The Fauna of King Island

A guide to identification and conservation management

Edited by
Richard Donaghey
2003
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The idea of a book for land managers on invertebrate and vertebrate fauna of Tasmania was conceived more than five years ago but languished through lack of a publisher. The King Island Natural Resource Management Group provided the opportunity and funding to turn a dream into reality at least for the fauna of King Island. This book provides information on the ecology and conservation management of invertebrate and vertebrate fauna of terrestrial and freshwater habitats of King Island. It is a companion volume to *The Native Vegetation of King Island, Bass Strait* and the *King Island Flora – a field guide*, as well as the *Field Guide to Tasmanian Birds*. We intended to write a book that served as a guide to fauna identification and management and distribute it to all land owners and managers of King Island and land management agencies, so it had to be written in a readable style. Most of the chapters are written by scientists, and it soon became apparent that with limited time and budget it was difficult to write both a field guide and a technical book to suit everyone.

The main aims of the book are: to synthesise published information and recent survey data on the fauna of King Island; to provide guidelines for conservation management of fauna; and to encourage land managers to identify vertebrate fauna and fill in the gaps on the distribution and abundance of fauna.

Chapter 1, the Introduction, provides a brief summary of the island’s location, climate, geology, soils and land use history. Chapter 2 outlines the main native vegetation communities and Chapter 3 describes streams and wetlands of King Island and their macroinvertebrates based on recent surveys of the freshwater systems. Chapter 4 describes the ecology of terrestrial invertebrates of pastures and various types of native vegetation, and highlights their habitat requirements and management.

Chapter 5 summarises the ecology and biogeography of the vertebrate fauna: freshwater fish, frogs, reptiles, birds and mammals. Chapter 6 highlights the role and habitat needs of the fauna of old growth eucalypt forests with a focus on birds and insects. Chapter 7 presents and interprets recent survey data on forest birds, identifies threatened and declining birds and their habitats, provides guidelines on habitat management for fauna and specifies action to recover threatened and declining species.

Chapter 8 serves as a field guide to the vertebrates of King Island and gives accounts of all the species of freshwater fish, frogs, reptiles, mammals and most of the resident and regular visiting birds, with cross-references to the plates.
Animals have co-evolved with plants, and together they form an interconnected web of life. The health of native vegetation depends on many different fauna. This book will be useful to any land managers and advisors with a desire to discover King Island’s fauna and their habitat needs, and manage native vegetation for fauna. The book does not pretend to be a complete fauna guide, but it does provide a foundation for present and future action to protect the biodiversity of King Island. There is an urgent need on King Island to continue fauna surveys and monitoring, and to recover threatened and declining species, especially birds. Little is known of the invertebrates of King Island, so we hope that this book, especially the invertebrate chapter, references and websites, will stimulate islanders and others to collect, identify and document the invertebrates of King Island.

Richard Donaghey
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The observations and publications of naturalists such as Dr Bob Green, Max McGarvie and others provided the foundation for this fauna guide. I am indebted to the landholders of King Island for their interest, hospitality and access to their remnant vegetation for conducting biodiversity surveys – the future of King Island’s fauna is in their hands. I enjoyed the company of Graeme Batey and Nigel Burgess in rediscovering scrub tits. The Bushcare program enabled Richard Barnes and me to visit King Island many times for conservation extension. I thank the NRM Group, its chairman David Robertson, Eve Woolmore, Katie Brown and especially Russell Warman for his endless patience and perseverance in steering the fauna guide through a few obstacles.

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Chapter 1

Introduction

Location

King Island is midway between Victoria and Tasmania in western Bass Strait. It is approximately 140 km both from Cape Otway on the coast of Victoria and Cape Grim on the north-west tip of Tasmania. The island is about 65 km long, 25 km from east to west and has an area of roughly 110,160 ha (2). King Island and the far north-west of Tasmania form the King biogeographical region. Between King Island and Tasmania are various rocks and small islands such as Reid, Black Pyramid, Hunter, Barren and Three Hummock Island. Until approximately 11–12,000 years ago King Island was part of a land bridge between Tasmania and the Australian mainland. Although there is no evidence of permanent Aboriginal settlement at the time of European discovery, there are scattered middens, especially on the west coast.

Climate

King Island has a mild maritime climate. Average annual rainfall ranges from 675 mm in the north to about 1,050 mm in the south. Rain falls predominantly in winter and occurs on average 215 days per year. Frosts are rare. The prevailing westerly winds often reach 100 km per hour (2).

Landforms

King Island has a low and undulating relief with many creeks, streams and rivers. There are four main physiographic units: the plateau country; the plains; the swamps and lagoons; and the dune formations (8). Barnes (2) gives a detailed summary of the island’s landforms, geology and soils. The plateau is mostly about 100 m above sea level and rises to Gentle Annie (168 m asl), the highest point on King Island. The plateau occupies much of the central and southern parts of the island. It is drained by many streams and rivers, the largest of these being Sea Elephant River flowing north, Fraser River flowing east and Ettrick River flowing west. Apart from some cliff formations on the coast between Fraser Bluff and City of Melbourne Bay, and a steep scarp that extends inland from Fraser Bluff, the slopes of the plateau are gradual. Because of the plateau, Yarra and Grassy creeks are sharply incised for about 3.2 km from the coast and Conglomerate and Barrier creeks for about 1.6 km. The western side of the plateau between Fitzmaurice Bay and Cape Whistler is buried beneath a 3–4 km wide belt of dunes (10).

The northern part of the island forms an extensive flat to undulating plain with only a few rises and hills, the highest being the prominent Mt Counsel (86 m). Most of the plains are covered with wind-blown sand that may exceed 10 m in depth. Young estuarine sediments of this plain are, in places, covered by peaty soils of former shallow lakes and swamps such as Reedy Lake, Egg Lagoon and South-east Lagoon. Numerous lagoons, the largest of which is Lake Flannigan, abut the sand hills (10).

Lagoons and marshes are a characteristic feature of the plains and are associated with the drainage
system of the island. The coastal dunes that fringe most of the island cause the total or partial blockage of streams, and the low-lying areas in the trough are characterised by swamps, marshes and lagoons. Water percolates through the dunes and trickles over the sand to the sea. Artificial draining has reclaimed many of the swamps in the north of the island such as Egg Lagoon (10). The prevailing westerly and south-westerly winds have lead to the formation of a series of sand dunes that form a rim around much of King Island. There are two major dune systems, the Old and New dunes (7). The New Dunes form an almost continuous rim around the island and a 4 km wide belt that extends along the entire west coast. They are mainly parabolic dunes. The simple conical dunes like those that can be seen inland from Currie are probably residual parabolic dunes. The New Dunes of the east coast are quartz sand, and the more widespread dunes are calcareous. Active blowouts are the first stage in parabolic dune formation, however, intensive grazing and burning off on the dunes has led to more extensive blowouts (7).

The Old Dunes can reach a height of 80 m in places and occur sporadically around the island. They extend further inland than New Dunes. They are parabolic dunes that have been modified by weathering over time (7).

Geology

Underlying the superficial deposits that cover much of the centre, south-east and south-west of the island is a folded metamorphic complex of Precambrian rock (rocks that include quartzites, slates and phyllites, various schists, granulites, porphyroids and conglomerates). Glacial and volcanic rocks occur between Grassy and Naracoopa (4).

A long broad belt of granite runs from Admiral Bay to Whistler Point. The main mass of granite begins on the western side of Disappointment Bay. Slates occur at the small headland north of Pennys Lagoon (7).

Predominant formations found throughout the island are of granite and gneiss. In some areas these are covered with sand hills, but they come to the surface on the west side of the island at Yellow Rock and near the Ettrick River, also forming reefs that are submerged at high tide, and on the east side at Lavinia Point. A bed of upper Silurian sandstone extends across the island from the north bank of Ettrick River to the south of Fraser River. Tertiary limestone is found in many parts of the island. The main outcrop is at the Blowhole, four miles north of Naracoopa (7).

There are several geological sites of national and state significance on the island. National significance sites include Egg Lagoon, Boggy Creek tufa terraces, Iron Monarch Cave, and City of Melbourne Bay foreshore. A site of state significance is the fragile Wickham granite, the oldest granite in Tasmania (730 million years old). Excavation for drainage of Egg Lagoon exposed a fossil of a giant marsupial. Lake Flannigan and Collier Swamp (especially the latter, which has no drainage) are significant because of their value to earth science, as unmodified wetlands, for their ongoing natural processes and biological values (4).

At Seal Rocks, calcareous solution tubes ‘calcified forest’ have been exposed (4).

Pre-European vegetation

The most comprehensive descriptions of the original vegetation of King Island were made by members of the Field Naturalists’ Club of Victoria who visited the island in November 1887, before irrevocable change was done by settlers just one year later. According to one of the expedition’s participants, Baldwin Spencer, they ‘had considerable difficulty in traversing the island, owing to the fact that its northern half was covered with dense scrub and its southern part with impenetrable forest’ (9).

In the Yellow Rock area a series of sand dunes in four parallel rows were covered with Spinifex grass, and hills were covered with salt, oily and currant bushes, and in some areas extensive covering of ‘pigface’ (*Disphyma crassifolium*). The Field Naturalists’ Club of Victoria reported (3) that further inland from Yellow Rock are ‘hills which run down the centre of the island, gradually increasing in height as they pass southward, until they culminate in the south-east part in Mount Stanley’. ‘These hills are covered with scrub, often extremely dense, and consisting principally of the mountain ti-tree (*Leptospermum scoparium*), of various acacias, banksias, native currant’ and
boobyalla. ‘In part they are covered with forests of gum (esp. *Eucalyptus globulus*), and in the woods abound the native hazel (*Pomaderris apetala*), musk (*Aster argophylicus*), sassafras (*Atherosperma moschatum*), and in parts blackwood. Over large tracts fires have destroyed the larger trees, leaving only their gaunt, charred trunks, which now give a weird appearance to the landscape’ (3).

Club members noted that in the far north of the island the view north from Fern Hill was undulating ground covered with scrub, tussock grass, fern, tea-tree and a few small gums. East of Fern Hill were large clumps of swamp tea-tree and the higher ground was covered with white heath. *Stackhousia* and the orchid (*Caladenia latifolia*) was abundant and the ground was covered with ‘curious white lichen as if it were snow-covered’. Inland from Boulder and Lavinia points the undulating land was covered with heath, bracken, tea-tree, banksia, prickly acacia and stunted gums (3).

**Early history and exploration**

King Island was ‘discovered’ by Mr Reid in the schooner *Martha* in 1799, but it was not named until 1801 when Captain Black, of the *Harbinger*, came across it on his way through the straits and named it after Governor King of New South Wales (1).

In December 1800 the *Lady Nelson*, on the same voyage on which Port Philip was discovered, visited King Island and surveyed its east coast. Lieutenant Murray included descriptions of some birds and animals found on the island and gave an account of the now extinct King Island emu which preceded that given by the French naturalist Péron by 11 months, yet Péron’s description of the emu is often regarded as the first (1).

Lieutenant Murray named the Bay of Seals (later Sea Elephant Bay) after first coming ashore on the east side of the island where he saw large numbers of these docile animals. He described seeing the King Island emu, seals, wombats and, on Elephant Rock, 6000–7000 seals. As soon as Murray’s accounts of the seals and sea elephants on King Island were made known, sealers in Port Jackson promptly visited the island. When the French visited the island just eight months later, the French naturalist Péron obtained his account of the emu that the sealers were utilising for food (1).

In 1798, Napoléon ordered an exploratory expedition of the South Seas. No expenses were to be spared and in 1800, Nicolas Baudin commanding the *Géographe* left Le Havre to lead the largest scientific team ever to leave Europe for the Pacific. When the accompanying vessel, the *Naturaliste*, was forced to head for home due to illness in the crew, Baudin purchased a schooner, the *Casuarina*, which, under the command of Louis de Freycinet, headed to King Island, where it spent several weeks around King, Hunter and Kangaroo islands (5).

In November 1887, 26 members of the Field Naturalists’ Club of Victoria explored King Island for 18 days. They were the first to traverse most of the island and list all the birds and plants they encountered (3).

**Settlement and development**

King Island was first leased for grazing in 1855, but the presence of a native species of pea (*Swainsonia lasterifolia*), which caused fatal blindness and madness in stock, meant that the lease was given up after four years. In 1862 the lease of the island was again taken up, but no grazing was attempted, instead the island was sublet mainly to hunters (10).

A third lease was attempted in 1869. Grazing frequently occurred on the dunes of the west coast, where *Swainsonia* had mostly been replaced by tussock grass (*Poa* sp.), melilot (*Melilotus indica*) and spear grass (*Bromus maximus*). This lease also proved unsuccessful, owing to sickness in the stock. Known as coastal disease, it affected both sheep and cattle, mostly in Surprise Bay and Yellow Rock River (10).

In November 1887, when the Field Naturalists’ Club of Victoria visited the island, its only inhabitants were the lighthouse keepers at Currie Harbour and Cape Wickham, and a solitary wallaby hunter (9).

In 1887 the island was opened for selection. In 1888 Bowling took up land at Surprise Bay and another Bowling settled north of Currie Harbour. Other settlers arrived and by 1901, the population reached 242. During this period of settlement almost all the grazing was done on the coastal dunes where the only pasture of any value existed.
When it was discovered that stock were cured of the coastal disease by simply removing them to other areas of the island, King Island quickly got a reputation for fat stock production (10).

Since 1911, when land speculation increased to include large areas of very poor country and the possibilities of the other forested areas being suitable for agriculture were investigated, there was a steady increase in the population. Dairying on the reclaimed swamps, sandy marsh and forest country soon replaced fattening of the cattle because of the deterioration of the coastal dunes which were mostly used as winter runs. Owing to their susceptibility to disease, sheep numbers declined, to become a minor part of the agricultural industry (10).

Extinctions of birds on King Island

The King Island emu (Dromaius ater) seems to have been the first extinction on the island as a direct result of human hunting. Commercial sealers, who arrived in 1802, used trained dogs to hunt the bird for food. Its small size (1,365 mm tall) and weight (up to 22.7 kg) compared to the mainland form (D. novaehollandiae) led Baldwin Spencer to describe it as a distinct species in 1906 (6).

Grey goshawk (Accipiter novaehollandiae) was recorded by the Field Naturalists’ Club of Victoria after their visit in 1887. Two birds, which were killing young turkeys, were shot in 1912. There have been no further reportings of this bird on the island (6). Glossy black-cockatoo (Calyptorhynchus lathami) once occurred on the island but disappeared in about 1920 after extensive fires (6). Gang-gang cockatoo (Gymnophaps fimbriatum) was once plentiful when large areas of eucalypt forest existed (6). Forty-spotted pardalote (Pardalotus quadragintus) was collected by the Field Naturalists’ Club of Victoria during their 1887 visit, but there are no other records (6).

Extinctions of mammals on King Island

Southern elephant seal (Mirounga leonina) – hundreds of docile elephant seals on the north-east beaches were slaughtered by sealers, and the species was extirpated from King Island by early in the 19th century.

Wombat (Vombatus ursinus) – in 1802 the log books of the Lady Nelson recorded the existence of wombat on the island, but the Field Naturalists’ Club of Victoria failed to find any during their 1887 visit, suggesting that the animal died out some time before the beginning of the twentieth century (6).

Tiger cat (Dasylopus maculatus) – common at the time of early settlement, the tiger cat was wiped out as a direct result of persecution. Early settlers destroyed it at every opportunity as it killed their poultry and damaged the skins of game animals by following snare lines and feeding on the animals caught there. No animals have been seen on the island since 1923 (6).

References

Chapter 2

Vegetation on King Island

Richard W. Barnes

On King Island, minor variation in the physical environment, combined with the island’s long history of isolation, has resulted in a unique island vegetation that lacks structural and species diversity compared with that of the Tasmanian mainland.

The main driving forces that shape native vegetation are soil fertility and drainage, fire history and the degree of exposure to marine influences. European settlement wrought significant change to the island’s vegetation, which has shown remarkable resilience. Clearing and firing have reduced the extent of native vegetation, and some plant communities have possibly been eliminated altogether or now exist only as remnant stands, especially forest communities. Native vegetation covers about 33.5% of the islands’ area, but at least 8% of this occurs in narrow bands and as small remnants in the islands centre, south-east and north (1).

The once mighty King Island wet forests dominated by Tasmanian blue gum (Eucalyptus globulus subsp. globulus) and Brooker’s gums (E. brookeriana) have been reduced to humbler scattered remnants through logging, fires and agricultural clearing. The straight-boled forest giants have gone, and it is likely that fire and further disturbance would need to be excluded for hundreds of years for the forests to attain their former stature. Photographs taken in King Island’s pioneering years (2) and occasional downers (fallen trees) on the forest floor indicate that trees frequently exceeded 40 m in height and 2 m in diameter at breast height. A few large rotting stumps on the island serve as a temporary reminder of the now gone forest giants. Only a relatively small number of eucalypt forest remnants remain on the island. Wet forest remnants generally feature an understorey of tall wet forest species, tea-trees and paperbarks while the dry eucalypt forests occur on nutrient-poor sandy soils near the coast.

The sand dunes that fringe the west and east coasts are referred to as the ‘dune system’ (3). These support heath, shrub and woodlands in areas sheltered from high salinity and strong winds. Disregarding the influence of fire, vegetation height is related to the strength of onshore winds, so lee slopes and swales support the tallest vegetation. The effects of salt-laden rain and offshore mist can extend inland to within 100 m of the high-tide mark (4).

King Island wet eucalypt forest

Prior to European settlement, wet forest was widespread on the fertile plateau country in the east, south, south-east and centre of the island (5). King Island wet eucalypt forest is dominated by either Tasmanian blue gum (Eucalyptus globulus subsp. globulus) or Brooker’s gum (E. brookeriana). White gum (E. viminalis subsp. viminalis) occurs as a subdominant tree in both forest types, especially on the drier sandy ridges.
Tasmanian blue gum forest occurs on fertile well-drained soils, whereas Brooker's gum forest occurs on heavier (clay) poorly-drained soils.

The species composition of the shrub and ground layer is variable and is related to soil characteristics (e.g. soil depth, clay content, moisture availability, parent rock/material), fire history (frequency and intensity), whether or not the area was cleared in the past, and if livestock have had access to the forest.

Land clearance is the single biggest threat to wet eucalypt forest on the island. Fragmentation and the removal of scrub around wet forest further threaten its viability. With the removal of adjacent scrub and heath, wet forest can be quickly degraded from the effects of exposure and changed microclimatic conditions. Stock grazing and/or native marsupial browsing can speedily destroy fern, sedge and herb dominated understoreys. Too frequent fires have eliminated the shrub layer in many wet forests, with some wet forest shrub species now being rare on the island (e.g. musk, Olearia argophylla; mountain pepper, Tasmannia lanceolata).

Tasmanian blue gum wet forest (Plate 2.1)
Wet forest dominated by Tasmanian blue gum occurs on fertile, well-drained soils. Canopy trees usually have open spreading upper branches and rarely exceed 30 m in height. Brooker's gum occurs in this forest type but it is less abundant than Tasmanian blue gum. White gum (E. viminalis subsp. viminalis) occasionally occurs on sandy ridges and shallow soils.

On very wet sites, Tasmanian blue gum wet forest may have a dense shrub layer formed by very tall paperbarks and tea-trees (Melaleuca ericifolia, M. squarrosa and/or Leptospermum scoparium). The shrub layer is usually even aged, of the same height and has little or no regeneration of the shrubs underneath.

Older or less frequently burnt forests have a dense shrub layer formed by broad leaf shrubs, including satinwood (Nematolespis squamea), rough dogwood (Pomaderris apetala), blackwood (Acacia melanoxylon), musk (Olearia argophylla), prickly currant bush (Cuprosma quadridfida), austral mulberry (Hedyocarya angustifolia), cheesewood (Pittosporum bicolor), heart berry (Aristotelia peduncularis), and cheery rice-flower (Pimelea drupacea). White gum with a shrub layer dominated by golden wood (Monotoca glauca), manuka (Leptospernum scoparum subsp. scoparum), prickly moses (Acacia verticillata var. verticillata) and silver banksia (Banksia marginata) occurs in small pockets throughout this wet forest.

Soft tree ferns (Dicksonia antarctica) and rough tree ferns (Cyathea australis) occur in the wettest forests and in riverine habitats where moisture is abundant. Common filmy fern (Hymenophyllum cupressiforme) can often be seen dangling from the trunk of both tree fern species.

The ground layer is generally sparse, particularly when the canopy and shrub layer is dense. When light reaches the forest floor, sedges (cutting grass, Gabonia grandis; tall sedge, Carex appressa) and ferns (water-ferns, Blechnum species; bat's wing, Histiopteris incisa; ruddy ground fern, Hypolepis rugosula; bracken, Pteridium esculentum) occur in dense clumps. Herbs are occasional on the forest floor and include Solomon's seal (Drymophila cyanocarpa), ivy-leaved violet (Viola hederacea), small shade nettle (Australina pusilla subsp. pusilla), blue bottle daisy (Lagenopbra stipitata) and hairy pennywort (Hydrocotyle birta).

Scramblers and vines, such as climbing blueberry (Billardiera longiflora), twining silkpod (Parsonsia brownii) and Australian clematis (Clematis aristata), connect the forest floor to the canopies above.

Brooker's gum wet forest (Plate 2.2)
Trees to 25 m tall dominate this forest. Brooker's gum is the dominant eucalypt species, with sporadic Tasmanian blue gums and white gums. Brooker's gums have a very straight trunk with spreading upper branches. They usually drop their lower branches with the resulting scar developing into a large hollow, but this process may take more than 100 years! Brooker's gum wet forest generally occurs along drainage lines, creeks and in ‘depressions’ in the landscape where water accumulates. Small patches of this forest type usually also occur on the shallow sandy soils in the island’s south-west.

Most Brooker's gum wet forests are dominated
by trees of the same age, possibly having their 'birth' after the 1930s fire that burnt across much of the island. There are usually fewer broad-leaf shrubs in Brooker's gum wet forest compared to Tasmanian blue gum-dominated wet forest, but most species are common to both. More common on heavier clay soils is a dense shrub layer to 15 m tall dominated by swamp paperbark (Melaleuca ericifolia) and scented paperbark (M. squarrosa), whereas manuka (Leptospermum scoparium subsp. scoparium) dominates the shrub layer on better drained sandy soils. Blackwood (Acacia melanoxylon) and silver banksia (Banksia marginata) are usually common in the shrub layer no matter what the soil type. Wet forest shrubs, such as rough dogwood (Pomaderris apetalata), blueberry ash (Elaeocarpus reticulatus) and musk (Olearia argophylla), are often present but very few in number.

Ferns, such as soft tree fern (Dicksonia antarctica) and rough tree fern (Cyathea australis), tend to occur in the understory of more open forests that lack a dense swamp paperbark shrub layer. Areas along water courses and drainage lines are havens for large ferns such as rough tree fern (Cyathea australis), mother shield fern (Polystichum proliferum), soft water fern (Blechnum minus), king fern (Todea barbara), tender brake (Pteris tremula) and ground ferns (Hypolepis species). Small delicate ferns, such as finger fern (Grammitis billardierei), gipsy fern (Ctenopteris heterophylla) and shiny filmy fern (Hymenophyllum flabellatum) often grow along riverbanks, on rotting logs or on the trunk of some of the larger ferns. Wet forest shrubs that like dark, moist conditions, such as the rare austral mulberry (Hedycarya angustifolia), can be found growing with many of these ferns.

Cutting grass (Gabania grandis) and tall sedge (Carex appressa) are frequent exploiters of the forest floor where canopy gaps in the crown allow more light to reach the forest floor. These opportunistic species are also common along forest margins where light levels are also generally higher. Most herb and scrambler species in this forest are common to Tasmanian blue gum dominated wet forest on King Island (described above).

King Island dry eucalypt forest and woodland (Plate 2.3)

Dry eucalypt forest and woodland is dominated by white gum (Eucalyptus viminalis subsp. viminalis) and Tasmanian blue gum (E. globulus subsp. globulus). Dry forest and woodland occurs on sandy well-drained soils mostly around the island’s coastline. The trees are often stunted, mallee-like (multi-stemmed) and grow to about 8 to 16 m tall. They are especially stunted and mallee-like in areas that are frequently burnt or exposed to strong salt-laden winds. Wet soaks and areas with a deep peaty soil that occur throughout the forest are often dominated by stunted Brooker’s gum (E. brookeriana) and Tasmanian blue gum rather than white gums.

This forest is relatively species rich, especially in areas that have not been frequently burnt nor stock grazed. The structure of the forest and woodland is complex, with two distinct shrub layers. The tall shrub layer is often almost as tall as the canopy eucalypts and is dominated by species that tolerate low soil fertility. They include variable sallow wattle (Acacia micranota), golden wood (Monotoca glauca), silver banksia (Banksia marginata), coast tea-tree (Leptospermum laevisatum), manuka (L. scoparium subsp. scoparium), necklace she-oak (Allocasuarina monilifera) and coast wattle (Acacia longifolia subsp. sophorae). The lower shrub layer often contains heaths, small shrubs and sedges, such as pink beard-heath (Leucopogon ericoides), prickly beauty (Pultenaea juniperina), stinking boronia (Boronia anemonifolia), common heath (Epacris impressa), broom spurge (Amperea xiphoclada), cutting grass (Gabania grandis), slender rice-flower (Pimelea linifolia subsp. linifolia), sticky daisy-bush (Olearia glutinosa) and twiggy daisy-bush (Olearia argophylla).

Ground layer species, which are more abundant in canopy gaps and at the edge of scrub thickets, include bracken (Pteridium esculentum), Tasman flax lily (Dianella tasmanica), tassel cord-rush (Baloskion tetraphyllum), sand sword-sedge (Lepidosperma concarum), slender twine-rush (Leptocarpus tenax), showy parrot-pea (Dillwynia sericea), and spreading rope-rush (Empodisma minus). This forest type, unlike wet forest, has a
high number of native grasses in the ground layer, including common wallaby grass (Austrostachya caespitosa), coastal tussock grass (Poa poiformis var. poiformis), weeping grass (Ehrharta stipoides) and Australian salt grass (Distichlis distichophylla). Frequently burnt forests may have had their species-rich ground and shrub layers replaced with bracken and sand sword-sedge.

A colourful mosaic of small ferns, mosses and lichens sporadically occur in the small open areas throughout the forest. Lichens encrust the soil surface whereas ferns, such as swamp selaginella (Selaginella uliginosa), bushy clubmoss (Lycopodium deuterodensum), maidenhair (Adiantum aethiopicum), narrow comb fern (Schizaea fistulosa) and necklace fern (Asplenium flabellifolium), grow in moist areas, usually at the base of tea-trees and paperbarks or around moss clumps.

Scrambling grasses, sedges and herbs, such as hairy rice-grass (Ehrharta distichophylla), climbing blueberry (Billardiera distichophylla), downy dodder-laurel (Cassysthala pubescens), small-leaf clematis (Clematis microphylla) and spreading rope-rush (Empodisma minus), add further complexity to the forest as they twine through the shrubs and trees reaching for sunlight.

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Swamp forests

Blackwood swamp forest

(Plate 2.4)

This swamp forest is dominated by blackwood (Acacia melanoxylon) growing to 25 m high, with some trees reaching 30 m tall. The dense crown is formed by large spreading branches. Tall swamp paperbarks (Melaleuca ericifolia) often grow in association with the blackwood, and Tasmanian blue gum (Eucalyptus globulus subsp. globulus) and/or Brooker’s gum (E. brookeriana) are occasional emergent canopy trees to 30 m tall.

Although the canopy is often very dense there is often sufficient light penetration for a sparse number of tall shrubs to grow. These usually grow between 1 m and 15 m tall and include rough dogwood (Pomatoderris apetala), musk daisy-bush (Olearia argophylla), cherry rice-flower (Pimelea drupacea), golden wood (Monotoca glauca), prickly currant-bush (Coprosma quadrifida), austral mulberry (Hedycarya angustifolia), blueberry ash (Elaeocarpus reticulatus) and the ubiquitous manuka (Leptospermum scoparium). Australian clematis (Clematis drupacea), gipsy fern (Microsorum pustulatum subsp. pustulatum) and gipsy fern (Ctenocephalodium heterophylla), and bryophytes often drape tree fern and blackwood trunks in a shroud of green.

Relatively small areas of high light penetration created by the fall or death of a canopy tree may be dominated by a myriad of wet forest herbs and sedges, such as blue bottle daisy (Lagenophora stipitata), ivy-leaf violet (Viola hederacea), hairy pennywort (Hydrocotyle hirta), small shade-nettle (Australian pusilla subsp. pusilla), cutting grass (Gomphila grandis) and tall sedge (Carex appressa). In the absence of ferns or wet forest herbs the ground is generally covered by a thick layer of leaf litter from which the fruiting bodies of fungi appear in autumn.

Blackwood swamp forest is extremely restricted in its distribution and extent on the island due to logging, clearing and firing. Blackwood swamp forest now occupies riverine habitats, such as incised streams and south-east facing gullies, where river sediment accumulation has enhanced soil fertility and high humidity excludes fire. On the island this forest now only occurs in Pegarah State Forest and along the Fraser and Sea Elephant Rivers and Bronzingwater Creek near Naracoopa.

Swamp paperbark forest

(Plate 2.5)

Forests dominated by swamp paperbark (Melaleuca ericifolia) occur on poorly drained and heavy soils where fire frequency is low. The
canopy is closed and the understorey is sparse, because little light penetrates to the forest floor. Fallen trees and rotting logs on the ground may be common as over-mature trees collapse under their own weight or get blown over in strong winds.

Associated canopy tree species include scented paperbark (Melaleuca squarrosa), manuka (Leptospermum scoparium), blackwood (Acacia melanoxylon) and occasional emergent Brooker’s gums (Eucalyptus brookeriana). Very few tall shrubs are present as the canopy lets little light through. The shrubs usually have large leaves and few upward spreading branches as they are sheltered from high winds and strong sunlight. Shrub species present often include blueberry ash (Elaeocarpus reticulatus), rough dogwood (Pomaterris apetala), austral mulberry (Hedycarya angustifolia) and prickly moses (Acacia verticillata var. verticillata).

The forest’s ground layer is sparse and naturally low in species diversity. Bare ground is common, and rushes, sedges, ferns and wet forest herbs are the main colonisers of the forest floor. Wet soaks are often occupied by dense clumps of tall sedge (Carex appressa) and cutting grass (Gabania grandis). Hard water fern (Blechnum uattisi), mother shield fern (Polystichum proliferum), scrub nettle (Urtica incisa) and sword-sedges (Lepidosperma species) may also be present. Orchids like nodding greenhood (Pterostylis nutans) and large herbs, such as ivy-leaf violet (Viola bederacea), blue bottle daisy (Lagenophora stipitata) and hairy pennywort (Hydrocotyle hirta), are occasionally abundant at the base of swamp paperbarks as these small areas are better drained.

In small remnants or along the edges of larger patches of bare ground, exotic species, including yorkshire fog grass (Holcus lanatus), cocksfoot (Dactylis glomerata) and deadly nightshade (Solanum nigrum) are common.

Swamp paperbark forest has been extensively cleared from many swamps and lagoons, but an extensive tract still remains at the Nook Swamps, where individual trees may reach 30 metres tall. Patches still occur around the margins of some wetlands, such as Flannigans Lagoon, Bungaree Lagoon, Muddy Lagoon and the streams that flow into and out of Nook Swamps. Short swamp paperbark forests occur as small remnants across most of the south-east interior of the island.

Clearing and firing are threats to swamp paperbark forest, as too are changes to surface and underground hydrology through land clearance or the construction of drains. A high water table and low fuel loads on the forest floor tends to inhibit the spread of fires, except in extremely dry seasons. Fragmentation of swamp paperbark forest in a highly agricultural landscape threatens this forest type as it decreases the integrity of the forest and native species diversity, especially among ground-cover species (e.g. ferns, herbs and orchids).

Coastal grasslands (Plate 2.6)

Coastal grasslands are generally treeless and, as the name suggests, are dominated by native grasses and herbs. They occur on sand dunes, sand plains behind dunes, flat rocky shores and wind exposed cliffs. Grasslands may be dominated by one or more of blue tussock grass (Poa poiformis var. poiformis), spinifex (Spinifex sericeus), coast fescue (Austrostipa littoralis) and coastal spear grass (Austrostipa stipoides). Dune swales may be dominated by kangaroo grass (Thymeda triandra) which is an unusual habitat for this species.

Blue tussock grassland is the most common and widespread of the coastal grasslands and is often the result of frequent burning of coastal heath and scrub. Spinifex is a sand-binding grass which forms large patches on dunes rich with calcium carbonate. Coast fescue is another sand-binding grass that forms grasslands along the drier parts of the coast, often in combination with spinifex. Coastal spear grass tussock grassland occurs occasionally on sand but more commonly on rocky shores and cliffs close to the high water mark.

Herb and sedge diversity is usually high for all grassland types, with species including knobby club-sedge (Issolepis nodosa), coast sword-sedge (Lepidosperma gladiatum), native pigface (Carpobrotus rossii), sea celery (Apium prostratum), pale woodrush (Luzula flaccida), angled lobelia (Lobelia anceps), poison pea (Swainsona lesserti-folia), kidney weed (Dichondra repens), small orpanthera (Poranthera microphylla), small St John’s wort (Hypericum gramineum) and bracken...
(Pteridium esculentum). Exotic grasses and herbs (especially legumes) are often common in the island's remaining coastal grasslands, including King Island trefoil (Melilotus indica) which was sown by early settlers to improve the fertility and carrying capacity of the coastal country.

Some coastal grasslands have been man-made by the clearing, burning and stock grazing of coastal scrub. The replacement of woody species which regenerate by rootstock or seed, by vegetative reproducers such as tussock-forming grasses and bracken, is a response to frequent cool burning (6,7). In areas of very high fire frequency tussocks are usually scarce and the grassland turns into a bracken (Pteridium esculentum) dominated fernland. In less frequently burnt areas, and where coastal grassland grades to scrub, there may remain stunted mallee-like white gums (Eucalyptus viminalis subsp. viminalis).

Marram grass (Ammophila arenaria), a highly invasive and introduced grass, has been extensively planted on unstable foredunes and blow outs, many of which have been caused by the above-mentioned firing and grazing regimes (8). Marram grass often dominates the seaward face of frontal dunes where it has displaced native grasses because of the ability of marram grass to invade, colonise and bind free sand.

In the early days of European settlement coastal grasslands were favoured for stock grazing. Records at that time of ‘grass covered hills’ in the islands south and ‘hills covered with coarse grass, bracken fern and scrub’ inland of the north-west coast suggest a once more widespread occurrence of native coastal grasslands (9). Most native coastal grasslands and herbfields now occur on the dune systems in the north-west of the island or on headlands in the south and south-east.

**King Island sedge-heath-scrub**

(Plate 2.7)

King Island sedge-heath-scrub comprises three types of vegetation (sedgeland, heathland and scrub) that occur in a mosaic across the landscape. The form of the mosaic strongly relates to fire history. If unburnt for two to three years, sedgelands usually develop into heathland which may then turn into scrub after eight to 10 years without fire.

Sedgeland is dominated by sedges, lilies, grasses and small ferns less than 0.5 m in height. It is a very open community dominated by short purple-flag (Patersonia fragilis), emarginate yellow-eye (Xyris marginata), tassel cord-rush (Baloskian tetraphyllum) and spreading rope-rush (Empodium minus). The ground layer consists of ferns, fern allies and herbs, including screw fern (Lindsaea linearis), swamp selaginella (Selaginella uliginosa), sundews (Drosera species), hairy mitrewort (Mitrasacme pilosa), tiny bladderwort (Utricularia lateriflora) and occasionally some orchids. In wet soaks the ground is usually carpeted in lichens, fungi and slime molds.

Heathlands are dominated by small to medium sized shrubs of manuka (Leptospermum scoparium), silver banksia (Banksia marginata) and necklace she-oak (Allocasuarina monilifera), generally to a height of 2 to 4 m. Mallee-form white gums and Brooker’s gums occur in some areas, adding an open canopy to the heathland.

Frequent heath species include pink beard-heath (Leucopogon ericoides), prostrate guinea flower (Hibbertia prostrata), slender rice-flower (Pimelea linifolia), broom spurge (Amperea xiphoclada), prickly beauty (Pultenaea juniperina), golden pea (Aotus ericoides), common heath (Epacris impressa) and smooth parrot pea (Dillwynia glaberrima). Around the base of and among the shrubs are sedges, lilies and grasses such as Tasman flax lily (Dianella tasmanica), sand sword-sedge (Lepidosperma concavum), hairy rice grass (Ehrharta distichophylla), spreading rope-rush and cutting grass (Gambelia grandis). In wet soaks scented paperbark (Melaleuca squarrosa), pink swamp heath (Sprengelia incarnata), baueria (Bauera rubioides) and branching scale-rush (Sporadanthus tasmanicus) are frequent. Many of the ground layer species common in sedgeland are absent in heathland due to the shading effect of the shrubs, although they may persist where the canopy is open.

As the soil becomes drier, heaths appear in the scrub and eventually these dominate in more open areas. This is the heath component of this complex. Heathland species, such as pink beard heath (Leucopogon ericoides), prickly beauty (Pultenaea juniperina), slender rice grass (Pimelea linifolia), common heath (Epacris impressa) and...
hairy rice grass (*Ehrharta distichophylla*) often persist at these sites.

Scrub is dominated by tall shrubs including manuka and/or scented paperbark along with variable sallow wattle (*Acacia mucronata*), silver banksia (*Banksia marginata*), necklace she-oak (*Allocasuarina monilifera*), prickly moses (*Acacia verticillata var. verticillata*) and golden wood (*Monotoca glauca*). The height of the scrub is variable, being related to the amount of time since the last fire, soil fertility and exposure to strong winds. When the canopy is dense, heath species are absent, and spreading rope-rush (*Empodisma minus*) intertwines among the stems of the canopy shrubs. Even under the most dense canopy can be found mosses, fungi and lichen.

Fire removes the canopy and ground litter of scrub and encourages the establishment of ferns, sedges and other herbs. Bracken (*Pteridium esculentum*) is common on the driest sandy soils, and may dominate frequently burnt sites.

**Coastal heath and scrub** (Plate 2.8)

Heath is dense vegetation dominated by plants less than 2 metres tall with small, hard and usually prickly leaves. Coastal heaths are colourful habitats as there is often 20 or more species in a relatively small area. Common plants include heaths (*Epacridaceae* family), daisies, bush peas (*Pultenaea* species), twiggy wax flower (*Philotheca virgata*) and lilac bells (*Tetratheca pilosa*). Coastal heath may be a shrubbery of uniform height (generally less than 1 m tall), or there may be scattered emergents shrubs such as silver banksia, coast beard-heath (*Leucopogon parviflorus*) or she-oaks to 3 m in height. The ground layer may be sparse bracken (*Pteridium esculentum*), orchids, sundews (*Drosera* species) and sand sword-sedge (*Lepidosperma concavum*).

There may be some invasion of trees on the inland edge of coastal heaths. Small thickets of eucalypts (mainly white gums) may occur on sheltered or well drained sites. These thickets often appear tapered for wind resistance, with small trees in the centre surrounded by tall then shorter shrubs. Coastal heath may eventually be replaced by coastal scrub without fire.

Coastal scrub is dense vegetation that grows between 3 and 8 m tall. The canopy of the scrub is dense, fairly even and closed, sometimes with sparse emergent eucalypts. It is usually dominated by wind and salt-tolerant species including grey saltbush (*Atriplex cinerea*), silver banksia (*Banksia marginata*), scented paperbark (*Melaleuca squarrosa*), coast beard-heath, manuka (*Melaleuca ericifolia*), coastal tea-tree (*L. laevisgatum*), prickly moses (*Acacia verticillata var. ovoidea*), native rosemary (*Westringia brevifolia*), thyme rice-flower (*Pimelea serpyllifolia*) and tree broom-heath (*Monotoca elliptica*).

The ground layer is sometimes dominated by mother shield fern (*Polystichum proliferum*) or a somewhat taller layer, 1 to 1.5m tall, of tall sword-sedge (*Lepidosperma elatius*) and cutting grass (*Gahnia grandis*). At some sites the ground layer is absent, leaving the ground bare except for leaf litter and a few scattered mosses, lichens and fungi.

**Muttonbird rookeries**

Muttonbird rookeries occur all around the island, particularly the northern, eastern and southern coastline and on some offshore islands. Rookeries are generally treeless, but some trees and shrubs may occur as isolated individuals. Occasionally rookeries extend into nearby forest or scrub.

Plant coverage and the species present fluctuate throughout the year. Outside the breeding season plant coverage can be almost 100% with only the runs exposed or, on some rookeries, runs may be covered by vegetation where the birds attain flight on the rookery edge. Plant coverage decreases during the breeding season as birds dig up the soil to create and maintain burrows. This loss of plant coverage is exacerbated by the exposed windswept location of rookeries.

Blue tussock grass (*Poa poiformis*) is the most common species in muttonbird rookeries together with bower spinach (*Tetragonia implexicoma*) and coastal saltbush (*Rhoagodia candelleana* subsp. *candelleana*), which can form dense mats. Grey saltbush (*Atriplex cinerea*) may dominate some rookeries as may bracken (*Pteridium esculentum*) and/or coast sword-sedge (*Lepidosperma gladiatum*). Exotic grasses, herbs and woody weeds such as cocksfoot (*Dactylis glomeratus*),
scarlet pimpernel (*Anagallis arvensis*) and boxthorn (*Lycium sericissimum*), may be locally abundant within the rookery due to the high incidence of soil disturbance caused by the birds building and repairing burrows. The input of nutrients into the somewhat naturally nutrient-poor soil via muttonbird droppings increases the likelihood of weed infestation and dominance.

The combination of sandy soils, a coastal environment and the presence of underground nests makes muttonbird rookeries fragile and susceptible to damage from vehicles and stock. Muttonbird rookeries are naturally susceptible to sand blows as the birds themselves are constantly disturbing the soil surface and exposing bare sand to the wind.

**Dry scrub**

Dry scrub is rare, being restricted to well-drained calcium carbonate rich sandy soils. The dense shrub layer, to 8 m tall, is dominated by coast tea-tree (*Leptospermum laevigatum*), scented paperbark (*Melaleuca squarrosa*) and/or manuka (*Leptospermum scoparium*). Mallee-like white gums and Brooker's gums are occasional canopy emergents. Along the coast, coast tea-tree is the canopy dominant as it is highly tolerant of strong salt-laden winds.

Tall shrubs that also form the dense canopy include variable sallow wattle (*Acacia mucronata*), golden wood (*Monotoca glauca*), silver banksia (*Banksia marginata*), necklace she-oak (*Allocasuarina monilifera*) and prickly moses (*Acacia verticillata var. ovoidea*). Oddly, some species more commonly found in wet eucalypt forest (e.g. satinwood, *Nematoles squamea*; stinkwood, *Zieria arborescens*; blackwood, *Acacia melanoxylon*) may also occur in dry scrub, especially where the soil is relatively deep and moist and fires infrequent.

The lower shrub and ground layers are more species rich than wet scrub, possibly because of the higher penetration of light through the canopy. In some situations dry scrub appears to be a late developmental stage of long-unburnt dry heath. Ground layer species are more abundant and diverse under gaps in the canopy and at the edge of scrub thickets. Sedges, such as tassel cord-rush (*Baloskion tetraphyllum*), cutting grass (*Gabnia grandis*) and branching scale-rush (*Sporadanthus tasmanicus*), are locally abundant in areas where trees have fallen over or wind damage has opened the crown. Herbs are also relatively abundant and commonly include hairy pennywort (*Hydrocotyle birta*), kidney weed (*Dichondra repens*), Solomon's seal (*Drymophila cyanocarpa*), tall sundew (*Drosera peltata* subsp. *auriculata*) and blue bottle daisy (*Lagenifera stipitata*). In areas of a very dense canopy, there are no ground layer plants, and the soil is covered by a deep layer of leaf litter.

**Wet scrub** *(Plate 2.9)*

Wet scrub is an almost impenetrable thicket of trees, shrubs, heaths and sedges. The dense canopy, which rarely exceeds 8 m in height, is usually dominated by tea-trees and paperbarks, and there is little opportunity for light to reach the ground. Swamp paperbark (*Melaleuca ericifolia*) and scented paperbark (*M. squarrosa*) dominate on heavier clay soils, whereas manuka (*Leptospermum scoparium* subsp. *scoparium*) dominates on better drained sandy soils. Other canopy shrub species include variable sallow wattle (*Acacia mucronata*), dolly bush (*Cassinia aculeata*), golden wood (*Monotoca glauca*), silver banksia (*Banksia marginata*), necklace she-oak (*Allocasuarina monilifera*) and prickly moses (*Acacia verticillata var. ovoidea*). In tall and infrequently burnt wet scrub the rare blueberry ash (*Elaeocarpus reticulatus*) often grows as a straggly shrub in association with the wet forest shrubs satinwood (*Nematoles squamea*) and cheesewood (*Pittosporum bicolor*).

The ground layer is usually sparse due to the dense nature of the canopy. However, bauera (*Bauera rubioides*), cutting grass (*Gabnia grandis*) and fishbone water-fern (*Blechnum nudum*) are exploiters of canopy gaps. Occasional wet forest herbs are present, including Solomon’s seal (*Drymophila cyanocarpa*), blue bottle daisy (*Lagenifera stipitata*), creeping raspwort (*Gonocarpus micranthus*) and small shade nettle (*Australina pusilla* subsp. *pusilla*). Even under the most dense tea-tree and paperbark canopy there grow delicate coral lichens, clumps of moss,
colourful fungi, and an occasional screw fern (*Lindsaea linearis*).

**Saltmarsh** *(Plate 2.10)*

Saltmarsh dominates areas that are periodically inundated by the sea and where subdued wave action enables sediment to accumulate. On King Island, saltmarsh is restricted to the estuary and lower reaches of the Sea Elephant and Yellow Rock rivers. Unlike other streams which discharge into the comparatively low-energy eastern coastline of King Island, Sea Elephant River has been deflected southwards by low parabolic dunes of the New Dunes system (3). The shifting sands of the river mouth have caused a substantial back-up of brackish water, enabling saltmarsh to occupy flats up to 5 km from the river mouth. The north-easterly deflection of the mouth of Yellow Rock River by large dunes to the west has also resulted in a low-energy estuary suited to the development of saltmarsh.

Near the mouth of each estuary, where the inundating water is highly saline, saltmarshes are dominated by succulent herbs and shrubs to 80 cm tall. Beaded glasswort (*Sarcocornia quinqueflora*) and shrubby glasswort (*Sclerostegia arbuscula*) are the two most abundant species and give the saltmarsh its typical ‘red tinge’. They form the only ‘canopy structure’ to saltmarsh and are ground-hugging as are most other plants. Highly salty areas also support numerous succulent ground layer species such as shiny bog-sedge (*Schoenus nitens*), shiny swamp-mat (*Selliera radicans*), matted water-starwort (*Calltriche sonderi*) and streaked arrowgrass (*Triglochin striatum*). In extremely salt areas the ground is often ‘scalded’ and only algae is present on the soil surface.

Where inflowing rivers and streams make the water less saline, tussock rushes, tussock sedges, tussock grasses and non-succulent herbs are more prominent. These ‘grassy’ areas, such as those that fringe coastal lagoons and estuaries, are dominated by salt-tolerant coastal grasses including coastal spear grass (*Austrostipa stipoides*), Australian salt grass (*Distichlis distichophylla*), prickly couch (*Zostis macrantha*) and sea rush (*Juncus krausii* subsp. *australiensis*). Numerous herbs and sedges grow among the tussocks, such as knobby club-sedge (*Isolepis nodosa*), common buttons (*Cotula australis*), sea celery (*Apium prostratum*), angled lobelia (*Lobelia alata*), sea rocket (*Cakile maritima*) and creeping brookweed (*Samolus repens*).

Grass-dominated saltmarsh often grades into wet scrub or coastal grassland as soil salinity and waterlogging decreases. These areas provide breeding and shelter habitat to the many animals that use the saltmarsh for foraging.

**Wetlands** *(Plate 2.11)*

Wetlands are areas covered by non-tidal, still water for several months of the year or more. This includes swamps, marshes, lagoons and the swampy, marshy or lagoonal edges of lakes. Wetlands are among the world’s most productive environments. They are vital habitat and breeding grounds for many species, especially fish, waterbirds, frogs and a huge variety of invertebrates. Plants and animals that live in wetlands are adapted to wet conditions for at least part of their life cycle. Wetlands help to purify water by acting as filters that trap sediment and nutrients, and they reduce erosion and provide protection from floods by absorbing and slowly releasing water.

Wetlands on King Island generally occur around the edge of the island where the dunes meet the flatter inland areas. Deep, permanently inundated wetlands support aquatic herblands of aquatic or floating herbs and sedges. Water-milfoil (*Myriophyllum simulans*) is widespread in freshwater bodies, whereas brackish water-milfoil (*M. salsugineum*) dominates brackish wetlands. Emergent plant species include tall spike-rush (*Eleocharis sphacelata*) and jointed twig-rush (*Baumea arthrophylla*), and floating species include pondweed (*Potamogeton* species), water-ribbons (*Triglochin* species), yellow marsh-flower (*Villarsia reniformis*), wrinklewort (*Ruppia* species), common duckweed (*Lemna dispersa*), and species of the alga *Lamprothamnus*.

Marginal herbfields occur in a narrow fringe around wetlands and are dominated by herbs, grasses and sedges. Plants are usually ground-hugging, less than 10 cm in height and species diversity is high, often reaching 15 or more species in 1 m². Common herb and grass species include
mossy pennywort (*Hydrocotyle muscosa*), angled lobelia (*Lobelia anceps*), shiny swamp-mat, creeping brookweed (*Samolus repens*), prickly couch (*Zoysia macrantha*), shiny bog-sedge (*Schoenus nitens*) and spiny everlasting (*Ammobium calyceroides*). Some larger sedges may be present, such as bog-sedges (*Schoenus* species), strand sedge (*Carex pumila*), club-sedges (*Isolepis* species) and spreading rope-rush (*Empodisma minus*).

Wetlands that are frequently inundated and have a deep peat soil may be dominated by sedges and rushes. Plants are generally greater than 50 cm in height (above water level) and many species of rush (*Juncus* species), twig-rush (*Baumea* species), sedge (*Carex* species) and spike-rush (*Eleocharis* species) may form a dense sward in and around the wetland. There are very few or no shrubs, wildflowers and herbs.

**Coastal shores**

(Plate 2.12)

The coastal shore of King Island is a mixture of sweeping beaches, sand dunes and rocky shorelines. Sand dune vegetation occurs on sand dunes in a narrow but variable coastal zone and, in rare cases, on wind-blown dunes inland of rocky shores. Desiccation by onshore salty winds and the building and shaping of sand dunes by waves and wind drives the shape and species composition of the vegetation.

Beaches and the mobile sands of ‘blow outs’ are often devoid of vegetation except for isolated succulents, sand-binding introduced grasses (marram grass) and open native *Spinifex* grassland. As the sand becomes more stable, plant diversity and density increases. Round-leaved pigface (*Disphyma crassifolium*), sea parsley (*Aiptum prostratum*), native pigface (*Carpobrotus rossii*) and climbing saltbush (*Einadia nutans* subsp. *mutans*) carpet the stable sands in greenery, whereas beaded glasswort (*Sarcocornia quinque-flora*), grey saltbush (*Atriplex cinerea*) and pale goosefoot (*Chenopodium glaucum*) provide a stunted canopy at the very front of the dune.

Near-shore and rocky areas, which are subject to extreme salt spray and/or possible inundation by salt water, support low-growing salt-tolerant herbs and shrubs such as round-leaved pigface, native pigface and beaded glasswort, with cushion bush (*Leucophyta brownii*) and sea box (*Alyxia buxiifolia*) occurring intermittently. Lichens, notably orange crustose species and yellow foliose species, are conspicuous on bare rocks.

A little further from the shoreline, shrubs such as velvet correa (*Correa backhouseana*), sea box, boobyalla (*Myoporum insulare*), coast beard-heath (*Leucopogon parviflorus*), coast everlasting, sticky daisy bush (*Olearia glutinosa*), ice plant (*Tetragonia implexicoma*) and coastal saltbush (*Rhagodia candollea* subsp. *candollea*) are common and form an impenetrable tangle of branches and trunks. Herbs, including wild geranium (*Pelargonium australe*) and leafy pepper cress (*Lepidium foliosum*), and grasses such as blue tussock grass (*Poa poiformis*) and knobby club rush (*Isolepis nodosa*) are common at ground level.

**Improved pasture**

Pasture is a species and structurally poor habitat composed of mainly exotic grasses, herbs and forbs. On occasion, there may be minor occurrences of native grasses, including wallaby grass (*Austrodanthonia* species), spear grass (*Austrostipa* species) and bracken (*Pteridium esculentum*).

**Regenerating cleared land**

Degraded pasture and land that is regenerating back to some type of native vegetation can be seen across much of King Island, especially near the west coast where land clearance and pasture improvement has been less effective than in more inland regions.

In some situations, especially on land that is marginal for agriculture, pasture may have been left to revert back to scrub or heathland. As a general rule, once cattle have been removed and fertiliser no longer applied, many native species start to re-establish on the light sandy soils along the island’s coastline.

Recolonisation of cleared land is usually by the invasion of native species, including grasses and sedges such *Juncus* species (rushes) and knobby club-rush (*Isolepis nodosa*). On King Island native
species that invade degraded pasture are coast wattle (*Acacia longifolia* subsp. *sophorae*), prickly broom heath (*Monotoca scoparia*), coast beard-heath (*Leucopogon australis*) and coast tea-tree (*Leptospermum laevigatum*) in coastal situations, and manuka (*Leptospermum scoparium* subsp. *scoparium*), woolly tea-tree (*L. lanigerum*), scented paperbark (*Melaleuca squarrosa*), swamp paperbark (*M. ericifolia*) and silver banksia (*Banksia marginata*) more inland. Swamp paperbark (*Melaleuca ericifolia*) is a quick coloniser of degraded or unused pasture on heavy soils on the plateau, so long as rootstock still persists in the soil.

**Plantations and shelterbelts**

Plantations of radiata pine (*Pinus radiata*), Tasmanian blue gum (*E. globulus* subsp. *globulus*) and stringybark (*E. obliqua*) occur in Pegarah State Forest near Naracoopa. Small farm forestry sites and ornamental plantings occur on some properties, with some being up to 40 years old.

Recently, shelterbelts have been established across much of the central, southern and western areas of the island. These are generally dominated by swamp paperbark and are often relicts of the original native vegetation that once widely occurred on the island. Some plantings have included mainland Tasmanian and mainland Australian species as well as local species.

Structurally, shelterbelts that have been planted are very open as they are not very wide. Exotic grasses and weeds usually dominate the ground layer. Shelterbelts formed by the retention of native vegetation are more species-diverse, at least for the first few years after being made. Species loss and degradation increase with a decrease in the width of the shelterbelt and in the presence of stock grazing.

For more detailed information on King Island vegetation, refer to *The Native Vegetation of King Island, Bass Strait*. (1)

**References**


King Island vegetation

Plate 2.1
Tasmanian blue gum wet forest on King Island
Richard Barnes

Plate 2.2
Brooker’s gum wet forest
Richard Barnes

Plate 2.3
Dry eucalypt forest and woodland
Richard Barnes

Plate 2.4
Blackwood swamp forest
Richard Barnes

Plate 2.5
Swamp paperbark forest
Rob Blakers

Plate 2.6
Coastal grassland dominated by spinifex
Richard Barnes
Chapter 3

The aquatic fauna of King Island’s streams and wetlands

Peter E. Davies, Katie Brown, Rodney Walker, Laurie Cook

Introduction

King Island has a wide range of freshwater aquatic environments including rivers and streams and ephemeral and permanent wetlands (ponds, swamps, lagoons). The fauna of these environments is not well known, and the writing of this chapter required some new sampling to be done. As a result we now know that the island has many species (more than 140) of aquatic macroinvertebrates, including burrowing crayfish, aquatic insects, freshwater crabs and snails, as well as eight species of freshwater fish.

The island is highly seasonal in its rainfall, and, as a consequence, most of the streams and rivers have very low or no flow during the summer and autumn months. Some sections have permanent water, especially near the coast or those associated with springs or escarpments.

The landscape of the island has changed substantially since European settlement, and significant changes have occurred to its freshwater habitats. Most of the catchments no longer have their original vegetation cover, and that, coupled with intensive agriculture, has undoubtedly led to changes in stream flows and water quality. Changes to the bankside or riparian vegetation have been significant, with many stream sections and wetlands now having no or limited areas of natural riparian vegetation (1), and with many of these areas being accessed by stock, with effects on bank erosion and water quality. There is evidence of higher levels of turbidity, nutrients and salinity in several streams, as well as in some wetlands (2, K. Brown, unpublished data).

Before European settlement, most of the streams on the island were swamp-channel complexes with shallow channels containing large amounts of woody and other organic matter, often overlying sands. They were heavily shaded, slow flowing (except for those in the south-east), and many sections probably experienced seasonal (summer) drops in dissolved oxygen levels due to decomposition of organic material, during periods of slow flow and higher temperatures. In some cases, surface waters in swamps and lagoons and some stream sections were probably devoid of oxygen and contained hydrogen sulphide (rotten egg gas). This can be seen today in places like Collier’s Swamp. Overall though, water quality was probably better than today, and stream habitats were more uniform across the island.

Despite these changes and the highly seasonal rainfall, the majority of streams and wetlands on the island still manage to maintain a reasonably diverse fauna, which in many cases is highly abundant.

Streams

The physical form of King Island streams was studied recently (3) and this has revealed that:

• rivers on the island are divided into five broad types, each with a characteristic form – rivers on flat landscape surfaces, on escarpments on
the edge of these surfaces, in the dunefields of the west and east coasts, and on the younger northern plains;
• these regions are not determined by geology or by climate (which is fairly uniform over the island), but rather by the long-term history of changes from wind action and sea-level; and
• the presence of native riparian (bankside) vegetation in good condition is a key factor in determining the form and stability of river environments on King Island.

Wetlands

There are many wetlands on the island, varying in size from small ponds and ephemeral swamps to large ‘lakes’ and estuarine shallows with permanent water. The island was typified by having many swampy habitats when first settled, and the number and condition of these has declined significantly over the last century. The condition of wetlands is determined by:
• changes to (e.g. clearing) and management (e.g. burning) of surrounding vegetation;
• changes to drainage, inflows and outflows;
• management of levels through damming, draining, levees or roads;
• changes to water quality from local or upstream erosion, increased nutrient loads for pasture development; and
• introduction of exotic species such as plants (e.g. Typha) and animals (e.g. trout).

Many or all of these things have been experienced by the wetlands on the island. In addition, large numbers of farm dams represent new habitat created since settlement, especially during the last 50 years. Examples of the wetlands in different disturbance categories are shown in Table 1.

Table 1. Wetland experiencing different degrees of disturbance on King Island

<table>
<thead>
<tr>
<th>Disturbance category</th>
<th>Description</th>
<th>Wetland examples</th>
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<tbody>
<tr>
<td>1</td>
<td>Intact marginal vegetation, no sign of drainage, immediate catchment still with substantial vegetation cover.</td>
<td>Lily and Swan Lagoons, Nook Swamps, Colliers Swamp</td>
</tr>
<tr>
<td>2</td>
<td>Disturbed margin vegetation and/or some drainage, and/or immediate catchment with moderate degree of vegetation cover and/or some evidence of sediment input from local/catchment erosion and/or water quality impacts.</td>
<td>Bertie Lagoon (vegetation burnt in 2001 fire)</td>
</tr>
<tr>
<td>3</td>
<td>Heavily disturbed marginal vegetation or marginal vegetation absent, and/or wetland severely drained or physically altered, and/or limited natural vegetation cover in catchment; significant evidence of sediment input from local/catchment erosion and/or water quality impacts.</td>
<td>Pearshape and Tathams Lagoons – limited marginal vegetation, heavy disturbance, sedimentation and water quality impacts.</td>
</tr>
<tr>
<td>4</td>
<td>No marginal vegetation (other than grasses or weeds), and/or completely altered physically and/or no natural vegetation in immediate catchment, and/or severe disturbance from erosion and/or other water quality changes.</td>
<td>Bobs Lagoon – minimal marginal vegetation. Fenced for a few years, now a macrophyte dominated wetland, receiving agricultural runoff.</td>
</tr>
</tbody>
</table>
Fish (Plates 3.1–3.8)

There are eight freshwater fish species on King Island, all of which are considered common to the south-eastern Australian mainland and Tasmania. Six of these are native to the island and two (brown trout and rainbow trout) have been introduced as recreational fishing species. The native freshwater fish fauna consists of species that have a marine dispersal stage or have a high tolerance to salt. The trout species have been introduced for recreational fishing, and their effects on the native fauna is unknown, but probably limited.

It is unlikely that trout will establish significant self-sustaining populations on the island. Considerable care must be taken in future translocations (stockings) from mainland Tasmania to ensure that redfin perch and mosquito-fish are not also accidentally translocated. These pest species could establish major populations in the habitats on King Island and have a significant impact on the existing native fish and macroinvertebrate fauna.

All of the native species except the southern pygmy perch (*Nannoperca australis*) spawn in marine areas, and the resulting juveniles disperse widely in estuaries and/or local coastal waters prior to re-entering freshwater. The southern pygmy perch is a land-locked species but has a high tolerance to salt.

A recent survey conducted by the Inland Fisheries Service revealed that most of the freshwater habitat on King Island is degraded. The larger nature reserves (e.g. Lavinia) could sustain a diversity of fish species. The fish fauna in these areas is probably close to that which occurred throughout the island prior to European settlement.

More information on identification, natural history, range and status of individual fish species on King Island is contained in the vertebrate species accounts on pages 89–138.

Crayfish

Two species of freshwater crayfish are known from King Island – *Geocharax gracilis* and *Engaeus cunicularius*. Both of these species are widespread on the island. They live in burrows, though *G. gracilis* can also be seen in open water in streams and wetlands. *Engaeus* burrows are found around the margins of swamps and wetlands and along river banks. *Geocharax* is also found in these habitats, but is also more widely distributed across field and heathy plains, often with very deep burrows. Both of these species are widespread and occur in both northern Tasmania and Victoria. *Engaeus cunicularius* is also found in north-eastern Tasmania and Flinders Island. Both species build ‘chimneys’ at the entrance to their burrows, and those of *Geocharax* can be quite a sight when scattered over paddocks (or even golf courses!).

Macroinvertebrates

There is a wide variety of macroinvertebrates in the streams and wetlands of the island. Macroinvertebrates are small invertebrates that are typically caught by net, visible to the naked eye, and range in size from around 0.25 mm to 10 cm. They include a variety of forms – aquatic insects, molluscs, crustaceans, worms and many species. They represent the core of animal diversity in freshwater environments. In sampling conducted for this guide from 10 rivers or creeks and seven wetlands in 2002, 140 different forms (or ‘taxa’) of macroinvertebrates were identified, many of these being families or orders with many species yet to be identified or described. This represents between 200 and 300 species of macroinvertebrates from those waters alone. The species found are listed in Table 2.

Macroinvertebrate communities are strongly dependent on the type of habitat as well as the condition of the stream or wetland.

Macroinvertebrates in the streams

A wide variety of macroinvertebrates are found in the streams, with their communities strongly related to the degree of human disturbance or development in the catchment.

Streams on the island can be classed as being in good to moderate, moderate to poor, and poor to very poor condition. These three classes of streams have distinct differences in their macroinvertebrate community composition.
Streams which are considered to be in good to moderate condition are: Seal River, Fraser River, Pass Creek, Sea Elephant River. Species with higher abundances in these better condition streams are as follows:

- The leptophlebiid mayfly *Nousia* sp. AV8.
- The stoneflies of the family Grypopyterygidae – *Dinotoperla serricaudata*, *Leptoperla varia*, *Riekoperla triloba regalis*, all of which are ‘shredders’, feeding on organic material such as twigs and leaves.
- The leptocerid caddisflies *Notalina spira* which builds its case from leaves, *Triplectides proximus* which builds its cases from hollowed out twigs (often with a twig ‘rudder’) in reaches with dense Melaleuca or tea-tree riparian forest, and *Triplectidina nigricornis*.
- The conoesucid caddisfly *Lingora aurata*, with a sand grain case.
- The sphaerid bivalve or pea-shell, *Pisidium casertanum*.
- The freshwater false spider crab *Amarinus lacustris*.

Streams currently considered as in moderate to poor condition are: Seal River, Ettrick River, Grassy River and Yarra Creek. Streams classified as in poor to very poor condition include Yellow Rock River, Porky’s Creek and Egg Lagoon Creek. Species that increase in abundance as stream catchments are developed and riparian zones are degraded or cleared are:

- The amphipods (scud) *Austrochiltonia dalhousiensis* and *Austrochiltonia australis*.
- The freshwater isopod *Heterias pusilla*.
- The planorbid snail *Glyptophysa gibbosa*.
- The seed shrimp or Ostracods, common to slow flowing and silty or plant dominated habitats in King Island streams.
- The leptocerid caddis *Symphitoneuria opposita*, associated with aquatic plants on unshaded channel edges.
- The native freshwater hydrobiid snails *Phrantelea* and/or *Beddomia* (genera with potentially new species unique to the island), which favour slower flowing, plant-dominated backwaters.

Much of this response is due to changes in the nutrient, sediment, salinity and light regime of the streams. Catchment development tends to be associated with increased channelisation of the streams, along with large amounts of fine sediment lying in and moving through the channel, plus increased salinity. Increases in nutrient levels may occur but have little effect until light levels increase. Once riparian vegetation is opened up or removed, increased light allows extensive growth of aquatic plants (such as pondweed, watercress or *Triglochin*), mainly along the channel margins but occasionally across the entire channel (downstream reaches of Yellow Rock River), which can take advantage of enhanced sediment and nutrient loads in cleared catchments.

Thus, catchment development causes a shift from:

1. well shaded, shallow, sometimes braided channels containing large amounts of woody material, twigs and leaves – with a fauna dominated by leptocerid caddis (which build cases from bark, twigs and leaves) and grypopterygid stoneflies which ‘shred’ wood and leaf material as a food source;

2. open, deeper or more channelised sections with less woody material (organic carbon), more silt and areas of aquatic plants, sometimes coupled with higher salinity – with a fauna dominated by plant and slower flow loving species like planorbid snails, hydropphilid beetles, amphipods, isopods and ostracods.

*Potamopyrgus antipodarum*, an introduced New Zealand hydrobiid snail (common to many agricultural catchments in south-east Australia and Tasmania) was found to occur in all the streams sampled, with the exception of Seal and Fraser rivers. This suggests that these are the least disturbed rivers sampled on the island, since infestation with *P. antipodarum* is generally linked with multiple human disturbance. It was particularly abundant in the highly degraded and channelised Egg Lagoon Creek. This species is a small, brown water snail with a relatively pointy spire. It often has delicate teeth-like features on its shell, but these may be absent. The females of
this species carry their embryos in a small pouch under the shell, a characteristic feature seen when a specimen is squeezed between the fingers.

Species in mid-channel habitats which indicate low levels of catchment and riparian disturbance are the stoneflies *Leptoperla varia*, *Dinotoperla saccicata* and *Riekoperla triloba regalis* (all of the family Grypopterygidae). These two species are much more abundant in less disturbed streams with intact riparian vegetation and low levels of catchment disturbance. They can be regarded as ‘target species’ for stream rehabilitation on King Island, and are mainly associated with high levels of organic debris (melaleuca and ti-tree leaves, twigs and branches). *D. saccicata* is more abundant in good condition edge habitats, while *R. triloba regalis* is more abundant in channel habitats of good condition streams.

These stoneflies have a winged adult stage and an aquatic nymph stage which look similar, though the latter have wing pads on their backs. Slow moving, drab (grey-brown) in colour and frequently small (5–10 mm long), the nymphs can be readily found crawling on sticks or rocks in good condition streams. They are easily distinguished by the presence of two short ‘tails’ or cerci protruding from the tip of their abdomen, with a bunch of short tufts between them which are their gills. When picked up (in water!) they often wag their tails to and fro in order to maintain their oxygen supply. As adults they are brown-grey, often found crawling on bankside vegetation or logs, with straight wings folded neatly over the body and long antennae. They are poor fliers.

Adults of the Hydrophilid water scavenger beetle *Limnoxenus zelandicus* and the planorbid snail *Glyptophysa gibbosa* are indicative of high levels of disturbance in King Island streams when found in abundance in stream edge habitats. The adults favour slow-moving water and are herbivorous, feeding on aquatic plants. They are more abundant in streams that have little or no riparian vegetation, often with abundant aquatic plants along the edges, or in streams where the majority of the upstream drainage has been channelised. These streams often have higher salinity levels.

*Limnoxenus* is an oval beetle, up to 1 cm long as an adult. It looks black, but under strong light is actually bright green. It has large, silvery areas on its underside which are the air bubbles trapped on hairs that act as a bubble lung or plastron. Unlike many diving beetles, it swims with all of its legs, in a frantic action. The adults eat algae and water plant material. As a larva it is a predator on aquatic snails, which abound in the habitats it favours on King Island. The larvae have symmetrical mandibles with three teeth. The species is common in south-east Australia, and is capable of coping with its habitat drying up in summer. It usually stays put until near dry conditions when it disperses by flying. The adults are strong fliers and can seek out other wet areas to colonise.

The planorbid snail *Glyptophysa gibbosa* is a mid-sized snail (typically 0.5 to 1.5 cm long on King Island) which occupies slow flowing areas or stream edges with lots of plants. It feeds on algae and plant material and organic detritus. It has a fairly plain spiral shell, brown to brown-black in colour. Like many snails it is hermaphrodite and capable of self-fertilising. In productive environments in south-east Australia it is capable of reproducing between one and three times every year and can have very high population densities (up to several thousand per square metre).

**Macroinvertebrates of the wetlands**

From the survey of seven wetlands in 2002, 71 taxa were recorded. In contrast to the streams, each wetland on King Island has its own distinctive faunal community, which seems to bear little or no relationship with the condition of the wetlands. The species found in the seven wetlands surveyed are shown in Table 3. The faunal community in these wetlands is strongly dependent on the aquatic vegetation, which are in turn dependent on water regime and quality, and light conditions.

Differences in the fauna between the wetlands are quite marked. For example, the amphipod (or scud) *Austrochiltonia australis* dominates in all the wetlands surveyed except for Bobs Lagoon and Colliers Swamp in which it is either absent or very scarce, and in Pearshape Lagoon where the
Table 2. Macroinvertebrates recorded from streams on King Island. XXX, XX and X = taxon represents > 50%, 25% or 10% of total abundance. Data from winter 2002 kick net samples (live picked) from mid channel and edge habitat

<table>
<thead>
<tr>
<th>Class</th>
<th>Order</th>
<th>Family</th>
<th>Species</th>
<th>Seal River</th>
<th>Fraser River</th>
<th>Yellow Rock River</th>
<th>Pass River</th>
<th>Porky Creek</th>
<th>Ettrick River</th>
<th>Grassy River</th>
<th>Sea Elephant River</th>
<th>Yarra Creek</th>
<th>Egg Lagoon Creek</th>
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<tr>
<td>Mollusca</td>
<td>Gastropoda</td>
<td>Hydrobiidae</td>
<td>Potamopyrgus antipodarum</td>
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<td>X</td>
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Table 3. Macroinvertebrates recorded from wetlands on King Island. XXX, XX and X = taxon represents > 50%, 25% or 10% of total abundance. Data from winter 2002 kick net samples (live picked) from mid channel and edge habitats

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closely related *Austrochiltonia dalbousiensis* dominates. Chironomids (midges) are ubiquitous but are markedly dominant in Colliers Swamp, reflecting the occurrence of stagnant conditions with low oxygen and hydrogen sulphide.

**Identification of freshwater fish**

The following sources are strongly recommended:


**Identification of macroinvertebrates**

The macroinvertebrates are too diverse and numerous to be comprehensively covered here. Handy guides to freshwater macroinvertebrates are:

- Identification of macroinvertebrates to species level is often a specialist job, requiring a microscope and keys, many of which are listed in *The Waterbug Book*. We recommend getting familiar with the main orders and families first before venturing further.

**Acknowledgment**

Thanks to Dr Alistair Richardson, School of Zoology for advice on crayfish.

**References**

Chapter 4

Invertebrates on King Island

Peter McQuillan

Introduction

(Plates 4.1–4.16)

Several thousand species of invertebrates live on King Island, representing the largest proportion of the animal fauna. A few may be endemic to the island, but island populations of even widespread species are likely to be genetically different from those on the mainland and hence are an important component of Australia’s biodiversity. Insects and their relatives perform essential ecological services such as nutrient recycling, soil conditioning, pollination and seed dispersal of flowering plants and help regulate the numbers of other invertebrates.

To a large extent, the insect fauna resembles that of the lowlands of north-western Tasmania. Indeed, King Island was attached to Tasmania as a peninsula as recently as 12,000 years ago when sea levels were much lower. Unlike for vertebrates, there have been limited studies of the island’s invertebrate fauna. Until further collections are made, only a broad impression of this fauna can be gained from the few publications which mention the island’s invertebrates, together with insights from the fauna of similar habitats in northern Tasmania.

This chapter presents an overview of the land-based invertebrate fauna present in various habitats and offers a few suggestions for management of this very important component of the native animal life on the island.

Historical aspects

The earliest account of King Island’s insects is by François Péron (1775–1810), the French zoologist on the Nicolas Baudin expedition, who visited the island in 1802 during a survey voyage to map the southern Australian coast. In his journal he noted that on King Island (Bass Strait) the seashore was covered with the corpses of sea elephants, and there are found Trox which devour the ligaments and membranes of the older carrion (Péron & Freycinet 1824). Although Trox beetles remain common on the island today, sadly the sea elephant has been exterminated.

Remarkably, the insect fauna of adjacent north-western Tasmania was documented in the early nineteenth century by Wilhelm Erichson, a leading German entomologist (Erichson 1842 translated by Fogg 1858). The Silesian shepherd Adolphus Schayer, an overseer of stock with the Van Diemens Land Company, who lived and worked around Stanley and Woolnorth from 1831 until 1843, collected many local invertebrates which he forwarded to zoologists in Berlin. Many of Tasmania’s most familiar insects were named by Erichson at this time. However, some others, such as Schayer’s grasshopper, are now extremely rare and threatened.

Few biologists visited for the next half century, but in November 1887 a contingent of members of the Field Naturalists’ Club of Victoria spent time ashore and reported their findings the following year (2). This publication gives a valuable insight
into the habitats on King Island before widespread settlement. Over a few days in December 1906, Arthur Lea, the Tasmanian Government Entomologist, with Mr A. Conlon from the Department of Agriculture, surveyed the beetle fauna in the vicinity of Currie. He reported on 278 species (7), mostly from coastal heaths, and estimated that the total beetle fauna of the island would exceed 1,000 species. Some of these have not been found anywhere else in the world and others have not been collected again.

Since that time, knowledge of the invertebrate fauna has accumulated only slowly, although from the 1950s a good understanding of the pests of local agriculture has emerged. Introduced pests have gradually arrived through human agency. The most common land snails on the island today are introduced pest species, however 14 native species were located in a recent survey by Bonham (1).

**Immigrant insects**

King Island is strategically located to intercept migrating insects from mainland Australia. Radar studies at Stanley in the 1970s (3) demonstrated that large numbers of airborne insects routinely move southwards across Bass Strait in the warmer months. The unpredictable climate of much of Australia has resulted in many insect species being opportunistic in their breeding cycles and highly mobile in their search for favourable habitats, sometimes dispersing over much of the continent.

Regular immigrants to King Island include several grasshoppers such as the Australian plague locust (*Chortoicetes terminifera*) and the subtropical spur-throated locust (*Nomadaeiris guttulosa*), neither of which are believed to breed on the island. Several non-resident butterflies are recorded, including the wanderer (*Danaus plexippus*), the lesser wanderer (*Danaus chrysippus*) and the caper white (*Belenois java*). The latter species breeds in very large numbers on caper bushes (*Capparis* spp.) in inland Australia and often migrates to the south and east coasts of the continent in late spring.

Insects are likely to be borne on warm north-westerly winds associated with blocking high pressure systems over the Tasman Sea. This points to a likely origin of western New South Wales and Victoria or eastern South Australia for these insects. Many small insects exploit these dispersal opportunities also, including some agricultural pests. The cabbage moth (*Plutella xylostella*), various aphids and the Rutherglen bug (*Nysius vinitor*), a nuisance in seed crops and gardens, are typical examples. The worrisome bushfly (*Musca vetustissima*) does not survive the winter in the southern half of Australia and reinvaives from the subtropics each spring, some years in very large numbers. Newly arrived female flies place batches of eggs in the plentiful fresh cattle dung where the maggots grow quickly so that local breeding on the island supplements the invaders.

**Invertebrates in pastures**

The large areas of improved pasture on King Island have been gradually colonised by a variety of both native and introduced invertebrates. Compared to native grasslands, pastures are simpler in structure and higher in nutrients but support fewer native species. Some insects dependent on native grasslands are among the most threatened in Australia due to the conversion of most of their habitat to farmland.

The root zone of pasture is enriched with organic matter from the annual root growth of the grasses and clovers. On most farms there are insufficient earthworms to recycle this material and its accumulation favours a build up of cockchafer beetle larvae which thrive on the living and dead root matter. These subterranean grubs are C-shaped, usually whitish and soft-bodied, with a yellowish head capsule. Many native species are involved, including species of the genera *Diphuscphala, Scitala, Sericesthis, Phyllotocus* and *Heteronyx* (9). Populations occasionally reach pest proportions, and their feeding may undermine the pasture, encouraging forest ravens to disrupt it further as they forage for the grubs. The beetle stage is usually active at night dispersing and seeking egg-laying sites, but the shiny green adults of the scarab beetle *Diphuscphala* occasionally swarm on white flowers or even white items hanging on washing lines! They have also been reported defoliating raspberry canes in gardens.

Several native dung beetles have adapted to the excrement of farm animals, although they are relatively inefficient recyclers of farm animal dung.
In spring and autumn, *Onthophagus australis* is quickly attracted to fresh droppings, and females dig vertical tunnels beneath a pat, provision it with a ball of dung and lay an egg on it. The developing larva eats the dung ball and emerges to the surface as a beetle after about two months.

A variety of other insects eat the green parts of the pasture. Most troublesome is the pasture cockchafer (*Aphodius tasmaniae*), a native beetle whose larvae live in vertical tunnels in the soil from which they emerge on moist nights to feed on clovers and grass. They cut off a few stems at a time and sometimes return them to the tunnel to eat later. Population densities can exceed a hundred per square metre, and the resulting centimetre-long adults may swarm to house lights on warm evenings in mid to late summer.

Less common but often conspicuous is the caterpillar of the oxycanus moth (*Oxycanus antipoda*) which can reach 10 cm in length. It lives in deeper tunnels in the soil and also emerges at night to feed. They are sometimes found living in hallowed-out potatoes. The large grey moth flies in May.

A native grasshopper and a cricket have become especially common since the expansion of pastures. The so-called wingless grasshopper (*Phaulacridium vittatum*) usually exists in mixed populations of winged and wingless individuals. Eggs are laid in autumn in well-drained soil, often in bare patches of pasture. The tiny blackish hoppers emerge in November and grow quickly through the summer, favouring pasture with a good content of clover and flatweeds. They may invade gardens in search of food as the pasture dries out over summer. The nocturnal black field cricket (*Teleogryllus commodus*) is a glossy, fast-moving winged insect which matures in autumn. It prefers heavy clay soils which crack in summer and thrives on germinating seeds. A much smaller cricket, *Bobilla* sp., is sometimes abundant in damp overgrown pasture. Damp pastures are often infested by the introduced conical snail *Cochlicella*.

Pasture insects sometimes become pests because their natural predators and parasites cannot maintain themselves in the modified environment. An exception is the small wolf spider *Venatrix* which is one of the most abundant predators in pastures in spring and summer.

### Invertebrates in forests

The tall forests of Tasmanian blue gum are now very depleted, so it is impossible to be sure of the detail of their original invertebrate fauna. Studies in Europe have shown that insects associated with ancient trees are increasingly threatened, and the situation is likely to be similar in Australia. Large trees support many species. *Eucalyptus* roots are eaten by the underground larvae of large ghost moths *Abantiades* which emerge to fly on damp evenings in late summer. The foliage is attacked by beetle, wasp and moth larvae, and infestations of sap-sucking lerps can stress trees when water is scarce. Among the more common beetles are chrysomelid leaf beetles of the genera *Paropsis*, *Chrysophtharta* and *Cryptocephalus*. At least 250 species of moths are likely to depend on eucalypt foliage for sustaining their caterpillars. The woody trunks and branches are bored by the larvae of many beetles, especially longicorn beetles (family Cerambycidae). Among the most spectacular on the island is *Enneaphyllus aeneipennis*, the male of which has long finger-like projections on each segment of its long antennae.

An interesting collection of invertebrates lives under the bark of large eucalypts. Many of these are predators which search the tree at night for food, helping reduce the numbers of defoliating insects. Huntsman spiders (*Delena cancerides*) and gnaphosid spiders have flattened body shapes which suit their lifestyle. Small colourful carabids of the tribe Lebiini are fast-moving beetles commonly found here. Large trees usually support vigorous ant colonies at their base which rely heavily on the sugary secretions of sap-sucking insects to which the ants trail daily.

The large logs which slowly accumulate in these forests are a key resource for many plants and animals. They release nutrients to the environment slowly, while providing moisture and protection for many decades as they decay.

Wattle trees (*Acacia* spp.) are important components of forests as resources for invertebrates. They have a distinctive fauna quite different from that of eucalypts. The white satin moths (two species of *Thalaina*) are among moths which eat the nutritious foliage.
Invertebrates in heathland

The heathlands of King Island are rich in plant species and therefore support many varieties of insects.

The jack jumper ant (*Myrmecia pilosula*) is widespread but probably most abundant in heathland on sandy soils. This aggressive species is among the most primitive of living ants. Colony sizes are modest, from a few dozen to a few hundred ants, and their social structure is rudimentary. Workers are solitary hunters in daylight and seek insects and honeydew for food. Small black ants establish large colonies on free draining soils. Some of these, including species of the genus *Anonochomyrma*, range widely for food and can also be important dispersers of seeds.

Heathlands support unusual species of grasshoppers and crickets. At least ten species of grasshoppers occur, including the unusual reed-like *Psednura pedestris*. The sluggish stick-like cricket (*Zaprochilus australis*) eats flowers and nectar at night. Also nocturnal is the robust flightless ground cricket (*Kinemania ambulans*) which hides by day in shallow excavations beneath rocks or logs. After rain, root-feeding mole crickets (*Gryllotalpa*) may be heard trilling in their galleries a centimetre or two below ground.

Many species of moths inhabit the heathlands, although most are small in size and active at night. So-called mallee moths (family Oecophoridae) are small but often brightly coloured in various shades of red, yellow and grey. Their caterpillars usually eat dead leaves which they bind together with silk to form a secure retreat. There is a number of day-flying moths likely to be seen. Flying weakly close to the ground, or visiting flowers, is the metallic green forester moth *Pollanisus viridipulverulentis*. Larger and more active is the whistling moth *Hecatesia*, the black and orange males of which fly rapidly around tree tops, emitting a high-pitched whirring sound, especially in the late afternoon. Its caterpillars feed on strangling dodder *Cassytha*.

The foliage of paperbark *Melaleuca* is eaten by the larvae of the defoliating sawfly (*Lophyrotoma anatis*), along with the larvae of pyralid moths *Macalla* spp. The latter construct and live inside ramifying silken tubes coated with their dung pellets among the stems. This presumably protects them from birds. A small sap-sucking psyllid (*Boreiglycaspis melaleucae*) can stunt growth and reduce seed set. The melaleuca flower weevil (*Haplonyx sp.*) eats flower buds, mature flowers, and immature seed capsules, while the melaleuca gall-fly (*Fergusonina sp.*) causes leaf and flower buds to distort.

Heathlands are rich in nectar sources for much of the year. The profuse flowers of *Melaleuca* are visited by a wide range of insects seeking nectar and pollen. The soldier beetle (*Chauleognathus pulchellus*) is sometimes present in enormous numbers, along with nectar scarabs (*Phyllotocus spp.*) and the bright green *Dipheucephala smaragdula*. Many native bees visit *Melaleuca* also.

The diverse insect fauna of heathlands supports many spiders. The common large circular-web spiders are members of the cosmopolitan genus *Aranens*. A distinctive relative is the enamelled spiny spider (*Austracantha minax*). The leaf-curling spider (*Phonognatha graeffei*) spins a low web but often incorporates a twisted leaf at the centre in which to hide.

However, many of the heathland spiders do not spin conspicuous webs. Among the largest (up to 2 cm long) are badge spiders (*Neosparassus* species) that are fawn or green on top, with distinctive colour combinations of black, white or orange under the abdomen (the ‘badge’) and banded front legs. Small colourful flower spiders (*Diaeaa* species) ambush flies at blooms, wolf spiders actively patrol the ground for prey at night, and compact jumping spiders (family Salticidae) are widespread on vegetation. Several species of *Myrmachine* closely resemble ants. Fast moving, colourful zodariid spiders, which are specialist hunters of ants, are often seen zig-zagging along pathways on sunny days.

Invertebrates in sand dunes

Coastal dunes are special environments which have a characteristic suite of invertebrates. Fresh water is usually scarce, and foredunes, in particular, are a desert-like environment. It is not surprising, therefore, that many of the insects found here are closely related to those found in the arid zone of mainland Australia. A good example is the large black carabid beetle (*Scaraphites rotundipennis*).
This robust flightless predator, the size of a 50 cent piece, is an accomplished burrower which excavates deep tunnels in the sand in search of root-feeding cockchafer grubs (8). The larvae of the large scarab beetle (*Pimelopus nothus*), males of which have a short horn on their head, live deep in the sand where they feed on the roots of native grasses.

The nocturnal dung beetle (*Onthophagus pronus*) is a distinctive glossy black species in which the male has a long prong-like horn projecting forwards from the thorax. Although widespread on sandy soils, it is especially numerous in coastal dunes and is particularly attracted to the dung of wombats.

Darkling beetles of the family Tenebrionidae are common in dunes also. On the seaward side, the yellowish hemispherical *Sphargeris phycoides* is common at night along the high tide mark, apparently grazing on microscopic algae. Among the litter under dune shrubs live shiny black *Adelium* beetles and the matte, coarsely sculptured *Celbe coaattius*.

Several conspicuous wasps inhabit the coastal dunes. The large black and yellow banded *Thynnus zonatus* is sometimes mistaken for a European wasp. *Thynnus* has wingless females which, after mating, burrow in search of cockchafer grubs on which their larvae feed. The robust black, grey and white banded bembicid wasp (*Bembix furcata*), slightly bigger than a honeybee, is often observed stocking its angled tunnels with paralysed blowflies as food for its larvae. The burrow is carefully covered over with fresh sand and the juveniles left to their fate. *Bembix* visits flowers for nectar, including the blooms of *Solanum*. A related wasp is the slender orange and black *Ammophila* which has a similar biology but stocks its nest with caterpillars, especially cutworm larvae.

The moth fauna of sand dunes is poorly studied. Several native cutworms in the genus *Proteuxoa* are known, most of which have caterpillars dependent on native grass. The same foodplant is eaten by the woolly caterpillars of the anthelid moth, *Pterolocera*, the females of which cannot fly. The nutritious foliage of coastal wattles is eaten by the caterpillars of various moths such as *Praxis*, *Chlorocoma*, *Antibia* and *Acyphas*. At night, large flightless spiny weevils *Leptotus* ascend the shrubs to feed. The roots of dune plants are attacked by various insects including cicada nymphs and black, smelly cydnid bugs.

The single species of scorpion in Tasmania, *Cercophonius squama*, is widespread and especially abundant on well-drained soils near the coast. It is a nocturnal hunter of small slow invertebrates which it grasps with its pincers and subdues with its sting. Daylight hours are spent immobile in a retreat under bark, leaf litter, woody debris or stones. Females engage in maternal care of their young, and a dozen or so small whitish juveniles may sometimes be seen crowded onto the back of their parent. This inoffensive species commonly wanders indoors, especially after wet weather in autumn, but humans are rarely stung. In any case, the discomfort is temporary and comparable to a bee sting for most victims.

**Invertebrates on sandy coastline**

Organic material deposited on the beach by storms and tides is a major source of nutrients to the island. Stranded kelp and other algae, together with microscopic single-celled diatoms, feed a surprising diversity of invertebrates, which in turn are eaten by predators including spiders and shorebirds. At night, pale-coloured amphipods, a jumping crustacean, emerge from the sand and forage between the tides. Decaying kelp generates vast numbers of kelpflies (family Coelopidae) whose maggots transform the alga into a bacteria-rich soup which they consume. Several species of darkling beetles live under stranded kelp and seaweed and breed there. *Phycosecis* is another small beetle which is associated with algae. Many of the beach invertebrates are sand-coloured and difficult to see, including a relatively large wolf spider.

**Carcasses**

Roadkilled mammals are attractive to a wide variety of insects eager to capitalise on the food bonanza such a carcass represents. An orderly succession of insects colonises the carcass as it decomposes. Several native brown blowflies, notably *Calliphora stygia* and *Calliphora bili*, arrive and deposit eggs and live larvae respectively, within an hour or so of death. Less common are the native bluebottle (*Calliphora augur*) and the introduced greenbottle
Native dung beetles, especially *Onthophagus posticus*, are attracted to the semi-digested gut contents of grazing mammals, and insect predators of fly larvae, such as metallic blue histerid beetles (*Saprinus*) and assorted rove beetles (family Staphylinidae), arrive within a few days as the maggot population explodes. The red-headed devil’s coach horse beetle (*Creophilus erythrocephalus*), is an example of the latter. Perhaps a week later, as drying proceeds, specialist skin beetles, including the coarsely granular trogid beetle (*Trox australasiae*), the hide beetle (*Dermestes maculatus*) and black and yellowish embossed silphid beetle (*Ptomaphila lachrymose*), assemble to feed and breed under the remains.

**Conservation status of the invertebrate fauna**

King Island is one of the least studied parts of Australia in terms of its invertebrate fauna. Even today, it is not possible to estimate accurately how many species occur on the island. There is an urgent need to document the fauna as an aid to future planning and to monitor changes in the fauna.

It is probable that several insects have become locally extinct since European involvement with the island. The King Island emu and the southern elephant seal almost certainly supported parasitic species which have disappeared with their hosts. The same is probably true for the invertebrates intimately associated with locally extinct hosts such as the gang-gang cockatoo and spotted-tailed quoll. Extensive clearing for farmland has probably eliminated some local insect species, but information is lacking.

Nevertheless, the size of most invertebrates means that their home ranges are quite small and populations can survive in quite small patches of habitat. Small scraps of remnant bush that might be only of marginal value as bird habitat for example, may have value for preserving native insects.

The southern hairy red snail, listed as Rare and Vulnerable under the Threatened Species Protection Act, was rediscovered in wet forest near the east coast in 1996 (1).

**Habitat requirements for key invertebrates**

Dead wood, both standing and on the ground, is an important resource for native insects which use it as food, as a breeding site and as protection from predators and the elements. Dead wood is usually colonised by fungi which increase its nutritive value to insects. Native bees are an important group of insects which use holes and crevices in dead wood as nesting sites.

Unfortunately, scavenging for firewood and frequent hazard-reduction burning can locally deplete this habitat. Dead wood accumulates in the environment as trees die of old age and from infrequent severe storm events which cause the collapse of living trees.

Leaf litter which accumulates beneath trees and shrubs is another important habitat. This mulch concentrates nutrients and moisture as well as providing shelter and food for invertebrates. Birds can often be seen foraging for insects in the litter. Frequent fires can have a serious impact on the insects which live in leaf litter. Although hazard reduction fires have a place in protecting life and property, they should be used sparingly and targeted carefully.

**Management and restoration of forests for invertebrates and forest function**

Island ecosystems are usually more at risk from the detrimental impacts of introduced species. Careful attention to quarantine will be needed to keep European wasps, bumblebees, Argentine ants and other environmental pests from establishing on King Island. It is almost impossible to eradicate insect pests once they establish.

It is wise to maintain some benchmark sites in different native vegetation types where natural processes can proceed without interference. This means that only natural disturbance events are allowed, such as fires from lightning strike and natural blow down of trees. Curbs on human interference might include banning of firewood collection, no soil extraction, and care to avoid the introduction of weeds and other pests. Vehicular
access should be discouraged as the biological soil crust needs to be preserved and erosion avoided. Such benchmark sites serve as refuges for native species as well as references to inform restoration of sites elsewhere. A few stretches of coastline should be allowed to have kelp accumulate and decay naturally.

Careful management of vegetation will favour survival of a diverse invertebrate fauna. Marram grass should not be further encouraged, because it out-competes native plants and it supports very few native animals. Avoid weed invasion which follows from overgrazing and nutrient enrichment. Infestations of some weeds changes the soil environment to the disadvantage of native invertebrates.

Care should be taken to avoid feral bee colonies establishing in areas of native bush. European honeybees readily monopolise the nectar sources aimed at native pollinators which are not competitive in the presence of the larger and more aggressive honeybee.

Acknowledgments

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References


Recommended reading

A number of books and articles which deal with Australian invertebrates more widely are useful for identifying at least some of the King Island fauna.

Insects (General)

- Ecowatch has introductory information about Australian insects and their use in environmental

- A number of books and articles which deal with Australian invertebrates more widely are useful for identifying at least some of the King Island fauna.

Caddis-flies

Butterflies
- An excellent illustrated guide to South Australian butterflies by Roger Grund, but much information relevant to Tasmania: http://users.chariot.net.au/~rgrund/

Moths

Ants

Grasshoppers and crickets

Beetles

Land snails

Spiders
- Australian Museum website on spiders and their relatives: http://www.amanline.net.au/invertebrates/ara/

Centipedes

Pasture insects
**Invertebrates**

**Plate 4.1**
The golden stag beetle *Lamprima aurata* is common in summer and breeds in dead wood.  
Peter McQuillan

**Plate 4.2**
The small moth *Macrobathra* has caterpillars which tie the terminal leaves of wattles (*Acacia*) on coastal dunes.  
Peter McQuillan

**Plate 4.3**
The stag beetle *Syndesus cornutus* is active at night and also breeds in dead wood.  
Peter McQuillan

**Plate 4.4**
The oecophorid moth *Thema chlorochyta* is typical of many small moths with caterpillars feeding on fallen dead eucalypt leaves.  
Peter McQuillan

**Plate 4.5**
The male dung beetle *Onthophagus pronus* has a distinctive forward-directed prong used in rivalry with other males.  
Peter McQuillan

**Plate 4.6**
The tea-tree seed capsule moth *Bathrotoma* hollows the seed capsules of *Melaleuca*.  
Peter McQuillan

**Plate 4.47**
The Banksia jewel beetle *Cyria imperialis* bores in the stems of banksias.  
Peter McQuillan

**Plate 4.8**
The green geometrid moth *Chlorocoma cadmoria* feeds on tea tree *Leptospermum* as a caterpillar.  
Peter McQuillan
Invertebrates

Plate 4.9
The sand dune carabid beetle *Scaraphites rotundipennis* is a predator of large scarab beetle larvae.

Plate 4.10
The anthelid moth *Pterolocera* has a flightless female and is dependent on grasses.

Plate 4.11
The pasture scarab *Aphodius tasmaniae* is a common pest of sown pasture in the larval stage.

Plate 4.12
The caterpillar of *Danima banksiae* feeds exposed on *Banksia* and *Hakea* shrubs.

Plate 4.13
The red-headed cockchafer *Adoryphorus couloni* feeds on roots as a larva and can be a pest in pastures.

Plate 4.14
The trogid beetle *Trox australasiae* breeds under carcasses.

Plate 4.15
Cockchafer larvae common in pastures.
1. *Adoryphorus couloni*  2. *Sericesthis* sp.  3. *Aphodius tasmaniae*

Plate 4.16
The ant *Rhytidoponera* is common on sandy soils and disperses the seeds of many native plants.
The Bass Strait land bridge disappeared about 11,000 years ago, leaving Tasmania and King Island geographically separated from continental Australia. Continental islands like King and Flinders have fewer species than nearby Tasmania and Victoria.

**Freshwater fish of King Island**  
(Plates 3.1–3.8)

The King Island fish fauna presently consists of eight freshwater fish species. The six native species occurring on the island are short-finned eel (*Anguilla australis*), climbing galaxias (*Galaxias brevipinnis*), spotted galaxias (*Galaxias truttaceus*), common jollytail (*Galaxias maculatus*), southern pygmy perch (*Nannoperca australis*) and freshwater flathead (*Pseudaphritis urvillii*). Another native species, Australian grayling (*Prototroctes maraena*), has only been recorded once on the island but not during recent surveys, so is a vagrant or is locally extinct. The other two species, brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*), have been introduced as recreational fishing species (3, 4).

The native freshwater fish fauna on King Island generally consists of species that have a marine dispersal stage to their lifecycle or, in the case of southern pygmy perch, have a high tolerance to salt. Brackish water environments dominate the freshwater habitat of King Island. This high saline environment is partly due to the low elevation of the island and the fact that large areas were cleared for farming, bringing the water table closer to the surface.

All of the native species except the southern pygmy perch are catadromous in nature, meaning they spawn in marine areas, and the resulting juveniles have a dispersal stage prior to re-entering freshwater. The southern pygmy perch is considered a land-locked species but, like the other native fish found on the island, it has a high tolerance to salt. All eight species of freshwater fish currently found on King Island are considered common to south-eastern Australian mainland and Tasmania. It is not clear if King Island populations are confined to the island itself or if there is exchange of individuals throughout the south-eastern Australian area.

A recent survey conducted by Tasmanian Inland Fisheries Service revealed that most of the freshwater habitat on King Island is degraded. This is primarily due to farming practices, channelisation of the wetlands and the use of phosphate based sprays. In the larger nature reserves a diversity of fish species was located, and the water quality was considered good. These areas are buffered from the effects of farming practices and as a result resemble what the fish fauna may have been like prior to European settlement.

**Amphibians: frogs**  
(Plates 5.1–5.7)

Frogs are the only order of amphibians living in Australia. Four families occur naturally, whereas
one introduced toad represents the only member of the true toad family. There are about 150 species of frogs in Australia. Eleven species inhabit mainland Tasmania, including three endemics. Six species occur on King Island.

The six frogs found on King Island are two tree frogs, the green and golden frog (*Litoria raniformis*) and brown tree frog (*Litoria ewingi*); two marsh frogs, eastern banjo frog (*Limbnodinastes dumerili*) and striped marsh frog (*Limnodynastes peroni*) and two froglets, the common or brown froglet (*Crinia signifera*) and smooth froglet (*Geocrinia laevis*). All these frogs are found in far north-west Tasmania. Eleven species of frogs occur both in adjacent west and central Victoria and in Tasmania. King Island and Flinders Island each have six species of frogs, of which four are common to both islands. Thus, the eight species common to Victoria and Tasmania are found on either King or Flinders Island (14). The two species of frogs found on Flinders but not King Island are spotted marsh frog (*Limbnodinastes tasmaniensis*) and southern toadlet (*Pseudophryne semimarmorata*). Interestingly, the range of both these frogs is restricted to the eastern half of Tasmania. The striped marsh frog and smooth froglet are the two frog species found on King but not Flinders Island. Both, the striped marsh frog and smooth froglet are more common in the north-west than north-east Tasmania. Thus, the difference in frog distribution on the large Bass Strait islands reflects their current distribution in relation to present climate and past climate when the land bridge occurred (16).

The six species of frogs on King Island are basically the same group of frogs found in the far north-west of Tasmania, although one of the marsh frogs, the eastern banjo frog or pobblebonk, differs at a subspecies level. Curiously, the endemic Tasmanian froglet (*Crinia tasmaniensis*) occurs in the far north-west and throughout Tasmania but not the Bass Strait islands. It has been suggested that the Tasmanian froglet evolved from stock ancestral to the common or brown froglet when Tasmania was geographically isolated before the last glacial but did not migrate across the land bridge to King Island (15).

The life histories of the six species of King Island frogs separate into three distinct groups. One group, the tree frogs and the common froglet, have non-foamy egg masses placed in water and aquatic larvae. The smooth froglet has non-foamy egg masses placed on land and aquatic larvae. Its relatively large eggs laid on land are later flooded with water, and the larvae then develop. The third group, the two species of marsh frogs, have foamy egg masses placed in water and aquatic larvae (15).

The breeding seasons of the six King Island frogs fall into three groups. The common froglet and brown tree frog breed all year, the smooth froglet breeds in summer–autumn, and the green and golden frog and striped marsh frog breed in spring–summer (15). Only male frogs call, and their calls are most obvious during their mating seasons when they generally call near or in water. Often there is a chorus of several species by late spring, but each species can be identified by its own distinctive call.

**Reptiles: snakes and lizards**

(Plates 5.8–5.12)

The reptiles of King Island include three snakes and six lizards. While the Australian continent might be termed ‘a land of reptiles’ in terms of numbers and diversity, the Tasmanian mainland and the islands around it are not exactly a paradise for reptiles.

Reptiles are often referred to as being ‘cold blooded’, but are more properly called ectotherms, which means they have to obtain their body heat from the environment rather than maintaining a constant heat within the body as is the case with endotherms, such as mammals and birds. Obviously, regulating body heat from the environment to a level of optimum functioning (between 25 and 35°C) is easier in a warm climate. Species adapted to cool climates have developed special strategies, and some of the efficiencies of these strategies make our reptile fauna particularly interesting.

The three snakes found on King Island are the same three as on the Tasmanian mainland. The six lizard species on King Island, compared to the Tasmanian mainland’s 18, are the same six that are commonly found in north-west Tasmania. The fact that there are around three additional lizards in the general north-west area that have not been recorded on King Island may either mean that they have yet to be recorded, or, more probably, they
do not occur. These are the mountain dragon \((Tympanocryptis diemensis)\), the she-oak skink \((Cyclodomorphus casuarinae)\) and the delicate skink \((Lampropholis delicata)\). The delicate skink would be the most likely to have been overlooked, as the other two are very distinctive lizards. However, its distribution in the north-west is tenuously recorded so far.

Part of the strategy for reptiles living in cold climates is to give birth to fully developed young. All three snakes and all but three of the 18 Tasmanian lizards give birth to live young. On King Island, the eastern three-lined skink \((Basiana duperreyi)\) is the only reptile that lays eggs. Only one of the reptiles on King Island, the Tasmanian tree skink, is endemic, meaning it is found only in Tasmania \((12, 17, 18)\).

Birds

Birds are a conspicuous and strong component of the King Island fauna. Tasmania has a distinct but impoverished avifauna compared to continental Victoria \((1)\). Excluding habitats absent from Tasmania, Victoria has 176 breeding bird species whereas 104 species of freshwater and land birds \((59\%\text{ of Victoria's total})\) regularly breed in Tasmania \((19)\). By comparison, Green \((24)\) estimated that of the 104 species of freshwater and land birds breeding in Tasmania, 60 species regularly breed on King Island. This total includes about 14 freshwater birds, 13 non-passerine land birds, 34 passerine land birds but excludes all exotic introduced birds. King Island has 86 species of land and freshwater birds that are breeding residents or regular migrants and visitors, 12 species of breeding or resident marine birds and shorebirds, 35 species of land and freshwater birds that are irregular migrants and visitors, vagrants and accidentals, 14 species of migratory shorebirds and irregular gulls and terns, 24 species of resident and visitor marine birds and 11 species of introduced non-Australian birds \((\text{see Appendix 1})\). The King Island total of 182 bird species compares to 212 species for Tasmania. The number of bird species breeding regularly on an island correlates with the size of an island and its habitat diversity.

Tasmania's large offshore islands have far fewer habitats than Tasmania. The predominant bird habitats in Tasmania are coastal heath, grassy woodlands, dry and wet eucalypt forests, swamp forests, rainforest, alpine and moorland vegetation and freshwater systems. King Island is flatter and lacks the diverse rainforest, alpine and moorland habitats of western Tasmania and the diverse eucalypt forests of east and south-east Tasmania.

Specialist moorland birds such as ground parrot, striated fieldwren and southern emu-wren are absent from King Island but present in Rocky Cape National Park, north-west Tasmania. Cool temperate rainforest dominated by myrtle-beech is absent from King Island. Interestingly, two specialists of this habitat, the pink robin and scrubtit, appear to favour paperbark swamps on King Island. In north-central Tasmania both species inhabit tall wet eucalypt forests with tree fern gullies. Breeding birds that are more common in the drier woodlands and forests of eastern half of Tasmania but absent from King Island are: musk lorikeet, eastern rosella, masked owl, tawny frogmouth, Australian owlet-nightjar, scarlet robin, spotted quail-thrush, grey butcherbird and grey currawong. English names of birds follow Christidis and Boles \((2)\).

King Island is rich in endemic bird species and has 10 of Tasmania's 12 endemic resident breeding birds. These are green rosella, Tasmanian scrubwren, scrubtit, Tasmanian thornbill, yellow wattiebird, yellow-throated honeyeater, strong-billed honeyeater, black-headed honeyeater, dusky robin and black currawong \((6)\). King Island once had another Tasmanian endemic bird, the forty-spotted pardalote, but it became locally extinct, presumably early in the 20th century. The remaining endemic, the flightless Tasmanian native-hen, is absent from the Bass Strait islands. Two endangered species, the orange-bellied parrot and swift parrot, are passage migrants to King Island but breed in Tasmania.

The period of isolation provided ample time for the evolution of endemic species and endemic subspecies \((19)\). The endemic King Island emu became extinct in the early 19th century. King Island lost four other species, grey goshawk, glossy black-cockatoo, gang-gang cockatoo and forty-spotted pardalote as a result of extensive clearing of forests and extensive fires. Five subspecies only occur on King Island. These endemic subspecies
are the race *archibaldi* of the brown thornbill (9, 21), the race *brownii* of the green rosella (20), race *kingi* of the yellow wattlebird, race *kingi* of the dusky robin and race *colei* of the black currawong (8, 9, 21). Tasmanian endemic subspecies of brown falcon, brown quail, southern boobook, grey fantail, little grassbird, superb fairy-wren and crescent honeyeater are present on King Island (22). The subspecies *xanthanotus* of the yellow-tailed black-cockatoo occurs in South Australia, western Victoria and Tasmania (7). Birds from Tasmania and the Bass Strait islands may constitute a separate subspecies since they differ from mainland birds in that females are larger than males and males have significantly wider bills than mainland males (7).

Some Tasmanian and King Island birds exhibit behavioural and ecological adaptations compared to their mainland relatives. Forest birds that are specialist bark and trunk foragers include the three endemic species scrubtit, strong-billed honeyeater and yellow-throated honeyeater, and the grey shrike-thrush (8, 13). The strong-billed honeyeater spends a large proportion of its time foraging on bark of branches and trunks searching for invertebrates. It uses its strong bill to probe into cracks and prise apart strips of bark. Similarly the grey shrike-thrush in Tasmania spends more time foraging on bark and trunks than birds on the mainland (13). In Tasmania the brown thornbill forages more on branches and trunks and in the canopy than birds on the mainland (13). Tasmania and King Island lack the specialised trunk-feeding treecreepers, sittella and crested shrike-tit of southern Victoria. This suggests that in the absence of these species the strong-billed honeyeater has exploited this vacant niche, and other species such as yellow-throated honeyeater, scrubtit, grey shrike-thrush and brown thornbill have expanded their niches and adapted to bark and trunk foraging (13).

On King Island the Tasmanian endemics are a distinctive element of the forests. The bark foraging strong-billed honeyeater and yellow-throated honeyeater are widespread and common in many habitats. The dusky robin is the most widespread and common robin. The abundant and widespread Tasmanian thornbill has expanded its niche and occupies wet and dry habitats, whereas the brown thornbill is critically endangered (5) with a restricted range. The Tasmanian scrubwren is common in the ground layer and understorey layers. Populations of the large endemic yellow wattlebird and green rosella are recovering from extensive clearing of native forests. Foliage gleaning specialists such as the endemic black-headed honeyeater and two species of pardalotes that favour white gum are uncommon to rare. Other King Island birds that are uncommon to rare and may be declining include common bronzewing, yellow-tailed black-cockatoo, southern boobook, tawny-crowned honeyeater, pink robin, satin flycatcher and little grassbird.

King Island is home to a few special mainland Australian species that are scarce in Tasmania. The nankeen night heron breeds on the island but not on the Tasmanian mainland. The range of the golden-headed cisticola has contracted on King Island, and it now breeds in sedgeland in lower Sea Elephant River but not on the Tasmanian mainland. The dusky moorhen is a breeding resident on King Island but is slowly expanding its range in Tasmania. Stubble quail, nankeen kestrel, buff-banded rail and barn owl are more common on King Island than in Tasmania. The status of the yellow-faced honeyeater and tawny-crowned honeyeater on King Island requires further study.

**Mammals**

(Plates 5.13–5.23)

The mammals of King Island are an impoverished subset of those on mainland Tasmania and include some Tasmanian endemic species and subspecies. Of the 35 native mammal species in Tasmania, 17 occur on the islands of Bass Strait. On King Island 14 terrestrial species have been recorded since settlement (c. 1880). The southern elephant seal (*Mirounga leonina*) was exterminated from King Island early in the 19th century (Plate 5.13).

Two terrestrial species became locally extinct on King Island by the early 20th century. These were the largest herbivore, common wombat (*Vombatus ursinus*), which may have been in low numbers and on the decline in 1887, and the largest marsupial carnivore, the spotted-tailed quoll (*Dasyurus maculatus*), last seen in 1923 (Plate 5.14). Neither the spotted-tailed quoll nor the wombat are extinct on the Tasmanian mainland (6).
Fossil records from the last interglacial period of the Pleistocene include modern wombats, kangaroos and wallabies. The larger kangaroos did not survive on any of the Bass Strait islands in the post-glacial period since there were insufficient grasslands to support a breeding population which eat large quantities of grass.

The 12 terrestrial native mammal species that still occur on King Island are two monotremes (platypus and echidna), one dasyurid (swamp antechinus), three possums, three macropods (red-necked or Bennetts wallaby, Tasmanian pademelon and long-nosed potoroo), at least two resident bats and one native rat. Mammals absent from King Island but present on Flinders Island are common wombat, southern brown bandicoot (Isoodon obesulus), white-footed dunnart (Sminthopsis leucopus), new holland mouse (Pseudomys novaebollandiae), water rat (Hydromys chrysogaster) and two bats, little forest eptesicus (Eptesicus vulturinus) and chocolate wattled bat (Chalinolobus morio) (10, 11, 23).

There are five species and 14 subspecies of terrestrial mammals (56%) endemic to Tasmania (22). On King Island there is one endemic species, Tasmanian pademelon (Thylogale billardierii), and eight endemic sub-species, or 69% of the mammalian fauna. Tasmanian platypus is genetically distinct from mainland populations, and King Island platypus is more closely related to platypus in Victoria than Tasmania despite the geographic history (Shiro Akiyama).

The platypus (Ornithorhynchus anatinus) is uncommon throughout the island but more common in the streams and rivers flowing to the east. It favours wet forest habitats with undisturbed banks for burrows. King Island platypus has lost genetic variability, and may be suffering genetic/population bottleneck due to long-term isolation and relatively small population size (Shiro Akiyama). Its survival depends on further protection of streams, ponds and riparian vegetation. Stream banks need protection from erosion and disturbance by farm livestock and agricultural operations. Vegetation corridors need to be protected, maintained and restored along streams and water bodies, serving the needs of both platypus and those of other native mammals and birds.

Survey records for the echidna (Tachyglossus aculeatus) suggest it is rare, but local observations indicate it is more common. It occurs in more open habitat such as patches of dry eucalypt forests, woodlands and heathland. Their population is probably significantly less than the pre-settlement levels, and this is related to habitat loss and fragmentation.

The native mammals currently present on King Island are the survivors of recent geographic isolation and post-settlement clearance of forest and conversion to pastures. Consequently, the grazing native herbivores, the red-necked or Bennetts wallaby (Macropus rufogriseus), Tasmanian pademelon and brush-tail possum (Trichosurus vulpecula) are now very common to common over most of the island. The brush-tail possum shows no inclination to be arboreal (tree dwelling) like those on the Australian mainland. The less common ring-tail possum (Pseudocheirus peregrinus) and the rare eastern pygmy possum (Cercartetus nanus) are the only true arboreal mammals on King Island (10, 23).

Native mammals that appear to be rare with very restricted distributions on King Island are swamp antechinus (Antechinus minimus), eastern pygmy possum, long-nosed potoroo (Potorous tridactylus) and the bats, the lesser long-eared bat (Nyctophilus geoffroyi) and Gould's wattled bat (Nyctophilus gouldi). All these mammals appear to be more sensitive to habitat loss and fragmentation and hence are vulnerable to local extinction. These mammals have special habitat needs. The eastern pygmy possum and the two bat species require hollows and cracks in trees as roosts and den sites as well as nearby native forests and scrub for foraging. Swamp antechinus and long-nosed potoroo may require large forest remnants for their survival. Protected areas such as Lavinia State Reserve and large, less secure areas of native vegetation, like Pegarah State Forest and many forest remnants on private land may be vital for their survival.

Three bat species have been recorded from King Island. One species, the grey-headed flying-fox (Pteropus poliocephalus), is a visitor from mainland Australia. The other two bat species, lesser long-eared bat and Gould’s wattled bat, appear to be rare, but this may be an artefact of inadequate surveys. It is highly unlikely that the time-consuming bat survey methods, particularly
harp traps and mist nets, have been used on the island. There are still many suitable roost trees on the island either in native bush remnants or scattered throughout the agricultural landscape. Neither of the latter two bat species is considered endangered on mainland Tasmania. However, as it is unlikely that they would fly from either mainland Australia or Tasmania, the King Island populations could be considered vulnerable in the absence of detailed survey data. It is not impossible that intensive bat surveys may discover species not yet recorded on King Island.

The water rat (Hydromys chrysogaster) is present in Tasmania and on other islands of the Bass Strait including Three Hummock Island. It is a very adaptable species inhabiting still and flowing freshwater bodies. The water rat is an agile swimmer in salt water and is common along coastlines where it feeds on shell fish, small crabs, fish and other invertebrates. There seems no reason why it should not be present on King Island, but it is not mentioned in any of the accounts (23).

References
## Freshwater native fish

- short-finned eel: *Anguilla australis*
- climbing galaxias: *Galaxias brevipinnis*
- common jollytail: *Galaxias maculatus*
- spotted galaxias: *Galaxias truttaceus*
- Australian grayling: *Prototroctes maraena*
- southern pygmy perch: *Nannoperca australis*
- freshwater flathead: *Pseudaphritis urvillii*

## Amphibians

- brown tree frog: *Litoria ewingi*
- green and golden frog: *Litoria raniformis*
- smooth froglet: *Geocrinia laevis*
- eastern banjo frog: *Limnodynastes dumerili*
- striped marsh frog: *Limnodynastes peroni*
- common froglet: *Crinia signifera*

## Reptiles

- White’s skink: *Egernia whitii*
- blotched bluetongue: *Tiliqua nigrolutea*
- southern grass skink: *Pseudomoia entrecasteauxii*
- metallic skink: *Niveoscinus metallicus*
- Tasmanian tree skink: *Niveoscinus pretiosus*
- eastern three-lined skink: *Bassiana duperreyi*
- white-lipped snake: *Drysdalia coronoides*
- tiger snake: *Notechis ater*
- lowland copperhead: *Austrelaps superbus*

## Birds

### Extinct land birds

- King Island emu: *Dromaius ater*
- grey goshawk: *Accipiter novaehollandiae*
- glossy black-cockatoo: *Calyptrhynchus lathami*
- gang-gang cockatoo: *Callocephalon fimbriatum*
- forty-spotted pardalote: *Pardalotus quadragintus*

### Extant land and freshwater native birds – breeding residents or regular migrants and visitors

#### Freshwater native birds

- blue-billed duck: *Hymenolaimus malacorhynchos*
- black swan: *Cygnus atratus*
- Cape Barren goose: *Aster事e novaehollandiae*
- Australian shelduck: *Tadorna tadornoides*
- Australian wood duck: *Chenonetta jubata*
- Pacific black duck: *Anas superciliosa*
- Australasian shoveler: *Anas erythrorhyncha*
- grey teal: *Chinonetta gryla*
- chestnut teal: *Chinonetta leucura*
- hoary-headed grebe: *Poliocephalus poliocephalus*
- little pied cormorant: *Phalacrocorax melanoleucos*
- great cormorant: *Phalacrocorax carbo*
- cattle egret: *Ardea ibis*
- purple swamphen: *Porphyrio porphyrio*
- dusky Moorhen: *Gallinula tenebrosa*

#### Passerines

- superb fairy-wren: *Malurus cyaneus*
- spotted pardalote: *Pardalotus punctatus*
- striated pardalote: *Pardalotus striatus*
Appendix 1 continued

Tasmanian scrubwren
scrubtit
brown thornbill
Tasmanian thornbill
yellow wattledbird
yellow-throated honeyeater
strong-billed honeyeater
black-headed honeyeater
crecent honeyeater
New Holland honeyeater
tawny-crowned honeyeater
white-fronted chat
flame robin
pink robin
dusky robin
olive whistler
golden whistler
grey shrike-thrush
satin flycatcher
grey fantail
black-faced cuckoo-shrike
dusky woodswallow
Australian magpie
black currawong
forest raven
little raven
Richard’s pipit
welcome swallow
tree martin
little grassbird
golden-headed cisticola
silvereye
Bassian thrush
Sericornis humilis
Acanthornis magnus
Acanthiza pusilla
Acanthiza ewingii
Anthochaera paradoxa
Lichenostomus flavicollis
Melithreptus validirostris
Melithreptus affinis
Phylidonyris pyrroptera
Phylidonyris novaehollandiae
Phylidonyris melanostris
Epthianura albifrons
Petroica phoenicea
Petroica rodinogaster
Melanodryas vittata
Pachycephala alveacea
Pachycephala pectoralis
Callincicla harmonica
Myiagra cyanoleuca
Rhipidura fuliginosa
Coracina novaehollandiae
Aratus cyanopterus
Gymnorhina tibicen
Sterna fuliginosa
Corvus tasmanicus
Corvus mellori
Anthus novaeseelandiae
Hirundo neoxena
Hirundo nigriceps
Megalurus gramineus
Cisticola exilis
Zosterops lateralis
Zoothera lunulata
Irregular migrants and visitors, vagrants and accidental land and freshwater birds

pink-eared duck
Malacorhynchus membranaceus
hardhead
Aythya australis
Australasian grebe
Tachybaptus novaehollandiae
Podeiceps cristatus
Phalacrocorax varius
Phalacrocorax sulcicristis
Egretta garzetta
Ardea pacifica
Ardea alba
Threskiornis molucca
Threskiornis spinicollis
Phatalea regia
Phatalea flavipes
Elanus axillaris
Haliastur sphenurus
Accipiter cirrocephalus
Aquila audax
Falco longipennis
Falco peregrinus
Gallinula chloropus
Erythropogon cinctus
Cacatua roseicapilla
Cacatua sanguinea
Trichoglossus haematodus
Glossopittpa concinna
Tyto alba
Apus pacificus
Todiramphus sanctus
Acanthis amandina
Lichenostomus grypus
Acanthis erythrocephalus
tenuirostris
Pachycephala rufiventris
Grallina cyanoleuca
Rhipidura leucophrys
Lalage sueurii
Aratus leucorynchus
Aratus personatus
Aratus superciliosus

Some breeding or resident marine birds and shorebirds

little penguin
Eudyptula minor
short-tailed shearwater
Puffinus tenuirostris
black-faced cormorant
Phalacrocorax fuscus
pied oystercatcher
sooty oystercatcher
red-capped plover
hooded plover
Pacific gull
silver gull
caspian tern
crested tern
fairy tern
yellow-billed penguin
Sterna novaezelandiae
crested tern
Sterna bergii
Sterna nereis

Irregular migrants and visitors, vagrants and accidental land and freshwater birds

pink-eared duck
Malacorhynchus membranaceus
hardhead
Aythya australis
Australasian grebe
Tachybaptus novaehollandiae
Podeiceps cristatus
Phalacrocorax varius
Phalacrocorax sulcicristis
Egretta garzetta
Ardea pacifica
Ardea alba
Threskiornis molucca
Threskiornis spinicollis
Phatalea regia
Phatalea flavipes
Elanus axillaris
Haliastur sphenurus
Accipiter cirrocephalus
Aquila audax
Falco longipennis
Falco peregrinus
Gallinula chloropus
Erythropogon cinctus
Cacatua roseicapilla
Cacatua sanguinea
Trichoglossus haematodus
Glossopittpa concinna
Tyto alba
Apus pacificus
Todiramphus sanctus
Acanthis amandina
Lichenostomus grypus
Acanthis erythrocephalus
tenuirostris
Pachycephala rufiventris
Grallina cyanoleuca
Rhipidura leucophrys
Lalage sueurii
Aratus leucorynchus
Aratus personatus
Aratus superciliosus
Regular and irregular migratory shorebirds and irregular gulls and terns

- bar-tailed godwit
- eastern curlew
- common greenshank
- grey-tailed tattler
- ruddy turnstone
- red-necked stint
- sharp-tailed sandpiper
- curlew sandpiper
- Pacific golden plover
- double-banded plover
- lesser (Mongolian) sandplover
- common pheasant
- kelp gull
- Arctic tern

Resident introduced non-Australian land birds

- bar-tailed godwit
- eastern curlew
- common greenshank
- grey-tailed tattler
- ruddy turnstone
- red-necked stint
- sharp-tailed sandpiper
- curlew sandpiper
- Pacific golden plover
- double-banded plover
- lesser (Mongolian) sandplover
- common pheasant
- kelp gull
- Arctic tern

Resident and visitor marine birds

- rockhopper penguin
- Fiordland penguin
- common diving-petrel
- southern giant-petrel
- Antarctic (silver-grey) petrel
- cape petrel
- Kerguelen petrel
- great-winged petrel
- white-headed petrel
- blue petrel
- Salvin’s prion
- Antarctic prion
- slender-billed prion
- fairy prion
- grey petrel
- fluttering shearwater
- wandering albatross
- black-browed albatross
- shy albatross
- grey-headed albatross
- yellow-nosed albatross
- sooty albatross
- white-faced storm-petrel
- Australasian gannet

- Eudyptes chrysocome
- Eudyptes pachyrhynchus
- Pelecanoides urinatrix
- Macronectes giganteus
- Thalassoica antarctica
- Daption capense
- Lugensa brevirostris
- Pterodroma macroptera
- Pterodroma lessonii
- Halobaena caenula
- Pachyptila salvini
- Pachyptila desolata
- Pachyptila belcheri
- Pachyptila turtur
- Procellaria cinerea
- Puffinus gavia
- Diomedea exulans
- Diomedea melanophris
- Diomedea cauta
- Diomedea chrysostoma
- Diomedea chlororhynchos
- Diomedea fusc
- Pelagodroma marina
- Morus serrator

Resident introduced non-Australian land birds

- common pheasant
- Indian peafowl
- wild turkey
- California quail
- spotted turtle-dove
- skylark
- house sparrow
- European greenfinch
- European goldfinch
- common blackbird
- common starling

Mammals

Extinct land and marine mammals

- spotted-tailed quoll
- common wombat
- southern elephant seal

Extant land mammals

- platypus
- echidna
- swamp antechinus
- common ringtail possum
- brush-tail possum
- eastern pygmy possum
- long-nosed potoroo
- red-necked or Bennett’s wallaby
- Tasmanian pademelon
- grey-headed flying-fox
- lesser long-eared bat
- Gould’s wattlebat
- house mouse
- swamp rat
- black rat
- house cat

- Omithorhynchus anatinus
- Tachyglossus aculeatus
- Antechinus minimus
- Pseudocheirus peregrinus
- Trichosurus vulpecula
- Cercartetus nanus
- Potorous tridactylus
- Macropus rufogriseus
- Thylogale billardieri
- Pteropus poliocephalus
- Nyctophilus Geoffroyi
- Nyctophilus gouldi
- Mus musculus
- Rattus lutreolus
- Rattus rattus
- Felis catus
Plate 5.1  
Brown tree frog  
*Litoria ewingii*  
Peter Brown

Plate 5.2  
Eastern banjo frog  
*Limnodynastes dumerilii*  
Peter Brown

Plate 5.3  
Striped marsh frog  
*Limnodynastes peronii*  
Peter Brown

Plate 5.4  
Green and golden frog  
*Litoria raniformis*  
Peter Brown

Plate 5.5  
Common froglet  
*Crinia signifera*  
Peter Brown

Plate 5.6  
Smooth froglet  
*Geocrinia laevis*  
Peter Brown

Plate 5.7  
Smooth froglet (underside)  
*Geocrinia laevis*  
Peter Brown
Reptiles

Plate 5.8
Tiger snake
Notechis ater
Mike Thomas

Plate 5.9
Lowland copperhead
Austrelaps superbus
Bill Wakefield

Plate 5.10
White-lipped snake
Drysadia coronoides
Bill Wakefield

Plate 5.11
Blotched bluetongue
Tiliqua nigrolutea
Nature Conservation Branch

Plate 5.12
White's skink
Egernia whitii
Nature Conservation Branch
Plate 5.13
Southern elephant seal  
*Mirounga leonina*
Nature Conservation Branch

Plate 5.14
Spotted-tailed quoll  
*Dasyurus maculatus*
Nature Conservation Branch

Plate 5.15
Platypus  
*Ornithorhynchus anatinus*
Nick Mooney

Plate 5.16
Echidna  
*Tachyglossus aculeatus*
Nature Conservation Branch

Plate 5.17
Gould's wattled bat  
*Nyctophilus gouldi*
Nature Conservation Branch

Plate 5.18
Swamp antechinus  
*Antechinus minimus*
Dave Watts
Mammals

Plate 5.19
Eastern pygmy possum
*Cercartetus nanus*
Dave Watts

Plate 5.20
Common ringtail possum
*Pseudocheirus peregrinus*
Dave Watts

Plate 5.21
Long-nosed potoroo
*Potorous tridactylus*
Nature Conservation Branch

Plate 5.22
Red-necked or Bennett’s wallaby
*Macropus rufogriseus*
Richard Donaghey

Plate 5.23
Swamp rat
*Rattus lutreolus*
Nature Conservation Branch
Introduction

Old growth eucalypt forests are very rich in biodiversity and provide a home for many fauna, fungi, and micro-organisms that depend on forests for their survival and reproduction. Fauna is a collective term for all vertebrate animals with backbones (mammals, birds, reptiles, amphibians and fish) and invertebrate animals without backbones such as crayfish, centipedes, millipedes, snails, spiders and a multitude of insect groups (e.g. bugs, beetles, moths, butterflies, ants, bees and wasps). Fauna has co-evolved with flora, and together they interact to form an interdependent web of life. Plants need fauna for pollination, seed dispersal and nutrient cycling. Plants supply fauna with food, shelter from predators, sites for depositing eggs, hollows and crevices for nest, den and roost sites, nesting material and protection from the weather. Fauna that need hollows and crevices are dependent on old growth forests.

The precious few remaining large old Tasmanian blue gums (Eucalyptus globulus subsp. globulus) on King Island today are testament to the giant old growth eucalypt forests that once covered much of the island 200 years ago. Much of the tall eucalypt forests were cleared for agriculture and repeatedly burnt by fires following human settlement. At the turn of the 19th century King Island’s tall wet eucalypt forests were home to four large cockatoos that used large hollows for nesting. Two of these, the gang-gang cockatoo (Callocephalon fimbriatum) and glossy black-cockatoo (Calyptorhynchus lathami), are now locally extinct on King Island. Today the yellow-tailed black-cockatoo (Calyptorhynchus funereus) and sulphur-crested cockatoo (Cacatua galerita) are threatened with local extinction. Large old logs on the floor of old growth eucalypt forests provide den sites for mammals such as the predatory dasyurid, the spotted-tailed quoll (Dasyurus maculatus). This quoll survived on King Island until early in the 20th century but is now locally extinct.

Features of old growth forests

Very large, old eucalypt trees that live for 300–400 years dominate old growth forests. With good soils and high rainfall eucalypts grow fast and tall. The forest canopy is dominated by eucalypt foliage, and a complex understorey of shrubs develops beneath the canopy. Old growth eucalypt forests are characterised by elements that contribute to structural diversity. These structural attributes of old growth forests are:

1. horizontal and vertical tiers provided by large, old eucalypts;
2. large, dead stags (standing dead trees) resulting from fires, disease, natural ageing and tree death;
3. large logs on the forest floor and in streams;
4. hollows and crevices that develop in old trees;
5. litter on the ground (10).
Each of these structural elements is characteristic of old growth eucalypt forests and provides habitat for distinctive fauna.

**The forest canopy**

The canopy, branches and trunks of mature and old growth eucalypts play a pivotal role in plant-animal interactions and provide essential resources to fauna. Leaves use the sun’s energy to produce high-energy sugars through photosynthesis. Leaves store sugars and minerals, and these provide food to a vast array of leaf-eating insects such as beetles and their larvae, caterpillars of moths, and sap-sucking insects. These insects are highly sought by insect predators, parasites and spiders. Insectivorous birds in turn search the foliage, twigs and branches for a multitude of arthropod prey. The flowering eucalypts have co-evolved with insect pollinators. Eucalypt flowers provide a rich source of nectar and pollen that attract insects and nectar-feeding birds. Insects such as beetles and nectar-feeding birds transfer pollen from flower to flower. Australia’s largest honeyeater, the yellow wattlebird (Anthochaera paradoxa), feeds on blue gum flowers and assists with pollination. Many birds forage in the canopy and glean the foliage and flowers for insects. These include habitat specialists such as spotted pardalote (Pardalotus punctatus), striated pardalote (P. striatus), black-headed honeyeater (Melithreptus affinis) and green roSELLA (Platycercus caledonicus) but also others like golden whistler (Pachycephala pectoralis), crescent honeyeater (Phylidonyris pyrrhoptera), New Holland honeyeater (P. novaehollandiae) and two species of cuckoos that all favour wet eucalypt forests.

**Bark**

Bark is a special substrate for insects and spiders that hide under bark to escape from birds searching for prey. All King Island eucalypt species, but especially Tasmanian blue gum (Eucalyptus globulus subsp. globulus) and white gum (Eucalyptus viminalis subsp. viminalis), have loose bark that peels off in ribbons and sheets in summer–autumn. Arthropods that hide under bark include scorpions, spiders, bugs, beetles and their larvae. The strong-billed honeyeater is a specialist bark forager that forages in small groups and flies from tree to tree and between remnant bush patches searching for insect prey. Noisy flocks of strong-billed honeyeaters forage on the trunks and branches of eucalypts, paperbarks and tea-trees and use their bills to probe under and prise off bark to search for and capture arthropod prey. The yellow-throated honeyeater (Lichenostomus flavicolliS) and grey shrike-thrush (ColLuricinclA barmonica) also specialise in bark foraging on trunks and branches.

The yellow-tailed black-cockatoo forages on the trunks and branches of standing live and dead eucalypts and wattles. It searches for wood-boring insect larvae of longicorn beetles and cossid moths that tunnel beneath the bark and in galleries in the wood. The yellow-tailed black-cockatoo uses its strong bill to excavate into the tree, remove strips of bark and woodchips and extract the larvae. It also forages for wood-boring insect larvae in fallen branches and logs on the ground. This behaviour is also common in the cool temperate rainforests of western Tasmania.

**Limbs and branches**

Large, old eucalypts more than 100 years of age have a range of very large sturdy limbs and branches and finer live and dead branches, twigs and foliage that provide large raptors and small birds with a vast number of potential nest sites. The majestic white-bellied sea-eagle (Haliaeetus leucogaster) is the largest avian predator on King Island and is at the top of the food chain. Adult sea-eagles are dark grey and white with a body length of 75–85 cm. The white-bellied sea-eagle is carnivorous and preys on birds, reptiles, fish, mammals, crustaceans and carrion (9). On King Island their prey includes blotched blue-tongue lizards (R. Donaghey) and probably waterfowl, turkey and peafowl. The huge nest of sticks of the sea-eagle measures on average 2 m wide by 1 m deep and so needs good support. On King Island the sea-eagles nest is often built 10–20 m up on a large limb against the trunk of a large, tall blue gum often well inland in wet forest.

The small satin flycatcher (Myiagra cyanoleuca) is another bird that depends on mature and old growth eucalypt trees for nesting. It is a trans-Bass
Strait migrant that heralds its arrival on King Island in late October-early November with guttural buzzy calls and high-pitched whistles. This restless bird perches in the upper tree strata, quivers its tail and sallies in the air after insects. The satin flycatcher builds its cup-shaped nest of bark and spider web on a horizontal fork of a dead branch usually high up in a large, old eucalypt. It favours mature and old growth eucalypt forest. It is rare and locally threatened on King Island and occurs at Pegarah State Forest.

Fibrous bark from eucalypts, sticks, twigs, leaves, rootlets and spider webs are resources in a eucalypt forest used by birds to build their nests. Green moss and lichens are used as exterior decorations and camouflage on nests of robins, silvereye (Zosterops lateralis), Bassian thrush (Zoothera lunulata) and Tasmanian thornbill (Acanthiza ewingii).

Emergent eucalypt trees are an important component of old growth forests, but beneath the canopy are the ground layer and understorey trees and shrubs that make up layers of vegetation. The variety of understorey trees is generally similar in old growth and younger forests. Depending on disturbance history such as fire, understorey trees in older forests are usually taller and less dense with more spreading branches. Some shrubs and ground layer plants may only occur in older forests. Wattles (Acacia spp.) and dogwood (Pomaderris apetala) predominate in the wetter gullies and play an important role in recycling nutrients. Sassafras (Atherosperma moschatum) occurs sparingly in some sheltered tree fern gullies. Austral mulberry (Hedyccarya angustifolia) is a common understorey tree along streams in the south-east. It reaches its southern limit on King Island and is found nowhere else in Tasmania.

**Understorey layers of trees, shrubs and tree ferns**

Understorey trees and shrubs provide fauna with a range of food such as nectar, flowers, fruit, seeds, leaves, invertebrates, manna and lerp (a sugary substance secreted by sap-sucking insects). Understorey plants are used by birds for shelter and as nest sites so are critical for their survival and reproduction. About one third of Tasmania’s 60 forest and woodland birds need understorey vegetation for nesting (2). On King Island up to 12 species build nests in understorey plants of eucalypt forests ranging in size from the brush bronzewing (Phaps elegans) to the diminutive endemic Tasmanian thornbill. All four endemic honeyeaters nest in the understorey layers including the foliage and branches of eucalypt saplings. The nest of the uncommon black-headed honeyeater is usually well concealed in eucalypt foliage. The strong-billed honeyeater usually builds its nest in eucalypt trees and saplings but also in dogwood, tea-tree and fronds of tree ferns (7, R. Donaghey). The yellow-throated honeyeater and crescent honeyeater usually place their nests low in dense understorey shrubs, sedges and ferns. Both species of whistlers, olive and golden, nest in understorey. The olive whistler inhabits dense understorey thickets. The golden whistler forages in all levels of vegetation, including canopy of tall eucalypts, but nests in dense understorey.

The foliage and sapwood of understorey wattle trees (Acacia spp.) are richer in nutrients than eucalypts and typically support larger numbers of insects which are available to predators including birds. The flowers of wattles produce large amounts of pollen, collectively over many months, and this is utilized by native bees and flies as a food source. Wattle seed is often eaten by weevils (Melanterius spp.) before it leaves the seed pod. Shed seeds are further dispersed by ants which are attracted to the oil-rich, fleshy body attached to the seed. Many understorey shrubs have specialised pollinators. Native peas use certain native bees which are attracted to their bilaterally symmetrical flowers. Soldier beetles (Chauliognathus lugubris) and nectar scarabs (Phyllotocus spp.) are very active flower visitors to many white-flowered species.

Tall, old tree ferns are a characteristic feature in gullies of old growth eucalypt forests. Tree ferns are an ancient lineage, and individuals can live for hundreds of years. The soft tree fern (Dicksonia antarctica) is common on King Island and forms clumps in wet gullies and is an understorey plant in wet forests. The far less common rough tree fern (Cyathea australis) usually occurs on drier, upper slopes of wet forests. In spring a flush of new fronds unfurl from the crown of soft tree ferns. Fallen leaf litter and moisture deposit in the
crows. Birds like the grey shrike-thrush and Bassian thrush build well-concealed nests in the crown of tree ferns. Green moss on the external walls of the Bassian thrush’s nest blend in with tree fern foliage. In the absence of tree-hollows, brush-tail possum (Trichosurus vulpecula) often rest by day in the crown of tree ferns.

Ferns are invested with toxic chemicals which help prevent their leaves being eaten. However, a few highly specialised insects have overcome these defenses and are found exclusively on ferns. The caterpillars of certain geometrid moths (Idiodes spp.) can be seen grazing fronds at night with impunity. Some insects which feed on poisonous plants store toxins in their body which make them distasteful to birds.

Trunks of tree ferns provide a substrate for many epiphytic ferns, mosses and for germinating trees such as cheesewood (Pittosporum bicolor). Fruit-eating birds such as silvereye eat the sticky red seeds of cheesewood, which are passed through their gut and deposited on trunks of tree ferns. The ageing brown fronds of tree ferns droop toward the trunks and provide many potential nest sites for small brown birds that build dome-shaped nests of bark. Tasmanian thornbill forage for insects on tree fern fronds and use fibre from trunks of tree ferns as nest material. Tasmanian thornbill, scrubtit (Acanthornis magnus) and Tasmanian scrubwren (Sericornis humilis) place their dome-shaped nests among decaying fronds of tree ferns and epiphytic ferns against or near trunks of tree ferns.

**Standing dead and dying trees**

Standing, rotting dead trees are great value for wildlife and provide a source of food for wood-boring insects such as beetles, beetle larvae and caterpillars of moths. Adult ladybird beetles overwinter under the rotting bark of standing dead trees, then disperse widely in early spring. Cracks and crevices in these trees provide homes for mammals such as bats, birds, reptiles and frogs.

When large trees are killed by fire, disease or old age, there is a succession of changes in the wood quality which is reflected in the insects which exploit the dead tree for food and living space. The sapwood is initially rich in carbohydrates, including sugars, which are eaten by the larvae of beetles such as cerambycids, buprestids and others. These channelise the outer sapwood, promoting further drying out of the wood and encouraging the entry of fungi, important for accelerating decay. Nutrients are returned to the forest floor in the form of faeces excreted from the tunnels. After one to several years, and having transformed the internal architecture of the dead tree, the larvae attain the adult beetle stage and leave in search of other moribund trees to infest.

The exterior openings to these larval channels are attractive to a range of other insects seeking shelter, as well as their predators, including spiders. An important group which exploit this space are native bees which are essential for successfully pollinating the native flora. Most Australian bees are solitary, with each female rearing her young independently, unlike the highly social European honeybee. An abandoned beetle tunnel provides an ideal nursery, and female bees pack balls of harvested pollen into them into which they lay eggs. In the absence of dead trees some bees may use insect-riddled fence posts, but up to 15 species may use a single standing tree.

As rotting progresses into the heartwood, other insects colonise the tree. The low nutrient content of this wood is enhanced by the action of certain fungi, and many insects which appear to eat dead wood, in fact survive on a mixture of wood fibre and fungi. More than 150 species of beetles on King Island depend on fungus-infested dead wood for their nutrition.

This structural weakening of the tree eventually leads to its collapse during a windstorm, and contact with the soil initiates a whole raft of changes. The soil inoculates the wood with new types of fungi and moisture is less limiting. Plant roots may invade the wood, further accelerating the recycling of its nutrients. A host of flightless beetles, unable to exploit the standing stag, make good use of the fallen log. Tenebrionid beetles (Saragus, Adelium and other genera) and elaterid beetles breed in the moist space between the soil and the log, with their larvae developing on the organic matter as scavengers. The soil-log interface is the site of much fungal and insect activity, and logs should not be rolled over unnecessarily because the moist microclimate is easily destroyed.
Hollows and crevices

Hollows and crevices are extremely important for some birds and mammals as nest, den and roost sites. Hollows form through a combination of factors such as damage and decay from insects, fungi, fire, wind and water. Hollows usually develop in eucalypts older than 100 years but sometimes form in younger trees under stress from disease, fire damage and lack of water. Hollow formation is associated with several tree characteristics, particularly age of the tree, tree diameter and tree health. A positive relationship exists between a tree’s diameter and its age, the number of hollows and size of hollows. In forests with larger trees there is a higher proportion of trees with hollows and more hollows in individual trees. Older trees develop larger hollows suitable for larger animals such as cockatoos and owls. Hollows suitable for vertebrate fauna generally are not present in eucalypts less than 120 years of age.

Studies conducted on mainland Australia show that hollows for larger animals take more than 200 years to develop (4). The lack of arboreal termites in Tasmania, including King Island, means that hollows are often slower to develop.

Hollow-dependent birds (Plates 6.1–6.7)

The dependence of fauna on old growth eucalypt forest on King Island is illustrated here by four species of hollow-nesting birds: a cockatoo, a parrot, an owl and a pardalote. The yellow-tailed black-cockatoo is a large black cockatoo with a body length of 55–65 cm (6). It is the last surviving black cockatoo on King Island. Numbers of this cockatoo have declined since human settlement as a result of habitat destruction and loss of hollows for nesting. Nesting yellow-tailed black-cockatoos need a very large, deep hollow in a trunk, spout or stump of a large mature or old eucalypt, either live or dead. Most hollows are 1–3 m deep, 30–40 cm in diameter and 10–20 m above ground. These hollows are mostly in eucalypts more than 200 years of age. Nest trees generally are spaced 50–150 m apart (6). The cockatoo roosts in tall, mostly densely foliaged trees.

The yellow-tailed black-cockatoo forages in trees and shrubs for seeds and invertebrates. It extracts wood-boring larvae of longicorn beetles and cossid moths from standing and fallen wattles and eucalypts. It takes seeds of native *Acacia, Allocasuarina, Banksia* and *Hakea* and the introduced Monterey pine (*Pinus radiata*) (6). During the breeding season it may forage far from the nest. In autumn–winter it forages widely in flocks of up to 50 birds on King Island.

The yellow-tailed black-cockatoo has a high adult lifespan and a low reproductive rate. The King Island population may be stable or declining and limited by a shortage of suitable hollows. This population needs to be monitored and its status determined. If the population is low or declining then a community project needs to be developed to protect all large old eucalypts with suitable hollows and to erect nest-boxes.

Another King Island bird that needs hollows for nesting is the endemic subspecies of the green rosella (*Platycercus caledonicus brownii*), now recognised as nationally threatened (3). The population declined after extensive clearing of native vegetation for agriculture and subsequent loss of hollows (5). The green rosella favours wet eucalypt forest with a leafy canopy and dense understorey. Throughout the year the green rosella is mainly arboreal and forages at all levels from the ground to canopy. It feeds on seeds, fruit, flowers and buds. Seeds are taken from the fruits of eucalypts, wattles, sedges and tea-trees.

The green rosella is widely distributed throughout King Island, and recent bird surveys suggest that it is recovering on the island. The population may be limited by lack of suitable nest-hollows. It breeds in hollows in a trunk, limb or spout of living and dead trees, mostly eucalypts. Suitable hollows occur in large trees 6–20 m above ground and have entrance holes 5–20 cm in diameter and a nest chamber considered to be 50 by 15 cm (6). On King Island the green rosella has nested in abandoned buildings at Grassy and even in low forks of trees with an overhead leafy cover. This behaviour suggests that nest-hollows are in short supply and the population may benefit from erection of starling-proof nest-boxes.

The southern boobook (*Ninox novaeseelandiae leucopsis*) is a small, spotted endemic subspecies of owl that is a breeding resident on King Island. It is rare and locally threatened on King Island. The southern boobook is a top nocturnal predator that
is important for forest health and function. It forages at night in forests, woodlands and in more open sites at the forest-pasture edge. It feeds on invertebrates such as beetles and moths (6) attracted to lights around homesteads. By night it often perches on fence posts, stumps and buildings and hunts prey such as frogs, lizards, small birds and mammals, particularly mice and rats. It depends on hollows for nesting and roosting and is affected adversely by loss of old growth, hollow-bearing trees.

The southern boobook is territorial during the breeding season. Suitable nest-hollows typically occur in living or dead old eucalypts more than 150 years old. Hollows may be in vertical trunks, spouts or limbs. Hollows are 50–250 cm deep and 20–30 cm in diameter (6). Southern boobook roost by day in hollows, in dense foliage of trees, in barns, sheds and in the dark, sheltered cover of the rootball of fallen trees (R. Donaghey). These observations suggest a shortage of suitable hollows for roosting and breeding. Thus the southern boobook on King Island should benefit from the erection of nest-boxes and platforms.

King Island once had three species of small, forest pardalotes that specialise in gleaning insects from eucalypt foliage. The nationally endangered forty spotted pardalote (Pardalotus quadragintus) is now locally extinct on King Island but still survives on Flinders Island. The remaining two species, the spotted pardalote and striated pardalote, forage in all three eucalypt species but especially white gum (Eucalyptus viminalis), where they feed on sugary lerp secreted by psyllid sap-sucking insects. Both pardalote species are uncommon to rare on King Island. The resident spotted pardalote (Pardalotus punctatus) excavates a tunnel in stream and earthbanks for nesting. The rare, migratory striped pardalote Pardalotus striatus is a small, insectivorous forest dweller that depends more on tree-hollows for nesting. In north coastal Tasmania in shrubby coastal white gum the striated pardalote nests in loose colonies (R. Donaghey) and excavates a tunnel in sandy soils like the spotted pardalote. Similar nesting behaviour may occur on King Island but has not been reported.

The striated pardalote requires small hollows with a small entrance size of 3–6 cm. These hollows form in the main trunk, spouts and limbs of large eucalypts more than 100 years old (8). The reasons for the rarity of the striated pardalote on King Island are unclear. The underlying causes may be a combination of factors such as insufficient old growth forest with suitable hollows for nesting and a scarcity of white gum for foraging, but population parameters such as mortality, reproduction, recruitment and dispersal are unknown.

**Logs and fallen branches**

Large logs and fallen branches on the forest floor and in streams are a special feature of old growth eucalypt forests. The continual death of trees through ageing, disease, insect attack and damage from wind and fire contributes to large woody debris accumulating on the forest floor. Storms and strong winds snap off branches and sometimes tree-crowns and these crash to the forest floor. All the woody debris is slowly decomposed and recycled by myriads of fungi, bacteria and invertebrates. Nutrients are recycled to the soil for use by plants.

Rotting logs carpeted with moss, fungi and lichens are an ideal nursery bed for germinating moisture-loving trees such as sassafras and can give rise to a row of trees in the forest. This veneer of tiny plants is colonized by an astounding array of tiny invertebrates such as mites (oriabatids, erythraeids), springtails (smithurids, entomobryids), small beetles (weevils, pselaphid and scydmaenid beetles) and insect larvae, especially flies, all arranged in a complex foodweb. Fungi decompose logs, fallen branches and litter, and recycle nutrients. Fungi provide nutritious food for many animals including small mammals. In autumn, many native fungi that are symbiotic with eucalypt roots produce fruiting bodies (toadstools and truffles) which are eaten by insects and potoroos, resulting in the dispersal of their spores to new localities. These fungi serve to enhance the growth rates of eucalypts and fruit generously after fires, thereby promoting the re-establishment of gum trees. Logs on the ground and over streams also provide a pathway for mammals such as possums.

Crevices, ledges and hollows in stumps, stags, uprooted trees and logs on the ground are used by
birds, mammals, lizards, frogs and invertebrates for shelter, roosting and nesting. Cavity-nesting birds include dusky robin (Melanodryas vittata), flame robin (Petroica phoebe), Bassian thrush and grey shrike-thrush.

Ground layer litter and vegetation

The ground layer of an old growth eucalypt forest is characterised by a deep litter composed of bark, fallen leaves, flowers, fruits and seeds. Ground layer ferns such as Blechnum water-ferns and mother shield fern (Polystichum proliferum) are abundant. The ground layer, forest soils and decaying litter are home to an abundant array of invertebrates such as molluscs, amphipods, centipedes, millipedes, earthworms and insects, particularly beetles and ants. These arthropods provide food for ground foraging birds particularly Bassian thrush, that probes the soil for worms, Tasmanian scrubwren and robins. The dusky robin and flame robin frequent the forest edge and more open areas in the forest. Robins sit quietly on low perches scanning the ground, then flutter to the ground and pounce on insects. Brush bronzewing forage on the ground searching for seeds of wattles and tea-tree. Ground layer of litter, ferns and sedges provides nest sites for two endemics, the Tasmanian thornbill and Tasmanian scrubwren that nest on or near the ground. Nests of the Tasmanian scrubwren are parasitised by the fan-tailed cuckoo (Cacomantis flabelliformis) that appears to favour larger forest remnants and is uncommon on King Island. Old growth wet forests support many of the 14 species of native snails on King Island. The rare and vulnerable southern hairy red snail was rediscovered in wet forest near the east coast in 1996 (1). The unusual semi-snail Helicarion is another denizen of wet forests. A complex ground layer in these forests is critical in helping resist invasion by introduced pest species such as conical snails and slaters.

References


Hole-nesting forest birds

Plate 6.1
Forty-spotted pardalote
*Pardalotus quadrangintus*
Nature Conservation Branch

Plate 6.2
Yellow-tailed black-cockatoo
*Calyptrorhynchus funereus*
Donald Trounson

Plate 6.3
Lerp, a sugary secretion by psyllid sap-sucking insects, is food for pardalotes

Plate 6.4
Southern boobook
*Ninox novaeseelandiae*
Trevor Waite

Plate 6.5
Flame robin (male)
*Petroica phoenicea*
Trevor Waite

Plate 6.6
Flame robin (female)
*Petroica phoenicea*
Trevor Waite

Plate 6.7
Spotted pardalote
*Pardalotus punctatus*
Trevor Waite

Plate 6.8
Striated pardalote
*Pardalotus striatus*
Trevor Waite
Chapter 7

Ecology, conservation and management of birds and recovery of threatened species

Richard Donaghey and Sarah Lloyd

Introduction

At the turn of the 21st century the King Island landscape is a mosaic of predominantly agricultural land with about 30% remnant native vegetation. Much of the original vegetation is gone. Less than 5% of the original Tasmanian blue gum forest and tall paperbark swamp forest remains today as mature forest. Vegetation clearance and destruction of habitat is the greatest cause of the loss and decline of species. In the last 100 years King Island has lost five bird species, including the unique King Island emu and two black cockatoo species, gang-gang cockatoo and glossy black-cockatoo. Bob Green and Max McGarvie (10) documented the birds of King Island nearly 40 years ago. Since that time there has been regeneration of native vegetation in the agricultural landscape resulting in regrowth scrub, eucalypts and paperbark in shelterbelts along fences and along streams and rivers. Green and McGarvie considered quite a few forest birds uncommon to rare in the 1960s. Apart from the Field Atlas from 1977 to 1981 (4) there have been no quantitative surveys of King Island birds. Bird populations change in response to changes in habitat. Predictably, some species have declined as a result of vegetation clearance, conversion of land to agriculture and severe bushfires. Most of the extinct species and many of those facing the greatest threats to extinction today are those that are dependent on elements of old growth forests. Some species have benefited from vegetation clearance and others are recovering as regrowth vegetation matures.

Birds as indicators

The presence of some fauna may be a good indication of habitat quality, ecosystem function and environmental health. Birds are excellent indicators of biodiversity, ecosystem health and sustainability because some species are highly sensitive to environmental changes such as pesticides, habitat fragmentation and climate change. Birds are good indicator species in agricultural landscapes since they are a conspicuous feature of farms, and some species are very sensitive to habitat loss and fragmentation (2, 21, 22, 24). The presence of predators high up the food chain and their prey is a very good measure of ecosystem function and sustainability. Diurnal birds of prey, such as eagles, hawks and nocturnal owls are high up the food chain. In the forests of NSW and Victoria, the presence of large forest owls, powerful owl (*Ninox strenua*) and sooty owl (*Tyto tenebricosa*), that prey on glider possums, is a good indicator of forest health (19). Smaller birds lower down the food chain can also be good indicators of landscape health. The ground-foraging hooded robin (*Melanodryas cucullata*), a close relative of Tasmania’s endemic dusky robin, inhabits woodlands and is highly sensitive to the fragmentation, reduction and degradation of habitat (6, 7, 23). In woodlands in the ACT and NSW the hooded robin was found only in woodland remnants greater than 100 ha in size and in very good condition. The species most sensitive to a parameter or threat was regarded as a focal species.
(15, 23) for that parameter or threat. Hence, the hooded robin was regarded as a focal species for both remnant area and condition. Another ground foraging robin, eastern yellow robin (*Eopsaltria australis*), was absent from isolated remnants and was a candidate focal species for isolation (23).

**The bird indicator project on King Island**

The Natural Heritage Trust project ‘Biodiversity Indicators for Sustainable Land Management’ sought to determine which forest birds are good indicator species for protecting, managing and restoring native vegetation and which species are uncommon to rare. Identifying a few indicator species sensitive to habitat area, condition and isolation provides land managers with information and guidelines for sustainable land management. Bird indicator species also enable land managers to monitor the health of properties, catchments and the landscape and to make more informative decisions about landscape restoration and revegetation.

Fieldwork was conducted on King Island in spring 2001 and autumn 2002. Sarah Lloyd recorded the numbers of bird species on transects at 21 sites on King Island. The sites represented remnants mostly less than 10 ha in size up to 1200 ha at Pegarah State Forest (Figure 1). For each site, vegetation was described and habitat quantified and scored using Tasforhab. This is a method developed by Tasmanian PWS, now the Nature Conservation Branch, to quantify habitat structure by the height and percentage cover of the vegetation layers and ground litter. The bird surveys were conducted in mornings in the last third of October and again in March/April (16).

**Numbers, status, population trends and habitat of King Island forest birds**

During both the spring and autumn surveys, birds were recorded on the forest and woodland transects, at the forest edges, flying overhead and off the transects. The autumn surveys included an influx of some migratory species such as silvereye, a marked increase in some resident species such as spotted pardalote, yellow-throated honeyeater and crescent honeyeater and a decrease in other species, notably cuckoos. The total number of species recorded at the 21 sites during both spring and autumn was 69 species, 59 native species and 10 introduced species. The total of 69 species included non-forest birds such as waterbirds, lapwings and birds of open space and grasslands such as white-fronted chat, common skylark, Richard’s pipit and welcome swallow. The following analysis is restricted to 49 forest and woodland birds including the Australian shelduck and Australian wood duck that breed in tree-hollows in forest. Numbers, status and habitat

**Figure 1. Bird survey sites**
requirements of the 49 forest and woodland birds recorded in spring and autumn are presented in Table 1. The spring survey was conducted during the last third of October when species present were most likely breeding birds. Spring is the season when most birds tend to be more visible and vocal. Spring is also the season when there is peak demand for forest resources such as food, nest sites and nest material. For these reasons the determination of common, uncommon and rare birds was based on the frequencies of birds in spring.

**Twenty most common forest bird species on the surveys**

The twenty most common breeding birds of forests and woodlands in spring in decreasing order of abundance were:

- Tasmanian thornbill, superb fairy-wren, grey fantail, forest raven, grey shrike-thrush, Tasmanian scrubwren, strong-billed honeyeater, Australian magpie, yellow-throated honeyeater, New Holland honeyeater, golden whistler, black-headed honeyeater, European goldfinch, common starling, green rosella, olive whistler, crescent honeyeater, dusky robin, common blackbird and silvereye (Table 1).

Of these 20 species, 17 are native, three are introduced and only one, the silvereye, is migratory. Nineteen of these common birds occurred on more than 50% of the survey sites. These common to fairly common birds are mostly habitat generalists in that they occupy both wet and dry vegetation such as wet and dry eucalypt forests and woodlands. However, the Australian magpie prefers open woodland with short grassland and pastures for foraging and needs trees for nesting and roosting. The three common relatively large birds are the forest raven (52–54 cm), Australian magpie (38–44 cm) and green rosella (32–38 cm). The rest of the common birds are mostly small, ranging in size from 10 cm (Tasmanian thornbill) to 20 cm in length (grey shrike-thrush).

The 20 most common birds were grouped into guilds according to their nest site, diet and foraging behaviour (Table 2). The composition of bird guilds may give an indication of forest function and forest resources that may be limiting bird populations. Fifteen (75%) of the common birds are insect-eaters. Insectivorous forest birds are natural predators of insects that defoliate eucalypts and are vital for maintaining the health of forests, woodlands and shelterbelts.

Vegetation layers that make up the forest structure are the canopy, understorey trees and shrubs, and ground layer vegetation. These layers provide birds with habitat for foraging, perching and nesting. Old and mature eucalypts provide nest sites for large birds such as white-bellied sea-eagle, other raptors, and small birds such as satin flycatcher. Common birds that nest in large trees are forest raven, Australian magpie and black-headed honeyeater. Hollows develop in mature and old eucalypts and are used for nesting by parrots, cockatoos, pardalotes and owls. Among the 20 most common birds the only native bird that nests in tree-hollows is the fairly common endemic green rosella. The introduced common starling nests in tree-hollows and competes with native fauna for hollows.

Understorey is essential for many small, insectivorous birds and provides them with food, foraging, roosting and nest sites and shelter from enemies. Thirteen native birds and two introduced birds require understorey for nesting (Table 2). The black-headed honeyeater also nests in understorey trees. Most of these understorey birds build nests in shrubs and ground layer vegetation usually less than 2 m above ground. The presence in spring of birds like Tasmanian scrubwren, yellow-throated honeyeater, crescent honeyeater and olive whistler is usually a good indication that the habitat has suitable, dense low understorey required by these species for nesting. The dusky robin builds a nest in forks of shrubs and trees but also nests in tree-cavities if they are available. Three understorey-nesting species, grey shrike-thrush and the endemic strong-billed and yellow-throated honeyeater, are trunk-bark specialists that forage for invertebrates on and under bark on trunks and branches of trees. In summary, most of the common birds are small in size, habitat generalists, insect-eaters and nest in understorey.

**Uncommon, rare and threatened birds on the surveys**

Less than 14 individuals of each of the remaining 29 species of forest birds were recorded in spring on
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<td>U</td>
<td>WEF,</td>
</tr>
<tr>
<td>flame robin</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>14</td>
<td>R</td>
</tr>
<tr>
<td>dusky robin (E)</td>
<td>14</td>
<td>20</td>
<td>14</td>
<td>33</td>
<td>53</td>
<td>FC</td>
</tr>
<tr>
<td>olive whistler</td>
<td>15</td>
<td>27</td>
<td>7</td>
<td>10</td>
<td>37</td>
<td>FC</td>
</tr>
<tr>
<td>golden whistler</td>
<td>17</td>
<td>32</td>
<td>17</td>
<td>30</td>
<td>62</td>
<td>FC</td>
</tr>
<tr>
<td>grey shrike-thrush</td>
<td>20</td>
<td>43</td>
<td>20</td>
<td>50</td>
<td>93</td>
<td>C</td>
</tr>
<tr>
<td>satin flycatcher</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>R</td>
<td>D</td>
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</tr>
<tr>
<td>grey fantail</td>
<td>17</td>
<td>67</td>
<td>20</td>
<td>82</td>
<td>149</td>
<td>C</td>
</tr>
<tr>
<td>black-faced cuckoo-shrike</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>13</td>
<td>R</td>
</tr>
<tr>
<td>dusky woodswallow</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>R</td>
<td>U</td>
<td>WEF,</td>
</tr>
<tr>
<td>Australian magpie</td>
<td>12</td>
<td>35</td>
<td>7</td>
<td>15</td>
<td>50</td>
<td>C</td>
</tr>
<tr>
<td>black currawong (E)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>R,V</td>
</tr>
<tr>
<td>forest raven</td>
<td>16</td>
<td>54</td>
<td>17</td>
<td>38</td>
<td>92</td>
<td>C</td>
</tr>
<tr>
<td>European greenfinch</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>R</td>
<td>U</td>
<td>CS</td>
</tr>
<tr>
<td>European goldfinch</td>
<td>17</td>
<td>30</td>
<td>14</td>
<td>26</td>
<td>56</td>
<td>C</td>
</tr>
<tr>
<td>silvereye</td>
<td>10</td>
<td>14</td>
<td>17</td>
<td>78</td>
<td>92</td>
<td>C</td>
</tr>
<tr>
<td>Bassian thrush</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>U</td>
</tr>
<tr>
<td>common blackbird</td>
<td>14</td>
<td>16</td>
<td>8</td>
<td>9</td>
<td>25</td>
<td>FC</td>
</tr>
<tr>
<td>common starling</td>
<td>11</td>
<td>30</td>
<td>8</td>
<td>14</td>
<td>44</td>
<td>C</td>
</tr>
</tbody>
</table>
the 21 survey sites. Although these species were uncommon to rare on the surveys not all of them are uncommon to rare throughout King Island. The four species of ducks are common on wetlands and dams. The brown falcon is fairly common on farms with paddocks and scattered trees, and bush. The brush bronzing is more common in King Island scrub, and coastal heath and scrub. Uncommon regular breeding species on King Island are the spotted pardalote, yellow wattlebird and Bassian thrush. Birds high up on the food chain, like eagles and other raptors, occur in low densities. Other large birds such as cockatoos were naturally rare in the past and are still very rare. Others like the King Island brown thornbill were much more common a century ago but are critically endangered. Some recent arrivals, recorded during the last 20–30 years, are the Australian shelduck, Australian wood duck, brown goshawk and yellow-rumped thornbill. Many migratory species are fairly common during migration but are scarce during the breeding season. The dusky woodswallow may not be a regular breeder; the black-faced cuckoo-shrike was recorded at five sites during late October so may have been breeding.

Ten of the 12 Tasmanian endemic birds occur on King Island. There is no geographical variation in the populations of endemic yellow-throated honeyeater, strong-billed honeyeater and black-headed honeyeater from Tasmania and King Island (12). The Tasmanian scrubwren (Sericornis humilis) is treated as a separate species, and tregellasi from King Island is recognised as a separate subspecies but the taxonomy is unsettled (13). The remaining six endemic birds on King Island are recognised as endemic subspecies based on their measurements, genetics and morphology (12, 13). The conservation status of the King Island subspecies of the dusky robin (Melanodryas vittata kingi) is Least Concern (8), and the King Island subspecies rufifrons of the Tasmanian thornbill is also not threatened. According to IUCN (International Union for Conservation of Nature) criteria, the King Island endemic subspecies of green rosella, scrubtit, yellow wattlebird and black currawong are all threatened. The conservation status of the scrubtit is Critically Endangered and
the green rosella, yellow wattlebird and black currawong are Vulnerable and face a high risk of extinction (8). The endemic subspecies archibaldi of the King Island brown thornbill is Critically Endangered (8).

For the spring surveys 21 species were categorised as rare on the basis that either five or less individuals were seen or the species was seen at fewer than four sites (Table 1). Rare species included brown goshawk, nankeen kestrel, painted button-quail, brown thornbill, yellow-rumped thornbill and eastern spinebill. The presence of painted button-quail was detected from circular depressions or ‘platelets’ on the ground. Eight species were classified as uncommon to rare on the spring surveys (Table 1), these were: Pacific black duck, pallid cuckoo, fantailed cuckoo, Horsfield's bronze-cuckoo, spotted pardalote, striated pardalote, yellow wattlebird and flame robin. Four species of forest birds not

Table 2. Guilds of twenty most common forest birds of King Island in relation to nest site, diet and foraging

<table>
<thead>
<tr>
<th>Native birds nesting in tree-hollows</th>
<th>Common name</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground/foliage foraging parrot</td>
<td>green rosella</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Native birds nesting in large trees</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-foraging omnivore</td>
<td>forest raven</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Ground-foraging insectivore</td>
<td>Australian magpie</td>
<td>1</td>
<td>15%</td>
</tr>
<tr>
<td>Foliage-gleaning insectivore</td>
<td>black-headed honeyeater</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Native birds nesting in understorey trees and shrubs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trunk/bark foraging insectivores</td>
<td>strong-billed honeyeater</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>yellow-throated honeyeater</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>grey shrike-thrush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliage-gleaning insectivores</td>
<td>Tasmanian thornbill</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>golden whistler</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>olive whistler</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>silvereye</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-foraging insectivores</td>
<td>superb fairy-wren</td>
<td></td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>Tasmanian scrubwren</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dusky robin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerial insectivore</td>
<td>grey fantail</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Nectarivores</td>
<td>New Holland honeyeater</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>crescent honeyeater</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Introduced birds nesting in tree-hollows</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-foraging insectivore</td>
<td>common starling</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Introduced birds nesting in understorey trees and shrubs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-foraging insectivore</td>
<td>common blackbird</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Ground/foliage foraging seed-eater</td>
<td>European goldfinch</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
detected on any surveys were: nankeen night heron, southern boobook, scrubtit and pink robin. Twelve species of forest and woodland birds on King Island were considered rare and five species threatened (see status column of Table 1). This high number of rare and threatened species of forest birds on King Island raises the following questions.

1. Are the survey sites representative of other sites on King Island and is rarity an accurate assessment of their status on King Island?
2. Have the rare species undergone a population decline or range contraction or both?
3. Are some species naturally rare?
4. What ecological factors are associated with rarity?

Birds with a large body size such as eagles and other raptors are naturally rare because they have small population sizes, large home ranges and occur at low densities. Large forest birds that are rare on King Island are white-bellied sea-eagle, brown goshawk, yellow-tailed black-cockatoo, sulphur-crested cockatoo and nankeen night heron. Two endemic birds that are uncommon or rare are yellow wattlebird and black currawong.

Some birds were probably naturally rare in the past and are still very rare. The eastern spinebill was collected by the Field Naturalists’ Club of Victoria in 1887, and Campbell recorded it around homestead gardens in 1903. Green and McGarvie considered it either very rare or extinct by 1970. One was reported during the Field Atlas (1977–1981) and one was seen in December 2001.

Other birds are rare now because apparently they are recent arrivals and have not yet colonised much of the island. Some recent arrivals first recorded during the last 20–30 years are: Australian shelduck, Australian wood duck, brown goshawk and yellow-rumped thornbill. The brown goshawk was first recorded during the Field Atlas (1977–1981) and since then has been reported more frequently. The yellow-rumped thornbill was not recorded by Green and McGarvie or during the Field Atlas. It was first reported by M. Holdsworth in 1977 (14) and seen by S. Lloyd in March 2002. Green and McGarvie did not report the Australian shelduck in 1970. It was first reported during the Field Atlas, but since then the population has expanded rapidly.

Some King Island forest birds have undergone a population decline and range contraction as a result of loss of habitat through clearance and bushfires, and other factors. These include the yellow-tailed black-cockatoo, sulphur-crested cockatoo, green rosella, southern boobook, scrubtit, brown thornbill, yellow wattlebird, flame robin, pink robin, black currawong and Bassian thrush. Others like the King Island brown thornbill were much more common a century ago but now are critically endangered.

Some birds that suffered a population decline following land clearance for agriculture have recovered in the last 40–50 years as regrowth paperbark, scrub and eucalypts are maturing. Green and McGarvie identified birds that were depleted by loss of forest and were uncommon to rare in the 1960s. Four of these species that are recovering are green rosella, spotted pardalote, black-headed honeyeater and golden whistler.

The five most abundant forest birds during the spring 2001 surveys were Tasmanian thornbill, superb fairy-wren, grey fantail, Tasmanian scrubwren and grey shrike-thrush. These species were present at nearly all sites in both small and large remnants. This suggests these abundant birds are more tolerant of habitat fragmentation and reduction in remnant size and are more resilient to habitat alteration.

Uncommon to rare forest birds are more sensitive to habitat changes in the landscape. To understand responses of birds to habitat change it may be instructive to see if uncommon and rare birds have specialist habitat requirements that could limit populations. Identifying ecological factors underlying population declines should provide insights into developing guidelines for habitat management and species recovery. Grouping birds into guilds according to how they use habitat for nesting and foraging helps to document species specificity to habitat.

In Table 3 the uncommon, rare and threatened birds were grouped into guilds of habitat parameters such as nest site, diet and foraging behaviour. Scarcity and availability of suitable nest sites may be an important factor limiting bird populations so birds were sorted first into nest site guilds. Most of the uncommon to rare birds are in
Table 3. Guilds of uncommon, rare and threatened native King Island birds breeding in forest in relation to nest site, diet and foraging

*Birds of eucalypt forests, blackwood and paperbark swamp forests and tea-tree scrub*

<table>
<thead>
<tr>
<th>Native birds nesting in tree-hollows and bank tunnels</th>
<th>Common name</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bark searching insectivore and seed-eating cockatoo</td>
<td>yellow-tailed black-cockatoo</td>
<td></td>
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</tr>
<tr>
<td>Ground-foraging seed-eating cockatoo</td>
<td>sulphur-crested cockatoo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliage-gleaning insectivorous pardalotes</td>
<td>striated pardalote</td>
<td>7</td>
<td>24.1%</td>
</tr>
<tr>
<td></td>
<td>spotted pardalote</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carnivorous and insectivorous owl</td>
<td>southern boobook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grazing duck</td>
<td>Australian shelduck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grazing duck</td>
<td>Australian wood duck</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Native birds nesting in large trees</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carnivorous raptors</td>
<td>white-bellied sea-eagle</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>brown goshawk</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>brown falcon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-foraging omnivore</td>
<td>black currawong</td>
<td>8</td>
<td>27.6%</td>
</tr>
<tr>
<td>Nectarivorous large honeyeater</td>
<td>yellow wattlebird</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerial insectivores</td>
<td>satin flycatcher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>dusky woodswallow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliage-gleaning insectivore</td>
<td>black-faced cuckoo-shrike</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Native birds nesting in understorey trees and shrubs</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk/foliage foraging insectivore</td>
<td>scrubtit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliage-gleaning insectivore</td>
<td>brown thornbill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-foraging insectivores</td>
<td>Bassian thrush</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pink robin</td>
<td>8</td>
<td>27.6%</td>
</tr>
<tr>
<td></td>
<td>flame robin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yellow-rumped thornbill</td>
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<td></td>
</tr>
<tr>
<td>Nectarivorous small honeyeater</td>
<td>eastern spinebill</td>
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<td></td>
</tr>
<tr>
<td>Ground-foraging seed-eater</td>
<td>brush bronzewing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground-nesting seed-eater</td>
<td>painted button-quail</td>
<td>1</td>
<td>3.5%</td>
</tr>
<tr>
<td>Insectivorous brood parasites</td>
<td>pallid cuckoo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>fan-tailed cuckoo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horsfield’s bronze-cuckoo</td>
<td>4</td>
<td>13.8%</td>
</tr>
<tr>
<td></td>
<td>shining bronze-cuckoo</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Native birds nesting in colonies</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nocturnal foraging heron</td>
<td>nankeen night heron</td>
<td>1</td>
<td>3.5%</td>
</tr>
</tbody>
</table>
three categories of nest sites: tree-hollows, large trees and understorey trees and shrubs.

### Birds nesting in tree hollows and bank tunnels

Suitable tree hollows for fauna occur in old growth eucalypt forests and in old trees and stags still standing after clearance and burning. Since much of the old and mature blue gum forest on King Island was cleared and burnt, there is likely to be intense competition for scarce tree-hollows. Forest birds such as cockatoos, parrots, owls and pardalotes depend on hollows for nesting and roosting. Three of the five extinct King Island birds, glossy black-cockatoo, gang-gang cockatoo and forty-spotted pardalote, used hollows for nesting. Fifteen species of native birds on King Island use forest trees with hollows for nesting. Five of these species, yellow-tailed black-cockatoo, sulphur-crested cockatoo, southern boobook, barn owl and striated pardalote, are rare on King Island. The endemic subspecies of green rosella is Vulnerable, so nest-boxes should help its recovery (Tables 1–3). Large, deep hollows required by cockatoos may take 150 to 200 years to develop whereas small hollows used by striated pardalote may take 100 years or less to form. Ducks are another group of birds that use hollows. Recent colonists like Australian shelduck and Australian wood duck regularly nest in tree-hollows and may reduce the availability of hollows for rare forest birds. Pacific black duck and chestnut teal use hollows too but also nest on the ground. Shallow hollows or cavities on tree trunks and logs, and hollows in tree stumps as well as other sites are used by flame robin, dusky robin, grey shrike-thrush, dusky woodswallow and Bassian thrush. Thus hollows are an extremely important resource for many nesting birds. If there are too few hollows then a nest-box project targeted at specific rare species should benefit their recovery.

One species of pardalote, the rare migratory striated pardalote, usually builds a nest in small hollows in blue gum but also nests in buildings. The resident spotted pardalote excavates a tunnel in the banks of streams, hillsides and earth banks such as roadside cuttings. Both species forage in the foliage of eucalypts, especially white gum and Brooker’s gum. They feed on lerp, a sugar coating secreted by psyllid insects, and invertebrates gleaned from eucalypt leaves. The spotted pardalote is uncommon to rare, so planting of white gum should benefit the recovery of both species.

### Birds nesting in large trees

Eight species of uncommon, rare and threatened forest birds use large trees for nesting (Table 3). At the top of the food chain is the large, predatory white-bellied sea-eagle. The huge stick nest of this eagle needs to be supported by the branches and trunks of large trees, particularly blue gums. Other carnivorous raptors, the brown goshawk and brown falcon, build their nests in both mature and old trees. Two Vulnerable species, the yellow wattlebird and black currawong, probably nest in both regrowth and mature trees. Two migratory species, the satin flycatcher and dusky woodswallow, use mature and old trees for nesting. The rare satin flycatcher favours mature and old growth wet blue gum forest for breeding. It mostly builds its nest on horizontal dead branches, often high up in eucalypts. The dusky woodswallow constructs a nest in shallow hollows and in upright and horizontal forks in trunks and branches of tall trees. Another migratory species, the black-faced cuckoo-shrike, is also a habitat specialist that needs large trees for breeding. It builds its shallow nest usually high up in the horizontal forks of eucalypts.

### Understorey-nesting birds

Seven species of uncommon, rare and threatened species and the brush bronzewing nest in understorey trees and shrubs (Table 3). Two species, the pink robin and the critically endangered scrubtit, are habitat specialists that favour tall paperbark swamp forest but also inhabit tree fern gullies in blue gum forest. The uncommon Bassian thrush is another habitat specialist that breeds in paperbark swamp forest and moist tree fern gullies with lots of fallen branches, logs and litter on the ground. It forages on the ground for worms and other invertebrates. Ground-foraging birds and ground-nesting birds tend to be more sensitive to landscape and habitat
change. This guild also includes the critically endangered brown thornbill, two rare breeding robins and the ground-nesting painted button-quail (Table 3). Although the brush bronzewing was rare on the survey sites, it is probably much more common in scrub, heath and tea-tree habitats.

Four species of cuckoos, the brood parasites, occur on King Island. All four species, pallid and fan-tailed cuckoo and Horsfield’s and shining bronze-cuckoo, are migratory and breed on King Island. The pallid cuckoo inhabits woodland. Horsfield’s bronze-cuckoo frequents coastal heath and scrub and the fan-tailed cuckoo and shining bronze-cuckoo favour wet eucalypt forest. These latter three species all parasitise nests of hosts such as the fairy-wren, scrubwren and thornbills that nest low in understorey.

**Monitoring waterbirds and forest birds**

Monitoring waterbirds, grassland birds and forest birds on farms and in reserves over time gives a good indication of land sustainability. Ongoing bird counts for the *Atlas of Australian Birds* provide useful data on bird abundance and distribution. Annual bird counts conducted over several years and decades at fixed sites provide data on population trends in response to changes in the landscape. A standard methodology used by Birds Australia and the Nature Conservation Branch, DPIWE, can be applied to King Island.

Annual counts of waterbirds can be conducted at several freshwater lagoons and swamps throughout the island during spring to monitor breeding waterbirds and/or in autumn–winter to monitor non-breeding birds.

Ideally, breeding forest and woodland birds can be monitored at fixed sites each year. Select replicates of vegetation sites to represent five major plant communities on King Island. These forest types are King Island wet eucalypt forest, King Island dry eucalypt forest and woodland, swamp paperbark forest, King Island sedge-heath-scrub and wet scrub. Select at least one replicate site for each plant community, and for these 10 sites set up a fixed transect within the interior of each site.

Conduct annual counts of forest birds at each site along fixed 100 m transects each spring, using the 20 minute 2 ha methodology of Birds Australia. Search each site for difficult-to-detect birds such as brown goshawk, cuckoos, brown thornbill, scrubtit and Bassian thrush.

**General action to recover uncommon, rare and threatened birds of King Island**

1. Obtain funding for at least one full-time Project Officer to coordinate the recovery of rare and threatened birds of King Island.
2. Develop and coordinate an integrated action plan for King Island with cooperation from DPIWE, KINRM Group, Birds Australia, property managers and any other interested parties.
3. Engage the King Island community in implementing the recovery plans.
4. Determine and monitor distribution, abundance and population size of each species in breeding and non-breeding seasons.
5. Identify critical habitat for each species on public and private land.
6. Protect critical habitat from clearance and wildfire.
7. Develop a fire prevention and management strategy for critical habitat.
8. Protect and manage specific habitat elements such as large trees, understorey, nest sites and food trees.
9. Identify and protect trees with hollows.
10. Determine and manage the impact of hollow-use by common starling, brush-tail possum and other fauna.
11. Encourage private landowners to maintain and restore connectivity through vegetation linkages across property boundaries.
12. Provide economic incentives to landowners to protect and manage habitat through covenants and stewardship agreements.
13. Place a moratorium on further land clearing until the use of that land by rare and threatened species has been determined.
Recovery of locally extinct fauna

Throughout Australia, scientists and rural communities are working together to recover landscapes and threatened species and, in some instances, reintroducing species to areas where they have become regionally extinct. For example, the vulnerable numbat (Myrmecobius fascatus) has been reintroduced successfully into Yookamurra Sanctuary in the South Australian mallee from south-western Western Australia. Colonies of the endangered black-eared miner (Manorina flavigula) have been translocated successfully from the Bookmark Biosphere Reserve in the South Australian Murray Mallee to the Murray-Sunset National Park in north-western Victoria.

The King Island emu is extinct, but four bird species and three mammal species that have become locally extinct from King Island still survive elsewhere. It may be desirable and inspirational to reintroduce one or more of these species to King Island. One of the most appropriate candidate species for reintroduction is the endangered forty-spotted pardalote (Pardalotus quadragintus) (Plate 6.1). The range of this species has contracted to south-east Tasmania with core populations on Maria and Bruny Islands. The establishment of a colony of forty-spotted pardalote on King Island would reduce the risk of extinction. This species is a habitat specialist that requires white gum for foraging and tree-hollows for nesting (5, 8, 13). A recovery program based on planting of white gum communities would also benefit the recovery of striated pardalote, spotted pardalote and black-headed honeyeater.

Management of habitat for fauna with special emphasis on birds

1. First priority is to retain and, if necessary, increase the size of native vegetation remnants, particularly riparian vegetation and forest patches. Manage native vegetation primarily to protect biodiversity, soils and water. Creating a network of native vegetation enhances the integrity and function of the plant communities and their wildlife.

2. Another important management priority for biodiversity conservation is to connect native vegetation remnants with landscape linkages. These linkages could be native vegetation that provides additional habitat or corridors, clumps of vegetation and even isolated trees that facilitate faunal movement from one patch to another. Landscape linkages can be crown land or private land. Council can play a vital role by developing incentives and partnerships with private landowners.

3. Maintain and enhance habitat diversity on properties and within catchments. Habitat diversity is a major determinant of bird species diversity. Habitat diversity primarily refers here to different plant communities with a range of vegetation age and structure.

4. Maintain a range of tree ages both within patches and within plant communities. For example, an uneven aged wet eucalypt forest with old and mature trees with hollows and young regrowth trees is very good habitat for forest birds. Natural disturbances such as windstorms and fire create gaps in a forest, and natural regeneration then produces younger eucalypts. On its own a uniform regrowth eucalypt forest does not provide habitat for fauna dependent on old growth elements such as hollows and large old trees. However, regrowth eucalypts provide habitat for understory birds and in more than 100 years will provide hollows for hollow-nesting birds.

5. Retain all old, large eucalypts, especially those with tree-hollows. Tree-hollows provide homes for insectivorous bats, possums and birds such as parrots, cockatoos, owls and pardalotes. Suitable hollows take 100–200 years to form. Eucalypts can live for 300–400 years, so old trees with hollows are essentially irreplaceable.

6. Retain all regrowth, mature and old Tasmanian blue gum, white gum and Brooker’s gum. Eucalypts increase bird species diversity. Any mature eucalypt trees older than 100 years provide birds with greater foraging and nesting sites. Raptors and satin flycatcher depend on mature and old eucalypts for nest sites. Mature and old white gum trees are important food trees for birds that forage in foliage and specialise on feeding on psyllid insects and lerp
(sugar coating produced by sap-sucking insects). Birds that feed on lerp are the endangered swift parrot, spotted pardalote, striated pardalote and the endemic black-headed honeyeater. Mature and old Tasmanian blue gum and Brooker’s gum are important foraging trees for three bark specialists, the grey strike-thrush and two endemic honeyeaters, the strong-billed honeyeater and yellow-throated honeyeater.

7. Leave standing dead trees unless they pose a hazard to people. Standing dead trees provide homes for mammals, birds, reptiles and for many insects such as over-wintering ladybird beetles.

8. Leave fallen dead trees to rot on the forest floor. Rotting logs provide a substrate for decomposers (fungi and insects) and a nursery bed for seedling plants.

9. Maintain and restore layers of understorey trees, shrubs and ground layer vegetation. Understorey is essential foraging and nesting habitat for many small and medium-sized birds. Nearly half of King Island’s forest and woodland birds nest in understorey.

10. Leave fallen branches, logs, leaf and bark litter on the ground as foraging and nest sites for birds, lizards, invertebrates and other fauna.

11. Enhance and restore local canopy eucalypts and understorey vegetation especially to areas undergoing extensive rehabilitation.

12. Maintain and restore native vegetation along streams and around dams. Aquatic vegetation such as sedges in and around wetlands creates habitat for insects, frogs, reptiles and birds.

13. Control feral cats.

14. Foster responsible cat ownership.

15. Eradicate or control environmental weeds. Eradicate blackberry before it becomes too invasive. Control weeds in the bush such as mirror bush, asparagus fern and others.

16. Identify the requirements of bird species with regard to vegetation type, diet, habitat structure (large old trees, trees with hollows, understorey trees and shrubs and ground layer vegetation for foraging and nesting) and plant species. See Tables 1–3.

17. Identify the critical habitat and requirements for endangered bird species such as white-bellied sea-eagle, orange-bellied parrot, scrubtit and brown thornbill and frogs such as the green and golden frog.

18. Identify those fauna species that are habitat specialists.

19. Develop guidelines for management of habitat for other fauna such as hollow-dependent mammals and invertebrates.

**General principles of reserve design**

**Reserve size**

Advantages of large reserves are:
- Greater species richness.
- Greater habitat diversity.
- Greater resilience and ecological integrity.
- Maintenance of ecological processes and function.
- Preserves more viable populations.
- Greater protection of fauna higher up the food chain.

**Reserve shape**

Advantages of round and square shapes compared to linear shapes are:
- Lower perimeter to area ratio.
- Edge effects minimised.
- Decreased disturbance from increased wind, temperature and light.
- Decreased risk of fire.
- Decreased risk of predation.

**Reserve connectivity**

- Isolated habitat patches lose more species over time.
- Isolated habitat patches are a greater barrier to animal dispersal and reduce population recruitment.
- A cluster of patches provides greater dispersal, movement and recruitment of animals among patches.

**Some criteria for high priorities for reserves**

- Large patch in good condition.
- More poorly reserved plant communities.
• Greater richness of biodiversity.
• Greater number of rare and threatened species and communities.
• Old growth vegetation and greater structural complexity.
• Little or no disturbance.
• Lower incidence of weeds and feral animals.
• Greater proximity and connectivity to other vegetation patches.

Conservation priorities for King Island fauna

The highest priority for forest conservation is Pegarah State Forest. It is the largest remaining forest remnant and fulfils the above criteria. It is the only patch of forest on King Island that has the full compliment of breeding forest birds.

Ten sustainability guidelines for birds on farms (1)
(Adapted from Birds Australia Guidelines)
1. Aim to protect and restore native vegetation on at least 30% of the farm.
2. Protect and revegetate with local tree and understorey plant species.
3. Large sites have more bird species than smaller sites. Try to protect and restore sites to greater than 2 hectares, preferably 5–10 hectares, in size.
4. The wider the windbreak or shelter, the more species of forest and woodland birds.
5. Connect patches of native vegetation with habitat strips at least 50 m wide or create habitat clumps as ‘stepping stones’.
6. Maintain and restore vegetation structure such as a canopy of local eucalypts and understorey layers of trees, shrubs, ferns, sedges and grasses.
7. Retain large, old trees, particularly those with hollows. Maintain a range of tree ages.
8. Leave fallen branches, logs, rocks and leaf and bark litter as shelter for fauna and as foraging and nest sites for birds.
9. Maintain and restore native vegetation around water. Create vegetation around dams and wetlands as habitat for frogs, reptiles and waterbirds.
10. The number of bird species increases with age of the site. Learn to identify birds and monitor birds in existing remnants and revegetation sites every few years.

Guidelines for protecting and restoring landscape linkages (3)
1. Connect existing native vegetation patches and riparian strips with linkages of local native vegetation preferably 50–100 m in width. Wide corridors provide greater habitat for animals. The greatest priority is to link the biggest remnants to make one larger habitat patch. Connecting riparian vegetation is also a high priority. Even clusters of paddock trees can function as ‘stepping stones’ for some fauna.
2. Increase the area of more isolated native vegetation remnants through natural regeneration or revegetation.
3. Maintain and restore vegetation linkages along streams and rivers, and up and along ridges.
4. Farm productivity can be improved by planting perennial crops and trees for timber in a buffer zone around native vegetation remnants. Buffer zones minimise edge effects by reducing disturbance and providing better wind protection.
5. Enhance the ecological function and habitat value of remnants and linkages by improving vegetation structure and diversity.
6. Improve the biodiversity value and function of remnants and linkages by providing specific habitat for threatened fauna and indicator species. Examples include erecting nest-boxes for hollow-dependent fauna, growing specific plants to provide food, shelter and nest sites for fauna. White gum is a food tree for pardalotes and honeyeaters.
7. Monitor fauna in remnants and linkages.

Revegetation and habitat restoration

The principal land use on King Island is agriculture. This rural landscape is a mosaic of grazing land with scattered remnant native vegetation. Most of the original native forest is gone and the remaining patches are much reduced in size, fragmented and
isolated. The agricultural ecosystem that replaced the native vegetation is simplified in terms of numbers of plant and animal species, vegetation structure and function. Natural ecosystems play an important role in processes such as soil formation and protection, water production and purification, climate control and maintaining biodiversity (the variety of nature). Today it is recognised that protecting natural land and freshwater systems and maintaining biodiversity is fundamental to sustainable agriculture (1).

The continuing presence of birds on farms and in the rural landscape depends on private conservation of habitat and its connection to other habitat on private and public land. Ideally farmers should set aside areas of habitat greater than 5–10 ha with linkages to other habitat. On many farms revegetation can be used to enlarge existing remnants, connect patches of native vegetation and enhance remnants in poor condition. Revegetating the farm with native eucalypts and understorey plants brings many ecological and economic benefits. These include livestock and crop shelter, timber products such as firewood, fence posts and sawlogs, native pest controllers, better water quantity and quality, and less soil erosion.

Birds are part of an interconnected web of nature and play an important role in keeping landscapes healthy. Birds perform services for farmers and they do it for free. Birds benefit farmers by controlling insect pests in pastures, crops and shelterbelts. Some well-known examples of beneficial birds that prey on insects in pastures and crops are the migratory cattle egret and the resident Australian magpie and masked lapwing (spur-winged plover). Raptors (birds of prey) such as swamp harrier, eagles, falcons and owls prey on agricultural pests such as mice, rats and rabbits. Forest and woodland birds are vital for maintaining the health of forests, woodlands and shelterbelts. A variety of leaf-eating beetles, caterpillars and the larvae of sawfly wasps defoliate eucalypts. Bush birds are natural predators of leaf-feeding insects and eat about 50–70% of the insects in patches of eucalypts.

One important benefit of protecting and restoring habitat is to reduce the decline in farm birds and recover rare and threatened species. In less than five years birds will be using and even breeding in revegetation sites. The first colonisers to feed and nest in low understorey include superb fairy-wren, Tasmanian thornbill and grey fantail. In 10–20 years, as the eucalypts and wattles assert their dominance, other common birds will use the habitat. These could include yellow-throated honeyeater, strong-billed honeyeater, golden whistler, grey shrike-thrush, silvereye, Tasmanian scrubwren and green rosella, and with a bit of luck some of the rarer ones. The type of birds colonising revegetated sites depends on several factors, particularly size of the patch, diversity of canopy and understorey plant species used in revegetation, and distance to nearest habitat source from which surplus birds can be recruited. After the breeding season young birds disperse from their birth site and move through the landscape searching for a mate and a vacant site to occupy. Where birds settle primarily depends on the habitat available and whether they can establish a space and acquire a mate.

Conclusion

It is very encouraging that many King Island farmers have protected their riparian and forest vegetation with help from the Natural Heritage Trust devolved grants. This demonstrates that many King Island farmers have a great capacity and willingness to recover landscapes and manage their properties sustainably. Some birds are recovering, but far too many are still rare and threatened. Farmers are interested in nature, particularly birds, and undoubtedly some farmers will take up the challenge of helping them recover. There are many fine examples of rural communities and government working together. Successful recovery projects provide hope and inspiration and many of these are highly relevant to King Island. Some of these recovery projects are for the following threatened birds: the orange-bellied parrot, the glossy black-cockatoo on Kangaroo Island, the red-tailed black-cockatoo in south-east Australia and Carnaby’s black-cockatoo in south-west Western Australia (8, 18). Funding for a project officer will provide the necessary impetus and enthusiasm for the recovery of King Island’s rare and threatened fauna and species with high conservation significance.
References

Appendix 1. List of rare and threatened species and species of high conservation significance on King Island

**Frogs**

*Vulnerable*

green and golden frog

**Birds**

*Critically endangered*

- orange-bellied parrot
- brown thornbill
- scrubtit

*Endangered*

- white-bellied sea-eagle

*Vulnerable*

- Australasian bittern
- green rosella
- yellow wattlebird
- black currawong

*Naturally rare in Tasmania*

- nankeen night heron
- nankeen kestrel
- golden-headed cisticola

*Naturally rare on King Island*

- eastern spinebill

*High conservation significance on King Island*

- painted button-quail
- yellow-tailed black-cockatoo
- southern boobook
- striated pardalote
- flame robin
- pink robin
- satin flycatcher

*Recent rare arrivals*

- brown goshawk
- yellow-rumped thornbill

*Uncommon to rare on King Island*

- fan-tailed cuckoo
- spotted pardalote
- black-faced cuckoo-shrike
- dusky woodswallow
- Bassian thrush

See Appendix 2 for action plans to recover many of these species.
Appendix 2. Action to recover rare and threatened species and species with high conservation significance

Species critically endangered

**Orange-bellied parrot**

**Brown thornbill**
Refer to APAB pp. 479–480 and TTFH pp. 254–255.

**Scrubtit**
Refer to APAB pp. 456–457.

**Further action**
- Protect the Nook Swamp from bushfire.
- Manage the Nook Swamp as critical habitat for scrubtit and pink robin.
- Determine the distribution, abundance and population size of scrubtit in the Nook Swamp.
- Determine use of habitat use by scrubtit.
- Search for new sub-populations of scrubtit in tall paperbark swamp forest in Bungaree Lagoon but particularly in Collier Swamp and the Red Hut Point area.
- If new population found, determine their abundance and secure and manage the land they occupy.

**Vulnerable**

**Australasian bittern**
Refer to APAB pp. 182–83 and 643.

**Green rosella**
Refer to APAB pp. 321–322.

**Further action**
- Determine and monitor distribution, abundance, population size and trend from Atlas data.
- Determine use of hollows and extent of competition for hollows by other fauna and the introduced common starling.
- Erect starling-proof nest-boxes for the rosella and monitor and manage usage.
- Monitor nesting success of the rosella in natural hollows, other sites and nest-boxes.
- Identify and protect rosella nest trees and hollows.

**Yellow wattlebird**
Refer to APAB pp. 490–91.

**Additional threat**
- Assess impact of further clearing of King Island scrub and tea-tree on the wattlebird population.

**Further action**
- Determine and monitor distribution, abundance, population size and trend from Atlas data.
- Determine habitat use and foraging ecology.
- Protect and manage habitat.

**Black currawong**
Refer to APAB pp. 578–79.

**Further action**
- Determine and monitor distribution, abundance, population size and trend from Atlas data.
- Monitor population in winter to determine winter habitat and present population size.
- Monitor population in spring–summer to determine density of breeding pairs and breeding habitat.

**Recovery action for hollow-nesting birds and birds of high conservation significance**

**Yellow-tailed black-cockatoo**
- Consider adopting the yellow-tailed black-cockatoo as logo for recovery of King Island birds.
- Train community volunteers in determining age and sex of cockatoos in the field.
- Involve the King Island community in annual counts and recovery plan.
- Develop a technique to monitor birds in non-breeding and breeding seasons.
- Determine and monitor distribution, abundance and population size in winter–spring from a coordinated count throughout the island.
- Determine population trends from Atlas data.
- Determine age of population from annual counts.
- Determine density of breeding pairs.
- Identify seasonal foraging habitat and food plants.
- Identify and protect critical breeding habitat, nest trees and nest-hollows.
Appendix 2 continued

- Determine if population limited by shortage of nest-hollows and competition for hollows by other fauna such as bush-tail possum.
- Erect nest-boxes at appropriate sites (9, 20).
- Monitor and manage usage of nest-boxes.
- Monitor nesting success.

**Southern boobook**
- Train community volunteers and landowners in identification of owls by sight and sound.
- Determine population trend from Atlas data.
- Determine and monitor distribution, abundance and population size from owl calls during breeding season.
- Identify and protect owl roost and nest sites.
- Erect platforms and nest-boxes at sites that lack adequate hollows (9).
- Monitor and manage usage of nest-boxes.
- Study prey from owl pellets.
- Monitor nesting success.

**Striated pardalote**
- Train landowners and community volunteers in identification of pardalotes by sight and sound.
- Determine population trend from Atlas data.
- Determine and monitor distribution, abundance and population size during the breeding season.
- Identify and protect critical breeding habitat on public and private land.
- Identify and protect nest trees and hollows.
- Protect all mature white gum woodland and Tasmanian blue gum forest.
- Search for new breeding territories.
- Erect nest-boxes for pardalotes at sites that lack adequate hollows (9).
- Monitor and manage usage of nest-boxes.

**Flame robin**
- Determine population trend from Atlas data.
- Determine and monitor distribution, abundance and population size during spring and autumn migration.
- Determine location and density of breeding pairs in mid-spring.
- Identify and protect breeding habitat.
- Identify and protect hollows in trees, stumps and logs.

**Pink robin**
The rare pink robin coexists with the scrubtit in tall paperbark swamp forest and tree fern gullies of wet eucalypt forest.
- Conduct recovery action in conjunction with that of scrubtit.
- Train community volunteers to identify both sexes of pink robin.
- Determine and monitor distribution, abundance and population size.
- Determine number and density of breeding pairs in the Nook Swamp and Pegarah forest.
- Search for and determine numbers of breeding pink robin in paperbark forest at Collier Swamp and Red Hut Point area.
- Protect breeding habitat.

**Satin flycatcher**
- Train community volunteers in identification of both sexes of the satin flycatcher.
- Determine and monitor distribution, abundance and population size during migration.
- Determine and monitor distribution and density of breeding pairs in mid to late spring.
- Identify and protect old growth Tasmanian blue gum forest on public land (Pegarah forest) and private land.

**Action for recovery of King Island birds naturally rare in Tasmania**

**Nankeen night heron**
- Verify whether nesting colony at Pass River is active during spring breeding seasons.
- With the cooperation of landowners, search for and locate new nesting colonies in paperbark swamp forest, wet tea-tree and eucalypt forest in the Nook Swamp and Sea Elephant catchment.
- Protect habitat of breeding colonies from wildfire and stock.
- Protect nesting colonies on private land through covenants and management agreements.
- Minimise human disturbance around nesting colonies.
- Determine number of nesting pairs in colony, and nesting and fledgling success.
- Assess impact of potential predators, such as forest raven, on eggs and young.
Golden-headed cisticola

- Protect known breeding habitat from wildfire along Lower Sea Elephant River.
- Determine and monitor distribution, abundance and population size from summer counts.
- Determine population trend from Atlas data.
- Locate new breeding habitat and protect from clearance and wildfire through education and economic incentives.

Action for protection and recovery of sensitive indicator birds

Birds sensitive to habitat alteration can serve as good indicators of a healthy landscape and sustainable land management. The Bassian thrush is an uncommon habitat specialist that prefers larger forest patches and is sensitive to habitat fragmentation and degradation. It forages on the ground for invertebrates and selects shallow hollows as nest sites. The Bassian thrush is beautifully marked, easily recognisable and has an ethereal, flutelike song. It is vulnerable to predation by feral cats and to competition for food and space from the introduced common blackbird. For all these reasons it is a good indicator species for property managers to watch out for.

Bassian thrush

Conservation action for property managers:

- Learn to identify this species by sight and sound.
- Record date of sightings and habitat occupied.
- Protect and manage breeding habitat, particularly mature paperbark swamp forest and wet eucalypt forest with lots of litter, logs and fallen branches on the forest floor.
- Connect riparian vegetation and forested patches across properties and catchments.
- Restore vegetated linkages to allow for population dispersal and recruitment.
- Control feral cats.
Nationally threatened bird species and endemic subspecies

Plate 7.1
Brown thornbill
Acanthiza pusilla
Trevor Waite

Plate 7.2
Orange-bellied parrot
Neophema chrysogaster
Dave Watts

Plate 7.3
Black currawong
Strepera fuliginosa
Rob Blakers

Plate 7.4
Swift parrot
Lathamus discolor
(passage migrant)
Dave Watts

Plate 7.5
Green rosella
Platycercus caledonicus
Trevor Waite

Plate 7.6
Scrubtit
Acanthornis magnus
Dave Watts

Plate 7.7
Yellow wattlebird
Anthochaera paradoxa
Trevor Waite
Tasmanian endemic common to uncommon forest birds

Plate 7.8
Tasmanian scrubwren  
*Sericornis humilis*
Trevor Waite

Plate 7.9
Strong-billed honeyeater  
*Melithreptus validirostris*
Trevor Waite

Plate 7.10
Tasmanian thornbill  
*Acanthiza ewingii*
Jim Napier

Plate 7.11
Black-headed honeyeater  
*Melithreptus affinis*
Trevor Waite

Plate 7.12
Yellow-throated honeyeater  
*Lichenostomus flavicollis*
Trevor Waite

Plate 7.13
Dusky robin  
*Melanodryas vittata*
Dave Watts
Chapter 8

Species accounts of King Island vertebrate fauna

Rodney Walker (fish), Jim Nelson (frogs and reptiles), Richard Donaghey (mammals and 83 bird species), Sarah Lloyd (10 bird species)

Freshwater fish

**Fish terms** (2)

- **Adipose fin** – small dorsal fin nearest the tail with no rays or spines.
- **Anal fin** – unpaired fin on ventral surface between the vent and tail.
- **Dorsal fin** – rayed fin on upper surface.
- **Origin** – (of fins) the anterior-most (head) point of the fin.
- **Pectoral fin** – paired fins just behind or below gill openings.
- **Pelvic fins** – paired fins on ventral surface.

Refer to glossary in ‘Tasmanian Freshwater Fishes’ – pp. 15-18 (2) for further terms and diagrams.

**Short-finned eel**

*Anguilla australis*  Plate 3.1

**Other name:** Silver eel, which refers to the colouration of the migratory adults.

**Size:** Generally, males are smaller than females. Females can reach lengths of over 1100 mm and weigh upwards of 3 kg, however, more commonly they are around 50 cm and 0.5 kg.

**Description:** An elongate and cylindrical/tubular native fish species. Its dorsal, anal and caudal fins are continuous, forming one inseparable fin containing no spines. Pelvic fins are absent, but small ovate pectoral fins are present just behind small vertical gill openings. The skin is slimy with small indistinct scales deeply embedded. The species has a large mouth extending to below the eyes, with nostrils that are long and protrude above the upper lip.

**Colour:** Short-finned eels are a uniform colour but can vary from olive-green through brown to black on the dorsal side with a lighter greyish white ventral surface. Mature migratory adults often have a very dark dorsal surface with an easily distinguishable silver belly. The juvenile glass-eel stage is transparent and unpigmented on arrival into freshwater, but soon develop a uniform brown-black colouration.

**Preferred habitat:** Found in freshwater lakes, swamps, rivers and streams, preferring still water that is often turbid. Often associated with deep pools that contain areas of cover, such as weed beds and/or woody debris. The spawning run, the final stage of the life cycle, is spent in oceanic waters.

**Natural history:** The glass eel stage is about 60 mm in length when they migrate from the sea into estuaries during March to November. Once in brackish or freshwater, they develop pigmentation.
and enter the elver stage of their lifecycle. The elvers then penetrate into the upper reaches of waterways. Eels can take between 15 to 30 years to mature. When mature, they then migrate downstream to the sea to spawn and die. It is thought that spawning occurs at great depth in the Coral Sea. Larval eels, known as *leptocephali* (because of their willow leaf shape) are carried back from the spawning grounds via the ocean currents, and the lifecycle begins over again.

**King Island range:** Short-finned eels are native to Tasmania, King and Flinders Islands as well as south-eastern mainland Australia and New Zealand. Due to the ability of the species to penetrate into all reaches of swamps and streams it is able to move across moist ground. The species is widespread in the majority of freshwater habitats on the island. King Island supports a commercial fishery for the short-finned eels and periodic restocking of the species occurs using elvers harvested from mainland Tasmanian waters.

**King Island conservation status:** The short-finned eel remains abundant across its entire range, although numbers may have declined due to commercial fishing of both the feeding and migratory stages.

**Utility:** As a recreational angling species it provides good sport as it is considered a hard fighting fish. It is also enjoyed as a food by some. It is easily caught on rod and line and will readily take most bait. A recreational angling licence is required. It also is caught in unbaited fyke nets by commercial fishers.

**Special management:** The species is managed for both its commercial value and its recreational angling qualities. The species is abundant and widespread throughout its entire range and as a result requires no special management considerations.

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**Climbing galaxias**

*Galaxias brevipinnis*  
Plate 3.2

**Other names:** Known as koaro in New Zealand.

**Size:** Reaches 280 mm in length, but more commonly ranges from 150–170 mm.

**Description:** This native species is the largest of the Australian galaxiids. It has an elongate body with an almost tubular trunk. As with all the galaxiid species an adipose fin and body scales are absent. Its head is dorsally flattened, containing a large mouth with the lower jaw distinctly shorter than the upper. Its mouth reaches well below the eyes and large lateral canine teeth are present. The fins are thick and fleshy particularly at their base with the anal fin origin behind the dorsal fin origin. Both pelvic and pectoral fins are large and round. A distinctive dark blotch immediately above the pectoral fin base is evident.

**Colour:** Highly variable pattern of markings, from bold bands to irregular patches and blotches. The general colour is greyish brown to dark olive, darker on the back and becoming lighter on the sides and belly. The stomach area is usually a dull silvery olive. Gold iridescence is often apparent on the back and sides in bright sunlight.

**Preferred habitat:** The climbing galaxias is a secretive and solitary species that prefers clear flowing streams with rocky substrates. Can also be found landlocked in some lake systems across its range. Often found in the upper reaches of streams above natural barriers to other fish species but can be found down to sea level in streams that do not contain introduced species such as trout. Swims near the bottom, usually near the cover of rocks and logs.

**Natural history:** This species has both landlocked and riverine populations. In riverine populations, spawning takes place in autumn. The exact site is unknown, however eggs have been found among litter of the forest floor beyond the normal limits of stream flow, presumably spawned there during times of flood. The eggs can number from several hundred to many thousand (up to 23,000 have been reported). The newly hatched larvae are thought to be swept downstream where there is a marine stage of about five to six months before the juvenile fish return to freshwater in spring as part of the whitebait runs. Landlocked populations breed in spring, and schools of juvenile fish are seen in lake margins during late summer.

The climbing galaxias is an aggressive upstream migrant. It is well known for its ability to climb moist surfaces of waterfalls and other barriers and can penetrate the upper limits of stream systems. It adheres to damp rock surfaces with its fleshy
pectoral and pelvic fins and wriggles upwards using lizard-like movements.

King Island range: In surveys conducted on King Island in 2001, the species was recorded in only one location, above the gauging weir in the Ettrick River. Past surveys have, however, recorded the climbing galaxias in the Yellow Rock River. Possibly still occurs in the larger streams on King Island, although in low numbers.

King Island conservation status: Given the limited distribution of the species on the island, both historically and in recent surveys, it appears that the climbing galaxias is restricted to pockets of suitable habitat in a small number of streams. The distribution has almost certainly been reduced following the historical clearing of forests on King Island and the channelisation of streams.

Utility: The species forms part of the annual whitebait migration. A recreational whitebait fishery does not currently exist on King Island, as the biomass of fish is small. However, if habitats could be restored and the annual migration nurtured, a whitebait fishery could be considered in future. This species also adds to the native biodiversity of fish on King Island, and its aesthetic value is also of importance.

Special management: There are no special management guidelines in place for the King Island population. Its range and abundance is limited, but this can only be improved by restoring stream riparian zones, water quality and instream habitat.

Spotted galaxias

*Galaxias truttaceus*  
Plate 3.3

Other name: Mountain trout, spotted mountain trout or mountain minnow.

Size: A large galaxiid that can reach sizes over 200 mm, but more commonly 120–140 mm.

Description: The spotted galaxias is a stout-bodied native fish with a deep belly, large head and mouth. As with all the galaxiid species an adipose fin and body scales are absent. The jaws are of equal length and the mouth reaches back to the front of its eyes with no lateral canine teeth present. The fins are large, with the anal and dorsal fins distinctly rounded and the anal fin origin directly below the dorsal fin origin. The tail is slightly forked.

Colour: Colouration of this species is variable, depending on habitat. Regular small spots with surrounding lighter halos are evident, but the number and pattern of these spots is variable. General body colour is brownish to deep olive, paling to brownish grey on the sides and silvery on the belly. Fins are generally brown to olive with the dorsal, anal and caudal fins appearing golden to bright orange in colour with a dark outer edging. A distinctive diagonal dark stripe is always present passing back downwards through the eyes, and two blue-black blotches are present above the pectoral fins origin. Juveniles have a barred pattern rather than spots.

Preferred habitat: Commonly associated with plants, rocks and logs on the margins of streams and lake systems. It is most common at lower elevations often remaining near the coast.

Natural history: The species has both riverine and landlocked populations, each with a different breeding time. The riverine populations breed in autumn–winter, with the exact location unknown. The resulting larvae are washed out to the coast where they return some months later as part of the whitebait run. Landlocked populations spawn among aquatic vegetation during spring. The larvae are found around the lake margins throughout summer. The eggs are approximately 1.3 mm in diameter and number between 1,000 and 16,000 in adult females. The spotted galaxias is a carnivorous species, feeding opportunistically on a wide range of terrestrial and aquatic invertebrates.

King Island range: During surveys conducted on King Island in 2001, the species was recorded in one location only, below the gauging weir in the Ettrick River. Past surveys have, however, recorded the spotted galaxias in the Grassy River. It is possible the species still occurs in the larger streams on King Island, although in low numbers.

King Island conservation status: Given the limited distribution of the species on the island, both historically and in recent surveys, it appears that the spotted galaxias is restricted to pockets of suitable habitat in a small number of streams. The distribution has almost certainly been reduced
following the historical clearing of forests on King Island and the channelisation of streams.

**Utility:** The species forms part of the annual whitebait migration. A recreational whitebait fishery does not currently exist on King Island, as the biomass of fish is small. However, if habitats could be restored and the annual migration nurtured, a whitebait fishery could be considered in future. This species also adds to the native biodiversity of fish on King Island, and its aesthetic value is also of importance.

**Special management:** There are no special management guidelines in place for the King Island population. Its range and abundance is limited, but this can only be improved by restoring stream riparian zones, water quality and instream habitat.

### Australian grayling
*Prototroctes maraena*

**Other names:** Cucumber herring or cucumber mullet.

**Size:** The species has been reported to reach a maximum size of about 300 mm, however, they are more commonly 170–180 mm in length.

**Description:** A slender elongate native species that is laterally flattened. It has a small head with a bluntly rounded snout and large eyes. It has a small-based dorsal fin on the middle of its back originating just behind the level of the pelvic fins. A small adipose fin is present and the tail fin is deeply forked. A weak, horny abdominal keel can be felt in front of the anal vent. The species also has a distinctive cucumber odour when caught, a characteristic it shares with a closely related family member, the Tasmanian smelt. The body is covered in cycloid scales of moderate size, which are easily dislodged when handled.

**Colour:** The Australian grayling is generally dark green to grey along the back, silvery along the sides with a white belly. Colouration can vary slightly depending on maturity. A dark mid-lateral streak is usually present and effectively divides the pigmentation pattern of the back and sides. The fins are grey in colour, but can be almost transparent along the outer edges.

**Preferred habitat:** The species appears to prefer clear, moderate- to fast-flowing rivers and streams, often in the upper reaches of catchments. Typically found in gravel-bottom pools. Often seen in schools below barriers to upstream movement, such as weirs, waterfalls or log jams.

**Natural history:** The Australian grayling is a shy species that flees when disturbed. It spawns in autumn, probably during the months of April and May, but spawning requirements are unknown. Males mature sexually at one year of age and the females in their second year. They are thought to commonly live for about three years, however specimens estimated at five years of age have been recorded. On hatching, the larvae are about 4.5 mm long and are phototropic; this means they are attracted to the sunlight and are washed downstream as a result. The larvae then have a marine stage and return to the rivers in spring when they are about six months old.

The Australian grayling is an opportunistic omnivore, feeding on a mixed diet of algae and both aquatic and terrestrial invertebrates. Its intestine has a double loop, which is rare in salmoniform species. This almost certainly allows additional time for the digestion of algae and the absorption of plant material.

**King Island range:** During surveys conducted on King Island in 2001, the species was not recorded. Historical survey information has recorded it only once, below the gauging weir in the Ettrick River.

**King Island conservation status:** Australian grayling abundance has declined across its entire range (south-eastern mainland Australia and coastal Tasmania). The reasons for this decline are unclear. A second grayling species in New Zealand has also declined and is now thought to be extinct. On King Island the fact that the species has only ever been recorded once, suggests that it is either an occasional wayward migrant swept by the marine currents during its larval stage, or it may have vanished from the island altogether.

**Utility:** The Australian grayling was once a very popular angling species, especially before numbers began to decline. Its numbers are such now that it is protected in all Australian waters. This species also adds to the native biodiversity of fish on King Island.
Island (if still present) and its aesthetic value is also of importance.

**Special management:** The Australian grayling is fully protected under state and commonwealth threatened species legislation and the Tasmanian *Inland Fisheries Act 1995*. It is prohibited to take or disturb the species. However, there has been little public education and enforcement to support the legislation. It should be considered that this species still exists on King Island. Any activities involving the use or manipulation of suitable habitat should consider the impacts that these actions may have on this and other species.

**Common jollytail**  
*Galaxias maculatus*  
**Plate 3.5**

**Other names:** Known as inanga in New Zealand, and as puyen in Chile and Argentina. Also often referred to as the common galaxias or spotted minnow.

**Size:** May reach 190 mm, but more commonly less than 100 mm.

**Description:** The common jollytail is a slender-bodied native galaxiid, with a small head that is bluntly pointed and containing large eyes. The mouth is small, reaching back to the front of the eyes with equal length jaws that lack canine teeth. The fins are thin and membranous with dorsal and anal fins rounded and set posteriorly. The tail is distinctively forked.

**Colour:** Translucent olive-green on the back and upper sides, with a variable combination of small dark bars and spots on the sides. The belly, gill covers and eyes are distinctive silver, and a greenish sheen is usually apparent above a silver belly.

**Preferred habitat:** Found in a wide variety of habitats, but most common in gently flowing waters of streams, rivers and in lakes at lower elevations. It has an amazing tolerance to salinity, being capable of surviving salinities of 49 parts per thousand (seawater is about 35 ppt).

**Natural history:** Adult fish migrate downstream in autumn and breed in estuarine marshes. Eggs are deposited on marginal vegetation during spring tides and hatch on the next, or a subsequent, spring tide, and the larvae are taken to sea. The larvae remain at sea for about four to five months and return to freshwater as a major part of the whitebait run in spring. The freshwater stage of the lifecycle inhabits the lower reaches of coastal streams and can also form landlocked populations in farm dams and coastal lagoons. Fish usually mature at one year of age but some can take as long as three years to reach sexual maturity. The common galaxias is a carnivorous species, feeding opportunistically on a wide range of terrestrial and aquatic invertebrates.

**King Island range:** The common jollytail is widespread on King Island. It can be found throughout Lavinia State Reserve and all of its associated waterways, including Nook Swamp, Egg Lagoon Creek and the myriad of drains that run into this area. All of the swamps and coastal lagoons in the south of the island, including Big Lake, Shearing Shed Lagoon, Denbys Lagoon, Colliers Swamp and Woodland Lagoon also appear to contain the common jollytail. In addition, the majority of coastal streams, rivers and drains as well as any lagoons that are periodically connected to coastal drainages may also contain populations.

**King Island conservation status:** The species is considered as very common on the island. This is due to its tolerance of salinity and periodic increases in nutrient load. Its abundance does not appear to be in a state of decline.

**Utility:** The species forms part of the annual whitebait migration. A recreational whitebait fishery does not currently exist on King Island, as the biomass of fish is small. However, if habitats could be restored and the annual migration nurtured, a whitebait fishery could be considered in future. This species also adds to the native biodiversity of fish on King Island, and its aesthetic value is also of importance.

**Special management:** There are no special management guidelines in place for the King Island population. Its range and abundance appear to be healthy and stable, therefore no special management is required.

**Southern pygmy perch**  
*Nannoperca australis*  
**Plate 3.4**

**Size:** Largest specimen known is 85 mm, but normally only grows to 65 mm total length.
**Description:** The southern pygmy perch is a small-scaled native fish that is laterally compressed. Its body depth is variable but is usually more than 30% of the fish length. It has a small mouth that extends back to just below the eye and does not contain canine teeth. Its dorsal fin is deeply notched, with the entire anterior portion containing spines. The lateral line is divided into two distinct portions, and the body is covered in small ctenoid scales.

**Colour:** Colouration is highly variable, depending on water clarity and geographical range. The base colour varies from pale cream to brownish green on the top and fading to white or silver on the belly. Irregular dark brown blotches are often evident along the sides of the fish, interspersed with hints of red that are more obvious in males. The fins are clear or dusky in appearance, with breeding males developing darkened fins with reddish tinges during the breeding season.

**Preferred habitat:** The species inhabits vegetated margins of streams, billabongs, drains, dams and swamps, in still or gently flowing water.

**Natural history:** The species is thought to be a protracted or multiple spawner, breeding between September and January. Several hundred eggs that hatch in around three days are randomly scattered on aquatic vegetation. Females grow larger than males, although the males grow faster in the first few years of life. Most fish in a population are either one or two years old, although fish can live for more than five years. Both sexes mature in their first year and the males become highly territorial during the breeding season. Their diet consists of small crustaceans, insects and their own larvae.

**King Island range:** The southern pygmy perch is widespread on King Island. During surveys conducted in 2001 the species was recorded throughout Lavinia State Reserve and Nook Swamp. It was also located in several small water bodies that drain into Lake Flannigan, although not in the lake itself. It is possible that this species is in Lake Flannigan, although if a report of trout within the lake is correct, it may have been removed through predation.

**King Island conservation status:** The species is considered to be common on the island and does not appear to be in a state of decline.

**Utility:** The southern pygmy perch is thought to play an important role in mosquito control in drains, dams and waterways across its range. It also adds to the native biodiversity of fish on King Island, and its aesthetic value is also of importance. In the past it has been utilised as an attractive aquarium species, but a permit to possess freshwater fish is required from the Tasmanian Inland Fisheries Service.

**Special management:** There are no special management guidelines in place for the King Island population. Its range and population status appear to be healthy and stable and therefore requires no special management.

**Freshwater flathead**

*Pseudaphritis urvillii* 

**Plate 3.7**

**Other names:** The species is known as a tupong in Victoria, but also is commonly known as a flathead, sand trout, marble fish, sandy, congolli and roach in other locations.

**Size:** Attains lengths of 340 mm, but mostly about 100–150 mm.

**Description:** A native species. The freshwater flathead is an elongate and cylindrical fish, distinguishable by the flattened head, pointed snout and eyes positioned near the top of the head. The lower jaw is longer than the upper, and both jaws are lined with bands of small teeth. First dorsal fin origin is well behind the head, second dorsal fin is long and low. Anal fin origin is below the last rays of the first dorsal fin and resembles the second dorsal fin in shape and length. Head and body are covered with moderate-sized ctenoid scales.

**Colour:** The species is variable in colour depending on the substrate of the area it inhabits. Usually whitish overall, dusky-green to reddish-brown dorsally, with an irregular series of dark brown blotches on the sides. Undersurface white to yellow. Its fins are transparent, except for faint spotting on the tail and dorsal fins.

**Preferred habitat:** A bottom-dwelling species of brackish estuaries, but also inhabiting slow-flowing freshwater systems, sometimes many kilometres inland from the coast. Usually found around logs, aquatic plants, leaf litter and undercut banks.
Natural history: The freshwater flathead is equally at home in either fresh or salt water. The spawning site is unknown but it does not appear to be in freshwater. Juveniles are most abundant in the lower reaches of rivers during spring and summer, whereas larger specimens are generally more common upstream. It is likely that the freshwater flathead lives to at least five years of age. Its diet consists of insect larvae, worms, small crustaceans and other fish.

King Island range: Found in the lower reaches of all the main rivers on King Island. It has also been found in several of the small coastal creek systems that contain permanent water. Recent surveys in 2001 did not locate this species in the Nook Swamp area of King Island, although this habitat appears to be suitable.

King Island conservation status: The species is considered to be common on the island and does not appear to be in a state of decline.

Utility: Although excellent eating, this species is usually too small to be utilised as a table fish. It is usually only caught by recreational anglers and is of no commercial importance. It adds to the native biodiversity of fish on King Island, and its aesthetic value is also of importance.

Special management: There are no special management guidelines in place for the King Island population. Its range and population status appear to be healthy and stable and therefore requires no special management.

Brown trout

Salmo trutta

Plate 3.6

Other names: Often called sea trout or Englishman.

Size: Can reach at least 1,400 mm (fork length) and weigh more than 20 kg, is known to reach at least 900 mm and 14 kg in Australia.

Description: An introduced species. The salmonidae family is characterised by a dorsal fin high on the back and further forward than the pelvic fins, an adipose fin, small scales, a lateral line and axillary processes on the pelvic fins. Brown trout are generally a thick-bodied fish with a big head and a mouth that extends back below the eyes. Eyes are moderately large although they appear smaller with increased body growth. Its tail is slightly forked, if at all.

Colour: Colouration of the brown trout is highly variable depending on habitat and life history. Sea-run specimens are silvery and somewhat olive on the back, with indistinct dark spots on the sides. Lake fish also tend to be silvery in general colour but the spots on the sides of the fish can vary from red to brown-black. River fish are often much darker than lake or sea-run specimens and are usually more distinctly marked, often with darker spots above the lateral line and bright red or pale brown spots surrounded by halos below the lateral line.

Preferred habitat: This species is one of Australia’s most well-adapted freshwater fish introductions. It can and does survive in a wide range of habitats from small streams to brackish marshes and freshwater lake systems. Prefers deep cool and well-oxygenated water with cover from avian predators (i.e. weed beds, overhanging vegetation, undercut banks etc.) and easy access to feeding areas.

Natural history: This species is native to Europe, from Iceland and Scandinavia, south to Spain and Northern Africa, and eastwards to the Black and Caspian Seas. It was introduced into Australia in the 1860s and has spread by a combination of stocking and migration and now forms self-sustaining populations in many areas in southern and eastern Australia.

Brown trout spawn in autumn and winter (April–August) in rivers and streams with gravel substrates. Spawning fish often migrate upstream into feeder streams and tributaries with gravel beds but may spawn locally in a river or on a lake shore if gravel is present and there is sufficient water movement to oxygenate the eggs. The eggs take several weeks to develop depending on water temperature. The young larvae (alevins) remain in the gravel for some time after hatching until they absorb their yolk sack. After emerging from the gravel beds (redds) they begin feeding and form shoals in slow-flowing water or around lake margins.

Brown trout are predatory in nature and feed on a wide variety of animals – aquatic crustaceans,
molluscs, insects and small fishes, as well as terrestrial organisms that fall into the water.

**King Island range:** Since 1995 the Inland Fisheries Service has stocked brown trout into several waterbodies on King Island. Waters include; Lake Wickham, Penny’s Lagoon and Cask Lake. It is possible that brown trout exist outside these lakes from illegal introductions and/or escapees forming small populations within streams. Recent surveys in 2001 did not locate this species in any streams. However, previous records show the species exists in several areas.

**King Island conservation status:** This species is introduced to King Island and stocked into several lakes as a recreational fish species. It has no conservation status, but size and bag limits exist for the taking of the species and an angling licence is required.

**Utility:** Brown trout are a very popular recreational angling species and are managed solely for this purpose.

**Special management:** An angling licence is required to take this species and minimum size and bag limits apply.

**Rainbow trout**  
*Oncorhynchus mykiss*  
Plate 3.8

**Other names:** Often known as a steelhead.

**Size:** Maximum size of about 1,120 mm and >20 kg in weight, although in Australia they have been recorded at 780 mm in length and weighing 8 kg.

**Description:** An introduced species. Resembles brown trout in most features, but rather deeper bodied and more laterally compressed.

**Colour:** Colouration of the rainbow trout is variable depending on habitat and life history. Lake fish are predominantly silvery, with dark olive to steely-blue backs and many small dark spots on the sides. Often a rosy pink stripe is evident along the sides and on the gill covers. River fish and those on spawning migrations are more distinctly marked, with the pink stripe appearing intense, often-deep crimson in colour. Spots on the sides are bolder and more conspicuous.

**Preferred habitat:** This species prefers lakes, but also inhabits streams in cool (10–22°C), well-oxygenated water typically over gravel bottoms.

**Natural history:** Life history is similar to that of brown trout. This species does have a wider temperature tolerance than brown trout, but appears to be much better adapted to lakes than river systems. Rainbow trout spawn later than brown trout, during winter to early spring (August–October). The eggs are smaller and faster developing than brown trout. Brown and rainbow trout often coexist together, although brown trout usually dominate.

**King Island range:** The species has been recorded in several lake systems on King Island, although stockings by the Inland Fisheries Service have not occurred since 1995. An illegal hatchery carrying rainbow trout was discovered on King Island in early 2000. It is unclear if fry and fingerlings from this hatchery were used to illegally stock farm dams or lake systems of the island.

**King Island conservation status:** The species has been introduced to King Island and stocked into several lakes as a recreational fish species. It has no conservation status, however size and bag limits exist for the taking of this species and a licence is required in order to fish.

**Utility:** Rainbow trout are a very popular recreational angling species and are managed solely for this purpose.

**Special management:** An angling licence is required to take this species and minimum size and bag limits apply.
Amphibians

All King Island frogs can be identified by their calls alone, and for this purpose an available audio tape is useful.

Handling frogs for identification purposes can be detrimental to the animals and should only be carried out with care and for good reasons. The mucus covering the skin of frogs is very important to their health, and any handling should be kept to a minimum and only done with wet hands. Holding frogs by their back legs for identification purposes reduces the contact area while effectively immobilising them. The mucus on the skin of tree frogs in particular will irritate lips and eyes, so if frogs are handled for any reason, care should be taken to wash the hands afterwards. This secretion is also toxic to other frogs that might be put in the same container with tree frogs.

The following descriptions point out key identifying features, which together with habitat preferences and mating calls, should be useful for attaching names to local frog species.

Brown tree frog
*Litoria ewingi* Plate 5.1

**Identification:** The brown tree frog is a small, brown climbing frog with good leaping abilities. It is usually less than 45 mm in length, and, like all tree frogs, it has round discs on the ends of its fingers and toes used for climbing. This is the little frog that climbs windows at night catching insects and calls in gardens at the first hint of rain, usually at night. It is usually dark or light brown in colour (occasionally greenish) with a black stripe running from its nose through its eyes. Inside its thighs it has a bright yellow to orange patch of skin, and its toes are well webbed. Its belly skin is granular and white. Males have dark nuptial pads in their inner fingers, acting a little like Velcro for hanging onto slippery females.

**Mating call and breeding:** The male’s call is a repetitive one that is almost a trill, and sounds like ‘creee, cree-creee-creee’ with the first note usually the longest. It may call practically anytime of year, especially when there are good rains. Breeding occurs any time the conditions are good, with a peak breeding time in spring. The eggs are unmistakable, and can easily be seen in grape-like clusters clinging to stems of vegetation below the surface of the water.

**Habitat and range:** The brown tree frog can be found almost everywhere on King Island where there is habitat. When not breeding it can be found some distance from water, where it usually shelters under rocks and logs during the day. This is a frog that loves gardens and will usually breed in a provided frog pond that does not contain fish. It can be found during the day in damp places in vegetation or hiding in shelter, waiting for its evening role of eating insects.

Green and golden frog
*Litoria raniformis* Plate 5.4

**Identification:** The green and golden frog is a large, mostly green frog that can reach around 90 mm. The colour can range from green to brown on its back, with scattered brown or golden blotches. The lower sides of the frog are very warty, and the belly is white and granular. Being a tree frog (although it is not much of a climber), the ends of the fingers and toes have discs for climbing. The males have dark nuptial pads in their inner fingers, acting a little like Velcro for hanging onto slippery females.

**Mating call and breeding:** This frog is a summer breeder, and usually does not show itself until the weather begins to warm up in late spring and early summer. It is a basking frog that likes to sit in the sun, usually near the edge of water, or on floating vegetation. Its breeding call is not usually heard until the nights begin to warm up, and then it begins its growling call which sounds something like ‘Crawk, crawk, crawk, crraaawwk’. Once heard, it is unmistakable and is one of the great sounds of a summer night. The males call from the water, and the eggs are laid in a mat that sinks to the bottom of the pond. Tadpoles develop quickly in warm weather to a large size, often around 80 mm, and can metamorphose by late summer into frogs about 25 mm or more. Later hatching of tadpoles can
overwinter and metamorphose the next season, although this probably is not the normal strategy.

Habitat, range and behaviour: This large frog usually prefers farm dams and has been shown to eat a variety of food including tadpoles, frogs, small fish, lizards and even small snakes. Anything that moves and that it can get in its mouth is fair game. Captive animals for research have been fed on mice which they unceremoniously stuff into their mouths using their hands.

Conservation status: The green and golden frog is listed as Vulnerable under the Tasmanian Threatened Species Act 1995. It has shown a worrying decline on the Tasmanian mainland, and has disappeared from a number of areas, including the midlands and the north-west, and has declined in several areas such as the Tamar Valley. The reason for this decline is unknown, and why it has disappeared entirely from the north-west, which should be frog heaven for this species, is a total mystery.

The anecdotal evidence is that this frog is in decline on King Island for unknown reasons. One contributing factor could be the population expansion of the introduced magpies and possibly the increasing numbers of forest ravens. These actively foraging birds would make short work of daytime active frogs that prefer open areas for basking and which often move during the day through paddocks to and from dams. Also, the new metamorphlings have been recorded moving across paddocks away from water en-masse late in summer to find winter shelter, presumably then providing easy pickings for birds. Observations of such predation would be valuable, and should be documented and made available to Natural Resource Managers and the DPIWE Conservation Branch. The current range of this frog on King Island is uncertain.

Eastern banjo frog

Limnodynastes dumerili

Identification: The banjo frog is often called the pobble-bonk, a name which describes its distinctive call. This frog can reach nearly tennis ball size (about 70 mm). It might also be said to generally have a tennis ball shape. It is squat, has no webbing between the fingers or toes and has a distinctive oval gland on its back leg. It can be quite variable in colour, ranging from a uniform dark brown to a patchy dark and light brown. It usually has at least a partial lighter coloured stripe down its back, although with the subspecies which is found on King Island and in south-western Victoria, this dorsal stripe is poorly developed or absent. Also with the King Island subspecies the belly skin is dark grey with white dots all over, whereas the Tasmanian mainland sub species has a much lighter belly either off-white or light grey with brown spotting.

This frog is robust looking and often is mistaken for a toad. Its habit of digging itself into loose soil with its back feet, and then popping up to surprise unsuspecting gardeners also leads to this mistaken identity. Australia has no true toads except the introduced cane toad. However, toads are simply a family of frogs, and a number of frogs have similarities to toads. Males that are breeding have dark nuptial pads on the inner fingers, and breeding females have fleshy flanges on the second and third fingers.

Mating call and breeding: The common name pobblebonk comes from the call of this frog. However, each male frog only calls bonk as a single note call. The males are very competitive callers, and as soon as one calls, the others try to outdo it resulting in a pobble bonk sound when three frogs call. Eggs are laid in spring and summer, and the distinctive egg masses are seen as white floating froth, which, on close examination, contains many black and white eggs. The eggs sink after floating a few days. The tadpoles can develop quickly in warmer, usually shallower waters, but have also been observed to take anything up to two years to develop in deeper waters in colder Tasmanian conditions. The older tadpoles get very large and are usually quite dark. They can often be seen in deep dams coming to the top and rolling over into a dive. Large green and golden tadpoles will also do this, but they are green-metallic looking, while banjo tadpoles look mostly black.

Habitat and range: This frog likes dams, fire dams and permanent marsh areas. It is occasionally found breeding in temporary water where the tadpoles have to metamorphose quickly. It is probably widespread on King Island, but distribution records are sketchy.
Striped marsh frog

Limnodynastes peroni

Identification: The striped or Peron’s marsh frog is similar in size (about 70 mm) to its relative the banjo frog, but on closer examination it is a more streamlined looking frog with a pattern of stripes usually discernible on its back. It has a sharper nose and smooth, white belly skin. It lacks the banjo frog’s gland on the back leg, and does not have any webbing between its fingers and toes. Males do not have nuptial pads on their fingers, but instead are distinguished by having very muscular looking arms compared to females.

Mating call and breeding: The striped marsh frog call is heard from concealed areas in the water as a soft ‘smuck’, and sounds similar to a finger popping out of a cheek. It breeds in late spring, often a little later than the first banjo frogs breed. Like the banjo tadpoles, development can be variable according to conditions and water temperature, but probably they would metamorphose within a year. The frothy, typical marsh frog egg masses differ from the banjo frog’s in that the eggs lack any pigment and are totally white. They are often laid under overhanging vegetation if it is available.

Habitat and range: This frog likes areas of permanent water, often quite close to the coast. The striped marsh frog is only found along the north coast of the Tasmanian mainland, and mostly in the north-west. It is common on King Island near the coast at Currie, and is recorded from various sites near the west coast, but more complete distribution information for King Island would be interesting. Occurrence is widespread on the Australian mainland, all the way from South Australia to northern Queensland but its presence in Tasmania is little more than a toehold. Because of its scarcity, it has been proposed that it be listed on the Threatened Species List for Tasmania. Small, completely isolated populations of species can be treated as though they were separate species under the threatened species strategy.

Common or brown froglet

Crinia signifera

Identification: This very common small frog is a particularly interesting one in its endless variability in appearance. It rarely exceeds 25 mm in size, but it may be smooth or warty, patterned or plain, a uniform brown or a combination of colours. However, its belly skin is always white with black blotches, and has a granular texture. Breeding males have dark throats, while females have white throats. There is no webbing or discs on a common froglet’s fingers or toes, and it almost always has a small mustard coloured spot on the tip of its tailbone, which is not described in the literature but which can usually be used as an easy diagnostic feature. Because of its otherwise confusing appearance, this frog has thus been dubbed the ‘yellow-spotted bum frog’ when teaching children to identify frogs, and they never forget that one!

Mating call and breeding: The common froglet breeds from early in late winter to spring in Tasmania and continues breeding whenever conditions are right. The call is a ‘crick, crick, crick, …’ repeated at short intervals and endlessly. Multiply this by many hundreds at a good dam in early spring, and it becomes a serious presence interspersed with brown tree frogs trilling over the top at a higher note and volume. The eggs are laid as singles in shallow water and sink to the bottom. The dark little tadpoles scuttle along the bottom and metamorphose in a few weeks into little metamorphlings of less than a centimetre. Occasionally, hundreds of small tadpoles can be seen in what are little more than quickly drying puddles, and the race is on to try to metamorphose before the water dries up. The warm water speeds the process, but often they lose the race, and unless a rain comes or a kind child collects them and moves them to better conditions, they are doomed.

Habitat and range: These little froglets are very common on King Island and might be expected almost anywhere there is water. They particularly like sags and other vegetation around the edges of ponds and dams. When not breeding, the common froglet can often be found under rocks and logs some distance from water.

Smooth froglet

Geocrinia laevis

Identification: The smooth froglet is a very interesting little frog which can reach about 30 mm in size. It is plump looking, grey or brown on its
back with occasional reddish markings, and sometimes with lighter brown bands running down each side of the back. Its underside is much more dramatic, with smooth light coloured skin that is boldly marbled with dark brown, whereas the groin area is usually coloured red or at least pink, with the undersides of the legs and arms often pinkish. There is no mistaking this frog once you turn it over!

**Mating call and breeding:** The smooth froglet’s call is a ‘cra-a-a-ak’ sound similar to the brown froglet, but drawn out more, somewhat like running your thumb along a harsh comb. The breeding season occurs in late summer and autumn. Large eggs of about 6 mm are laid in clumps of up to 150 eggs. These are laid on land in areas that are going to be inundated later with water. Usually the male calls from small pockets in the soil in the midst of vegetation, and the female comes and lays the eggs in this spot. The tadpoles develop within the egg itself, and once the area is flooded they hatch out of the egg and develop like other tadpoles. Metamorphosis to frogs takes place during late spring and summer at which time the frogs are around 10 mm.

**Habitat and range:** Sometimes, especially on the west coast of mainland Tasmania, the males call from under rocks where the soil is wet and will stay saturated for winter and spring. The frogs are most often found in or near open forest. Areas near the edge of permanent water which will rise during winter are also favoured. The males can be very difficult to find when they are calling, because they conceal themselves well. The habitat and the time of year are additional clues to the call sound when trying to determine whether it might be a smooth froglet. This froglet is probably widespread on King Island occurring wherever there are suitable conditions.

**Conservation of frogs**

Frogs have been showing worrying declines and extinctions around the world. Because they have occupied the planet for a very long time, it should ring alarm bells when they start to disappear. They are increasingly being seen as indicator species which may provide us with early warnings when things in the environment are going wrong. They play a very important role in the planet’s biodiversity by providing food for many animals and by controlling the populations of many invertebrates, particularly insects.

Responsible land managers can look after their frog populations by protecting habitat and by responsible chemical use. Even supposedly safer chemicals such as Roundup have been shown to kill tadpoles, through a surfactant included in the chemical leaching from paddocks into wetlands. A new formulation called Bio-Roundup is designed to be frog-friendly. Any use of chemicals around wetlands should be carried out only with the greatest of caution, and good advice should be sought concerning both product and application.

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**Reptiles – snakes**

**Tiger snake**

*Notechis ater*  
Plate 5.8

**Identification:** The tiger snake is our largest snake in Tasmania, with individuals quite often reaching 1.5 m long. Some of the giant Mt Chappell Island sub species are closer to 2 m long. But the many stories of the one that was as long as the tractor, or with a head on one side of the road while the tail was on the other are the stuff of tall tales rather than reality.

Typically, a tiger snake might be black with yellow bands on its sides thus giving it the ‘tiger’ common name. The tiger snake is the only one of our three snakes that has banding, of whatever colour combination. However, sometimes the snake can be totally black, or brown, or greenish or several other colours, and may not have any of the identifying light and dark bands. The other identifying features for a tiger snake that might separate it from a copperhead are the large head with prominent eyes, and the glossy scales. In
comparison, a copperhead has matt looking scales and a small head. One problem with the glossy/matt choice is that when snakes are getting close to shedding their skins, the scales lose their gloss, and sometimes a clue to this condition is that the eye lenses can be seen to be cloudy to opaque. Snakes can be virtually blind at this time, but their main sense organ, their tongue, is still working fine.

**Behaviour and natural history:** Mating usually occurs in late summer into autumn, at which time a number of snakes are usually seen dead on the roads. A very high percentage of these will be males out searching for females. Males can be identified by the lack of immediate taper below the vent where their sexual organs are packed, and by larger sized heads in the older snakes. Females’ tails taper immediately from their vent. They give live birth and a typical litter is probably around 30, born during summer.

The tiger snake is a commonly encountered Tasmanian snake that has gathered a reputation for fierceness, based mostly on tall tales and phobic fantasy. Certainly, this snake has a tendency to stand its ground, especially when surprised suddenly or when people try to move it off with various threats. It can put on a display of flattening the upper portion of its body in cobra fashion, and occasionally will make threatening strike actions accompanied by coughing-like expulsions of air. It is quite capable of biting at this stage if it fails to drive the perceived enemy away. The species has possibly learned by long experience not to turn its back on humans, finding that it is better to make us back off first before it makes a hasty escape – which it will do given the chance.

**Potential danger:** Make no mistake, the tiger snake is a seriously dangerous snake, with a highly toxic venom that requires immediate medical treatment. But stories of its aggression are greatly exaggerated and imagined, and they do not reflect the reality of this generally timid animal that will do what it can to avoid encounters with people.

Threat displays are unusual, and when they do occur they usually consist of false striking, clumsily carried out with a closed mouth. However, each snake is an individual, and generalisations about behaviour may not apply.

A local resident snake will often stretch out or curl up to digest its meal in the same place each

**Lowland copperhead**

*Austrelaps superbus*  

**Identification:** The lowland copperhead is a large snake capable of growing well over 1 m in length. The largest specimens might approach 1.5 m, but generally the older snakes seem to get fatter rather than longer. They typically are a matt black colour on their back with a cream coloured belly, and often with an orange to red stripe down their side, but also without. They can, alternatively, be a matt orange-brown colour on their back, and then a dark coloured band across the neck will usually be present, with the top of the head also dark coloured. The head is narrow and the lip scales are barred white.

**Behaviour and natural history:** Copperheads are active both day and night and also at fairly low temperatures. They are good swimmers and catch tadpoles under water. Mating takes place in autumn, and males can sometimes be found twisted together carrying out wrestling matches for the prize of a female. Litters are around 20 and are born in late summer to autumn.

This is a different tempered snake than the tiger snake, as it tends to use its muscular body for dramatic flight rather than put on threat displays. They often curl up partly hidden in grass to digest their morning meal of frogs, and are usually less than alert to the clumsy approach of humans. Then at close quarters they may suddenly shoot out of the grass with great thrashings of their bodies as they take flight, quite oblivious to the heart stopping moments they cause.

Threat displays are unusual, and when they do occur they usually consist of false striking, clumsily carried out with a closed mouth. However, each snake is an individual, and generalisations about behaviour may not apply.

A local resident snake will often stretch out or curl up to digest its meal in the same place each...
day, and this provides a good opportunity to get used to viewing a snake and learning to accept their presence. There really isn’t much choice because snakes will always come around to exploit a food source, so it is better to learn to know and respect the areas where the local residents bask, and leave them to carry out their important natural role.

**Habitat and range:** Copperheads are hugely fond of frogs and can most often be found lurking about frog habitats. However, they can be found in a wide variety of habitats and are very common on King Island.

**Potential danger:** Copperheads are easy snakes to step on, and several related instances suggest that even when stepped on they are unlikely to bite. For instance, a surveyor tells that he felt a tapping on his pant leg and looked down to see the poor shoe-pinned copperhead rapping on his leg with its mouth closed. Copperheads have small fangs, a poor delivery system and are possibly responsible for a number of what hospitals term ‘dry bites’. There are few recorded deaths from known copperhead bites, but they are nevertheless snakes with seriously dangerous venom. Their venom is similar to that of the tiger snake, and the same antivenom is used, the same first-aid procedures are necessary for bites.

**White-lipped snake**

*Drysdalia coronoides*  
Plate 5.10

**Identification:** The white lipped snake is a small, slender snake usually of light shades of grey-green or grey-brown on its back. The belly of the snake can be a lighter shade of the back, or, in younger snakes, can often be pink to orange or yellow. The white stripe along the upper lip scales edged on top with black gives this snake its common name, and its unmistakable identification. It is commonly called the whip snake in Tasmania, but this common name more appropriately refers to a group of Australian snakes. Thus, white-lipped snake is a more preferred common name that avoids confusion.

Small copperheads might be confused with white-lipped snakes, because copperheads have white scales on their upper lip. But only the white-lipped snake has black along the upper edge of the white stripe, making it stand out. Also, young copperheads are much stockier looking snakes than white-lipped ones which tend to be almost worm-like when they are small.

**Behaviour and natural history:** White-lipped females give live birth to up to about 10 young in summer. They mate in autumn. It is a very shy snake, making it extremely unlikely for a person to be bitten without serious provocation. The most common sighting of the snake is during its fast retreat as humans approach. This snake feeds exclusively on lizards and consequently may potentially be found almost anywhere you might find lizards.

It is quite prepared to bite humans if carelessly handled.

**Habitat and range:** White-lipped snakes are recorded on King Island, but being discreet little snakes the distribution information is sketchy. They tend to like cool, moist habitats and are rarely found near human inhabited areas. It often takes keen eyes to spot them in their habitat. Occasionally it is possible to surprise one basking, often coiled on bushy vegetation, which they dive into immediately if disturbed.

**Potential danger:** The small size of the snake, the small quantities of venom needed to kill lizards and the small fangs are probably important factors in considering this snake not to be dangerous. Its small fangs can penetrate bare skin areas and cause a reaction usually similar to a bee sting. However, it is important to note that more people probably die each year of allergic reactions to bee, wasp or ant stings in Australia than of snake bites, and so all venomous bites should be treated with caution. The white-lipped snake is in the same family as Tasmania’s other two snakes, and presumably has a similar working venom.

**Conservation of snakes**

Most people would be surprised to know how many snakes are discreetly living near them. Under fairly recent legislation they became protected animals, so if one takes up residence in an unacceptable spot, a trained remover of snakes should be brought in. Killing snakes is illegal except as a last resort; it is also often dangerous and rarely necessary.
Snakes often visit gardens, preying on mice and frogs, and their presence is rarely observed. However, the use of bird netting to protect berries often reveals their presence in the worst way when they get hopelessly tangled in the netting. It takes quite a bit of patience and nerve to cut them loose, and this whole scenario is best avoided by making sure that any netting is stretched tight so that snakes are not easily caught in it, or, if they are, they do not become tangled.

Reptiles — lizards

Lizards can be difficult to identify to species level. Often fairly discreet scale characteristics are used which are beyond the purposes here. With only six lizards to choose from on King Island, there are probably only two or three that might be confusing, and close observation will usually sort these. Care must be taken when catching and handling lizards so as to avoid causing the tail to break off. This is a survival mechanism which often detracts a predator, but once broken the replacement growth is cartilage which cannot be broken from that point again. Smaller lizards can be held by the head with the thumb over the eyes applying light pressure which causes the animal to hold still and not struggle while identifying features.

Blotched bluetongue

*Tiliqua nigrolutea* Plate 5.11

Description: The blotched bluetongue lizard is familiar and unmistakable to most people as the largest lizard in Tasmania and on King Island. Most bluetongues seen are probably under 350 mm total length, but occasionally larger ones can reach around 450 mm total length. The bluetongue is a large member of the skink family, but, unlike most skinks, it does not shed its tail. It is ground dwelling and daytime active.

As the common name suggests, this lizard has a bluetongue which is usually noticeable when the animal is disturbed and opens its mouth widely in a threat display while also hissing. The body has dark brown to black blotchy markings over lighter usually greenish to bluish-brown pigment. Some animals have orange on the head and speckled on the body. Bluetongues are stout looking with tapering thick tails. Males are shorter in the body, stockier in the shoulders and with broader heads than females. Females are longer in the body between the front and back legs. Older animals are easier to sex than younger ones.

Behaviour and natural history: Bluetongues are capable of biting which can cause bruising and possibly breaking of the skin. Any bites should be disinfected, as these lizards sometimes eat carrion and can carry nasty bacteria. Their diet is wide ranging and includes snails, berries, flowers, various plants and almost anything they can catch, including nestling and fledgling birds that might fall out of the nests.

The adage is not true that if you have bluetongues in your garden you won’t have snakes, because both copperheads and tiger snakes like eating young bluetongues. Bluetongues mate in spring, and females are thought to only breed every second or third year. There are often around 12 offspring in a litter that are live born in late summer to late autumn. New young bluetongues sometimes do not even get to find food before they need to find shelter for the winter.

Habitat and range: The blotched bluetongue can be found in a variety of habitats from coastal to montane. It usually inhabits warmer areas of the Tasmanian mainland, is found on Bass Strait islands and also in suitable habitat in the south-eastern part of mainland Australia. Practically every part of Australia has a species of bluetongue lizard, and they make distinctive and delightful contributions to a rich reptile fauna. They are great for eating snails in the garden and can further be lured there by strawberries which they love.

White’s skink

*Egernia whitii* Plate 5.12

Description: White’s skink is a medium sized burrowing lizard with a rather striking appearance.
It has a brown stripe down the middle of its back with similar width black stripes on each side of this. The black stripes each contain single rows of white dots running down the back. The lighter brownish grey sides of the animal (occasionally almost chocolate brown) contain black spots with white dots in them. Adults can reach around 200 mm in total length, with females sleeker and longer than the stouter males.

**Behaviour and natural history:** White’s skinks are usually found in rocky situations in a variety of habitats. They often excavate the entrance to their burrows under a rock, and they can be seen basking close to this entrance and surveying their territory. They are quick to dart down this entrance when startled. If that escape cannot be reached, they usually have other escape holes into their burrow system or a well-known rock crevice. The burrow system can be home to a family unit, with the male, the female and a juvenile or two defending the territory and living together in apparent tolerance.

They mate in spring, and one to four live young are born in mid summer. These skinks rarely stray too far from their burrow systems, and they tend to live in colonies with traditional territories. White's skink is distinctive and, with close observation, it is unlikely to be easily confused with other lizards.

**Habitat and range:** This lizard can be found in coastal heath, grasslands, dry forests and open woodlands, usually in rocky situations. It is relatively common on the mainland of Tasmania, especially in warmer areas, and is quite common on the Bass Strait islands. It is also found in the south-eastern part of the mainland of Australia. As the common name ‘grass skink’ suggests, these lizards like open habitats where grasses and sedges occur and can also be in grassy woodlands. They do not tend to expose themselves very much and keep well hidden in the ground cover. They can be confused with the eastern three-lined skink which may occupy similar habitat.

**Southern grass skink**

*Pseudomoia entrecasteauxii*

**Description:** The southern grass skink is a moderate sized skink of around 125 mm total length. King Island specimens are often longer. This lizard is widespread and shows certain differences in appearance according to location. The King Island individuals tend to have five dark stripes down the length of their backs and two white stripes along their sides, one starting on a level just above the eye and the lower one starting on a level just below the eye.

**Behaviour and natural history:** Although relatively common, this skink is rather more secretive than some of the other common skinks. During the summer breeding season the males of the southern grass skink take on an orange to red breeding colour on the underside of their body and extending along part of the lower white stripes on their sides near their front legs. Adult females are larger than the males and do not take on this colouring. Live young are born during the summer, and average litters are reported to be four or five and up to eight on King Island.

**Habitat and range:** The southern grass skink is found mainly in the warmer areas of the mainland of Tasmania and on the Bass Strait islands. It is also found in the south-eastern part of the mainland of Australia. As the common name ‘grass skink’ suggests, these lizards like open habitats where grasses and sedges occur and can also be in grassy woodlands. They do not tend to expose themselves very much and keep well hidden in the ground cover. They can be confused with the eastern three-lined skink which may occupy similar habitat.

**Three-lined skink**

*Bassiana duperreyi*

**Description:** The three-lined skink is a moderate sized skink reaching around 160 mm in total length. The common name comes from several prominent lines, but how these might add up to ‘three-lined’ can be a mystery. Each side has a black, thick stripe, bordered above and below by white lines, running through the eyes and along the sides. The back is a brown colour. On close examination there is a black line that runs down the middle of the back, and usually two, often fainter black lines, that run down each side of the back next to the upper white lines, thus making three fairly discreet black lines. But what about the prominent white lines – two on each side? The easiest identification of this skink is the thick black stripe on its side bordered above and below by white lines, and this combination at least adds up to an immediate three, if you only count one side…
**Behaviour and natural history:** The three-lined skink is a long and narrow skink with a long tail and short legs. It is not a climbing skink and is particularly adapted to grasslands, heathlands, or open woodlands. Breeding males have pink to red throats during the early summer mating season. Females lay five to 10 eggs during early December under rocks or other cover. Communal nesting has also been recorded. The eggs hatch about four or five weeks after laying.

**Habitat and range:** This skink is considerably more common in the eastern half of the Tasmanian mainland, especially in warmer areas of heathlands, grasslands and open woodlands. It is found on the islands around Tasmania and also in the south-east of mainland Australia. It is relatively common in the heathlands along the south-east coast of King Island. It prefers warmer conditions as might be expected from an egg-laying lizard.

**Metallic skink**

*Niveoscincus metallicus*

**Description:** The metallic skink is a medium-sized skink usually reaching around 150 mm total length. It can vary considerably in appearance according to geographic location, ranging from plain light to dark brown with a metallic sheen on its back, to a more usual lighter or darker flecking on a brown background colour. A black line may or may not be present down the middle of the back, and various other dark and light lines on the back and sides may be present to some degree or absent.

Such confusing variability in appearance often means looking closer at a specimen in the hand so that the under surface of the lizard can be seen. The entire underside is often a salmon-pink to orange in adults. Sometimes it is merely whitish or some shade of off-white, and then it is necessary to look at the belly scales, which are considerably larger than the Tasmanian tree skink – the most confusing other species.

**Behaviour and natural history:** The metallic skink has shorter legs than the Tasmanian tree skink, and does not like to climb very much other than to reach basking areas such as rocks. It is a slightly more robust looking animal than the tree skink, with a thicker head. These two species often occur together, thus giving good opportunities for comparison. Mating occurs in autumn and spring, and live young are born during the summer with litter sizes around four.

**Habitat and range:** The metallic skink is Tasmanian’s most widespread reptile, and is found from the coast to alpine areas. They are found on most off-shore islands around Tasmania. They also occur on mainland Australia in central southern Victoria. Metallic skinks can be found in most habitats and are often locally abundant around human habitation.

**Tasmanian tree skink**

*Niveoscincus pretiosus*

**Description:** The Tasmanian tree skink is a moderate sized skink and can reach around 140 mm in total length. It is flat in the body and head and has well developed long legs. The colour on its back is greyish to light or dark brown that is well speckled with light and dark flecks. A well-developed black line usually runs down the middle of its back. The upper side is black or dark brown-edged above and below with narrow white lines. This dark side stripe often contains scattered small, white spots, and the stripe may taper at the back leg into a line that continues down the tail. The belly and under surface is normally grey or whitish with small scales. Sometimes the underside of the rear legs and the surrounding area will be coloured orange or reddish.

**Behaviour and natural history:** This species is a strong climber, and its flat body allows it to exploit narrow spaces, hunting its invertebrate food in rocks, logs and trees. It also likes to make its way into houses and is often seen cleaning up the flies, other insects or spiders in window areas. Its attraction to sweet spills in the kitchen such as jam suggest it might supplement its diet in the wild with the odd berry.

**Habitat and range:** The Tasmanian tree skink can be found in practically any habitat, from trees to rocks to weatherboards, where it can exploit its climbing abilities. It has even been recorded from coastal rock platforms on King Island and from tiny islets with hardly any vegetation.

The Tasmanian tree skink is the only Tasmanian endemic reptile known from King Island. It is also known as the ‘pretty skink’, which is an admirable
Accounts of bird species were compiled for:
1. almost all land and freshwater native species that are breeding residents or regular migrants and visitors; and
2. some breeding or resident marine birds and shorebirds on King Island.

The sequence of species and English names follows Christidis and Boles (1).

Management: Conducting annual counts of waterbirds and land birds is basic research that underpins the conservation and management of species. For further information on a methodology for monitoring waterbirds and forest birds see chapter 7.

Definitions:
Cere: bare area at base of upper bill containing the nostrils in Cape Barren goose and goshawks.
Coveys: groups
Eclipse plumage: dull plumage acquired after the breeding season by many male ducks and fairy-wrens.
Lores: area between the eyes and base of bill.
Manna: white, sugary sap exuded from wounded branches of trees.
Morph: distinctive colour plumage within a species.
Speculum: iridescent green patch on duck’s wings.

Stubble quail
*Coturnix pectoralis*
Length: Male 16–20 cm. Female 17–20 cm.
Identification: Large plump quail similar to brown quail. Female: brown; white eyebrow and crown stripe; cream short triangular streaks on shoulders, back and underbody. Male: diagnostic orange-buff face and throat, centre of breast black with bold triangular white streaks. Distinct two-note whistle.
Habits: Singly, pairs, groups. Forages on ground for seeds. When disturbed quickly runs into cover or flushes with whirring wings.
Habitat: Grasslands, cereal crops, drier rank margins of wetlands. Prefers habitat with diverse herbs and grasses and cover not too dense.

Nests in scrape on ground in grass and crops.

Range and status: Rare on King Island, possibly occurs more in north half of island. Not positively recorded recently. Numbers possibly declining. Current status unknown. Formerly common on Tasmanian mainland, now rare.

Special management: Monitor populations and determine current distribution, abundance and conservation status. Determine critical habitat.

Threats: Feral cats, ravens and farm machinery.

Brown quail
*Coturnix ypsilophora*
Other names: Swamp, Tasmanian or Tasmanian swamp quail.
**Length:** 17–22 cm.

**Identification:** A large, plump dark quail. Diagnostic plain face with dusky ear-spot; upperbody brown with fine white streaks. Underbody brown with wavy black barring. Eye yellow.

In flight similar to stubble quail – wings produce whirring sound, whereas brown quail wings produce whistling and metallic noise. Distinctive voice.

**Habits:** Single, pairs. Forages mostly on ground in tall grass and cereals for seeds, also insects and worms. When flushed, bursts from cover with whistling and metallic sounds of wings. Individuals fly and glide in different directions and dive into cover. More active at dawn and dusk.

**Habitat:** Grasslands, cereal crops, margins of swamps.

Nests in scrape in ground in dense, low vegetation of grasses, rushes, shrubs.

**Range and status:** Restricted range. Rare on King Island, possibly irregular visitor. Not recorded on King Island since 1971 but recorded recently from Three Hummock Island.

**Special management:** Conduct surveys in spring and summer to determine presence, distribution, abundance and status.

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**Blue-billed duck**  
Oxyura australis  
Plate 8.51

**Other name:** Stiff-tailed duck.

**Length:** 37–44 cm.

**Identification:** A small diving duck with large round head, short neck, prominent concave bill and stiff tail held erect or flat. Sits low in water with sloping back.

Breeding male a striking rich chestnut with black head and bright blue bill. Breeding female and non-breeding male brownish-grey finely barred buff-ochre.

Similar species: larger musk duck, hardhead and Eurasian coot.

**Habits:** Pairs, small flocks. Congregates in large winter flocks of up to 100 birds. secretive, feeds in open, deep water on aquatic vegetation and insects. Obtains most food by diving and some gleaned from water surface and aquatic vegetation.

**Habitat:** Prefers large, permanent freshwater lagoons with deep, open water and dense aquatic vegetation in and around the wetlands. Disperses in breeding season.

Nests in rushes and reeds usually over water.

**Range and status:** Widespread on lagoons in north and south. At times abundant in the north on Lake Flannigan. Occasional breeding resident on King Island and regular visitor in autumn–winter. Uncommon to rare on Tasmanian mainland.

**Special management:** Monitor populations to determine annual distribution, abundance, conservation status and breeding status.

Protect significant wetlands from degradation by stock.

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**Musk duck**  
Biziura lobata

**Other names:** Diver, steamer, lobed duck.

**Length:** Male 66 cm. Female 55 cm.

**Identification:** A large, dark blackish-brown diving duck with short wings; broad, triangular shaped black bill and long stiff tail. Sexes differ.

Male: leathery grey-black flap hanging below bill and musky odour when breeding. Similar smaller female lacks distinct lobe under bill.

**Habits:** Singles, pairs, small to large flocks. Sits low in water with tail erect or flat. Mostly dives to feed on aquatic invertebrates. Displaying males expand bill-lobe, fan stiff-tail, rotate in water, kick, splash and emit shrill whistles.

**Habitat:** Prefers large, well-vegetated waterbodies with permanent deep freshwater.

Nests in dense, tall aquatic vegetation, usually over water.

**Range and status:** Widespread on larger, deep lagoons, particularly throughout western King Island. Occasional breeding resident. Regular and sedentary.

**Special management:** Monitor populations for abundance and breeding. Protect large, deep lagoons from stock.
Black swan  
*Cygnus atratus*

**Length:** 110–140 cm. Wingspan 160–200 cm.

**Identification:** Very large, black swan with red bill. In flight neck outstretched and white wings prominent.

**Habits:** Pairs, small groups to large flocks. Breeding pairs territorial and sedentary. Feeds on aquatic vegetation below water by up-ending or from water surface. Grazes on pastures. Congregates in flocks during non-breeding season.

**Habitat:** Freshwater lagoons, estuaries, swamps, ponds, farm dams, flooded pastures.

**Range and status:** Widespread over island on lagoons, estuaries and farm dams. Very common to abundant breeding resident.

**Special management:** Some management action may be necessary to reduce grazing intensity on pastures.

Cape Barren goose  
*Cereopsis novaehollandiae*

**Length:** 75–91 cm.

**Identification:** Unmistakable large, ash-grey goose with large green-yellow cere at base of bill; dark-grey spots on wing coverts; wing tips and tail black. Legs pink and feet black.

**Habits:** Pairs, small flocks. On land grazes on native and pasture grasses, legumes and cereal crops. Swims in water.

**Habitat:** Grasslands, lagoons and margins. Introduced to Hunter and Three Hummock islands. Breeds on Three Hummock Island.

**Range and status:** Widespread. Rare in 1960s. Population has expanded in last 40 years. Now a fairly common breeding resident. On mainland Tasmania population probably expanding along north-west coast and hinterland.

**Special management:** Monitor population and determine current distribution, changes in population size and status. Retain and protect trees with hollows.

Australian shelduck  
*Tadorna tadornoides*  
Plate 8.53

**Other names:** Chestnut-breasted shelduck, mountain duck.

**Length:** Male 59–72 cm. Female 56–58 cm. Wingspan 94–130 cm.

**Identification:** A large, boldly coloured duck with black head, orange breast and white forewing. Sexes similar but female has conspicuous white around eye and base of bill. Strong flight with black head, orange collar and prominent large white forewing and underwing.

**Habits:** Pairs, family groups in breeding season and larger flocks in non-breeding season. Grazes on land on grasses, pastures and crops.

**Habitat:** Freshwater lagoons, farm dams, estuaries, pastures, crops, shallow-flooded pastures.

**Range and status:** Widespread. Rare in 1960s. Population has expanded in last 40 years. Now a fairly common breeding resident. On mainland Tasmania population probably expanding along north-west coast and hinterland.

**Special management:** Monitor population and determine current distribution, changes in population size and status. Retain and protect trees with hollows.

Australian wood duck  
*Chenonetta jubata*

**Other names:** Maned duck, maned goose.

**Length:** 47–48 cm.

**Identification:** Medium-sized pale grey duck with brown head and two black bands along back. Sexes differ. Adult breeding male: brown head with short black mane on back of neck; breast grey with fine black barring; black lower back, tail, belly and undertail. Non-breeding male pale brown like female. Adult female distinguished by pale brown head, two white stripes above and below eye, brown underparts with white speckles, white (not black) belly and undertail. In flight distinctive white inner trailing wing (secondaries).
Habits: Pairs, small flocks. Forages in shallow water. Mostly grazes on land in grasslands, pastures and crops. Loafs on bare banks of farm dams. Settles on water when disturbed.

Habitat: Farm dams with nearby pastures and crops, freshwater lagoons and coastal bays.

Nests in tree-hollows, usually live in or near water. Not known if nests on ground on King Island.

Range and status: Not recorded on King Island in 1960s and 1970s. In mainland Tasmania a rare visitor before 1972 when first recorded breeding. Now common in Tasmania. Currently widespread and a common breeding resident on King Island.

Special management: Monitor population size to determine distribution and abundance. Determine nest-sites and whether competing with other hollow-nesting native birds.

Pacific black duck

Anas superciliosa

Other names: Wild duck, black or brown duck.

Length: 47–60 cm.

Identification: Large, dark brown dabbling duck with distinct black stripes on head. Whistling flight with conspicuous white underwing and green and purple speculum edged black.

Habits: Pairs, small and large flocks. Feeds on seeds and invertebrates by up-ending in shallow water. Grazes on land on seeds and leaves. Rises strongly out of water. Loafs on logs and branches in and out of water.

Habitat: Freshwater lagoons, farm dams, swamps, marshes, creeks, rivers, estuaries, pastures, mudflats, beaches and drainage ditches.

Nests in tree-hollows and on ground in dense cover.

Range and status: Widespread. Common regular breeding resident.

Special management: Maintain and/or restore low vegetative cover around margins and away from wetlands. Erect nest-boxes over water. Monitor use of nest-boxes and tree-hollows by waterfowl and other animals. Construct and vegetate islands in farm dams for nesting waterfowl.

Australasian shoveler

Anas rhynchotis

Other names: Blue-winged or southern shoveler.

Length: 45–55 cm.

Identification: A short-necked duck with massive, dark, spatulate, forward-sloping bill as long as head. Sexes differ. Adult breeding male: blue-grey head; yellow eye; powder-blue shoulder; lower underbody bright chestnut with white flank-mark; legs and feet orange. Adult female brown, mottled darker; pale eye-ring and shoulder powder-blue like male. In flight prominent powder-blue shoulder and green speculum. Similar species: chestnut teal.


Habitat: Larger lagoons with open water, swamps, freshwater wetlands with densely vegetated margins, farm dams, estuaries.

Nests on ground in grassy paddocks, usually among shrub and herb cover.

Range and status: Widely distributed on lagoons, especially on western side of island. Uncommon breeding resident.

Special management: Monitor population in winter and spring to determine distribution, abundance and conservation status. Manage and restore vegetative cover around wetlands and protect wetlands from stock.

Grey teal

Anas gracilis

Length: 42–44 cm.

Identification: Small grey duck easily confused with female and eclipse male chestnut teal. Both sexes of grey teal best distinguished by much whiter chin and upper throat whereas those of female chestnut teal are brown. Male grey teal recognised from female chestnut teal by behaviour and calls.

Habits: Pairs, small groups to large flocks. Forages for seeds and animal food by up-ending in water
and strips seeds from vegetation while swimming. Nomadic and dispersive. Numbers fluctuate.

**Habitat:** Freshwater wetlands (lagoons, swamps), estuaries, farm dams.

Nests in tree-hollows but also on ground under shrub cover.

**Range and status:** Widely distributed. Uncommon regular visitor. Not known to breed on King Island.

**Special management:** None required other than protection of wetlands.

**Chestnut teal**

*Anas castanea*

**Other names:** Chestnut-breasted or green-headed teal.

**Length:** Male 40–50 cm. Female 35–45 cm.

**Identification:** Similar in size to grey teal but smaller than Pacific black duck. Sexes differ. Adult breeding male: bottle-green head and neck; breast and belly rich chestnut; white flank mark; black undertail. Male eclipse like dark female. Adult female brown, similar to grey teal but crown a darker brown, face and throat fawn-buff with dark streaks.

**Habits:** Mostly pairs, small groups. Larger groups in winter. Feeds on seeds and small invertebrates by dabbling, pecking at water surface and stripping seeds from plants. Loafs on bare areas, mudflats and on logs and branches at margins of wetlands.

**Habitat:** Freshwater lagoons and coastal swamps, brackish estuaries and bays, saltmarsh, creeks, rivers, farm dams.

Nests in tree-hollows or on ground on island wetlands and well-vegetated margins of wetlands.

**Range and status:** Widely distributed. Uncommon regular visitor. Not known to breed on King Island.

**Special management:** None required other than protection of wetlands.

**Hoary-headed grebe**

*Poliocephalus poliocephalus* Plate 8.57

**Other names:** Dabchick, hoary-headed dabchick.

**Length:** 29–30 cm.

**Identification:** Small, dumpy greyish-brown diving waterbird. Breeding adult: head (crown, face and neck) black with diagnostic silver white streaks. Adult non-breeding (winter) plumage lacks prominent head streaks and closely resembles winter plumage of Australasian grebe (*Tachybaptus novaebollandiae*). Similar species: in winter Australasian grebe distinguished from hoary-headed grebe by smaller size, line separating dark crown from white face passes through eye in Australasian grebe but below eye in hoary-headed grebe (hhg), yellow eye (brown in hhg) and flanks and neck rufous-brown (brown in hhg). Adult breeding Australasian grebe has diagnostic black head and neck with chestnut stripe on side of neck, yellow facial patch between eye and base of lower bill, chestnut flanks and a trilling call.

**Habits:** Pairs, small and large groups. Swims on water. Fluffs rear of body. Dives for small aquatic food. Dives and flies short distance when disturbed.

**Habitat:** Large and small freshwater lagoons, swamps, farm dams and brackish waterbodies.

Nests over water on a floating vegetative platform.

**Range and status:** Hoary-headed grebe is a common breeding resident throughout King Island. Australasian grebe was first reported as a vagrant on King Island in 1972 and first recorded in Tasmania in the 1960s. It is expanding its range in north-west Tasmania.

**Special management:** Monitor population and record sightings of Australasian grebe.

**Little penguin**

*Eudyptula minor*

**Other names:** Fairy or little blue penguin.

**Length:** 40–45 cm (males slightly larger).

**Identification:** Black to blue-grey above, white below. Bill black. Feet: flesh white to pinkish, soles black.

**Habits:** Singles or parties at sea. Dives and swims underwater. Feeds on small fish. Circles around shoals of fish then charges and catches and swallows prey underwater. Moves to and from breeding colonies in darkness.

**Habitat:** Oceans, bays; around jetties and piers. Roosts throughout year in old burrows and nest-sites.
Nests in rabbit-like burrows in single pairs or large colonies, mostly on islands.

**Range and status:** Abundant in Bass Strait. Common on King Island. Twenty small colonies in Grassy area and in south-west from north of Catarqua Point to Surprise Bay contain 400–500 pairs. An estimated 9,000 pairs breed on eastern Councillor Island (Oil Spill Response Atlas database).

**Special management:** Monitor colonies on King Island to determine population trends. Protect colonies and burrows, especially during the breeding season.

### Short-tailed shearwater

*Puffinus tenuirostris*

**Other names:** Tasmanian muttonbird, slender-billed shearwater, Bass Strait or Tasmanian shearwater.

**Length:** 40–45 cm.

**Identification:** Dark smoky brown with paler throat and silky gloss on underwing. Tail short, rounded. In flight, black toes extended just past tail tip.

**Habits:** Very large flocks fly offshore in undulating streams; rests on surface of water in large rafts, only approaching nesting area after dark.

**Habitat:** Nests in burrows in the ground.

**Range and status:** Common in Bass Strait. Undertakes extensive migration, overwinters in subarctic waters of the Bering Sea. Nineteen colonies around King Island, particularly in the north, east and south, estimated to contain about 548,000 burrows (13).

**Special management:** Protect breeding colonies and burrows. Monitor size of colonies and changes in vegetation in rookeries.

### Little pied cormorant

*Phalacrocorax melanoleucos*

**Other names:** Little black-and-white cormorant or shag.

**Length:** 55–65 cm.

**Identification:** Small cormorant, white below and black above, with diagnostic white eyebrow from bill over eye in adults, not immatures, and lack of black flank-mark. Similar species: irregular adult pied cormorant is larger (66–80 cm) with longer bill, yellow spot in front of eye and prominent black flank-patch.

**Habits:** Singles to breeding and roosting colonies. Forages in marine and inland freshwater wetlands and dams. Swims and dives for freshwater crayfish and fish. Rests in trees, often dead trees, near water.

**Habitat:** Inland coastal waters, lagoons, swamps, estuaries and farm dams.

**Range and status:** Widespread. A common breeding resident.

**Special management:** Determine size and location of existing breeding colonies.

### Great cormorant

*Phalacrocorax carbo*

**Other names:** Black, big or large black cormorant or shag.

**Length:** 80–85 cm.

**Identification:** Black cormorant distinguished from little black cormorant by larger size. Breeding plumage with diagnostic yellow throat pouch,
whitish facial patch, black crest on nape and a white oval thigh patch.

**Habits:** Mostly solitary. Perches in dead trees and on rocks often with wings extended to dry. Dives for fish and crustaceans. Flight strong.

**Habitat:** Coasts, bays, estuaries, rivers, lagoons, swamps, farm dams.

Nests in trees in colonies. Breeding not recorded on King Island.

**Range and status:** Widespread in inland and coastal waters. Common regular resident or visitor.

**Special management:** Monitor population size and determine distribution and abundance.

### White-faced heron

*Egretta novaehollandiae*  
Plate 8.52

**Other name:** Blue crane.

**Length:** 66–68 cm. Wingspan 106 cm.

**Identification:** Medium-sized blue-grey heron with white face and upper throat and yellow legs. Breeding birds have plumes on back and breast. Similar species: white-necked heron, much larger, with white head and neck.

**Habits:** Solitary, pairs. Small to large groups in autumn–winter. Forages for frogs.

**Habitat:** Inland and coastal freshwater, brackish and saline waters including estuaries, coastal rocky shores, bays, freshwater lagoons, swamps, farm dams and pastures.

Nests in forks of branches of tall eucalypts and paperbark.

**Range and status:** Widespread inland and along coast. Common breeding resident.

**Special management:** Monitor population.

### Cattle egret

*Ardea ibis*

**Length:** 70 cm.

**Identification:** Sociable, small white egret with yellow bill and eye. Adults in breeding plumage have buff-orange head, neck and breast. Similar species: intermediate egret.

**Habits:** Forages in small parties and large flocks of hundreds among cattle, particularly dairy cattle. Feeds on insects, earthworms and other invertebrates disturbed by grazing cattle and on ticks and other ectoparasites of cattle.

**Habitat:** Pastures, particularly improved pastures, grasslands, swamps, freshwater wetlands and estuaries.

**Range and status:** Colonised northern Australia in 1940s and expanded south. Regular autumn–winter non-breeding migrant to Tasmania and King Island.

**Special management:** Monitor population size.

### Nankeen night heron

*Nycticorax caledonicus*

**Other name:** Rufous night heron.

**Length:** 55–65 cm.

**Identification:** Stocky heron with rich rufous upperbody, black crown, white underbody and yellow legs.

**Habits:** Roosts by day in densely foliaged trees, including exotic conifers such as *Cupressus macrocarpa*. Moves out at dusk but sometimes flies during the day. Nocturnal feeder on frogs and crustaceans.

**Habitat:** Swamp paperbark forest. A small colony breeds or used to breed in swamp paperbark trees at Pass River, the Nook Swamp and Sea Elephant area.

Builds nest of sticks in swamp paperbark.

**Range and status:** Restricted range on King Island, uncommon breeding resident. Locally threatened. King Island is southern-most breeding colony in Australia. Breeds in spring. Adults leave colony after breeding and migrate to Victoria.

**Special management:** Monitor size and reproductive success of colonies at Pass River and/or the Nook Swamp and Sea Elephant area. Protect breeding colonies and paperbark habitat from fire and cattle. Monitor loss of eggs and young by potential predators such as forest raven.

### Australasian bittern

*Botaurus poiciloptilus*

**Other name:** Brown bittern.

**Length:** 66–76 cm.

**Identification:** Large, stocky, thick-necked heron. Upperbody mottled and streaked dark brown, buff and black. Eye orange-brown or yellow. Similar
specie: Juvenile nankeen night heron is smaller, paler below, more densely streaked with prominent white spots on wing (and perches in trees).

**Habits**: Mostly solitary. Very secretive with cryptic plumage. Stealthily forages for frogs, fish and crustaceans in shallow water with body almost horizontal and neck extended. When alarmed may ‘freeze’ with bill pointing straight up. Sometimes flies by day with slow wing beats, neck hunched and green legs trailing beyond tail. In spring and summer birds utter resonant load booming calls.

**Habitat**: Large freshwater swamps with extensive mats of tall dense reeds and rushes.

**Range and status**: Range has contracted. Once more common. Rare in the Nook Swamp in the 1960s. Considered Vulnerable by Garnett & Crowley (3).

**Special management**: Conduct surveys in swamps in late spring–summer to detect voice and presence of bitterns. Protect and manage these wetlands from drainage and fire.

**White-bellied sea-eagle**

_Haliaeetus leucogaster_  Plate 8.10

**Other name**: White-breasted sea-eagle.

**Length**: 75–85 cm. Wingspan 180–220 cm. Female larger.

**Identification**: Sexes similar. Very large white and grey eagle. Adult: head and underbody white; back, wings grey; wedge-shaped tail white with basal half black; black wing-tips. Juvenile: Dark brown body; buff head; grey-white tail with diagnostic dark brown sub-terminal band. Immature: similar to juvenile but tail buff-grey with no band.

**Habits**: Singles, pairs, family parties. Soars and glides on broad, upswept wings. Perches, often for long periods, on branches of live and dead trees near lagoons, rivers and estuaries; and on rocks and in trees along the coast. Patrols coastline over water. Preys on fish, lizards, waterbirds, seabirds and small mammals such as rats. May steal prey from other raptors and seabirds.

**Habitat**: Coastal shores, bays, beaches, estuaries, saltmarsh; freshwater rivers and wetlands, farm dams, coastal scrub, wet blue gum forests, paperbark swamp forest.

Builds large stick nest, in large forks of blue gum and swamp paperbark, well inland or near coast.

**Range and status**: Widespread around coast and inland rivers. Seven or eight breeding pairs and 11 known nests on King Island. High conservation status.

**Special management**: Totally protected. Protect all nests and forest habitat around each nest. Minimise disturbance around nests. Each year monitor number breeding pairs, nesting success and number of young fledged per nest.
Special management: Minimise human disturbance around nest area to prevent desertion of eggs or young. When mowing paddocks with nests, leave 20–30 m buffer of tall grass around each nest.

Brown goshawk
*Accipiter fasciatus* Plate 8.9
Length: 40–50 cm. Wingspan 70–100 cm. Female larger.
Identification: Adult is greyish above with rufous hind collar, rufous below with fine white bands and a long, rounded tail. Immature: head, throat and upper breast brown, streaked white; rest of underbody whitish with broad, rufous-brown bars. In flight barring of underbody, tail and underwing is prominent. Similar species: collared sparrow-hawk is smaller with a square tail.
Habits: Mostly solitary, pairs. Swift flight through trees, along shelterbelts and between patches. New Holland honeyeater alarm calls alert observer to presence of raptors such as goshawks. Soars high with broad wings with tail slightly fanned. Forages beneath forest canopy for small birds.
Habitat: Eucalypt forests and regrowth, particularly wet forests. Also homestead gardens.


Brown falcon
*Falco berigora* Plate 8.18
Length: 40–50 cm. Wingspan 120 cm. Female larger.
Identification: Several morphs. Medium-sized raptor, mostly dark brown upperbody and whitish below with fine brown streaks; whitish-buff cheek with dark brown moustachial stripe.
Habitat: Open dry forests and woodlands, farmlands with copses and rows of shelter, grasslands, heathy-woodlands, King Island scrub. Builds nest in large, mature and old trees. Renovates old nests of other raptors and ravens.

Range and status: Widespread. Common breeding resident.

Special management: Retain large trees for nesting.

Nankeen kestrel
*Falco cenchroides*
Length: 30–35 cm. Wingspan 80 cm. Female larger.
Identification: Pale rufous upperbody and whitish below with black streak down from eye. Male: head and tail grey. Female: head and tail rufous.
Habits: Singles, pairs. Perches on telegraph poles, fence posts, dead trees. Hovers over paddocks and grasslands.
Habitat: More common over grasslands and paddocks.

Range and status: Widely distributed, particularly in west half of island. Rather rare resident breeding species. Uncommon regular visitor to King Island.

Buff-banded rail
*Gallirallus philippensis*
Length: 28–33 cm.
Identification: Medium-sized rail with prominent white eyebrow and broad rich stripe from bill through eye to nape; grey throat and undertail; underparts with fine black and white bands and cinnamon-buff band across breast. Similar species: Lewin’s rail.
Habits: Mostly singles. Secretive in dense cover. Flicks tail up when alert. Flies at night.
Habitat: Sedgy swamps, marshes, edges of lagoons, creeks, drainage ditches.

Range and status: Observed in the Nook Swamp, Lavinia State Reserve and nearby Councillor Island. Current status unknown. Not known if sedentary or a regular or irregular visitor.
Special management: Conduct wetland surveys in spring and report sightings of rail species.

Lewin’s rail
*Rallus pectoralis*  Plate 8.56

**Length:** 21–37 cm.

**Identification:** Medium-sized rail with diagnostic long, pink, dark tipped bill; rufous crown and nape; streaked back and forehead; finer and less extensive black and white barring on breast, belly and undertail; wings dark brown mostly spotted white. Distinct voice.

**Habits:** Singles, pairs. Secretive in dense cover in shallow and permanent water and along ditches, fence lines and shelterbelts. Forages on ground and in shallow water for molluscs, earthworms, crustaceans and insects.

**Habitat:** Paperbark and blackwood swamps, marshes, lagoon edges, creeks, saltmarsh and shelter along fences and drainage ditches.

**Nests** near or over water in clumps of tussocks, sedges and reeds.

**Range and status:** Widespread but more common in Nook Swamp. Uncommon breeding resident. Conservation status unknown, perhaps declining.

**Special management:** Monitor wetlands, especially the Nook Swamp, in spring to determine density of singing males. Fence off critical wetlands from stock. Eliminate feral cats.

Spotless crake
*Porzana tabuensis*  Plate 8.54

**Length:** 17–21 cm.

**Identification:** Brown wings and back; grey head and underbody; undertail barred black and white; red eye; red legs.

**Habits:** Mostly singles. Very secretive. Forages in fresh or brackish water of marshes, swamps, lagoons and saltmarsh. When flushed flies short distance with legs dangling.

**Habitat:** Freshwater marshes, swamps, lagoons with dense vegetation, and saltmarsh.

**Nests** on ground or over water in clumps of rushes, sedges and tussocks.

**Range and status:** Previously widespread, possibly more restricted. Recently recorded from saltmarsh at Sea Elephant River estuary. Uncommon and sedentary. Breeding requires confirmation. Possibly locally threatened.

**Special management:** Conduct breeding bird surveys of wetlands to determine current distribution and status.

Purple swamphen
*Porphyrio porphyrio*

**Other name:** Bald coot.

**Length:** 44–48 cm.

**Identification:** Large, unmistakable waterbird with massive red bill and frontal shield; deep indigo-blue head, neck and underbody; flicks tail up exposing white undertail; red legs.

**Habits:** Mostly pairs, small groups in breeding season. May form winter flocks of 50 birds. Forages mainly on aquatic vegetation in swamps and on pasture grass. Also eats seeds, fruit, insects, frogs, lizards, fish, young birds, eggs and small mammals.

**Habitat:** Aquatic vegetation in and around freshwater swamps, marshes and lagoons, pastures, vegetated margins of farm dams and drainage ditches.

**Nests** in reeds and rushes in and around wetlands.

**Range and status:** Widespread. Common breeding resident. Numbers probably increasing.

**Special management:** Monitor population size.

Dusky moorhen
*Gallinula tenebrosa*  Plate 8.55

**Length:** 35–40 cm.

**Identification:** Medium-sized slaty-black waterhen with diagnostic bright red bill tipped yellow, red frontal shield and undertail-coverts white with black central band.

**Habits:** Pairs, small groups. Swim with neck up and head jerked forward. Forages in water and on land for leaves, seeds, fruit, molluscs, insects and spiders. When feeding, gleans food from water surface and tips up body to take food under water. Aggressive.
**Habitat:** Open water and well-vegetated freshwater lagoons, swamps, creeks and farm dams.

Nests on ground and above water in reeds and rushes in and around wetlands.

**Range and status:** Widespread from Lavinia State Reserve south to Pearshape Lagoon. Fairly common breeding resident. Population stable or increasing. First recorded on King Island in 1960s. First recorded in 1976 on Tasmanian mainland where range in north-west is expanding slowly.

**Special management:** Protect wetland habitat.

**Eurasian coot**

*Fulica atra*

**Length:** 35–39 cm.

**Identification:** Medium-sized slate-black waterbird with diagnostic white bill and frontal shield; lobbed feet.

**Habits:** Pairs, family groups, larger flocks. Eats plant food on land but mostly dives for it in open water inshore and well off-shore.

**Habitat:** Large fresh or brackish lagoons, swamps and farm dams with open water and submerged aquatic vegetation.

Nests in rushes and clumps of vegetation in open water, fringes of wetlands and on ground at edges.

**Range and status:** Widespread on larger wetlands such as Lake Flannigan and Pearshape and Tathams lagoons. A common breeding resident but numbers fluctuate. May not breed every year.

**Painted button-quail**

*Turnix varia*

**Length:** Male 17–19 cm. Female 18–23 cm.

**Identification:** Large button-quail similar in size to brown quail. Sexes differ in size and plumage. Larger, brighter female has diagnostic bright chestnut shoulder-patch. Both sexes have underbody grey with buff-white spots, back and wings brownish-grey streaked and speckled black and white, eyebrow white and eye red. Presence detected by scrapes on ground.

**Habits:** Singles, pairs, small groups. Forages for seeds and fruit on ground. Scratches and scrapes leaf litter, making circular depressions or platelets. Flushes with low, fast flight. When disturbed, freezes or runs fast through vegetation. Voice of female a low booming, often at night.

**Habitat:** Coastal tea-tree, wattle and eucalypt heath and scrub with much ground litter, fallen dead branches and grassy tufts.

Nests on ground in grassy tea-tree heath among litter, fallen branches and herbs.

**Range and status:** Present in coastal heath in and south of Lavinia State Reserve. Rare and sedentary breeding resident. Possibly locally threatened.

**Special management:** Monitor population to determine abundance, critical habitat and conservation status.

**Latham’s snipe**

*Gallinago hardwickii*

**Other name:** Japanese snipe.

**Length:** 29–33 cm. Wingspan 50–54 cm.

**Identification:** Medium-sized wader with long, straight bill (twice as long as head), short broad, pointed wings, long tail and short legs. Sexes similar. Crown black-brown with narrow buff median stripe; pale eyebrow; black stripe through eye. Back, wings blackish with bold buff ‘V’ marks, two longitudinal buff stripes on both sides of upperbody and rufous-brown barring on wings. Throat, breast light brown to buff with dark streaks; lower breast and belly white; flanks and underwing white with dark barring.

**Habits:** Singles, pairs, small groups. When disturbed, explode from cover with fast zigzagging flight, utter short, sharp ‘shak’ note and drop to ground. Forage in edges of wetlands and probe in soft soil for seeds and invertebrates (earthworms, spiders and insects).

**Habitat:** Vegetation fringing permanent and ephemeral freshwater wetlands, swamps, damp vegetation at edges of creeks, pools, drainage ditches, farm dams and shady edges of forests.

**Range and status:** Widespread. Fairly regular summer, non-breeding migrant from Japan.

**Special management:** Protect and manage wetland habitat. Maintain vegetative cover around edges of wetlands. Protect wetlands from stock.
Waders

Palearctic waders or shorebirds migrate long distances across the globe each year. From as far south as Hobart these remarkable birds fly up to 12,000 km to within the Arctic Circle along the route known as the East Asian-Australasian Flyway. From their breeding grounds in the Northern Hemisphere they fly south each Austral spring to spend the summer in Australia before returning each Austral autumn to the Northern Hemisphere.

A number of these birds can be seen on King Island during their time in Australia. Bar-tailed godwit (Limosa lapponica) (Plate 8.36), eastern curlew (Numenius madagascariensis) and common greenshank (Tringa nebularia) (Plate 8.37) can be seen feeding on the mudflats at Sea Elephant River. Large numbers of ruddy turnstone (Arenaria interpres) (Plate 8.38) and red-necked stint (Calidris ruficollis) (Plate 8.40) can be found foraging among the seaweed along the rocky shores on the west of the island.

One migratory wader, the double-banded plover (Charadrius bicinctus) (Plate 4.46), is the only wader to breed in New Zealand and winter in southern Australia, including King Island.

Pied oystercatcher

Haematopus longirostris

Other name: Redbill.

Length: 42–51 cm.

Identification: Large black and white wader. Black with white belly and rump. Straight scarlet bill and red legs.

Habits: Singles, pairs, and autumn and winter flocks.

Habitat: Sandy, shellgrit or pebble beaches; sandspits and sandbars; tidal mudflats and estuaries. Occasionally seen on rocky shores, grassy paddocks, golf courses and parks.

Nests on ground on exposed sandy beach.

Range and status: Common where suitable habitat occurs. Sedentary and dispersive.

Special management: Protect nest-sites on beaches from off-road vehicles and dogs.

Sooty oystercatcher

Haematopus fuliginosus

Other names: Black oystercatcher, redbill, black redbill.

Length: 40–52 cm.

Identification: Large all-black wader with red bill and dull pink legs. Large, bare, fleshy eye-ring.

Habits: Like pied oystercatcher, but usually solitary, in pairs or small autumn and winter flocks.

Habitat: Favours rockier habitat than pied oystercatcher.

Nests on rocky shores among shingles and shell fragments.

Range and status: Less common than pied oystercatcher. Sedentary.

Special management: Protect nest-sites on beaches from off-road vehicles and dogs.

Red-capped plover

Charadrius ruficapillus

Other name: Red-capped dotterel.

Length: 14–16 cm.

Identification: Male: white forehead; crown and nape rusty red with black margins; black mark from nape to eye and on upperbreast. Female: head and nape sandier, markings less distinct. Immature: paler with scaly patterns on upperparts.


Habitat: Sandy and shelly beaches, margins of saline or freshwater wetlands and lakes, inland or coastal.

Nest is a scrape in the sand, just above high tide level.

Range and status: Often seen where suitable habitat occurs. Sedentary, nomadic.

Management: Protect nesting beaches from off-road vehicles and dogs.
Black-fronted dotterel
*Elseyornis melanops* Plate 8.49

**Other name:** Black-fronted plover.

**Length:** 16–18 cm.

**Identification:** A small plover with diagnostic white eyebrow over a black eye-stripe that joins Y-shaped black band on white underbody; red eye-ring; red bill tipped black. In flight, note chestnut shoulder-bars, white wing-bar and black tail with white edges and tip. Distinctive tinkling calls in flight.

**Habits:** Mostly singles, pairs. Forages in gravel, sand or mud for seeds, worms, snails, crustaceans, insects. Horizontal stance; bobs head, runs swiftly.

**Habitat:** Bare gravel and muddy margins of freshwater lagoons, farm dams, estuarine creek flats, shingle beaches, temporary inundated paddocks.

- Nests on ground usually near water on sand, gravel or pebbles.

**Range and status:** Widespread, particularly in north of island and along west coast. Uncommon breeding resident. Population apparently increasing.

**Special management:** Monitor population in breeding season to determine distribution and number of breeding pairs. Nesting birds vulnerable to disturbance from humans, vehicles and predation from feral cats.

Hooded plover
*Thinornis rubricollis* Plate 8.43

**Other name:** Hooded dotterel.

**Length:** 19–23 cm.

**Identification:** Small plover of ocean beaches. Black head and throat with white rear ‘collar’. Immature has less distinctive markings.

**Habits:** Pairs or family parties, often at water’s edge.

**Habitat:** Sandy beaches, occasionally tidal mudflats. Does not tolerate human disturbance.

- Nest a scrape in the sand a few meters above high tide line.

**Range and status:** Declining due to disturbance of habitat, especially during breeding season.

Conservation status on King Island: Nationally Vulnerable.

**Management:** Protect nesting beaches especially during breeding season.

Banded lapwing
*Vanellus tricolor* Plate 8.48

**Other names:** Black-breasted or banded plover.

**Length:** 25–29 cm.

**Identification:** Medium-sized lapwing much smaller than masked lapwing. Diagnostic black sides of neck extending into broad black U-shaped breast-band on white underbody and black cap with bold white line through eye to nape. Hind neck, back and tail grey-brown. Yellow eye-ring and red wattles above base of yellow bill. In flight, wings black with bold white wing-bar and white rump and tail with black sub-terminal band. Distinct three-note voice higher than masked lapwing.

**Habits:** Breeding pairs, forms small flocks of up to 30 or more birds in autumn–winter. Forages on ground in open paddocks for seeds, snails, worms, insects and spiders. Upright stance. Wary and alert.

**Habitat:** Short grass and bare paddocks, crops with bare ground, airfields, herbfields and dry grasslands with sparse vegetation.

- Nests in depression on ground in dry grasslands, pastures and crops.

**Range and status:** Locally common in drier north-west of island, particularly north of Currie toward Egg Lagoon. Locally common breeding resident. Not threatened.

**Special management:** Monitor population to determine distribution and abundance. Protect nests from stock, farm machinery and vehicles.

Masked lapwing
*Vanellus miles* Plate 8.50

**Other names:** Spur-winged plover, masked plover.

**Length:** 30–37 cm.

**Identification:** Large, noisy familiar bird. Black crown and nape extending into black collar around side of breast. Grey-brown upperbody and white below. Diagnostic bright yellow wattles, yellow
eye-ring and bill; long sharp wing-spurs. In flight, note black wings and tail and white rump.

**Habits:** Pairs, families in breeding season, small to large flocks of up to 200 birds in autumn–winter. Forages on ground for snails, worms, millipedes, centipedes and insects on pastures, grasslands, beaches and mudflats. Wary and alert. Upright stance. Aggressive and noisy. Dives and screams at intruders to protect eggs and young.

**Habitat:** Margins of wetlands, farm dams, estuaries, beaches, airfields, grassy roadside verges, grassy and bare paddocks, river flats, lawns and golf courses.

Nests on ground in improved pastures, margins of swamps and lagoons and grassy airfields.

**Range and status:** Widespread on island. Very common sedentary breeding resident.

### Pacific gull
*Larus pacificus*  
**Plate 8.45**  
**Other name:** Mollyhawk  
**Length:** 50-67 cm. Wingspan 1.3-1.6 m.  
**Identification:** A large gull with massive yellow bill tipped red. Sexes alike but male larger. Head and underbody white; back black; wings black with broad white trailing edge; tail white with black sub-terminal band; legs yellow. Juvenile dark brown with glossy black bill. Year 2 immature mottled brown with paler rump. Year 4 immature like adult but head mottled grey. Similar kelp gull is smaller with all-white tail and smaller bill with red spot on lower bill tip only.  
**Habits:** Singles, pairs, small groups. Flies over coastal beaches and waters; follows fishing boats. Feeds on molluscs, fish, birds and carrion. Drops molluscs on rocks.  
**Habitat:** Coasts, bays, estuaries, beaches and coastal farmland.  
Nests on ground in small, loose colonies on off-shore Christmas, New Year and Councillor islands.  
**Range and status:** Common around coast and islands of King Island. Trend of breeding population unknown.  
**Special management:** Monitor distribution and abundance of breeding pairs to determine if population stable, increasing or declining.

### Caspian tern
*Sterna caspia*  
**Plate 8.44**  
**Length:** 48–54 cm.  
**Identification:** Largest tern with black-capped head and bright red bill. Long wings, darker at tips. Tail short, white and slightly forked.  
**Habits:** Solitary or pairs. Patrols rivers, beaches and reservoirs. Hovers before plunging to take fish.  
**Habitats:** Coasts, offshore waters, beaches, mudflats, estuaries, rivers, sometimes inland.  
Nests in scrape among seaweed, grass and sticks.  
**Range and status:** Seldom numerous.  
**Special management:** Monitor population size. Protect nesting beaches especially during the breeding season.

### Crested tern
*Sterna bergii*  
**Length:** 44–48 cm.  
**Identification:** Large, common, black-capped tern with long, straw-yellow bill and black legs. Long wings and forked tail. Breeding: white forehead separates black shaggy crest and bill. Upperparts deep silver-grey.  
**Habits:** Singles or flocks. Cruises along shoreline before plunging to catch fish.  
**Habitats:** Coasts, beaches, bays, rivers, swamps, lakes, larger rivers.  
Nests in scrape in sand, earth or on rock.  
**Range and status:** Abundant, sedentary, dispersive. Large colony on southern coast of King Island.

### Fairy tern
*Sterna nereis*  
**Plate 8.47**  
**Length:** 21–25 cm.  
**Identification:** Small tern similar to and difficult to tell from little tern, especially immatures. See Pizzey (12).  
**Habits:** Solitary or small to large flocks.  
**Habitats:** Coastal waters, bays, inlets, saline or brackish lakes.  
Nests in small colonies on elevated exposed sandy beaches.
Range and status: Known to breed on King Island.

Conservation status on King Island: Listed as Rare (Tasmania’s Threatened Species Protection Act 1995).

Management: Protect beaches, especially during the breeding season.

**Common bronzewing**  
*A* Phaps chalcoptera* Plate 8.1

**Length:** 32–36 cm.

**Identification:** A large pink-grey pigeon with distinct scaly wings and metallic bronze-green wing coverts. Male: cream forehead and purple-brown crown and nape. Female has grey forehead and is duller.

Similar species: smaller brush bronzewing is distinguished from common bronzewing by rich chestnut throat, nape, back and shoulders and far less bronze-green on wings.

**Habitats:** Singles, pairs. Forages on ground under wattles and tea-tree for seeds. Bursts from ground with clatter of wings.

**Habitat:** Dry eucalypt forest, grassy scrubby edges of swamp paperbark, King Island scrub and perhaps coastal heath.

**Nests** in shrubs and small to tall trees, usually in understorey.

**Range and status:** Possibly very restricted range. Two observed at Pass River in March 2001. A rather rare breeding resident.

**Special management:** Record and report locations of sightings. Identify and protect critical habitat.

**Brush bronzewing**  
*A* Phaps elegans* Plate 8.19

**Length:** 28–31 cm.

**Identification:** Diagnostic rich chestnut throat, nape and shoulder patch; and two metallic bronze-green bands on plain olive-brown wings. Underbody blue-grey. Male: yellow-buff forehead and grey crown. Female: duller with grey forehead.

Similar species: common bronzewing.

**Habitats:** Singles, pairs. Feeds on seeds on ground in dense scrub, roadside and forest edges and clearings.

**Habitat:** Paperbark, dry and wet eucalypt forest, King Island scrub and coastal heath.

Nests in shrubs and small trees in dense understorey.

**Range and status:** Widespread. A common breeding resident.

**Yellow-tailed black-cockatoo**  
*A* Calyptorhynchus funereus* Plate 6.2

**Length:** 55–65 cm.

**Identification:** Unmistakable, large black cockatoo with large yellow panel in long tail and yellow ear patch. Male: bill blackish and eye-ring reddish-pink. Female: bill whitish, eye-ring grey and brighter yellow ear-patch.

**Habitats:** Pairs, family trios, flocks of up to 50 or more in autumn–winter. Forages at all levels of vegetation from ground to tree canopy. Feeds on seeds and extracts wood-boring insect larvae by ripping open branches and trunks of trees. Flies with slow flapping flight. Twists and glides through trees exposing yellow tail panel.

**Habitat:** Dry and wet eucalypt forest, King Island scrub, coastal heath, exotic conifer plantations and shelter. Extracts seeds of *Allocasuarina* and *Banksia* in scrub and heath and seeds from cones of *Pinus radiata*.

Nests in large, deep, often vertical, hollows in trunks of large, old trees.

**Range and status:** Widespread. Uncommon breeding resident. High conservation status. King Island population may be declining.

**Special management:** Monitor size, age and sex of population in autumn–winter. Erect nest-boxes.

**Green rosella**  
*A* Platycercus caledonicus brownii* Plate 7.5

**Length:** 32–38 cm.

**Identification:** A blue-cheeked rosella with red forehead; yellow head and underparts; dark green back with black motting; shoulder, leading edge of wing and tail blue. Male: brighter yellow. Female: greener, duller.

**Habitats:** Pairs, autumn–winter flocks. Forages for seeds, flowers, fruit at all levels from ground to canopy of tall eucalypts. Strong, fast flight.
Habitat: Dry and wet eucalypt forests, King Island scrub, shelterbelts, homestead gardens.


Range and status: Occurs throughout King Island, particularly in forests in centre, south-east and south. Uncommon 40 years ago but now more common breeding resident. The King Island subspecies is Vulnerable (3).

Special management: Monitor population size. Protect, manage and restore eucalypt forest to provide present and future tree-hollows and cavities. Erect nest-boxes.

Blue-winged parrot
*Neophema chrysostoma*  
Plate 8.13

**Length:** 20–23 cm.

**Identification:** A small, olive-green parrot with yellow facial mask and blue band between eyes; distinctive broad cobalt blue shoulder patch and wing edge; yellow lower breast and belly. Female duller. Tinkling call. Similar species: orange-bellied parrot distinguished by grass-green upperbody rather than olive-green; far less blue on shoulder; orange belly patch and distinct buzzy voice.

**Habits:** Singles, pairs, small flocks. Forages on ground for seeds in copses, pastures, grasslands. Rises from ground quickly when disturbed. Often perches on fence-lines.

**Habitat:** Grassy edges of eucalypt forests, scrub and coastal heath, saltmarsh, crops, crop residue, pastures, airfields and golf-courses.

**Range and status:** Widespread in spring and autumn. A common trans-Bass Strait migrant. Regularly stops over on King Island but not known to breed.

Orange-bellied parrot
*Neophema chrysogaster*  
Plate 7.2

**Length:** 20–22 cm.

**Identification:** A vivid, grass-green parrot with blue forehead-band between eyes; blue leading edge of wing; orange patch on yellow belly. Female duller. ‘Buzz’ alarm call. Similar species: Take care to distinguish from more abundant blue-winged parrot in migration flocks.

**Habits:** Singles, pairs, small parties and flocks. Feeds on ground. Migrates in autumn from breeding grounds in south-west Tasmania along west coast to King Island arriving about mid-late May. Winters from coastal southern Victoria to south-eastern South Australia. Returns to Tasmania in mid-October.

**Habitat:** On migration stopover on King Island forages in extensive saltmarsh and rushes in and near Sea Elephant River estuary, Lavinia State Reserve. Feeds on seeds of sea-rocket and seeds of pastures and weeds.

**Range and status:** Breeding range contracted to coastal south-west Tasmania. Critically endangered. Numbered thousands in 19th century. Today total population in the wild estimated at less than 200 birds.

Special management on King Island: Monitor population, taking care to identify from similar blue-winged parrot and report sightings to orange-bellied parrot recovery team.

Protect critical feeding habitat on King Island such as coastal saltmarsh and fringing eucalypts by excluding fire, weeds, livestock and vehicles.

Pallid cuckoo
*Cuculus pallidus*

**Length:** 28–33 cm.

**Identification:** A large grey cuckoo with long tail and prominent white notchings on outer and inner tail.

**Habits:** Singles, pairs. Flight undulating with long, pointed wings. In spring calls with rising notes from exposed branches and overhead wires.

**Habitat:** Preferably dry eucalypt forest but also wet forest, King Island scrub, coastal heath and grasslands, farmlands and homestead gardens.

Parasitises cup-shaped nests of honeyeaters, flycatchers and woodswallows.

**Range and status:** Widely distributed. A regular and common trans-Bass Strait passage migrant. Some birds breed on King Island.
Fan-tailed cuckoo  
*Cacomantis flabelliformis*  
Plate 8.11  
**Length:** 25–27 cm.  
**Identification:** Slaty-grey upperbody; throat and breast pale rufous; grey undertail feathers notched white.  
**Habits:** Mostly singly. Calls a downward trill, often from high perches. Undulating flight.  
**Habitat:** Breeds in wet eucalypt forest. Visits paperbark forest, scrub, homestead gardens.  
Parasitises dome-shaped nests of scrubwrens, thornbills, fairy-wren and cup-shaped nests of silvereye and honeyeaters.  
**Range and status:** Widespread. Common, regular trans-Bass Strait migrant.  
Uncommon breeding resident.

Horsfield’s bronze-cuckoo  
*Chrysococcyx basilis*  
**Length:** 15–17 cm.  
**Identification:** Bronze-green upperbody; underbody whitish with brown bars; white belly patch where bars incomplete. Diagnostic dark ear-patch bordered by white bar.  
Similar species: bronze-green shining bronze-cuckoo has complete barring below and lacks white eyebrow and dark ear.  
**Habits:** Mostly singly. Calls and sits motionless from elevated perches. Swift flight.  
**Habitat:** Favours coastal heath, coastal eucalypt and scrub.  
Parasitises dome-shaped nests of fairy-wrens, thornbills and cup-shaped nests of robins and chats.  
**Range and status:** Distributed along coast, particularly east coast from Lavinia State Reserve south past Naracoopa. Regular, common trans-Bass Strait passage migrant. Some birds breed on King Island.

Shining bronze-cuckoo  
*Chrysococcyx lucidus*  
Plate 8.12  
**Length:** 16–18 cm.  
**Identification:** Bronze-green upperbody with brown head; underparts white with complete brown bars. Similar to Horsfield’s bronze-cuckoo. Voice very different.  
**Habits:** Mostly singly. More conspicuous in spring, singing from exposed or concealed dead twigs and branches. Flight swift.  
**Habitat:** Eucalypt forest, particularly wet forest, paperbark and blackwood forest, King Island scrub and homestead gardens.  
Parasitises dome-shaped nests of scrubwrens, thornbills, fairy-wren and cup-shaped nests of silvereye and honeyeaters.  
**Range and status:** Widespread, particularly in the south. Regular, common trans-Bass Strait passage migrant. Breeds on King Island.

Southern boobook  
*Ninox novaeseelandiae*  
Plate 6.4  
**Other names:** Mopoke or morepork.  
**Length:** 25–36 cm.  
**Identification:** A small, yellow-eyed brown owl with white spots on wings and underbody; dark brown eye-patches.  
**Habits:** Singly, pairs, families. By day roosts in tree-hollows, barns, sheds, in dense foliage of trees and tree ferns and even in cavities of the root ball of large, fallen trees. At night sits on fence posts and exposed branches. Pounces on prey such as small mammals, particularly mice and rats, birds, frogs and flying insects like moths.  
**Habitat:** Dry and wet eucalypt forests with hollow-bearing trees, blackwood and paperbark forests and homestead gardens.  
Nests in tree-hollows.  
**Range and status:** Widespread, particularly in south and Sea Elephant catchment. Uncommon to rare breeding resident. Locally threatened. Population possibly limited by shortage of suitable tree-hollows. High conservation status.  
**Special management:** Monitor population size. Protect mature and old eucalypts with hollows and regrowth eucalypt forest to provide future hollow-bearing trees. Erect nest-boxes and platforms.

Superb fairy-wren  
*Malurus cyaneus cyaneus*  
Plates 8.21 & 8.22  
**Other names:** Blue wren, Jenny wren, superb blue wren.  
**Length:** 13–14 cm.
Identification: Only small blue bird with upright tail. Sexes differ. Adult male: sky blue cap, cheek patch and upper back; blue-black throat, breast, lores, nape and back; dark blue tail; grey-white belly. Female: soft brown upperbody and white below; tail brown; red-brown lores and eye-ring. In autumn, blue males moult into an eclipse brown plumage with blue tail, but some males retain adult blue plumage over-winter.

Habits: Pairs, family groups. Forages for insects on ground and in foliage of trees and shrubs. BREEDS cooperatively. Breeding pairs are socially monogamous but both male and female of a pair mate outside their social unit.

Habitat: Low shrubby, heathy open areas including King Island sedge-heath-scrub complex, shrubby coastal heath and scrub, clearings and margins of forests and streams, saltmarsh, sedgerush wetlands, regenerating cleared land, roadside vegetation and gardens. Rapidly colonises regenerating and restored land after clearance and fire.

Builds a dome-shaped nest on ground or in low shrubs, grass and sedges.

Range and status: Widespread. A very common breeding resident.

Spotted pardalote

Pardalotus punctatus

Other name: Diamondbird.

Length: 8–10 cm.


Habits: Singles, pairs, family groups. Active and inconspicuous in eucalypt foliage. Best detected by single and 2-note high piping notes. Forages for insects and lerp of psyllids on eucalypt foliage.

Habitat: King Island blue gum (Eucalyptus globulus) forest and woodland, especially with white gum and Brooker’s gum.

Excavates tunnel in soil/sand in stream-banks, roadside cuttings and hill slopes.

Range and status: Range contracted and now possibly restricted to Tasmanian blue gum forests with white gum and Brooker’s gum and blue gum-white gum heathy woodland. Occurs in coastal shrubby white gum in Lavinia State Reserve and in heathy woodland with white gum in the centre and south. Recorded more often in autumn.

A rare to uncommon breeding resident on King Island.

Special management: Monitor population to determine distribution and abundance. Protect food trees and habitat, particularly coastal and inland forests and woodland with white gum as a dominant or co-dominant eucalypt. Restore breeding habitat by planting white gum and by providing sandy banks for nesting.

Striated pardalote

Pardalotus striatus striatus

Other name: Striated diamondbird.

Length: 10.5 cm.

Identification: Sexes alike. Crown black streaked white; rich yellow eyebrow; underbody yellowish; wing black with narrow white streak on outer wing. Nominate subspecies striatus distinguished from ornatus by yellow (not red) wing-spot and more white streaking on crown.

Habits: Similar to spotted pardalote but voice different.

Habitat: Mature and old growth blue gum forest with tree-hollows/cavities.

Builds partly domed or dome-shaped nest of bark and or grass in tree-hollow or at end of tunnel excavated in soil of stream-banks, near vertical earth banks of road cuttings and roots of trees.

Range and status: Probable range contraction and severe population decline since human settlement. A rare trans-Bass Strait breeding migrant. High conservation status.

Special management: Monitor population to determine distribution, abundance and critical breeding habitat. Protect remaining mature and old growth Tasmanian blue gum forest with tree-hollows. Determine location and extent of any breeding colonies in earth banks like those in coastal shrubby white gum in north-west Tasmania.
Tasmanian scrubwren
*Sericornis humilis tregellasi* Plate 7.8

**Length:** 11–13 cm.

**Identification:** Sexes alike. A small plump brown bird. Darker brown upperbody and paler below; eye cream; two white wing-bars at bend of wing.

**Habits:** Pairs, small groups. Forages for invertebrates in ground litter, on logs, fallen branches and in understorey vegetation. May also forage in upper branches of swamp paperbark. Scolds when alarmed.

**Habitat:** Ground layer vegetation of ferns, sedges and shrubs of eucalypt forests and woodlands, swamp paperbark forests, riparian vegetation, sedge-heath-scrub complex.

Builds well-concealed, dome-shaped nest on ground or very close to ground.

**Range and status:** Widespread. A common endemic breeding resident.

**Special management:** Continue to fence off and protect linear riparian vegetation in particular but also rectangular patches of native vegetation. Maintain and enhance ground layer vegetation and logs and litter on the ground.

**Scrubtit**
*Acanthornis magnus greenianus* Plate 7.6

**Other name:** Tasmanian scrubtit.

**Length:** 11–12 cm.

**Identification:** Sexes alike. A small brown bird with prominent cream throat and breast; buff flanks; grey cheeks; cream eye; two white wing-bars at bend of wing. Similar species: distinguished from Tasmanian scrubwren by slender body, diagnostic cream throat and breast, grey cheeks and foraging behaviour.

**Habits:** Pairs, small groups. Ascends tree-trunks and branches like a treecreeper. Forages for invertebrates on tree trunks and among foliage of swamp paperbark, shrubs and ferns at all levels of vegetation from the ground to the canopy of swamp paperbark forest.

Builds dome-shaped nest in fronds of tree ferns and epiphytic ferns and in dense shrubs usually 1–3 m above ground.

**Habitat:** Favours tall paperbark swamp forests with denser understorey of young paperbark and ferns. Inhabits tree fern gullies in wet eucalypt forest.

**Range and status:** Probably formerly more widespread prior to habitat destruction of tall blue gum forest by clearance and bushfires. Range probably contracted further in recent decades. Recorded in the 1960s in swamp paperbark and wet eucalypt forest at the Nook Swamp, Pass River, Yellow Rock and Pegarah State Forest. Rediscovered in the extensive swamp paperbark forest of the Nook Swamp in 1998–99 and again in 2001, before and after the bushfires that burnt much of Lavinia State Reserve in 2000. Searches in 2001 failed to find any scrubtit in the swamp paperbark of Pass River and in the tree fern gullies of mature blue gum forest at Pegarah. Population almost certainly in decline and now critically endangered (3). Population estimated at less than 200 on basis of suitable habitat but this may be an over-estimate.

**Special management:** First priority is to recognise that the Nook Swamp is critical habitat for scrubtit and protect this tall swamp paperbark forest from wildfire. Another priority is to monitor scrubbits at the Nook Swamp to determine population size, distribution and habitat. Extensive searches for scrubbit need to be conducted at localities where scrubbit was recorded in the recent past such as Pass River, Yellow Rock, Pegarah State Forest and at potential sites such as Bungaree Swamp in the north-west and particularly at Colliers Swamp and Red Hut Point area in the south.

**Brown thornbill**
*Acanthiza pusilla archibaldi* Plate 7.1

**Other name:** King Island brown thornbill.

**Length:** 10 cm.

**Identification:** Sexes alike. Olive-brown upperbody with diagnostic olive-buff flanks; greyish undertail and bold blackish streaks on grey throat and breast. Red eye.

**Similar species:** Common Tasmanian thornbill has white flanks and undertail.

**Habits:** Singles, pairs. Actively forages for insects in ground layer vegetation, understorey shrubs and small trees.
**Habitat:** Drier wet scrub and eucalypt forest with *Leptospermum scoparium* at Pegarah State Forest, open farmland at Loorana.

Probably nests on ground or in low understorey vegetation like the brown thornbill on the Tasmanian mainland.

**Range and status:** Very restricted range. Recorded in Pegarah State Forest in 1968 and at Loorana in 1971. Thought to be extinct but two birds seen in 2002 at Pegarah State Forest.

**Conservation status:** Critically Endangered (3).

**Special management:** Continue to search for birds at Pegarah State Forest and nearby to confirm presence and attempt to determine population size.

**Tasmanian thornbill**

*Acanthiza ewingii rufifrons*  
Plate 7.10

**Length:** 10 cm.

**Identification:** Sexes alike. An active small brown bird; brown upperbody and greyish below with brown breast streaks. In good light prominent, diagnostic snow-white undertail coverts that fluff out from sides of tail and white flanks. Similar species: Tasmanian scrubwren, scrubtit, brown thornbill.

**Habits:** Pairs, small parties. Forages for invertebrates in foliage of swamp paperbark, understorey trees and shrubs, tree fern fronds and ferns.

**Habitat:** Eucalypt forest and woodlands; blackwood and paperbark swamp forests; and scrub, sedgeland and heathland communities.

Builds a dome-shaped nest on and near the ground in dense ground layer and understorey vegetation.

**Range and status:** Widely distributed throughout the island in most dry and wet vegetation.


**Yellow wattlebird**

*Anthochara paradoxa kingi*  
Plate 7.7

**Length:** 37–45 cm.

**Identification:** Australia’s largest honeyeater. Greyish with prominent dark streaks on underbody; diagnostic long, pendulous yellow-orange wattles, bright yellow belly and long tail, tipped white.

**Habits:** Singles, pairs, flocks. Harsh voice. Forages for mostly nectar but also fruit and invertebrates in eucalypt forests, scrub and heathlands.

**Habitat:** King Island blue gum forests and woodlands with white gum and Brooker’s gum; King Island scrub and heath with banksia; homestead and urban gardens.

Nests in forks of trees and tall shrubs.

**Range and status:** Widespread, particularly in the east and south. Uncommon by the 1960s following extensive wildfires and clearance of forests for agriculture, especially in the first half of the 20th century. Probably more widespread in the last 40 years of the 20th century as a result of maturation of regrowth eucalypts and protection of native vegetation. Population recovery threatened by projected clearance of scrub and heath and uncontrolled wildfires.

Uncommon breeding resident and endemic subspecies.

**Conservation status** Vulnerable on basis of population size and habitat occupied (3).

**Special management:** Monitor population size and distribution. Protect and enlarge remnant bush, especially eucalypt forests and woodlands.

**Yellow-throated honeyeater**

*Lichenostomus flavicollis*  
Plate 7.12

**Length:** 20 cm.

**Identification:** Sexes similar. Distinctive bright yellow throat; grey-blackish head and rest of underbody; olive-green back and tail.

**Habits:** Mostly singly, pairs, family parties. Forages for invertebrates and manna on and under bark of trunks and branches and in foliage.

**Habitat:** Tasmanian blue gum forests and woodlands; blackwood and paperbark swamp forests; scrub and heathland, particularly scrub with sparse emergent eucalypts and dominated by *Leptospermum lanigerum* on wetter sites and *Leptospermum scoparium* on drier sites; homestead and urban gardens.

Nests low in dense understorey shrubs, trees and ground layer vegetation.

**Range and status:** Widespread. A common endemic breeding resident.
Special management: Monitor distribution and abundance. Protect, maintain and restore eucalypt forests and woodlands with dense understorey shrubs, particularly tea-tree (*Leptospermum* spp.).

**Strong-billed honeyeater**

*Melithreptus validirostris* Plate 7.9

**Length:** 16–17 cm.

**Identification:** Only Tasmanian honeyeater with black head and distinctive blue eye crescent extending into white nape band. Throat white with black chin strip; rest of underparts greyish; back, wing, tail olive-brown. Immature: Yellow-orange bill, legs and nape. Similar species: black-headed honeyeater.

**Habits:** Pairs, family groups. Bark specialist. Searches for invertebrates at all levels of vegetation on and under bark of trunks and branches of eucalypts in particular, but also swamp paperbark and tea-tree.

**Habitat:** Wet and dry eucalypt forest but also paperbark swamp forest and tea-tree.

**Range and status:** Widespread in remaining eucalypt forest and swamp forest, particularly in the east, centre and south of the island. A common breeding resident.

**Special management:** Protect all remaining eucalypt and swamp forest, particularly mature and old growth forest. Regenerate and restore local eucalypts.

**Black-headed honeyeater**

*Melithreptus affinis* Plate 7.11

**Other name:** Blackcap.

**Length:** 12.5–14.5 cm.

**Identification:** A small honeyeater with diagnostic all black head and throat and small whitish crescent over eye. Similar species: larger strong-billed honeyeater has white nape band; black chin and white throat.

**Habits:** Pairs, small groups. Forages for invertebrates and lerp in foliage of eucalypts, especially white gum and wattles.

**Habitat:** Dry and wet eucalypt forest, particularly forest and heathy woodland with white gum. Nests in foliage, often high in eucalypt canopy.

**Range and status:** Patchy distribution in eucalypt forest with white gum, Brooker's gum and Tasmanian blue gum south of Reekara. Considered rare 30–40 years ago but population recovering. Uncommon endemic breeding resident.

**Special management:** Monitor population size. Protect and manage all mature and old growth eucalypt forest, especially white gum forest. Restore white gum in appropriate soils and plant communities.

**Crescent honeyeater**

*Phylidonyris pyrrhoptera* Plates 8.23 & 8.24

**Length:** 15–16 cm.

**Identification:** Sexes differ. Male: dark grey with diagnostic broad, black broken crescent on whitish breast; broad yellow panel on wings and tail. Female and immature: browner with less distinct crescent.

**Habits:** Singles, pairs, small groups. Forages for nectar, particularly from flowers of epacrids, and insects in low vegetation and in foliage of eucalypts. Dispersive in autumn–winter.

**Habitat:** Heathy eucalypt woodland, wet eucalypt forest, paperbark swamp forest, King Island scrub, wet tea-tree scrub, coastal heath and scrub, rural and urban gardens.

**Range and status:** Widespread. Common in Lavinia State Reserve, Sea Elephant catchment, Pegarah State Forest and coastal heath south of Naracoopa around to Seal River. Common breeding resident.

**Special management:** Protect and manage a diverse range of eucalypt, scrub and heath vegetation.

**New Holland honeyeater**

*Phylidonyris novaehollandiae* Plate 8.20

**Other name:** Yellow-winged honeyeater.

**Length:** 17–18 cm.

**Identification:** Sexes alike. Boldly streaked black and white honeyeater with white iris and
prominent yellow panel on wings.

**Habits**: Singles, pairs, family groups. Aggressively defends territory and nectar-bearing shrubs, especially from smaller nectar-feeding birds such as crescent honeyeater and eastern spinebill. Forages for nectar in flowers of shrubs and eucalypts. Sallies in air for insects.

**Habitat**: Dry and wet eucalypt forest, paperbark swamp forest, King Island scrub, coastal heath and scrub, wet tea-tree scrub, rural and urban parks and gardens.

Nests in dense shrubs of understorey in native vegetation and in garden shrubs.

**Range and status**: Widespread. Common breeding resident.

**Special management**: None required. Reduce numbers of territorial New Holland honeyeater in gardens by not planting exotic flowering shrubs, particularly nectar-rich *Grevillea*. These shrubs provide New Holland honeyeaters with a defendible year-round source of food. Planting of *Correa* and epacrids provides nectar for smaller honeyeaters.

**Tawny-crowned honeyeater**

*Phylidonyris melanops*  
Plate 8.3

**Length**: 15–17 cm.

**Identification**: A pale brown and white honeyeater with distinctive creamy-buff crown and black mask extending from bill through eye down sides of breast. Similar species: crescent honeyeater.

**Habits**: Singles, pairs. Perches atop bushes and during breeding season flies up and gives flutelike liquid notes. Forages for nectar and insects.

**Habitat**: Low coastal heath.

Nests in low heathy bushes.

**Range and status**: Last recorded from coastal heath near Lake Martha Lavinia more than 30 years ago. Presence not confirmed despite searches in Lavinia State Reserve in last five years. Current status uncertain but must be rare or possibly locally extinct given severity of wildfires in Lavinia State Reserve in recent years. Tasmanian subspecies occurs on King Island.

**Special management**: Conduct extensive searches in breeding season in Lavinia State Reserve heath to determine distribution, abundance and habitat needs. Determine an appropriate fire management strategy to provide suitable successional stages of heath.

**Eastern spinebill**

*Acanthorhynchus tenuirostris*  
Plate 8.5

**Length**: 15–16 cm.

**Identification**: A small honeyeater with a long, fine decurved bill. Sexes differ slightly. Male: black crown and sides of breast; throat white with central rufous patch; rest of underbody rufous-buff; mantle chestnut; wings grey; tail black, white edges prominent in flight. Female: similar but with grey crown.


**Habitat**: Wet and dry eucalypt forests, coastal heath and scrub with epacrids and *Banksia*, homestead and urban gardens. May visit gardens in summer–autumn to feed on flowers of exotic shrubs such as *fuchsia* spp., sage (*Salvia* spp), lion’s ear (*Leonotis leonurus*) and native shrubs such as *Correa* spp.

Nests in understorey shrubs and small trees.

**Range and status**: Considered very rare or absent from King Island about 30 years ago. Recently sighted in central-east. Current status rare but more information needed.

**Special management**: Keep a watch out for this species, report and record all sightings. In rural and urban gardens provide food shrubs by planting *Correa* and *Epacris* spp.

**White-fronted chat**

*Epthianura albifrons*  
Plates 8.25 & 8.26

**Length**: 11–13 cm.

**Identification**: Sexes differ. Male: diagnostic white forehead, face and underparts separated by black breast band that extends to nape and hind crown; back and wings grey. Female: grey-brown upperbody and duller breast band.

**Habits**: Pairs, parties. Forages on ground for invertebrates and seeds. Perches on top of bushes, wire fences and posts.
**Habitat:** Coastal grassland, coastal heath and scrub, saltmarsh, freshwater and brackish wetlands and estuaries with grassy/sedgy edges, regenerating cleared land with rushes and low shrubs and coastal shores.

Nests low in shrubs and tussocks.

**Range and status:** Widespread along coast, particularly in north-east, north, west and south coasts. Common breeding resident.

**Special management:** Protect and manage coastal vegetation, saltmarsh and wetlands.

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**Flame robin**

*Petroica phoenicea* Plates 6.5 & 6.6

**Length:** 12.5–14 cm.

**Identification:** Sexes differ. Male: sooty-grey upperbody with small white forehead patch and white wing-bar; flame orange underparts from throat to belly. Female and immature: pale brown upperbody and buff-white wingbar; pale grey-brown underbody; white outer-tail feathers.

**Habits:** Singles, pairs, small groups. Forages for insects by pouncing from a perch to ground. Perches on branches, posts, wire fences, stumps and tops of herbs, bushes and boulders.

**Habitat:** Breeds in coastal scrub, heathy woodland and stream-banks in wet eucalypt forest. On migration, particularly in autumn–winter, inhabits open paddocks, pastures, regenerating cleared land, eucalypt forest and woodland and coastal heath.


**Range and status:** Widespread, especially during migration. Uncommon breeding and visiting trans-Bass Strait migrant. Less common than earlier decades. Population in decline in south-east Australia.

**Special management:** Monitor population size on migration and in breeding season. Determine distribution, habitat and density of breeding pairs. Protect and manage breeding habitat.

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**Pink robin**

*Petroica rodinogaster* Plates 8.2 & 8.4

**Length:** 11.5–13 cm.

**Identification:** Sexes differ. Male: sooty-black upperbody and upper breast; breast, belly rose-pink. No white in wing and tail. Female: differs from female flame robin by olive-brown upperbody; warm tan wing-mark and no white on outer tail.

**Habits:** Singles, pairs. Sits quietly and pounces to ground to seize invertebrates. Also forages in foliage. Disperses in autumn–winter to scrub fringing the Nook Swamp.

**Habitat:** Tall paperbark swamp forest and mature wet blue gum forest with tree fern gullies. Nests in understorey trees and shrubs.

**Range and status:** Current range restricted to the Nook Swamp and mature wet forest at Pegarah State Forest. A rare breeding resident. High conservation status on King Island.

**Special management:** Monitor population at the Nook Swamp. Protect Nook Swamp paperbarks and the Pegarah wet Tasmanian blue gum forest from fire. Search for pink robin particularly in remaining swamp forest in Collier Swamp–Red Hut Point area and Bungaree Swamp.

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**Dusky robin**

*Melanodryas vittata kingi* Plate 7.13

**Length:** 16–17 cm.

**Identification:** Endemic brown robin larger than other all brown robins in Tasmania. Sexes alike. Olive-brown above; grey-brown underbody; paler whitish throat and eyebrow; dark line through eye; white wing-bar; outer tail edged buff-white. Similar species: female and immature golden whistler greyish upperbody with whiter throat.

**Habits:** Singles, pairs, family parties. Perches quietly on stumps, fence posts and branches. Flies to ground to snatch invertebrates.

**Habitat:** Wet and dry eucalypt forests, paperbark swamp forests and forest edges, King Island scrub, heath and tea-tree scrub and urban and homestead gardens.

Nests low in cavities in trees and stumps, in forks of understorey trees and shrubs and in artificial sites around human settlement.

Special management: Protect habitat. Maintain tree-cavities and stumps as nesting sites.

**Golden whistler**

*Pachycephala pectoralis*  Plates 8.29 & 8.30

Length: 16.5–18.5 cm.

Identification: Sexes differ. Male: black head and breast band separates white throat from rich golden-yellow underbody and nape collar; tail grey. Female and immature: grey-brown upperbody; whitish throat and greyish underbody. Similar species: female-plumaged birds differ from dusky robin by slimmer body, greyer plumage and different voice and foraging behaviour.

Habits: Singles, pairs. Forages for invertebrates on foliage at all levels of vegetation from the eucalypt canopy to low understorey. Snatches prey from foliage and twigs by flutter flight. Adults sedentary but range further in autumn–winter. Immatures disperse in autumn–winter.

Habitat: Favour wet and dry eucalypt forest with dense understorey shrubs but also occur in paperbark swamp forest, King Island scrub and rural and urban gardens.

Nests in dense understorey shrubs and small trees.

Range and status: Widespread but patchy range in eucalypt forests in east and south. Considered uncommon in 1960s. By 2000 a fairly common breeding resident.

Special management: Monitor distribution and abundance of population. Protect old, mature and regrowth eucalypt forest. Maintain and enhance dense understorey shrubs as nesting habitat.

**Satin flycatcher**

*Myiagra cyanoleuca*  Plates 8.7 & 8.8

Length: 15–17 cm.

Identification: Sexes differ. Male: uniform glossy blue-black with white lower breast and belly.
Female: blue-grey upperbody with rich orange-buff throat and upper breast; rest of underbody white.


**Habitat**: Mature and old growth eucalypt forest, especially wet blue gum forest.

**Range and status**: Considered locally common in 1960s but not recorded breeding on King Island. Current range restricted to Pegarah State Forest and mature Tasmanian blue gum forest near Reekara. A rare trans-Bass Strait migrant. Resident during late spring–summer months but breeding requires confirmation. High conservation status.

**Special management**: Monitor population in late spring to determine distribution and abundance and breeding status. Protect all mature and old growth eucalypt forest, especially wet Tasmanian blue gum forest. Satin flycatcher depends on old and mature eucalypts for nest-sites and foraging.

**Grey fantail**
*Rhipidura fuliginosa*  Plate 8.31

**Length**: 14–17 cm.

**Identification**: Sexes alike. Dark grey with white eyebrow; small white mark behind eye; white wing-coverts; long, dark grey, fan-shaped tail with white tips and outer-tail. Sooty-grey breast band bordered by white throat and creamy-buff breast and belly.

**Habits**: Singles, pairs, family parties. Very active aerial acrobat. Forages in foliage at all levels with tail fanned. Tumbles, loops and sallies in air after flying insects.

**Habitat**: Occurs in all habitat types. Wet and dry eucalypt forest, paperbark and blackwood swamp forest, King Island scrub and heath, coastal scrub and heath, regrowth forest, regenerating cleared land, rural and urban parks and gardens. One of first bird species to colonise regenerating and restored land.

Usually nests low in understorey shrubs and small trees but sometimes nests high in canopy.

**Black-faced cuckoo-shrike**
*Coracina novaehollandiae*  Plate 8.14

**Other names**: Summerbird, shufflewing, grey jay.

**Length**: 30–36 cm.

**Identification**: Light blue-grey with black face and throat; underbody white-light grey; tail tipped white.

**Habits**: Singles, pairs, small parties, small flocks on migration. Undulating flight. Immediately on perching, alternately refolds each wing up and down. Sits on high exposed branches. Forages for invertebrates mostly in foliage, sometimes on ground.

**Habitat**: Mostly wet and dry eucalypt forest, especially old and mature forest but also coastal scrub and heath, King Island scrub and rural and urban gardens.

**Range and status**: Widespread. A common and regular trans-Bass Strait migrant. Breeding not confirmed on King Island

**Special management**: Monitor population in spring–summer to determine if any breeding occurs. Protect, maintain and manage all old and mature eucalypt forest.

**Dusky woodswallow**
*Artamus cyanopterus*  Plate 8.15

**Length**: 17–18 cm.

**Identification**: Sexes alike. Smoky-brown with bluish-grey bill; grey wings with distinctive long white streak on leading edge of wing; tail black tipped white.

**Habits**: Pairs, parties, small flocks. Soars in flight giving ‘chirp-chirrup’ notes. Sits on posts, stumps and exposed branches; wags tail and darts out to catch flying insects.

**Habitat**: More open dry and wet eucalypt forest, King Island scrub, coastal heath and scrub.
In north-west Tasmania nests in loose aggregations. Builds nest in tree-cavities and upright and horizontal forks in trunks and branches of tall eucalypts.

**Range and status:** Widespread. A common, regular trans-Bass Strait migrant. One record of breeding on King Island.

**Special management:** Monitor population and determine breeding status. Protect and manage eucalypt forest.

### Australian magpie
**Gymnorhina tibicen hypoleuca**  
**Other name:** White-backed magpie.

**Length:** 38–44 cm.

**Identification:** Familiar black and white bird with pointed, whitish black-tipped bill. Adult male: black with pure white 'back' from nape to basal half of tail and white patch on wing. Female: nape white and back mottled grey. Adult eye red-brown. Immature: like female but duller and underbody mottled black-grey; eye black. Distinctive rich, carolling voice sang as duet.

**Habits:** Flight swift and direct. Forms small, sedentary breeding groups and larger groups of non-breeding birds. Perches on posts and high on tree-branches and overhead wires. Forages on ground and probes in soil for invertebrates (beetle and moth larvae).

**Habitat:** Open farmland, parkland and woodland with scattered native and exotic trees for perching, roosting and nesting. Grassy surrounds of airfield, golf course and homestead gardens. Benefited greatly from clearing of forest.

Builds nest in forks of branches of exotic and native trees (eucalypts, paperbark, tea-tree).

**Range and status:** Widespread. A common, regular trans-Bass Strait migrant. One record of breeding on King Island.

**Special management:** Monitor population and determine breeding status. Protect and manage eucalypt forest.

### Black currawong
**Strepera fuliginosa colei**  
**Plate 7.3**

**Length:** 47–49 cm.

**Identification:** Familiar large, black bird with massive, black bill; bright yellow eye and white tips to wings and tail.

**Habits:** Singles, pairs, winter flocks. Omnivorous diet of fruit, insects, carrion and small vertebrates. Forages on beaches among seaweed and on ground in pastures and forests. Forages on branches and in foliage. Distinctive voice.

**Habitat:** Wet and dry eucalypt forest and woodland, paperbark and blackwood swamp forest, coastal heath and scrub, beaches, pastures, homestead gardens.

Builds large stick nest in forks of paperbark, blackwood and eucalypt trees.

**Range and status:** Widespread but patchily distributed. Range has contracted in recent decades. King Island population is an endemic subspecies. Considered locally common in 1960s with winter flocks of 150. Population in decline. An uncommon to rare breeding resident. Conservation status Vulnerable (3).

**Special management:** Monitor population in winter to determine population size and winter habitat. Monitor population in spring–summer to determine density of breeding pairs and breeding habitat and location. Study breeding ecology of forest raven and interactions with black currawong where they coexist.

### Forest raven
**Corvus tasmanicus**

**Other names:** Tasmanian raven or crow.

**Length:** 52–54 cm.

**Identification:** Large, black bird with massive bill, short tail and white iris. Voice a slow and far-carrying bass ‘karr...karr...karr’, final note sometimes drawn out and descending.

**Habits:** Singles, pairs, family groups. Forms small to large winter flocks of up to 100 birds. Omnivorous. Forages on ground for invertebrates, reptiles and frogs. Scavenges on roadkill carcasses of wallabies and other animals.

**Habitat:** Farmland, wet and dry eucalypt forest, blackwood and paperbark swamp forest, King...
Island scrub, coastal scrub and heath, saltmarsh, estuaries, beaches.

Builds large stick nest in eucalypts, paperbarks and tea-trees.


**Special management:** Monitor population size in non-breeding and breeding seasons. Determine if forest raven is displacing black currawong from breeding and foraging habitat.

### Little raven
*Corvus mellori*

**Length:** 48–50 cm.

**Identification:** Slightly smaller than forest raven with less massive, more curved bill. Distinguished from forest raven by voice and wing-flicking behaviour. Voice a guttural baritone, rapid and clipped ‘ark-ark-ark-ark’ faster than forest raven. Perched birds often accompany each note with upwards flick of both wings closed together (2).

**Habits:** Sociable. Forms winter flocks. Roosts communally. Omnivorous. Forages on ground for invertebrates and scavenges on carcasses of dead animals.

**Habitat:** Open farmland and many vegetation communities on the island. Semi-colonial breeder.

Builds stick nest in tree-forks usually below 10 m high. Breeding not recorded on King Island.


**Special management:** Monitor distribution and population size in non-breeding season.

### Richard’s pipit
*Anthus novaesellandiae*

**Other names:** Groundlark, Australian pipit.

**Length:** 16–19 cm.

**Identification:** Pale brown groundlark. Diagnostic thin, black streak down side of buff throat joins dark breast streaks. Fawn eyebrow; outer tail edged white; long pinkish legs. Similar species: Introduced common skylark distinguished by crest on crown and no black throat streak.

**Habits:** Singles, pairs, small winter flocks. Walks, runs and wags tail up and down. Perches on rocks, tops of bushes, tussocks, fences. Fluttering song flight in spring. Forages on ground for invertebrates.

**Habitat:** Open farmland, pastures, grasslands, airstrip, golf course, roadsides, low coastal heath, forest clearings.

Nests on ground in shelter of tussocks or rocks.

**Range and status:** Widespread, particularly on west half of island. Considered more common in early 1900 but increasing in early 1970s around Loorana. Fairly common to uncommon breeding resident.

**Special management:** Monitor distribution and abundance in breeding and non-breeding seasons in relation to numbers and habitat of common skylark. Protect nesting habitat.

### Tree martin
*Hirundo nigrans*

**Other names:** Tree swallow, Australian tree martin.

**Length:** 12.5–14 cm.

**Identification:** Sexes alike. Small black and white swallow with diagnostic deep buff forehead, white rump and short tail. Crown and upperbody glossy-black; underbody whitish with fine dark streaks on throat.

Other aerial insectivores: familiar welcome or house swallow has longer, deeply forked tail; forehead, face and throat a deep rufous-tan and rump blue-black not white.

White-throated needletail (spine-tailed swift) is a very fast, large, long-winged, black swift with white forehead, throat and undertail; and short, dark square tail.
Habits: Erratic flight of small groups often over freshwater and around nearby large old eucalypts and more isolated paddock eucalypts. Roost sociably in trees. Perch on overhead wires.

Habitat: Open farmland, rivers and freshwater wetlands with large old eucalypts with tree-hollows.

Nests in tree-hollows but also on cliffs and in buildings. Nesting not recorded on King Island.

Range and status: Fairly common trans-Bass Strait migrant. Breeding not recorded. Some birds usually present in spring and summer. Over 30 birds recorded at Lake Martha Lavinia in November–December 1972 were either breeding birds or non-breeding immatures. Current breeding status unknown.

Special management: Monitor distribution and abundance during spring and autumn migration and also during spring to determine if breeding occurs. Identify and protect large, old eucalypts with tree-hollows.

Little grassbird
Megalurus gramineus

Length: 13–15 cm.
Identification: A cryptic, small brown bird of reeds and rushes of wetlands. Sexes alike. Crown and upperbody brown with black streaks; eyebrow pale; underbody greyish with fine black streaks; long, pointed tail. Distinct three-note song ‘pe-pee-peeee’.


Habitat: Freshwater wetlands, swamps, drainage ditches and damp regenerating cleared land with dense reeds and rushes.

Nests low in shrubs, reeds, grasses and rushes.


Special management: Monitor distribution and abundance. Estimate population size in spring from singing males. Protect wetland habitat.

Golden-headed cisticola
Cisticola exilis

Other names: Golden-headed fantail warbler, tailorbird.

Length: 9–11.5 cm.
Identification: Small brown, cryptic bird of marshy vegetation. Sexes differ in breeding season. Breeding male: head, nape, breast and sides of underbody rich golden buff; back and wings buff with heavy black streaks; belly whitish. Female and non-breeding male: less golden; crown buff-brown with fine black streaks. Voice: breeding males utter insect-like ‘bzzt’ followed by explosive ‘wit-wit’ when perched or in flight.

Habits: Singles, pairs. Breeding males spiral high and sing in air like a common skylark then plummet to the ground, often near nest. Males also sing from tops of bushes, reeds, rushes and grasses.

Habitat: Wet, reedy margins of freshwater lagoons and swamps, river-flats with rushes, drainage ditches, low moist heath and regenerating, poorly drained land with rushes and reeds.

Builds dome-shaped nest low in tussocks, rushes and shrubs.


Special management: Monitor distribution and density of breeding males and females in summer. Identify and protect breeding habitat from clearance and wildfire.

Silvereye
Zosterops lateralis lateralis

Length: 10–12.5 cm.
Identification: Small grey and olive-green bird with diagnostic white eye-ring. Upper body olive-green with grey back. Throat and breast grey with flanks rich chestnut-buff; undertail whitish.

Habits: Singles, pairs, small to large flocks. Forages for invertebrates in foliage during breeding season. Feeds on fruit, particularly in late summer–autumn.
Disperses in autumn. Migrates to mainland Australia in autumn.

**Habitat:** Wet and dry eucalypt forest with understorey shrubs, paperbark and blackwood swamp forest, coastal heath and scrub, King Island scrub, rural and urban parks, gardens and orchards.

Nests in dense foliage of understorey shrubs and small trees.

**Range and status:** Widespread. Common breeding trans-Bass Strait migrant.

**Bassian thrush**

*Zoothera lunulata* Plate 8.16

**Other names:** Ground, scaly or White’s thrush.

**Length:** 26–29 cm.

**Identification:** Only Tasmanian native thrush. Sexes alike. Olive-brown to coppery-brown upperbody; whitish underbody with black scallop markings. Similar species: juvenile common blackbird, an introduced thrush, is browner with dark brown mottling.

**Habits:** Singles, pairs. Forages in ground litter and jabs bill in soil for worms and other invertebrates. Sings a beautiful flutelike song particularly at dawn and dusk in spring.

**Habitat:** Favours tall paperbark swamp forest and wet and dry eucalypt forests with lots of leaf litter, logs and fallen branches on the ground.

Nests in forks of small understorey trees, tree-cavities, stumps and crowns of tree ferns.

**Range and status:** Widespread. Uncommon breeding resident.

**Special management:** Protect all remaining paperbark swamp forest and eucalypt forest, particularly mature and old growth forest.

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**Mammals**

**Abbreviations:** Head and body (HB), Tail (T), Weight (Wt).

**Platypus**

*Ornithorhynchus anatinus* Plate 5.15

**Size:** HB 400–450 mm. T 100–150 mm. Wt 2.5 kg.

**Description:** Naked blue-grey snout like duck’s bill, broad tail, webbed feet. Upperbody grey-brown fur.

**Habits:** Swims low in water. Dives and forages for aquatic invertebrates. Very active in early morning and evening. Shelters in burrow in bank of stream.

**Habitat:** Freshwater streams and rivers.

**Range and status:** Fairly widespread in rivers flowing to east and south. Uncommon. Tasmanian platypus is genetically distinct from mainland populations, and King Island platypus are more closely related to platypus in Victoria than Tasmania (Shiro Akiyama).

**Special management:** Record sightings and map distribution. Monitor stream health and protect riparian vegetation.

**Short-beaked echidna**

*Tachyglossus aculeatus* Plate 5.16

**Other name:** Echidna or spiny ant-eater.

**Size:** HB 400 mm. Wt 3–4 kg.

**Description:** Strong, sharp spines cover back, tail and dark brown fur. Long snout is tubular and naked. Short legs with long claws. The Tasmanian echidna has more fur and less spines than those on mainland Australia.

**Habits:** Forages on the ground and digs in soil and among logs. Extracts ants and other soil invertebrates with sticky tongue. Burrows beneath soil when disturbed.

**Habitat:** Eucalypt forests and woodlands and tea-tree scrub, especially those on sandy soils.

**Range and status:** Considered common in late 1980s. Probably fairly widespread and uncommon, but current status needs to be determined on new surveys.

**Special management:** Record sightings and map distribution.
**Swamp antechinus**  
*Antechinus minimus minimus*  
Plate 5.18

**Size:** HB 120 mm. T 80 mm. Wt 55 g.

**Description:** Upperbody fur grizzled brown with distinct rufous tinge on rump, flanks and hind legs. Underbody paler, greyish-yellow or buff. Pointed snout. Ears short and broad. Tail 70% of HB. Six teats like swamp antechinus in Tasmania.

**Habits:** Active at dawn and dusk. Moves fast along runways. Forages for insects, spiders, earthworms and other invertebrates. Builds nest of grass and sedges in tussocks. Males die off after mating in autumn.

**Habitat:** Edges and interior of wet scrub and forest, paperbark and blackwood swamp forest and wet sedgeland and heath.

**Range and status:** Recorded from Pegarah State Forest and near Naracoopa and Reekara. Rarely reported, possibly uncommon but easily overlooked.

**Special management:** Conduct small mammal surveys to determine distribution, habitat and abundance. Vulnerable to predation by domestic and feral cats, so eradicate feral cats and foster responsible cat ownership.

**Brushtail possum**  
*Trichosurus vulpecula*  
Plate 5.18

**Size:** HB 450 mm. T 300 mm. Wt 3.5 kg.

**Description:** Very familiar possum with thick, soft, grey-brown fur and a bushy tail.

**Habits:** Eats mostly leaves but also flowers, fruits and bird’s eggs and young. Mostly forages on the ground. Roosts in hollows, buildings and in crown of tree ferns.

**Habitat:** Eucalypt forests and woodlands, swamp forests, scrub and heath.

**Range and status:** Widespread and very common.

**Eastern pygmy possum**  
*Cercartetus nanus*  
Plate 5.19

**Size:** HB 90 mm. T 90 mm. Wt 30 g.

**Description:** Upperbody fawn-grey. Underbody paler greyish-buff to white. Tail prehensile with sparse brown fur, often swollen at base. Ears large and oval. Nose and feet pinkish.

**Habits:** Arboreal. Forages in eucalypts and *Banksia* for mainly pollen and nectar but also insects, spiders and fruit. Builds nest of shredded bark and leaves in tree hollows, cracks in branches and in sheds. Inactive and torpid for days and weeks in cold weather and in winter.

**Habitat:** Wet scrub, King Island scrub and coastal heath and scrub.

**Range and status:** One record from Egg Lagoon. Possibly uncommon to rare but status unknown.

**Special management:** Conduct mammal surveys to determine distribution, habitat and abundance. Protect trees with hollows and foraging habitat.

**Common ringtail possum**  
*Pseudocheirus peregrinus*  
Plate 5.20

**Size:** HB 330 mm. T 330 mm. Wt 900 g.

**Description:** Upperbody fur grizzled grey-brown with rufous tinge to limbs and flanks. Underbody and patch behind ears white. Prehensile (able to curve and grip), long tapered tail with lower one-third tipped white.

**Habits:** Nocturnal and arboreal. Forages in canopy and understorey and feeds on leaves, especially eucalypts, flowers and fruit. Builds nest or drey of bark, leaves and twigs in densely foliaged shrubs and trees. Voice is a high-pitched twittering.

**Habitat:** Eucalypt forests and woodlands, paperbark swamp forest, wet tea-tree scrub.

**Range and status:** Considered uncommon by Green in 1960s. Probably still uncommon.

**Special management:** Conduct mammal surveys to determine distribution, habitat and abundance. Protect trees with hollows and foraging habitat.

**Long-nosed potoroo**  
*Potorous tridactylus*  
Plate 5.21

**Other name:** Rat kangaroo.

**Size:** HB 360 mm. T 230 mm. Wt 1.3 kg.

**Description:** Head and upperbody grizzled dark brown. Paler underbody. Elongated snout. Tail short often with white tip. Short rounded ears. Claw on middle digit of forefoot longer than claws on outer digits. Smaller and browner than Tasmanian potoroos.
Red-necked wallaby
*Macropus rufogriseus*  
*Other name:* Bennett’s wallaby.  
*Size:* HB 800 mm. T 750 mm. Wt 16 kg.  
*Description:* Thick dark grey fur above and paler below. Reddish-brown neck.  
*Habits:* Feeds on grasses and herbs.  
*Habitat:* Pastures and grasslands with nearby forest, woodland, scrub and heath.  
*Range and status:* Widespread and abundant.

Tasmanian pademelon  
*Thylogale billardieri*  
*Other name:* Rufous wallaby.  
*Size:* HB 600 mm. T 410 mm. Wt 7 kg.  
*Description:* Upperbody fur light grey-brown with paler underbody. Ears long and joined across forehead by flap of skin. Nose leaf well-developed.  
*Habits:* Roosts during the day in tree-hollows and cracks, under bark and in buildings. Hibernates from late autumn-early spring. Forages for insects, especially moths, on warm nights from late spring to late autumn. Most active soon after sunset and before sunrise. Flies slow and often forages low to the ground.  
*Habitat:* Edges and interior of forests and woodlands.  
*Special management:* Conduct surveys of bats.

Lesser long-eared bat  
*Nyctophilus geoffroyi pacificus*  
*Size:* HB 50 mm. T 43 mm. Forearm 36.5–42.6 mm. Wt 6.8–12.2 g.  
*Description:* Upperbody fur light grey-brown with paler underbody. Ears long and joined across forehead by flap of skin. Nose leaf well-developed.  
*Habits:* Roosts during the day in tree-hollows and cracks, under bark and in buildings. Hibernates from late autumn-early spring. Forages for insects, especially moths, on warm nights from late spring to late autumn. Most active soon after sunset and before sunrise. Flies slow and often forages low to the ground.  
*Habitat:* Edges and interior of forests and woodlands.  
*Range and status:* One record near Currie. Status unknown.  
*Special management:* Conduct surveys of bats.

Swamp rat  
*Rattus lutreolus velutinus*  
*Size:* HB 160 mm. T 110 mm. Wt 120 g.  
*Description:* Upperbody soft, thick, dark grey-brown fur with paler underbody. Tail dark grey and scaly. Distinguished from introduced black rat by shorter tail than HB and plumper head and body.  
*Habits:* Mainly nocturnal. Makes well-defined runways and shallow burrows in dense grass and sedges. Feeds on stems of grasses and sedges,
fungi and insects. Constructs nest in burrows and grasses.

**Habitat:** Wet sedgeland, rank grass, margins of wetlands and sedgy-grassy gullies of wet forest, heath and swamp forest.

**Range and status:** Probably widespread and fairly common.

**Special management:** Conduct small mammal surveys.

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**References**

**Identification and biology of freshwater fish**


**Identification and biology of frogs and reptiles**


**Cassette tape**


**Identification, biology and conservation of mammals**


**Taxonomy, identification, biology and conservation of birds**


**CDs**

Rare King Island land birds

Plate 8.1
Common bronzewing
*Phaps chalcoptera*
Trevor Waite

Plate 8.2
Pink robin (male)
*Petroica rodinogaster*
Jim Napier

Plate 8.3
Tawny-crowned honeyeater
*Phylidonyris melanops*
Trevor Waite

Plate 8.4
Pink robin (female)
*Petroica rodinogaster*
Jim Napier

Plate 8.5
Eastern spinebill
*Acanthorhynchus tenuirostris*
Trevor Waite

Plate 8.6
Little grassbird
*Megalurus gramineus*
Trevor Waite
Plate 8.7
Satin flycatcher (female)  
*Myiagra cyanoleuca*
Trevor Waite

Plate 8.8
Satin flycatcher (male)  
*Myiagra cyanoleuca*
Trevor Waite

Plate 8.9
Brown goshawk (immature)  
*Accipiter fasciatus*
Trevor Waite

Plate 8.10
Black-faced cuckoo-shrike  
*Coracina novaehollandiae*
Trevor Waite

Plate 8.11
Fan-tailed cuckoo  
*Cacomantis flabelliformis*
Bill Wakefield

Plate 8.12
Dusky woodswallow  
*Artamus cyanopterus*
Trevor Waite

Uncommon King Island land birds
Common King Island land birds

Plate 8.13
Bassian thrush
*Zoothera lunulata*
Trevor Waite

Plate 8.14
Blue-winged parrot
*Neophema chrysotoma*
Trevor Waite

Plate 8.15
White-bellied sea-eagle
*Haliaeetus leucogaster*
Bill Wakefield

Plate 8.16
Brown falcon
*Falco berigora*
Bill Wakefield

Plate 8.17
Swamp harrier
*Circus approximans*
Trevor Waite

Plate 8.18
Brush bronzewing
*Phaps elegans*
Trevor Waite
Plate 8.19
Shining bronze-cuckoo
*Chrysococcyx lucidus*
Trevor Waite

Plate 8.20
New Holland honeyeater *Phylidonyris novaehollandiae*
Trevor Waite

Plate 8.21
Superb fairy-wren (male) *Malurus cyaneus*
Trevor Waite

Plate 8.22
Superb fairy-wren (female) *Malurus cyaneus*
Trevor Waite

Plate 8.23
Crescent honeyeater (female) *Phylidonyris pyrrhoptera*
Trevor Waite

Plate 8.24
Crescent honeyeater (male) *Phylidonyris pyrrhoptera*
Trevor Waite
Plate 8.25
White-fronted chat (male)  
*Epthianura albifrons*
Trevor Waite

Plate 8.26
White-fronted chat (female)  
*Epthianura albifrons*
Trevor Waite

Plate 8.27
Olive whistler  
*Pachycephala olivacea*
Dave Watts

Plate 8.28
Grey shrike-thrush  
*Colluricincla harmonica*
Trevor Waite

Plate 8.29
Golden whistler (male)  
*Pachycephala pectoralis*
Trevor Waite

Plate 8.30
Golden whistler (female)  
*Pachycephala pectoralis*
Trevor Waite
Plate 8.31
Grey fantail
*Rhipidura fuliginosa*
Trevor Waite

Plate 8.32
Australian magpie
*Gymnorhina tibicen*
Bill Wakefield

Plate 8.33
Richard’s pipit
*Anthus novaeseelandiae*
Trevor Waite

Plate 8.34
Silvereye
*Zosterops lateralis*
Trevor Waite

Plate 8.35
Black-faced cormorant
*Phalacrocorax fuscescens*
Bill Wakefield

Plate 8.36
Bar-tailed godwit
*Limosa lapponica*
Bill Wakefield

**Shorebirds, gulls and terns**
Plate 8.37
Common greenshank
Tringa nebularia
Bill Wakefield

Plate 8.38
Ruddy turnstone
Arenaria interpres
Dave Watts

Plate 8.39
Pied oystercatcher
Haematopus longirostris
Bill Wakefield

Plate 8.40
Red-necked stint
Calidris ruficollis
Bill Wakefield

Plate 8.41
Red-capped plover
Charadrius ruficapillus
Trevor Waite

Plate 8.42
Sooty oystercatcher
Haematopus fuliginosus
Dave Watts

Plate 8.43
Hooded plover
Thinornis rubricollis
Trevor Waite
Plate 8.44
Caspian tern
*Sterna caspia*
Bill Wakefield

Plate 8.45
Pacific gull
*Larus pacificus*
Bill Wakefield

Plate 8.46
Double-banded plover
*Charadrius bicinctus*
(breeding plumage)
Bill Wakefield

Plate 8.47
Fairy tern
*Sterna nereis*
Bill Wakefield

Plate 8.48
Banded lapwing
*Vanellus tricolor*
Trevor Waite

Plate 8.49
Black-fronted dotterel
*Elseornis melanops*
Bill Wakefield

Plate 8.50
Masked lapwing
*Vanellus miles*
Trevor Waite
Waterbirds and quail of King Island

Plate 8.51
Blue-billed duck (male)  
*Oxyura australis*  
Bill Wakefield

Plate 8.52
White-faced heron  
*Egretta novaehollandiae*  
Trevor Waite

Plate 8.53
Australian shelduck (female)  
*Tadorna tadornoides*  
Bill Wakefield

Plate 8.54
Spotless crake  
*Porzana tabuensis*  
Bill Wakefield

Plate 8.55
Dusky moorhen  
*Gallinula tenebrosa*  
Bill Wakefield

Plate 8.56
Lewin’s rail  
*Rallus pectoralis*  
Trevor Waite

Plate 8.57
Hoary-headed grebe  
*Poliocephalus poliocephalus*  
Bill Wakefield

Plate 8.58
Brown quail  
*Coturnix ypsilophora*  
Bill Wakefield
Addendum

Scarlet robin
*Petroica boodang*

**Length:** 12-13 cm

**Identification:** Sexes differ. Male: Black head and upperbody with large white patch on forehead and white-wing-bar; black throat; scarlet breast and white belly; black tail with white edges. Female: Pale brown upperbody and buff-white wingbar; white throat and belly with orange-red breast; white outer-tail feathers. Orange-red breast distinguishes the adult female from all other female Tasmanian robins. Similar male flame robin is sooty-grey above with flame-orange underparts from throat to belly and sooty-grey chin.

**Habits:** Singles, pairs. Forages for invertebrates by pouncing from a perch to ground. Takes some prey from branches and trunks. Perches on branches, posts and wire fences. Song a cheery warble ‘wee-chedalee-dalee’.

**Habitat:** In north west Tasmania inhabits dry eucalypt forest and woodland, *Banksia serrata* woodland, edges of wet eucalypt forest, and coastal heath and scrub with shrubby eucalypts.

**Range and status:** One adult male seen in August 2003 in open paddocks in central southern King Island. An uncommon casual visitor.

**Special management:** Search for scarlet robins in autumn-winter-early spring, particularly amongst migrating flame robins.

Disperses in autumn-winter-early spring through open farmland, shelterbelts and gardens.

Nests in vertical and horizontal forks of tree branches.

Scarlet robin (male)  
*Petroica boodang*  
Richard Donaghey