BASS COAST

Biodiversity Biolinks Plan 2018

Table of Contents

1. Introduction

The purpose of the Bass Coast Biodiversity Biolinks Plan is to provide connectivity in the landscape by linking remnant patches of indigenous vegetation using biolinks or wildlife corridors. The aim is to restore ecological connectivity to encourage the movement of wildlife and allow for genetic diversity in breeding populations to ensure long term viability of isolated species such as the Southern Brown Bandicoot.

This Plan identifies areas with high biodiversity value for flora and fauna that are viable sites for re-vegetation and remnant protection across Bass Coast Shire. Council aims to introduce connectivity in the landscape to improve the capacity for native plants and animals to adapt to predicted climatic impacts of higher temperatures and extreme weather events. Repairing and building on the existing biolinks will address the current loss of biodiversity resulted from habitat loss and fragmentation. The Plan covers the Bass Coast Shire region, it identifies remnant vegetation, assets and threats to native vegetation as well as identifying biolinks or linkages between priority remnant vegetation.

"Wildlife corridors are connections across the landscape that link up areas of habitat. They support natural processes that occur in a healthy environment, including the movement of species to find resources, such as food and water" http://www.environment.gov.au/topics/biodiversity/biodiversity-conservation/wildlife-corridors/what-are-wildlife-corridors

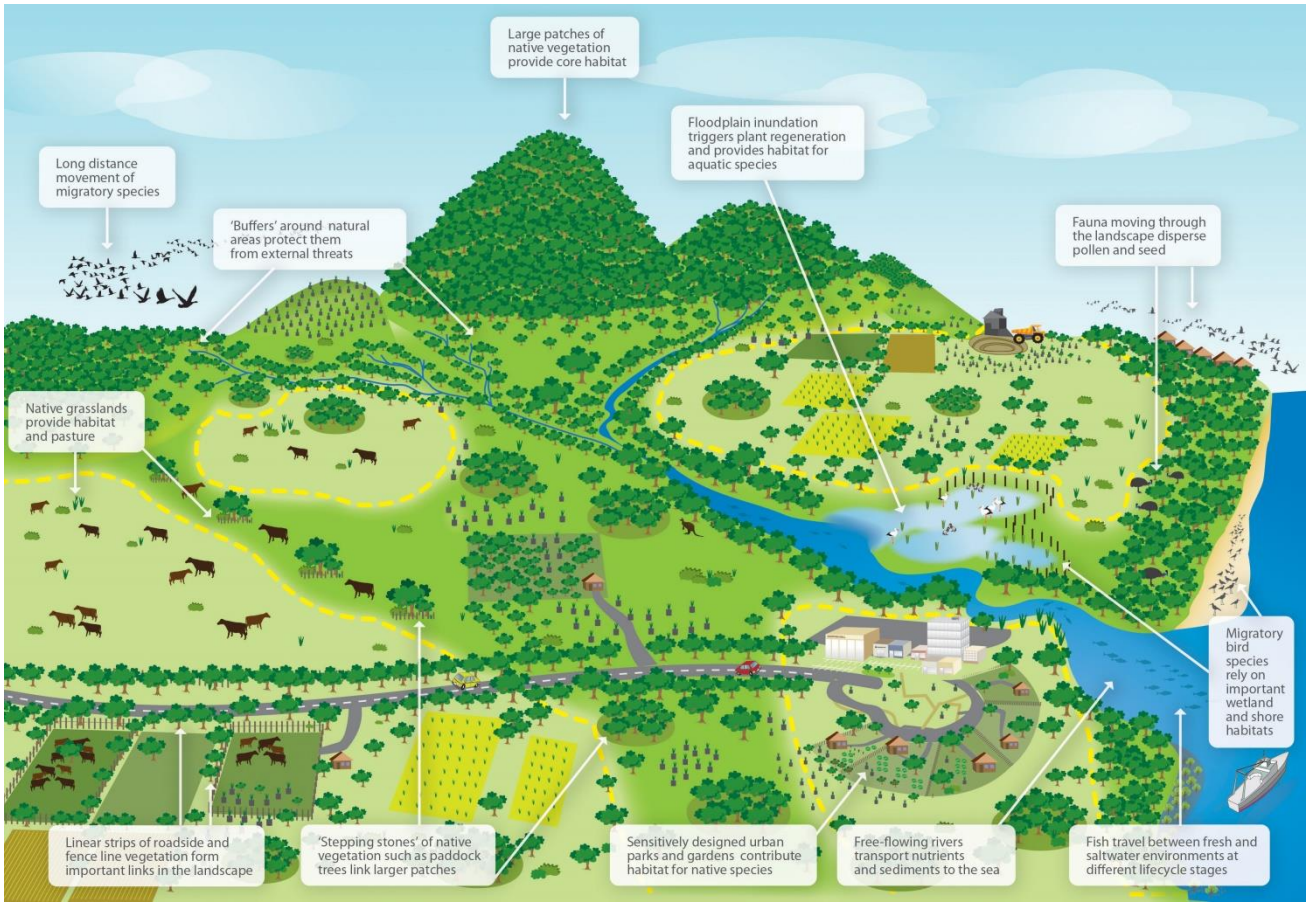

Fig 1. Diagram showing landscape elements that contribute to biolinks

Background

Bass Coast is a region that encompasses both coastal and rural environments that contain some significant pockets of native vegetation. In 2017, the native vegetation cover was mapped with a total of 14 per cent for the entire area of Bass Coast Shire. This native vegetation cover is made up of woodlands, native grass lands and salt marshes. Native grasslands and salt marshes are threatened habitats that provide important habitats for significant species such as Antechinus, Southern Brown Bandicoot and Orange Bellied Parrot.

The native vegetation on Phillip Island was estimated at seven per cent cover in 1997 from aerial maps. Since then, millions of native plants have been planted by community groups, Landcare, landowners, Council and government authorities and Phillip Island Nature Parks. This has increased the cover across Phillip Island which now has approximately 20 per cent native vegetation cover.

Extensive revegetation works have been underway in the Bass Hills for 20 years by Bass Coast Landcare and the local landowners. An estimated 30,000 indigenous plants have been planted in the Bass Hills each year, which has led to a noticeable change in the landscape with many gullies and hillsides now covered in vegetation. The increase in vegetation cover is a great outcome and demonstrates that the continued effort of the community has led to a significant increase in native vegetation and habitat across the Shire.

Strategic Fit

The vision for the natural environment in Bass Coast is that;

'Our unique natural environment is protected, maintained and enhanced for the enjoyment of all.'

The Biodiversity Biolinks Plan is a strategic document that provides an approach to introduce connectivity in the landscape by linking remnant patches of indigenous vegetation and movement of species to find resources using biolinks. The Plan minimises natural area fragmentation and promotes corridor linkages for flora and fauna.

Strategies for achieving the vision through the *Council Plan 2017-2021* are:

- *Enhance our environment and landscape with vegetation and native wildlife protection initiatives.*
- *Manage the balance between our natural environment, public access and use of our foreshores and waterways*
- *Partner with other land managers along coastal areas for consistent management*

The Biolinks Plan has adopted these principles throughout its development and demonstrates how Council intends to meet its strategic indicator measure to *Increase native vegetation cover by minimum of 1.5% each year.*

Objectives

The objectives of the Biolinks Plan are to:

- Identify priority areas of remnant vegetation that need protection and enhancement for landscape-scale connectivity
- Identify the main strategic linkages to connect remnant vegetation within the Shire
- Provide opportunities for community and stakeholder feedback and engagement into the linking of biodiversity across the Shire
- Provide an action plan for the implementation of revegetation across land management boundaries
- Identify opportunities for funding
- Explore options to embed it into the Bass Coast Planning Scheme

2. Method

Guiding principles are used to determine the most suitable options for biolinks across the Shire. The following guiding principles were outlined in the '*Biodiversity Conservation Strategy for Melbourne's Growth Corridors*' written by Victorian State Government.

- Larger habitat areas are more likely to support viable populations of a greater diversity of threatened species, greater diversity of threatened and key functional species, greater genetic diversity, more natural disturbance regimes, and habitats at a range of successional stages, and area able to better recover from disturbance events such as fire
- Small and medium habitat areas are important in supporting a diversity of habitat types, important populations of certain species, and habitat connectivity across a landscape
- Connectivity between habitat patches and across a landscape is important in supporting metapopulations, the recolonisation of habitat patches after a disturbance, and breeding
- Buffer zones around habitat areas are important in supporting viable populations, reducing the impacts of adjacent land uses and potentially enhancing habitat connectivity
- Isolated habitat areas are likely to be recolonised by individuals more readily if located near larger habitat areas

Taking this into consideration, the following design principles were followed when the Department of Environment, Land, Water and Planning (DELWP) and Council were developing the Plan.

Design principles

- Identify high biodiversity value areas
- Identify viable sites for revegetation and remnant protection
- Increase connectivity and improve capacity of biodiversity to cope with climate change
- Maintain and improve existing connectivity along coastal areas and The Gurdies/Grantville vegetation blocks

- Find linkages between coastal areas and the Strzelecki Ranges using rivers and creek lines as a primary source
- Improve riparian values by creating vegetation nodes

The information gathered through this process provided direction to manage the high value locations for remnant protection and re-vegetation in Bass Coast Shire. It will identify where to increase the quality and quantity of native vegetation with the aim of creating connectivity in the landscape. This will assist stakeholders to determine revegetation and remnant protection opportunities, with prospects to attract funding based on the improved biodiversity outcomes of implementing the Plan.

Method to determine locations of biolinks

Patches of native vegetation over two hectares were identified and a boundary put around each one. A buffer of 200m has been drawn around the remnants and linkages provided.

The following process was used to determine potential biolinks:

- Run the West Gippsland Catchment Management Authority (WGCMA) Biodiversity Blueprint platform with selected suites of criteria to produce a range of outputs. Compare outputs and select at least one that provides the most useful representation of the distribution of significant areas (ie two hectares and greater) of remnant plus planted native vegetation across the Shire; highlighting potential linkage areas
- Augment 1:50,000 vegetation mapping within the Shire with finer-scale mapping from the most recent and highest resolution available, aerial imagery
- Map potential strategic vegetation corridors or biolinks across the landscape. These are:
    - new corridors following (typically linear) geographical features such as major waterways, large lake/wetland shores and the coastal strip
- Comment was invited on the draft biodiversity assets and linkages map through workshops involving
    (a) Agencies such as WGCMA, Port Phillip and Western Port Catchment Management Authority, Council, DELWP, Parks Victoria, Melbourne Water, and Phillip Island Nature Parks
    (b) interested parties within the community such as Bass Coast Landcare Network, South Gippsland Conservation Society and Bunurong Land Council
- Conducted workshops in a range of locations across the Shire with the general community, and invite participants to suggest additional biolinks
- Map the suggested biolinks
- The biolinks mapping was then loaded onto Council's website and comment was invited from the community on a web-based platform
- Biolinks mapping was completed based on community feedback.

Project area

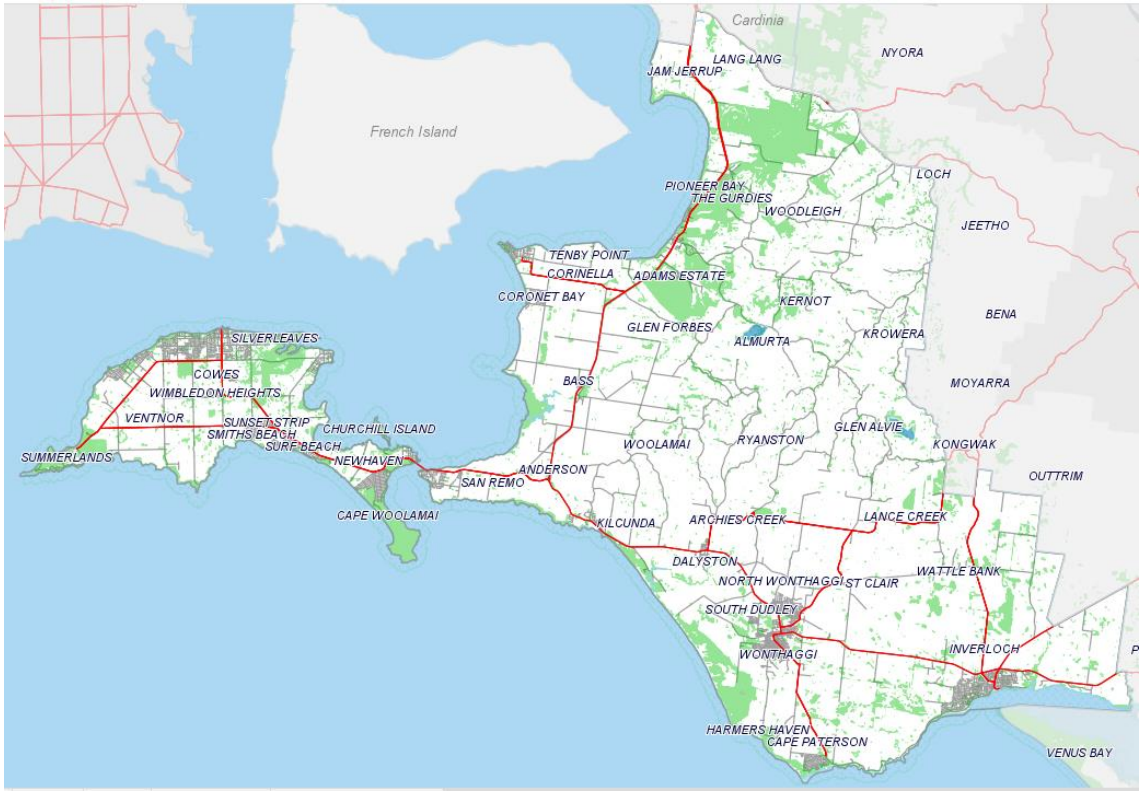

Fig 2. Bass Coast Shire Council project area

3. Stakeholder Engagement

A wide range of stakeholder engagement was undertaken throughout 2017 with community and agencies with an interest in the land.

The engagement included an initial workshop with agencies which included DEWLP, WGCMA, Port Phillip Western Port Catchment Management Authority, Parks Victoria, Bass Coast Landcare, South Gippsland Water, Westernport Water, Melbourne Water, Trust for Nature, Greening Australia, Western Port Biosphere, and Phillip Island Nature Parks. A further three community workshops were held at Kernot, Phillip Island and Wonthaggi where around 100 residents and representatives from 'Friends of' groups and Coast Action Groups who had input into were the biolinks should be located.

Council engaged with the Bunurong Land Council to get their input into the Plan with the following comments received from the Land Council.

'Bunurong people have belonged to the land, waters, and sea of the current Bass Coast Shire Council boundaries and beyond for over 45,000 years. The Bunurong community continue to maintain this ancient connection to this very day.

Historically, Bunurong people cared for and lived as one with the land, waters, plants and animals within the broader traditional Bunurong lands. Bunurong people understood and respected the connection and importance of healthy land and water systems and lived and managed them accordingly with Traditional Ecological Knowledge, and with songlines from creation stories. Some of the natural connectedness between different physical, biological, and culturally significant spiritual systems has been lost as a result of settlement.

The Bunurong community are supportive of the Bass Coast Shire Council objectives to protect, rehabilitate and/or reinstate critical biolinks across the Council's region as a first step in attempt to heal the land and waters, plants and animals of traditional Bunurong lands.'

4. Ecological assets

The major ecological assets for Bass Coast Shire are:

Rivers and creek systems

The Powlett River and Bass River are the two river systems in Bass Coast. The Powlett River has high biodiversity values, it is listed as a Nationally Important Wetland. The Lower Powlett is a designated high priority waterway in the *West Gippsland Waterway Strategy 2014-2022*, and threat reduction such as invasive pest plants and animals along with climate change are key priorities.

The Bass River is described as a high priority river in Bass Coast in Melbourne Water's *Healthy Waterway Strategy 2013-17.*

Coastal vegetation

Large tracts of remnant vegetation are found on the coastal zone of Bass Coast. These are often intact remnant vegetation, making them important biolinks for fauna.

Bunurong Coast Wetlands contains rare wetland types that provide habitat connectivity with the marine and estuarine systems of South Gippsland. These wetlands support a range of bird species and indigenous vegetation, remnants of a once extensive wetland complex.

Roadside vegetation and linear reserves

Bass Coast has significant linear roadside vegetation found on designated roads. These contain high conservation reserves with native grassland reserves. These areas are managed in an environmentally sensitive way to improve their health.

The Bass Coast Rail Trail is another linear reserve which contains stands of native vegetation. The Rail Trail is an important biolink in the Shire that links a number of key remnants such as the Powlett River and coastal vegetation.

Large iconic forests and woodlands

The largest intact blocks of vegetation in Bass Coast Shire contain the highest amount of biological diversity. They are essential for conservation of the local flora and fauna species.
These reserves include The Gurdies Nature Conservation Reserve, Hurdy Gurdy Creek Nature Conservation Reserve, Bunurong Coastal Park and the Wonthaggi Heathlands Nature Conservation Reserve.

Bunurong Coast Wetlands

This asset incorporates rare wetland types that provide habitat connectivity with the marine and estuarine systems of South Gippsland. These wetlands support a range of bird species and indigenous vegetation and are remnants of a once extensive wetland complex.

Marine

Bass Coast, just like most of Victoria's coastline, has a unique marine environment with diverse habitats that support many marine plants and animals that are fundamental for biodiversity. Bass Coast's marine environment supports a variety of uses, including fishing, recreation, ecotourism and shipping. The protection of the marine feeding hotspots and their connections, the biolinks, from over-fishing, oil spill and marine pollution is crucial to maintain the health of this exceptional marine biodiversity on the doorsteps of the Bass Coast.

5. Threatening Processes

Threats

The key threats to natural assets are invasive plants and animals, climate variability impacts (storm surge, sea level rise, fire and flood), recreational activities; urban expansion and development. Key threats to the Bunurong Coast Wetlands assets are livestock access; changed water regime (due to draining); industrial and urban development; and invasive plants and animals.

Fragmentation

Habitat fragmentation is the process of habitat loss, leading to the division of large continuous habitats into a greater number of smaller habitats which are isolated from each other. This isolation can have harmful effects on biodiversity, leading to greater edge effect. The edges of habitats are often subject to greater disturbance and a higher level of weed invasion. Fragmentation also limits the movement between patches, leading to a lower genetic diversity.

Invasive plants and animals

Invasive pest plants and animals are among the most serious threats to Bass Coast Shire's natural environment. Weed invasions change the natural diversity and balance of ecological communities through displacing native species, contributing significantly to land degradation. They represent the biggest threat to our biodiversity after habitat loss. Invasive weeds threaten the survival of many plants and animals as the weeds compete with native plants for space, nutrients and sunlight.

Climate variability

The negative impact of climate change to native vegetation will be from reduced rainfall and increased air temperatures. Increased temperatures will reduce moisture and water availability for surface and groundwater systems. This could lead to changes in the composition of vegetation communities (*Kitching et al., 2013*).

The key threats to biodiversity in the region are climate variability related extreme events (eg wildfire, flood, fire, storm surge, sea level rise) and climate change – shifting distribution patterns for species.

On average the future climate in Bass Coast is projected to be warmer and drier than it is today (mid-range warming of + 0.8°C by 2030). An increase in severe weather events can be expected. Biodiversity can expect to be affected at varying scales (from individual species to ecosystems). Species may alter their distribution patterns, abundance, behaviour and the timing of migration or breeding. (WGCMA *Regional Catchment Strategy, 2013-2019*).

Sedimentation and erosion

Run off from catchments threatens Western Port Bay and the biodiversity within the bay. Sediment deposits and nutrients and fertiliser run off from farms can have a negative impact on sea grass and mangroves.

Population Growth

Population growth is steady in Bass Coast with an average around 2 per cent growth over the last 10 years. This increase in population places additional pressure on biodiversity and the remaining natural bushland and coastal habitats with increases in urban development which leads to increased stormwater runoff. Residents that move to lifestyle properties can encroach on existing native vegetation or can enhance the natural environment depending on their land management.

6. Opportunities

Effective riparian management actions typically include fencing, revegetation, protection and enhancement of indigenous vegetation, controlled grazing, provision of off stream watering infrastructure, weed management and pest control. These management actions provide many benefits to the community and landholders. These include:

Riparian protection

Riparian fencing prevents stock falling down banks, getting stuck in the waterway or wandering onto other properties. Riparian vegetation acts as a windbreak which provides protection and is important for the storage of carbon. Riparian vegetation helps to stabilise stream banks and reduce erosion. Native riparian vegetation is effective at reducing the occurrence and scale of flood related channel and bank erosion. Vegetation within a riparian zone can slow the overland movement of water, and cause sediment and attached nutrients to be deposited on the land before they can reach the stream channel. Riparian vegetation can also take up and remove some of the nutrients being transported.

Improved river and riparian land health

Trees on riparian land provide a supply of organic matter to waterways, including large woody debris, which supports aquatic biodiversity and nutrient cycling. Vegetated riparian zones provide habitat, especially for significant birds, animals and fish. A network of habitat in the landscape connects larger patches of remnant vegetation and provides a corridor for the movement of animals and native plants.

Pest Plant and Animal control

A comprehensive integrated pest plant and animal control program is underway within Bass Coast. Council coordinates a roadside weed control program to reduce the cover of weeds on the roadside and promote the regeneration of native vegetation. The coastal foreshore and bushland reserves have an annual program of works to control invasive plants.

A rabbit strategy has been developed by Bass Coast Landcare in conjunction with Council and Phillip Island Nature Parks to minimise the rabbit population across the Shire.

Phillip Island Nature Parks have a comprehensive fox control program on Phillip Island that has been highly successful, recently declaring the island fox-free by removing the whole fox population.

7. Inclusion in the Planning Scheme

The biolinks maps will be inserted into the environment section of the Municipal Strategic Statement at Clause 21.04-3 Biodiversity Conservation and Habitat Protection. This will enable the Council's planning department to use the biolinks maps as a guiding document to determine if an area is suitable for revegetation or development.

This Plan developed with the community and agency input and the inclusion into the Bass Coast Planning Scheme will demonstrate how Council intends to meet its target to *Increase native vegetation cover by minimum of 1.5% each year.*

8. Identified Biolinks

Over 200 biolinks have been identified through the process of preparing the Plan. The major biolinks are listed here with a brief description:

The Bass Coast Rail Trail:

The Rail Trail provides a vegetated linkage between Wonthaggi and Woolamai. It links the riparian vegetation along the Powlett River, Bridge Creek and Woolshed Creek to the foothills of the Strezlecki Ranges. The planted and remnant vegetation along the Rail Trail has been assessed for health, biodiversity and level of weed infestation and is being revegetated over time.

Bass River and significant tributaries:

The River edge contains significant vegetation cover which has been improved over the past 15 years with works undertaken by Landcare and Melbourne Water. A continuous riparian linkage is required to improve the habitat and water quality in the Bass River.

Powlett River and significant tributaries:

The Powlett River mouth is listed as a wetland of national significance and is a major tributary in Bass Coast and contains significant environmental values. The vegetation communities found along the River are listed as endangered and vulnerable but many are in poor to moderate condition, these communities could be enhanced with supplementary planting. Where there are areas that are unfenced, a co-ordinated approach of contacting and encouraging landholders by DELWP and the WGCMA to exchange the grazing licences to riparian licences would greatly enhance the vegetation quality.

The main threats to the Powlett River are degraded water quality, degraded riparian vegetation (large trees in particular), livestock access and reduced streamside vegetation width. Many of these threats can be alleviated by fencing off and revegetating the waterway edge.

Screw Creek

Screw Creek has riparian vegetation has very high biodiversity value with many rare and threatened species found at the mouth of the Creek. The vegetation at the mouth is protected under Council's Native Vegetation Offset Scheme and Parks Victoria reserves. A continuous riparian linkage should be established along this Creek line.

Phillip Island:

A wildlife corridor crossing Phillip Island from east to west was planted approximately 15 years ago coordinated by the Phillip Island Landcare Group with the assistance of local landowners.

This corridor links the two largest patches of remnant vegetation from the Koala Conservation Reserve to the Penguin Parade. This corridor could be assessed and widened in consultation with the landholders. Biolinks that adjoined this wildlife corridor were also planted as the opportunity arose.

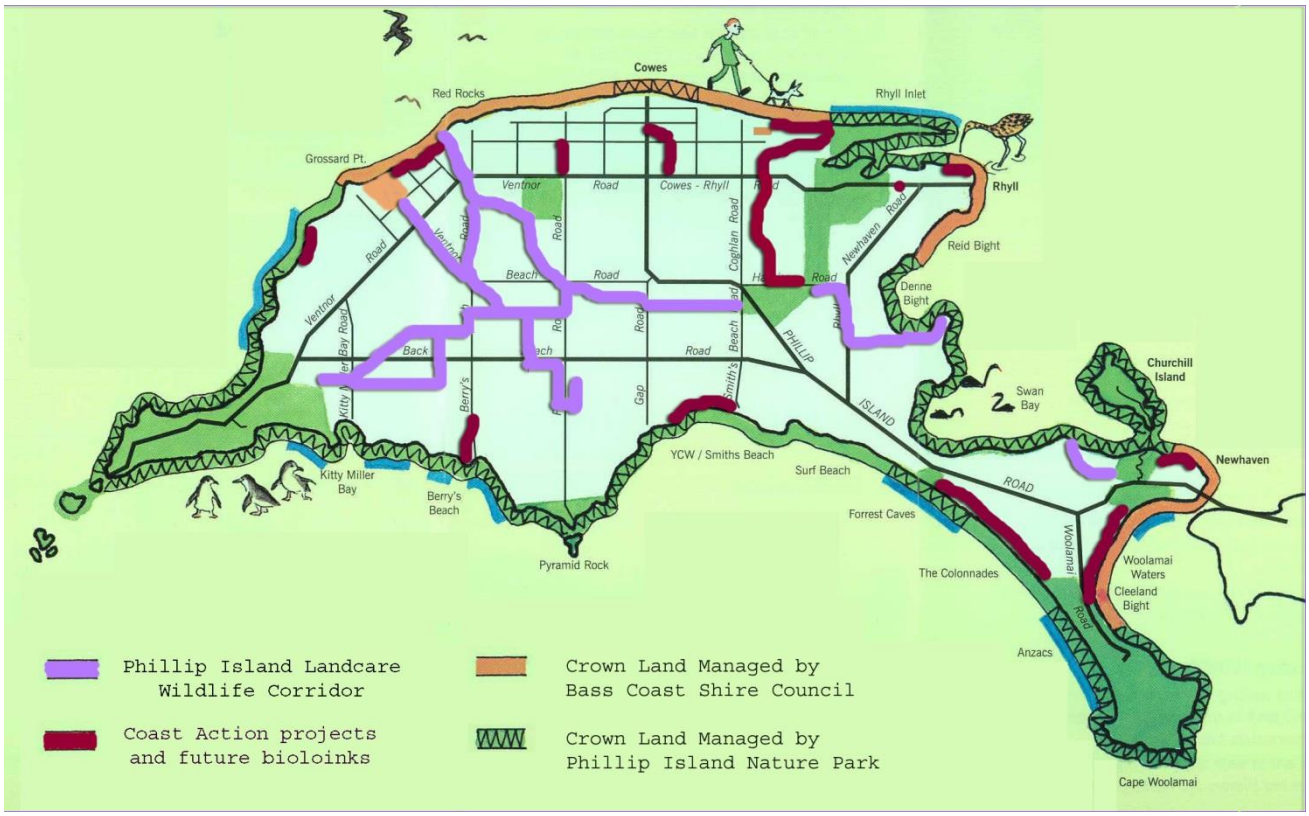

Fig 3. Wildlife Corridor developed by Phillip Island Landcare group 2007

Road reserves:

Within the Shire there are many unmade and unused roads that contain high quality vegetation and link remnant patches. Vegetation along these roadsides will continue to be improved and enhanced.

9. Map of Biolinks

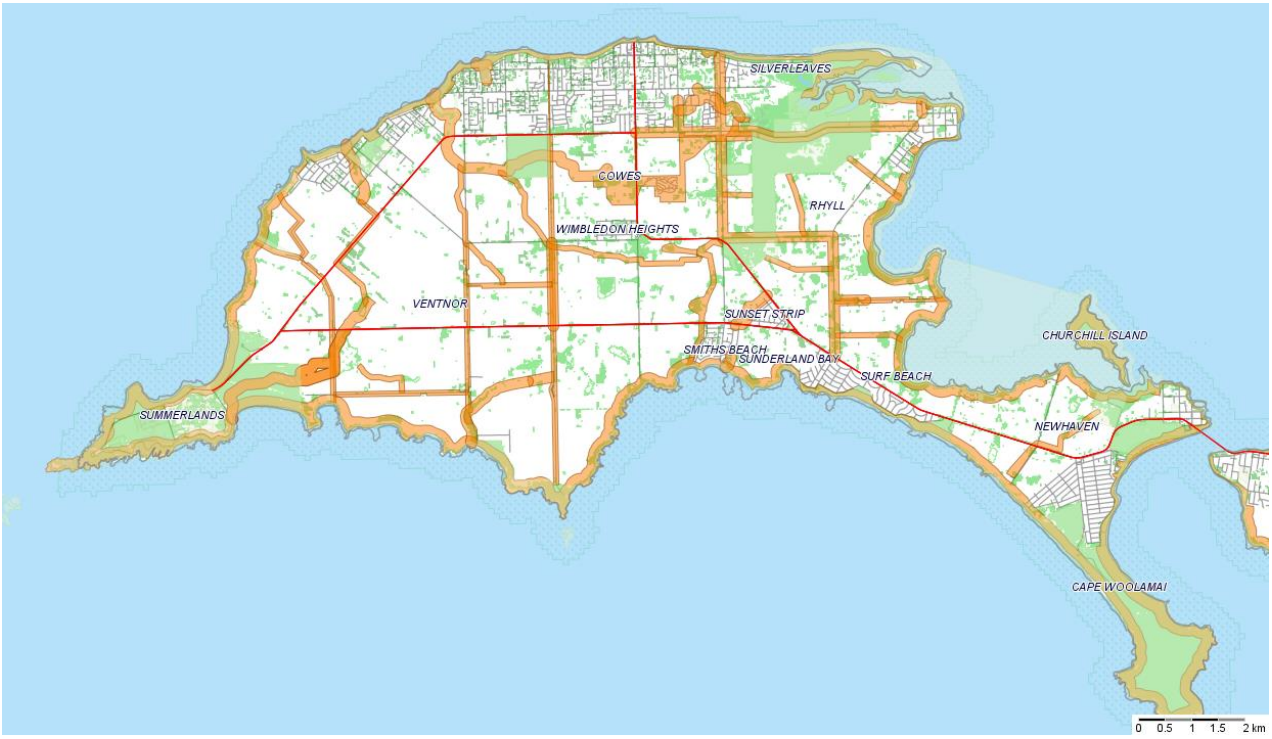

Fig 4. Biolinks identified on Phillip Island that will provide connectivity across the landscape.

Fig 5. Biolinks identified around Grantville and Glen Alvie that will provide connectivity across the landscape.

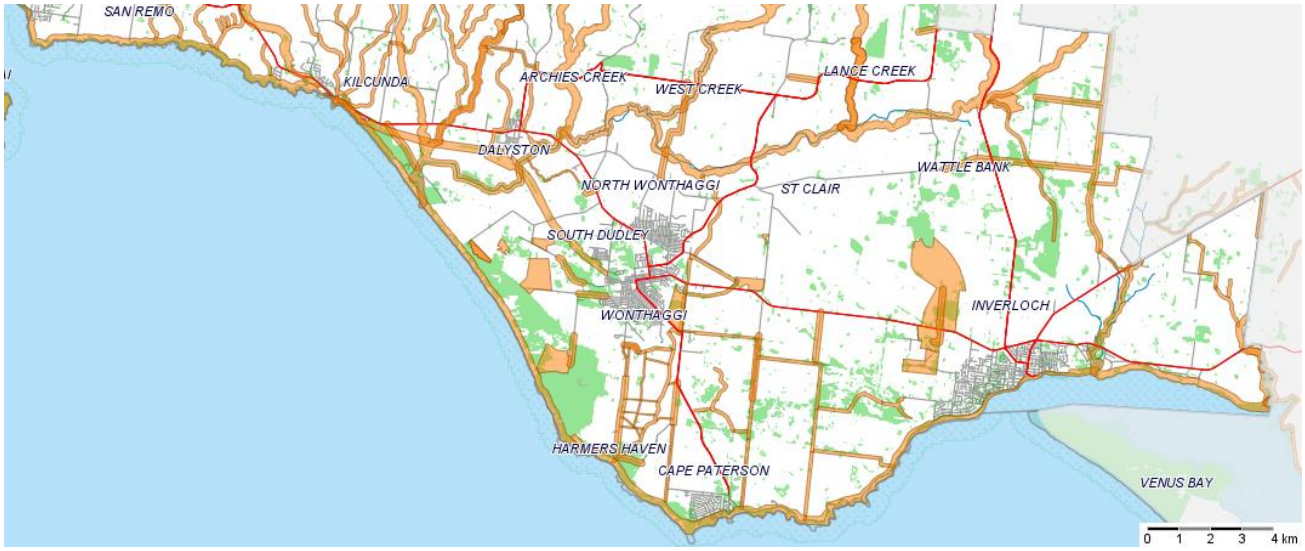

Fig 6. Biolinks identified around Wonthaggi and Inverloch that will provide connectivity across the landscape.

10. References

1. Kitching, R, Boulter, S, Hobbs, R, Mansergh, I, McKellar, R, Stafford Smith, M, Wardrop, Stadler, F, 2013 *National Climate Change Adaptation Research Plan Terrestrial Biodiversity: Update 2013*, National Climate Change Adaptation Research Facility, Gold Coast. ISBN: 978-1-921609-81-7 availabe online https://www.nccarf.edu.au/sites/default/files/attached_files_publications/Update-Report-2013_NARP_Terrestrial%20Biodiversity_0.pdf

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