

## Key Threatened Species

### FLORA



#### **Rosella Spider Orchid *Caladenia rosella***

**Habitat:** Grassy Dry Forest, Heathy Dry Forest, Box-Ironbark on sandy clay loams derived from sandstone and mudstone. Cottles Bridge (see Dunmoochin Biodiversity Study), Research, Christmas Hills. Although once scattered throughout central Victoria, the Rosella Spider-orchid is currently only known from four populations and less than 150 plants. The entire known population occurs within the Shire of Nillumbik.

**Description:** 20cm tall, leaf 4-9cm long and covered in fine hairs, pink-red collar at the base, one flower pale to bright pink with a musk like fragrance, flowers August to September (peak early to mid-August), leaves evident around July, fruits

October to November. Grows among native moss, *Triquetrella papillata* and have a key pollinator species – a bee from the *Leioproctus* genus, which relies on a diverse range of daisies, wattles and peas.

**Threats:** Mainly annual grasses and herbs – *Briza maxima*, *Ehrharta erecta*, rabbit grazing and White-winged Choughs, infrequent fires, House Mouse. Loss of key pollinator species - a bee of the *Leioproctus* genus, is reliant upon a diverse range of daisies, wattles and peas to collect enough food to feed its young.

**Current management:** Caging, microsite management, hand pollination, capsule/seed collection, weed control.

**Actions:** Fence off populations or replace fencing, cages. Select introduction sites which are secure or permanently protected. Protect areas with potential habitat. Control pest plants and animals. Harvest seed and establish seedlings. Plant/direct seed with a diverse array of daisies, wattles and peas in areas where weed control works have been undertaken to provide habitat for pollinator species.



#### **Round-leaf Pomaderris *Pomaderris vacciniifolia***

**Habitat:** The species is found in dry forests on well drained soils in gullies and on gentle slopes. In Nillumbik LGA, the species is found within Valley Grassy Forest EVC dominated by Yellow Box and Candlebark. Around St Andrews it is also found within Creek-line Herb-rich Woodland EVC dominated by a Swamp Gum *Eucalyptus ovata* in wetter sites and Yellow Box *Eucalyptus melliodora*

and Candlebark *Eucalyptus rubida* along alluvial terraces. In Nillumbik the species is known from a small number of populations including one reserve in Christmas Hills, one reserve and several roadsides in St Andrews and Smiths Gully, and one reserve in Eltham South.

**Description:** Round-leaf Pomaderris is a medium shrub growing to 3-4 metres high. It has small elliptic leaves to 20mm long that are dark green and smooth/glabrous on the upper surface with inconspicuous veins and are pale grey below with dense stellate (star shaped) hairs on the lower surface. The flowers are small and creamy white, on fine pedicels (fine individual flower stalks), in small leafy panicles (branching groups), petals present, ovary prominent with stellate hairs (branching type hairs), style just cleft (divided / split). Flowers occur in the leaf axile. It flowers from October to November.

**Threats:** Round-leaf Pomaderris is a rare plant with a restricted range in Melbourne. As populations are small, this makes them extremely vulnerable to natural and anthropogenic disturbance. The main threats are browsing by feral herbivores (e.g. deer species, goats, rabbits, hares) and native herbivores, land clearance and weed invasion. Bark damage due to deer rubbing their antlers and insect damage have also been recorded. It is particularly vulnerable to the effects of prolonged drought which can kill plants and restrict recruitment. As it is often found growing on roadsides and under power lines it is also subject to damage from weed spraying, roadside slashing and drain clearing. The species appears reliant on periodic disturbance events, such as fire and there is encouraging evidence of regeneration at several of the 2009 bushfire sites.

**Current Management:** Populations are being protected from grazing and browsing pressure by fencing (particularly rabbit-proof and deer fencing). Plants are also being recruited from seed and cuttings and are being placed back into existing populations.

**Actions:** Increase population size through growing plants from seed and cuttings (it is one of the few members of its genus that is easy to grow from cuttings) and planting back within a population. Select other introduction sites. Control woody and herbaceous weeds such as Spanish and English Broom and Blackberry. Control of pest animals (rabbits, deer) and fencing off populations from browsing pressure.



**Wine-lipped Spider Orchid *Caladenia oenochila***

**Habitat:** Wine-lip Spider-orchid mostly occupies hillcrests and exposed hill slopes. Most of the sites where it has been recorded are consistent with Box Stringybark Woodland (Grassy Dry Forest). Vegetation commonly associated with Wine-lipped Spider orchids typically supports a rich diversity of shrubs, particularly peas and wattles, with a high diversity of grasses, daisies and other orchids. It also occurs in damp and valley sclerophyll forest and is associated with Creekline Herb-rich Woodland, Herb-rich Foothill Forest and Valley Grassy Forest. It prefers moist, well drained soils. The Shire of Nillumbik contains one of the largest concentrations of Wine-lip Spider-orchid in Victoria. This includes the largest known population of the species (over 800 plants in a

reserve in St Andrews). All other populations are relatively small and many have declined over the last decade. The species is also localised in parts of outer-eastern Melbourne, the Grampians, South Gippsland and Anglesea.

**Description:** Wine-lip Spider-orchid is a tall (to 40cm), hairy, erect, terrestrial orchid with a wiry stem. It displays 1-2 sweetly perfumed flowers which are pale yellow-green with very dark red hairs on the tips and outer surface. The labellum is undivided and is deep red which is paler towards the base. The marginal teeth and calli are deep red. It flowers from August to November. Leaf is linear-lanceolate to 15cm with reddish spots on the base.

**Threats:** Wine-lip Spider-orchid is endemic to Victoria and has been depleted across its range by destruction of habitat for agricultural and other purposes including mining and land development. Remaining populations are at threat from further vegetation clearance and the effects of weed invasion, grazing by native and feral herbivores, predation and loss of key ecosystem processes such as periodic burning. Alteration of habitat such as reduction in patch size, change in hydrological processes, excessive soil disturbance and shading (from built structures) are a major threat to the species or the related taxa that it depends on (e.g. mycorrhizal fungi, pollinators).

**Current Management:** Most of the known populations of these orchids are fenced and/or caged to prevent rabbit and Kangaroo grazing as well as tuber predation by white-winged choughs. Hand-pollination is also undertaken. Collection and direct sowing of seed at the appropriate time of year has been undertaken to increase germination and recruitment rates.

**Actions:** Increase the cover of indigenous shrubs and herbs, reducing the cover of exotic grasses and other weeds. Undertake (intensive) weed control works around populations - *Briza maxima*, *Ehrharta erecta*. Fence/cage populations which are not protected from grazing or tuber predation. Select introduction sites. Protect areas with potential habitat. Control pest plants and animals. Harvest seed and establish seedlings.



### **Charming Spider-orchid *Caladenia amoena***

**Habitat:** Grassy Dry Forest; Box Ironbark Forest, sandy loams derived from sandstone and mudstone. Prefers poor quality, dry soils. Restricted area to the north east of Melbourne in the Greensborough-Plenty-Hurstbridge area within the Victorian Midlands interim bioregion. Only found in two populations at Plenty (public land) and Wattle Glen (private land).

**Description:** Erect, terrestrial orchid to 10cm tall with slender green to reddish hairy stems. Displays a single, yellowish-green flower with a crimson stripe to 20mm wide. Perianth segments to 25mm long, hanging, recurved and tapering abruptly at the ends with an erect dorsal sepal which curves over the column. The labellum is V-shaped and green with a maroon tip. It has clubbed, maroon calli in 4 crowded rows. The lateral lobes are erect with a few short teeth. Flowers from August to October. Has a densely hairy lanceolate leaf to 80mm with red spots near the base.

**Threats:** Population has been severely reduced and altered by historic mining activities and more recent urban development. Annual weeds (*Briza maxima*, *Ehrharta erecta*), grazing by rabbits and kangaroos, site disturbance by walkers and mountain bike riders, predation by slugs and snails,

**Current Management:** Fencing, caging, weed control, micro-site management, hand-pollination, capsule collection.

**Actions:** Fencing, caging, weed control, micro-site management, hand-pollination, capsule collection. Protect identified habitat on private land in Wattle Glen. Control high threat, priority weeds, grazing by introduced and native herbivores, digging up of tubers by introduced Blackbird and the native White-winged Chough and predation of shoots and flowers by slugs, snails and other invertebrates. Fence remaining populations and manage micro-habitat. Hand pollinate, and harvest and store seeds. Investigate germination and seedling establishment. Isolate and culture mycorrhizal fungi, develop in vitro propagating techniques and establish seedlings in cultivation, maintain a database on cultivated plants and establish *ex-situ* collections of the Charming Spider Orchid in protected areas.



**Emerald-lip Greenhood *Pterostylis smaragdyna***

**Habitat:** It is known from several populations, including at Christmas Hills, Cottlesbridge, Hurstbridge, St Andrews and Eltham. All populations are now very small and confined to less than 20-30 plants. It prefers Box-ironbark Woodland and Dry sclerophyll forest (Grassy Dry Forest), low flat ridges and moister flats in open box-stringybark forest with grassy understorey, growing in dark brown loam

over yellow clay. It is known from several populations, including at Christmas Hills, Cottles Bridge, Hurstbridge, St Andrews and Eltham. All populations are now very small and confined to less than 20-30 plants.

**Description:** Emerald-lip Greenhood is a terrestrial orchid that grows to 55cm, displays 1-12 (usually 7) flowers. It has several linear-lanceolate leaves up the stem that are curved down and encircle the stem. Basal leaves are ovate, but absent on flowering plants. Flowers are translucent green with noticeable darker green stripes, the lower sepals are oblong green and joined for most of their length, pointed downwards. Labellum is emerald green with dark green central stripe (which is occasionally brownish green). Flowers from July to September. The Emerald-lip Greenhood is similar to the Tall Greenhood (widespread and locally common) and is distinguished by the stockier habit and larger, more upright striped flowers with a green labellum. All known pollinators of the Genus *Pterostylis* have been male insects of the fungus gnat and mosquito family.

**Threats:** Clearing for housing developments, rabbit grazing and weed invasion, fuel reduction burns conducted during autumn when plants are actively growing poses a significant threat to the species as it often kills plants. Most remaining populations are very small and are at risk of inbreeding depression due to limited genetic diversity. Misidentification.



**Current Management:** Specialist management in the past has involved cross-pollinating plants from different populations by hand in an effort to increase genetic diversity. Protection of plants with steel cages and tree guards. Hand weeding around plants.

**Actions:** Protection within steel cages or tree guards to prevent grazing by rabbits, possums and White-winged Choughs. Grassy and herbaceous weeds should be hand-weeded around the vicinity of plants to prevent competition. Cross-pollination by hand, investigate germination and seedling establishment, establish *ex-situ* collections in protected areas.



**Silurian Striped Greenhood *Pterostylis* sp. aff. *stricta***

**Habitat:** Restricted to lowland Box–Stringybark and Box-Ironbark forest and woodland, including within Grassy Dry Forest and Box Ironbark Forest EVC's. These vegetation types in the region typically support a range of pea shrubs, daisies, lilies and grasses. Currently considered to be endemic to north-east Melbourne, with the majority of populations

restricted to the Shires of Banyule and Nillumbik. In the Nillumbik Shire the species is currently only known from conservation reserves at Eltham, Yarrambat and Christmas Hills and on private property at Cottles Bridge.

**Description:** The Silurian Striped Greenhood is a small, colony-forming orchid that grows to approximately 15cm tall. The leaves form a rosette and are ovate-elliptic with wavy margins. The flower is green with prominent white stripes. Plants grow from small tubers and remain dormant during spring, summer and early autumn. This taxon has recently been recognised as distinct from *Pterostylis striata*, which was formerly known as *P. alata*.

**Threats:** Threatened by clearance of habitat, weed invasion and predation by White-winged Choughs, rabbits and possums

**Current Management:** Grows in highly localized colonies, making them particularly vulnerable to grazing pressure. Plants can be protected with a steel cage, but leaf litter must be carefully removed from the cage each year to prevent build-up and smothering of orchids. Grassy and herbaceous weeds should be removed from around populations by hand weeding and with the help of a weed burner.

**Actions:** Colonies can be expected to thicken and spread in response to protection from grazing and targeted management of grassy and herbaceous weeds. As with other greenhoods some soil disturbance with hand tools, such as when digging out flat weeds, may be beneficial and encourage spread. Protection within steel cages or tree guards to prevent grazing by rabbits, possums and White-winged Choughs. Grassy and herbaceous weeds should be hand-weeded around the vicinity of plants to prevent competition. Cross-pollination by hand, investigate germination and seedling establishment, establish *ex-situ* collections in protected areas.

## FAUNA



### Spot-tailed Quoll *Dasyurus maculatus*

**Habitat:** Found in a variety of habitats including rainforest, wet and dry sclerophyll forest, coastal heath and scrub and sometimes Red Gum forest along inland rivers. Can be found in lowland, foothill, montane & dry forest with rocky outcrops, structurally complex habitat with dense understorey and overstorey, and extensive riparian vegetation. They have a large home range (580ha-2200ha), den sites are in large hollow logs, hollow trees, rock crevices and/or caves. They also like exposed areas or rock ledges for communal latrine sites.

**Description:** Long bodied, long tailed and short-legged with thick coarse fur. They have reddish brown to dark chocolate brown fur with white spots around the body and tail. The average weight is around four kilos (males sometimes up to 7kg). They are a solitary species, mostly nocturnal and partly arboreal. They eat high levels of ground dwelling prey (antechinus, bush rat, possums, gliders, birds, and insects) and sometimes birds (rosellas). Mating occurs in late autumn to early winter (April-August).

**Threats:** Habitat loss and fragmentation of habitat, predation by introduced species (foxes, dogs and cats) and competition for food, use of 1080 poison – female and juvenile quolls are susceptible to 1080, fire and controlled burns which can affect prey numbers and refuge habitat, road deaths as quolls will scavenge on road kill and is placed in danger of getting hit by a car. As they move at night, they might also get hit by a car when crossing roads.

**Current Management:** Research on Spot-tailed Quoll undertaken by DSE. In East Gippsland there is protection of large areas of suitable habitat in Special Protection Zones and Special Management Zones (State Forests and areas under the Central Highlands Regional Forests agreement). On private land, areas have been protected through overlays in the local planning scheme. Threatened species network runs training days, information sessions and community group surveys. Strategic fox control programs.

**Actions:** Survey for the species using a reliable, standardised method. Protect areas of suitable habitat on private land. Provide habitat – large hollow logs. Appropriate management and conservation is necessary for the south-east mainland population at a landscape-level rather than rely on public reserves. Undertake fox, cat and dog control – ensure best practice control methods are used in areas of know/recorded habitat to minimise the risk of baiting programs to Quolls. Use Pindone as an alternative to 1080 baits for rabbit control. Involve the community in conservation efforts – surveys and fox control.



**Brush-tailed Phascogale *Phascogale tapoatafa***

**Habitat:** Prefers dry forest types that have a relatively open understorey but will also use moist gullies adjacent to these habitats. The species favours rough-barked trees and dead branches which are more easily climbed. The species is most commonly recorded in drier forests (Box-Stringybark woodland and Grassy

Dry Forest). Nillumbik contains a large proportion of what is believed to be the most genetically diverse meta-population in Victoria. The largest concentrations occur around Christmas Hills, Watsons Creek and Kangaroo Ground but the species is also sparsely distributed in parts of Eltham and North Warrandyte. Females forage over a home range of 30-60ha that do not overlap, whereas males forage over areas greater than 100ha. They nest in as many as 30 sites each year and nest in hollows in dead or live trees, under flaking bark or in tree stumps. A nursery nest requires large, secure cavities with small entrance.

**Description:** Small arboreal mammal (rat sized) with a distinctive black bushy tail. The body is grey in colour and the eyes and ears are relatively large. Nocturnal, mostly solitary, shy and avoids spotlight beams. Animals can often be identified by their rapid, agile, jerky and erratic movements between trees. Eats mostly arthropods, small vertebrates and nectar and probes for invertebrates amongst bark and rotting wood. Mating occurs in winter for 3 weeks between mid-May and early July and most males will die after the breeding season at 11-12 months old. Females have litters with seven to eight young born late June and early August. Females may live to 3 years old, but usually only raise one litter. Young remain in the pouch for seven weeks after which they are left in the nest while the mother forages at night.

**Threats:** Depleted throughout its range by clearance and disturbance of habitat, leading to habitat fragmentation and a major reduction in hollow-bearing trees. The species is also affected by predation from feral and native carnivores, particularly cats and foxes. The low density of populations and fragmentation of habitat make the Brush-tailed Phascogale particularly vulnerable to the effects of in-breeding depression. Fragmentation of habitat also exerts greater pressure on males to travel longer distances during the breeding season (often through cleared habitats), putting them at greater risk of predation and bodily stress.

**Current Management:** Survey of populations undertaken by Parks Victoria – PV and DSE have a Brush-tailed Phascogale monitoring program and have been collecting DNA samples of dead/road-kill Phascogales. PV also had the Kinglake Biolink Project which aimed at getting Phascogales back into Kinglake National Park following the fires. Nest boxes have been installed. Fox and cat control has been undertaken.

**Actions:** Install nest boxes, undertake fox and cat control, provide habitat connectivity – revegetate in areas to provide connectivity between habitat for known populations. Promote the retention of hollow-bearing trees, protect habitat, and undertake weed control.



### **Powerful Owl *Ninox strenua***

**Habitat:** Prefers open woodland and can also be found throughout dry forests if suitable hollows for breeding and secluded roosting sites are available. They generally favour dense gullies for roosting and breeding sites and older forests where large tree hollows provide nesting sites and plentiful arboreal prey items. The species has been known to inhabit suburban parks where large populations of prey possum species occur. In the Nillumbik Shire, regular roosting and breeding sites are restricted to damp, shaded gullies within extensive patches of dry forest. Many of these sites occur within close proximity to the Yarra River. Key breeding sites in the past have included at Smiths Gully, in the Morrison's Block of Yarra Valley Parklands in Eltham South, Blooms Road in North

Warrandyte, along the Plenty River at Plenty, in the Environmental Living Zone at Kangaroo Ground, at One Tree Hill Conservation Reserve in Christmas Hills and in the upper Diamond and Arthurs Creeks.

**Description:** The Powerful Owl is the largest owl in Australia, reaching up to 55-65cm in height, with a wing span of 120-140cm. The male is larger than the female. The body is mottled dark grey-brown above and white below with dark brown chevrons (chest barring). The eyes are large, forward directing and bright yellow. Immature birds are whiter/paler. The Powerful Owl is readily identified by the call, a single whoooo or double 'whoooo, hoooo'. The species is a nocturnal hunter and usually roosts in tall leafy trees. It feeds on possums and gliders. Usually two eggs are laid in a large hollow lined with wood debris between June and July. Young remain dependent for eight months. They establish new territories during February and March and reach sexual maturity at two years of age. Each pair mates for the life of the partner.

**Threats:** Declined throughout parts of its range due to the reduction in habitat and the large hollow-bearing trees which are essential for breeding. Foxes and other predators are also known to occasionally prey on young fledging chicks. Reduction in prey density is a big issue as well, particularly as males only hunt during the breeding season. Foxes and cats can impact on prey density.

**Current Management:** Installation of specialist nest boxes to replace hollows, protection of known breeding sites, and revegetation of previously cleared sites.

**Actions:** Protection of trees with hollows, identify habitat and breeding sites and protect these, control foxes and cats, revegetate and create habitat links, promote regeneration of large old hollow bearing trees and install nest boxes.





Photo by: Paul Gullan/Viridans Images

### **Barking Owl *Ninox connivens***

**Habitat:** Prefers relatively open habitats and is rarely confined to forest. They prefer open woodland and forest including Box-Ironbark and foothill habitat on granitic slopes. The species is often recorded in edge habitats, between woodlands and wooded farmlands than in forests interiors, but it is probably due to its foraging behaviour, abundance of rabbits and large, hollow bearing paddock trees. The Barking Owl requires habitats that support suitable large hollow-bearing trees

for nesting. Live hollow-bearing trees are preferred for nesting over dead ones and tree species used include Red Box, Grey Box, Red Stringybark, Blakely's Red Gum and River Red Gum. Barking Owl has been recorded breeding around Cottles Bridge and Smiths Gully and along the Yarra at Warrandyte North and Kangaroo Ground. The species has also been recorded throughout the Shire while foraging.

**Description:** Medium-sized brown owl, with white spots on the wings. The underside is whitish and heavily streaked. The head is various shades of brown and the eyes are large, forward facing and brilliant yellow in an indistinct facial mask. The Barking Owl is often identified by its call which consists of a dog-like barking sound or a series of blood curdling screech like a screaming or wailing woman. The species is 35-45cm in length and has a wing span of 85-100cm. The Barking Owl defends a small territory in a large home range. The home range is estimated to be 100-1000ha. It is an obligate hollow-nester and pairs, which usually mate for the life of the partner, may re-use the same nest hollow for many years. They nest between July and October and produce two to three eggs in large hollow-bearing trees. The young are raised within the hollow until they are old enough, usually until the next autumn or winter. The species mostly feeds on a variety of insects, except when breeding when a variety of birds and mammals (ground and arboreal) are taken, including rabbits and small possums. Hunting sometimes begins before dark and can continue after dawn.

**Threats:** Most threatened owl in Victoria due to a number of causes, including clearance of habitat, depletion of hollow-bearing trees suitable for nesting and predation by foxes. Mortality has also been recorded due to secondary poisoning through rabbit baiting programs, entanglement in barbed wire fences and after vehicle collisions. The decline in hollow bearing trees has also had an impact on hollow-dependent prey species. The Barking Owl appears to have declined in the Nillumbik Shire over the last decade. There have been very few recent records and it is unknown if the species is still a breeding resident.

**Current Management:** Installation of nest boxes and control of pest animals.

**Actions:** Private landowners will be encouraged to protect scattered trees, large old trees on farmland. Conduct surveys to locate as many resident pairs of Barking Owls as possible across land tenures throughout the main range of the species. Install nest boxes and revegetate cleared areas.



### **Common Dunnart *Sminthopsis murina***

**Habitat:** Prefers dry forests with a relatively open mid storey and ground layer dominated by tussock grasses. In the Shire of Nillumbik, many populations have inhabited bushland dominated by Red Stringybark and Long-leaf Box with an open understorey and a ground layer dominated by Red-anther Wallaby Grass, which the Common Dunnart is known to utilise for shelter. Some sites have

scattered rocky outcrops which are also likely to be utilised. Dunnart species are known to shelter under a variety of artificial objects, including sheets of concrete, tin and iron. The Common Dunnart is scattered throughout drier parts of the State. Previously in Nillumbik, from 1980's to 1990's, the species had been recorded at multiple sites including Cottles Bridge, Christmas Hills, St Helena, Kangaroo Ground and Yarrambat. However, recently the Common Dunnart has only been recorded at one reserve in Christmas Hills.

**Description:** Common Dunnart is a small carnivorous marsupial and is mouse-grey above whilst mostly white below. They have large rounded ears and thin tail. They are very similar to the White-footed Dunnart and are only distinguished by the lack of striations on the foot pads, shorter muzzle and steeper forehead. Common Dunnarts prefer dry forests predominately with an open mid storey and ground layers. In Nillumbik the Common Dunnart has inhabited bushland dominated by Red Stringbark and Long-leaf Box with Red-anther Wallaby Grass as the ground layer. However, the presence of logs and rock crevices was shown to be of more importance than trees and understorey composition. It is a nocturnal, terrestrial carnivore that feeds on a wide range of insects, including beetles, roaches, cricket larvae and spiders. Breeding occurs from August to March, with 8-10 young born. During the day, the Common Dunnart has been known to rest in cup-shaped nests from 70-110mm wide consisting of dried grasses and leaves built into log hollows, grass clumps, or grass trees. During periods of cold weather animals may enter periods of low activity or torpor.

**Threats:** Declined throughout its range, likely due to clearance of its habitat, predation by introduced predators (foxes and cats) and inappropriate fire regimes. Long periods without fire may lead to decline or local extinction due to reduction in prey species and decline of habitat values. However, a loss of habitat structure and microhabitat due to fire needs to be balanced against the longer term benefits from favourable fire regimes. Little is known about the population dynamics of this species and it is difficult to tell the true viability of this species. Fragmentation of habitat and loss of structural complexity of habitat may be impacting the species as individuals are at a higher risk of predation. Isolation can also impact on genetic viability. Introduced rodents may also be out-competing the Common Dunnart.

**Current Management:** A detailed management program for this species has been coordinated by Parks Victoria at Christmas Hills since 2005. Following an ecological burn, a series of concrete pavers were laid out in areas of suitable habitat. Common Dunnarts were subsequently recorded nesting beneath the pavers two years later in 2007. To provide protection from predators, a 1.5 metre high fence was erected around the site. Some key habitat and foraging plants were reinstated to the site, including Austral Grass Tree which provides nesting sites for Dunnarts and Cat's Claw Grevillea which

attracts invertebrates prey species when in flower. The concrete pavers were improved by adding piles of small river pebbles with a hollow for nesting and drainage channels around the pavers to provide protection during heavy rains. Dunnarts have continually been found beneath the pavers since 2007, including many breeding females. The project at Christmas Hills acts as a model for the management of this highly threatened mammal across its Victorian range. A similar project is also being trialled in the southern portion of Kinglake National Park.

**Actions:** Install concrete habitat pavers in areas of suitable habitat or areas with records of Common Dunnart. Revegetate disturbed areas and re-instate habitat where Dunnart have previously been recorded. Undertake pest animal control – foxes, cats and rats, and pest herbivore control (rabbits, deer), apply ecological burns to some areas in a mosaic fashion, connect fragmented habitat, particularly in known areas of occurrence, promote conservation efforts and encourage reporting of sightings.



### **Lace Monitor *Varanus varius***

**Habitat:** Prefers dry sclerophyll forests and woodlands. Arboreal and will shelter in tree hollows, but will forage on the ground, feeding on carrion. It has mostly been recorded in Grassy Dry Forest, Valley Grassy Forest and Herb-rich Foothill Forest. It has been recorded in Strathewen, Christmas Hills, St Andrews and Kangaroo Ground. These sightings mostly represent dispersing individuals that have wandered from habitat in the southern sections

of Kinglake National Park.

**Description:** Large lizard with a tail-body length of up to 2 metres. The body is dark grey to black and is covered in numerous bands made up of small yellow/cream markings. The tail is laterally compressed. The Lace Monitor is the only *Varanus* species in the Greater Melbourne area and the largest lizard in this region. Females lay 4–14 eggs in a clutch, often in an active termite mound, where the constant temperature and humidity are ideal for incubation. This is a semi-arboreal species and opportunistic carnivore. Their diet typically consists of insects, reptiles, small mammals, birds and birds' eggs. They are also carrion eaters, feeding on already dead carcasses of other wildlife. Lace monitors will also forage in areas inhabited by people, raiding chicken coops for poultry and eggs, rummaging through unprotected domestic garbage bags, and trash cans in picnic and recreational areas.

**Threats:** The Lace Monitor has declined throughout its range due to a range of processes. As a top-order predator it is particularly vulnerable to degradation of native ecosystems that inevitably leads to reduction in prey species. Loss of old trees and stumps has reduced sheltering sites while foxes and other predators have been known to eat the young and eggs. The species has also suffered from persecution by humans and attacks from domestic dogs.

**Current Management:** Monitoring populations using remote sensing cameras. Creation of bio-links such as the recent project in the southern Kinglake National Park increasing connectivity between areas of suitable habitat.

**Actions:** Connect habitat, formally record sightings and encourage reporting of sightings, revegetate and provide connectivity between suitable habitat, promote the species and conservation efforts, control foxes, cats and dogs, protect large old trees and trees with hollows, identify and protect nest sites.



**Southern Toadlet *Pseudophryne semimarmorata***  
**and Brown (Bibron's) Toadlet *Pseudophryne***  
***bibroni***

**Habitat:** A variety of damp habitats in sclerophyll forests. Habitat includes ephemeral gullies, the edges of creeks and wetlands and wet depressions in woodland and forest. The species has mainly been recorded along ephemeral drainage lines including the EVC's Creepline Herb-rich Woodland and Gully Woodland. Usually located in wet areas under rocks, logs or leaf litter, but the species has not been located at many of its former sites for over a decade and appears to have declined. Recent records of Southern Toadlet include very small populations at three locations in Eltham South, a small population along a gully in Bunjil Reserve and in gullies of the southern section of Kinglake National Park. Records of Brown Toadlet in Nillumbik are over 20 years old.



**Description:** Small short-limbed species growing up to 35mm long. The body is olive to dark brown with numerous small warts above, while the belly has prominent black and white marbling pattern. The underside is smooth in females and granular in males. The Southern Toadlet is very similar to the Bibron's Toadlet (or Brown Toadlet) but is distinguished by the orange colouration on the throat and limbs. The Brown Toadlet does not have the orange colouration. The toes are not webbed and there is a visible coloured gland at the base of each hind leg. Its movement tends to be walking rather than hopping. Tadpoles are up to 31mm long. Southern Toadlet and Brown Toadlet are active for only a short period of the year during autumn and early winter. During this time single to small groups of males call from small burrows among damp leaf litter attempting to attract females. Eggs are large (up to 6mm) and laid in a gelatinous mass in damp situations. Following mating and spawning, the female leaves the male who then looks after the eggs. During periods of high rainfall the hatching tadpoles can be washed into larger pools and wetlands. By late spring into summer the tadpoles undergo metamorphosis from tadpole to small toadlets.

**Threats:** The main threat to this species appears to be associated with loss of suitable habitat associated with clearing of bushland. Other factors such as rising salinity, agricultural pesticide spraying and disease could be playing a part but their impact is unknown at this time. Areas



degraded by weed invasion and pollution of streams and wetlands also have had an impact on this species. The drought may have also had an impact on populations of this species as sites may have been too dry for tadpoles to reach maturity.

**Current Management:** Limited management has been trialled for this species.

**Actions:** Collection and analysis of accurate data concerning the existing population size and distribution is important. Controlling weeds, prevent erosion and urban runoff. Create frog habitat and protect ephemeral drainage lines.



### **Swift Parrot *Lathamus discolor***

**Habitat:** Mainly inhabits drier forests and woodlands where abundant supplies of nectar and lerps can be found. Due to sporadic patterns of eucalypt flowering, the species is highly mobile and may be abundant at a location one year but absent the next. The species is also commonly found in parklands and suburban areas where it feeds on native and indigenous planted trees. Tree species that are favoured by Swift Parrot include Yellow Gum, Red Ironbark, Yellow Box, Manna Gum, Swamp Gum and some planted non-indigenous species. Important areas of habitat that contain these tree species include riparian corridors, remnant bushland (Box Ironbark Forest) and paddocks with scattered trees. Depending on the availability of food, it can be recorded in bushland around Plenty and in residential areas around Eltham, Greensborough and St Helena. An area of Yellow Gum woodland at Goldworthy Lane in Plenty has been described as one of the most important areas for Swift Parrot in Greater Melbourne. The species has also been recorded irregularly at Smiths Gully, Eltham, Research, Cottles Bridge, Yarrambat, Doreen and north of Arthurs Creek.

**Description:** The Swift Parrot is mostly bright green in colour, with dark-blue patches on the crown, a prominent red face, and the chin and throat are narrowly bordered with yellow. It is approximately 25 cm in length, the wingspan is 32 to 36 cm and it weighs about 65g. It is a slim, medium-sized parrot with angular pointed wings and a slender tail giving it the characteristic streamlined flight-silhouette. Swift Parrots are often detected by their rapid flight and conspicuous, high-pitched call.

**Threats:** Clearance of suitable habitat, clearance of key breeding sites in Tasmania and fragmentation and depletion of critical foraging habitat in Victoria, adult mortality by windows, cars and other man-made structures, firewood collection and poor knowledge of ecological requirements.

**Current Management:** Preventing clearance and degradation of habitat. Revegetation of previously cleared areas with a range of eucalyptus suitable to support this species and understorey shrubs is a positive step towards increasing available foraging habitat.

**Actions:** Revegetate areas with eucalyptus species including Yellow Gum, Red Ironbark, Yellow Box, Manna Gum and Swamp Gum in areas of known foraging habitat. Prevent further loss of Box Ironbark habitat and protect areas with large old trees. Promote the protection and enhancement of Swift Parrot habitat through landowner agreements and covenants.



**Eastern Horseshoe Bat *Rhinolophus megaphylus***

**Habitat:** Forests in which suitable caves (or human-built caves such as mineshafts) are found. The species requires caves to roost and breed. Eastern Horseshoe Bats roost in warm, humid caves, holes and cracks in rocks, old mines and tunnels and occasionally under buildings. Up to 50 bats roost together in a colony, hanging free from the ceiling.

**Description:** A small, large-eared, leaf-nosed microbat. Fur grey-brown on head and back, slightly paler grey-brown below. Tail narrow and not extended beyond the tail membrane. Eyes very small and ears very large, pointed and well separated. Nose large and complex, made up of a lower, horseshoe-like structure around the nostrils, an upper, lance-shaped structure, above the nostrils, and a wrinkled, folded structure between the two. Nocturnal. Eastern Horseshoe Bats are distinguished by the horseshoe-shaped fleshy area around their nose. They are disturbed when people enter their caves, especially in the breeding season when they may abandon their young. They hunt flying and non-flying insects and spiders and fly close to the ground or foliage to catch their prey, and then carry them to special feeding roosts to eat. Females give birth to a single young (Nov-Dec) which is carried on the female's belly for the first week then left in a maternity roost until weaned (about 8 weeks).

**Threats:** Eastern Horseshoe Bats are vulnerable to disturbance from human visitors to cave roosts, destruction of cave roost sites by mining or closure of old mine sites, and loss of feeding habitat by forestry operations, and clearing for agriculture and housing.

**Current Management:** Unknown

**Actions:** Locate and identify roosting/breeding sites (caves, mines etc.) and feeding areas and protect these sites. Revegetate cleared areas and provide connectivity across the land. Prevent further loss and degradation of foraging habitat and roosting and breeding sites.



**FEMALE**      1 cm



**MALE**      1 cm

**Small Ant-blue Butterfly *Acrodipsas myrmecophila***

**Habitat:** Most records are from hilltops in eucalypt open-forest or woodland and is known from a number of widely dispersed locations in the north and east. However, populations are very localised and they appear to be rare in natural situations. In Victoria it is known only from a single remnant habitat patch which supports a small breeding colony in open grassy woodland on a well-drained gentle slope where the associated ant, Coconut Ant *Papyrius* sp., occurs. The only recent Victorian record is from near Broadford. The species has been

previously recorded in Ringwood, Heathmont, Glen Waverley, Lilydale, Wandin, Ocean Grove and another site near Broadford, but it is believed to be extinct in these areas as a result of habitat disturbance. Larvae and pupae and associated ants have been found in dead stumps or sometimes live trees of Golden Wattle *Acacia pycnanthal*, old fence posts or at the base of Red Box saplings.

**Description:** It is a very small butterfly, with a wingspan of about 20mm (18mm male, 20mm female). It has cryptic colouration. **Male:** dark bronzy-brown, hind wings with two obscure brown-black subtornal spots outwardly edged by a narrow broken pale blue tornal line. **Female:** dark bronzy-brown, fore wing has a broad mauve-blue central area on the upper side. The hind wing is also broadly mauve-blue with two obscure brown-black subtornal spots outwardly edged by a narrow blue terminal line. Both the male and female are grey-brown underneath with a series of darker bands and spots edged with brown-black and white. The underside of the hind wing has two black subtornal spots inwardly edged with orange and outwardly edged with a narrow white terminal line. The Coconut Ant *Papyrius* sp., which this species is reliant on, normally builds nests in dead wood, including stumps, branches and logs, in soil, or at the base of living trees. The Small Ant-blue lays eggs in loose clusters of up to 40 on dead stumps or near the base of trunks of small trees containing nests of *Papyrius* sp. Eggs are covered by a byre built by the ants who constantly attend to the eggs or sometimes larvae is carried into the ants nests. The larvae are cared for by the ants until they pupate and the adults emerge. Adults have been recorded from late October to mid-March, but it is not clear if there are two generations annually or a single generation with variable larval development. Courtship behaviour is simple and rapid (the males hilltop) and mating seems to occur in the upper canopy.

**Threats:** This species is endemic to Australia and is very localised. It has disappeared from previously recorded locations due to habitat loss or decline of the associated ant due to vegetational change. However, it is possible that it is more abundant than believed, but its small size, adult behaviour and localised distribution render detection difficult. The species and associated ant are very sensitive to changes in environmental condition and increasing urbanisation and habitat disturbance including firewood collection, vegetation removal, weed invasion and various recreational pursuits have all impacted on this species. Increase in weeds, grazing pressure and changes to land use have restricted this species to one remaining known population in Broadford, which makes them vulnerable to climatic change and random disturbances. Mountain peaks and hill-tops are also used for communication towers, fire lookouts and survey facilities and the construction of these degrades butterfly habitat by removing plants used for hill-topping, food and shelter.

**Current Management:** Unknown at this stage.

**Actions:** Research, monitoring and survey. Management of weeds and restoration of habitat, particularly on hill-topping sites. Community education and information on invertebrates and encourage the retention and management of native vegetation.

## Vegetation types



### Box-Stringybark Woodland (regionally vulnerable- endangered) floristic community

**Habitat:** On Silurian mudstone-siltstone formations, the community has a canopy comprised of Red Stringybark, Long-leaf Box and Yellow Box. Red box is absent from sandstone formations but can be locally dominant on mudstone-siltstone formations. Other tree

species have localised occurrences including Candlebark and Messmate. The understorey supports a rich diversity of shrubs, particularly peas and wattles. The ground flora supports a high diversity of grasses (typically 12-15 species, including eight more wallaby grasses), orchids and daisies. Examples can be found in St Helena Bushland Reserve, Yarra Valley Parklands (Morrison's Block, Pauline Toner Reserve), Professor's Hill Reserve, Dunmoochin, Bunjil Reserve, One Tree Hill, Rifle Range Reserve.

**Description:** Box-Stringybark Woodland (BSW) is a regionally vulnerable to endangered floristic community that has its main occurrence within the Shire of Nillumbik, being restricted to an area between Yarrambat and Warrandyte. It occurs on hillcrests and exposed hill-slopes within areas of low rainfall (650-750mm) and includes several sub-communities that occur in relation to geology and aspect. BSW has been described as the ecological bridge between Grassy Dry Forest of upland areas and Valley Grassy Forest of the lowlands. It is segregated from Grassy Dry Forest from which it is typically distinguished by the high diversity of grasses and field herbs (e.g. daisies and orchids). It supports an alliance of species that have strong biogeographical links with the Goldfields region of central Victoria. BSW occupies sedimentary soils of Silurian origin, with separate sub-communities occurring on siltstone-mudstone and sandstone formations. BSW supports a high diversity of threatened flora species, particularly orchid taxa such as Rosella Spider Orchid, Wine-lip Spider Orchid, Woodland Plume-orchid, Silurian Greenhood and Emerald Greenhood and herbs and shrubs such as Slender Stylewort, Downy Daisy-bush, Pale-flower Crane's-bill, Arching Flax-lily and Velvet Apple-berry. It also provides habitat for a large diversity of regionally threatened flora. It includes core habitat for the Brush-tailed Phascogale and Speckled Warbler and localised occurrences of Common Dunnart in the north of the Shire.

**Threats:** BSW occupies the densely populated lowland hills and has been heavily cleared and fragmented for housing development. In earlier days much of this area was cleared for timber extraction and mining. Remaining areas have been degraded by a range of processes that include grazing by feral and native herbivores, tree die-back caused by loss of insectivorous birds and altered hydrology, weed invasion and cascade effects of ecosystem decay. Extensive and intact examples of some sub-communities are very rare. Loss of large, hollow-bearing trees affects all sub-communities and most stands are dominated by a high density of young regrowth. BSW has not been documented during broad-scale vegetation mapping and has been included within the more common Ecological Vegetation Class Grassy Dry Forest, which is listed as 'Least Concern' within all Victorian bioregions.



**Current Management:** Weed control (annual weeds and woody weeds), pest animal control (rabbits, deer, foxes, cats), installation of nest boxes, protection and intensive management of Rosella Spider Orchid and Wine-lip Spider Orchid, and protection of Brush-tailed Phascogale and Common Dunnart.

**Actions:** Undertake weed control, advocate for listing as an endangered EVC, undertake pest animal control, identify areas that contain rare and threatened species, target private property for permanent protection, revegetate degraded areas (particularly adjacent to good quality BSW) and undertake surveys for threatened fauna.

## **OTHER OPTIONS**

Brown Quail, Superb Lyrebird, Clover Glycine, Common Bent-wing Bat *Miniopterus schreibersii*, Arching Flax-lily *Dianella* sp. aff. *longifolia* (Benambra), Matted Flax-lily *Dianella amoena*, Pale Flower Crane's-bill *Geranium* sp. 3.