



Kara Kara Conservation Management Network

Strategic Plan 2013 - 2018



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Acknowledgement of Country

The Kara Kara CMN Committee acknowledges that the eastern part of the geographical area covered by this Plan is Jaara country, and the western part is Wotjobaluk country. The members and elders of the Dja Dja Wurrung and Barengi Gadjin communities and their forebears have been intrinsically connected with the land for millennia.

As custodians of this land they have performed age-old ceremonies of celebration, initiation and renewal. We acknowledge their living culture, their links to the land and their unique role in sustaining the natural life of this area.

List of acronyms

| | |
|-------|--|
| BNGLN | Buloke and Northern Grampians Landcare Network |
| BHA | Bush Heritage Australia |
| CaLP | Catchment and Land Protection Act 1994 |
| CFA | Country Fire Authority |
| DEPI | Department of Environment and Primary Industries (known as Department of Sustainability and Environment before 1 July 2013) |
| DSE | Department of Sustainability and Environment (name changed to Department of Environment and Primary Industries from 1 July 2013) |
| EPBC | Environment Protection and Biodiversity Conservation Act 1999 (Cth) |
| EVC | Ecological Vegetation Class |
| FFG | Flora and Fauna Guarantee Act 1988 (Vic.) |
| NCCMA | North Central Catchment Management Authority |
| NCR | Nature Conservation Reserve |
| PV | Parks Victoria |
| SAFNC | St. Arnaud Field Naturalists' Club Inc. |
| TfN | Trust for Nature |
| VBRC | 2009 Victorian Bushfires Royal Commission |

Note: In October 2013, the name of St. Arnaud Range National Park was changed to Kara Kara National Park.

Executive summary

The Kara Kara Conservation Management Network (Kara Kara CMN) was established in 2010 by the Buloke and Northern Grampians Landcare Network (BNGLN) to protect and enhance biodiversity in the St Arnaud region.

The Kara Kara CMN is custodian of an area in central Victoria spanning approx. 1,950 km² or 194,450 ha; from St Arnaud in the north to Moonambel in the south, and from Morrl Morrl in the west to the Avoca River in the east. The St Arnaud Range is central to this area and incorporates the Kara Kara National Park (formerly the St Arnaud Range National Park), which contains the largest remnants of temperate woodland in northern Victoria. The area has been identified as having high ecological values and is a key area for the conservation of a number of EPBC/FFG-listed species.

Temperate woodland supports a large and distinctive component of Australia's biodiversity. However, widespread land clearing since European settlement and other human impacts have given rise to a range of processes that are now threatening this biodiversity. Key threats have been identified as landscape fragmentation; habitat loss and simplification; overgrazing by native and introduced species; inappropriate fire regimes; weed invasion; and the impact of introduced predators.

The Kara Kara CMN's vision is to protect and enhance habitat critical to the survival of temperate woodland birds and other threatened fauna and flora species, primarily through the creation and maintenance of well-managed bio-links.

Fundamental to this vision is a series of key aims, namely to (i) Link existing public reserves with the St Arnaud Range to increase connectivity in the landscape; (ii) Increase the area of the more productive Ecological Vegetation Classes (EVCs) in lower areas and along creek lines (many of which are listed under the EPBC Act); (iii) Improve biodiversity by improving the structure and complexity of existing native vegetation; and (iv) By 2025, increase the conservation security of the best quality remnants of native vegetation along creek line systems by at least 100 hectares.

We will achieve these aims through engagement with key stakeholders, both public and private land managers, and commercial and philanthropic funders.

With a view to reversing the decline in biodiversity within our area of interest, the Kara Kara CMN has as its focus four key conservation targets:

- (i) **Declining woodland birds**, including those on both Federal and State threatened species lists as well as non-listed species whose populations are known to be in decline;
- (ii) **Box woodland**, specifically Box and Ironbark-dominated open forests with variable understorey;
- (iii) **Native vegetation along creek lines**, defined as any remnant vegetation included within a range of specific EVCs, and including vegetation in minor wetlands and gullies that drain into the Avoca and Avon Rivers; and
- (iv) **Native orchid species**, particularly those listed as endangered or threatened under Federal and/or State legislation.

Specific threats have been identified for each of the conservation targets and co-ordinated strategies/actions developed involving a range of stakeholders on both public and private land.

To determine whether our strategies are working, the Kara Kara CMN will periodically measure progress against a number of indicators to check that critical threats are being kept in check, and whether the viability of our conservation targets is improving and there is progress towards our key aims.

1. Overview

1.1 Introduction

The Kara Kara Conservation Management Network (Kara Kara CMN) was established in 2010 by the Buloke and Northern Grampians Landcare Network (BNGLN) through engagement with key stakeholders, both public and private land managers, and commercial and philanthropic funders. The Kara Kara CMN has a dual focus of increased social connectedness and collaboration, associated with increased biodiversity protection and the enhancement of multi-tenure landscapes.

Membership of the Kara Kara CMN is open to all interested local community groups and individuals. Current membership includes Landcare groups, the St Arnaud Field Naturalists' Club (SAFNC), Parks Victoria, the North Central Catchment Management Authority (NCCMA), Bush Heritage Australia (BHA), Trust for Nature (TfN), the Wedderburn CMN, Country Fire Authority (CFA), VicRoads, Department of Environment and Primary Industries (DEPI) and Northern Grampians Shire.

The Kara Kara CMN's area of interest covers approximately 194,450 hectares, with the Kara Kara National Park and adjacent reserves being core areas (see Map 1) in this region. The area has been identified as having high ecological values and is a key area for the conservation of a number of species.



Photo courtesy of D Saxon-Campbell.

1.2 Our vision

The Kara Kara CMN is committed to protecting and enhancing habitat critical to the survival of our woodland birds and other threatened fauna and flora species, primarily through the creation and maintenance of well-managed bio-links.

1.3 Bioregional and landscape context

The natural environment is an essential part of our lives as it underpins human existence and supports everything from food production and water quality, to health and our way of life. To do this, nature needs a level of biological diversity. There has been an ongoing loss and degradation of native habitat not just locally, but world-wide, and our challenge is to stop and reverse this decline to protect the intrinsic values of our local natural environment.

Temperate woodlands support a large and distinctive component of Australia's biodiversity. There are about 1,500 species of higher plants and about 250 species of vertebrates, many of which are largely restricted to this ecosystem. Europeans have had a major impact on areas of temperate woodland and this has resulted in a number of species having threatened status. Other species are in decline.

One of the greatest losses has been the reduction in the number of large old eucalypts, and their replacement by multi-stemmed coppice regrowth. Large trees generate a taller, more open and structurally more complex forest. They also produce reliable and

abundant nectar, provide foraging sites such as peeling bark, fallen branches for ground-dwelling native mammals and birds, and contain hollows suitable for nesting sites.

Drainage lines, with their deeper and moister soils, make a significant contribution to the biodiversity of the area. However, because of their higher productivity they have been selectively cleared for agriculture. Where not cleared, these areas are more prone to weed invasion than the adjacent slopes, and in places have been severely disturbed by alluvial gold mining.

After the land subdivision of the 1860s and allocation of farm blocks, holdings were steadily cleared for agriculture. However, with the explosion of the rabbit population, the area was severely overgrazed. A combination of overgrazing and cultivation on erosion-prone soils led to significant erosion along many drainage lines and siltation of the lower land. This changed the hydrology of these drainage lines, and led to less water being held in the soil profile in eroded areas, making it less productive.

The Land Act of 1865 had a clause enabling people to lease 20 acres of land within 10 miles of a goldfield. This proved popular as it enabled people to be largely self-sufficient; however, it has left a legacy of isolated lots within the National Park as well as small lots along creek lines. It also showed that agriculture had a future, so when up to 160 acres could be selected between 10 and 30 miles from a goldfield, agricultural production rapidly expanded.

The Kara Kara CMN's focus is on the area originally covered by Box-Ironbark forests and woodlands. Box-Ironbark forests and woodlands have been associated with agriculture, gold mining and forestry since the early days of European settlement. This association has led to the clearing of large areas of native vegetation, particularly on the more gently sloping parts of the landscape, and pressures from settlement such as grazing and timber cutting on much of the remaining area. Fortunately, isolation from large populations has meant that the remaining vegetation is less impacted than most of the Box-Ironbark woodlands in Victoria. Some areas still retain stands of old trees that are similar to stands in pre-European times.

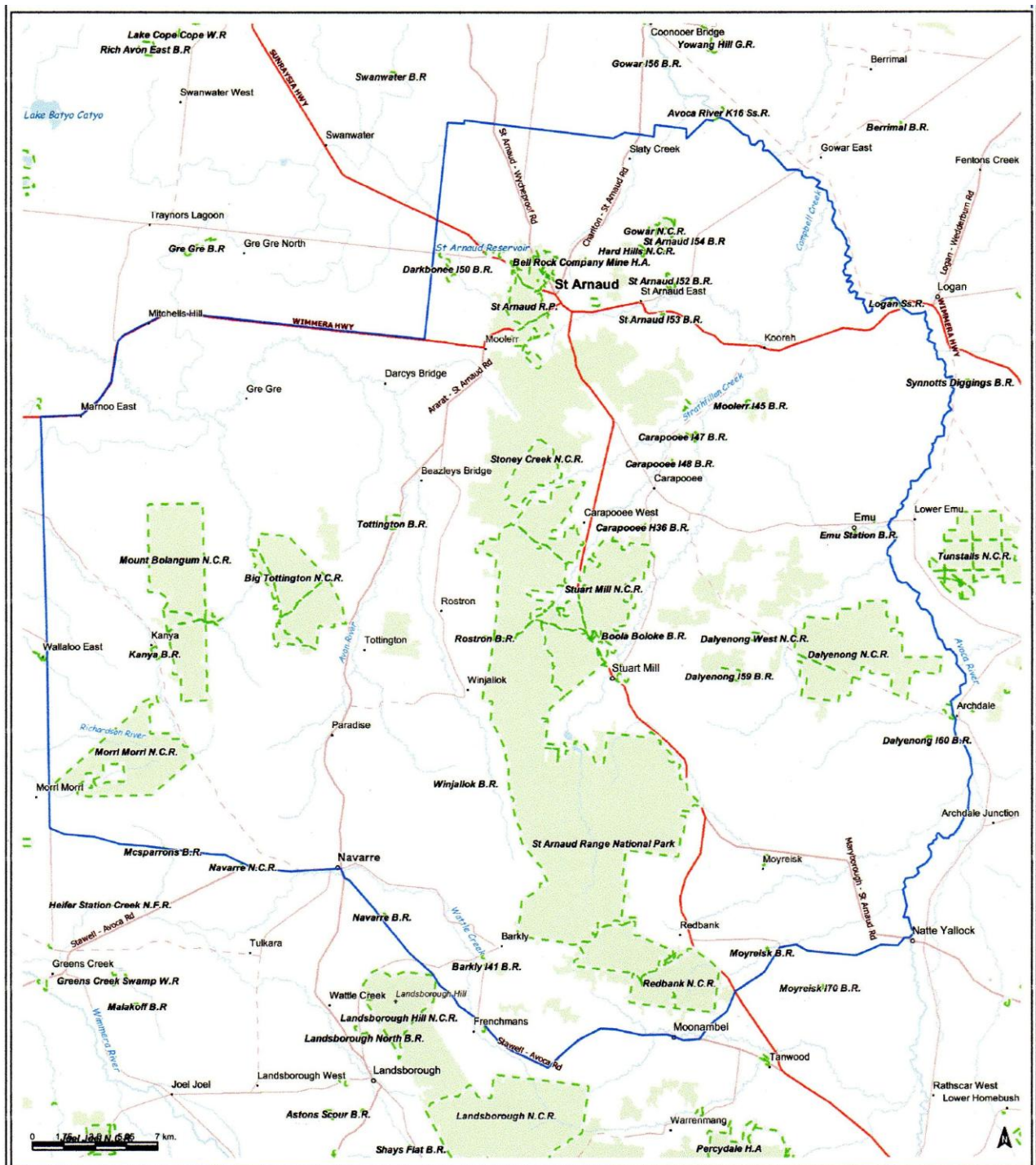
While the Kara Kara CMN area has some significant stands of vegetation on Crown land that have been protected under the Parks and Reserve system including one of the largest stands of Box-Ironbark in Victoria, these areas are largely on steeper and/or low fertility land. The blocks are also isolated from other reserves by freehold land that has been extensively cleared. A consequence of this is that some EVCs are not well represented in the reserve system, and there are significant barriers to wildlife recolonising a reserve following events such as fire or heavy fox predation.

Over the last 15 years, understorey vegetation has suffered, first during the long drought conditions when the understorey noticeably thinned out, and more recently when regeneration is being heavily grazed by a combination of kangaroos, wallabies and rabbits.

1.4 Location

The Kara Kara CMN's project area is located in central Victoria. It extends from St Arnaud in the north to Moonambel in the south, from Morrl Morrl in the west to the Avoca River in the east, with the Kara Kara National Park and adjacent reserves being core areas.

The St Arnaud Statistical District, which includes almost all the Kara Kara CMN area as well as some broad acre farm land to the north of St Arnaud, had a population of 3,523 in 2010. Agriculture and associated industries are a significant component of the local area, with the value of agricultural production estimated to be \$89.2M in 2006.



Map 1: The Kara Kara CMN's area of interest, with the Kara Kara National Park (shown on the map as St. Arnaud Range National Park) at its core.

In his paper "Understanding Rural Victoria", Neil Barr (2005) identifies several social landscapes that are relevant to the area, particularly to the west of the Kara Kara National Park where large farms with broad acre cropping and/or sheep grazing as the main focus predominate. In this area, farms are becoming larger, leading to a decline in the regional population. Around St. Arnaud and to the south east of the township in particular, there are a number of subdivisions with small blocks that stem from the gold

mining of the 1800s. This is creating a transition to an amenity landscape where lifestyle is more important than agricultural production and residents are often retired or have off-farm income. This area also includes several vineyards and olive groves, including a number in the Moonambel valley.

Some intensive piggery and turkey production has been established in the area. This has provided alternative farming income for some farmers, and employment for others.

This change to lifestyle farming and more intensive agriculture has, to some extent, counterbalanced the reducing population of the large farming area.

St. Arnaud, with a population of about 2,300, is the main town and service centre for the district. Moonambel is the next largest, with a population of about 270. The vineyards around Moonambel and in the north of the Pyrenees Wine Region have created a local tourist industry. At present, only a few of the visitors venture outside the town and vineyards. Stuart Mill, with a population of about 240, has a township water supply. Other townships with smaller populations include Navarre, Barkly, Redbank and Natte Yallock. There are also a number of surveyed townships in the area, but most of these are now reduced to a few scattered houses and a public hall.

1.5 Legal status

Kara Kara CMN is a not-for-profit entity incorporated in Victoria.

1.6 History and culture

Archaeological evidence indicates that Aboriginal people have lived in Central Victoria for thousands of years. While the evidence within the Kara Kara CMN area is limited, it is reasonable to assume that the area was occupied for a similar length of time to other areas such as the Grampians where considerable research has been undertaken (Attwood 1999).

Aboriginal people are closely bound to their land by religious beliefs that are expressed through the Dreaming, a period when creator beings and ancestral spirits formed the environment and laid the foundations of society and culture (Attwood 1999).

Aboriginal societies are separated into language groups, with each group having a number of clans. Trading between groups was common and there is local evidence of active trading routes crossing the Kara Kara CMN area (Attwood 1999).

Unfortunately a smallpox epidemic was also transmitted into the area and is thought to have halved the population prior to European settlement in Victoria. This epidemic and other European diseases, plus the arrival of European settlers, was the start of a major disruption of Aboriginal society that still has impacts today (Attwood 1999; Palmer 1999).

The Kara Kara CMN area includes parts of both the Dja Dja Wurrung and Wotjobaluk Native Title Claim areas (Attwood 1999). Agreements have been reached between the Victorian Government, and the Dja Dja Wurrung Clans Aboriginal Corporation and the Barengi Gadjin Land Council, as the bodies representing Aboriginal interests in these claims. The Dja Dja Wurrung agreement includes joint management of some areas, including part of Kara Kara National Park.

The region around the St. Arnaud Range has a long and proud history of on-ground conservation and policy achievements for biodiversity gains benefitting the wider community and the health of the landscape generally. This has been largely achieved by volunteer members of the community.

Previous works and programs include:

- Community education under the Avon Richardson Land and Water Management Plan and the Avoca Salinity Management Plan, including newsletters, field days and courses such as Trees in Rural Landscapes and Landscape Planning;
- Twenty-eight years of Field Naturalists working for biodiversity protection;
- Major projects to fence and revegetate waterways and create bio-links in Carapooee, Pental Hills and Reedy-Paradise funded through the National Action Plan for Salinity and Water Quality;
- Contributions to the research attained by monitoring and surveying in partnership with DSE, Parks Victoria and NCCMA;
- A substantial contribution to the Biodiversity Atlas of Flora and Fauna sightings and photos, and BirdLife Australia's Atlas of Australian Birds;
- The Wax Gardens Reserve Management Plan; and
- Private land covenants and stewardship, and ecosystem services projects.

European settlement of the area started with the establishment of large pastoral leases, but it was the discovery of gold in the 1850s that started the move to a substantial change in land use. Initially, large numbers of miners descended on the most recent gold discovery, but as the easy-to-get gold started to run out, mining was left mainly to the large reef mining operators.

Pastoral leases were broken up and the land subdivided to provide farms for the now unemployed miners. Clearing the land for agriculture became a significant activity, initially by ringbarking trees to encourage better grass growth, and later supplying Melbourne with firewood. Over the same period, rabbit populations exploded, leading to severe overgrazing of cleared land and erosion of the erosion-prone soils. Once myxomatosis had reduced rabbit populations, attention turned to controlling erosion and this led to the introduction of sub clover and perennial grasses such as *Phalaris*, which had the dual benefit of reducing soil erosion and dramatically increasing farm productivity. The potential for *Phalaris* to become an environmental weed was not an issue at that time. Attitudes have continued to change over time and a significant number of farmers have undertaken environmental works on their properties.

Crown land blocks were, for a long time, seen as purely a resource to be used. Initially, mining occurred in a virtually uncontrolled fashion wherever gold was found, and timber harvesting occurred as required by the miners. Although mining decreased after a few years, the attitude of managing Crown land purely for productive uses continued with timber harvesting and stock grazing normal practices.

Attitudes have changed dramatically over the last 30 years. Grazing licences are no longer issued for the larger blocks of Crown land, including the National Park and Nature Conservation Reserves. The hectares available for timber harvesting have been greatly reduced, and management and harvesting practices have been modified to reduce environmental impacts. However, there are still significant pressures on biodiversity. These include some management practices such as eucalyptus oil harvesting and inappropriate fire management. The other significant pressure is the impact of the recent drought, which reduced understorey vegetative cover and severely stressed mature trees. This has been exacerbated by large populations of kangaroos and wallabies grazing on the new vegetation growth following the drought-breaking rain events of 2011.

1.7 Scope

The geographic scope of the project covers 194,450 ha, and is centred round the Kara Kara National Park and adjacent reserves.

Kara Kara CMN aims to:

- Link existing reserves with the St Arnaud Range at the centre;
- Increase the area of the more productive EVCs on the lower land and along creek lines (many of these are listed in the EPBC Act);
- Improve the biodiversity value by increasing the complexity of existing vegetation; and
- By 2025, increase the conservation security of the best quality remnants of native vegetation along creek line systems by 100 hectares.

Scope of land tenure includes both public and private land. Whilst public land provides a substantial backbone of native vegetation in our focus area, critical habitat is scattered throughout private landholdings.

- Re-establishing understorey will be considered where appropriate grazing protection is practical.
- Revegetation projects will target areas that provide links between existing stands of vegetation and to riparian zones, as these are refuge areas for wildlife during droughts.
- The revegetation can have other purposes - vegetation offsets, erosion and salinity control.
- Assist private landholders to establish covenants on land with high value remnant vegetation.

Where appropriate, work with stakeholders to influence policy and planning to:

- *Upgrade the conservation status of selected public reserves;*
- *Develop management plans with biodiversity objectives for selected public reserves; and*
- *Identify vegetation classes in the Council planning scheme.*

It is the intention of the Kara Kara CMN to:

- *Identify opportunities for biodiversity conservation;*
- *Provide opportunities that assist the farming community to achieve agricultural productivity and biodiversity; and*
- *Engage with the community through seminars and field days.*

2. Our conservation targets

2.1 Situation analysis

Conservation targets:

*Declining woodland birds;
Box woodlands;
Native vegetation along creek lines; and
Nationally listed orchids.*

Major threats:

*Landscape fragmentation;
Habitat loss and simplification;
Overgrazing by native and introduced species;
Inappropriate fire regimes;
Weed invasion; and
Introduced predators.*

For each direct threat there are contributing factors that influence the magnitude of the threat. The situation is complex, as some threats will impact on more than one conservation target and contributing factors can influence more than one threat.

In the same way, strategic actions may reduce the impact of more than one threat and/or contributing factors, and in some cases several strategic actions in combination are required for an effective outcome.

A Situation Analysis diagram showing the Kara Kara CMN's key conservation targets, the major threats to these targets along with their contributing factors, and our targeted management strategies and actions are shown in the Conceptual Model in Fig. 1.

Kara Kara CMN Conceptual Model: Situation Analysis

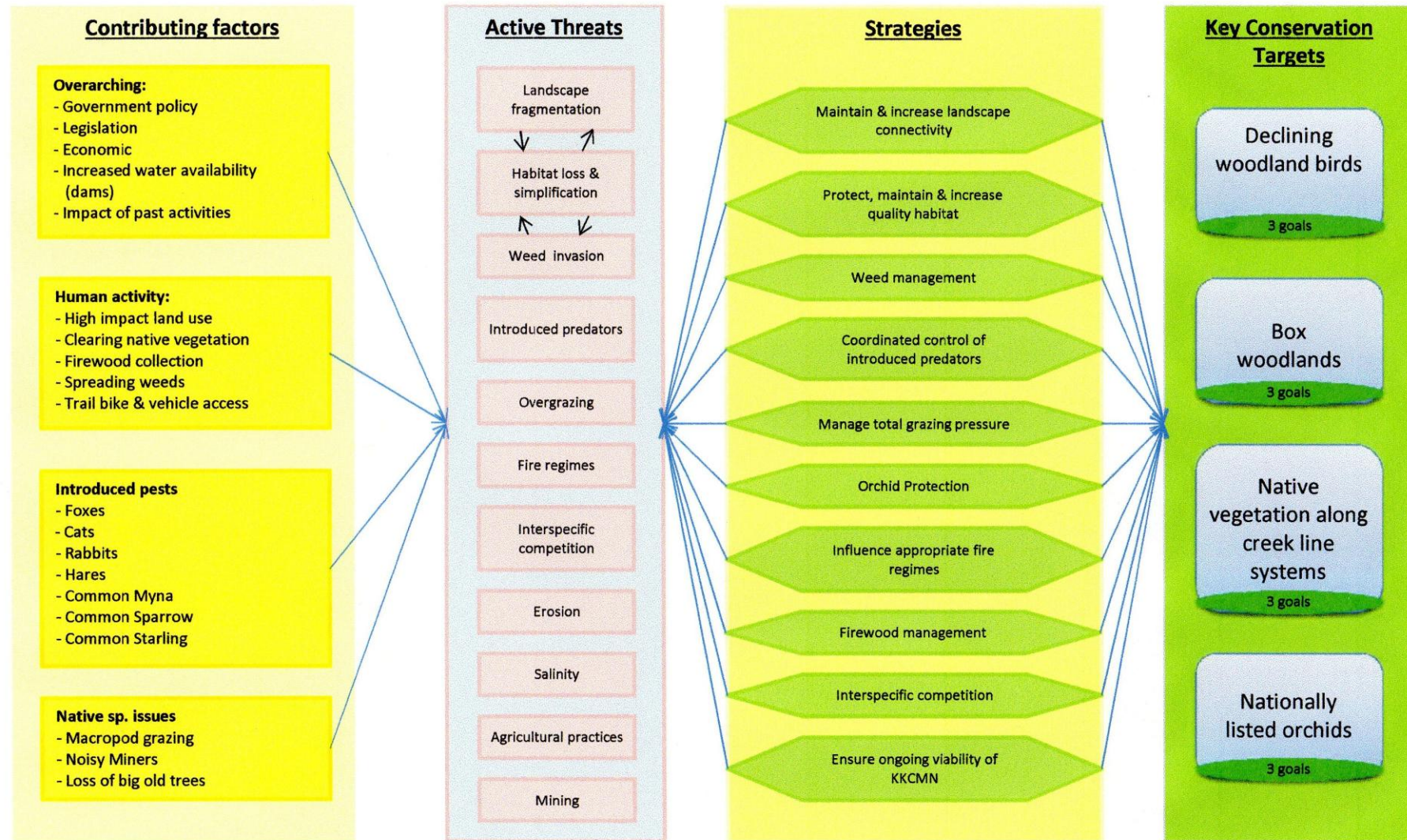


Fig. 1: This Conceptual Model represents a Situation Analysis for the Kara Kara CMN area. To the right are the key targets we are aiming to protect. Major threats to those targets are shown to the left, along with the factors that are contributing to the existence of those threats. Strategies show where we intend to take action to reduce the threats and thereby help to protect the targets. Note that contributing factors “upstream” of strategies are likely to continue to occur, and therefore we will need to continually execute those strategies in order to protect the targets.

2.2 Declining woodland birds

Threats to this target:

Fragmented landscape;

Reduced understorey vegetation and structural complexity;

Grazing pressure from native and introduced herbivores;

Predation by cats and foxes;

Interspecific competition from both introduced and native bird species (e.g. Common Mynas and Noisy Miners).

Woodland birds are a good indicator of the broader health of the landscape. They have been declining for several decades and a concerted effort is now required to reverse this decline.

Declining Woodland Birds includes those on both federal and state threatened species lists as well as those non-listed species whose populations have been recorded to be in decline. Species include:

- Diamond Firetail (Flora and Flora Guarantee (FFG) Act: Threatened; DSE Advisory List: Vulnerable);
- Hooded Robin (FFG Act: Threatened; DSE Advisory List: Near threatened);
- Bush Stone-Curlew (FFG Act: Threatened; DSE Advisory List: Endangered);
- Powerful Owl (FFG Act: Threatened; DSE Advisory List: Vulnerable);
- Speckled Warbler (FFG Act: Threatened; DSE Advisory List: Vulnerable);
- Swift Parrot (EPBC Act: Endangered; FFG Act: Threatened);
- Painted Honeyeater (FFG Act: Threatened);
- Barking Owl (EPBC Act: Endangered); and
- Regent Honeyeater (FFG Act: Threatened, EPBC Act: Endangered).

It is important to include not only those birds that are already listed on State and Federal threatened species lists but also birds that are known to be declining so we can prevent them from becoming threatened. This is contrary to past practice, where focus is not put on a species until it is listed by which time it is often too late. Declining woodland birds are reliant on understorey vegetation; the presence of large, healthy hollow-bearing trees (for nesting sites and as a food source); and an abundance of coarse debris on the ground.



The endangered Swift Parrot.
Photo: Australian Geographic.

Species include:

- Black Chinned Honeyeater;
- Brown Treecreeper;
- Crested Bellbird;
- Crested Shrike-tit;
- Fuscous Honeyeater;
- Jacky Winter;
- Red-capped Robin; and
- Southern Whiteface.

Goals:

Establish baseline data on bird populations in the Kara Kara CMN area by June 2014.

Survey bird assemblages at selected woodland sites within the Kara Kara CMN area on an ongoing basis to monitor the status of woodland bird populations over time.

Stabilise current populations of declining woodland birds over next five years.

Create an environment that will facilitate wildlife movement between existing significant stands of vegetation, and to facilitate links to stands outside the Kara Kara CMN area by 2025.

2.3 Box woodlands

Threats to this target:

Landscape fragmentation;

Weed invasion;

Overgrazing;

Habitat simplification; and

Inappropriate fire regimes.

Box woodland is a key vegetation type within the Kara Kara CMN focus area. As this ecosystem naturally occurs in more fertile, lowland plains and valley floors, it has been extensively cleared since European settlement. These areas are more biologically productive than the steeper slopes and are important habitat for a number of birds and mammals.

The better examples of these remnant grassy woodlands are often dominated by a canopy of Grey Box, Yellow Box and sometimes Yellow Gum, Red Gum and Buloke, often between 15 and 25 metres high. The understorey typically has a diverse mix of native perennial tussock grasses and annual and perennial native forbs/ wildflowers – often including terrestrial orchids. A mix of tall to low shrubs (wattles, riceflowers, hopbush, bushpeas and even heaths) are usually also present but rarely dominant.



Box-Ironbark woodland in the Kara Kara National Park.
Photo courtesy of D Saxon-Campbell.

Locally significant stands of Grey Grasstrees (*Xanthorrhoea glauca* ssp. *angustifolia*) are found within this target vegetation type [within the Box-Ironbark Ecological Vegetation Class (EVC)]. Some declining mammal species are present, including the Tuan, Common Dunnart, Spot-tailed Quoll and Squirrel Glider.

Kara Kara CMN aims to:

- Stop box woodland decline;
- Increase their extent; and
- Enhance their condition through -
 - Improved structural complexity;
 - Quality of habitat;
 - Species diversity; and
 - Age class diversity.

It is also critical to ensure adequate representation of each EVC within the target area. Refer to Appendix 1 for an EVC listing.

Goals:

Increase the extent of viable Box woodlands in protected areas across the district by 2017.

Create an environment that will facilitate wildlife movement between existing significant stands of vegetation from Morrl Morrl Nature Conservation Reserve (NCR) to Dalyenong NCR, and to facilitate links to stands outside the area by 2025.

Upgrade the protection status of some public reserves in the target zone by 2025.

2.4 Native vegetation along creek line systems

Threats to this target:

Invasive weeds which become more dominant as habitat simplification proceeds;

Erosion;

Salinity;

Stock access;

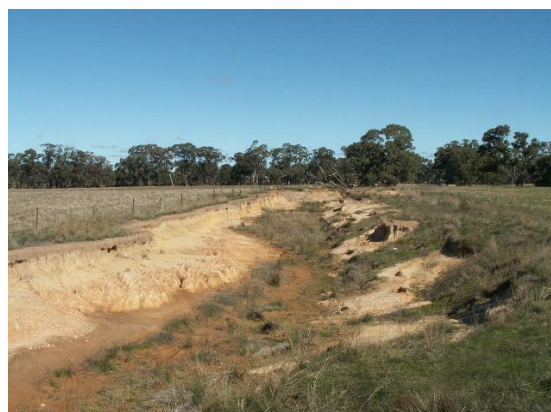
Habitat simplification; and

Rabbits and hares.

Native vegetation species along creek line systems, including valley floors, are critical for the region's biodiversity.

They act as important connections between remnant patches of native vegetation, connecting both public and private land, protected and unprotected. These natural biolinks provide for the movement of fauna, plant dispersal and for the movement of water and nutrients via episodic flooding processes.

Creek line EVCs are more biologically productive than the steeper slopes and ridge lines and they act as drought refuges once the vegetation is mature.



Examples of creek line health within the Kara Kara CMN area. Photos courtesy of A Hughes and J Boadle.

This target is defined as any remnant vegetation that can be considered as within the following EVCs (DSE 2007):

- 56 Floodplain Riparian Woodland
- 641 Riparian Woodland
- 679 Drainage-line Woodland
- 68 Creekline Grassy Woodland
- 74 Wetland Formation
- 83 Swampy Riparian Woodland and areas fronting creek lines.

This target includes minor wetlands and gullies that feed into the creek systems that, in turn, run into the Avoca and Avon Rivers.

Farm dams and land clearing have changed the hydrology of our creek systems, with ephemeral drainage and creek lines now effectively extinct across central Victoria. Dryland salinity is widespread and often manifest as saline discharge into drainage systems, killing native vegetation and encouraging weeds such as Spiny Rush (*Juncus acutus*) and Sea Barley Grass (*Hordeum marinum*). Reduced vegetation often leads to soil erosion and siltation of creek lines.

Goals:

Identify and note the condition of priority patches of remnant vegetation along creek lines by December 2014.

By 2025, maintain and improve existing vegetation condition along creekline systems to allow for greater connectivity of habitat.

By 2025, increase the conservation security of the best quality remnants of native vegetation along creek line systems by at least 100 hectares.

2.5 Nationally-listed orchids

Threats to this target:

Overgrazing by both native and introduced herbivores;
Habitat simplification;
Inappropriate fire regimes;
Physical damage from human activities; and
Loss of pollinators.

The Kara Kara CMN area contains many Nationally-listed Orchids, including some that are endemic to the area.

Orchids included in this Key Conservation Target are:

- Mclvor Spider Orchid (*Caladenia audasii*) – Endangered under EPBC Act; Threatened under FFG Act;
- Stuart Mill Spider-orchid (*Caladenia cretacea*) (pictured) – Threatened under FFG Act;
- Red-cross Spider-orchid (*Caladenia cruciformis*) – Threatened under FFG Act;
- Brilliant Sun-orchid (*Thelymitra mackibbinii*) – Vulnerable under EPBC Act and Threatened under FFG Act;
- Lowly Greenhood (*Pterostylis despectans*) – Endangered under EPBC Act and Threatened under FFG Act; and
- Swamp Diuris (*Diuris palustris*) – Threatened under FFG Act.



Depleted orchid species:

Veined Spider-orchid (Caladenia reticulatea ssp.);
Golden Cowslips (Diuris behrii); and
Woodland Leek Orchid (Prasophyllum sp. aff. validum).

Until 2012, the Department of Sustainability and Environment (now the Department of Environment and Primary Industries) ran the Threatened Native Orchid Recovery Program in Victoria.

Goals:

Provide ongoing support to the collaborative effort between Parks Victoria, DSE/DEPI and SAFNC to protect these orchids within the Kara Kara CMN area.

Maintain 2011 levels of Nationally-listed orchid populations over the next five years.

Raise awareness of endemic orchid species within the community.

2.6 Key threats to our targets

The key threats to each of our targets have been assessed to help identify what actions are required. Threat ratings are based on a combination of scope (the area affected by the threat), severity (the degree of damage) and irreversibility (how permanent the damage is). This process was conducted according to a rating scale provided by Bush Heritage Australia. Refer to Appendix 2 for an explanation of the threats rating system.

| Active threats across systems | Declining woodland birds | Box woodland | Native vegetation along creek lines | Nationally-listed orchids | Overall threat rating | Relevant Strategy/s |
|--|--------------------------|---------------|-------------------------------------|---------------------------|-----------------------|---------------------|
| Landscape fragmentation | Medium | Low | Medium | Low | Medium | S1, S2, S6 |
| Habitat loss and simplification | Medium | Medium | Medium | Medium | Medium | S2, S5, S6, S7, S8 |
| Weed invasion | Low | Low | Medium | Low | Low | S3 |
| Introduced predators (e.g. foxes and cats) | Medium | Low | Low | Low | Low | S4 |
| Overgrazing (by native and introduced herbivores) | Medium | Medium | Medium | High | Medium | S5, S6 |
| Fire regimes (influencing current and future public policy) | Medium | Medium | Low | Low | Medium | S7 |
| Interspecific competition (e.g. Noisy Miner, Common Myna, European Honeybee, Common Starling, House Sparrow) | Medium | Low | Low | Low | Low | S2, S9 |
| Erosion | Low | Low | Low | Low | Low | S1, S2 |
| Salinity | Low | Low | Medium | Low | Low | S1, S2, S6 |
| Agricultural practices (i.e. changing land use) | Low | Low | Medium | Low | Low | - |
| Mining | Low | Low | Low | Low | Low | |
| Overall Threat Status for Targets | High | Medium | High | Medium | Medium | |

Key to strategies (Section 3):

- S1: Maintain and increase landscape connectivity
- S2: Protect, maintain and increase quality habitat
- S3: Weed management
- S4: Coordinated control of introduced predators
- S5: Manage total grazing pressure
- S6: Orchid protection
- S7: Influencing appropriate fire regimes
- S8: Firewood management
- S9: Interspecific competition
- S10: Ensure the ongoing viability of the Kara Kara CMN

2.7 Key threats defined

2.7.1 Threats: Agricultural practices, landscape fragmentation, and habitat loss and simplification

There is substantial evidence to indicate that habitat quality plays an important role in the distribution of a broad range of species in a fragmented landscape and where habitat quality is degraded or simplified, many of these species may decline, occur at lower densities or be unable to breed (Mortelliti, Amori & Boitani 2010; Radford, Bennett & Cheers 2005).

Since human settlement in the St Arnaud region, widespread land clearing, primarily for agriculture, has led to habitat within the landscape becoming increasingly fragmented. As a result, in many areas available habitat for both vertebrate and invertebrate fauna has been reduced to isolated and sometimes interconnected patches of varying size.

As well as disrupting the natural function of the environment and the ecosystems within it over time (DSEWPC 2012), fragmentation has also led to an increase in edge habitat which tends to be more susceptible to a range of degrading processes such as invasion by weeds and pest animals, and increased grazing pressure (Ford *et al.* 2001).

At the same time, practices such as firewood collection involving the removal of coarse woody debris and old dead trees from within forested areas and roadside corridors, has led to significant habitat simplification.

In Victoria, the removal of native vegetation is regulated through the State's planning system; however, while this regulation has substantially reduced large-scale clearing, the practice continues on an "informal" basis and on exempt projects where losses are offset with commensurate gains.

Of all of the threats identified in this Strategic Plan, habitat loss, habitat fragmentation and habitat simplification/degradation are seen as *the* major risks to biodiversity within the Kara Kara CMN area. The strategies outlined in Section 3 of this Plan aim to address these threats.

2.7.2 Threat: Weed invasion

Environmental weeds are known to pose a significant threat to biodiversity because of their ability to change and damage ecosystems (DSE 2010), thereby eroding habitat quality.

With agriculture being the primary land use within the Kara Kara CMN area, weeds are predominately spread during grain cultivation/transportation and/or by grazing herbivores such as domestic livestock. Native macropods also graze on cleared land and disperse weed seeds in woodland habitat. Weeds species are also common along creek lines and roadsides, or anywhere regularly disturbed by natural processes (e.g. floods) or by human activities such as cultivation, grazing and machinery operation.

Common environmental weeds in the Kara Kara CMN area and their classification under the Catchment and Land Protection (CaLP) Act 1994 include Bridal Creeper (*Myrsiphyllum asparagoides* – Restricted), Boneseed (*Chrysanthemoides monilifera* – Regionally Prohibited), Spear Thistle (*Cirsium vulgare* – Restricted), Soursob (*Oxalis pes-caprae* – Restricted), Horehound

(*Marrubium vulgare* – Regionally Controlled), St John's Wort (*Hypericum perforatum* – Regionally Controlled), Gorse (*Ulex europaeus* – Regionally Controlled) and Wheel Cactus (*Opuntia robusta* – Regionally Controlled), Blackberry (*Rubus fruticosus* agg – Regionally Controlled and a Weed of National Significance), Cape Tulip (*Moraea miniata* – Regionally Controlled), Spiny Rush (*Juncus acutus* – Regionally Controlled), Boxthorn (*Lycium ferocissimum* – Regionally Controlled), and Sweet Briar (*Rosa rubiginosa* - Regionally Controlled), together with Deadly Nightshade (*Atropa belladonna*), Gazania (*Gazania rigens*) and several exotic fruit tree and cactus species (NCCMA 2012).

The Kara Kara CMN has adopted a Weed Management Strategy (Section 3.3) to address major weed infestations in our area of interest.

2.7.3 Threat: Introduced predators

Introduced predators, in particular the European Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*), can have a severe adverse impact on small mammals and reptiles (Lindenmayer *et al.* 2011) as well as on ground-dwelling or nesting woodland bird species.

Predation by the European Red Fox (pictured) is listed as a key threatening process under the Endangered Species Protection Act 1992 and the EPBC Act 1999. In Victoria, the CaLP Act lists foxes and feral cats as “established” pest animals (DPI 2013). However, there is evidence that co-ordinated and targeted control programs can have localised impact on the predation of vulnerable significant species and can be an effective conservation strategy if sustained (Carter 2010; Lindenmayer *et al.* 2011).

While foxes are omnivores and cats carnivores, both species are opportunistic predators, eating a wide variety of foods. In Victoria, dietary studies on both species have shown their primary prey to be the European Rabbit (*Oryctolagus cuniculus*). Sheep are another major food source for foxes representing about 20% of their diet, while both foxes and cats also prey on mice, smaller native mammals, reptiles, birds and invertebrates. Foxes also feed on berries and fruits (Coman & Brunner 1972; Coman 1973; DPI 2010), in the process potentially dispersing the seeds of environmental weed species such as Blackberries (*Rubus fruticosus*) into woodland areas.



European Red Fox.

As these dietary studies show, foxes are a major agricultural pest, impacting of farm productivity. In the main, this is due to lamb predation; however, the exact number of lambs lost to fox predation is often difficult to determine due to their habit of killing and caching food before farmers realise a birth has occurred.

Research shows that fox dens are typically located in areas of highest food availability, especially quality food sources (DPI 2011). This is consistent with observations of fox behaviour in the Kara Kara CMN area, which indicates that foxes live on forest edges and feed mostly on private land.

In the Kara Kara CMN area, foxes pose the greatest predatory threat to ground-dwelling/nesting native birds, such as the Bush Stone-Curlew (*Burhinus grallarius*) which is listed as threatened under the FFG Act. Feral cats are less prevalent. To date, fox numbers have been managed through strategic baiting programs on public land, notably by Parks Victoria, and by both baiting and shooting on private land. Since 2011, management efforts on private land have been assisted by incentives such as the Victorian Fox and Wild Dog Bounty (DPI 2013).

The Strategy in Section 3.4 aims to address this threat through the coordinated control of introduced predators.

2.7.4 Threat: Overgrazing

Grazing pressure caused by native and introduced herbivores has a massive adverse impact on the condition and function of ecosystems throughout the Kara Kara CMN area. Lowland slopes and plains where woodlands predominate are especially vulnerable.

In the Kara Kara CMN area, grazing pressure is attributed to domestic stock, macropods (pictured) and introduced herbivores such as the European Rabbit and Brown Hare (*Lepus capensis*) (Menkhorst & Knight 2001).

Overgrazing adversely impacts all of the four conservation targets in this Plan and has the highest overall threat rating. Without reducing total grazing pressure, biodiversity decline is likely to continue throughout the Kara Kara CMN area, with little opportunity for natural regeneration of understorey vegetation or successful habitat restoration (Lindenmayer *et al.* 2011).

A strategy to address this threat is outlined in Section 3.5 (Manage Total Grazing Pressure) of this Plan.



Eastern Grey Kangaroos in the Kara Kara National Park. Photo courtesy of D. Saxon-Campbell.

2.7.5 Threat: Inappropriate fire regimes

For millennia, Australia's indigenous people have used fire to manage the landscape and its resources (Gott 2005). Today, fire remains an important tool for land managers in manipulating vegetation to promote biodiversity. However, predicting the effects of different fire management strategies on fauna requires

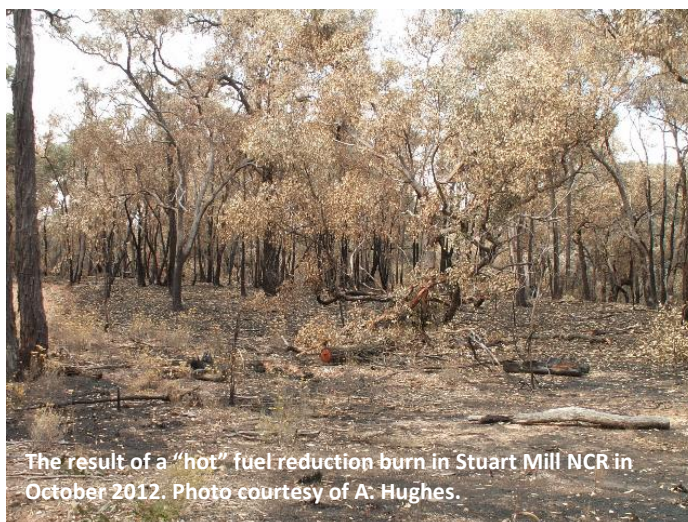
species-specific knowledge of how biota responds to fire, as well as the extent and mix of fire age classes that will best meet their needs. For the most part, this knowledge is lacking (Taylor *et al.* 2013; Ford *et al.* 2001; Tolsma, Cheal & Brown 2007).

Following the devastating Black Saturday bushfires of 2009, the Victorian Bushfires Royal Commission recommended that the “State fund and commit to implementing a long-term program of prescribed burning based on an annual rolling target of 5 per cent minimum of public land” (VBRC 2009).

The implied intention of this recommendation was that burning should focus on public land close to small communities in order to protect assets, and ultimately, human life. However, if the VBRC’s target for prescribed burning and fuel load reduction near property assets was to be met, burns would need to occur as frequently as every four or five years. For many native vegetation species, this burning interval is insufficient to enable regeneration and sufficient seed setting (Gell 2012).

Further, the window of opportunity for fire agencies such as the DSE and CFA to meet their prescribed burning target is weather dependent and thus relatively short, with controlled burns conducted either in autumn or spring. As a result, agencies struggling to meet this ambitious target have tended to make up the shortfall by burning large tracts of public land away from areas of asset concentration (Gell, 2012).

“Hot” fuel reduction burns such as that pictured, whether intended or not, often result in 100% canopy scorch, the destruction of logs/stump hollows and other coarse woody debris that provide important woodland habitat for fauna, and can lead to surface and tunnel soil erosion.



The unintended outcome of this prescribed burning regime is a change in the native vegetation matrix and an increased risk to biodiversity (Gell 2012).

In the Kara Kara CMN area, the risk to biodiversity posed by inappropriate fire regimes is manifest in reduced habitat for threatened native orchid species

(and their pollinators) and already declining woodland birds and mammals. It also threatens key vegetation communities, including remnant Box-Ironbark woodland in the Kara Kara National Park, which protects the largest intact area of this EVC remaining in Victoria (Parks Victoria 2009).

To address this threat, the Kara Kara CMN has adopted the Strategy outlined in Section 3.7 (Influence appropriate fire regimes) of this Plan.

2.7.6 Threat: Interspecific competition

In the context of this Plan, interspecific competition refers to the potential threat to native birds and small arboreal mammals from invasive and/or aggressive edge species, both native and introduced, such as the Noisy Miner (*Manorina melanocephala*), the Common Myna (*Sturnus tristis*), House Sparrow (*Passer domesticus*), Common Starling (*Sturnus vulgaris*) and the European Honey Bee (*Apis mellifera*).

Studies have shown that the presence of Noisy Miners can be a key determinant in whether small insectivores are present in remnant habitat, particularly where habitat is of lower quality (Major *et al.* 2001; Montague-Drake *et al.* 2011).

Similarly, Common Mynas, Common Starlings and House Sparrows out-compete woodland birds for resources in bushland remnants (BirdLife Australia 2011; Birds Australia 2013) and are also a threat to primary industry, with the potential to damage fruit crops, orchard and vineyard fruit, and feed on stock food and grain on agricultural holdings (Tracey *et al.* 2007; Higgins, Peter & Cowling 2006).

While their impact on ecosystems is difficult to assess, feral honey bees are known to out-compete native pollinators for floral resources and overtake tree hollows, displacing native birds and arboreal mammals (DSEWPC 2011; BirdLife Australia 2013; Oldroyd *et al.* 1997).

Feral species also play a role in dispersing the seeds and pollen of noxious weeds (Higgins, Peter & Cowling, 2006).



While Noisy Miners are present in edge habitats within the Kara Kara CMN, particularly along roadside corridors, and Common Starlings and House Sparrows are well established in the region, until recently the area has been relatively free of Common Mynas. However, sightings of this aggressive species have increased markedly over the past two

years as they spread along lines of human habitation, indicating that these species is becoming established within the region.

As shown in Section 2.6, the threat posed to declining woodland birds by interspecific competition is rated as medium. To address this threat, the Kara Kara CMN has adopted the Strategy outlined in Section 3.9 (Reducing impacts from interspecific competition) of this Plan. The strategy aimed at improving the quality of remnant habitat (Section 3.2) within the Kara Kara CMN area will also help to address this threat.

2.7.7 Threat: Erosion

Soil erosion and the associated siltation of waterways is a natural process which is fundamental to landscape evolution. However, poor land use practices can lead to higher rates of erosion which adversely impacts the landscape, both at the source and by increasing silt deposits downstream. Inappropriate fire regimes may also lead to an increase in erosion.

Within the Kara Kara CMN area, soil erosion is most likely to occur in sloping landscapes on soils derived from granite or sedimentary material. Granite soils have a very weak structure so soil particles are easily dislodged by moving water. Sedimentary soils, which are the most common soil type in the Kara Kara CMN area, have a dispersible clay subsoil so are prone to tunnel and gully erosion, particularly on the gentler slopes. This gullying is widespread and well established in the region due to gold mining and agricultural practices. Although the rate of gully erosion does "naturally" decline with age, often drainage systems are left in a permanent and serious dysfunctional state. These eroded drainage lines quickly transport high energy runoff into surrounding lowland areas rather than holding it in catchments and releasing it slowly. Restoring this functionality to catchments would have multiple benefits including reducing soil loss.

The main method used to reduce soil erosion is the establishment of a good cover of perennial vegetation within the surrounding catchment. Increasing the connectivity and quality of habitat, as well as good management practices by landholders, contribute to this outcome. Increasing vegetation cover along creek lines can also help to reduce erosion, and may also trap silt. Where these actions are not adequate, engineering works may be warranted.

Erosion control within riparian areas is the responsibility of the NCCMA and, therefore, is not addressed in this Plan.

2.7.8 Threat: Salinity

Within the Kara Kara CMN, the main impacts of salinity are on creek lines and on lower areas within the landscape where saline discharge can alter the range of species that will grow (NCCMA 2007).

The re-establishment of perennial vegetation, particularly in groundwater recharge areas, will help reduce saline discharge (NCCMA 2003).

To address this threat, the Kara Kara CMN has adopted strategies aimed at increasing habitat connectivity and quality, as outlined in Sections 3.1 and 3.2 respectively. Good management practices by landholders will also assist in mitigating this threat and will be encouraged by the Kara Kara CMN, where appropriate.

2.7.9 Threat: Mining

Within the Kara Kara CMN area, the threat to areas of native vegetation from mining is rated as low, and as such, is not covered by this Plan.

Victoria's Native Vegetation Framework, which is administered through the State's Planning Scheme, prohibits the widespread removal of native vegetation unless exempted. Where potential projects qualify for exemption, appropriate offsets are required (DSE 2012) under the planning scheme. These offsets may assist in increasing landscape connectivity and habitat quality within the Kara Kara CMN area.

3. Our strategies

The strategies that the Kara Kara CMN will pursue to reduce the key threats and protect our targets are described on the following pages. Objectives have been set for each Strategy and are defined so that progress can be monitored. Indicators should be monitored, and the strategies adjusted if the expected outcomes are not being achieved.

3.1 Maintain and increase landscape connectivity

While prone to degradation, habitat patches within the landscape are essential to the ongoing survival of many species (Worboys *et al.* 2011; Kennedy & Tzaros 2005; Mac Nally & Horrocks 2000). Maintaining these fragments and increasing the connectivity between them is a key aim for the Kara Kara CMN.

For the life of this Plan, this Strategy will specifically focus on linking remnant habitat extending west from the Kara Kara National Park to Morri Morri Nature Conservation Reserve (NCR), and east through Carapooee to Dalyenong NCR.

Objectives:

Increase the area and quality of remnant habitat within the Kara Kara CMN, in particular Box woodland;

*Improve spatial connectivity within the landscape for highly mobile species, such as the endangered Swift Parrot (*Lathamus discolor*); and*

Establish biolinks by connecting patches of existing remnant habitat through landscape-wide revegetation projects.

Actions:

Identify areas of habitat for potential action by -

- Establishing baseline data on bird populations in the Kara Kara CMN area of interest by June 2014; and*
- Surveying bird assemblages at selected woodland sites within the Kara Kara CMN area on an ongoing basis to monitor the status of woodland bird populations over time.*

Erect exclusion fencing where appropriate to enable regeneration/revegetation of areas of degraded habitat with appropriate species;

Facilitate the establishment of environmental covenants over key areas of habitat (which will require appropriate compensation to landholders);

Encourage the Northern Grampians Shire to introduce rate rebates for covenanted land; and

Coordinate with conservation management groups bordering the Kara Kara CMN area to develop habitat linkages where possible.

3.2 Protect, maintain and increase quality habitat

There is widespread evidence that habitat restoration and revegetation projects can reverse species decline and increase the distribution and abundance of woodland birds (Radford & Bennett 2004; Radford, Bennett & Cheers 2005).

In the context of this Strategy, “protected areas” refers to remnant habitat protected by both short- and long-term arrangements such as stewardship agreements and planning requirements, as well as land incorporated into the National Reserve System including land covered by private conservation covenants.

A long-term goal of the Network is to incorporate existing NCRs and Regional Parks within the Network’s area of interest into the Kara Kara National Park. A change in the conservation status of these NCRs and Regional Parks to National Parks will give increased protection against the threats outlined in this Strategic Plan, including habitat loss, fragmentation and simplification which, if not addressed, ultimately lead to species decline and, for some, possible extinction.

This Strategy will target remnant habitat (including parks and reserves) across an area extending from Tunstalls NCR in the east to Morri Morri NCR in the west and incorporating habitat remnants in between on both public and private land. Refer to the map in Section 1.4 for more information.

Objectives:

Protect and enhance habitat critical to the survival of woodland birds, and other threatened flora and fauna species;

Maintain, improve and increase the network of “protected areas” within the Kara Kara CMN; and

Increase the area and quality of habitat in the Kara Kara CMN through a range of restoration and revegetation projects.

Actions:

Identify parcels of remnant habitat on private land for potential protection using a range of measures/initiatives, including private covenants, by facilitating strategic land acquisitions, and by lobbying the State Government to upgrade the protection status of NCRs and State Parks;

Build relationships and partnerships with private landholders; and

Scope and obtain funding from both public and private sources for potential habitat restoration and revegetation projects using mixed species to support both vertebrate and invertebrate fauna.

3.3 Manage invasive weeds

Weed management, both suppression and eradication, enables native vegetation to regenerate and predominate, particularly when control programs are supplemented by habitat restoration and revegetation programs.

As weeds spread readily along creek lines, management and control programs will concentrate on weed invasions in riparian zones on both public and private land. Programs will also target upstream weed infestations to minimise the spread of seeds downstream. This is especially important in light of climate change modelling, which predicts less frequent but more intense rainfall/flooding events (CSIRO 2012).

Objectives:

Identify any emerging weed problems within the Kara Kara CMN area;

Eradicate environmental weeds where possible; and

Where eradication is not possible, suppress the spread of weed populations by minimising seed set and seed bank expansion.

Actions:

Document weed management programs previously undertaken within the Kara Kara CMN area;

Work with and support Landcare and other environmental networks, as well as public and private land managers in weed control and management programs;

Identify and map target zones for weed eradication and revegetation programs;

Initiate weed control programs using licensed contractors;

Monitor sprayed areas and initiate follow-up spraying programs where necessary to maintain ongoing weed control;

Initiate revegetation programs, as appropriate; and

Where weeds have developed resistance to some approved chemicals, investigate/explore alternative weed eradication methods as appropriate for use in sensitive riparian zones.

3.4 Co-ordinate control of introduced predators

Objective:

Reduce populations of introduced predators, specifically foxes and cats, and ensure these populations remain at low levels.

Actions:

Partner with key stakeholders (both government agencies and private landholders) to implement co-ordinated control programs in areas of high fox populations, incorporating baiting (1080), shooting and den eradication. These programs will build on the success of control programs previously conducted in the area by Parks Victoria and the NCCMA;

Promote and coordinate these control programs within the community to increase participation by private landholders (who are generally receptive to feral predator control);

Investigate funding opportunities for the purchase of approved baits;

Work with local landholders and Landcare groups to monitor the presence of feral cats; and

Through education, raise public awareness about the impact of cats on biodiversity.

Control programs will focus on woodland (including parks and reserves) and biolink edges, and on adjacent cleared areas on private land.

The strategy for feral cat control will focus on ongoing monitoring, and opportunistic shooting and trapping.

3.5 Manage total grazing pressure

Reducing grazing pressure within native woodlands not only substantially reduces habitat degradation but facilitates the natural regeneration of native vegetation (Lindenmayer 2011).

There is widespread evidence that sustained reductions in grazing pressure in many parts of the Kara Kara CMN area will provide the opportunity for natural regeneration of canopy and understorey plants, provided there is residual soil, control of weed competition, a seed source and favourable climatic conditions.

The widespread movement and persistence of native herbivores within the landscape means that implementation of this Strategy is not possible across the whole Kara Kara CMN area. As such, actions will focus on areas of “priority habitat”, that is, on land supporting remnant Box woodland, native vegetation along watercourses, and areas known to support populations of nationally-listed orchids. Priority habitat within areas identified as regional biolinks will be the focus of this Strategy for the life of the current plan (2013-2018).

As the largest component of total grazing pressure on private land and the most readily managed, domestic stock is a priority for intervention, either by exclusion (e.g. fencing) or by positively influencing grazing regimes through public education, financial incentives, management agreements, or through the facilitation of strategic land acquisitions.

On public land, the reduction of rabbit and macropod numbers in collaboration with relevant government agencies is necessary where these herbivores are having a significant adverse impact, such as along watercourses.

The effectiveness of actions relating to this Strategy will be measured by ongoing monitoring within fenced exclusion zones and in managed areas by Kara Kara CMN staff/volunteers and agency staff.

If successful, this Strategy is likely to be the most effective method of increasing habitat quantity and quality. As such, it is the Kara Kara CMN's main strategy for halting and reversing the decline in the regeneration of native vegetation.

Objective:

Manage total grazing pressure by both native and introduced herbivores, in particular by domestic stock, rabbits, hares, kangaroos and wallabies, to allow ecosystem recovery through the natural regeneration of vegetation on both public and private land.

Actions:

Researching total grazing pressure on public land by establishing and monitoring a series of fenced exclusion zones;

Detailed mapping of areas –

- That require total grazing pressure management as a priority,
- Have a high potential for vegetation recovery, and
- With potential as regional biolinks;

Developing interventions with collaborators/stakeholders on private and public land, including landholders, the NCCMA, Parks Victoria, DEPI, TfN and BHA; and

Developing fully-costed funding applications to support total grazing pressure management within priority target conservation areas and proposed biolinks.

3.6 Protect native orchids

The single biggest cause of decline for most native orchid species is habitat destruction (DSE 2004). Key threats such as weed invasion, and habitat loss and simplification through fire, land clearing, unauthorised firewood collection and grazing pressure by rabbits, hares and macropods all have an adverse effect on native orchid populations. Without intervention, these orchids are in danger of extinction.

Further, a number of native orchids, notably spider orchids, are known to have complex symbiotic relationships with other species such as mycorrhizal fungi and insect pollinators. For example, the most likely pollinators of Spider Orchids (*Caladenia* sp.) are male Thynnid wasps. Spider Orchid flowers mimic the scent of the female Thynnid wasp pheromone, attracting the male wasps which then pollinate the plant (DSE 2004). Thus, effective orchid protection requires the protection and restoration of habitat for both the plants *and* their pollinator partners.

In Victoria, the DEPI has been responsible for managing and coordinating programs to protect threatened orchid species listed under the EPBC and FFG Acts.

The role of the Kara Kara CMN and a key objective of this Strategy, therefore, is to assist the DEPI with implementation of this Program within the Kara Kara CMN area. The St Arnaud Field Naturalists' Club, as a partner organisation to the Kara Kara CMN, already has an established relationship with the DEPI and regularly assists with the implementation of Program initiatives.



At the same time, we recognise that a number of non-listed native orchid species are also under threat from habitat loss and degradation.

Objective:

Assist the DEPI with implementation of its Threatened Native Orchid Recovery Program within the Kara Kara CMN area.

Actions:

Survey existing and log new populations of listed and non-listed native orchid species on public and private land;

Record the location and assess the vulnerability and conservation status of non-listed native orchid species within the Kara Kara CMN area and where appropriate facilitate the listing of these species;

Monitor the life stages of these native orchid populations including plant emergence, flowering and seeding;

Erect exclusion fencing around threatened native orchid populations to mitigate threats such as grazing pressure and provide an opportunity for increases in population size and distribution; and

Assist with seed collection and species re-establishment programs in suitable habitat (as authorised by, and under the direction of, the DEPI).

Note: Additional actions aimed at protecting and restoring habitat and mitigating key threats to populations of native orchids and their pollinator partners are covered in other Kara Kara CMN strategies.

3.7 Influence appropriate fire regimes

As the impacts of climate change become more marked, the threat posed to remnant woodland habitat by fire will increase. So too will public pressure on governments of all persuasions to mitigate the threat of bush and grassfires through prescribed burning programs. While the protection of human life is paramount, the Kara Kara CMN believes that a balance must be achieved between this key aim and the protection of biodiversity.

Objectives:

Reduce the adverse impacts of inappropriate fire regimes by influencing public policy regarding the location, frequency and intensity of prescribed fuel reduction burns;

Influence planning for fuel reduction burning, promoting cool mosaic burns rather than large-scale hot burns to protect biodiversity; and

Promote the key principle that prescribed burning should focus on asset protection rather than just an area target.

Actions:

Make submissions to, and lobby, the Victorian State Government and government agencies regarding the need to protect areas of priority habitat from “too-frequent” prescribed burns within the Kara Kara CMN, and the status of significant EVCs and threatened species;

Participate in public fora and private discussions with responsible government agencies regarding the location, and appropriate frequency and intensity of proposed prescribed burns within the Kara Kara CMN area; and

Document, map and monitor areas of priority habitat before and after prescribed burns. Over time, this information will develop into a substantial database, which will comprise the knowledge base for submissions and lobbying efforts by the Kara Kara CMN.

3.8 Influence firewood management

Within the Kara Kara CMN area, habitat degradation/simplification has been identified as a major threat to each of the four conservation targets in this Plan.

While there are many causes of habitat degradation, the indiscriminate and illegal removal of coarse woody debris by the public - in particular fallen branches, and dead logs and mature trees with nesting hollows - from within areas of remnant vegetation (including designated Nature Conservation Reserves, Regional Parks and roadside corridors) is a key contributing factor.

Fallen timber and other coarse woody debris is fundamental to the ecology of both vertebrate (e.g. mammals, birds and reptiles) and invertebrate (e.g. termites) fauna (Ford *et al.* 2001). This has been clearly demonstrated by studies into the importance of coarse woody debris as habitat for populations of the Brown Treecreeper (*Climacteris picumnus*), a near-threatened woodland bird species in Victoria and specialist forager on fallen timber. A substantial and sustained increase in Tree Creeper densities was recorded in areas where fallen timber levels were artificially increased (Mac Nally 2006; Mac Nally, Horrocks & Pettifer 2002; DSE 2007).

The indiscriminate removal of coarse woody debris has also contributed to the continuing decline of the threatened Bush Stone-Curlew (pictured) (Ford *et al.* 2001) in the Kara Kara CMN area, which is listed under the FFG Act (DSE 2012).



The effective monitoring and control of firewood collection by the public over an area as large as the Kara Kara CMN is difficult for DEPI officers and Parks Victoria rangers to manage on their own. It is therefore hoped that a focus on public education will bring about cultural change within the

community, and where it doesn't, increase the likelihood of illegal firewood removal being reported and prosecuted.

Further, while the collective impacts of global warming and climate change are starting to put pressure on governments at all levels to move towards cleaner sources of energy, the availability of these energy sources in the St Arnaud region is not guaranteed. This Strategy is therefore seen as a long-term goal, with a timeframe of between five and 20 years.

Objectives:

Reduce indiscriminate and illegal logging, thinning and removal of native vegetation for firewood within State forests, along roadsides and in other public land and reserves;

Influence public policy at both a state and local government level on the most appropriate locations for firewood collection; and

Lobby for and promote the use of alternative energy sources to reduce the demand for firewood and by extension, habitat degradation within remnant vegetation in the Kara Kara CMN area.

Actions:

Support and work with State and local governments to influence –

- Where firewood is collected (both in the location of collection zones and in the type of firewood made available for collection); and*
- Town Planning policy, in particular the adoption of more energy-efficient guidelines for housing design and construction.*

Educate the community about the importance of maintaining habitat quality in remnant vegetation patches and along roadsides to help ensure the future survival of threatened flora and fauna species in the area;

Support the lobbying efforts of local government and community groups to bring natural gas to the Kara Kara CMN area; and

Support and promote the establishment of firewood lots by private enterprise on cleared and otherwise unproductive land.

3.9 Reduce impacts from interspecific competition

One of the consequences of habitat fragmentation and degradation on declining woodland birds, particularly smaller insectivores and honeyeaters, has been increased interspecific competition from a number of aggressive and/or invasive species, both native and introduced (Ford *et al.* 2001). These include the Noisy Miner, Common Myna, Common Starling, House Sparrow and European Honey-bee.

The major impacts relate to the competitive exclusion of smaller, passive species from resources such as nectar and nest hollows, particularly in smaller areas of remnant habitat (Major *et al.* 2001; Ford *et al.* 2001).

Other strategies in this Plan that aim to improving the quality and extent of native habitat through habitat restoration and revegetation projects, and weed management, will also assist in reducing the impact of feral species on woodland birds.

Objective:

Reduce the impact of feral species on declining woodland birds.

Actions:

Initiate an ongoing public education campaign to raise awareness about the impacts of feral species and encourage/recommend appropriate management strategies at a local level;

Encourage the public to report sightings of Common Mynas in the area to assist in monitoring the establishment and spread of this species;

Support/co-ordinate feral population reduction programs throughout the Kara Kara CMN area; and

Monitor and record the presence of feral honey bees on public land.

3.10 Secure the ongoing viability of the Kara Kara CMN

The Kara Kara CMN has a major role to play in co-ordinating the efforts of key stakeholders in the protection and conservation of biodiversity within the region.

To achieve its objectives and manage day to day administration, the Kara Kara CMN currently employs a Network Facilitator, a position that is funded until June 2015.

The Network is also supported by a diverse and skilled membership, bringing together representatives of local Landcare and environment groups, Victorian State Government agencies, non-government conservation organisations, and members of the local community (both urban residents and rural landholders).

Objective:

Provide for the ongoing capacity needs of the Network to ensure that this important role can continue and that the activities outlined in this Strategic Plan can be implemented.

Actions:

Seek/obtain funding to extend the Network Facilitator position beyond June 2015;
Expand Kara Kara CMN membership, focussing on recruiting members with skills relevant to Network objectives and to provide a larger pool of people to assist with activities and group management.

4. Measuring our progress

To assess how well our strategies are working, the Kara Kara CMN will periodically collect data based a number of indicators that gauge how well our strategies are keeping the critical threats in check and, in turn, whether the viability of our conservation targets is improving. A monitoring framework for the viability of our targets is outlined below.

Declining woodland birds

| Key ecological attribute | Indicator(s) |
|---|--|
| Presence of FFG/EPBC-listed species and non-listed species known to be in decline (Section 2.2) | Increase in overall species richness and diversity Stabilisation of FFG/EPBC-listed species populations in Kara Kara CMN area over time Reduction in feral predators |

Box woodlands

| Key ecological attribute | Indicator(s) |
|--|---|
| Heterogeneous vegetation structure (horizontal and vertical) | Improved tree canopy health/cover (including old hollow-bearing trees) Good species recruitment Increased connectivity in landscape Low weediness Overall good cover of coarse woody litter |

Native vegetation along creekline systems

| Key ecological attribute | Indicator(s) |
|-----------------------------------|--|
| Vegetation presence and structure | Increase in native vegetation species along creek lines Low weediness Reduced erosion and increased bank stability |

Nationally-listed orchids

| Key ecological attribute | Indicator |
|---|---|
| Presence of FFG/EPBC-listed species and non-listed species known to be in decline (Section 2.5) | Increase in number and size of populations of both nationally-listed and non-listed native orchid species |

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Ecological Vegetation Classes within the Kara Kara CMN Area

| Ecological Vegetation Class | | 2005 | 1750 |
|-----------------------------|---|----------|----------|
| # | EVC Name | Hectares | Hectares |
| 132 | Plains Grassland | 11 | 329 |
| 175 | Grassy Woodland * | 7,970 | 35,047 |
| 20 | Heathy Dry Forest | 10,516 | 12,930 |
| 22 | Grassy Dry Forest | 5,702 | 6,588 |
| 23 | Herb-rich Foothill Forest | 1 | 1 |
| 321 | Riverine Chenopod Woodland/Lignum Wetland Mosaic | 0 | 23 |
| 47 | Valley Grassy Forest * | 687 | 785 |
| 48 | Heathy Woodland | 3,808 | 5,716 |
| 56 | Floodplain Riparian Woodland * | 789 | 3,799 |
| 61 | Box Ironbark Forest * | 27,796 | 50,372 |
| 641 | Riparian Woodland * | 62 | 134 |
| 679 | Drainage-line Woodland * | 12 | 85 |
| 68 | Creekline Grassy Woodland *. | 2,334 | 5,552 |
| 697 | Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic * | 120 | 492 |
| 70 | Hillcrest Herb-rich Woodland | 1,437 | 2,406 |
| 74 | Wetland Formation * | 41 | 221 |
| 76 | Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic * | 8,616 | 34,751 |
| 803 | Plains Woodland * | 2,332 | 31,521 |
| 83 | Swampy Riparian Woodland * | 74 | 295 |
| 92 | Scrub-pine Woodland | 3 | 5 |
| 93 | Sandstone Ridge Shrubland | 1,653 | 3,386 |

Source: DSE 2013.

Threat ratings system

Note: This threat rating system was used to identify and rate the key threats to our conservation targets in Section 2.6 of this document. The rating system was kindly provided for the use of Kara Kara CMN by Bush Heritage Australia.

1. Rate the scope of the threat

| | |
|------------------|---|
| Very High | The threat is likely to be pervasive in its scope, affecting the target across all or most (71-100%) of its occurrence/population. |
| High | The threat is likely to be widespread in its scope, affecting the target across much (31-70%) of its occurrence/population. |
| Medium | The threat is likely to be restricted in its scope, affecting the target across some (11- 30%) of its occurrence/population. |
| Low | The threat is likely to be very narrow in its scope, affecting the target across a small proportion (1-10%) of its occurrence/population. |

2. Rate the severity of the threat

| | |
|------------------|---|
| Very High | Within the scope, the threat is likely to destroy or eliminate the target, or reduce its population by 71-100% within 10 years or 3 generations. |
| High | Within the scope, the threat is likely to seriously degrade/reduce the target or reduce its population by 31-70% within 10 years or 3 generations. |
| Medium | Within the scope, the threat is likely to moderately degrade/reduce the target or reduce its population by 11-30% within 10 years or 3 generations. |
| Low | Within the scope, the threat is likely to only slightly degrade/reduce the target or reduce its population by 1-10% within 10 years or 3 generations. |

3. Rate the irreversibility (permanence) of the threat

| | |
|------------------|--|
| Very High | The effects of the threat cannot be reversed and it is very unlikely the target can be restored, and/or it would take more than 100 years to achieve this (e.g., wetlands converted to a shopping centre). |
| High | The effects of the threat can technically be reversed and the target restored, but it is not practically affordable and/or it would take 21-100 years to achieve this (e.g., wetland converted to agriculture). |
| Medium | The effects of the threat can be reversed and the target restored with a reasonable commitment of resources and/or within 6-20 years (e.g., ditching and draining of wetland). |
| Low | The effects of the threat are easily reversible and the target can be easily restored at a relatively low cost and/or within 0-5 years (e.g., off-road vehicles trespassing in wetland). |

Explanation of Key Terms

Scope - Most commonly defined spatially as the proportion of the target that can reasonably be expected to be affected by the threat within ten years, given the continuation of current circumstances and trends. For ecosystems and ecological communities, scope is measured as the proportion of the target's occurrence. For species, scope is measured as the proportion of the target's population.

- The *target* refers to the focal conservation target at the scale being assessed - in technical terms, the target occurrence within the defined project area (e.g., small site, landscape, or even global scale).
- *Affected* means subject to one or more stresses from the threat.
- The *ten-year* time frame can be extended for some longer-term threats like global warming that need to be addressed today.
- *Current circumstances and trends* include both existing as well as potential new threats.
- *Occurrence* for ecosystems is typically by area.
- Species includes both single species targets as well as multiple species guilds. If a species is evenly distributed, then the proportion of the target's population is the same as the proportion of the area occupied, but if it is patchily distributed, then it is not. In these cases, it is important to specify the unit of assessment for the target (e.g., breeding pairs vs. nests vs. individuals).
- For both ecosystems and species, the proportion is estimated as the percentage of the target's occurrence at the scale being assessed (e.g. a water pollution threat affecting an aquatic ecosystem target is measured as the percentage of that aquatic ecosystem target affected, not the percentage of the entire assessment area).

Severity - Within the scope, this is the level of damage to the Target from the Threat that can reasonably be expected given the continuation of current circumstances and trends. For ecosystems and ecological communities, this is typically measured as the degree of destruction or degradation of the target within the scope. For species, this is usually measured as the degree of reduction of the target population within the scope.

- *Within the scope* refers to both the spatial and temporal scope defined above. It is important to note that the severity rating is not made for the entire assessment area, but only within the scope the threat affects. Thus, if the scope of a hunting threat only affects a sub-population of the overall species target, the severity assessment is only made in relation to that sub-population.
- For ecosystem targets, *destruction or degradation* is defined in reference to one or more key attributes of the target. Likewise, damage to species targets is most often defined in terms of the *degree of reduction* of the key attribute "population size." In some cases it may be appropriate to consider other key attributes for species targets, such as reduction of breeding pairs.

Irreversibility (Permanence) - The degree to which the effects of a threat can be reversed, and the target affected by the threat restored.

Explanation of Key Terms

- Permanence applies to the *effects of the threat* on the target, not the threat itself. In other words, it is not a measure of how difficult it is to stop the threat, but rather to undo the stress

caused by the threat on the target. It is important to note that the use of the permanence rating as specified is largely in respect to prioritizing potential threats.

- If a threat is looming that will cause irreversible damage, then it makes sense to try to address that threat. However, if the threat has already occurred and the irreversible damage has already taken place, then it may not make sense to prioritize that threat for action.

Explanation of How Target-Threat Ratings Are Calculated

The first table shows the rule-based procedure for combining the rankings for the **Scope** and **Severity** variables to get a ranking of **Threat Magnitude**.

| | | Scope | | | |
|----------|-----------|-----------|--------|--------|-----|
| | | Very High | High | Medium | Low |
| Severity | Very High | Very High | High | Medium | Low |
| | High | High | High | Medium | Low |
| | Medium | Medium | Medium | Medium | Low |
| | Low | Low | Low | Low | Low |

The **Threat Magnitude** is then combined with **Irreversibility** ratings using the second table to get the Target-Threat Rating.

| | | Irreversibility | | | |
|-----------|-----------|-----------------|-----------|--------|--------|
| | | Very High | High | Medium | Low |
| Magnitude | Very High | Very High | Very High | High | Medium |
| | High | High | High | Medium | Low |
| | Medium | Medium | Medium | Low | Low |
| | Low | Low | Low | Low | Low |

For example, if the Scope is rated as “Very High” and the Severity is rated as “High”, the Threat Magnitude is “High” (see first table). If the Irreversibility is rated as “medium”, then the overall rating becomes “Medium” (see second table)

Explanation of How Threat Rating Summaries Are Calculated

This methodology uses a combination of rules for rolling up ratings across targets and threats, and for the project as a whole. As shown in the grid below, the bottom row contains the overall ratings for each target, and the far right-hand column contains the ratings for each threat. The cell in the lower right-hand corner contains the overall rating for the project. Normally the overall project rating is based on rolling up the threat ratings in the right-most column, using the 3-5-7 and 2-Prime rules.

3-5-7 Rule

Multiple threats to individual targets and multiple target threat scores are first summed together using the 3-5-7 rule:

- 3 High rated threats are equivalent to 1 Very High-rated threat;
- 5 Medium rated threats are equivalent to 1 High-rated threat; and
- 7 Low rated threats are equivalent to 1 Medium-rated threat.

Refer Row 2 – there are 3 High ratings (which equals 1 Very High) and 1 Very High rating, so it is treated as if it had two Very High ratings. In the *lone Chaparral* Column, there are 5 Medium ratings (equals one High), plus one High, for a total equivalent of 2 High ratings.

| <i>Active Threats Across Systems</i> | Vernal pool grasslands | Lower Floodplain | Upper Floodplain: Chinook Salmon | Upper Watershed | lone Chaparral | Blue Oak Woodland | Overall Threat Rank |
|--------------------------------------|------------------------|------------------|----------------------------------|------------------|----------------|-------------------|---------------------|
| Farms | High | High | High | High | - | Very High | Very High |
| Housing | High | High | - | High | Medium | Very High | Very High |
| Groundwater withdrawal | - | High | Very High | - | - | - | High |
| Levee and dike construction | - | High | Very High | - | - | - | High |
| Industrial development | - | - | - | - | High | High | High |
| Fire suppression | Medium | - | - | High | Medium | High | High |
| Invasive/alien species: Plants | High | Medium | - | - | Medium | Medium | Medium |
| Invasive/alien species: Animals | - | Medium | Medium | High | - | - | Medium |
| Forestry practices | - | - | - | High | - | - | Medium |
| Operation of drainage systems | - | - | - | High | - | - | Medium |
| Grazing | Medium | - | - | - | - | Medium | Medium |
| Recreational vehicles | - | - | - | Low | Medium | - | Low |
| Agricultural runoff | - | Medium | - | - | - | - | Low |
| Overfishing or overhunting | - | - | Low | - | - | - | Low |
| Threat Status for Targets | High | High | Very High | Very High | High | Very High | VERY HIGH |

Overall
Project Rank

Prime Rule

After the 3-5-7 rule has been applied, the 2-prime rule is used to determine the rolled up rating for a target, a threat, or for the whole project. This rule requires the equivalent of two ratings at a certain level for the end result to be that level. For example, there would have to be the equivalent of at least two Very High ratings to produce a Very High result, or two ratings of Medium or above to produce a Medium result. In the example, the Housing threat has the equivalent of two Very High ratings (due to the 3-5-7 rule), so the result is Very High. The Recreational Vehicles row has one Medium rating and one Low. Since it does not have two or more Mediums, the result is Low.

Majority Override

The Majority Override rule ensures that the overall project rating is not reduced too much by the other rules. Normally, the overall project rating is a rollup of the threat ratings, using the rules above. However, if a majority of the targets have a rating higher than that computed rollup, then that majority rating is used instead. For example, if the result of using the 3-5-7 and 2-prime rules gave a project rating of Medium, but 4 out of the 6 targets had at least one rating of at High (or Very High), then the Majority Override rule would take effect and the overall project rating would be High.