



Wildlife corridors in South Gippsland

A guide to the South Gippsland
Biolinks Map



South Gippsland
Landcare Network





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Acknowledgement of Country

The South Gippsland Landcare Network acknowledges the Traditional Owners of the land and waters of South Gippsland the Bunurong, Boon Wurrung and Gunaikurnai peoples and pays respect to Elders past and present. We recognise their continuing connection to Country, and the knowledge and care they have held for these landscapes and the species within them over many thousands of years.

Thank you

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Thank you to the Landcare groups and members, landholders, community groups, land management agencies and Council staff who gave their time and local knowledge. More than 250 people contributed observations through our online map, with many taking part in workshops, information sessions and conversations across the region. Particular thanks go to the stakeholder working group, Landcare group representatives, and to the fauna experts who advised the project.

Introduction

Why prepare a Biolinks Map?

South Gippsland has a recent history of agriculture and forestry which has significantly changed the landscape. Today only one fifth of the native vegetation that once covered the region remains, with much of it scattered and isolated on private land. Animals that once moved freely across the region are now restricted to patches of forest, woodland and scrub separated by open farmland, plantations and roads. As a result, wildlife are more vulnerable to fire, drought, disease and predators, and less able to breed with populations elsewhere or recover from setbacks.

In recent years there have been various community groups interested in creating biolinks for wildlife and dedicating time and effort to achieving this.

The South Gippsland Biodiversity Protection Plan, completed in 2024, recommended developing a Biolinks Map to identify where fauna move through the landscape, where the gaps are and how these connections may be strengthened.



What is habitat connectivity?

A connected landscape is one where animals can move between areas of habitat to find food, shelter and mates, and to establish new territories.

Connections in the landscape are made up of a few simple parts:

- A habitat patch is an area of forest, woodland, scrub or wetland, with the right features to support a population of a particular species. When a habitat patch is very well suited to the requirements of a species it is referred to as 'core habitat'.
- A gap is land without suitable habitat. Examples include a paddock, lake or road.
- Stepping stones are smaller features that an animal can use to shelter briefly while crossing a gap: a clump of trees, a roadside strip, a patch of scrub, a fallen log, or farm dam with cover around it.
- Two distances decide whether a connection works, and they differ considerably between species:
 - interpatch distance is the furthest an animal will travel from one area of core habitat to the next; and
 - gap-crossing distance is the furthest it will move between stepping stones along the way.

While two habitat patches may be within the interpatch distance, without stepping stones and regular intervals many species will be unable to move between them.

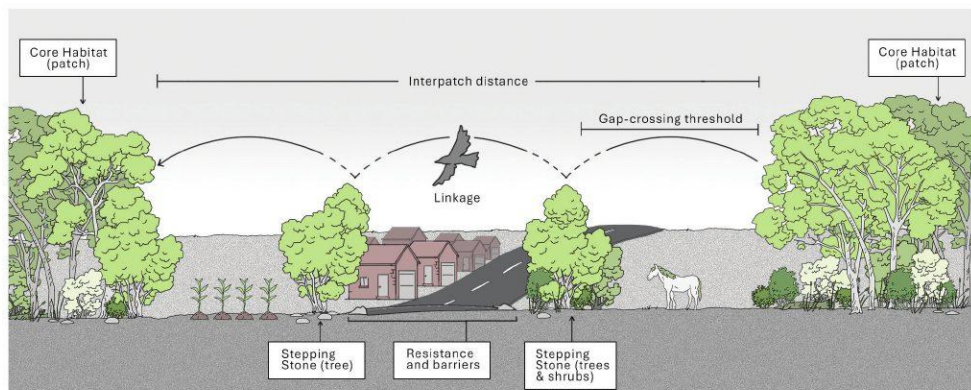


Figure 1. Examples of habitat and connectivity requirements for wildlife

Connectivity is not the same for every animal

Connectivity in the landscape looks different for various types of animals. For example, a Swamp Wallaby will easily cross hundreds of metres of open paddock, whereas a small woodland bird like a Flame Robin needs cover every 75 metres or so to minimise the risk of being exposed to predators. Finally, a glider cannot cross the paddock at all unless there are trees tall enough to glide between.

Because connectivity requirements vary between animals, we grouped South Gippsland's native fauna into five groups or 'guilds'. Each captures a cohort of animals with similar habitat needs and movement abilities. Each guild is represented by character species that are well known in the region and for which good information exists.

The maps for each guild show how different types of animals (e.g. birds versus ground fauna) move through the landscape, and where they can't.

This approach means that on-ground actions taken for one species will likely benefit many others with similar needs.



Understanding Biolinks

The South Gippsland Biolinks Map shows where wildlife are able to move through the region, and where that movement is most constrained. It is a guide to where effort will be most effective, not a prescription.

What the Biolinks Map shows

The Biolinks Map identifies areas of habitat capable of supporting populations of animals, and the pathways connecting them. These pathways are based on computer modelling that has been informed by numerous inputs, including local and expert information. They show the routes of least difficulty between areas of habitat, and their relative importance within the broader 'network', based on what is known about how different animals move through the landscape.

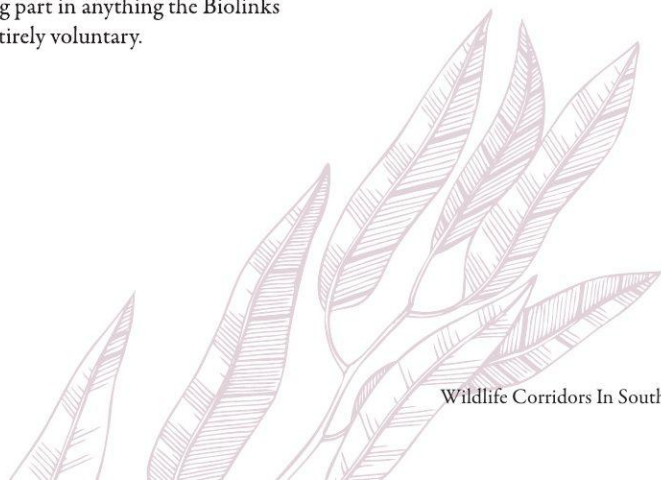
What the Biolinks Map does not do

It does not place any obligation, requirement or expectation on landholders or managers. It does not identify land for acquisition nor restrict what anyone may do with their property. It does not rank properties, and being shown within a potential corridor says nothing about how a property is managed now, or should be managed in the future. Taking part in anything the Biolinks Map identifies is entirely voluntary.

A note on habitat and corridors

The nature and condition of habitat varies substantially across South Gippsland, and not all patches identified will provide habitat for all species present in the region. Some patches are simply the wrong type (or 'structure') of vegetation, whilst others may be modified in such a way that they no longer 'function' as habitat. It is therefore important to examine each species requirements, where the model is indicating habitat and connections exist and do not, and the actual condition of habitat on-ground before planning any works or actions.

Where the Biolinks Map shows a corridor, it indicates a part of the landscape where protecting or improving connections would make the most difference. It is not a fixed boundary or line, and it is not a proposal for a particular action or outcome.



Developing the Biolinks Map

The Biolinks Map was developed over two years, and consultation shaped it at every stage. Key steps in the process included:

Community and stakeholder engagement

Numerous workshops and presentations were held with representatives from Landcare groups, management agencies and the broader community to establish the project's scope and priorities and identify key inputs for use in the modelling and development of corridor recommendations. Location-specific knowledge was also invited via an online map, with more than 250 responses received.

Preparing the habitat base layers

There was no existing data set that described habitat in the detail required for each of the fauna guilds, so one was developed through this project.

This process used existing data, including vegetation maps and aerial imagery, field surveys (from roadsides and public land) and community feedback to map every patch of habitat over one hectare across the region. Each patch was also attributed with relevant information, such as the height and density of the canopy, shrubs and ground layers, or the presence of large old trees, hollows, fallen timber and woody debris.

It resulted in over 1300 habitat patches, ranging from 1 to 6650 hectares being mapped. These were then used to identify 'core habitat' for each of the guilds.

The habitat map was reviewed by key stakeholders and the broader community before finalisation and use in the connectivity models.

Fauna expert guidance

A workshop of recognised fauna experts confirmed the five groups of animals (guilds) that would form the basis of the 'connectivity models' on which the Biolinks Map is built. These fauna guilds were chosen to best capture the habitat and movement requirements for a wide range of native animals that are affected by habitat fragmentation in the region. The experts also defined what each group needs to persist and move: the habitat it needs, how far it will travel, and which landscape features are more difficult to move through or represent a barrier.

Modelling the connections

Modelling was used to identify the pathways between core habitat for each guild, taking into account how the associated species move through the landscape. This included the consideration of stepping stones where present, and how land cover can affect movement. The modelling also described how significant each habitat patch and pathway is within the entire South Gippsland network.

The modelling used scientifically recognised methods, including the General approach to planning connectivity from local scales to regional (GAP CLoSR) framework and tools such as Graphab and Omniscap. Maps were firstly produced for each fauna guild, modelled, and then compiled into a single 'Biolinks Map' covering the entirety of the region.

The Biolinks Map

The Biolinks Map is an umbrella term for the broader project and associated models. This project has in fact produced multiple mapping products for each guild, combining these into a single 'Biolinks Map' that will serve as the key reference for the coordination of activities across SGLN, land managers and other relevant organisations.

The maps that have been produced by the project include:

- Two maps for each of the five fauna guilds showing core habitat and the connections between them, as well as the significance of those components and where gaps exist in the landscape. These maps can be used by individuals or groups that are particularly interested in creating habitat and connections for particular species or guilds, such as the ground-dwelling Lyrebird. Simplified versions of these maps are shown on pages 16 to 25.
- A network connectivity map that layers up the habitat requirements and connectivity of the more mobile guilds (generalists, small ground fauna and small woodland birds). This is shown on page 14. Gliders and ground-dwelling birds are not specifically included as their connectivity across the wider landscape is limited. For these two groups, viewing the fauna guild maps will be more appropriate.

- The consolidated Biolinks Map which documents 16 individual wildlife corridors, each comprised of multiple paths through the landscape designed to connect the most valuable habitats. Shown on page 26, these corridors represent the locations where on-ground action to enhance habitat and connectivity will make the greatest difference for the greatest number of species.

In addition to the maps, a technical report detailing the project's approach, findings and recommendations, based on careful examination of the model outputs, has also been prepared for SGLN. The technical report can be used to examine habitat connectivity and guide actions at a local scale.

The South Gippsland landscape

The South Gippsland landscape covers some 262,000 hectares, extending from the Strzelecki Ranges in the north to the Bunurong coast in the south. Before European presence in South Gippsland the ranges carried tall wet forests, the plains woodlands, swamps and wetlands and a near-continuous band of scrub and heath along the coast. Clearing for agriculture and forestry has led to a landscape that is productive and highly valued but retains only a fifth of its original native vegetation, much of it in small and isolated patches.

South Gippsland habitats

Different habitats in the South Gippsland landscape provide a variety of values for wildlife.

Wet and damp forests, and rainforests contain the largest trees, often with hollows, deep litter and dense vegetation. Home to diverse wildlife including gliders and ground-dwelling birds. Much of this forest is regrowth, and hollows take well over a century to form.

Foothill forests, woodlands and heathlands include vegetation and waterways on the undulating lower hills and plains, supporting a wide variety of fauna. A diversity of eucalypts sit over an often dense and sometimes heathy shrub layer. Variable ground cover is present, often featuring wildflowers.

Swamp scrub and swampy and riparian woodlands along waterways, drainage-lines and low-lying areas. Among the most cleared habitats in the region, with much of it remaining now on private land.

Seasonal and permanent wetlands, critical for a diversity of birds, amphibians and reptiles. The extent of wetlands in the region has drastically reduced, having more than halved in the last forty years alone.

Coastal scrubs and dunes form an almost continuous corridor along the ocean-facing southern boundary.

Estuarine vegetation including saltmarsh, scrubs and mangroves around the inlets, provides essential cover and foraging habitat for specialist fauna.

Planted vegetation, including native revegetation, shelterbelts and plantations, provide valuable, but often limited, habitat.

Scattered trees, roadsides and small remnants are important stepping stones, critical for allowing fauna to move across otherwise cleared country.



Regional nodes

A small number of key regions stand out as large areas of contiguous habitat, or clusters of habitat patches close enough to function as one. These anchor the network, and most of the corridors identified in the Biolinks Map interact with these in some way. These include:

The Westernport Woodlands - Adams Creek Nature Conservation Reserve, the former Holden Proving Ground and the surrounding patches at the north-western edge of the region, with the habitat along the Lang Lang River, the Bass River and Adams Creek.

Mount Worth - Mount Worth State Park and the many smaller state forest areas and reserves surrounding it, including extensive areas of habitat on private land.

The Mirboo North forests - the blocks of Mirboo North Regional Park centred on Mirboo North and Darlimurla. Comprised of several large blocks close enough together to work as continuous habitat for all but the most sensitive of species.

Wilsons Promontory - around 50,000 hectares of national park at the southern tip of the region, and by a wide margin the largest area of intact habitat in South Gippsland. It supports a diversity of flora and fauna that have largely disappeared from the surrounding landscape.

The southern Strzelecki Ranges - the tall wet and damp forests and rainforest gullies running from South Boolarra in the north, through Turtons Creek and Woorarra West in the west, and on to Hazel Park in the east, taking in Brataualung Forest Park. Includes some of the region's best tall forest and rainforest remnants, including old growth stands and fern galleries.

The Bunurong Coast and hinterland - the near-continuous coastal scrub and woodland environs from Venus Bay through Cape Liptrap to Waratah Bay, including Point Smythe Coastal Reserve and Cape Liptrap Coastal Park, and its hinterland. The most continuous habitat in the region outside the ranges and the Promontory.

What we found

South Gippsland supports areas of extensive, diverse habitat and strong, functional corridors

Six regional nodes as identified on page 11, anchor the network across South Gippsland. These are the region's principal refuges and support species found nowhere else in the landscape.

Smaller local nodes, comprised of clusters of patches with multiple paths between them, help bridge the gaps between regional nodes. These form the backbone of the corridors which connect the South Gippsland landscape. They include areas such as the Hoddle Range, the foothills associated with the Lang Lang River, the Great Southern Rail Trail from Koonwarra to Fish Creek, the plains of the Lower Tarwin catchment, and the coastal plains around Barry Beach and Port Welshpool.



Some parts of the landscape are connected by a few, limited pathways

Only three links carry the connection between the north and south of the South Gippsland region, and only provide connectivity for the most mobile of species. These are Korumburra South to Pound Creek, the Tarwin River West Branch, and Darlimurla to Gunyah. Each is narrow and reliant on a single path in many places. The same fragility is seen on a more local scale in other parts of the landscape, wherever a single link carries a connection with scant alternatives nearby. These are the places where protection is most important. Examples include:

- west of Mount Worth to the Lang Lang River;
- east of Korumburra to the Bass River and north to Mount Worth;
- between Barry Beach and Port Welshpool north into the foothills of Strzelecki Ranges;
- Tarwin Lower, connecting the Bunurong Coast to Middle Tarwin and Koonwarra;
- the Great South Rail Trail around Meeniyar, Buffalo and Fish Creek;
- the upper reaches of Stony Creek and western tributaries of the Tarwin River East Branch around Dumbalk;
- the northern parts of the Hoddle Range around Foster;
- the Yanakie Isthmus.

Habitats and corridors do not function for all species, and there are gaps in the landscape

Habitat through the southern half of the region is more extensive and better connected than in the north, which in places is only able to be traversed by the most mobile species. In addition, large parts of the landscape carry so little remnant native vegetation that meaningful wildlife connections cannot be made without first creating habitat. This includes localities around Poowong, Dumbalk north through to Mirboo North, west of Wooreen, the interior of the Yanakie Isthmus, Leongatha South, between Tarwin Lower and Buffalo, and the coastal plain around Toora.

Some of these locations represent some of the best agricultural land in the district and it may be difficult to also plan for the creation of wildlife corridors. Locations that have been cleared in the past but are no longer viable for farming or forestry may provide better opportunities for wildlife corridor creation and enhancement.

In contrast, some areas may support a relatively high cover of vegetation but fail to provide 'functional' habitat due to key elements missing, such as a diverse shrub layer or dense ground cover. In this case a focus is needed on improving the existing habitat for a broader range of species, often through stock exclusion and weed control.

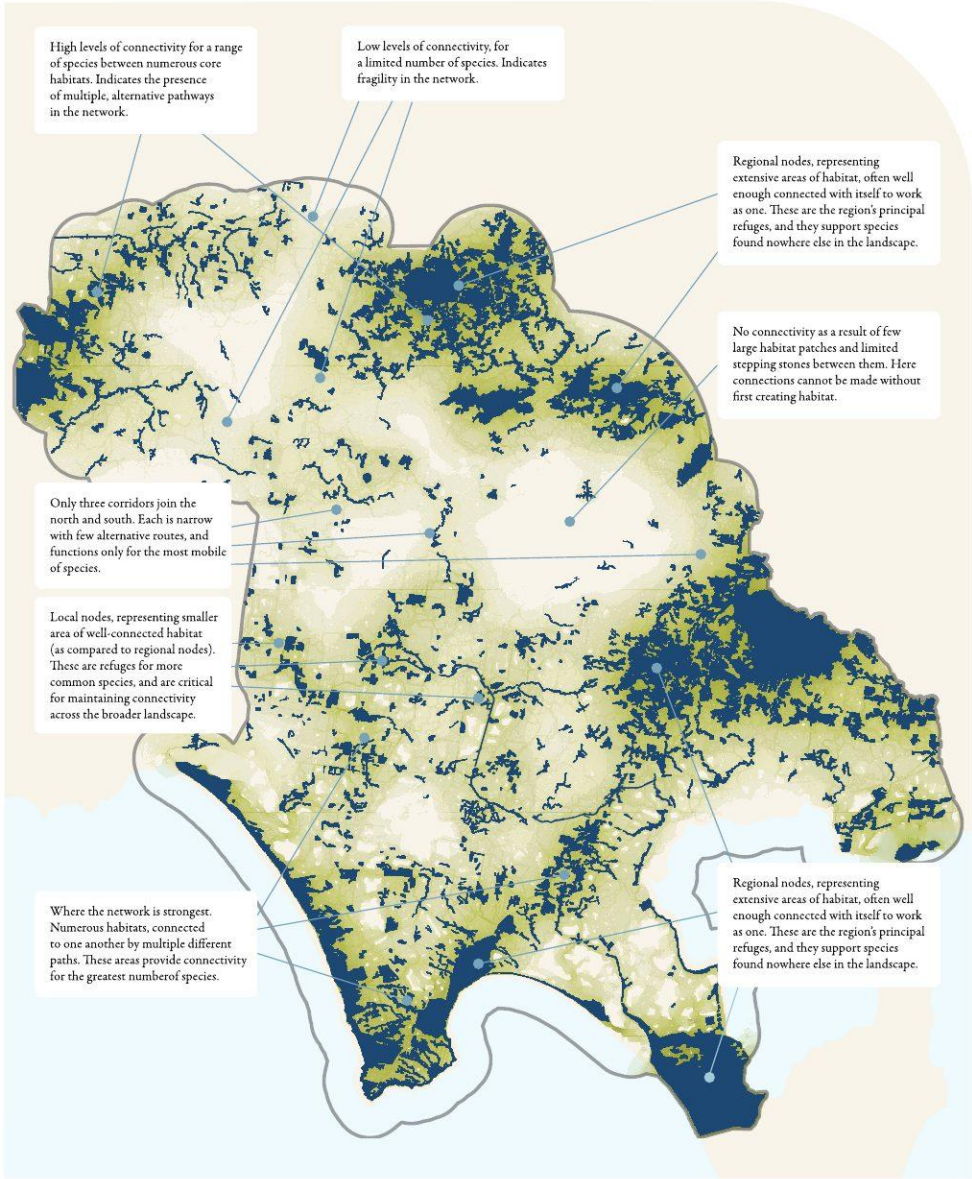
In other instances, stepping stones are the limiting factor. An absence of features such as scattered trees, roadside vegetation, riparian strips and small remnants can prevent less mobile species from moving between habitats.

The corridors already exist — they just need building on

Almost every corridor in the Biolinks Map aligns with a landscape feature: a gully, creek line, rail reserve, scattered trees, or a farm planting. These are the parts of the landscape most amenable to being strengthened and it is why a corridor may follow a degraded creek rather than the shortest line between two patches. The Lang Lang and Tarwin Rivers and the Great Southern Rail Trail are key examples of existing, major corridors which need to be protected and improved. Ensuring these corridors continue to support high-quality patches of 'core habitat', as well as wide, continuous strips of vegetation for movement is critical to ensuring they provide connections through the landscape for as many species as possible.

Elsewhere, actions such as protecting smaller habitat patches and the trees and strips of vegetation connecting them will ensure species currently present continue to inhabit the landscape into the future.

The connections within the South Gippsland network

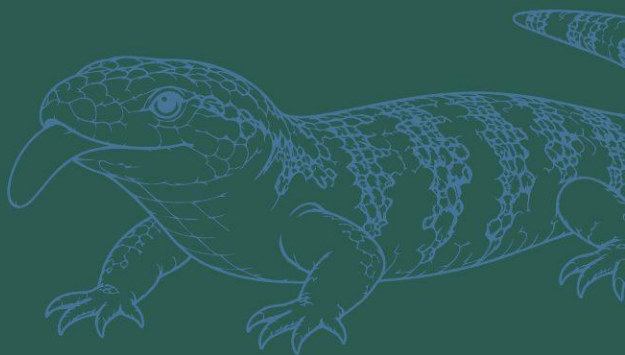




The five fauna guilds

Each fauna guild represents a group of animals with similar habitat and movement needs. Together they cover the range of ways native animals use the South Gippsland landscape, from those that can cross open country easily to those that cannot leave large, intact bush patches at all.

The modelling completed for each of the guilds provides valuable insight into what is happening within a region, and at varying scales. Whilst the Biolinks Map has been prepared based on the examination and collation of all models, planning for on-ground actions should examine each guild model thoroughly for the location in question, so actions are best targeted at protecting what is important and improving function for the species of greatest relevance.



Generalists

Character species:



Short-beaked Echidna



Swamp (Black-tailed)
Wallaby

Habitat

Forests, woodlands and scrubs of at least 15 hectares (which can consist of smaller patches close together). This guild uses the widest range of habitat of any of the five guilds, and is not fussy about condition.

Movement

Animals in the generalist guild are able to travel the furthest of all the guilds; up to 5 kilometres between habitat patches and able to cross 500 metres of open farmland between stepping stones.

Also benefits

Wombats, possums, larger reptiles and many common woodland birds.

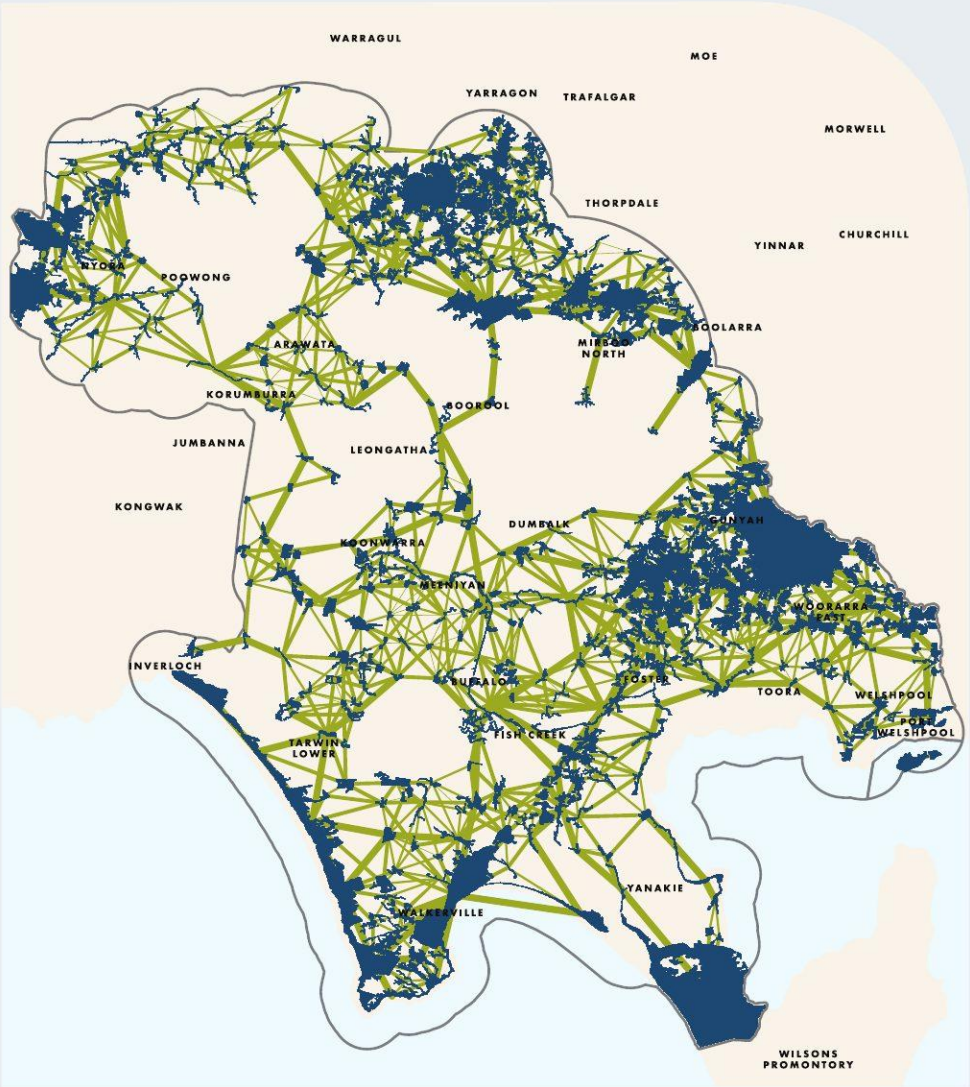
What we found

Habitat across the whole region is relatively well connected for these animals. However, the network is uneven and large parts of the landscape narrow to only one or two small paths between patches. The only habitat for this guild found to be cut off from the rest of the network was Little Snake Island.

Connectivity is strongest from Venus Bay to Cape Liptrap and north-east along the Hoddle Range, through the southern Strzeleckis, and around Mount Worth, Mirboo North and the Westernport Woodlands.

A small number of links are crucial to the network. Among these are Loch to Korumburra, Strzelecki to Arawata, Hallora to Seaview, Darlimulra to Boolarra South, Tarwin River West Branch, Korumburra South to Pound Creek, Tarwin Lower/ Meadows area and Yanakie Isthmus. Losing any one of them would separate large parts of the landscape.

Connectivity network for the Generalist Guild



Connections

- High importance
- Low importance
- Core habitat
- Connected habitats



Small ground fauna

Character species:



Long-nosed Bandicoot



Blotched Blue-tongue

Habitat

Forest, woodland, heathland and scrub with a dense ground layer of low shrubs, tussocks, sedges, ferns and fallen timber. Small areas are enough: 1 to 2 hectares, provided the cover is dense. Many of these animals have already disappeared from much of the region.

Movement

The small ground fauna guild will travel up to 2 kilometres between habitat patches, crossing up to 200 metres between stepping stones.

Also benefits

Bandicoots, antechinus, native rats, small reptiles and, where they persist, potoroos and dunnarts.

What we found

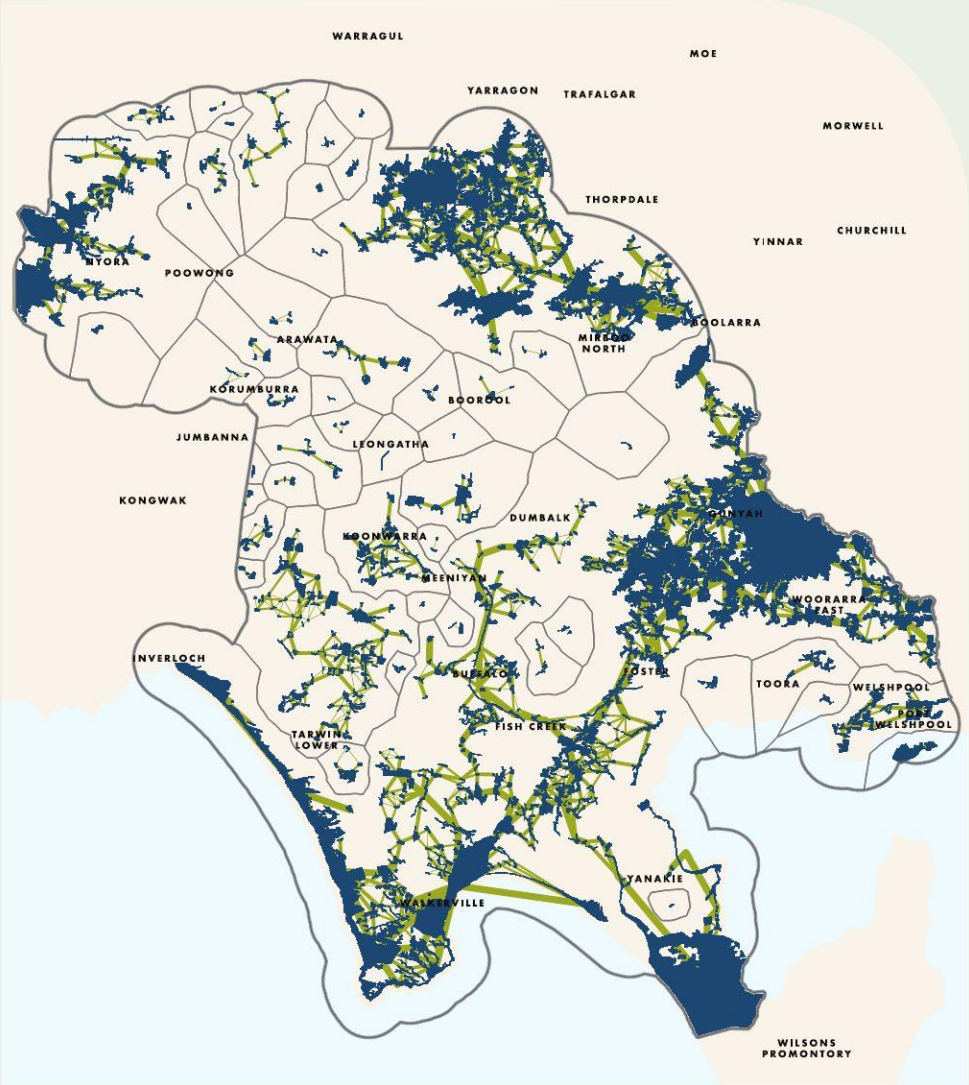
Habitat is divided into multiple, separated networks, and is predominantly present in the south. Many parts of the landscape, particularly in the north, support suitable vegetation communities but lack the dense ground cover structures to be considered habitat.

The southern network is extensive and well connected in places, with the models indicating connectivity between the Bunurong Coast and hinterland and the southern Strzeleckis via the Hoddle Range. This is also connected to extensive habitats around Buffalo, Meeniyan and Dumbulk via the Great Southern Rail Trail and major regional waterways.

However, several well-connected areas in the south are cut off entirely: the extensive habitats around Pound Creek, Middle Tarwin and Tarwin Lower; the patches south and east of Koonwarra; and the habitat around Barry Beach and Port Welshpool.

In the north, the only connected regions are those closely associated with the Westernport Woodlands in the west, and Mount Worth extending through to Mirboo North forests in the east. All other habitat is largely isolated, or persists as two or three small, poorly connected patches.

Connectivity network for the Small Ground Fauna Guild



Small woodland birds

Character species:



Eastern Spinebill



White-throated Treecreeper

Habitat

Forest and woodlands with a dense shrubby understorey, in patches at least 10 hectares in area (can consist of numerous smaller patches in very close proximity). These birds are uncommon in gardens and parkland, and need high-quality woodland and forest habitats to persist.

Movement

The small woodland bird guild can travel up to 1 kilometre between habitat patches, but will only cross around 75 metres of open ground between stepping stones. This behaviour is often informed by a reluctance to fly across open country, where they risk being taken by predators or driven off by aggressive birds.

Also benefits

Eastern Yellow Robin, Golden Whistler, Eastern Spinebill, treecreepers, scrubwrens, pardalotes and thornbills.

What we found

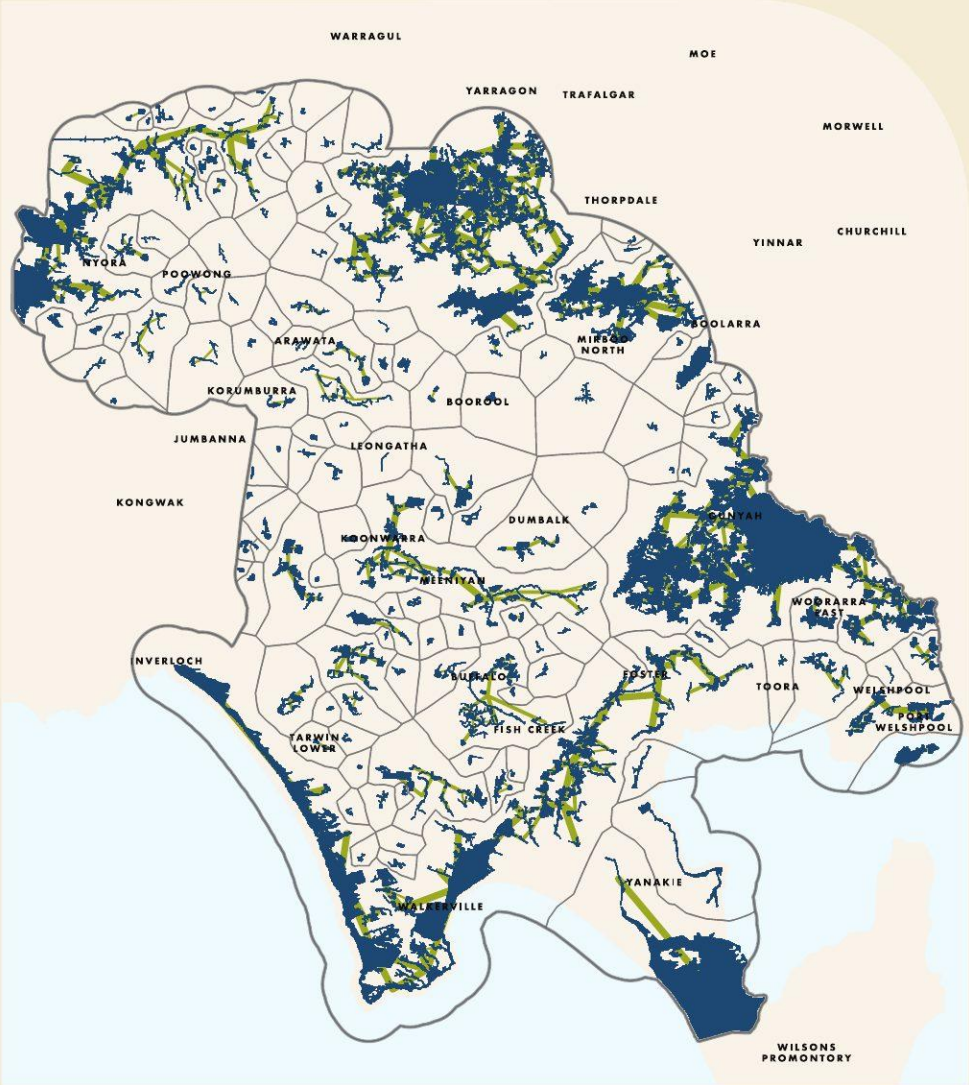
Core habitat for this guild was present across much of the landscape, with even heavily cleared parts supporting a few small patches. However, due to the guild's small gap crossing distance, these patches were often isolated or limited to small networks supported by a single link between habitat patches.

Several large, robust networks were identified, primarily centered around local and regional nodes, including the Westernport Woodlands (and habitats along the Lang Lang River and tributaries), Mount Worth, Mirboo North forests, sections of the Great Southern Rail Trail, Fish Creek, Bunurong Coast and via the Hoddle Range, and the southern Strzelecki Ranges.

Notably, the modelling showed a lack of connection in several critical locations associated with these larger networks, a feature which should be a priority for future management. Examples include:

- the Tarwin River West Branch and associated farmland where it intersects the Mirboo North forest blocks on either side.
- Darlimurla to Boolarra South, either side of the Mirboo North Regional Park.
- the Great Southern Rail Trail, between Stony Creek and Buffalo, and then Fish Creek and Foster.
- the northern end of the Hoddle Range, between Foster and Woorarra West.
- between Wilsons Prom and the southern end of the Hoddle Range, north of Shallow Inlet.

Connectivity network for the Small Woodland Bird Guild



Gliders

Character species:



Krefft's Glider



Feathertail Glider

Habitat

Forests and woodlands with old trees containing hollows, and a healthy understorey for feeding in continuous patches of 5 to 10 hectares. Hollows take well over a century to form which is an important limitation for this guild.

Movement

Gliders can travel up to 250 metres between habitat patches, but can only cross gaps of around 50 metres, and only when there are trees tall enough to glide between.

Also benefits

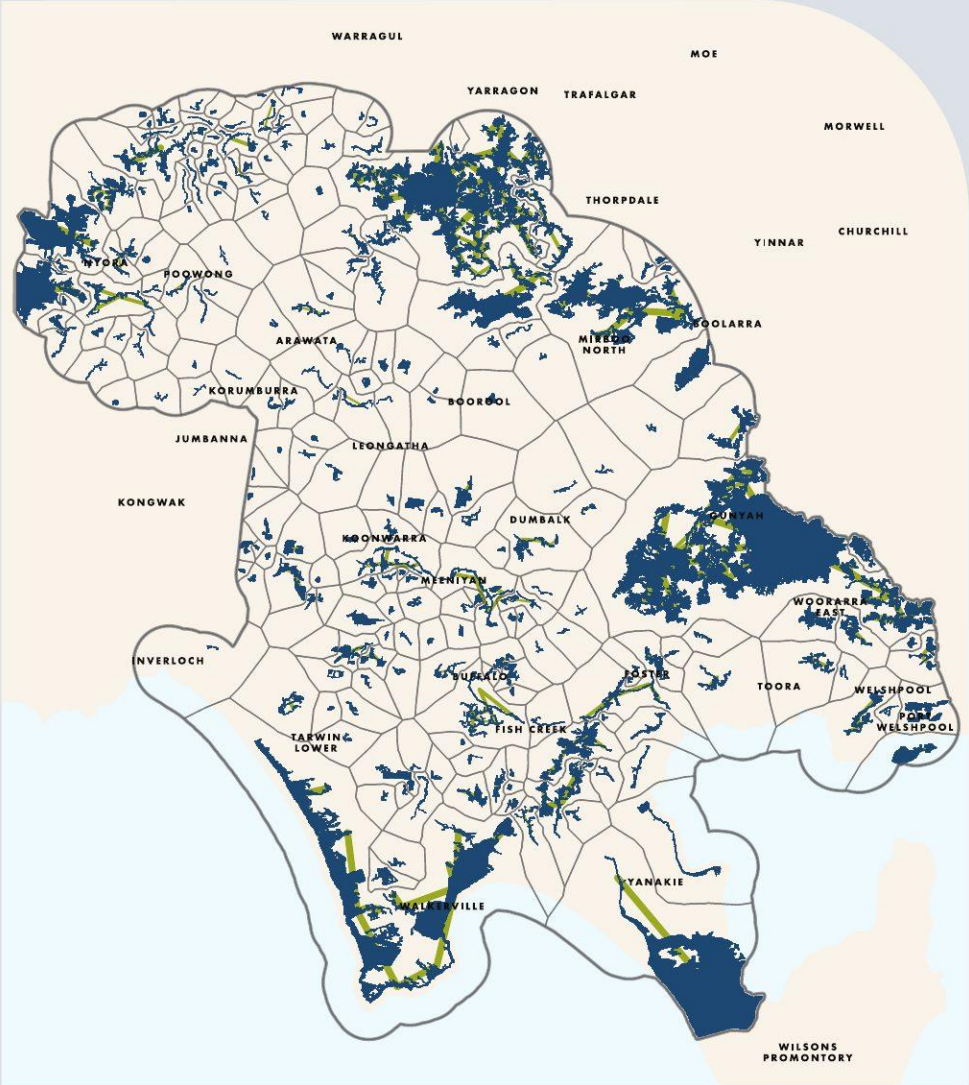
Southern Greater Glider, which are limited to tall, wet forest habitats within higher elevations along the Strzelecki Ranges. Habitat selection also applies to many hollow-dependent animals more generally, including owls, parrots and microbats.

What we found

Despite being widespread, habitat for gliders is more fragmented than for any guild except the ground birds. Although suitable habitat exists in many locations, the distance between patches and stepping stones is often more than a glider can cross. Interconnected core habitat is limited to more heavily forested country: the Westernport Woodlands and some habitats along the Lang Lang River, Mt Worth and surrounds, Mirboo North Forests, the Bunurong coast, the Hoddle Range, the southern Strzelecki Ranges and Wilsons Promontory.

However, even in these locations fragmentation is common, with the modelling frequently indicating gaps and a lack of connectivity in several places. Notably, the breaks impact the continuity of habitat in the Westernport Woodlands, Lang Lang River, Mirboo North Forests, the Hoddle Range, and many smaller clusters of habitat along the Great Southern Rail Trail. These locations should be a priority for action, with an emphasis on the protection and establishment of closely spaced trees to act as stepping stones. In addition, roads deserve particular attention for this guild. A wide road is often a barrier to a glider, which makes crossing structures such as glide poles or rope crossings an important consideration.

Connectivity network for the Gliders Guild



Ground-dwelling birds

Character species:



Superb Lyrebird



Bassian Thrush

Habitat

Damp and wet forests with an intact understorey and deep bed of leaf litter and woody debris, in very large patches of 50 hectares or more. The most stringent habitat requirements of any guild.

Movement

The key species in this guild are highly restricted, being only able to travel around 200 metres between habitat patches and unable to cross more than 50 metres of open ground (between stepping stones). In practice these birds need continuous habitat cover to move through the landscape.

Also benefits

Pilotbird, Eastern Whipbird, White-browed Scrubwren, and ground-foraging animals generally.

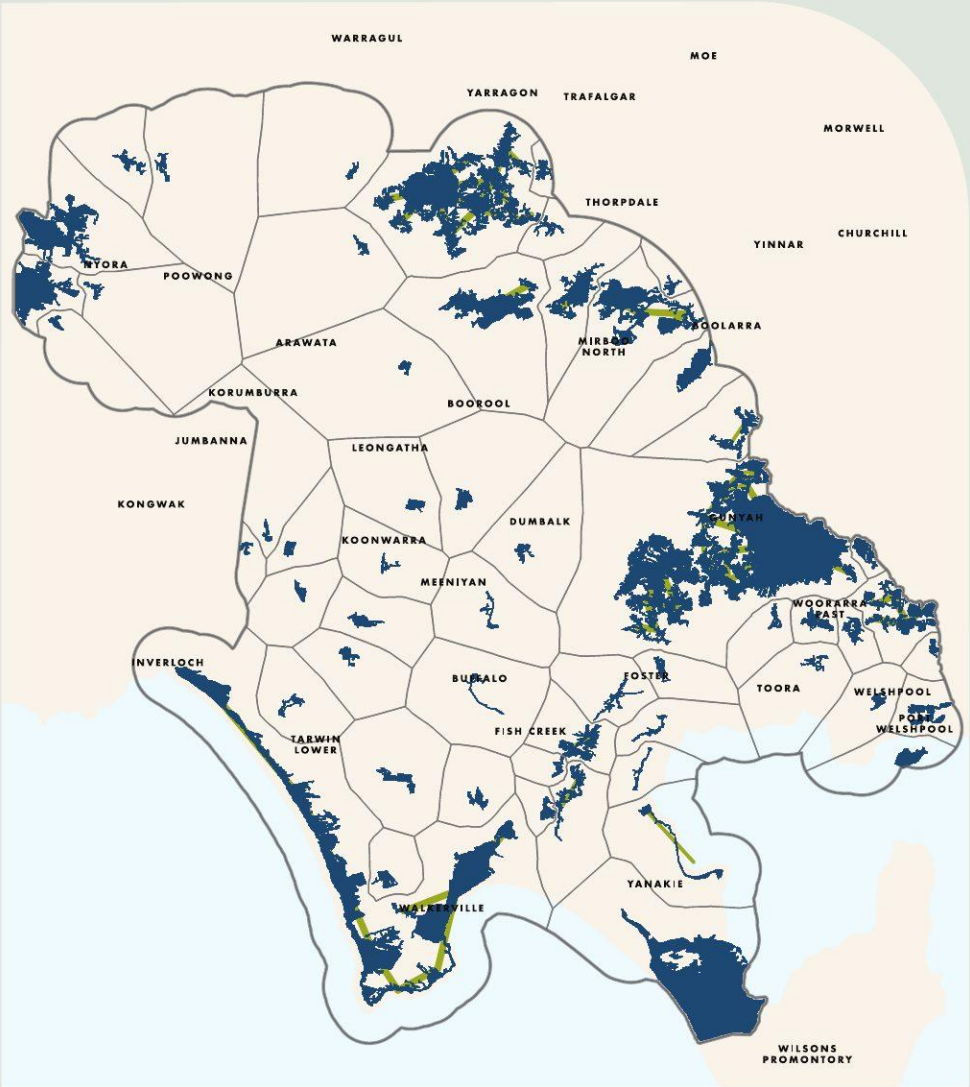
What we found

The most restricted of the five guilds. In practical terms, the priority for these species is protecting and expanding what already exists, rather than linking distant areas.

Habitat is confined to the largest nodes in the landscape: the Westernport Woodlands, Mt Worth and surrounds, Mirboo North Regional Park blocks (which are largely disconnected from each other), the southern Strzelecki Ranges, Bunurong Coast, Wilsons Promontory and smaller remnants in the Hoddle Range and between Toora North and Binginwarri.

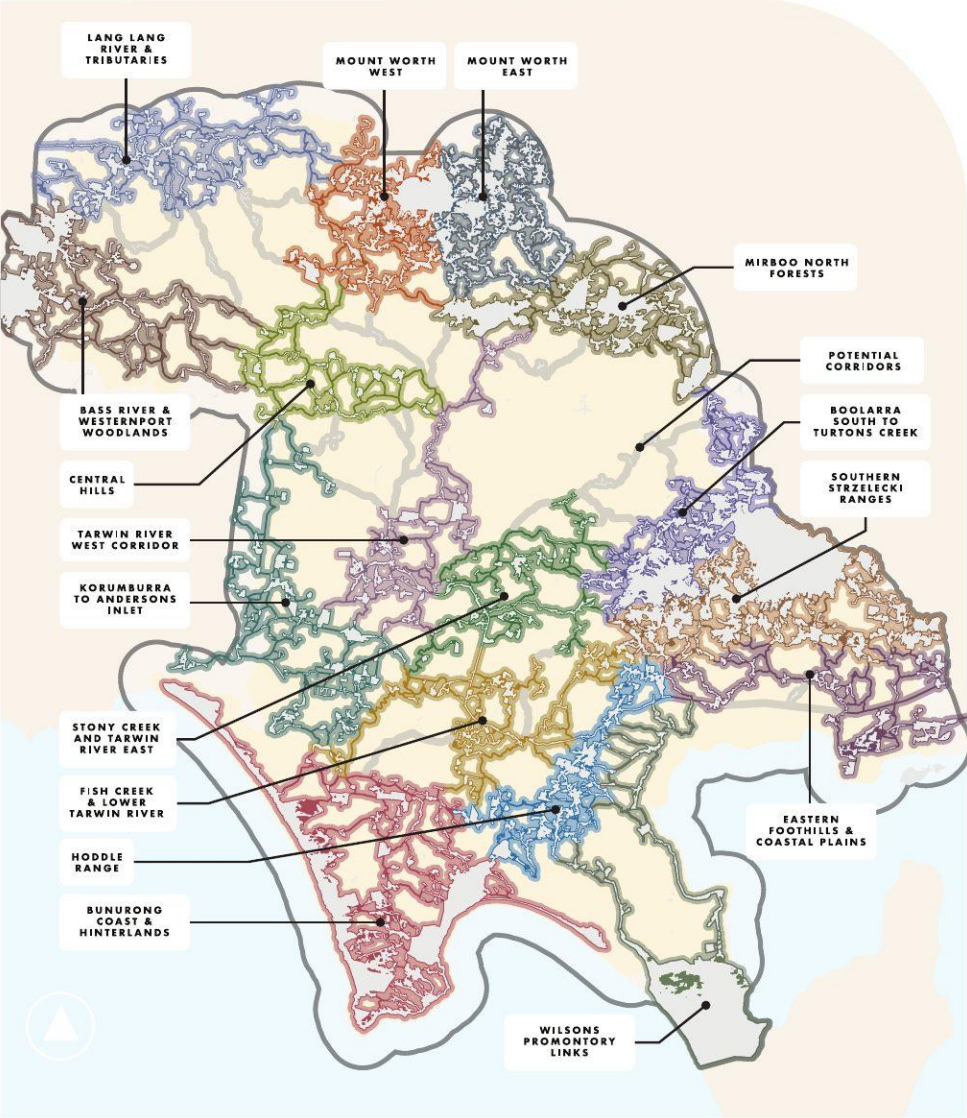
Habitat protection and improvement remains the key focus for this guild, however there are several opportunities to improve connectivity in the landscape. These include small gaps between extensive habitats in the Westernport Woodlands, the Mirboo North forests, through the Hoddle Ranges, and the large remnants between Toora North and Binginwarri.

Connectivity network for the Ground-dwelling Birds Guild



Biolinks Map

The Biolinks Map identifies sixteen corridors across South Gippsland where protecting and improving connections would make the greatest difference and where coordinated effort will be most effective.



No	Corridor	What it connects	What would help most
1	Lang Lang River and tributaries	The Lang Lang River, O'Mahoneys Creek and their tributaries, with remnants in the foothills around Athlone, Heath Hill and Poowong North.	Protect and widen the vegetation along the Lang Lang River and its tributaries. Build a network of secondary links between isolated remnants in the foothills. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) and wide, riparian corridors.
2	Bass River and Westernport Woodlands	The Bass River catchment, running east from the Westernport Woodlands via Nyora, Loch and Bena, taking in the western end of the Great Southern Rail Trail (GSRT).	Maintain and improve links between the large patches around the Westernport Woodlands and smaller remnants to the north and east. Revegetate and widen riparian corridors along the Bass River and its tributaries, as well as the GSRT. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) and wide, riparian corridors.
3	Mount Worth West	Habitat west of Mount Worth, from Ellinbank South through Seaview, Ferndale, Strzelecki, Trida, Wild Dog Valley and Mount Eccles.	Protect older remnants and the habitat values they support (e.g. hollows), whilst facilitating regeneration in gullies and maintaining key linkages throughout, particularly those south via Strzelecki/Wild Dog Valley. Focus on establishing continuous, wide, structurally diverse corridors where possible.
4	Mount Worth East	Wet and damp forest from Mount Worth through Allambee and Yarragon South to Hallston and Allambee South.	Protect native and remnant forest outside harvest areas. Maintain connections via corridors through plantation, open farmland and along waterways. Focus on establishing continuous, wide, structurally diverse corridors where possible.
5	Central Hills (Korumburra to Koorooman)	Relatively isolated woodland remnants north of Korumburra and Leongatha, including Arawata and Fairbank, connected by narrow corridors, primarily along drainage lines.	Enlarge and consolidate existing patches and the connections between them, and formalise the tenuous link north to Strzelecki/Wild Dog Valley. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) and wide, riparian corridors.

6	Mirboo North forests	The large, high-quality remnants of the Mirboo North Regional Park blocks and nearby reserves.	Maintain links between large remnants, and improve connectivity in the west and east, particularly for sensitive species such as small woodland birds. Focus on establishing continuous, wide, structurally diverse corridors between blocks where possible.
7	Korumburra to Anderson Inlet	Relatively isolated woodland, healthland and scrub patches from Korumburra south through Leongatha South to Anderson Inlet and Tarwin Lower. Connectivity increases substantially in the south. One of only three links between the north and south.	Enlarge and improve habitat patches and links in the north, where the corridor is weakest, whilst consolidating patches and protecting existing links in the south. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) in the north, and continuous, wide and structurally diverse corridors where possible in the south.
8	Tarwin River West Corridor	The Tarwin River West Branch, from Mirboo North Regional Park (west block near Hallston) south through Boorool, Nerrena, Koonwarra to Tarwin. One of only three links between the north and south.	Establish large patches of core habitat along the river corridor wherever possible (building connectivity for less mobile species), and connect and consolidate nearby patches through contiguous plantings. Focus on establishing a wide, structurally diverse corridor along the river which is fenced and protected from stock access.
9	Stony Creek and Tarwin River East	Stony Creek, the Tarwin River East Branch and the section of the Great Southern Rail Trail between Stony Creek and Meeniyah.	Widen and improve the vegetation along waterways and maintain habitat along the GSRT. Protect the small number of patches and links between Meeniyah and Dumbalk. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) and wide riparian corridors.
10	Boolarra South to Turtons Creek	The western edge of the southern Strzeleckis from Boolarra South to Dollar. In the north, one of only three links between the north and south.	Protect older remnants and the habitat values they support (e.g. hollows). Promote and support forest regeneration in gullies. Maintain key linkages throughout, particularly those in the north around Boolarra South. Focus on establishing continuous, wide, structurally diverse corridors where possible.

11	Fish Creek and lower Tarwin River	Habitat along the GSRT between Fish Creek and Buffalo, with waterways running east into the foothills and west to the Tarwin River.	Protect and consolidate habitat along the GSRT, and improve the vegetation along waterways to the east and west. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) and wide, riparian corridors.
12	Bunurong coast and hinterlands	Coastal scrub and woodland from Venus Bay to Waratah Bay including Cape Liptrap, with heathy remnants through the hinterland south-east of Tarwin Lower.	Protect and maintain the high level of connectivity present through the region, focusing on consolidating smaller hinterland remnants into larger patches. Focus on protecting and restoring closely spaced stepping stones (e.g. paddock trees) between habitat patches.
13	Hoddle Range	The range from Waratah Bay through to Foster and the southern Strzelecki foothills.	Protect and consolidate existing habitat, and establish continuous, wide, structurally diverse cover with a focus on improving connectivity for the glider and ground-dwelling bird guilds (i.e. tall trees for gliders and contiguous strips of vegetation with dense understorey for ground birds).
14	Wilsons Promontory links	Two narrow corridors, the Shallow Inlet and Corner Inlet coastlines, connecting Wilsons Promontory to the Hoddle Range and the foothills around Foster.	Widen and strengthen both coastal corridors with a focus on establishing a continuous, wide and structurally diverse corridor where possible. Manage pest plants and animals, particularly predators.
15	Southern Strzelecki Ranges	The southern edge of the ranges from Woorarra West and Foster North through Wonga, Mount Best, Toora North and Woorarra East to Binginwarri, including upper reaches of waterways flowing into Corner Inlet.	Protect older remnants and the habitat they support (e.g. hollows). Facilitate forest regeneration in gullies and maintain linkages along waterways to the south. Focus on establishing continuous, wide, structurally diverse corridors where possible.
16	Eastern foothills and coastal plains	Foothills east of Foster, including the lower reaches of waterways flowing into Corner Inlet as well as swampy and heathy woodlands around Barry Beach and Welshpool.	Widen and improve riparian corridors in the foothills, and protect the interconnected heathy habitats around Barry Beach and Port Welshpool. Focus on establishing continuous, wide, structurally diverse corridors where possible.

Connectivity is a joint effort

Much of the activities that the Biolinks Map identifies are already under way. Across South Gippsland, Landcare groups, landholders, community groups and agencies are protecting remnants, fencing waterways, revegetating gullies and monitoring wildlife.

The Biolinks Map does not replace that work. It builds on the efforts and progress achieved to date, and shows how it fits within the broader landscape, and where the next investment of effort will make the greatest difference.

Spotlight on:

The Great Southern Rail Trail - central portion

The Great Southern Rail Trail (GSRT) runs north-west to south-east across the entire region, creating an important wildlife link. This in turn intersects many additional corridors including the Tarwin River and its tributaries along the way. In particular there are large patches of habitat along and adjoining the rail trail from Koonwarra to the Hoddle Range and Foster, that would be isolated for many species if it weren't for this corridor.

For several groups of animals, this strip of public land provides essential habitat and connection. It is particularly important for ground fauna and small woodland birds. For the patches south and east of Meeniyah and around Buffalo it is the only connection to a wider network of suitable habitat. The GSRT land itself, managed by the South Gippsland Shire Council, is one of the few places in the region where habitat value can be improved directly by a public land manager, rather than depending on many separate landholders. Adjoining landholders can also easily add value and improve connectivity from the rail trail to other habitat patches. It is supported by active groups such as the Nerrena Tarwin Valley Landcare Group working along or beside the reserve and by large partnership projects such as the Blackspur Creek Wetlands Project.

While the rail trail retains some significant stretches of habitat, it is not an unbroken strip of high quality bushland. Key actions public and private land managers can undertake include:

- ✓ Conserve the existing vegetation along and adjacent to the rail trail, particularly where it is the only cover for some distance.
- ✓ Improve the understorey. Ensure there is adequate dense shrubs and a tall ground layer, not just canopy trees. This ensures that small ground fauna and small woodland birds can make use of these habitats.
- ✓ Widen the corridor where adjoining landholders are willing, especially at the narrowest points.
- ✓ Consider weed management where this will benefit relevant fauna. For example Sweet Pittosporum cover is high in some areas, potentially inhibiting native plant growth.
- ✓ Link adjoining remnants, wetlands and gullies in the surrounding landscape to the rail trail corridor.

What you can do

If you have remnant native vegetation on your property.

- ✓ Protect what is already there and consider its value for wildlife. Old trees, fallen timber, dense understorey and leaf litter take decades or centuries to replace, yet represent critical habitat for many species. Removing stock access is often key for improving the habitat in the understorey.
- ✓ Consolidate smaller patches into larger areas through stock exclusion and natural regeneration, or targeted revegetation. Relocate logs and woody debris into rehabilitated areas, and focus on establishing a diversity of grasses, sedges, ferns, shrubs and trees.
- ✓ Fence off and protect narrow linear corridors, and expand wherever feasible. Highly functional corridors are shown to be those with a continuous width of more than 50-100m, with a variety of native trees, shrubs and ground layer vegetation. Where this is not feasible, consider establishing isolated stepping stones close together.
- ✓ Retain old paddock trees (including dead ones) and small clumps of native vegetation, or create these features where practical (ideally no more than 75m apart). These provide vital stepping stones to allow movement through the landscape. Even better, fence around the tree and plant some shrubs to further improve the function of the stepping stone.

If you are planting

- ✓ Plant where it contributes to a connection. This can include widening an existing patch, closing a gap, or linking a gully to a remnant.
- ✓ Plant a mix of layers. Shrubs and ground cover are what many species require.
- ✓ Use locally native species where possible.

If you are managing weeds

- ✓ Remove woody weeds in stages, establishing replacement cover as you go. A blackberry-infested gully may be the only connection for wildlife in an otherwise open landscape. Weedy trees and shrubs can be treated and dead trees left standing to provide perches or habitat for birds.



If you are managing stock

- ✓ Exclude stock from areas of native vegetation where practical, even partially. Stock can cause severe damage to the understorey and reduce the quality of the habitat for many species.
- ✓ Allow the understorey to regenerate. In many places the seed remains in the soil. Sometimes you won't need to plant if you can wait a while.
- ✓ Use wildlife permeable/safe fencing wherever practical.

In all cases

- ✓ Consider joining or working with your Landcare group. Effort that connects across properties achieves considerably more than the same work in isolation.

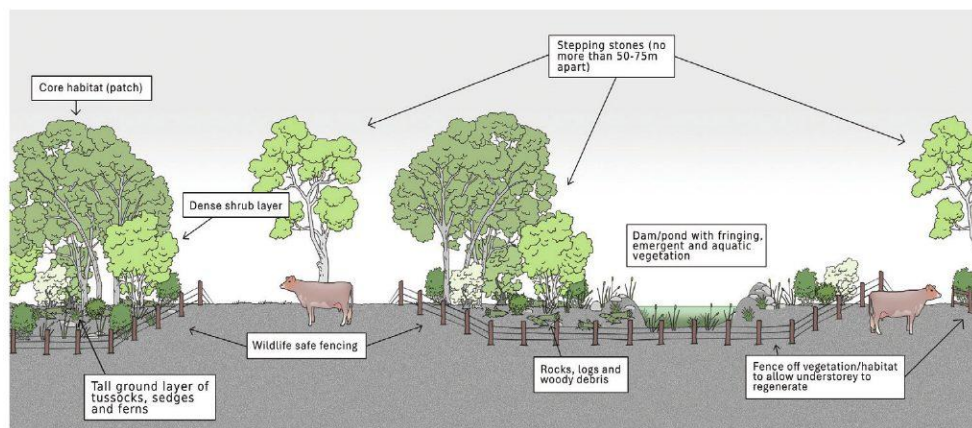


Figure 2. Examples of protection and restoration of habitat patches and stepping stones

Principles

The following principles guide use of the Biolinks Map and any activity to improve habitat connectivity.

Protection comes first.

Old trees with hollows, deep leaf litter and intact ground storey are values that cannot be easily created within a lifetime. Retaining them is both cheaper and more certain than attempting to recreate them.

Habitat condition is important.

Wildlife connections will only work if the habitat patches they connect have can support wildlife. The Biolinks Map project found that many patches lack the dense understorey, fallen timber and ground cover that many animals need. Across much of South Gippsland, improving the condition of existing patches matters as much as linking them.

Small features can provide a lot of value.

Scattered paddock trees, roadside vegetation, gullies and small remnants can make the difference as to whether animals can move between patches or not. Sometimes they are critical to maintaining connections and often can be easily created.

Do no harm.

Sometimes works intended to improve habitat can be harmful. For example planting trees into native grassland, clearing weeds that provide essential cover, or creating conditions that favour predator species are some examples to consider. Before undertaking any works consider the habitat and connectivity requirements of any fauna present in the local area.

Match the action to the tenure.

Some habitat patches or connections occur on public land, where a manager can act directly. Most are on private land, where taking on-ground action will depend on the voluntary support and participation of landholders.

Coordinate effort.

A corridor typically crosses many properties and several landscapes, and coordinated work achieves considerably more than the same effort applied in isolation. The collective action of landholders and Landcare groups is critical in most instances.



Where to from here

The Biolinks Map sets direction for long-term effort. It provides South Gippsland with a shared understanding of how wildlife moves across the landscape, and a common basis for future action. It can be used by individuals, local groups, agencies or organisations.

- For Landcare groups and landholders, it shows where local work will have the greatest benefit and can be used to support funding applications.
- For agencies and local government it provides context on regional connectivity for planning and land management.
- For funding organisations it will help demonstrate where and how a discrete project can contribute to regional biodiversity across the broader region.

The South Gippsland Landcare Network will use the Biolinks Map to guide investment, coordinate effort across groups and support work already happening across the region. While SGLN has instigated this work, the improvement of regional habitat and connectivity for wildlife will depend on the action of individuals and groups beyond just the network.

A technical report on the Biolinks Map project, including detailed maps, analysis and recommendations, has been prepared for the SGLN and its stakeholders.



