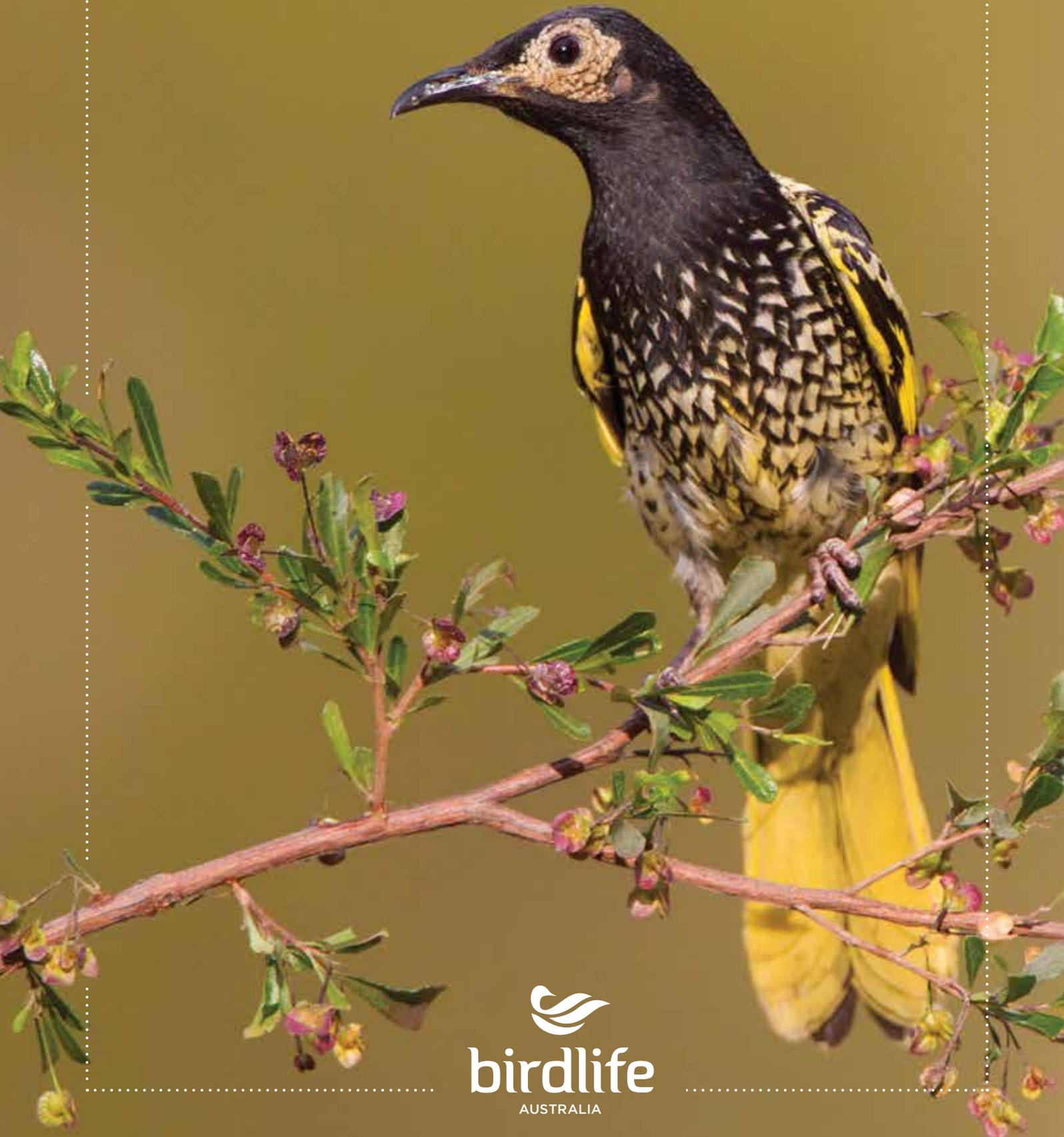


Saving the
REGENT HONEYEATER
A CONSERVATION AND MANAGEMENT GUIDE



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This is not only one of the handsomest of the Honey-eaters but is also one of the most beautiful birds inhabiting Australia, the strongly contrasted tints of its black and yellow plumage rendering it a most conspicuous and pleasing object, particularly during flight. I met with it in great abundance among the bushes of New South Wales...I have occasionally seen flocks of from fifty to a hundred in numbers, passing from tree to tree as if engaged in a partial migration from one part of the country to another, or in search of a more abundant supply of food.

John Gould, Birds of Australia (1865)

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INTRODUCTION

The Regent Honeyeater is a striking black and yellow bird which is endemic to mainland south-eastern Australia. Its scientific name – *Anthochaera phrygia* – means ‘embroidered flower-fancier’, and its beautifully patterned plumage certainly lives up to this name.

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 and recovery actions that are being undertaken and highlights the organisations and some of the individuals that are involved in trying to save the bird from extinction.

DID YOU KNOW?

The Regent Honeyeater has been known by various different names in the past, including ‘Warty-faced Honeyeater’, ‘Turkey-bird’, ‘Mock Regent’, ‘Flying Coachman’ and ‘Embroidered Honeyeater’.



The Capertee Valley, and nearby areas of the Blue Mountains, are one of the most important remaining areas for the Regent Honeyeater.

WHERE DOES THE REGENT HONEYEATER OCCUR?

Range and Population Size

When Europeans first arrived in Australia, Regent Honeyeaters were widespread across the south-east of the country, though largely confined to a broad ‘band’ within about 300 km of the coast. The range extended from around the Rockhampton region of Qld, through NSW, the ACT and Victoria all the way to Adelaide in South Australia. In fact, John Gould found two pairs in a large gum tree in the middle of Adelaide as he travelled around the country collecting and observing birds in the mid-1800s.

In Queensland, the earliest historical record of Regent Honeyeaters came from near Chinchilla in 1885, an unusually ‘inland’ sighting. The species was recorded at locations like Duaringa and Byfield in the Rockhampton region until the 1940s or so, with a single vagrant bird recorded about 200km north near Mackay in 1963. Since then, small numbers of Regent Honeyeaters have been sporadically recorded either in the broad Brisbane region, or inland around Warwick and Durikai. A single bird seen at Tin Can Bay in 2017 was the northernmost record since the Mackay bird in 1963.

Across NSW, the historic range still largely matches the current range, though the frequency of records in some regions has changed. Several historical records of Regent Honeyeater exist in the Riverina, where they occur very rarely today. The species was formerly recorded regularly in and around Sydney, where they were plentiful in places like Newport, Narrabeen, Belmore and Canterbury. They’ve only been recorded sporadically in these locations since the late 1940s, with most contemporary records in the outer Sydney basin.

In Victoria, they were formerly common in several areas where they are now absent, vagrant, or at best, an irregular visitor. They were once a regular visitor to east and south Gippsland, especially in coastal areas, but sightings in these regions are now very rare. They were a regular visitor to some suburbs of Melbourne until the 1940s, at times in good numbers, including St Kilda, Albert Park, Burnley, Box Hill, Oakleigh, and Murrumbena. They were occasionally recorded in the early 1950s in suburbs like Altona, Wattle Park, and Templestowe, and in low numbers in eastern and north-eastern suburbs like Blackburn and Warrandyte until the 1970s. Across central Victoria the species was also found around Bendigo in large numbers until at least the early 1950s, and were still listed occasionally as ‘moderately common’ in the 1970s, but by the 1980s they were being seen irregularly and in small numbers. Further west, they were once regular visitors around Maryborough, Stawell and Ararat, and occasional visitors to Portland. Since the 1980s the stronghold for the species in Victoria has been across the north-east, and it is here where they are still seen most often (albeit now in low numbers).

In South Australia, historical records range from Naracoorte, north to Oodla Wirra and Wilmington, and west to Kangaroo Island. However, most records in the state were around Adelaide and in nearby Mt Lofty Ranges, but few birds were seen beyond the 1930s – they are thought to have declined

during 1940s, become a vagrant during the 1950s, and only three records exist in the 1970s. They’ve not been recorded in South Australia since then.

The earliest accounts of Regent Honeyeaters from the mid-1800s include observations describing them as being seen in ‘great’ or ‘immense’ numbers. As recently as the early 1900s, Regent Honeyeaters were at times the most common honeyeater species in an area. Although no formal assessments of population size were ever formulated back then, we can glean insights into how plentiful they may have been from accounts written by early naturalists (and lament the current situation!). Thomas Austin published in the journal *Emu* in 1907 about the birds of the Talbragar River near Cobbora, NSW, and wrote this of Regent Honeyeaters:

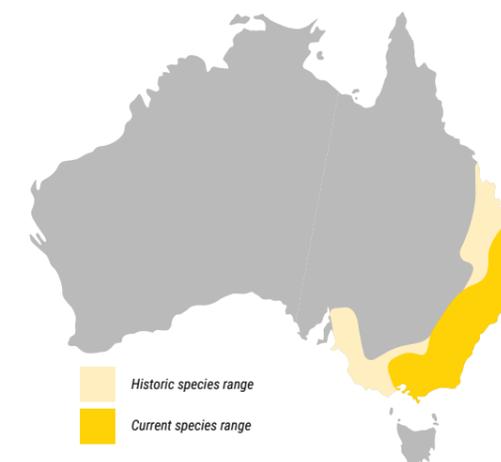
‘About on average this handsome Honey-eater comes in October one year in three; but this year it came in very large flocks about the end of March, and appears to be going to winter with us’

Not long after, in August 1909, eminent amateur ornithologist H.L. White described the situation around ‘Belltrees’ in the Upper Hunter Valley:

‘During the late winter Warty-faced Honey-eaters have been unusually plentiful in this locality; ever since March they have been with us in thousands. While riding through the bush one hears their peculiar notes all day long’

Sadly, by the 1940s the range and population size of the Regent Honeyeater started to contract dramatically.

Within the current range there are four key regions used most often. Three of those are in NSW – the Bundarra-Barraba area, the Capertee Valley and surrounds, and the Hunter Valley. The other area is north-east Victoria. Recent research has revealed that Burrigorang Valley is also an important breeding area.



Conservation Status

Due mainly to the rapid decline in the population estimate for the species, the Regent Honeyeater is listed as “Critically Endangered” under the International Union for Conservation of Nature (IUCN) Red List, and within the Action Plan for Australian Birds (2010). Further, it is also 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	QLD	NSW	ACT	VIC	SA [†]
Conservation Status	Critically Endangered	Endangered	Critically Endangered	Critically Endangered	Critically Endangered	Endangered

*Regent Honeyeaters are not found in Tasmania, the Northern Territory or Western Australia. [†]Considered extinct in SA.

The Decline Seen In One Lifetime

Former NSW National Parks and Wildlife Service Manager and well-known birdwatcher/bander, Alan Morris, recalls how he has seen the Regent Honeyeater decline before his very eyes during his lifetime. Alan was officially acknowledged by becoming a member (AM) in the General Division of the Order of Australia in the Queen’s Birthday Honours List 2019 for “Significant service to wildlife conservation, particularly native bird life.” Alan has also contributed more bird surveys to the BirdLife Australia atlas than any other individual, with over 22,500 surveys submitted at the time of writing.

After I joined the NSW National Parks and Wildlife Service in the 1960s I soon became familiar with Regent Honeyeaters and in 1965, I saw my first birds at a banding site adjacent to Munghorn Gap NR near Cooyal (where they were present in spring in most years). I banded over 40 birds at that site between 1967 and 1977 and counted 48 there Aug–Oct 1967, over 100 between March–May 1971 and more than 30 in April 1973. Back then they turned up most years. Elsewhere in late 1960, I can remember coming across 30–40 birds feeding in flowering Yellow Box at Binalong Travelling Stock Reserve (on the South-west Slopes), and in the 1970s I saw them a number of times in Ingalba NR near Junee, feeding in White and Yellow Box and Mugga Ironbark; places where you don’t see them nowadays.

During my time in Coonabarabran 1975–1983, I saw Regent Honeyeaters regularly in the Warrumbungle NP and occasionally along the Yellow Box Flats along Borah Creek in the Pilliga Nature Reserve. They were recorded mostly along Spirey & Mopora Creeks, near Camps Pincham and Blackman, where they fed in Needle-leaf Mistletoe, Yellow Box, White Box and Ironbark. Overall, between 1965–1985 I regularly saw Regent Honeyeaters in good numbers in Grassy Woodland sites across the Western Slopes/Tablelands of NSW. The birds have essentially disappeared from so many of these places, including the Warrumbungles.

Even in more recent times, I have seen some large concentrations. These included 50+ feeding in flowering Swamp Mahogany trees at Empire Bay on the NSW Central Coast mid-1995 (with other birds at Patonga at the same time), and over 150 feeding in and watering in a creek at Howes Valley in the early 1990s. We colour banded over 70 of those birds. Finally, there was a flock of 74 birds at South Tacoma, feeding in flowering Forest Red Gum,

Spotted Gum & Swamp Mahogany over several weeks in August 2002. At around the same time there were over 130 birds accounted for at nearby Lake Macquarie at Morisset, Wyee and Buttaba. That time, August 2002, was the last large concentration of Regent Honeyeaters on the Central Coast.

I have only recently stepped down from the Regent Honeyeater recovery team, for which I represented the Central Coast Operations Group for many years. It is so sad that there are so few Regent Honeyeaters around these days. I sincerely hope that the recovery team can successfully reverse the dramatic decline of the Regent Honeyeater so that future generations are able to experience seeing flocks of birds like I used to.



Alan diligently entering bird records into BirdLife Australia’s bird atlas.



A Regent Honeyeater feeding on nectar from a Swamp Mahogany inflorescence.

ECOLOGY

Diet and Foraging

Perhaps not surprisingly, given their name, Regent Honeyeater feeds mainly on nectar from eucalypt and mistletoe flowers. They are incredibly acrobatic when foraging, working their way from flower to flower, twisting and turning to get into all the available nectar. They tend to forage in the higher branches of the trees they are in, particularly eucalypts, which can make observations difficult. As a general rule they also seem to be a bit fussy about the trees they feed in, preferring the largest trees as they are known to produce more nectar than the smaller trees. It is thought that larger trees may also provide higher quality nectar.

Key flowering tree and mistletoe species for the Regent Honeyeater include:

- Mugga Ironbark *Eucalyptus sideroxylon*
- Yellow Box *E. melliodora*
- White Box *E. albens*
- Spotted Gum *Corymbia maculata*
- Swamp Mahogany *E. robusta*
- Yellow Gum *E. leucoxylon*
- Needle-leaf Mistletoe *Amyema cambagei*, which occurs on River Sheoak *Casuarina cunninghamiana*
- Box Mistletoe *A. miquelii*
- Long-flowered Mistletoe *Dendrophthoe vitellina*

At times, however, Regent Honeyeaters will opportunistically take the nectar from whatever flowering plants they can get their beaks into. Of particular importance at times are gardens planted out with native species, including cultivars of Grevilleas, Hakeas, and Callistemons. On rare occasions the species has also been observed feeding from introduced flowering plants, like Red Hot Pokers *Kniphofia uvaria*, but we certainly don’t advocate for people planting or retaining weed species like this in their gardens – native is always best.

Insects and other small invertebrates also make up a significant proportion of the diet of Regent Honeyeaters. Insects provide a great supply of protein and essential elements in their diet, and are a particularly critical resource when they are breeding – lots of protein helps with rapid growth of nestlings. Insects typically consumed include flies, caterpillars, moths and spiders. Insects are collected from the bark and foliage of the key tree species, but also shrubs and understorey plants like Acacias and Cherry Ballart *Exocarpos cupressiformis*. Regent Honeyeaters often collect flying insects by hawking – flying out from a high branch and spectacularly catching them in mid-air. Further, lerp (the sugary excretion produced by leaf-sucking psyllid insects) is also eaten regularly and is a great source of energy and nutrients. Finally, Regent Honeyeaters will occasionally feed on native and cultivated fruits.



Regent Honeyeaters consume large amounts of insects from understorey plants like this Cherry Ballart.



Regent Honeyeaters will at times take nectar from planted native shrubs, like this Grevillea.

Breeding and Life Cycle

Regent Honeyeaters make a cup-shaped nest from the bark of tree species like stringybark or box, or use the thin branchlets of the River Sheoak. The outside of the nest is bound together with spiderwebs and lined with soft material such as grass and wool. Nests are placed in a fork of a branch or branchlet, or in the haustoria (base) or foliage of mistletoe clumps. Nests can be found anywhere from 1–20 m above the ground, and usually take 6–10 days for the birds to build. The female does the nest building, with the male mate guarding her and defending their nest territory from other birds. Into the nest are laid two or three reddish-buff coloured eggs, and they are incubated by the female for 14 days. Nestlings are brooded and fed by both parents once they hatch, and leave the nest after around 16 days. It then takes about two more weeks before the fledglings can feed themselves, though the parents still provide some of their food for a while longer.

Regent Honeyeater pairs now usually breed on their own, but occasionally will also breed in

loose colonies (with nests 40–110m apart). When the population size was higher, it is believed that nesting aggregations would have been the typical situation during the breeding season. It is theorised that 'safety in numbers' would have allowed them to defend areas better in larger groups, in turn allowing higher breeding success.

Once paired up, Regent Honeyeaters tend to remain together during a breeding season if they are successful with raising a clutch of eggs to fledging (i.e. chicks leaving the nest), but they do not always form the same breeding pairs each season. In fact, most observations and colour banding has shown changes in partners between seasons. Unsuccessful pairs will sometimes change partners within a season, and if a partner is lost to predation the remaining bird will readily attempt to re-pair with another bird.

The timing of breeding for the species can vary between regions and appears to correspond with the flowering of key eucalypt and mistletoe

species. Pair bonding can start as early as June and July, however a typical breeding season usually occurs from August to January. If a nest fails due to predation of the eggs or inclement weather, re-nesting may occur in the same season but not always in the same location (for example, several pairs of both wild and captive-bred Regent Honeyeaters have been recorded moving over 40km after failed nesting attempts). When conditions are good and the flowering trees and mistletoe are producing abundant or prolonged nectar flow at a site, successful pairs have been observed raising a second brood in the same season.

It is hard to obtain accurate estimates of longevity of a species like the Regent Honeyeater, but the oldest known bird from banding was a female banded as a juvenile and not resighted until over 11 years later. So we know Regent Honeyeaters can live to at least 11 years of age in the wild (the oldest bird in captivity lived to 17).



A captive-released female feeds a 10-day old chick in the nest.



A female Regent Honeyeater sitting on eggs in a nest built into a clump of Box Mistletoe.



A male Regent Honeyeater heading to the nest to feed his growing chicks a load of insects.

Movement

In a word, the movement patterns around the landscape of Regent Honeyeater's is 'complex', and after several decades of research we are still learning more. However, the places and times that the species moves around the landscape is entirely determined by the flowering patterns and nectar flow from the key eucalypt species used for foraging. Regent Honeyeaters are often referred to as 'rich patch nomads', to describe the way they travel long distances in search of abundant nectar sources. Over the years several general patterns of movement have been identified:

- During the non-breeding season, particularly between January and April, the species becomes very hard to find. It is postulated that post-breeding birds disperse through the landscape in search of food, but where they go in this time is still largely unknown (see the 'Research and Monitoring section' for more details)

- Late autumn to early winter is when they tend to turn up in north-east Victoria, and records also come in of birds moving around the central Blue Mountains, coastal NSW and south-east Qld.

- Towards the end of winter, particularly during July, they tend to also contract back to one (or several) of the ocore breeding regions – the Bundarra-Barraba region, the Capertee Valley and the Hunter Valley.

However, the pattern described above would be expected in a year when trees and mistletoe flower at a typical time. The reality is that in most years there is much variation to this pattern. For example, in some years (particularly during drought) there are times when very few key tree species like Yellow Box or Mugga Ironbark flower anywhere across the inland slopes of the Great Dividing Range. In these years the species tends to push into coastal

regions, mainly from the NSW central coast through to south-east Qld, in search of better resources. Similarly, in some years key coastal trees like Swamp Mahogany or Spotted Gum will flower prolifically, and Regent Honeyeaters will preferentially move to those locations to take advantage of the bounty.

The species is capable of moving very long distances, both within years (up to 50km during the breeding season), and between years (hundreds of kilometres). Interestingly, the species has been recorded migrating with flocks of other honeyeaters, including Noisy Friarbirds and Red Wattlebirds.

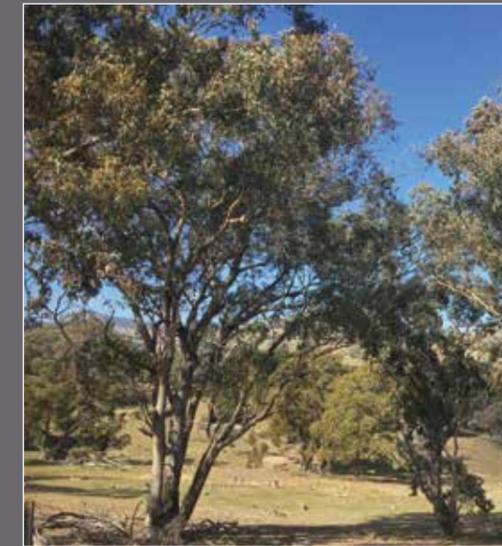
HABITAT TYPES

The Regent Honeyeater inhabits vegetation communities that contain their key feed tree and mistletoe species. Broadly, these are Box-Ironbark Woodland, Grassy White Box-Yellow Box Woodland, Spotted Gum Forest, Swamp Mahogany Forest and River Sheoak Forest, as outlined below.



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*. Box Mistletoe *Amyema miquellii* is also an important feature of the Box-Ironbark Woodlands. As an often highly fragmented habitat type, Regent Honeyeaters will also use remnant patches of Box-Ironbark Woodland in farmland, roadside reserves and travelling stock routes. **This is the dominant habitat in the north-east area of Victoria, the New England Tablelands, and the Darling Downs region of south-east Qld. It also occurs in small patches across other key regions (e.g. Capertee Valley).**



Grassy White Box-Yellow Box Woodland

Grassy White Box-Yellow Box Woodland (also referred to as 'Box-Gum Woodland') occur 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*. As with Box-Ironbark Woodland, Box Mistletoe *A. miquellii* also occurs in these grassy woodlands and supplements the eucalypt blossom as a source of food for Regent. **This is the dominant habitat in the Bundarra-Barraba, Burragarang and Upper Hunter regions of NSW and also occurs in the Capertee Valley and in small patches in north-east Victoria.**



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. Although some Box Mistletoe does occur in these forests, it is not as prevalent and not used as widely by Regent Honeyeaters as Long-flowered Mistletoe *Dendrophthoe vitellina* which grows on the Spotted Gum trees. **This is the dominant habitat in the Lower Hunter Valley and the south and north coast regions of NSW and provides key flowering resources in autumn and winter.**



Swamp Mahogany Forest

Outside of the breeding season Regent Honeyeaters sometimes utilise lowland coastal forests when prolific blossom is available in flowering Swamp Mahogany *Eucalyptus robusta*. Although the Swamp Mahogany trees are the main attractant for Regent Honeyeaters, other eucalypts do occur nearby and are sometimes used for foraging, including Forest Red Gum *E. tereticornis* and Blackbutt *E. pilularis*. **This is the dominant habitat in the coastal zone from the NSW south coast to the Sunshine Coast in Qld.**



River Sheoak Forest

River Sheoak *Casuarina cunninghamiana* is often the dominant tree along creeks and rivers on the inland side of the Great Dividing Range in NSW and QLD. While River Sheoaks don't provide nectar or lerp for Regent Honeyeaters to feed on, this habitat type provides great protection for nesting Regent Honeyeaters and has in many seasons produced greater breeding success than other habitat types. Needle-leaf Mistletoe *Amyena cambagei*, which grows in the branches of River Sheoak trees, is an important nectar source and can also provide a physical structure for nests. **River Sheoak is the habitat type utilised most often in the Capertee Valley, Upper Hunter, Burragorang and Bundarra-Barraba regions.**



Other habitat

Although the above habitats are preferred by Regent Honeyeaters, at times there may not be the blossom resources available in those vegetation communities, so birds will use other eucalypt-dominated habitats when blossom or lerp is available. They are also occasionally recorded in habitats where eucalypts do not dominate, such as coastal or mountain heaths, where they can be found feeding on flowering Banksias. Further, they are known to visit urban gardens planted with high nectar yielding native flowering shrubs such as cultivar Grevilleas, Banksias and Callistemons. Such visits are more likely where native bush remnants are nearby, and water sources such as bird baths are present - Regent Honeyeaters will readily dip in or drink from these.

Mugga Ironbark
Eucalyptus sideroxylon



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



"Ironbark" - bark is red-brown to brown-black and deeply furrowed.



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-shaped, creamy green, or glaucous. Fruit 5–11 mm long, 5–9 mm diameter.

White Box
Eucalyptus albens



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



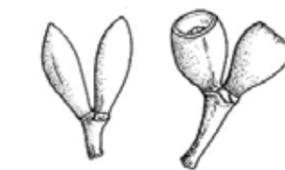
Bark rough over trunk and to base of large branches, fibrous, becoming tessellated, with pale grey and white patches. Upper branches smooth and white.



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

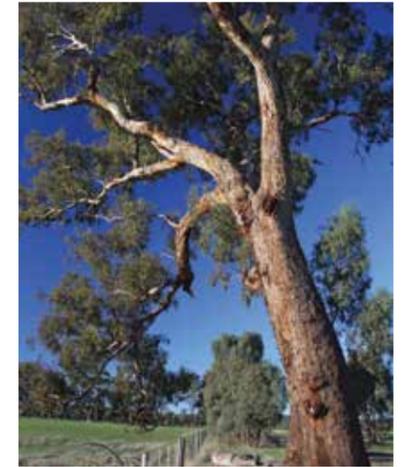


Adult leaves are 10–16 cm long, 1.7–3 cm wide, dull, blue-grey.



Fruit barrel-shaped to slightly urn-shaped. Up to 1.5 cm long and 1 cm wide. Buds up to 1.8 cm long and 0.6 cm wide. Usually waxy white.

Yellow Box
Eucalyptus melliodora



Tree to 30 m tall, growing in grassy woodland on fertile and/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.



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. Small, stalked fruit, cup-shaped.

Broad-leaved Ironbark
Eucalyptus fibrosa



Tree to 35 m high in wet or dry sclerophyll forest on shallower and somewhat infertile soils, extending from NSW south coast into Qld.



Bark persistent over whole tree, grey-black, deeply furrowed 'iron' bark.



Flowers cream, in clusters. Flowering time mostly October–February.



Adult leaves broad-lanceolate, 12–18 cm long, 2.5–5 cm wide, grey-green.



Buds elongated, 10–17 mm long, 4–5 mm wide. Fruit conical, 6–12 mm long, 5–10 mm wide.

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 coastal NSW with isolated patches elsewhere.



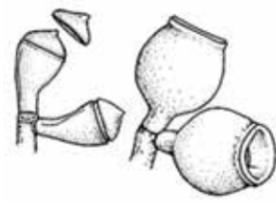
Bark smooth, powdery, white, grey or pink, often spotted, sheds in small polygonal flakes.



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 urn-shaped, 10–14 mm long, 9–11 mm.

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; cap pointed. Fruit cylindrical, 10–18 mm long.

Needle-leaf Mistletoe
Amyema cambagei



A mistletoe almost exclusively parasitic on species of *Casuarina* (Sheoaks). Widespread throughout NSW, occurring north from the Jervis Bay into Qld.



Branches to ~80 cm long. Leaves clustered, narrow and cylindrical with pointed tips (looking much like the host tree).



Flowers pink outside and downy, red inside, with green tips, arranged groups of 3. Flowering mainly occurs in spring.



Fruit spherical, downy, pink or red when ripe, 5–6 mm diameter.

Box Mistletoe
Amyema miquelii



Mistletoe growing on several eucalypt species and occasionally on acacias. It is the most widespread of the Australian mistletoes, occurring across all mainland states, mainly to the west of the Great Dividing Range.



Stems to 3 m long. Leaves flat, hairless and shiny, 3–40 cm long, 0.5–3 cm wide.

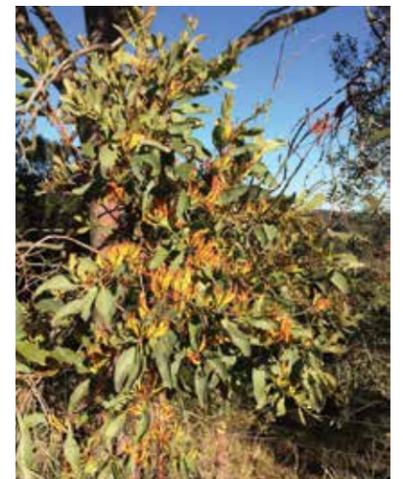


Flowers red, with 5–7 petals, in clusters composed of 2–7 groups of 3–5 flowers. Flowering mainly December–April.



Ripe fruit is yellow to red, pear-shaped, 8–12 mm long.

Long-flowered Mistletoe
Dendrophthoe vitellina



Mistletoe growing on *Eucalyptus*, *Angophora*, *Corymbia*, *Brachychiton* and others. Found on the coast and ranges, from Victoria to north-east Qld.



May be either spreading or hanging down. Usually has runners on top of the host tree bark. Young shoots and flower clusters are brown and hairy. Mature leaves hairless, leathery and green with rounded tips, 4–16 cm long, 0.6–4.5 cm wide.



Flowers yellow to red, 25–50 mm long, with a curved tube in clusters of 5–20. Flowers between November–March.



Fruit fleshy, yellow to red, egg-shaped.

IDENTIFICATION OF REGENT HONEYEATERS

Broad patch of bare warty skin around the eye, which is smaller in young birds and females. Best seen at closer range or with binoculars.

Regent Honeyeaters are 20-24cm long, with females smaller and having slightly duller plumage than the males.



Males call and sing prominently, whereas females only occasionally make soft calls.

Plumage around the head and neck is solid black, giving a slightly hooded appearance.

Distinctive scalloped (not streaked) breast.

Broad stripes of yellow in the wing when folded, and very prominent in flight.

From below the tail is a bright yellow. From behind, the tail is black bordered by bright yellow feathers.

Appearance

The Regent Honeyeater is medium-sized species of honeyeater (family Meliphagidae). When observed in the field the first things which will stand out if a good view is obtained are the dark head and the bold black and yellow pattern on the breast. None of the other species with which it is confused have an entirely black head, and the scalloping pattern on the breast is unique among Australian honeyeaters. The bold black and yellow patterning stands out very clearly, as does the yellow in the wings when in flight.

Juvenile Regent Honeyeaters look very different to adults, with generally plain brown body feathers, and only narrow white or pale yellow edges their flight feathers (in contrast to the bright yellow of adults). Further, the bare patch of facial skin on juvenile birds is grey-brown and lacks the warty texture of the adults. As a rule, the size and extent of the warty face increases with age and varies with sex, with males having 'wartier' faces than females. However, given the species has a propensity for foraging in the highest parts of the canopy this can be difficult to determine.



An adult feeding a recently fledged bird.

Another point to note in the field is the size of a Regent Honeyeater in comparison to other honeyeaters they are found with, particularly other 'yellow-winged' species. Regent Honeyeaters are larger than similar looking species, as is shown in the size comparison below. The two species most often confused are New Holland and White-cheeked Honeyeaters, and these are notably smaller and sleeker birds with no bare patch on the face.

Behaviour

Unfortunately, Regent Honeyeaters are now rarely seen in noisy flocks like they used to be but can still be seen in loose groups in key areas when nectar resources are abundant. When this happens they spend most of their time in the canopy or attempting to reach the canopy, if larger honeyeaters are defending this part of the flowering trees. Regent Honeyeaters are a pugnacious bird and will readily chase smaller birds away from blossom patches that they are guarding, as well as standing up to larger birds on occasion. Whilst they are an arboreal species, they will often come to the ground to bathe in puddles or small dams.

The Regent Honeyeater is highly vocal when establishing or maintaining a breeding or feeding territory. The male performs a pair-bonding display of head-bobbing and bowing, accompanied by song.

The call is described as a liquid, rolling series of notes "plink-ple-plink" with bell-like metallic "tink"s and frequent loud bill-clapping, typical of wattlebirds. Whilst not a particularly loud call, it is rather distinctive and can be picked up within a din of calling birds by an experienced ear. The Regent Honeyeater can also mimic other birds, especially large honeyeaters such as friarbirds and wattlebirds.

To listen to a Regent Honeyeater call please visit: <https://birdlife.org.au/projects/woodland-birds-for-biodiversity/regent-honeyeater-wl>

Size Comparison Measurements are from the tip of the beak to the tip of the tail.



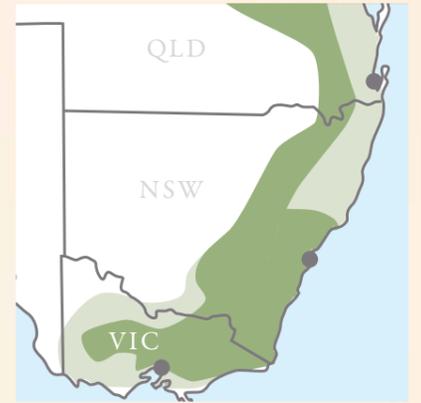
Common Misidentifications



Yellow-tufted Honeyeater *Lichenostomus melanops*

Habitat: Box-Ironbark woodlands and Spotted Gum forest with a shrubby understorey.

Notes: Common, sedentary bird of temperate woodlands. Has a distinctive yellow crown and ear tuft in a black face, with a bright yellow throat. Underparts are plain dirty yellow, upperparts olive-green. **Could occur in any region where Regent Honeyeaters occur, though unlikely in Swamp Mahogany forests.**



New Holland Honeyeater *Phylidonyris novaehollandiae*

Habitat: Heathlands, open woodland with heathy understorey, gardens and parklands.

Notes: Commonly seen in urban parks and gardens. Distinctive white breast with black streaks, several patches of white around the face, and a white eye ring. Tend to be in small, noisy and aggressive flocks. **Unlikely to be present in any preferred Regent Honeyeater habitat, though do occur in the Capertee Valley. Commonly mistaken for Regent Honeyeaters in parks and gardens in towns.**



White-cheeked Honeyeater *Phylidonyris niger*

Habitat: Heathlands, parks and gardens, coastal forests, less commonly dry open forests.

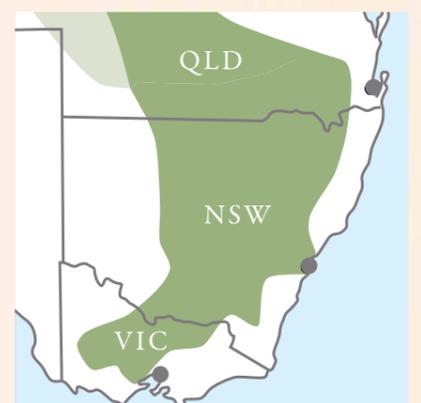
Notes: Similar to New Holland Honeyeater, but has a large patch of white feathers in the cheek and a dark eye (no white eye ring). Also has white breast with black streaking. **Unlikely to be present in any of the preferred Regent Honeyeater habitats except for Swamp Mahogany forests and occasionally in Spotted Gum forests.**



Painted Honeyeater *Grantiella picta*

Habitat: Box-Ironbark woodland, riverine vegetation with fruiting mistletoe.

Notes: A seasonal migrant, only visiting south-east Australia in spring and summer. Has a vivid pink bill, almost wholly white underparts, and solid black plumage on the head and back. A mistletoe specialist rarely seen foraging in eucalyptus flowers. **Could occur in any preferred Regent Honeyeater habitat where Mistletoe is present, except for coastal areas.**



THREATS

As with most threatened plants and animals, the key driver in the decline of the Regent Honeyeater has been the loss of habitat. However, there are other factors which have exacerbated the species' decline. Why Regent Honeyeaters have experienced such an alarming population crash is still not known for certain, but it is thought to be a combination of the following factors.



Habitat loss and fragmentation is the key driver of Regent Honeyeater decline.



Intensive wildfires like this one in the Lower Hunter Valley render suitable habitat unusable for years, and can even remove key components like mistletoe entirely.



Noisy Miners fiercely protect vast swathes of habitat across south-east Australia, and impact on the breeding and foraging opportunities for Regent Honeyeaters.

Habitat Loss and Fragmentation

Unfortunately for Regent Honeyeaters, the majority of suitable lowland, fertile woodlands have been cleared for agriculture and other development. It is estimated that less than 25% of the Regent Honeyeaters original foraging and breeding habitat remains, and clearing continues to this day for residential, industrial and agricultural development.

To make matters worse, the majority of Regent Honeyeater habitat that has not been cleared has been reduced to fragmented remnants, which exacerbates a range of other threats such as increased exposure to competition with other species. This in turn has an impact on the species ability to access resources.

The widespread loss of mature paddock trees throughout agricultural areas of the Regent Honeyeater's range also affects the species. Many records of the species are from areas of scattered paddock trees or small stands of remnant trees, and loss of these from the landscape, in combination with loss of understorey shrubs and trees, will potentially impact the species in the long-term.

Habitat Degradation

Many areas of remnant Regent Honeyeater habitat are in poor condition and face ongoing degradation and loss of quality, particularly in rural areas. The quality of these remnants may not be sufficient to support Regent Honeyeaters or sustain them during large-scale movements. Many remnants are likely missing important ecological features, such as large trees or high-quality nectar flows.

Loss of mature trees in remnant habitat occurs through senescence, eucalypt dieback (as a result of nutrient overload or salinity on pastoral land), harvesting for fence posts or firewood, or drought-induced stress. Grazing by livestock and rabbits and the associated soil compaction may restrict shrub and sapling regrowth, preventing regeneration. Invasive weeds and inappropriate fire regimes (including arson) also present an ongoing threat to the quality of remnant Regent Honeyeater habitat.

Habitat degradation may also result in changes to nectar availability in the Regent Honeyeater's key eucalypt species, resulting in a reduction of available foraging resources. Nectar availability is reduced through clearing, drought and frequent fire, all of which may reduce flowering events and hinder maturation of nectar-rich plant species.

Competition

During times of heavy eucalypt blossom, Regent Honeyeaters often compete for food resources with large aggressive honeyeaters such as the Noisy Friarbird and Red Wattlebird. Although this competition for resources is natural, Regent Honeyeaters do not have the 'weight in numbers' to compete for the resources with these larger birds, particularly when many other smaller nectar-feeders are present. Clearing and fragmentation of woodland habitat has potentially favoured these species because they have been able to adapt with the change.

Habitat fragmentation has benefited the highly aggressive Noisy Miner in particular, which has flourished in areas where Regent Honeyeaters would not have encountered them in the past. Noisy Miners aggressively exclude other birds from their territories and have been known to kill individuals of other species. Noisy Miners have also been observed pulling apart Regent Honeyeater nests. The fragmentation of the wooded landscape in south-eastern Australia has opened vast tracts of otherwise unsuitable habitat within which Noisy Miners are now burgeoning in numbers, to the detriment of Regent Honeyeaters.

Honeybees may also compete with Regent Honeyeaters for nectar, although the significance of this potential threat is unknown and requires further research.

Area	Years	Breeding success
Central NSW	1996	46.9%
Central NSW	1995	38.7%
Northern NSW	1993-96	38.3%
Central NSW	2015-17	33.7%
North-east Victoria	2015	21.0%
Northern NSW	2016-17	9.3%

Breeding success in recent years is significantly lower than that of the mid-1990s.



A Sugar Glider about to try to catch a female Regent Honeyeater (white arrow) sitting on eggs. The glider ate the eggs after she fled the nest.



The scene of the crime. This is what is left of a clutch of Regent Honeyeater eggs after suffering predation by a Sugar Glider.

Nest Predation

Over the past decade, during the post-release monitoring of captive-released birds in particular, it was apparent that something was causing failures of nests of Regent Honeyeaters. During 2015 two very important, but complementary, studies started to look at this – one on the fate of nests for wild birds, and another on the fate of the nest of captive released birds. In both projects the success rate of nests was monitored, along with any potential causes of failure. It's fair to say the results caught us by surprise, particularly what was happening to nests of wild birds.

Video and camera monitoring techniques confirmed that nest predation by native birds and mammals is impacting on the breeding success of the Regent Honeyeater (and was found to be the main cause of nest failure in wild birds). Mammals that were recorded preying on Regent Honeyeater nests included Sugar Glider, Squirrel Glider and Common Brushtail Possum. Birds recorded preying on Regent Honeyeater nests included Pied Currawong, Laughing Kookaburra, Pied Butcherbird, Australian Raven and Australian Magpie. Predation has included attempting to prey on incubating female Regent Honeyeaters, and taking eggs and nestlings from nests.

But perhaps most worryingly this predation, in combination with several other factors such as food availability and competition, has resulted in the species currently experiencing its lowest ever recorded breeding success (see table). **Whilst this predation might be considered 'normal', it is also potentially symptomatic of habitat degradation in these areas. Further, because Regent Honeyeaters are no longer nesting in loose aggregations they are likely more susceptible to such predatory events.**

Small Population Size

The cumulative impacts of each of the above threats, as well as others that we may not currently be aware of, has resulted in a critically low population of Regent Honeyeaters. It is feasible to suggest that the single biggest immediate threat to the survival of the Regent Honeyeater is its small population size. Once a population reaches a critically low level, random events such as disease or wildfire can cause rapid mortality of a large proportion of the remaining birds. Loss of genetic diversity, which can result in reduced biological fitness (survival and fertility), is also a likely outcome of low population size.

It is thought that the tendency for Regent Honeyeaters to nest together in aggregations historically allowed them to exclude larger honeyeaters from a nectar source. With a decreasing population, Regent Honeyeaters do not occur in sufficient numbers to effectively exclude other birds from nesting aggregations, and may be unable to form nesting aggregations in the first place. Individual pairs must spend more time and energy defending a breeding territory or nectar source, possibly resulting in lower reproductive output.

Climate Change

Whilst more difficult to accurately quantify, the widespread impacts of climate change also threatens Regent Honeyeater habitat. This is likely to occur as a result of climate-change induced increased risk of drought and bushfire, altered flowering patterns, potentially leading to further habitat degradation and changes to nectar availability. These impacts are more likely to affect habitat in inland areas, being more susceptible to drought and bushfire in particular. Prolonged climate-induced drought periods also reduce woodland bird reproduction rates significantly, including Regent Honeyeaters.

WHAT IS BEING DONE TO HELP THE REGENT HONEYEATER?

The Regent Honeyeater Recovery Team and Recovery Plan

The Regent Honeyeater Recovery Team was formed in 1994 after the species was declared nationally endangered. The team provides expert advice and implements many actions identified in the Regent Honeyeater Recovery Plan, which are designed to save the species from extinction. It currently includes representatives from BirdLife Australia, Taronga Conservation Society Australia, the Australian Government, the New South Wales and Victorian state governments, as well as independent researchers and community groups. The Recovery Plan is reviewed regularly, taking into account new research, emerging threats and contemporary strategies to save the species.

In effect, the Recovery Plan provides the "recipe for recovery". The current plan identifies actions under four key strategies:

- 1) Improve the extent and quality of Regent Honeyeater habitat
- 2) Bolster the wild population with captive-bred birds until the wild population becomes self-sustaining
- 3) Increase the understanding of the size, structure and population trends of the wild population of Regent Honeyeaters
- 4) Maintain and increase community awareness, understanding and involvement in the recovery program

Following are the main recovery actions being undertaken at present.

Habitat Restoration

Perhaps not surprisingly, given that habitat loss for agriculture, development, mining and other land uses has seen over 85% of temperate woodland in south-east Australia cleared, one of the primary recovery actions being implemented for the Regent Honeyeater is habitat restoration. This is usually undertaken by direct planting, either of tubestock or via direct seeding, but natural regeneration via fencing and stock management is also used in certain situations.

The national Regent Honeyeater Recovery Team, and the organisations involved with it, have worked tirelessly for the past 20 years to replant habitat in key locations. These have included around the known breeding locations in the New England Tablelands, in coastal habitat on the Central Coast of NSW, and around the Chiltern-Mt Pilot NP in Victoria. However, two locations have seen an enormous amount of effort and energy put into habitat restoration specifically for Regent Honeyeaters – the Lurg Hills near Benalla in Victoria, and the Capertee Valley in NSW.

Lurg Hills, Victoria

The Regent Honeyeater Project in the Lurg Hills of Victoria has been running for over 20 years, and has during this time established itself as one of the most active volunteer conservation projects in Australia. The project was established as the number of sightings of Regent Honeyeaters in the region started declining rapidly in the early 1990s and is situated in a landscape which has been significantly cleared for farming and timber over the past 150 years. The project has been designed to protect, restore and improve connectivity of significant remnants of Regent Honeyeater box-ironbark habitat in the district.

Over the life of the Regent Honeyeater Project, over 700,000 seedlings have been planted and nearly 1,800 hectares of habitat has been restored across 450 sites, the majority on private land. The project has also successfully engaged more than 175 landholders and attracts ongoing support from the wider community to assist farmers and other landholders with the on-ground works. Propagation and planting days are organised each year for over a thousand students from local schools and hundreds of volunteers – in total more than 40,000 people have helped collect seed, grow seedlings, and plant trees in the ground. The project has a long-running, purpose-built nursery, and has recently established a seed orchard to allow production of higher quantities of seed, and to allow for the genetic management of the plants they are growing for planting. Other work undertaken by this project includes seed collection, fencing, direct seeding, removal of excessive mistletoe from old Mugga Ironbarks, weeding, nest box construction and installation for gliders and phascogales, community education, ecological burning and wildlife monitoring.

Regent Honeyeaters have been sighted sporadically around rehabilitated areas; in one significant instance, a bird stayed for a week in a planted site. Many other threatened fauna species have also been observed utilising and benefitting from the restored areas, particularly the Grey-crowned Babbler.

Capertee Valley, NSW

The Capertee Valley Regent Honeyeater Operations Group was established by BirdLife Australia (then Birds Australia) in 1993 to help restore habitat for Regent Honeyeaters. The Capertee Valley is widely recognised as the contemporary 'stronghold' for Regent Honeyeaters, so the implementation of this habitat restoration was particularly important. The Operations Group has overseen the plantings since 1994. During this time, the group and its many volunteer supporters have planted over 125,000 trees and shrubs across more than 260 hectares of private property at strategic sites throughout the Capertee Valley. The "planting weekends" occur twice a year, generally in May and August, to coincide with the biannual Regent Honeyeater surveys that have been happening for a similar period of time. These weekends are very popular, with volunteers travelling from far and wide to assist with the planting effort. An important part of each weekend is a social dinner organised by the Capertee Valley Progress Association, which is held on the Saturday evening in Glen Alice Hall.

Regent Honeyeaters have been observed on a small number of occasions utilising the rehabilitated areas and as the plantings mature it is anticipated that more birds will use the tree-planting areas. Numerous other threatened and declining woodland birds have also been recorded using the planting sites, including Hooded Robins, Brown Treecreepers, Diamond Firetails, Speckled Warblers and Black-chinned Honeyeaters amongst others. Research is also happening on what birds are using the plantings to better inform future restoration programs.

The Capertee Valley tree-planting program has been jointly funded through Local Land Services and the Australian Government's National Landcare Program.

Left: A male Regent Honeyeater and begging juvenile in the Hunter Economic Zone (Lower Hunter Valley) November 2018



From Little Things, Big Things Grow

Regent Honeyeater 'champion' and former resident in the Capertee Valley, April Mills, tells the story of "Binalong", one of the properties that pioneered the long-standing habitat restoration efforts in this important region.

I have always been a passionate advocate for the environment and have faced the same issues and challenges as others who also decide to 'champion the cause'. Thus, when I bought a 140 acre property in the Capertee Valley in NSW I knew I had an environmental war on my hands.

The property "Binalong" was mostly a huge bare paddock with only sparse areas of bush up on the slopes where the house was situated. It had been overgrazed for years so the hope of having it regrow all by itself was pretty remote. It dawned on me that I was the person who needed to change this property into a wildlife reserve which would provide a safe home for native fauna and flora. Regent Honeyeaters and other threatened woodland birds had been found on the property but there certainly wasn't enough habitat when I arrived to provide long-term security for these birds.

"Binalong" was chosen as one of the original tree-planting sites in the Capertee Valley and in September 1995 I became involved in the BirdLife Australia (then 'Birds Australia') program to restore Regent Honeyeater habitat – a remarkable community-driven program that continues to this day.



'Binalong' in 1994.

About 120 volunteers came and spent that first weekend in the valley, planting 3000 trees and shrubs on "Binalong". When the planting was complete it was very moving to see everyone admiring the host of protective tree-guards stretching away across the paddock and into the distance. It was such a wonderful opportunity for city people to come and do something positive for the environment and the Regent Honeyeater. Many of these people have revisited "Binalong" and are able to see how they have helped change its bare-paddock surroundings into an area that is now frequented by many threatened bird species.

No Regent Honeyeaters have been recorded in the tree-planting on "Binalong" as yet, but doubtless they have used the trees because many other species are using them. Most of "Binalong", including the tree-plantings, are protected as a Conservation Area. This is vitally important, because that protection is enshrined in legislation and is "in perpetuity". There are now new owners of "Binalong" – Darren and Thalia Broughton – and they are proudly continuing the restoration efforts and documenting the birdlife through their wonderful videography and photography. It is heartening to know that my efforts to save the Regent Honeyeater will be safeguarded for generations to come.



'Binalong' in 2018.



This family of Regent Honeyeaters were raised on a property now protected under a conservation agreement in the Capertee Valley.



This Capertee Valley property had a restoration planting completed in the early 2000s, and in 2015 had two pairs of Regent Honeyeaters nesting in some remnant Yellow Box. In 2017 the property was covenanted to protect this important habitat in-perpetuity.

Habitat Protection

The vast majority of habitat lost from the range of the Regent Honeyeater is on what is now private land – those fertile, lowland sites which provide the best soils for stock grazing and cropping were once key locations for the species. What remains is critical for the survival of Regent Honeyeaters - over the first decade of this century, around 65% of all Regent Honeyeater records came from private property. These properties included farms and allotments of primary producers, hobby farmers, 'tree changers', and gardens in urban, peri-urban and regional parts of south-east Australia. In terms of what that means for Regent Honeyeater conservation it's pretty simple – in order to save the species from extinction, serious effort needs to be made to protect key habitat on private land. Without a network of high quality, well managed private land the species simply cannot be saved.

Since 2009, BirdLife Australia has partnered with the Biodiversity Conservation Trust of NSW (formerly Nature Conservation Trust) and Trust for Nature in Victoria, to permanently protect key habitat areas of private property used by the Regent Honeyeater and other woodland birds using conservation covenants (see breakout box for a description of the process). Over this time, more than 1,900 hectares has been covenanted across NSW and Victoria specifically for this purpose. Some of these covenants contain potential habitat for Regent Honeyeater or are within the range of the species. But several properties are known breeding locations, including:

- A property at Quorrobolong in the Lower Hunter Valley which had a 47-hectare covenant applied. This property has been used regularly by Regent Honeyeaters for more than 20 years, including over 50 birds in 2012 and 20 birds in 2017.
- A 121-hectare property near Glen Davis in the Capertee Valley, which since covenanting in 2012 has been used by Regent Honeyeaters in three separate years. On two of those occasions the species has bred on-site (see picture above).
- Another 31-hectare site in the central Capertee Valley, where tree planting had occurred in the early 2000s. In 2015 the property was used for breeding by at least two pairs of birds, with nests constructed in large Yellow Box trees adjacent to the tree planting site. This property was covenanted in 2017.

We are indebted to the dedication of the landholders who make this permanent and legally-binding commitment to habitat protection on their properties. This work continues in NSW, funded by the NSW government through its Environmental Trust program, with further covenants being sought in the Capertee Valley, the Lower Hunter Valley, and in the Bundarra-Barraba region.

THE COVENANTING PROCESS

- 1 A landholder is either contacted by BirdLife Australia or one of the covenanting agencies, or nominates an interest with them, and the property is assessed for suitability for Regent Honeyeaters. 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 Regent Honeyeater habitat.
- 2 The landholder enters into a Trust Agreement with the Biodiversity Conservation Trust of NSW (BCT) or Trust for Nature (TfN), 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 or TfN 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 3 years) to conduct management works, weed control, fencing, and monitoring.



Habitat Management

Along with restoring or replanting areas where habitat for Regent Honeyeaters has been lost, and giving in-perpetuity protection to key habitat on private property, there is also a need to actively manage habitat at sites where the species occurs. As with many threatened species programs, sites used by Regent Honeyeaters are often under great pressure from:

- Invasive weeds, which can outcompete native vegetation and regenerating Regent Honeyeater habitat.
- Pest animal species, which can wreak havoc on sites through damage to vegetation. In some regions, for example, feral pigs are known to damage riverbanks where River Sheoaks exist, and in other locations feral goats have been observed foraging on naturally regenerating trees.
- Inappropriate grazing by stock, again which impacts on the recruitment of key tree and shrub species.
- Honeybees, though the actual impact of these insects on the ability of Regent Honeyeaters to access nectar is not well studied and needs more research.

While these habitat management issues exist across all land tenures, some parcels of public land are particularly important for Regent Honeyeaters in NSW – Travelling Stock Reserves (TSRs). This amazing network of habitat strips along roadsides and creeks have been used since European settlement as a means of moving stock around the countryside, particularly during drought conditions to get stock to better country. Because these sites have largely been uncleared or unmodified, save for grazing, they often retain very large old habitat trees, which in turn provide great resources for Regent Honeyeaters when they flower. But active management is required to ensure they remain viable for the species. To that end, Local Land Services in several key Regent Honeyeater regions have been working to address this issue. Across the Bundarra-Barraba region of northern NSW a number of TSRs have seen grazing licences removed, which will allow the sites to recover and regenerate. Further, in a couple of important TSRs permits for commercial apiary have been withheld, as a precautionary measure, while further research is undertaken into potential competition. It is hoped that these sorts of management interventions will allow more Regent Honeyeaters to access the sites in coming years.



Travelling Stock Reserves, like this one at Coonoor in northern NSW, require appropriate management to ensure they continue to provide a vital network of habitat for Regent Honeyeaters.



2015 released male 'Yellow Yellow', back in Chiltern-Mt Pilot NP in 2017 after a 540km round trip to South Gippsland.



A recently fledged chick being fed by 2013 released female 'Orange Mauve'. Together with male 'Orange Yellow', this pair was the first recorded breeding successfully in the same year they were released.

Captive Breeding and Release

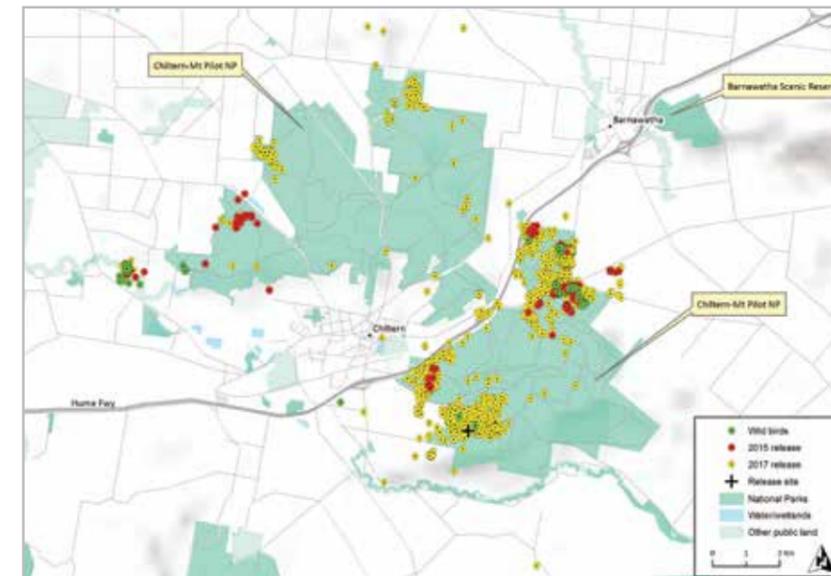
When a bird species reaches the point of being critically endangered in the wild, many recovery programs implement captive breeding programs as part of a package of interventions to stave off extinction in the wild. The Regent Honeyeater Recovery Team was ahead of the curve when it established a captive breeding program in 1995. At the time the species was 'only' listed as endangered, and it was estimated there were still 1,500 birds in the wild. But as insurance against the species going extinct, and for future releases to boost the dwindling numbers of the bird, ten nestlings were taken into captivity from the Capertee Valley (NSW) and Chiltern-Mt Pilot NP (Victoria), and hand-reared successfully at Taronga Conservation Society Australia in Sydney. Since that time there have been several other collections of wild birds to boost the founder population in the breeding program, including juvenile birds and young adults. Through the diligent husbandry of Taronga Conservation Society Australia and supporting institutions, Regent Honeyeaters have survived well and bred prolifically in captivity. At present the captive population fluctuates a little around a stable level of 50 birds, but new dedicated facilities being built at Taronga Western Plains Zoo in Dubbo are aimed at increasing the capacity, as well as building flexibility into the release program.

The first captive release was undertaken in 2000, when a small-scale trial release was carried out in the Capertee Valley. A total of nine birds

were released that year, and subsequent monitoring showed that they were capable of surviving in the wild. They were also mobile and able to move around the valley, and onto the base escarpments which provide such a dramatic backdrop to the location. However, the survival of birds in this release was less than ideal, with several young birds struggling to find enough food after a few weeks in the wild. This led to a hiatus for a few years while the recovery team, and Taronga Conservation Society Australia in particular, worked on improving captive husbandry to give better outcomes when birds are released into the wild.

By 2008 the recovery team decided the time was right to trial another captive release. A larger release of 27 birds was completed in Chiltern-Mt Pilot NP in Victoria. This area was chosen for several reasons – large numbers of the Regent Honeyeaters had historically used the site, it was a relatively large and intact patch of favoured box-ironbark habitat, and perhaps most importantly it was (and still is) the southern end of the range of the species. By releasing birds here, it was hoped that the northward contraction in the species range could be halted.

Since 2008 there have been a total of 287 birds released into the park, with each subsequent release building on the success of the previous release. The sequence of releases at Chiltern-Mt Pilot NP and the highlights of each are shown opposite:



In each captive release, project staff and volunteers collect a wealth of data. This map demonstrates the 6,000+ resightings made of birds released in Chiltern-Mt Pilot NP during 2017.



A team of volunteers reading colourbands of released birds feeding in the canopy. Laying on the ground is a great way to avoid neck strain on long days of monitoring.

SEQUENCE OF RELEASES AT CHILTERN-MT PILOT NP		
Release year	Release size	Milestone
2008	27	<ul style="list-style-type: none"> Birds survived well post-release Birds attempted to breed post-release Interaction between released and wild birds
2010	44	<ul style="list-style-type: none"> First recorded pairing between wild and released birds (wild male and released female) First successful breeding post-release, recorded in 2011 with a wild male and returned 2010 release female 6 birds returned to park more than one year after release
2013	38	<ul style="list-style-type: none"> Breeding success in immediate post-release period Records of dispersing birds as they left the park and headed into the surrounding landscape Released birds from 2010 cohort resighted in park, showing long-term survival in the wild
2015	77	<ul style="list-style-type: none"> More successful breeding post-release, including pairing of 2015 released birds with returning previously released birds Investigation of high levels of nest failure reveals novel predators for the first time – gliders captured eating eggs at night
2017	101	<ul style="list-style-type: none"> Largest ever release successfully implemented, demonstrating success of logistics and planning Highest number of nests recorded post-release – 42 attempts monitored in total Interventions to protect nests from predators trialled for first time



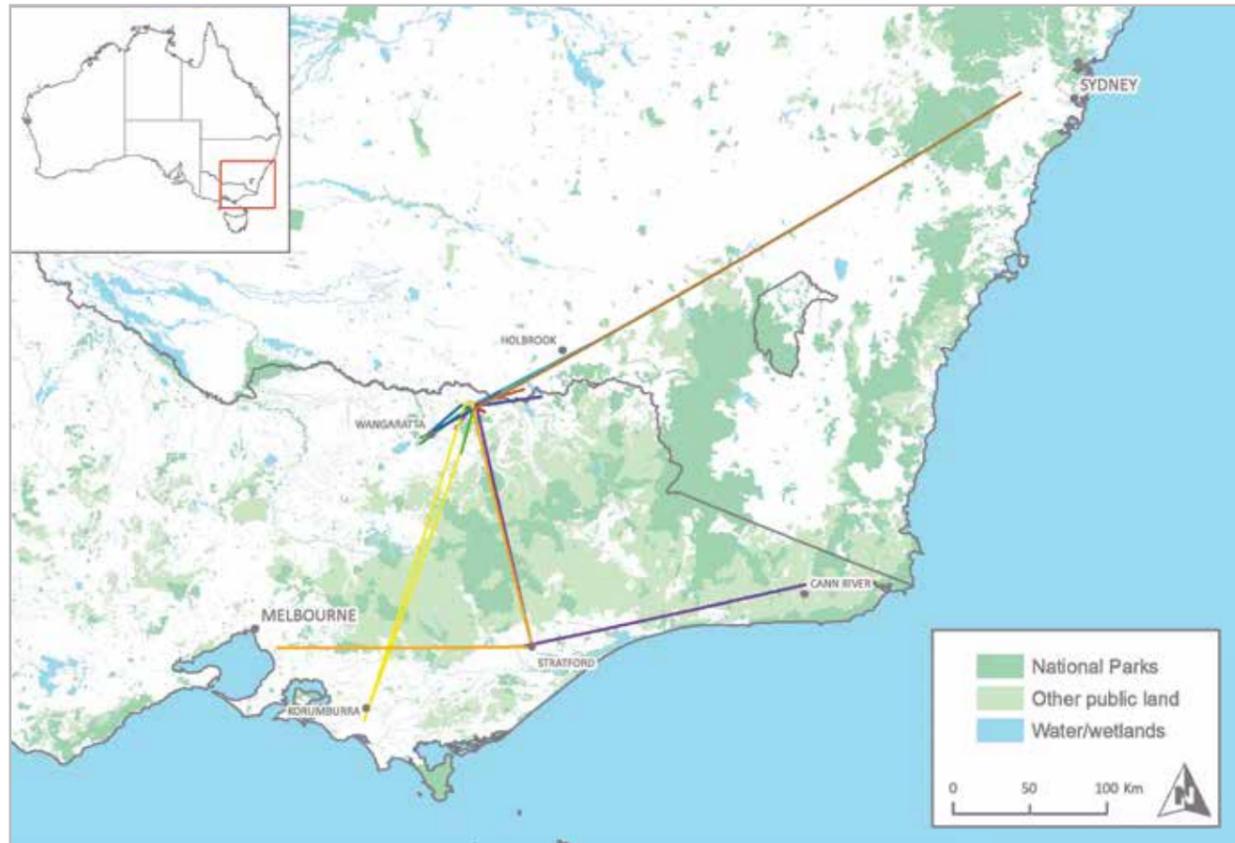
A captive-released bird wearing a radio transmitter, which enables collection of vital survival and movement data.



'Blue Blue' singing to attract a mate during the post-release breeding season 2015.



The Regent Honeyeater captive release program is the result of an outstanding collaboration between Taronga Conservation Society Australia (supported by eight other breeding institutions across south-east Australia), BirdLife Australia, the Department of Environment, Land, Water and Planning (Victoria), the Office of Environment and Heritage and the NSW Government's Environmental Trust, Parks Victoria, North-East CMA, the Australian Government, Monash University, the Zoological Society of London, Taronga Conservation Society Australia's Youth at the Zoo program, Friends of Chiltern-Mt Pilot National Park, and a team of the most dedicated and inspirational volunteers a recovery program could ask for. Across all of the releases conducted thus far, it is estimated that more than 500 volunteers have contributed over \$650,000 worth of in-kind labour via assistance with monitoring, field work and project management.



Released birds are all individually colour banded to allow identification by landholders and birders as they move through the landscape. This map shows the long-distance movements recorded for released birds to date.

The key to the monitoring of birds post-release has been the use of radio-transmitters, fitted to the birds using a 'backpack' style harness. This has been modified and improved over the course of the release program, and now provides us with an integral tool for following the behaviours and movements of the birds as they settle into life in the wild. Further to this, every bird that is released is fitted with a unique combination of bands on their legs – one metal and one colour band on one leg, and two colour bands on the other. This allows for identification of individual birds without the need to recapture them, and again provides amazing insights into the birds' behaviours.

Thanks to this level of marking, we have been able to note some remarkable movements of the birds:

- A male released in 2010 was found the following year more than 100km from the release site in Holbrook, NSW, feeding in a White Box on a farm in the district. It was present for a few days before moving on.
- A pair of birds released in 2013 who, after three unsuccessful nesting attempts in Chiltern-Mt Pilot NP, moved more than 50kms to a private property near Glenrowan where they successfully raised two chicks out of their fourth nest.
- Another male bird released in 2015 (known as 'Yellow Yellow' for the two yellow bands on his left leg) travelled to Outtrim in South Gippsland in late 2016, before turning up back in Chiltern-Mt Pilot NP in June 2017 – a round trip of 540 kms in under 12 months.
- A bird released in 2017 was seen in a backyard in Oxley Park, a western Sydney suburb, in company with an unbanded wild bird in June 2019. This site is over 460km from where the bird was released.

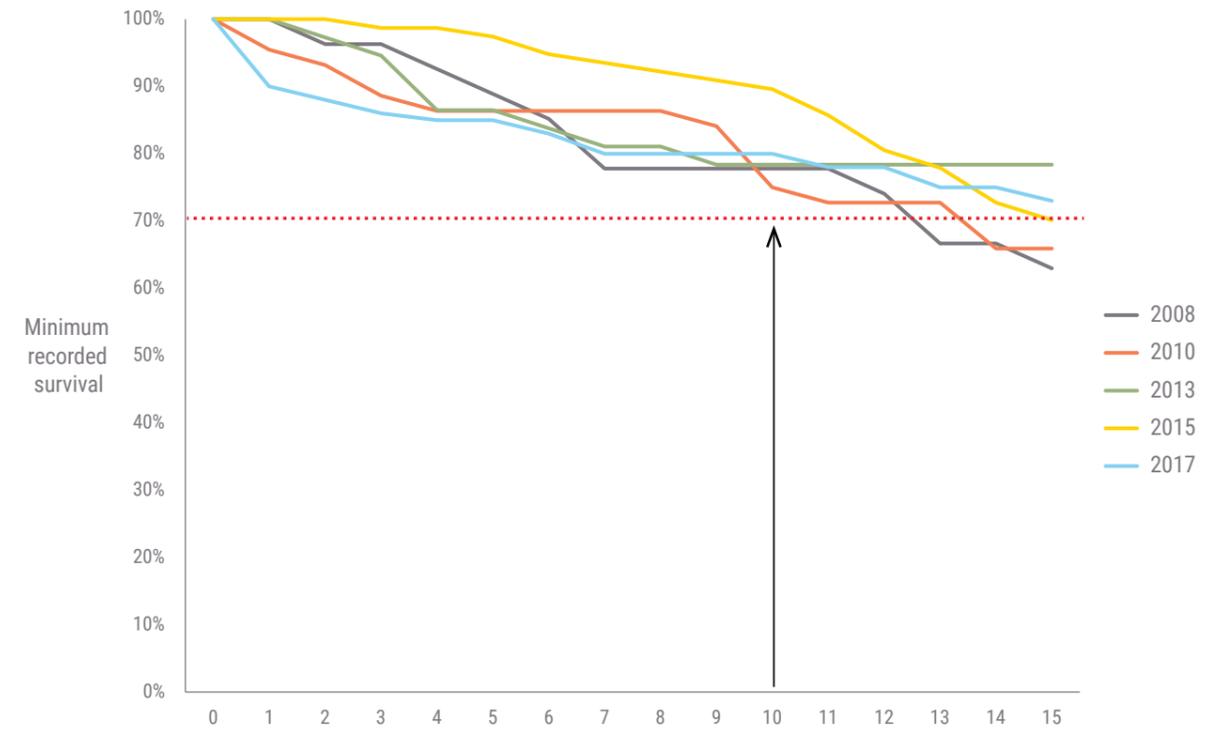
This colour banding has also allowed us to monitor the survival of birds in the long-term, in particular those birds which are seen again at least 12 months after release (i.e. returning to the forest or turning up in new locations after dispersal in the non-breeding season). Over the life of the release program there have been an average of just over 13% of all released birds being seen again at least one year after being set free.

This might not sound terribly high, but it compares favourably to the 15% resighting rate of wild birds which are captured, banded and released. That is – nearly as many released birds are being resighted as wild birds that have been captured and banded.

The recovery team is currently reassessing the location for upcoming Regent Honeyeater releases, potentially looking to release birds in sites where wild birds still occur more regularly, and in greater numbers. By releasing birds into the 'core' of their range in NSW in 2019 and beyond we hope to see better breeding outcomes, and population changes, over the coming years. Chiltern and elsewhere in north-east Victoria remain on the radar for future captive releases, and we are confident that we could let birds go again there and know that they will survive. Given that Regent Honeyeaters can live for up to 11 years, there is already a pool of released birds that will hopefully recruit new fledglings into the wild population in this region for years to come.

Key success indicators of the captive-release program include:

- Captive-reared birds surviving in the wild long-term at various sites in Victoria and southern NSW.
- Captive-reared birds able to move hundreds of kilometres away from the release site and return.
- Captive-reared females and males breeding in the wild and successfully rearing young.
- Captive-reared birds successfully mating and raising young with wild birds. This is critical to helping the wild population recover.



The short-term success marker for each release has been the survival/detection of at least 70% of birds at the 10 week post-release point. As shown here that has always been achieved, and often well beyond 10 weeks.

True Friends Helping Regent Honeyeaters

Friends of Chiltern-Mt Pilot National Park president Neville Bartlett reflects on efforts by the group, and in particular their involvement in the successful captive-release program for Regent Honeyeaters.

The Friends of Chiltern-Mt Pilot National Park is a diverse and active group of people who have been working for over 25 years to enhance the Park and the experience that visitors get from it.

Typical activities include (i) habitat restoration and enhancement, (ii) weed control, (iii) nest box maintenance and monitoring (iv) bird surveys and (v) encouraging and supporting visitors to the Park. The group has members with a broad range of interests, skills and expertise that enable it to perform these tasks in co-operation with Parks Victoria rangers. The group has created bird and flora brochures for visitors as well as maintaining a website featuring a database of all flora species found in the Park along with photographs of the various life-stages for each species. Each year a calendar featuring birds, flora, insects and other creatures and places in the Park is produced as the main fundraising activity for the year.

Given this broad background, the group has given enthusiastic support to the Regent Honeyeater Recovery Program ever since the original Regent Honeyeaters were captured and used to form the basis of the current captive breeding population. All five releases of captive-bred birds at Chiltern between 2008 and 2017 have been supported through regular monitoring and tracking with many hundreds of hours devoted to monitoring each release and the follow-up surveys all done while maintaining the regular activities of the group. The group's knowledge of the species over a long period of time has been helpful while each release has taught us many new things about this species and its attempts to breed. During 2018, while on patrol just outside the Park, one of our members discovered a pair of Regent Honeyeaters that had successfully reared two chicks to the fledgling stage. This find reminded us that recovery for this magnificent species is not beyond hope.



Neville Bartlett (standing at right) looking at the map as planning for the 2013 captive release unfolds.

Noisy Miner Control

Noisy Miners have become over-abundant in areas that they would not have otherwise occurred due to the fragmentation of woodland habitat. Here they intersect with Regent Honeyeaters and compete with them for food resources. Noisy Miners are also known to be highly aggressive towards Regent Honeyeaters and have been recorded destroying nests. The impacts of Noisy Miners on Regent Honeyeaters and other woodland birds have been listed under threatened species legislation as a 'Key Threatening Process', both at a national and state levels.



Noisy Miners have long been known to cause the decline of smaller woodland bird species through their hyper-aggressive domination of fragmented habitat.



Noisy Miners were removed from 2016-2017 within this treatment area in the Capertee Valley, NSW (yellow line). In 2017 this resulted in a number of successful Regent Honeyeater nests (green stars and yellow dots), with only one failed nest (red star).

Capertee Valley, NSW

Between 2016 and 2018, BirdLife Australia implemented a series of Noisy Miner removals in the Capertee Valley. The removal sites chosen included those used regularly by Regent Honeyeaters, and where breeding had been recorded in the previous five years. Sites selected included both public land and private properties. Four sites were treated in 2016, and five were treated across 2017 and 2018.

The distribution and estimated abundance of Noisy Miner colonies were recorded prior to each cull taking place. Standardised bird surveys were also performed at designated monitoring sites to collect baseline data against which the impacts of removing Noisy Miners could be assessed. These surveys were then repeated twice post-removal at each of the survey sites. Over the three removal periods just over 1,700 Noisy Miners were removed from Regent Honeyeater breeding sites in the Capertee Valley.

Initial data showed that Noisy Miner removal led to increasing bird species richness in almost all treatment sites, whether initially or several months post-removal. However, post-removal surveys revealed that Noisy Miners recolonised many treated sites, and suggested that numbers would return to pre-removal levels within one or two breeding seasons. This initial response indicated that continual removal may be necessary to keep Noisy Miner populations at a low level in the Capertee Valley, given the fragmented nature of the surrounding landscape.

However, following the completion of the initial 2017 removal, Regent Honeyeaters were observed establishing nests at sites in the Capertee Valley where Noisy Miner numbers were high. It was determined that further targeted removal could be beneficial for maximising Regent Honeyeater breeding success at these sites. A further round of removal was carried out in September 2017 at four sites.

This targeted removal of Noisy Miners from areas of active Regent Honeyeater nesting allowed pairs to successfully establish breeding territories without interference. At one of these sites – a crown land reserve at Boguee – two pairs of Regent Honeyeaters seen establishing nests before the removal were able to successfully raise juveniles following the removal of Noisy Miners. A further two more nests established within the removal site and successfully raised young, and another three pairs were observed feeding recently fledged young within the removal site. In addition, another four nests were established just outside the removal site, and all but one was successful in fledging juveniles.

These Noisy Miner removals have been funded by the NSW government through its Environmental Trust. More successful removals recently occurred under the same program in the Lower Hunter region during winter 2019, and additional removals were led by BirdLife Australia in the Bundarra-Barraba region in late autumn 2019, coordinated by North West Local Land Services.



This is the direct result of Noisy Miner removals at the right place and time - an adult bird feeding two chicks at a site in the Capertee Valley, spring 2017, where Noisy Miner numbers had been controlled.

Upper Hunter Valley, NSW

In 2017, Australian National University researchers conducted a Noisy Miner removal project along the Goulburn River in the Upper Hunter Valley of NSW. Regent Honeyeaters were present breeding in the area at the time. The research involved experimentally removing Noisy Miners and assessing the effect of the removal on subsequent Noisy Miner abundance, relative to a control area where no miners were removed. The occurrence of Noisy Miners near Regent Honeyeater nests was monitored, and the effect of miner removal on songbird populations was modelled.

The Goulburn River site was selected for Noisy Miner removal after four Regent Honeyeater pairs were sighted breeding within the study location the previous year, all of which were frequently observed defending their nests from Noisy Miners. In addition, the site had relatively low miner abundance and miners were uncommon in the surrounding heavily-forested landscape.

Prior to the culling, monitoring sites were established within the treatment and control areas. At each monitoring site, a five-minute point count of the surrounding 50 m radius was carried out to record numbers of Noisy Miners and other songbirds. Each site was visited twice prior to the removal of Noisy Miners.

After miner removal, three repeat visits were made to all monitoring sites finding that culling significantly decreased Noisy Miner abundance throughout the breeding season, when Regent Honeyeaters nested in the miner removal area. Songbird abundance and species richness increased significantly in the miner removal area, relative to the control area. This provides evidence that targeted competitor suppression can be a viable short-term way to reduce threats for the Regent Honeyeater during the critical breeding period, as well as benefiting bird diversity more broadly.

Chiltern-Mt Pilot NP, Victoria

Given the investment of the recovery team in captive breeding and release at Chiltern-Mt Pilot NP over the past decade, a trial removal of Noisy Miners was carried out around the edges of the forest in 2018. Sites selected for removal were those within the park where wild and captive released Regent Honeyeaters had previously bred, or where they were known to congregate and interact with Noisy Miners.

As with the other regions highlighted, surveys were undertaken at a number of Regent Honeyeater monitoring sites to evaluate the outcomes of the Noisy Miner removal. Unfortunately, this project was not as successful as the others, with the treated sites rapidly recolonised by Noisy Miners after the removals were completed. This has also happened in other similar projects, including works undertaken in the Bundarra-Barraba region. It seems that in the Chiltern region, which is relatively flat and open country, the high number of well-connected corridors of linear habitat like roadsides and creeklines provides ample opportunity for surrounding Noisy Miner colonies to flood back into treated areas. As a result, no clear recovery of other woodland birds was observed post-removal, and frustratingly very few Regent Honeyeaters were found in the treated areas after the project.

However, with these learnings in hand the coming years will see refined Noisy Miner removal projects supported by the North East CMA, through funding from the Australian Government's National Landcare Program. The focus for the upcoming work will be establishing a scale at which removal will be provide a benefit for Regent Honeyeaters and other co-occurring birds.



A trunk collar around the base of a Mugga Ironbark containing a Regent Honeyeater nest.

Nest Interventions

Finding out that Regent Honeyeater nesting success rates are at record low levels is one thing, but working out how to influence the outcomes for future nests is something entirely different. This is particularly so when many factors go in to determining whether a nest succeeds or not - weather, competitors, previous breeding experience of the adults, the location they choose, and predation. However, with predation identified as a key issue, during the 2017 captive release ways to improve breeding outcomes by reducing predator access to nests were examined.

Before deploying any potential nest protection measures on actual Regent Honeyeater nests, two methods were trialled for their ability to deter predators from artificial Regent Honeyeater nests - tree trunk collars and nest cages. The artificial nests were attached to trees in locations like those typically used by Regent Honeyeaters, and each nest was deployed with three decoy eggs: two commercially available quail eggs (similar in size to Regent Honeyeater eggs) and one plasticine egg. Each trial was conducted using experimental designs, and monitoring cameras were placed on as many nests as possible.

The nest cage was exactly as it sounds - a cage placed around the nest and tied into place with access holes on the sides for a Regent Honeyeater to get in and out. In the tree trunk collar experiment, a sleeve shaped 'possum collar' made from polycarbonate sheeting was fitted around the tree trunk at various locations in order to prevent possums and gliders from climbing trees (as is commonly seen in parks and gardens).

It quickly became clear that the nest cages didn't protect nests. The same holes in the cage sides which allowed a Regent Honeyeater to get in and out of also allowed access for predators - particularly Grey Shrike-thrushes, a well-known nest predator of small woodland birds. It was possibly a good outcome to rule this out on artificial nests, as the recovery team was not confident wild birds would tolerate interference like that around active nests.

For the tree trunk collars, the images recorded by the monitoring cameras showed a range of nest predators easily navigating around the collars, including Squirrel Gliders. Examination of the indentations in

plasticine eggs also showed evidence of both mammals and birds preying on these nests. Encouragingly though, a few nests in collared trees had no evidence of predation. From this outcome, and also as collars are a 'low impact' and low disturbance option, this method was then trialled in several trees containing actual nests.

The results of this work weren't conclusively positive, but interestingly in the 2017 captive release no predation by mammals of actual nests in trees with collars was observed. There is a chance this was due to low mammalian predator levels in the locations the nests were placed, but perhaps they did have some impact. As a result, this work will be incorporated into coming breeding seasons as attempts to improve the nest success of Regent Honeyeaters continue.



Trialling installation of collars on tree branches.



A volunteer releases a Regent Honeyeater after it was refitted with a radio-transmitter during the 2015 captive release.

Community Engagement

Building community awareness of the plight of the Regent Honeyeater is central to the recovery of the species. In fact, maintaining and increasing community awareness is one of the four strategies outlined in the Recovery Plan for the Regent Honeyeater. It will take a collaborative effort to save the Regent Honeyeater 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, assisting in captive-release programs, conducting searches for Regent Honeyeaters 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 Regent Honeyeater habitat on their land.

With the Regent Honeyeater 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 birdwatching is a growing pastime in Australia, there are proportionally very few for the size of the country and even fewer that are familiar with Regent Honeyeaters. It is hoped that by upskilling birdwatchers and the general public with tips on recognising Regent Honeyeaters (i.e. by learning their calls, differentiating from similar species) more reports of individuals will come to light. Records obtained from the public forms a large supplement of information for the more formal Research and Monitoring program.

Community engagement is predominantly conducted 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 Regent Honeyeaters and the effort to conserve them.



Community awareness and engagement is crucial in the recovery effort for Regent Honeyeaters, and workshops and field days are great ways for people to get involved.



WHY CONSERVE THE REGENT HONEYEATER?

Regent Honeyeaters inhabit woodlands that support a high abundance and diversity of other threatened and declining bird species, as well as other threatened plants and animals. Often these woodlands are recognised as endangered vegetation communities as well. This means that protecting and providing habitat for Regent Honeyeaters will not only benefit many other birds, but biodiversity in general. For this reason, the Regent Honeyeater has become a 'flagship' species for box-ironbark woodlands and other habitats in temperate south-eastern Australia.

Further, as a species which feeds extensively on the nectar from flowering eucalypts, Regent Honeyeaters would be involved in transferring pollen from tree to tree as they forage in the landscape. This level of 'ecosystem function' is part of an evolutionary process which ensures that there is adequate gene-flow from tree to tree within temperate woodlands of south-eastern Australia, in turn leading to healthy populations of trees, which leads to healthy habitat for wide-ranging nomadic species to thrive.

As an example of how action for Regent Honeyeaters can benefit other species, the Regent Honeyeater project in the Lurg Hills (highlighted in the 'Habitat Restoration' section), is a fantastic case study. During the 1900s Grey-crowned Babblers declined substantially across Victoria and by the 1990s they were reduced to as few as eight sub-populations across the north of the state. One of those areas includes the Lurg Hills. Since 2001 the entire Grey-crowned Babbler population of the region has been surveyed annually to assess their status, and response to tree planting efforts. After a few years the population started to increase, from an initial base of just over 50 birds to a peak in 2016 of 133 birds. Since then the population has dropped a little as a result of low rainfall, but it still sits substantially higher. The reason for the population rebound? Habitat back in the ground. Grey-crowned Babblers have readily used replanted habitat as soon as 6 years after planting, both as stepping stones' to move through the landscape for foraging, and for older sites as locations for nesting. Without this habitat planting for Regent Honeyeaters, Grey-crowned Babblers may well have been lost from the Lurg Hills forever.



Grey-crowned Babbler



Hooded Robin



Brown Treecreeper

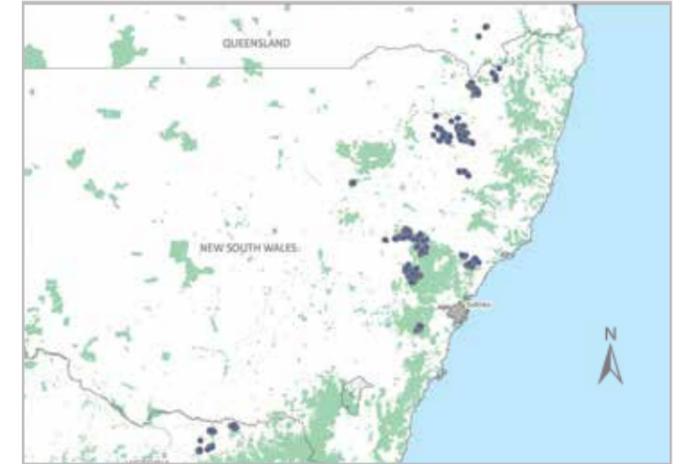


Dusky Woodswallow

Other threatened woodland birds also benefit from recovery actions implemented for Regent Honeyeaters.



Volunteers out searching for Regent Honeyeaters.



The NRHMP consists of over a thousand monitoring sites across the breeding range of the species.

RESEARCH AND MONITORING

Biannual Regent Honeyeater Surveys

Each year since the mid-1990s, biannual range-wide surveys for Regent Honeyeaters have been undertaken on the third weekend in May and the first weekend in August (and a week either side). These targeted surveys aim to get volunteers searching as many locations as possible within the range of the Regent Honeyeater to help monitor their population trends and distribution. These surveys were instigated by state agencies, which had carriage of the recovery program at that time. 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 Regent Honeyeaters in general and the May and August 'survey weekends' are now etched in the calendars of birdwatchers across eastern Australia. Because of the profile and participation the survey weekends receive, they also provide a good platform for increasing community engagement activities and there is often a flurry of educational programs centred on the months of May and August. They are also conducted and promoted simultaneously with mainland surveys for Swift Parrots.

National Regent Honeyeater Monitoring Program (NRHMP)

The National Regent Honeyeater Monitoring Program (NRHMP) commenced in 2015. Using species distribution models developed by researchers at the Australian National University (ANU), the aim of the NRHMP is to increase the quantity and quality of monitoring data obtained on the wild population of Regent Honeyeaters.

The NRHMP was built upon a "habitat suitability model" that used data from the Regent Honeyeater sightings database, combined with expert opinion and extensive ground-truthing. Using these information sources, ANU's model identified areas of priority habitat for the Regent Honeyeater based on predictions of high suitability across multiple years and varying climatic conditions. The NRHMP has gathered robust baseline data on nest survival, which identifies critical factors explaining nest survival and the causes of nest failure (refer to 'Nest Predation' section). In the longer term, it is hoped that the monitoring data will be sufficient to infer changes in population size based on occupancy rates of Regent Honeyeaters at monitoring sites.

The NRHMP comprises more than 1100 sites - circular survey areas of 50m radius - which have been established in priority regions, including all regions defined as "key breeding areas" in the Recovery Plan. The sites stretch from north-east Victoria to south-east Queensland. In 2018, BirdLife Australia joined with ANU to use the NRHMP as the standardised survey method for monitoring Regent Honeyeaters in their breeding range. The NRHMP has also superseded volunteer-led monitoring surveys that occurred over many years in the Capertee Valley, coordinated by BirdLife Southern NSW, Cumberland Bird Observers Club and Birding NSW (and the significant contribution that these surveys made to the understanding of Regent Honeyeaters is duly recognised - truly formative work for what we are doing now).

A summary of the methodology used at each NRHMP monitoring site is below.

- Play the call of the Regent Honeyeater for one minute using a standardised call employed by all field surveyors.
- Remaining four minutes conducting searches for Regent Honeyeaters.
- Recording blossom of key feed species (including mistletoe) using a scoring system on a pro-forma that is pre-filled with key species and tailored to different regions.
- Recording of all bird species encountered, and their abundance, with the site during the survey period.
- Detailed information is recorded if Regent Honeyeaters are encountered and extensive follow-up fieldwork is triggered at any sites where birds are found to be present.





Extracting a recaptured Regent Honeyeater from a mistnet.



"Blue/Metal Red/Orange" takes off from a Blackbutt branch at the Hunter Region Botanic Gardens on 3 August 2018.

THE STORY OF BMRO

"BMRO" is a female Regent Honeyeater, first banded in adult plumage in November 2013 at Bogee TSR in the Capertee Valley (where she was feeding on flowering Mugga Ironbark). She was monitored by ANU researchers along the Goulburn River (Upper Hunter Valley) during spring 2017 where she successfully bred, fledging 2 birds. Here she was mostly feeding on Yellow Box blossom.

In July 2018 she was spotted at the Hunter Region Botanic Gardens, feeding on flowering Blackbutt *E. pilularis*. At that time she would have been at least 7 years old, has travelled (point-to-point) about 250kms, and bred at least once successfully.

Go girl!

Colour Banding and Genetics

Over the years the Regent Honeyeater Recovery Team has been investigating the movements of Regent Honeyeaters to determine where they travel, how far they can fly, and what sort of habitats are used by the population. In order to learn more, a colour banding project was initiated in the late 1980s. This involves catching Regent Honeyeaters in mist nets then attaching four bands – two colour bands on one leg, and a metal band and a colour band on the other leg. This allows each bird to be given a unique colour band combination so that, when birds are resighted, we know where they have come from and how old they are (especially if they are banded as a juvenile). But in order to make sure the band combinations are recorded accurately, there is a strict order to read them by - left leg first, right leg second, and on both legs the colour band at the 'top' of the leg is read first (that is, the one closer to the body of the bird). So, a bird with a Red band above the metal band on the left leg, and a Yellow over a Green band on the right leg would be recorded as 'Red Metal/Yellow Green' (see examples above).

Since 1987, over 800 wild Regent Honeyeaters have been banded in the wild. Of those, just over 15% have been resighted again somewhere across the range of the species, which is not bad for a species in such low abundance and spread across such a large range. The longest-lived bird we know of to-date was a female banded in the Capertee Valley in 1997 as a juvenile bird (only a few weeks out of the nest); the same bird was not seen again until she was spotted at a different location in the Capertee Valley, more than 11 years after banding!

The longest movement from point-to-point we have recorded occurred relatively recently. A pair of birds breeding on the Gippsland Lakes in Victoria was banded in late 2009; at the time they were feeding a juvenile bird. In mid-2011 the male of that same pair was found breeding successfully with a different female in the Capertee Valley, NSW – a full 580km from where he was banded. But this distance is direct line from the point of banding to the point of resighting, so the actual distance travelled is likely much higher. There have also been similar movements documented, with birds from southern Qld, northern NSW and north-east Victoria travelling to the Capertee Valley, and birds from the Capertee Valley dispersing to the Upper Hunter area, the Central Coast and Lower Hunter Valley in NSW.

We also pick up interesting patterns of movement from banding, and a great example of this started in Chiltern-Mt Pilot NP in 2006. At the time there were 16 Regent Honeyeaters in the park, and the recovery coordinator managed to catch and band 11 of them. The first of these wasn't seen again until August 2009, when a male was found foraging in flowering White Box in the Capertee Valley (about 460 km from where it was banded). A month later, in September 2009, another

male was found but this time on the edge of Rushworth State Forest in central Victoria. This male was foraging in flowering Yellow Gum *Eucalyptus leucoxylon* over 150km from where it was banded, and more than 600km from the bird found in the Capertee Valley. Finally, a third bird out of that group was sighted the following year in April 2010 in the Warby-Ovens NP about 45 km west of the initial banding site. So, from a central point in Chiltern where they had all been feeding in flowering Mugga Ironbark, over the following few years they had dispersed across the bottom half of the current range of the species and were all feeding in different flowering tree species. It's quite a challenge for conservation managers when the species is capable of that level of dispersal and individuals can all go in different directions.

We rely heavily on the skills of birdwatchers to note colour band combinations when Regent Honeyeaters are found, so we always encourage anyone who sees a Regent Honeyeater to check the legs for bands. We also encourage anyone carrying a camera to take as many photos of Regent Honeyeaters as possible because often leg bands can be difficult to see in the field and may only be discovered later when reviewing photos (plus it makes it a lot easier to see now that we have the ability to zoom in on digital photos).

Over the life of the project the genetic make up of the population has been assessed several times. The main reason for taking genetic samples is to examine any 'structure' in the population, such that birds in Qld are genetically distinct from birds in north-east Victoria, for example. But secondly, a range of additional questions can be addressed by comparing the genetics of the wild and captive birds – is there inbreeding in captivity, are we breeding birds with lower genetic diversity, and so on. Across all analyses so far it has been determined that:

- There is no genetic difference between wild birds across the range (i.e. there is free gene flow from one end of the range to the other).
- Samples collected in the past 10 years have not changed in comparison to samples from the 1990s.
- Captive birds are as genetically diverse as the wild population, and there has been no evidence for loss of genetic variability in the captive population.

What does this all mean? For species managers it means that at the moment the genetic management of the captive population is being undertaken to best practice standards, and it also means we can take in new birds for the captive population from anywhere across the range of the bird, and release them anywhere across the range without fear of altering the genetic makeup of the species.

Radio and Satellite Tracking

Current knowledge of the movements of Regent Honeyeaters is based mainly on resightings of banded birds. Radio-tracking studies have been used but the use of transmitters is limited by the weight that the bird can carry and the short battery life. The geographical range of radio-tracking studies is also rather limited, especially for the highly mobile Regent Honeyeater. If a Regent Honeyeater decides to "shift regions", then radio-transmitters will not be able to tell you where the bird has gone. For monitoring the localised movements of captive bred birds post-release, radio-transmitters have been a valuable but labour intensive method of collecting data. However, for longer distance tracking of this nomadic species, more sophisticated technology is required.

From 2019, a study of Regent Honeyeater movement is planned using satellite-transmitters. This is very exciting, because we still do not know where Regent Honeyeaters disperse to after they breed. In fact, for the first six months of 2018 we had no idea where any birds were in NSW – we couldn't find them anywhere! The ability to track the movement of birds on a laptop using satellite technology is hoped to help answer some of these 'holy grail' questions about Regent Honeyeaters, such as where they go to after breeding, whether they move with flocks of other species regularly, and whether or not there are critical areas that we don't currently know about.

In order to limit the potential burden of carrying a satellite-transmitter over an extended time-period, the weight of the transmitter and harness cannot exceed 5% of the bird carrying it. This means we are limited to putting them on 'bulky males' for the moment, but we still expect that this will provide us with invaluable insights to their movements in the non-breeding (and breeding) season.



A blood sample is collected from a wild Regent Honeyeater for genetic analysis.

Mistletoe Dieback

As discussed in the habitat sections, one of the key food plants for the Regent Honeyeater is the Needle-leaf Mistletoe. This mistletoe species is found in River Sheoaks across a large area of NSW and Qld, and in places like the Capertee Valley it is a very important part of the species breeding habitat. When Needle-leaf Mistletoe flowers, it generally provides a very rich and reliable flow of nectar. In some years the nectar flow provides enough food for the birds to initiate and complete a full breeding cycle, even in the absence of good flowering and nectar from species like Yellow Box and Mugga Ironbark.

But in recent years there are key sections of the Capertee River and its tributaries where there has been extensive die off of Needle-leaf Mistletoe. In fact, in some sections there has been complete death of all mistletoe plants, rendering once important breeding sites completely unusable. The recovery team is currently investigating what has caused this mass mistletoe death, and is also looking at ways to reverse the decline of this important food source.

The Long-flowered Mistletoe has also declined in a key location in recent years, with successive wildfires in the Lower Hunter Valley within and around the Hunter Economic Zone killing off vast swathes of the plant (noting that mistletoe does not resprout after fire). In this region, this mistletoe species was a critical food source during a large breeding event in 2007, and again was important in 2018 when this area was the only site in NSW where the species bred. In coming years a trial is planned to 're-seed' the canopy trees with Long-flowered Mistletoe in the hopes that it will accelerate the recovery of this important area.



Dead Needle-leaf Mistletoe.



Healthy Needle-leaf Mistletoe.

HOW CAN YOU HELP?

Report Sightings

Every report of a Regent Honeyeater is extremely valuable and we need to hear about them as soon as possible. It is important for us to be able to verify sightings and find out quickly about the conditions where a bird may be (i.e. if others may also be present in a location with lots of flowering). In addition, we are working to band more birds to keep unlocking the secrets about movements of Regent Honeyeaters. As soon as you find a Regent Honeyeater please let us know via email at woodlandbirds@birdlife.org.au or via our online form <https://birdlife.org.au/what-to-do-if-you-see-a-regent-honeyeater/>

WHAT TO RECORD



TAKE A PHOTO

This is probably the most valuable piece of information. Even poor quality photos can help to confirm the age and sex of the bird, identify habitat and bands.



SCRIBBLE NOTES

Try and write down as much information as possible:

- Date & time
- Location
- Habitat
- Trees present
- Leg band colours
- Behaviour
- Other species present



CONTACT US

<https://birdlife.org.au/what-to-do-if-you-see-a-regent-honeyeater/>
or
woodlandbirds@birdlife.org.au

Volunteering Opportunities

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

- Get involved in the survey weekends. We are always eager to have more eyes and ears on the ground looking for Regent Honeyeaters – they occur over a large range and are very few in number, so the more people out searching the better! For more information on the annual range-wide Regent Honeyeater (and Swift Parrot) surveys please contact BirdLife Australia's woodland birds team (e: woodlandbirds@birdlife.org.au).
- Assist with monitoring of captive-released Regent Honeyeaters. We rely heavily on volunteers and supporters to help us search for captive-released birds. We undertake radio-tracking, colour-band reading, and behavioural observations. Further releases will occur in coming years, and we will be looking for volunteers to assist us with fieldwork.
- Help out on tree-planting events. The two largest Regent Honeyeater habitat planting programs are in the Lurg Hills near Benalla, Victoria (<https://www.facebook.com/regenthoneyeater/>) and the Capertee Valley, NSW (<https://birdlife.org.au/groups/birdlife-southern-nsw/>).
- Join BirdLife Australia www.birdlife.org.au and/or your local branch/birding club, organisations such as Landcare, natural history groups or a 'friends of' group to support efforts to conserve threatened species such as the Regent Honeyeater in your area.

For further information on any of the above, contact woodlandbirds@birdlife.org.au

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
 - > Queensland: Queensland Trust For Nature
www.qtnf.org.au
- > BirdLife Australia are also active in brokering conservation outcomes on properties with high quality Regent Honeyeater habitat (contact woodlandbirds@birdlife.org.au).
- Protect remnant woodland on your property to help provide habitat for the Regent Honeyeater. Fence remnant areas to prevent stock access and allow regeneration of native plants. Establish 'corridors' of plantings to connect areas of remnant habitat.
- Avoid harvesting important Regent Honeyeater tree species for firewood. Mugga Ironbark, Yellow Box, White Box, Broad-leaved Ironbark and Blakely's Red Gum 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.

If conservation of Regent Honeyeaters 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.

Further Reading

For further information on any of the studies or research summarised in this booklet, please see:

- BirdLife Australia's Regent Honeyeater website:
<https://birdlife.org.au/programs/woodland-birds/>
- Office of Environment and Heritage profile:
<https://threatenedspecies.bionet.nsw.gov.au/profile?id=10841>
- Australian National University Difficult Bird Research Group:
<https://www.difficultbirds.com/>

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The Regent Honeyeater Recovery Team is an outstanding collaboration between key organisations working together to save the Regent Honeyeater from extinction, with representatives on the recovery team and its sub-committees from BirdLife Australia, the Department of Environment, Land, Water and Planning (Victoria), Office of Environment and Heritage (NSW), the Department of the Environment and Energy (Australian Government), Taronga Conservation Society Australia, community-based Regional Operations Groups, relevant Local Land Services and Catchment Management Authorities, Australian National University, University of New England and several independent species experts. The captive breeding program undertaken by Taronga Conservation Society Australia is supported by eight other breeding institutions across south-east Australia, and we thank them all for their valuable contributions.

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Finally, there has been an enormous contribution from citizen science to help Regent Honeyeaters over the years. Early work was built on the knowledge gleaned from sightings made by community members, birders and landholders, and this continues today. Volunteers have provided massive amounts of in-kind support to activities such as tree planting and habitat restoration, surveys and monitoring, radio-tracking of captive released birds, and advocacy and lobbying for better outcomes for the species. The recovery program wouldn't be where it is without this support.

Sincerely,

Dean Ingwersen, Mick Roderick and Emily Mowat
BirdLife Australia



