times when nectar is in abundance, the influence of pollen and nectar consumption by bees is heightened during years when eucalypt blossom is scarce. European Honey bees are present throughout the Swift Parrot's range and are largely inactive during cooler periods of the day, allowing Swift Parrots and other nectar feeders to get a head start early in the morning. In contrast, Bumblebees (currently restricted to Tasmania) are active at much cooler temperatures, meaning Swift Parrots may face increased competition for foraging whilst in Tasmania for the breeding season.

Competition for breeding hollows is another threat facing the Swift Parrot. The introduced Common Starling *Sturnus vulgaris*, which is widespread across Tasmania, has been recorded competing with Swift Parrots for natural nesting cavities as well as nest boxes. The introduced European Honey Bee is also known to compete with Swift Parrots for tree hollows; this may result in Swift Parrot nestlings being killed and their hollows usurped.



The introduced Common Starling competes with Swift Parrots for nest hollows (Dean Ingwersen).

Climate Change

Whilst the specific mechanisms by which climate change will impact the Swift Parrot remain largely unknown, climatic shifts do pose a significant threat to the species' habitat. Potential scenarios arising from the impacts of climate change include changes in the timing and spatial distribution of vital flowering patterns, increased frequency and intensity of bushfire events within foraging and breeding areas, and prolonged drought cycles.

Increased incidence of drought conditions and bushfires will likely lead to the decline or death of foraging and nesting trees, and reduced availability of drinking water sources in the landscape.

Collision Mortality

Collisions with man-made structures are a frequent source of mortality for Swift Parrots throughout their entire range. Collisions commonly involve windows, fences (particularly chain-link fences) and vehicles. As an example, in July 2020 an observer reported finding five birds which had collided with a chain-link fence in western Victoria. A 2008 report into Swift Parrot collision mortality by the World Wildlife Fund (WWF) found that an estimated 2% of the total population is killed each year from such collisions. The report found that both adult and juvenile birds are susceptible to collision mortality, with collisions involving adult birds during the breeding season regarded as most impactful due to likely subsequent nest failure.

With urban expansion throughout many areas across their range and the associated increase in artificial structures, collision mortality among Swift Parrots is expected to increase. Given that less than 1,000 birds are now believed to remain in the wild, an annual loss of 4% of the total population to collisions alone is yet another devastating blow to a species that is already heavily impacted by other threats.



Five Swift Parrots were found deceased in July 2020 after entanglement or collision with this fence in Stawell, Victoria (Daniel Muscat).

WHAT IS BEING DONE TO HELP THE SWIFT PARROT?

The Swift Parrot Recovery Team and Recovery Plan

The Swift Parrot Recovery Team was formed in 1995. The team provides expert advice and helps to implement the actions identified in the national Swift Parrot Recovery Plan. The Swift Parrot Recovery Team currently includes representatives from the Australian Government, relevant state governments (Tasmania, South Australia, Victoria, New South Wales and the ACT), BirdLife Australia, as well as research scientists (e.g. Australian National University) and independent species experts.

Recovery plans are reviewed regularly to incorporate new research, emerging threats and contemporary strategies to help save the species for which they are written. A new Swift Parrot recovery plan is in preparation and is expected to be adopted by relevant range states in 2021. The plan considers the conservation requirements of the species across its range and identifies the actions needed to be undertaken to improve the species' long-term viability. It aims to "achieve and sustain a positive population trend for the Swift Parrot" by minimising threats while protecting and enhancing the species' habitat throughout its range.

The current recovery plan, published in 2011, identifies actions under six key strategies:

1. Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions
2. Manage and protect known Swift Parrot breeding and foraging habitat at the landscape scale
3. Reduce impacts from Sugar Gliders at Swift Parrot breeding sites
4. Improve understanding of foraging and breeding habitat use at a landscape scale in order to better target protection and restoration measures
5. Monitor and manage other sources of mortality
6. Engage community and stakeholders in Swift Parrot conservation.

The following sections outline the main recovery actions currently being undertaken to conserve the species.

Habitat Protection

Protection of the Swift Parrot's remaining habitat is crucial to prevent further population declines. Habitat protection can occur through inclusion in formal national parks and reserves, as well as on Crown lands, private properties and private reserves established by not-for-profit organisations. This section explores the existing measures for Swift Parrot habitat protection across different land tenures.



A Swift Parrot feeding in an Inland Grey Box (David Jenkins).

National Parks Estate

In the early 2000s, a review of public lands across northern Victoria saw many converted to National Parks or Nature Conservation Reserves, often with the conservation of Swift Parrots and other woodland birds in mind. As a result, many important sites in Victoria have been protected for the species. However, much of the Swift Parrot's mainland overwintering habitat is still within State Forests subject to logging activity, in remnants on private agricultural and pastoral land, or on small Crown land reserves (such as Travelling Stock Reserves; see section below).

In NSW for example, only 12% of the Swift Parrot's distribution occurs within National Parks estate. It should be noted, however, that a number of important remnant habitats on the western slopes of NSW (that were previously State Forests) have been incorporated into the conservation reserve system over the past two decades (e.g. Livingstone and Benambra National Parks created in 2001, Jindalee National Park in 2011). Over the years some significant areas of public land on the NSW south coast have also been afforded more protection.

The Swift Parrot's Tasmanian breeding habitat is also poorly represented in reserves. A recent breeding population survey found 71% of nest sites were on unreserved land, with 66% located on private property.

Travelling Stock Reserves

Many of the woodland remnants that remain in agricultural landscapes occur within the extensive Travelling Stock Reserve (TSR) network of Crown land. The TSR network was established over 150 years ago to facilitate the movement of livestock between properties and to markets. The network consists of roadside travelling stock routes and travelling stock reserves (holding paddocks) which are used for periodic livestock grazing. These essentially form a large-scale network of linear connected remnant vegetation in NSW and QLD, although many of these important land parcels have been sold off over the past few decades.

Because the remaining TSRs are publicly owned and generally have not been cleared or used for prolonged stock grazing, they have inadvertently protected across highly cleared agricultural landscapes. TSRs therefore have great ecological value, supporting a wide range of woodland-dependent species that are typically rare or threatened due to the extensive clearing of woodland habitat, including the Swift Parrot. The remnant vegetation within the TSR network often provides the best example of ecosystems and communities that are not well represented in National Parks and other protected corridors of remnant woodland vegetation areas, with approximately 80% of TSRs containing vegetation communities of high or very high conservation status. These parcels of land are going to be a vital component of the long-term recovery effort for species like the Swift Parrot and will need to be managed accordingly.



Mature Mugga Ironbark, suitable wintering foraging habitat, in Mates Gully TSR in NSW (Dean Ingwersen).

Private Land Conservation

Covenancing

Much of the Swift Parrot's preferred habitat is on the same fertile, lowland areas that provide the best soils for stock grazing and cropping. As a result, much of the species' habitat has been lost to clearing for agriculture. Any habitat that remains on private land is therefore crucial for the species, and many Swift Parrot records come from farmland, bush blocks and gardens in urban, peri-urban and regional parts of south-east Australia. This means that in order to save the species from extinction, serious effort needs to be made to protect, enhance and expand key habitat on private land.

BirdLife Australia's Woodland Birds Program, in collaboration with the NSW Biodiversity Conservation Trust (BCT) of NSW (formerly NSW Nature Conservation Trust), Victorian Trust for Nature (TfN), Tasmanian Land Conservancy (TLC) and the NSW Saving Our Species program, have permanently protected areas of key habitat for the Swift Parrot and other woodland birds using conservation covenants (see breakout box for a description of this process). Over the past decade, conservation covenants have been secured on more than 3,000 hectares of significant woodland habitat throughout the Swift Parrot range. Since then the covenancing partners in that program (BCT, TfN and TLC) have continued to secure valuable parcels of covenanted land for in perpetuity protection.

COVENANTING SWIFT PARROT HABITAT

- 1 A landholder is either contacted by BirdLife Australia or one of the covenancing agencies, or nominates an interest with them, and the property is assessed for suitability for Swift Parrots and other woodland birds. Factors used in the assessment include previous sightings of the species on or near the property, habitat present (and the quality), land use, and proximity to protected areas or other high-quality habitat.
- 2 The landholder enters into a Trust Agreement with the Biodiversity Conservation Trust of NSW, Trust for Nature or Tasmanian Land Conservancy and negotiates which area of the property will be subject to covenant protection. This area is registered on the property title and protects the biodiversity of the property in perpetuity.
- 3 The BCT, TfN or TLC develop a tailored Plan of Management for the property, which outlines works to be undertaken, activities which may be allowed on the covenant parcel, and the targets of the management and/or activities to be implemented. Reviews are conducted, usually at five-year intervals, to evaluate management and conduct flora and fauna monitoring.
- 4 Landholders can be paid incentives or management fees over the initial short-term (up to several years) to conduct management works, weed control, fencing, and monitoring.



Tasmanian Land Conservancy staff assess a property for a conservation covenant in Tasmania (Chris Tzaros).



Bush Heritage ecologist Dr Matt Appleby checking out the woodlands on Tarcutta Hills Reserve (Annette Ruzicka).

Private Conservation Reserves

BUSH HERITAGE

National not-for-profit conservation organisation Bush Heritage Australia owns several nature reserves which provide habitat for the Swift Parrot.

Swift Parrots regularly visit the region between Kara Kara National Park and Wedderburn on Dja Dja Wurrung country in central Victoria. Bush Heritage has several reserves in this region including Nardoo Hills Reserve and John Colahan Griffin Reserve. Swift Parrots are recorded on these reserves when there is mass flowering of the Yellow Gum, Yellow Box and Inland Grey Box trees.

Most significantly of all for the Swift Parrot is Bush Heritage's Tarcutta Hills Reserve. This 720-hectare reserve on Wiradjuri country 50 km south-east of Wagga Wagga NSW protects one of the largest areas of grassy white box woodland in good condition left in Australia. The surrounding landscape has been largely cleared for agriculture, but Tarcutta Hills was relatively intact when Bush Heritage acquired the first 432 ha in 1999. The second 288ha parcel of land was added in late 2020. Tarcutta Hills contains White Box and Mugga Ironbark that flower consistently during the winter months, providing a relatively reliable source of food for Swift Parrots. Flocks of 60 birds have been observed feeding here in recent years.

Along with Swift Parrots, these reserves also support many other threatened or declining woodland birds such as Hooded Robins, Superb Parrots, Brown Treecreepers and Diamond Firetails.



Little Swanport Reserve, Tasmania (Chris Tzaros).

TASMANIAN LAND CONSERVANCY

The Tasmanian Land Conservancy (TLC) is a not-for-profit environmental organisation that protects private land of high conservation significance in Tasmania. The TLC manages a number of reserves across Tasmania where Swift Parrots have been recorded, and which contain suitable foraging and breeding habitat. These include:

- Prosser River Reserve located just outside Buckland near the east coast of Tasmania. This reserve contains 500 hectares of old-growth forest, including Tasmanian Blue Gum and Black Gum. Swift Parrots are known to nest and feed on the reserve.
- Little Swanport Reserve, north of Triabunna. This 150-hectare reserve has had Swift Parrots recorded on site, and contains extensive Blue Gum forest suitable for foraging and abundant old-growth trees with nesting hollows.
- The Egg Islands reserve, covering 136 hectares on both the north and south Egg Islands, situated in the Huon River in south-east Tasmania. The islands include significant areas of Black Gum forest in excellent condition, where Swift Parrots have been observed foraging.



A Sugar Glider tries unsuccessfully to enter a Swift Parrot nest box fitted with a 'PKO' device (Dejan Stojanovic).



A Sugar Glider sitting low in a wattle tree (Dean Ingwersen).

Habitat Management

Various interventions have been trialled to boost available Swift Parrot habitat, or to reduce some of the threats which they face. This section highlights some of these innovative projects.

Nest Boxes

Supplementing Natural Hollows

Hollows suitable for Swift Parrots to nest in can take around 150 years to form naturally in eucalypt trees. A recent ANU project aimed to supplement the naturally available hollows with artificial nesting sites on islands off Tasmania where Sugar Gliders do not occur. A successful crowdfunding campaign for the project enabled the installation of 500 nest boxes and artificially cut hollows (hollows created in living trees using a chainsaw) in preparation for the 2016/17 breeding season.

At the start of the first season after box installation, 25% of the nest boxes were being used by Swift Parrots. The team found that there was no difference in reproductive success or nestling body condition between natural nest sites and artificial nests. It is hoped that boosting numbers on islands such as Bruny Island will allow the species to persist until a strategy is developed to deal with the Sugar Glider problem on mainland Tasmania.

Protection From Possums

ANU researchers have designed "possum-keeper-outer" (PKO) devices for nest boxes which aim to prevent predation by Sugar Gliders on Swift Parrot nests. The boxes are fitted with a light sensor and have a mechanical door that closes behind the parrot once darkness falls. In the morning, the sensor detects daylight, and the door opens again.

To trial the PKOs, 60 boxes were installed at three sites in 2017-18, with a quarter of the boxes fitted with a PKO. The trial was funded by a successful crowdfunding campaign. The team monitored Tree Martin nesting success as surrogate for Swift Parrots and found that PKOs reduced the nest failure rate from 81% to 25%. All nests without a PKO failed due to glider predation, whilst the PKO nests that failed did so from natural causes (it is normal for a proportion of nests to fail). Trials on Swift Parrot nest boxes have shown that the species is not disturbed by the light-triggered door opening and closing, however the PKO devices have not yet been rolled out for Swift Parrot nest protection.

There are several management challenges which have so far precluded the use of PKOs on Swift Parrot nests. Firstly, Swift Parrots prefer nesting in natural hollows over nest boxes. The applicability of individual nest protection tools on a broad scale is also challenged by the nomadic breeding pattern of Swift Parrots, access difficulties and the labour and cost intensive approach (equipment, tree-climbers). Installing nest boxes in anticipation of Swift Parrots could also have unwanted outcomes, such as attracting nest competitors (e.g. invasive Common Starlings). Despite these difficulties, PKOs may still be useful in areas of high glider predation to allow at least some Swift Parrot nests to survive

Sugar Glider Population Management

Given that the Sugar Glider was introduced to Tasmania, and is therefore not indigenous to the island, consideration has been given to managing them like an invasive species. In 2018 the Tasmanian State Government began a Sugar Glider trapping and euthanasia trial in Swift Parrot breeding areas to assess the feasibility of this as a management option. This involved the deployment of 80 new nest boxes, and the monitoring of existing nest boxes for the presence of Sugar Gliders.

Further, in 2019 a consortium of land managers (NRM South, the Tasmania Dept of Primary Industries, Parks, Water and Environment (DPIPWE), ANU, TLC, and Conservation Landholders Tasmania) began a similar project, to be undertaken in years when Swift Parrots nest on mainland Tasmania (rather than offshore islands). The initial stages of this project involved a trial to determine the most effective and cost-efficient trap types for Sugar Gliders. A follow-on field pilot study aiming to assess the impact of glider control on nest predation rates (of females, chicks and eggs) proved inconclusive. From the small sample size used in the study, the results suggested that site-level variation had the greatest impact on predation rates and not the control activities themselves.

Further trials are required to investigate the cost-efficiency and logistics associated with trapping and removal of Sugar Gliders on a larger scale.



Habitat restoration at key sites is hoped to provide long-term foraging options for the Swift Parrot (Chris Tzaros).



Swift Parrot habitat in Mogo State Forest, NSW (Dean Ingwersen).



Swift Parrot breeding habitat in Wielangta Forest, Tasmania (Chris Tzaros).

Habitat Restoration

Given that habitat loss is one of the main threats facing Swift Parrots, habitat restoration is an important recovery action for the species. This may be achieved through active planting of important feed trees, as well as through encouraging natural regeneration by fencing stock out of certain areas. Control of invasive weeds and pest animals which out-compete or denude native vegetation is also an important component of habitat restoration. There are a number of current habitat restoration projects specifically targeting Swift Parrots, and some of these include:

- A Central West Local Land Services (LLS) project which aims to stabilise the trajectory of the Swift Parrot in central-west NSW. The project will enhance and restore Swift Parrot foraging habitat through grazing management, pest animal control, and weed control on private and public land. The project will be undertaken in collaboration with BirdLife Australia and the Department of Planning, Industry and Environment (DPIE).
- A four-year project within Greater Sydney LLS focused on restoring habitat for the Swift Parrot and Regent Honeyeater throughout key areas of the NSW Central Coast and Northern Sydney. The project will involve the improvement and restoration of key habitat including box woodland and forest through strategic fencing, revegetation works, weed and pest animal control and community education.
- A Hunter LLS project which, although mainly focused on the Regent Honeyeater, aims to improve conservation outcomes for Swift Parrot and other woodland birds. The project targets recovery of key habitats in the Hunter region of NSW through grazing and stock management, weed control, revegetation and feral animal monitoring on private property and public lands. The project includes an incentives program for landholders to engage in on-ground restoration activities.
- A North East Catchment Management Authority (CMA) 'Bush for Birds' project over five years that aims to help landowners in north-east Victoria restore and improve preferred habitat of Regent Honeyeaters and Swift Parrots at a landscape scale. Key threats for the two species will be addressed using revegetation, protecting/improving quality of remnant vegetation with weed control, enhancement planting, ecological thinning, and Noisy Miner control.
- Saving Our Swift Parrots and other woodland species, a project which aims to help landowners in the Riverina and Central Coast regions of

NSW restore and improve Swift Parrot habitat at a landscape scale. This project is being delivered by the ANU together with Riverina LLS, Greater Sydney LLS, Central Coast Council, Murrumbidgee Landcare Inc., NSW DPIE and Greening Australia. The project will address key threats for the Swift Parrot using revegetation and protecting and improving the quality of remnant vegetation.

- A long-term landscape restoration program called 'Grow West' is being run by Port Phillip Westernport CMA and partners, which works with landholders, organisations and local communities to rehabilitate degraded landscapes and improve habitat values into the west of Melbourne. Through creating habitat corridors between these existing parks, the Grow West program is contributing towards the creation of further Swift Parrot foraging habitat within Melbourne's outer west.

Forestry Management

A large amount of remaining Swift Parrot habitat occurs on land managed by forestry bodies, particularly in Tasmania, but also in NSW, Victoria and even Queensland. In the three former states, there are measures in place to reduce impacts to Swift Parrot habitat from forestry operations. Many conservationists and scientists argue, however, that these measures do not go far enough and need to be amended to better protect remaining Swift Parrot habitat. Indeed, valuable old-growth forest habitat continues to be cleared despite the prescriptions that are in place to protect Swift Parrots. Groups such as BirdLife Australia and ANU are working with state agencies to strengthen protections for Swift Parrot habitat in areas managed for forestry operations. Below is an outline of forestry prescriptions in each state.

New South Wales

In NSW production forests, specific habitat protection is only required where there are Swift Parrot records at a particular location. Forestry prescriptions relating to Swift Parrots are applicable to production forests that are covered by the Coastal Integrated Forestry Operations Approvals (CIFOA), which cover the areas of the previous Upper North East, Lower North East, Southern and Eden IFOAs. The CIFOA requires that a minimum of five nectar trees per hectare of harvest area must be retained if the compartment contains, or is within two kilometres of, a record of a Swift Parrot. In addition, if there is a record of a Swift Parrot roost, a 25m radius exclusion zone around that roost must be established.

The codes of practice for private forestry operations in NSW require Forest Operation Plans to be prepared before operations commence. Those plans must contain any records of Swift Parrots, and the codes require that where there is a record, at least ten eucalypt feed trees must be retained within every two hectares of the net harvest area. Additionally, where a Swift Parrot is observed feeding, the tree in which it is feeding must be retained.

Victoria

Within Victorian State forests, management prescriptions for Swift Parrots vary between different Forest Management Areas (FMAs), which are broad State Forest administrative units.

In the Portland, Horsham and Midlands FMAs, disturbance of Swift Parrot flocks is to be avoided by "postponing timber harvesting operations that may affect them in their vicinity". Additionally, at least 30% of dry forest and woodland in the Midlands FMA is to be maintained (in State Forest Special Protection Zones from which timber harvesting is excluded, and in the conservation reserves that fall within the FMA).

In the North East FMA, Special Management Zones (SMZs) are to be established for "verified resident populations" of Swift Parrots. SMZs are areas managed to conserve specific features (e.g. threatened species), while catering for timber production under certain conditions. If an SMZ is being established, an application must be made to the Secretary of the Department of Environment, Land, Water and Planning (DELWP) prior to commencement of harvesting operations. SMZ applications must be accompanied by a SMZ plan (which details conditions under which timber harvesting may occur). Site inspections and detailed planning in consultation with DELWP is also to be conducted to ensure the Swift Parrot is adequately protected during timber harvesting operations or prescribed burning activities.

Within the Bendigo FMA, SMZs are to be maintained across all Swift Parrot Management Areas (SPMAs), which are located in 17 State Forests in the region. These SPMAs are managed to protect the key habitat features for Swift Parrots. All large trees are to be protected from harvesting, and all trees greater than 40cm diameter at breast height in high and low quality saw log and firewood harvesting operations are to be permanently retained. All management activities likely to disturb Swift Parrots are to be excluded while the birds are foraging within the areas.

Tasmania

In Tasmania, the management of Swift Parrot breeding habitat on forestry lands is guided by the Forest Practices Code and regulated by the Forest Practices Authority (FPA) in accordance with the *Tasmanian Forest Practices Act 1986*. Under the Act, Forest Practices Plans must be prepared prior to any forestry operations taking place. The preparation of these plans requires an assessment of potential habitat for threatened species (including the Swift Parrot) and the development and implementation of species-specific management prescriptions. These prescriptions are made available to Forest Practices Officers (who are authorised by the FPA to plan, supervise and monitor forest practices) through an online planning tool called the "Threatened Fauna Adviser".

Prescriptions for the Swift Parrot vary according to whether the proposed forestry operation is located inside the species' core or potential breeding range, and whether it falls within a designated "Swift Parrot Important Breeding Area" (SPIBA; see Policy section below). They also vary according to the mapped density of Swift Parrot habitat in an area. Prescriptions may include retention of nest trees, high-density nesting habitat, or a certain percentage of foraging trees in an area.

If Forest Practices Officers determine that a Forest Practices Plan meets the prescriptions for threatened species under the "Threatened Fauna Advisor", they are not required to notify the FPA about these threatened species; the plan is certified, and operations can go ahead. On the other hand, if management prescriptions for threatened species are unable to be met for a proposed operation, Forest Practices Officers are required to notify the FPA. The FPA may then consult with the Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE) and/or experts for advice and to determine appropriate management prescriptions.

It is important to note that forestry prescriptions for Swift Parrots in Tasmania only apply to habitat used during the breeding season; there is no requirement to assess forestry areas for their use by the species outside of the known breeding range.



Logging equipment and piles of harvested Spotted Gum in a NSW logging coupe (Dean Ingwersen).

Policy

First gaining attention as a declining species in the 1980s, the Swift Parrot has since been in a state of sustained and rapid decline, resulting in the species' conservation status being changed from 'endangered' to 'critically endangered' in 2015 under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Despite being listed as threatened and protected in all its range states and under federal environmental legislation for several decades, the Swift Parrot is today closer to extinction than ever before. This indicates that current environmental policy is failing to provide the protection required to reverse declining trends and save the species from extinction.

Although significant advances have been made in recent decades in understanding the dynamic ecological requirements of Swift Parrots, current policy underpinning the management of Swift Parrot habitat continues to poorly integrate this information into assessment processes and applied conservation measures. These shortcomings are particularly evident within the EPBC Act and its inability to allow for consideration of the cumulative impacts of habitat removal resulting from separate actions. Over time, this can result in significant loss of habitat within a given area, effectively allowing 'a death by a thousand cuts' for Swift Parrots.

In areas of publicly-owned forests subject to logging, both the economic and environmental values of these areas are managed under Regional Forest Agreements (RFAs). RFAs are long-term agreements which take legal precedence over the EPBC Act within the logging regions where they apply, and exempt commercial logging operations from the binding regulatory processes and requirements contained within the EPBC Act.

RFAs apply to a considerable extent of important Swift Parrot habitat, and since their inception in the mid-1990s, continue to allow extensive areas of habitat to be lawfully harvested, including critical breeding sites in Tasmania. These outcomes demonstrate the inadequacy of RFAs in ensuring the effective management and protection of Swift Parrot habitat in the presence of logging operations.

In Tasmania, efforts to improve the efficacy of Swift Parrot habitat management in relation to forestry practices resulted in the formation of a working group of key stakeholders in 2008, including Swift Parrot researchers and forestry industry representatives. This resulted in the development of a draft document in 2010 entitled '*Species Habitat Planning Guideline for the conservation management of Lathamus discolor (Swift Parrot) in areas regulated under the Tasmanian Forest Practices System*' (Habitat Planning Guideline). The fundamental aim of the Habitat

Planning Guideline was "to ensure that sufficient levels and arrangement of important nesting-habitat and foraging-habitat are being maintained to support a successful breeding event in any given year".

The Habitat Planning Guideline identified 12 "Swift Parrot Important Breeding Areas" (SPIBAs) within forested areas along the eastern and southern coast of Tasmania. SPIBAs are management units known or suspected to have supported a large portion of the Swift Parrot breeding population in any given year. The intended aim for Swift Parrots within SPIBAs was "no net decrease in the extent of existing high and medium density nesting-habitat or foraging-habitat". It was also intended that key habitat features in low density breeding habitat should be retained in situations where high and medium density habitat is scarce.

The document included guidelines to aid the selection of appropriate management options for forestry and other land-use activities, both within SPIBAs and elsewhere within the species' breeding range. However, the document is still in draft more than 10 years after its development and has not resulted in any mandatory industry guidelines for improving Swift Parrot habitat management. Although several of the management recommendations in the Habitat Planning Guideline have been incorporated into the "Threatened Fauna Advisor", they have progressively been watered down over time.

The lack of formal reservation of swift parrot habitat in many key breeding areas is yet another issue. For example, only 6.5% of the Southern Forests SPIBA is formally reserved, and the remaining habitat within the SPIBA continues to be logged. This is further compounded by areas of nesting or foraging habitat that were retained or informally reserved in the past being subsequently incorporated into new coupe proposals (forestry operations).

Reducing Collision Threat

Swift Parrot Collision Prevention Project

In 2008, the Threatened Species Network, a program of the Australian Government and WWF Australia, undertook a project to investigate the issue of Swift Parrot collisions and potential solutions. The project involved research on the issue of bird collisions both within Australia and internationally. A workshop was held targeting urban planners and landscape architects to seek their input into design solutions appropriate for the Australian situation.



Swift Parrot survey volunteers (Chris Tzaros).

What Can Be Done?

There are steps that can be taken at various stages in the planning and design of new buildings, as well as actions to retrofit existing buildings and other structures to minimise the potential risk of Swift Parrot collisions. Guidelines on parrot-safe building design resulting from the WWF Swift Parrot Collision Prevention Project have been published. The major principle behind minimising the risk of collisions for Swift Parrots is to minimise glass reflectivity and transparency and create "visual noise" so that the birds recognise windows and fences as a barrier in their flight-path. In the planning stage, potential solutions include consideration of proposed siting of new buildings in the landscape, particularly in relation to potential Swift Parrot flight-paths.

In the design of the building itself, glazing and other potentially hazardous structures should be limited in areas that are predictable bird collision areas, or else designed to facilitate their visibility to the parrots. Options to improve visibility include avoiding throughways that give false impression of an unobstructed passageway; angling windows to reduce reflections of adjacent habitat and the sky; creating "visual noise" through differentiations of material, texture, colour, opacity or other features that help fragment window reflections and reduce overall transparency; and muting reflections by extended rooflines to close off the angle of reflection of the sky. Many of these options are also relevant to existing buildings.

Australian Bird Strike Project – BirdLife Australia

At present there is little data available on the extent of bird strike in Australia. BirdLife Australia has launched a Bird Strike Project which aims to find out more about where and why it is happening. The website provides a single data collection point for bird strike incidents across Australia, which will allow potential hotspots to be mapped. Users can enter data into a survey form at:

<https://www.surveymonkey.com/r/aussiebirdstrike>

Research is also being conducted to come up with best practice guidelines based on international management solutions that may be applied in Australia. The goal is to eventually work with industry to get bird-friendly technology into buildings and other infrastructure.



Reducing window strike will help save Swift Parrots like this one from an untimely demise (Chris Tzaros).

Community Engagement

Building community awareness of the plight of the Swift Parrot is central to the recovery of the species. In fact, maintaining and increasing community awareness is one of the key strategies outlined in the Recovery Plan for the Swift Parrot. It will take a collaborative effort to save the Swift Parrot from extinction because it occurs across all land tenures and numerous administrative boundaries.

Awareness-raising also enables community members to actively participate in recovery actions. These include volunteering for tree-planting activities, conducting searches for Swift Parrots and lobbying for the protection of key habitat. Being able to mobilise volunteers in this way gives far greater power to these recovery actions. Community engagement also allows landholders to identify, restore and protect Swift Parrot habitat on their land.

With Swift Parrots now so few in number and being highly mobile and often unpredictable, maintaining a sightings database with contributions from the broader community is essential. Furthermore, although bird-watching is a growing pastime in Australia, there are proportionally very few birdwatchers for the size of the country and even fewer that are familiar with Swift Parrots. It is hoped that by upskilling birdwatchers and the general public with tips on recognising Swift Parrots (e.g. by learning their calls and differentiating them from similar species) more reports of the species will come to light. Records obtained from the public have largely formed the basis for long-term analysis of their distribution on the mainland each year for more than twenty years.

Community engagement is conducted extensively by BirdLife Australia through workshops, field days, presentations at seminars and conferences, talking to schools, addressing the media and production of promotional materials. Other organisations, such as Local Land Services, Catchment Management Authorities, government agencies, regional birding groups, zoos, museums and universities also contribute greatly to improving the public knowledge of Swift Parrots and the effort to conserve them.

WHY CONSERVE SWIFT PARROTS?

Swift Parrots as a Flagship Species

The Swift Parrot has become a 'flagship' species for conservation issues across eastern Australia, in particular for southern Tasmanian forests. Conservation of Swift Parrot habitat will also help conserve many other threatened bird species and hollow-dependent fauna. In Tasmania, this includes the Masked Owl and Forty-spotted Pardalote. On the mainland, the Swift Parrot shares its preferred habitat with many threatened woodland bird species such as the Regent Honeyeater, Little Lorikeet and Superb Parrot. Many other mammals, invertebrates and plants also benefit from protection and restoration of Swift Parrot habitat.

Threatened Ecological Communities listed under the EPBC Act that are important habitat for the Swift Parrot include: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, Cumberland Plain Woodland, Shale Sandstone Transition Forests, Shale Gravel Transition Forests, Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia, Gippsland Red Gum Grassy Woodland and Associated Native Grassland and Grassy Eucalypt Woodland of the Victorian Volcanic Plain. Conservation of Swift Parrot habitat will by default protect these nationally-listed Ecological Communities. There are also numerous Ecological Communities listed at the state level that benefit from efforts to protect and conserve Swift Parrot habitat.

The Role of Swift Parrots in Pollination

Because Swift Parrots feed on flowering eucalypts, they help to transfer pollen from tree to tree as they forage. The species is highly mobile, meaning that pollen can also be transferred effectively across the landscape. The resulting long-distance genetic transfer increases genetic variation in the plant populations that the Swift Parrot visits. Higher genetic variation means greater ecological resilience in ecosystems, improving their capacity to withstand or adapt to environmental change.

The Swift Parrot is the most effective pollinator of the Tasmanian Blue Gum *Eucalyptus globulus*, producing 76% of maximum possible seed set after just one visit to a flower, compared to <7% seed set produced by bees. The Swift Parrot has also been found to be a more effective pollinator of this eucalypt compared with other bird species. This is partly due to the Swift Parrot's consumption of pollen as well as nectar, resulting in a heavier pollen load on the parrot's head compared to other avian pollinators such as honeyeaters (which take only nectar). In addition, the Swift Parrot's short, thick bill more consistently contacts the stigma (female part of the flower) whilst feeding, increasing the chances of pollen being deposited successfully.

Ironically, the Tasmanian Blue Gum is crucial to the forestry industry in Tasmania, as is the Black Gum, another eucalypt species for which the Swift Parrot is a major pollinator.



Swift Parrot feeding on flowering Tasmanian Blue Gum. The Swift Parrot is an important pollinator for this species (Chris Tzaros).

RESEARCH AND MONITORING

Biannual Swift Parrot Surveys – Mainland Range

Each year since the mid-1990s, biannual mainland surveys for Swift Parrots have been undertaken on the third weekend in May and the first weekend in August (and recently, a week either side as well). These targeted surveys aim to get volunteers searching as many locations as possible within the winter range of the Swift Parrot. By identifying areas that the birds are visiting, volunteers help monitor Swift Parrot population trends and distribution, and keep track of what resources they are using. In recent years the surveys have been coordinated by BirdLife Australia, who have enlisted the help of regional coordinators to help guide volunteers to the most appropriate sites (e.g. where blossom is plentiful) and to advise on access restrictions.

The biannual surveys are an excellent way of promoting searches for Swift Parrots in general. Because of the profile and high level of participation the survey weekends receive, they also provide a good platform for increasing community engagement activities. The surveys are run in conjunction with surveys for the Regent Honeyeater, another critically endangered woodland bird that can occur in similar habitat.



Volunteers searching for Swift Parrots at Chiltern, Victoria (Chris Tzaros).

Biannual Searches - An Introduction to the Revised Survey Methods

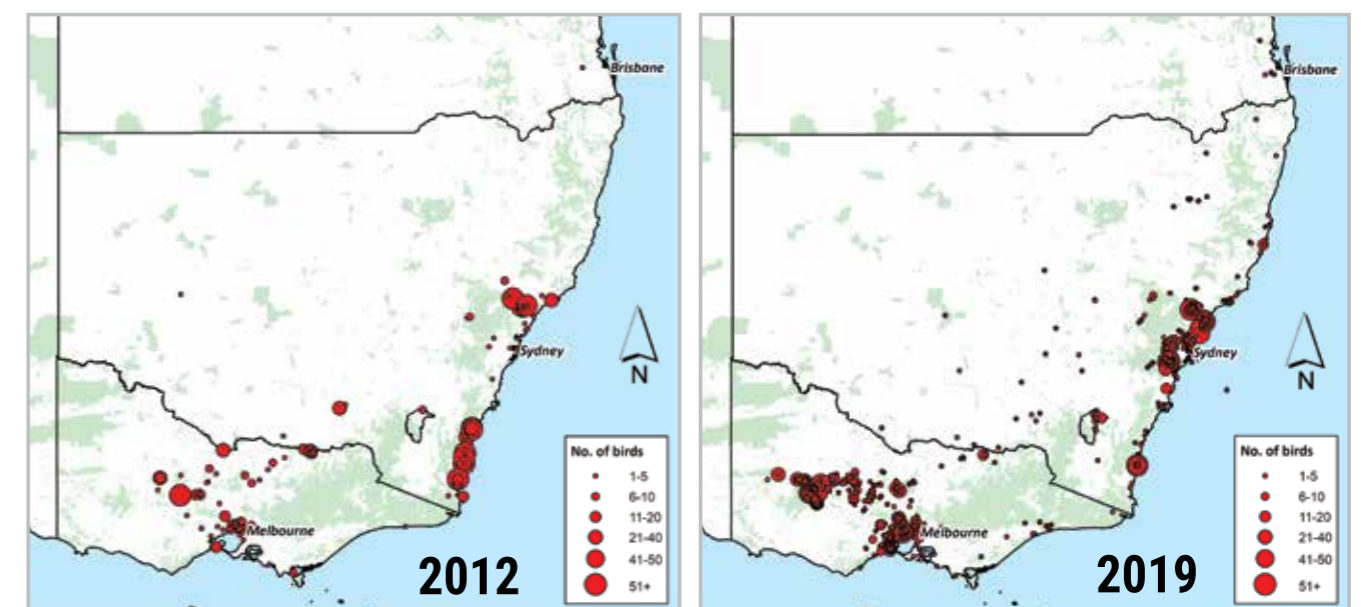
In partnership with ANU and the Swift Parrot Recovery Team, the BirdLife Australia Woodland Bird Program team is developing a revised winter monitoring program called "Swift Parrot Search", which will begin in some regions in 2021. The ongoing contributions of volunteer birdwatchers will remain critical to the success of the revised survey approach.

The long-term biannual surveys for Swift Parrots have shown us that their mainland distribution varies considerably from year-to-year as well as within years. However, the full extent, variation and availability of winter habitat for Swift Parrots remains uncertain. The relative influence of the various factors driving their movement patterns is also unclear. As such, identifying priority areas for Swift Parrot protection and management is difficult. The data collected using the existing biannual search methodology does not allow these uncertainties to be addressed in a scientifically-rigorous manner; the design and implementation of a revised winter monitoring strategy has been identified as a key action in the revised national Swift Parrot Recovery Plan.

Using the data collected from the 20+ years of biannual surveys, as well as habitat modelling recently produced by ANU researchers, more than 2,000 potential survey sites have been identified and then ground-truthed. For those found to contain suitable Swift Parrot habitat, detailed habitat assessments were undertaken and initial bird searches conducted.

With guidance from the regional coordinators, volunteer birdwatchers will visit the sites selected for permanent monitoring points. The new approach will use fixed search areas of 50 metre radius that are monitored for a defined time period of 5 minutes. As well as recording numbers and behaviour of any Swift Parrots detected, volunteers will also be asked to record the flowering intensity of tree species present, the presence of open fresh water, and the occurrence of other bird species.

The data collected will be collated and analysed to enhance our understanding of the ecology and conservation needs of Swift Parrots across their wintering range, empowering managers to make the best use of scarce resources for the species.



Data captured during the various mainland monitoring seasons by volunteers and staff (BirdLife Australia).

A Personal Perspective on Conserving Swift Parrot Habitat

Dr Tonia Cochran, founder of Inala Nature Tours shares her story about how her love of Swift Parrots – and desire to help prevent their extinction – led her to establish an incredible sanctuary on Bruny Island, Tasmania. Through her guiding business, Tonia continues to raise awareness about the Swift Parrot's plight, and she also supports other researchers' work to increase our knowledge about the species.

My involvement with Swift Parrots began in 1987 when I first moved to 'Inala' on South Bruny Island in Tasmania from an academic career in Marine Biology in Melbourne. The Inala property at that stage was 'only' 350 acres in size but comprised mainly of mature *Eucalyptus obliqua* (Messmate Stringybark) forest, interspersed with some old-growth *E. globulus* (Tasmanian Blue Gum). In 1990 I purchased an adjoining 150 acre property with its resident Forty-spotted Pardalote colony and really began taking notice of the resident and migratory birds which included the arrival and departure dates of the migratory Swift Parrots during their spring/summer visits to the property. I noticed that several pairs were breeding colonially in the many hollows in the mature stringybark forest at Inala, and reported this to the Threatened Species Unit of the Parks & Wildlife Service (now DPIPW). At that time, little was known of the breeding requirements of Swifties so the report of them breeding in stringybarks was treated with some scepticism until they visited Inala.

Since that time, I have collaborated closely with the Threatened Species Unit and more recently, the Difficult Bird Research Group (DBRG) and have made the Inala property available to researchers predominantly from the Australian National University, Canberra (ANU) and the University of Tasmania (UTas) for the study of several bird species including Swift Parrots and Forty-spotted Pardalotes, in support of furthering knowledge on these threatened species to better protect them. Swift Parrot nesting boxes have been installed around the Inala property, although the Swifties prefer the natural nesting hollows, much to the frustration of the researchers who risk life and limb climbing the trees to monitor chicks!

Since 1994, the Inala property has also been the base of my wildlife tourism business Inala Nature Tours which caters predominantly for birdwatchers from around the world. The property has become known for its Tasmanian endemic bird species and one of the best locations to view Forty-spotted Pardalotes and breeding Swift Parrots. Guests can stay in cottages on the property and explore the walking tracks, bird-hides and platforms erected to maximise the chances of seeing these species

with minimal impact. Our guided tours are designed to increase awareness and proceeds go towards conservation, through the Inala Foundation. Many of our guides are also researchers, and two of them (Dr Andrew Hingston and Dr Catherine Young) work directly on Swift Parrot research.

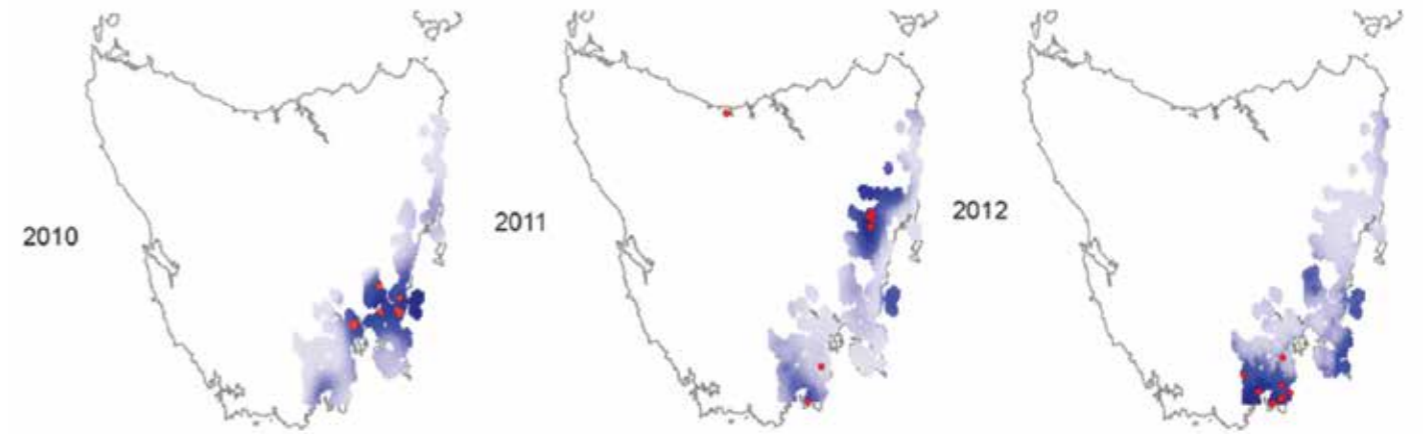
I have also encouraged visits by school and community groups, most recently through an Australian Government funded Protecting the Breeding Population of Swift Parrots project for public engagement activities through NRM South. The Inala team and I have also planted thousands of trees, mostly *E. viminalis* for the Forty spotted Pardalote and *E. globulus* and *E. ovata* for Swift Parrots on the Inala property and throughout Bruny Island, to create future vital habitat for these species. Inala Nature Tours also partners with BirdLife Tasmania and the Bruny Island Environment Network (BIEN) as organisers of the biennial Bruny Island Bird Festival, which is also designed to increase awareness and celebrate the richness of Bruny's birdlife. The stars of the show are inevitably the Swifties!

In 2015 I purchased an adjoining property, increasing the Inala property size to around 1,500 acres. One of the main reasons that influenced my decision to purchase the property was the large area of mature and old growth Swift Parrot nesting trees therein, and the recognition that we could not afford to lose any more of this vital habitat. I had worked tirelessly to protect a logging coupe adjacent to Inala throughout that year and realised the fragility of this habitat and how easily and quickly it can potentially be lost forever. This also inspired me to place Conservation Covenants on the property to protect it in perpetuity. Some of these covenants were part of the BirdLife Australia's Woodland Birds for Biodiversity Program.

Swifties are, and always will be, a large part of my life and an inspiration to strive further to protect them. It's the least we can do for these colourful, chatty natural jewels and we cannot afford to delay any further in protecting them and the habitat that they desperately need to survive. Extinction is not an option.



Dr Tonia Cochran (left) with Margaret Atwood (right), author and advocate for Swift Parrot conservation, at Tonia's property on Bruny Island.



Modelling of suitable habitat (blue shading) and actual Swift Parrot nests found (red dots) across several breeding seasons in Tasmania (Difficult Bird Research Group, ANU).

Breeding Habitat Surveys

A Swift Parrot population monitoring program was established in Tasmania in 2009, a collaboration at the time between ANU, the Swift Parrot Recovery Team, the federal and Tasmanian Governments and BirdLife Australia. The monitoring program surveys over 1,000 sites in potential habitat across the species' breeding range to track annual variations in the distribution and relative abundance of the Swift Parrot population. The surveys also provide a measure of available breeding habitat by monitoring feed tree flowering intensity, and have been conducted since inception by ANU.

These surveys have allowed the researchers to track trends in Swift Parrot site occupancy and abundance over multiple years, investigate habitat use and to identify priority areas of habitat. These data are crucial for understanding how the birds respond to patchy and unpredictable tree flowering events by shifting the locations where they breed.

Predicting Breeding Locations

Availability of suitable Swift Parrot breeding sites varies annually over a large area of south-eastern Tasmania. The exact location of breeding each year depends on the intensity of Tasmanian Blue Gum or Black Gum flowering and the availability of nearby tree hollows for nesting. These specific requirements mean that only a fraction of their total breeding range is likely to be suitable each year. As a result of the yearly fluctuations in nectar resources across Tasmania, the movements of Swift Parrots have been difficult to predict. This limits the ability of land managers to protect the species, as it is hard to know where to focus management efforts.

ANU researchers have recently found that by assessing flower bud development in food trees, it is possible to predict where Swift Parrots will settle to breed up to a year ahead of time. Using data collected at the >1,000 sites in their landscape scale monitoring program, the researchers found that locally high bud abundance corresponded to occupancy by Swift Parrots in the following breeding season. Accurately predicting where birds will settle allows managers to implement proactive management actions at important sites. For example, researchers have been able to deploy nest boxes ahead of the breeding season and so increase the availability of nesting sites.

Radio Tracking

Swift Parrots are a small species renowned for their fast flight and their ability to move across vast landscapes, making them difficult to track using traditional hand-held radio antennas. This has meant that the species' movements during the non-breeding season have largely remained a mystery. ANU researchers have developed a specialised radio-tracking system that can be attached to an off-the-shelf drone. The tracker drone allows scientists to search large areas efficiently for tagged birds, and to track up to 40 birds at a time. In contrast, a traditional handheld tracking system can track only a single animal at a time.

Tracking from the air enables more frequent direct line of sight with the tags and increases the likelihood of signal detection, which is a major challenge when radio-tracking wildlife from the ground. One of the greatest benefits of aerial tracking technology is that it can be used in densely vegetated or rugged landscapes which are difficult to access on foot. Using aerial tracking, it has been found that even though Swift Parrots are capable of long-distance flights during the winter, they are frequently dependent on very small patches of habitat on and around farmland. This means that the loss of even a small area of habitat could have a significant impact on the species' survival.



Swift Parrot in Black Gum, one of two key Tasmanian feed trees (Chris Tzaros).

HOW CAN YOU HELP?

Report Your Mainland Swift Parrot Sightings!

Every report of a Swift Parrot is extremely valuable and BirdLife Australia needs to hear about them as soon as possible. It is important to be able to verify sightings and find out about the conditions where a bird or birds may be (e.g. numbers present at a location, amount of flowering or other food sources being taken).

One of the best ways to record a sighting is to take a photo, no matter how poor the quality may be. This can help to age the birds, determine behaviour and identify the habitat they are using. Wherever possible, it is also important to document:

- Date and time of observation
- Location (as specific as possible)
- Number of Swift Parrots seen (and/or heard)
- Behaviour and other species present
- The presence of flowering eucalypts, lerp or other food sources.

Given that Swift Parrots are often heard before they are seen, a simple way of collecting evidence for verification is through capturing sound recordings on your phone which can then be sent through to BirdLife Australia.

As soon as you find a Swift Parrot, please let BirdLife Australia know via email woodlandbirds@birdlife.org.au. Birdwatchers are also encouraged to add their sightings of Swift Parrots and other species to the Birddata database <https://birddata.birdlife.org.au/record-survey>.

Tasmanian Swift Parrot Sightings

In Tasmania, any observation of foraging Swift Parrots or a potential nesting site is valuable information and should be reported to the Tasmanian state government's Natural Values Atlas (NVA) www.naturalvaluesatlas.tas.gov.au. Records stored on the NVA are a permanent record and are accessible to other people interested in this species. Breeding records are particularly important.

Volunteering Opportunities

There are many ways of volunteering your time to help save the Swift Parrot. Here are some ideas:

- Get involved in BirdLife Australia's biannual survey periods on the mainland, which now run for six weeks in both April-June and July-August each year. We are always eager to have more eyes and ears on the ground looking for Swift Parrots – they occur over a large range and are very few in number, so the more people out searching the better! Instructions and resources such as maps will be provided, and you will be connected to a network of observers in your local area. For more information on the annual range-wide Swift Parrot (and Regent Honeyeater) surveys please contact BirdLife Australia's woodland birds team (e: woodlandbirds@birdlife.org.au or visit <https://birdlife.org.au/swift-parrot>).
- Help create new Swift Parrot habitat and get involved in upcoming tree-planting events near you. A starting place are the projects outlined on pages 26-27.
- Join BirdLife Australia and your local birding club, organisations such as Landcare, natural history groups or a 'friends of' group to support efforts to conserve threatened species such as the Swift Parrot in your area.
- Visit BirdLife Australia's Act For Birds website (www.actforbirds.org) to see how you can help out with campaigns to help the Swift Parrot and other threatened birds. For example, you could send a letter to your local member advocating for better protection of Swift Parrot habitat.

Found a Dead or Injured Swift Parrot?

If found injured, please:

- 1) Loosely wrap the bird in a blanket or towel, and gently place it in a secure and well-ventilated box;
- 2) Place the box away from noise, pets, children or other disturbances;
- 3) Do not attempt to feed the bird;
- 4) Take the bird to your nearest vet clinic or wildlife carer as soon as possible, and report all details via email to woodlandbirds@birdlife.org.au.

If you find a dead Swift Parrot, we recommend you:

- 1) Look for other birds in the immediate area that may also be deceased or injured;
- 2) Check if there are any living birds or suitable feed trees nearby;
- 3) Determine the cause of death if possible – e.g. collision with chain fence, or window or car or unknown;
- 4) Photograph the bird(s);
- 5) Look for coloured and labelled leg bands used to identify individual birds (record and photograph if present);
- 6) Where possible, retrieve the bird(s), place it in a sealed plastic bag, and store it in a freezer (for identification purposes and potential collection by a museum); and,
- 7) Email all relevant details (location, notable hazards etc.) and images to woodlandbirds@birdlife.org.au.

How to Prevent Window Strikes Around Your Home

There are also some important preventative measures you can take around your home or workplace to reduce the chances of bird collisions with windows – an issue which impacts on up to a third of Australia's bird species, including Swift Parrots! These simple but effective measures are discussed further on page 29 of this booklet and in the 'Make your windows safe for birds' brochure developed by BirdLife Australia's Urban Birds team found at:

<https://www.birdsinbackyards.net/getinvolved/Bird-Strike-Project>

For Landholders

- Consider nominating your property for a private land conservation protection and covenanting initiative. There are a range of departments to assist with land restoration such as Local Land Services, Catchment Management Authorities, Landcare networks and state environment departments. For covenanting habitat in-perpetuity, contact:
 - > **NSW: Biodiversity Conservation Trust** (www.bct.nsw.gov.au)
 - > **Victoria: Trust For Nature** (www.trustfornature.org.au)
 - > **Tasmania: Tasmanian Land Conservancy** (www.tasland.org.au)
 - > **Queensland: Queensland Trust For Nature** (www.qtnf.org.au)
- Protect remnant woodland or forest on your property to help provide habitat for the Swift Parrot. Fence remnant areas to exclude or limit stock access and allow regeneration of native plants. Establish 'corridors' of plantings to connect areas of remnant habitat.
- Avoid harvesting important Swift Parrot feed tree species for firewood. Mugga Ironbark, Yellow Box and White Box are all heavily harvested for firewood, at rates well above a sustainable level. The general public should also enquire about the source of any firewood they buy, particularly online.
- Landholders in Tasmania can help by avoiding cutting down Tasmanian Blue Gums and Black Gums, as well as hollow bearing trees.

If conservation of Swift Parrots on your property is something you would like to be involved in, either contact BirdLife Australia or the closest office of your Local Land Services, Catchment Management Authority or state environment department.



Swift Parrot feeding in Swamp Mahogany blossom (Stephanie Owen).



Swift Parrot searching for lerp in foliage in the Lower Hunter Valley (Mick Roderick).

SELECTED FURTHER READING

Brereton, R., Mallick, S. & Kennedy S. (2004). Foraging preferences of Swift Parrots on Tasmanian Blue-gum: tree size, flowering frequency and flowering intensity. *Emu* 104, 377–383.

Forest Practices Authority (2010). *Interim species habitat planning guideline for the conservation management of Lathamus discolor (Swift Parrot) in areas regulated under the Tasmanian Forest Practices System*. Internal report to the Forest Practices Authority. Forest Practices Authority, Hobart.

Heinsohn, R., Olah, G., Webb, M.H., Peakall, R. & Stojanovic, D. (2019). Sex ratio bias and shared paternity reduce individual fitness and population viability in a critically endangered parrot. *Journal of Animal Ecology* 88, 502-510.

Higgins, P.J. (Ed.) 1999. Handbook of Australian, New Zealand and Antarctic Birds. Volume 4: Parrots to Dollarbird. Oxford University Press, Melbourne.

Kennedy, S. & Tzaros, C. (2005). Foraging ecology of the swift parrot *Lathamus discolor* in the Box-Ironbark forests and woodlands of Victoria. *Pacific Conservation Biology* 11, 158-173

Pfennigwerth, S. (2008). *Minimising the swift parrot collision threat: guidelines and recommendations for parrot-safe building design*. WWF-Australia, Ultimo NSW.

Saunders, D.L. & Russell, T. (2016). Settlement and Swift Parrots - Historic and ongoing habitat loss for a critically endangered species (1788 – 2016). *Papers and Proceedings of the Royal Society of Tasmania* 150, 1-19.

Saunders, D.L. & Tzaros, C. (2011). National Recovery Plan for the Swift Parrot *Lathamus discolor*. Birds Australia, Melbourne.

Stojanovic D., Terauds A., Westgate M.J., Webb M.H., Roshier D.A., Roshier & Heinsohn R. (2015). Exploiting the richest patch has a fitness pay-off for the migratory swift parrot. *Journal of Animal Ecology* 84, 1194-1201.

Stojanovic, D., Webb, M.H., Alderman, R., Porfirio, L.L. & Heinsohn, R. (2014). Discovery of a novel predator reveals extreme but highly variable mortality for an endangered migratory bird. *Diversity & Distributions* 20, 1200-1207.

Webb, M.H., Holdsworth, M.C. & Webb, J. (2012). Nesting requirements of the endangered Swift Parrot (*Lathamus discolor*). *Emu* 112, 181-188.

Webb, M.H., Stojanovic, D. & Heinsohn, R. (2018). Policy failure and conservation paralysis for the critically endangered swift parrot. *Pacific Conservation Biology* 25, 116-123.



Swift Parrot image this page (Mick Roderick courtesy of Mindaribba Local Aboriginal Land Council).

PLANT IMAGE CREDITS (pages 10-14)

Yellow Gum

Tree: photo by BirdLife Australia
Bark: "Yellow Gum1" by Team Axe 1 (<https://commons.wikimedia.org/w/index.php?curid=29309287>). Cropped from original.

Flowers: "Eucalyptus leucoxylon buds" by Murray Fagg (<https://commons.wikimedia.org/w/index.php?curid=82141856>). Cropped from original.

Leaves: "Eucalyptus leucoxylon (Inland Blue Gum)" by Arthur Chapman (<https://flickr.com/photos/32005048@N06/27765552570>). Cropped from original.

Red Ironbark

Tree: "Eucalyptus tricarpa - upper branch bark" by Geekstreet (https://upload.wikimedia.org/wikipedia/commons/e/e1/Eucalyptus_tricarpa_-_upper_branch_bark.jpg)

Flowers/leaves/bark: "Eucalyptus tricarpa subsp. tricarpa (Red Ironbark, Mugga Ironbark)" by Arthur Chapman (https://flickr.com/photos/arthur_chapman/)

Mugga Ironbark

Tree: photo by BirdLife Australia
Bark: "eucalyptus-sideroxyylon-subsp.-sideroxyylon-2" by Friends of Chiltern Mt Pilot National Park (<https://flickr.com/photos/82806364@N02/50230728291>). Cropped from original.

Flowers: "Eucalyptus sideroxyylon-flowers leaves-Hawea Pl Olinda-Mau" (32084441570) " by Forest and Kim Starr (<https://commons.wikimedia.org/w/index.php?curid=71978695>)

Leaves: "Eucalyptus sideroxyylon foliage NC1-1" by Macleay Grass Man (<https://flickr.com/photos/73840284@N04/48735243502>)

White Box

Tree and bark: photos by BirdLife Australia
Flowers: "eucalyptus-albens-7" by Friends of Chiltern Mt Pilot National Park (<https://flickr.com/photos/friendsofchiltern/50228034382/>)

Leaves: "Eucsomerton1b" by Casliber (<https://commons.wikimedia.org/w/index.php?curid=19864931>)

Swamp Mahogany

Tree: photo by Allan Richardson
Flowers: "Eucalyptus robusta Lai Chi Kok Park, Hong Kong" by KHQ Flower Guide (<https://flickr.com/photos/52582306@N03/9229858028>)

Leaves: "Swamp mahogany in flower" by Doug Beckers (<https://flickr.com/photos/37103729@N02/3490147630>)

Bark: "Swamp Mahogany bark, Galgabba Point" by Tim J Keegan (<https://flickr.com/photos/49333819@N00/47391881021>)

Forest Red Gum

Tree: "Eucalyptus tereticornis 120619-0296" by Tony Rodd (<https://flickr.com/photos/8108294@N05/8436823501>)

Bark: "Eucalyptus tereticornis bark 7th Brigade Park Chermiside L1020038" by John Robert McPherson (<https://commons.wikimedia.org/w/index.php?curid=83481203>) Cropped from original.

Flowers: "Eucalyptus tereticornis 090718-6190" by Tony Rodd (<https://flickr.com/photos/8108294@N05/3793998675>)

Leaves: "Eucalyptus tereticornis white flowers 7th Brigade Park Chermiside P1070049" by John Robert McPherson (<https://commons.wikimedia.org/w/index.php?curid=83503608>)

Spotted Gum

Tree: "spotted gum" by robynejay (<https://flickr.com/photos/65749227@N00/452441063>)

Bark: "Corymbia maculata bark 7th Brigade Park Chermiside P1030124" by John Robert McPherson (https://commons.wikimedia.org/wiki/File:Corymbia_maculata_bark_7th_Brigade_Park_Chermiside_P1030124.jpg)

Flowers: Photo by Mick Roderick
Leaves: "Eucalyptus maculata (Spotted Gum) Flowers & Foliage, Drysdale Victoria Australia" by Rexness ([https://commons.wikimedia.org/wiki/File:Eucalyptus_maculata_\(1\).jpg](https://commons.wikimedia.org/wiki/File:Eucalyptus_maculata_(1).jpg))

Red Bloodwood

Tree: "Corymbia gummifera habit" by Ian Brooker and David Kleinig (<https://commons.wikimedia.org/w/index.php?curid=86979361>)

Bark: "Red Bloodwood bark, Yengo National Park" by Doug Beckers (<https://flickr.com/photos/37103729@N02/8543723152>) Cropped from original.

Flowers: "Red Bloodwood flowers" by John Tann (<https://flickr.com/photos/31031835@N08/6783420557>)

Leaves: "Corymbia gummifera" by Tatters (<https://flickr.com/photos/62938898@N00/48656884066>)

Yellow Box

Tree: BirdLife Australia
Bark: "Eucalyptus melliodora" by NSW Grassy Ecosystems (<https://flickr.com/photos/31390704@N06/2945686505>). Cropped from original.

Flowers: "Eucalyptus Melliodora" by candlebarkeucalypts (<https://flickr.com/photos/140790241@N02/37639274136>)

Leaves: "Yellow box leaves" by John Tann (<https://flickr.com/photos/31031835@N08/3437416809>)

Inland Grey Box

Tree: "Eucalyptus microcarpa. Grey Box." by Mamma Knows Plants (<https://flickr.com/photos/156978158@N03/25407351877>)

Bark: Eucalyptus microcarpa Blair, Neil © 2020 Royal Botanic Gardens Board (<https://vicflora.rbg.vic.gov.au/flora/taxon/e5427742-1a80-43b7-bef8-d41745ac0f3f>). Cropped from original.

Flowers: "Eucalyptus microcarpa - Grey Box" by Nathan_Johnson (<https://flickr.com/photos/55432009@N08/16692494940>). Cropped from original.

Leaves: "eucalyptus-microcarpa-4" by Friends of Chiltern Mt Pilot National Park (<https://flickr.com/photos/82806364@N02/50229140662>). Cropped from original.

Coastal Grey Box

Tree: "Eucalyptus moluccana trunk CC2" by Macleay Grass Man (<https://flickr.com/photos/73840284@N04/29738862588>)

Bark: "Eucalyptus moluccana trunk NC7" by Macleay Grass Man (<https://flickr.com/photos/73840284@N04/28721223407>). Cropped from original.

Flowers: Photo by Kirrily Hughes.
Leaves: "Eucalyptus moluccana fruit NC6" by Macleay Grass Man (<https://flickr.com/photos/73840284@N04/41801358840>). Cropped from original.

Blackbutt

Tree: "Blackbutt (Eucalyptus pilularis)" by Poytr (<https://flickr.com/photos/73840284@N04/29738862588>)

Bark / flowers / leaves: © Australian Plants Society (Sutherland Group) (<http://sutherland.austplants.com.au/>)

Tasmanian Blue Gum

Tree: "Eucalyptus_globulus-trunk_bark-Hosmers_Grove_Haleakala_National_Park-Mau" by Starr Environmental (<https://flickr.com/photos/97499887@N06/43428763232>)

Bark: "IMG_0886.JPG" by nautical2k (<https://flickr.com/photos/62614925@N00/2232533188>)

Flowers: "Eucalyptus globulus subsp. globulus" by dracophylla (<https://flickr.com/photos/40325561@N04/4716989528>)

Leaves: "Eucalyptus globulus" by Joan Simon (<https://flickr.com/photos/95905799@N00/15345095225>)

Black Gum

Tree: "Eucalyptus ovata subsp. ovata". by Andre Messina, © 2020 Royal Botanic Gardens Victoria Board (<https://vicflora.rbg.vic.gov.au/flora/taxon/0ace770d-d8bf-43f6-be31-dfbf4ae1a4b7>)

Bark: "Bark Eucalyptus ovata - San Francisco Zoo - San Francisco, CA" by Daderot (https://commons.wikimedia.org/wiki/File:Eucalyptus_ovata_-_San_Francisco_Zoo_-_San_Francisco_CA_-_DSC03544.jpg)

Flowers: "Eucalyptus ovata. Swamp gum" by McCann, Ian, © 2020 Royal Botanic Gardens Board (<https://vicflora.rbg.vic.gov.au/flora/taxon/0ace770d-d8bf-43f6-be31-dfbf4ae1a4b7>). Cropped from original.

Leaves: "Eucalyptus ovata 071009-7396" by Tony Rodd (<https://flickr.com/photos/8108294@N05/1895363475>)

Brooker's Gum

Tree and leaves: "Eucalyptus brookeriana" by Andre Messina ©2021 Royal Botanic Gardens Board (<https://vicflora.rbg.vic.gov.au/flora/taxon/66006c52-46be-4fbc-8c3c-c6922a617111>). Cropped from originals.

Bark: "Eucalyptus brookeriana - trunk base bark" by Geekstreet (<https://commons.wikimedia.org/w/index.php?curid=65994425>). Cropped from original.

Flowers: Photo by Robert Wiltshire

