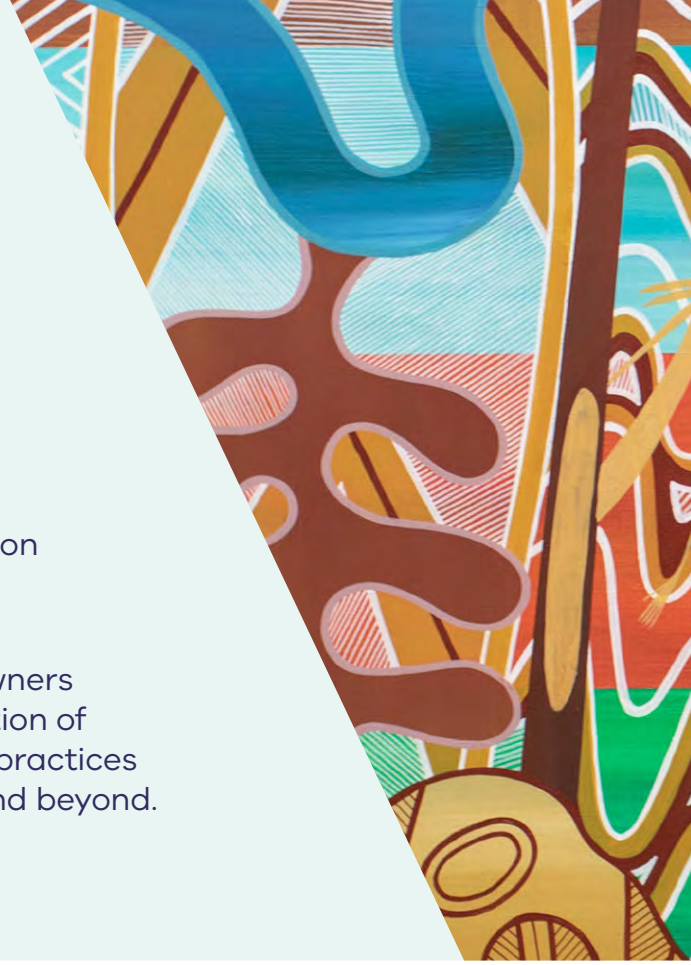
Victorian Wildlife Rehabilitation Guidelines

Part B: **Birds**

VICTORIA State Government



Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

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VICTORIA State Government | Energy, Environment and Climate Action

ZOOS VICTORIA *Fighting Extinction*

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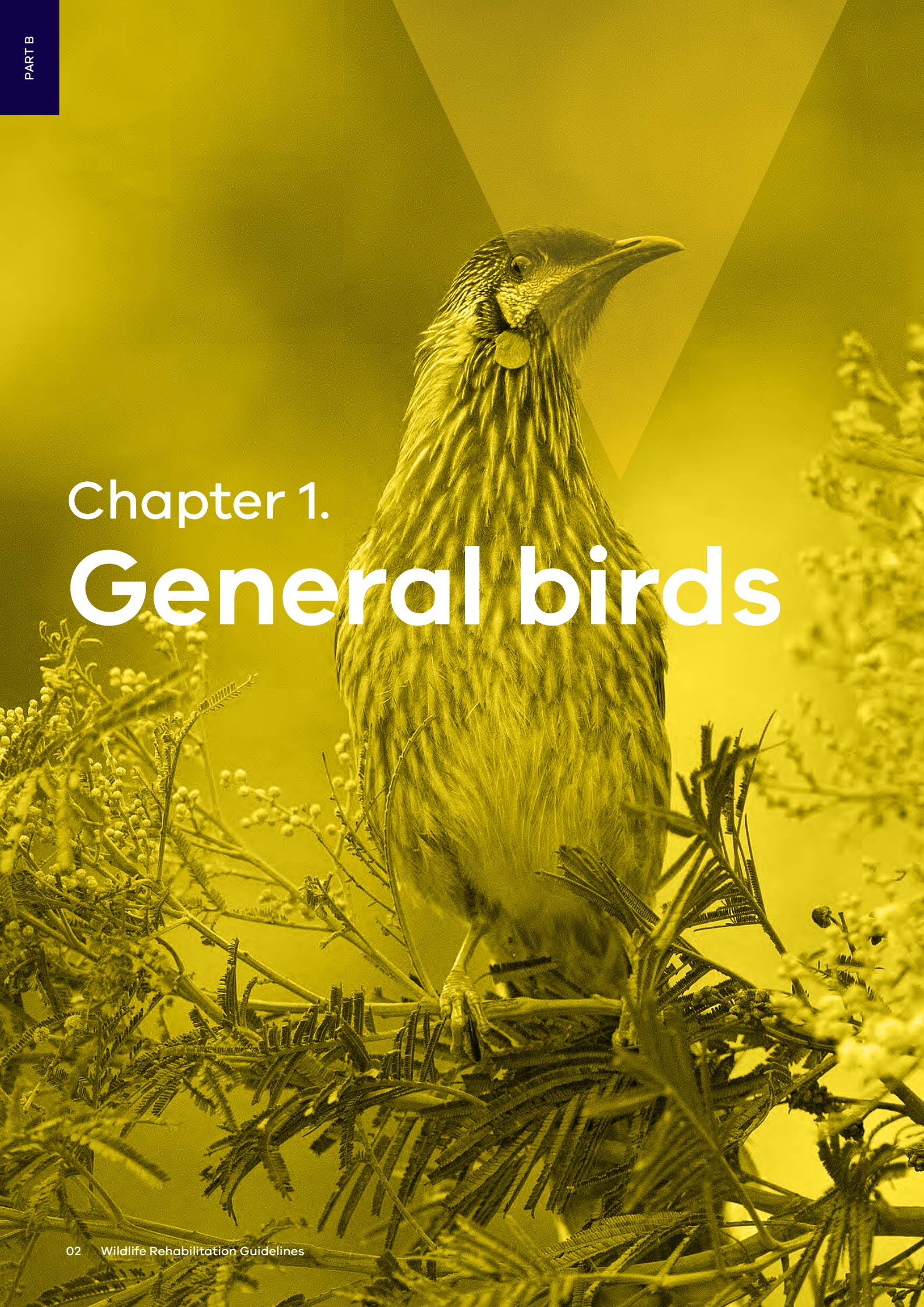


Chapter 1.
General birds

Contents

Photo credit: David Paul,
Museums Victoria

In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: **https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers**.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.

1.1 Introduction

Victoria is home to 516 species of birds. Raptor, waterbird and marine bird requirements are detailed in Chapters 2 and 3. This chapter addresses the husbandry, care and welfare of some of the other bird species. Despite the incredible number and diversity in this group, which includes parrots, pigeons, honeyeaters, carnivores and insectivores, a much smaller number of species most commonly come into care. These are listed in **Table 1.1** and form the basis of this chapter.

When birds come into care it is the responsibility of the wildlife rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition, and an environment appropriate to the stage of rehabilitation. The focus should be on the animal's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the animal's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. For example, a bird with a fractured wing must be confined and not allowed to attempt flight until that fracture has healed. It can then be allowed a staged return to free flight. Further information about the five domains of animal welfare is in Part A of these guidelines.

1.2 Species information

Profiles for some of the general bird species found in Victoria are detailed in the following tables. Morphometric data was obtained from the Australian Bird Study Association Inc. website (**https://absa.asn.au/**). Wing chord is the distance from the wrist joint to the end of the longest primary feather (see **Figure 1.1**). For assistance in identification of various bird species, refer to the recommended reading and reference material at the end of this chapter.

Figure 1.1 Avian wing showing measurement of wing chord.

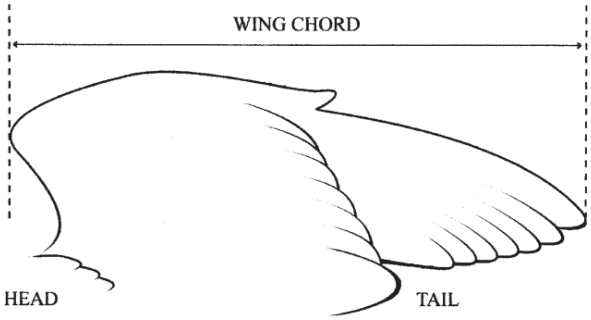
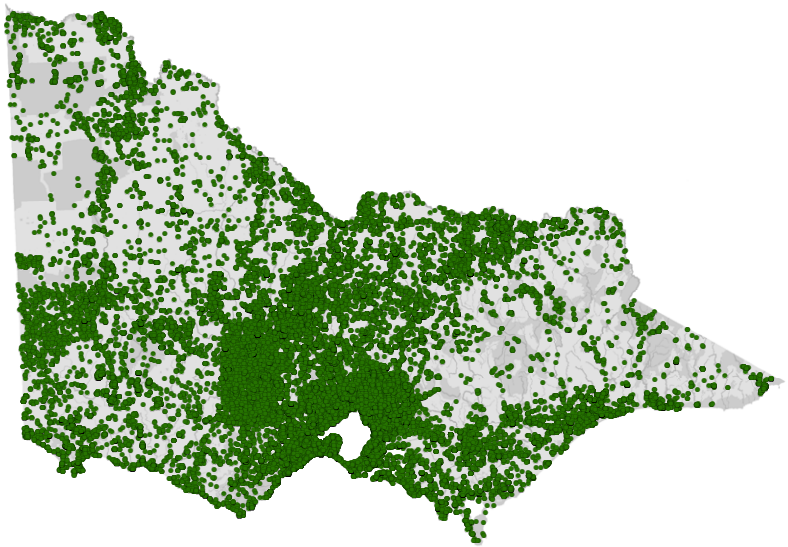
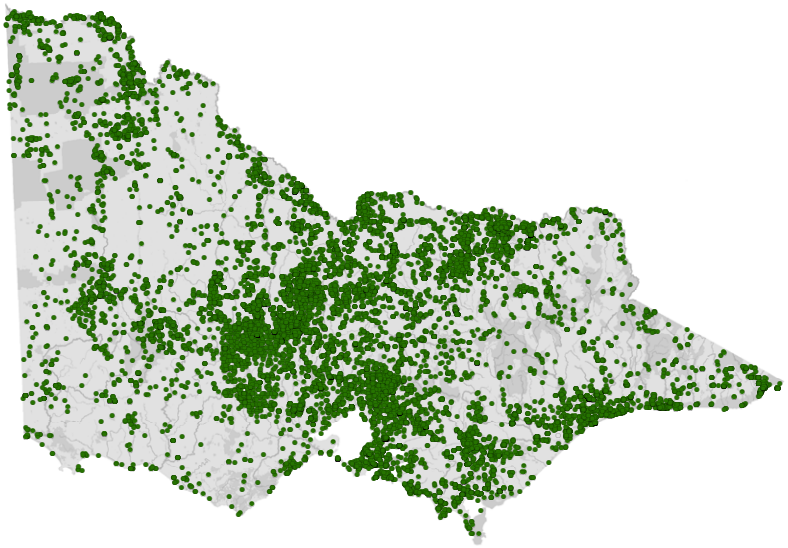


Image: Zoos Victoria

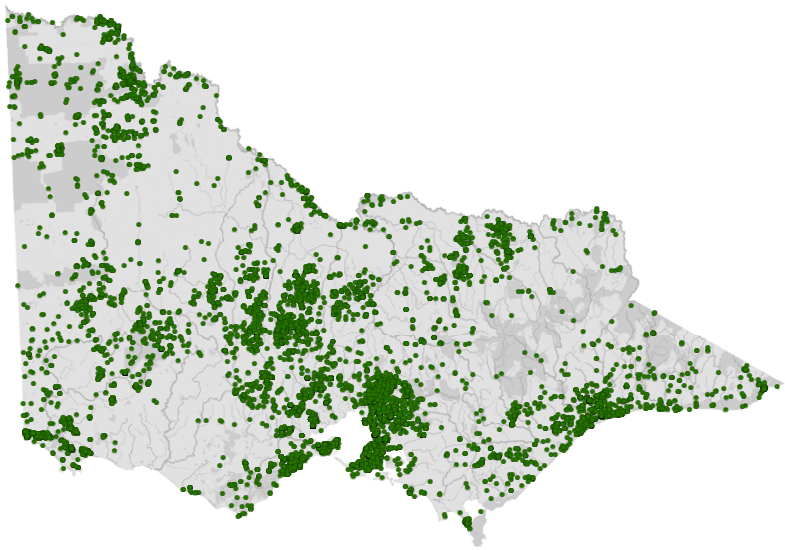
Table 1.1 Species profiles

Species	Australian magpie *(Gymnorhina tibicen)*
 Photo credit: David Paul, Museums Victoria	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**

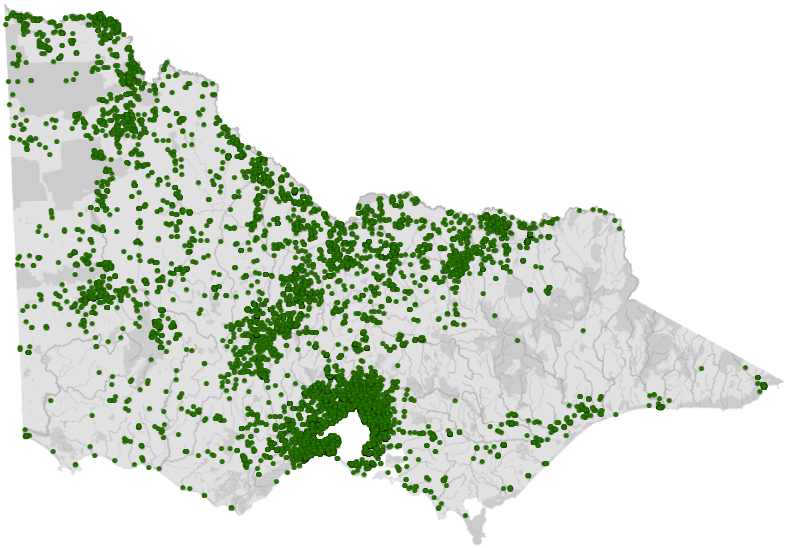
Species	Australian magpie *(Gymnorhina tibicen)*
General appearance	Black and white plumage at the nape, upper tail and shoulder are white in males and grey in females. The beak is white with black tip
Conservation status*	Common
Adult morphometrics	Body weight: Male: 250–410 g. Female: 237–372 g Head and body length: 370–430 mm Wing chord: Male: 251–290 mm. Female: 250–282 mm Tail length: Male: 138–157 mm. Female: 124–161 mm
Habitat	Farmland Urban: lawns, gardens, streets
Home range	2–18 ha
Behaviour	Diurnal. Often seen in groups. Non-migratory, strongly territorial
Foraging Style	Feeds mostly on ground
Diet	**Invertebrates**: worms, snails, slugs, spiders, cockroaches, moths, beetles, ants, aphids, lerps, mantids, crickets, cicadas, mantids **Vertebrates**: frogs, lizards, small birds, mice **Seeds**: oat, clover, *Setaria*, pine, fruit
Longevity	25 years
Nesting	June–December
Breeding season	August–November
Incubation length	September–December
Nesting location	In fork or branch of tree, sometimes in shrub
Developmental stage at hatching	Altricial
Fledgling	October–January
Age at dispersal	3 months
Age at maturity	1 year

Species	Australian raven *(Corvus coronoides)*
 Photo credit: NW Longmore, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Glossy black corvid, long feathers under throat fanlike when calling
Conservation status*	Common
Adult morphometrics	Body weight: Male: 540–820 g. Female: 500–780 g Head and body length: 460–530 mm Wing chord: Male: 335–381 mm. Female: 323–357 mm Tail length: Male: 191–240 mm. Female: 181–225 mm
Habitat	Woodland, forest, farmland
Home range	110 ha
Behaviour	Diurnal. Groups. Non-migratory. Territorial
Foraging Style	Feeds on the ground
Diet	**Invertebrates**: grasshoppers, locusts, earthworms, molluscs, beetles, ants, aphids, moths, spiders **Vertebrates**: small birds, eggs, nestlings, lizards, carrion, rats, mice, frogs **Seed**: *Poa*, *Paspalum*, clovers, *Acacia* flowers of pasture weeds and native shrubs **Fruit:** fig, grevillea flower
Longevity	22 years

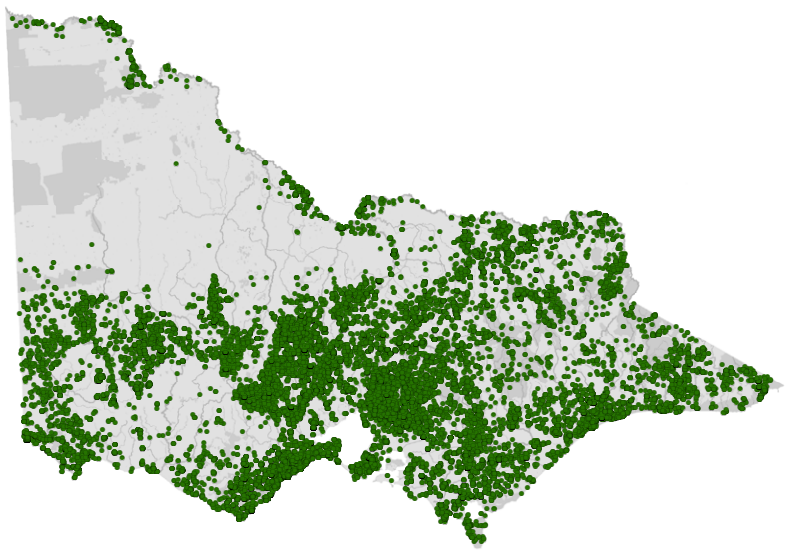
Species	Australian raven *(Corvus coronoides)*
Nesting	August–November
Breeding season	July–September
Incubation length	August–October
Nesting location	In fork of a tree, also on artificial structures
Developmental stage at hatching	Altricial
Fledgling	August–October
Age at dispersal	3 months
Age at maturity	1 year

Species	Common bronzewing *(Phaps chalcoptera)*
 Photo credit: Rodney Start, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Brown-backed pigeon with pale forehead
Conservation status*	Common
Adult morphometrics	Body weight: Male: 330–360 g. Female: 300–330 g Head and body length: 300–360 mm Wing chord: Male: 182–217 mm. Female: 186–221 mm Tail length: Male: 115–138 mm. Female: 110– 133 mm

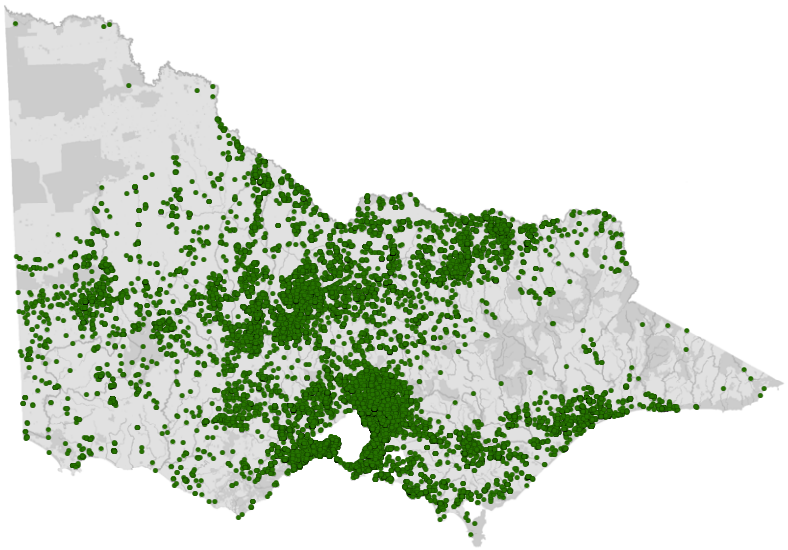
Species	Common bronzewing *(Phaps chalcoptera)*
Habitat	All habitats except desert and rainforest
Home range	0.2 birds/ha
Behaviour	Diurnal. Single, pairs, flocks. Non-migratory
Foraging Style	Feeds on the ground
Diet	**Seeds**: grasses, herbs, clovers, wattle, native and introduced grasses, thistles **Fruit**: *Hakea*, *Eucalyptus* **Invertebrates**: snails, slugs, beetles
Longevity	25 years
Nesting	August–January
Breeding season	July–January
Incubation length	August–January
Nesting location	Usually low in a tree or bush
Developmental stage at hatching	Altricial
Fledgling	August–January
Age at dispersal	1 month
Age at maturity	1 year

Species	Crested pigeon *(Ocyphaps lophotes)*
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Brownish grey pigeon with fine upright crest
Conservation status*	Common
Adult morphometrics	Body weight: Male: 142–260 g. Female: 150–200 g Head and body length: 300 –340 cm Wing chord: Male: 157–175 mm. Female: 152–167 mm Tail length: Male: 128–152 mm. Female: 122–150 mm
Habitat	Grassland Urban: park, roadside, railways, gardens
Home range	0.1–1.6 birds/ha
Behaviour	Diurnal. Single, pairs, open flocks. Non-migratory
Foraging Style	Feeds on the ground
Diet	**Annual seeds**: clovers, native and introduced grasses, peas **Greens**: fig, eucalypt seed, manna **Insects**: grasshoppers, beetles, lerps
Longevity	25 years
Nesting	Year round
Breeding season	Commonly spring-summer, but can be any month

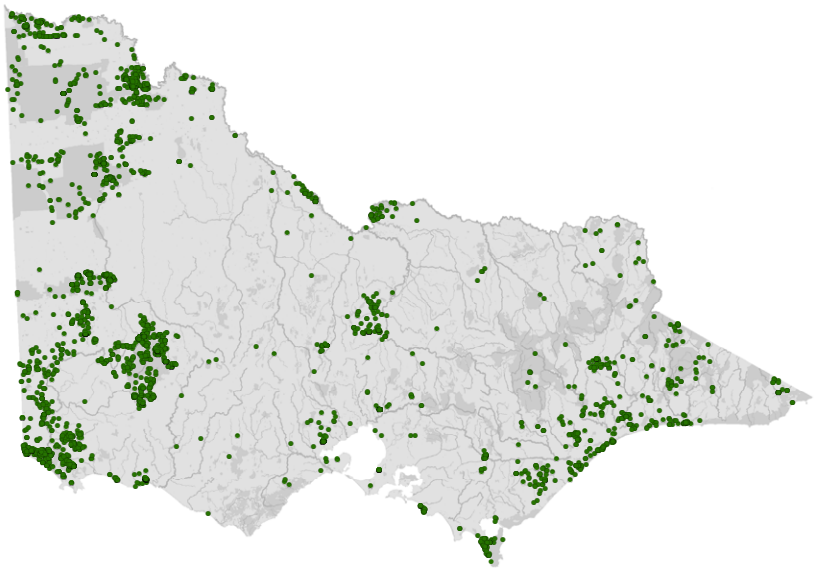
Species	Crested pigeon *(Ocyphaps lophotes)*
Incubation length	Year round
Nesting location	In shrub or tree up to 5 m
Developmental stage at hatching	Semi-altricial
Fledgling	Year round
Age at dispersal	1 month
Age at maturity	1 year

Species	Crimson rosella *(Platycercus elegans)*
  Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Blue cheek, crimson body. There is a colour variation in northern Victoria where yellow feathers replace the crimson plumage Juvenile: Mostly green with a crimson patch on the forehead and throat. Blue cheek
Conservation status*	Common
Adult morphometrics	Body weight: Male: 115–170 g. Female: 100– 170 g Head and body length: 320–360 mm Wing chord: Male: 167–188 mm. Female: 166–178 mm Tail length: Male: 182–216 mm. Female: 167–199 mm

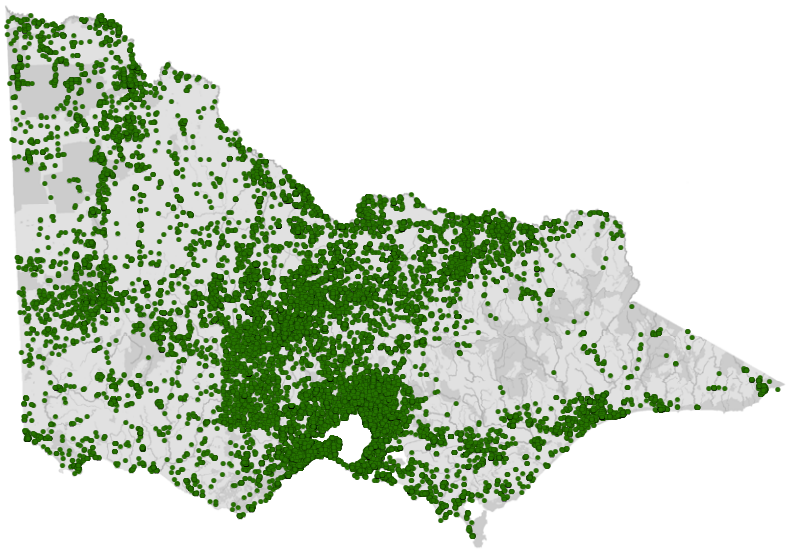
Species	**Crimson rosella *(Platycercus elegans)***
Habitat	Old, wet forests, rainforest, coastal forest
Home range	0.1–6 birds/ha
Behaviour	Diurnal. Pairs, small flocks. Non-migratory
Foraging Style	Feeds in foliage and on ground
Diet	**Seeds**: *Paspalum*, wallaby grass, clover, winter grass, wattles, oats **Fruits**: fig, mistletoe, pine, *Eucalyptus* nuts, flowers and nectar, *Callistemon*, *Grevillea*, *Banksia*, ferns **Insects**: aphids, moths, beetles, flies
Longevity	27 years
Nesting	September–January
Breeding season	October–December
Incubation length	November–December
Nesting location	In tree hollow or cavity in building
Developmental stage at hatching	Altricial
Fledgling	December–January
Age at dispersal	2–3 months
Age at maturity	18–24 months

Species	Eastern rosella *(Platycercus eximius)*
 Photo credit: David Paul, Museums Victoria  Photo credit: Imogen Warren	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult: White cheek, red head and breast, yellow belly Juvenile: Nape and crown more patchy green
Conservation status*	Common
Adult morphometrics	Body weight: Male: 100–112 g. Female: 90–122 g Head and body length: 280–320 mm Wing chord: Male: 152–163 mm. Female: 145–158 mm Tail length: Male: 151–168 mm. Female: 145–165 mm
Habitat	Open forest, farmland, logged areas Urban: parks, gardens, golf courses
Home range	0.1–5.5 birds/ha
Behaviour	Diurnal. Pairs, small flocks. Non-migratory, resident
Foraging Style	Raids fruit, nuts in orchards and gardens
Diet	**Seeds**: Cyprus, clovers, millets, pine, *Setaria* sp, *Eucalyptus*, wattle, sorghum, oxalis **Fruits**: flowers, nectar **Insects**: lerps, scale insects, beetles, fly larvae
Longevity	27 years
Nesting	August–February

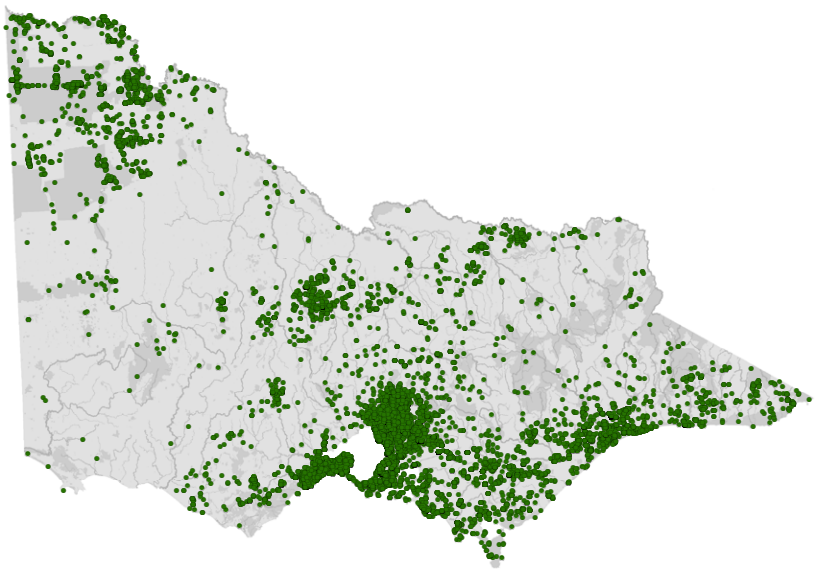
Species	Eastern rosella *(Platycercus eximius)*
Breeding season	August–January
Incubation length	September–February
Nesting location	Tree hollow, stump, fence post, burrow in bank, termite mound
Developmental stage at hatching	Altricial
Fledgling	October–March
Age at dispersal	2 months
Age at maturity	1 year

Species	Emu *(Dromaius novaehollandiae)*
 Photo credit: Heath Warwick, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large (1–1.3 m at the shoulder), flightless, brown to grey-brown
Conservation status*	Common
Adult morphometrics	Body weight: Male: Average 31.5 kg. Female: Average 36.9 kg Head and body length: Male: Average 148.5 cm. Female: Average 156.8 cm
Habitat	Woodland but avoids thick forest
Home range	0.1–100 ha

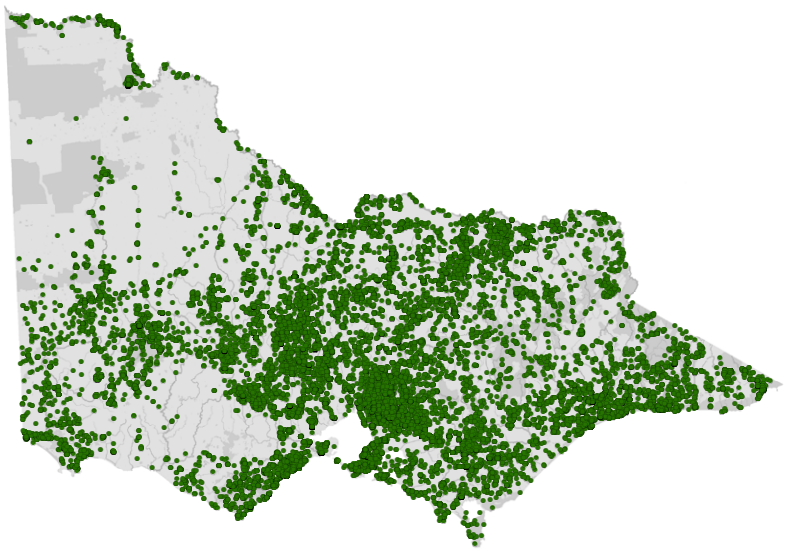
Species	**Emu *(Dromaius novaehollandiae)***
Behaviour	Diurnal. Mostly in pairs but may form larger groups when dispersing. Resident but may be dispersive
Foraging Style	Feeds on the ground
Diet	**Native plants and grasses**: seeds, flowers, fruits **Invertebrates**: caterpillars, beetles, grasshoppers, ants, flies, spiders, centipedes **Vertebrates**: small rodents, lizards
Longevity	10–20 years
Nesting	April–October
Breeding season	April–October
Incubation length	June–December
Nesting location	On the ground
Developmental stage at hatching	Precocial
Fledgling	No defined period
Age at dispersal	6 months
Age at maturity	2 years

Species	Galah *(Eolophus roseicapilla)*
 Photo credit: Tracey-Ann Hooley, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Small pink and grey cockatoo
Conservation status*	Common
Adult morphometrics	Body weight: Male: 273–380 g. Female: 200–350 g Head and body length: 350–360 mm Wing chord: Male: 256–279 mm. Female: 244–274 mm Tail length: Male: 139–156 mm. Female: 136–151 mm
Habitat	Crops, pasture, open forest Urban: gardens, golf course, roadside
Home range	0.1 birds/ha–1 bird/15 ha
Behaviour	Diurnal. Pairs to large noisy flocks. Resident
Foraging Style	Feeds in trees and shrubs
Diet	**Seeds**: grasses, herbs, clover, sorghum, wheat, thistles, onion grass bulbs, kikuyu roots, *Eucalyptus*, wattle and liquid amber nuts and flowers **Insects**: moths, insect larvae
Longevity	30 years
Nesting	July–December

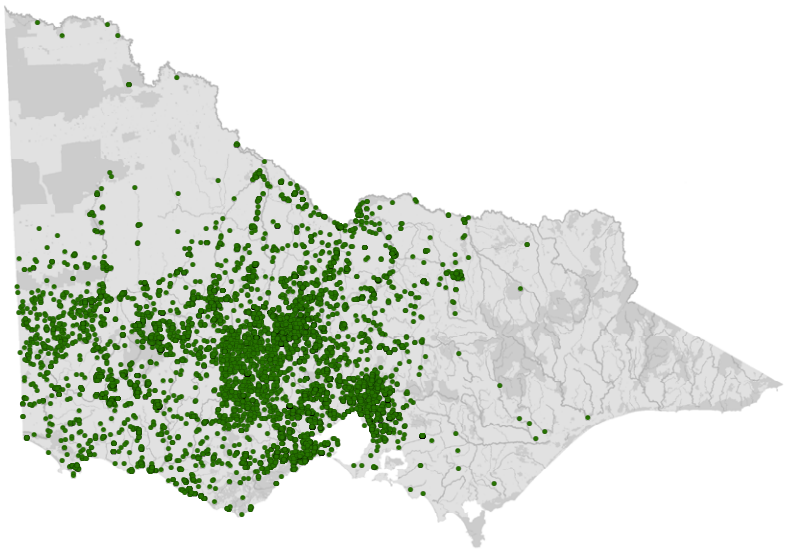
Species	Galah *(Eolophus roseicapilla)*
Breeding season	August–October
Incubation length	September–November
Nesting location	Tree hollow, occasionally hole in cliff
Developmental stage at hatching	Altricial
Fledgling	November–January
Age at dispersal	6–8 weeks
Age at maturity	3–4 years

Species	Grey butcherbird *(Cracticus torquatus)*
 Photo credit: Ian McCann, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Small white throated butcherbird with grey back, beak with hooked tip
Conservation status*	Common
Adult morphometrics	Body weight: 73–120 g Head and body length: 270–300 mm Wing chord: Male: 139–153 mm. Female: 131–142 mm Tail length: Male: 101–132 mm. Female: 104–113 mm

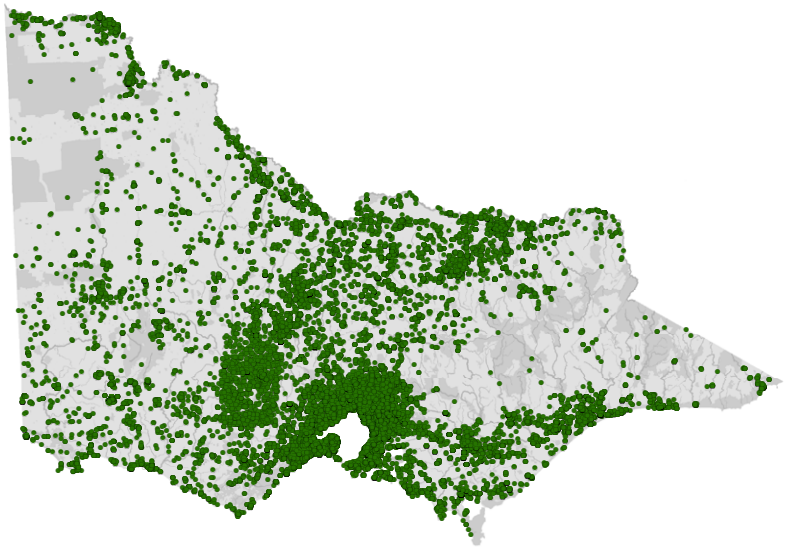
Species	Grey butcherbird *(Cracticus torquatus)*
Habitat	Woodland, forest, acacia shrublands, rainforest, riparian vegetation, urban areas
Home range	4.5–7 ha
Behaviour	Diurnal. Singles, pairs, occasionally small groups. Non-migratory or resident with some local dispersal
Foraging Style	Attack from perch onto the ground or among branches
Diet	**Invertebrates**: spiders, beetles, moths, cicadas, earthworms, aphids, lerps, bees, ants **Vertebrates**: small birds (quail, honeyeater) Occasional fruit (fig, proteas), grass, seed
Longevity	8–15 years
Nesting	August–January
Breeding season	August–October
Incubation length	August–October
Nesting location	In fork of tree or sapling
Developmental stage at hatching	Altricial
Fledgling	September–January
Age at dispersal	Up to 1 year
Age at maturity	2 years

Species	Laughing kookaburra *(Dacelo novaeguineae)*
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large kingfisher with dark patch around eye, little silver and blue on shoulder
Conservation status*	Common
Adult morphometrics	Body weight: Male: 200–450 g. Female: 200–465 g Head and body length: 410–470 mm Wing chord: Male: 188–237 mm. Female: 198–231 mm Tail length: Male: 123–171 mm. Female: 137–170 mm
Habitat	Open forest, farmland, parks, gardens
Home range	0.04–0.8 birds/ ha
Behaviour	Diurnal. Pairs, groups of dominant pair and 'helpers'. Non-migratory, territorial
Foraging Style	Preys on insects and reptiles, from above
Diet	**Invertebrates**: beetles, mealworms, moths, crickets, earwigs, ants, earthworms, snails, crayfish **Vertebrates**: lizards, snakes, birds, bird eggs, rodents, frogs, fish
Longevity	10 years
Nesting	September–January

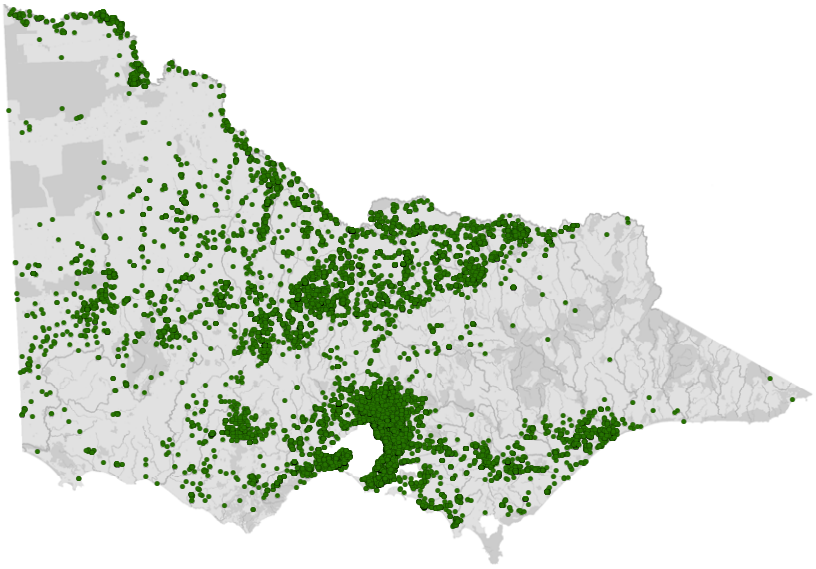
Species	Laughing kookaburra *(Dacelo novaeguineae)*
Breeding season	August–December
Incubation length	August–January
Nesting location	Tree hollow, hole in bank, wall
Developmental stage at hatching	Altricial
Fledgling	October–March
Age at dispersal	3–4 months
Age at maturity	1 year

Species	Long-billed corella *(Cacatua tenuirostris)*
 Photo credit: NW Longmore, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Large white cockatoo, long thin bill, blue around eyes, red at nostrils and throat, small white crest
Conservation status*	Common
Adult morphometrics	Body weight: Male: 490–676 g. Female: 357–615 g Head and body length: 380–410 mm Wing chord: Male: 274–293 mm. Female: 260–287 mm Tail length: Male: 118–129 mm. Female: 116–130 mm
Habitat	Grassland, open forest

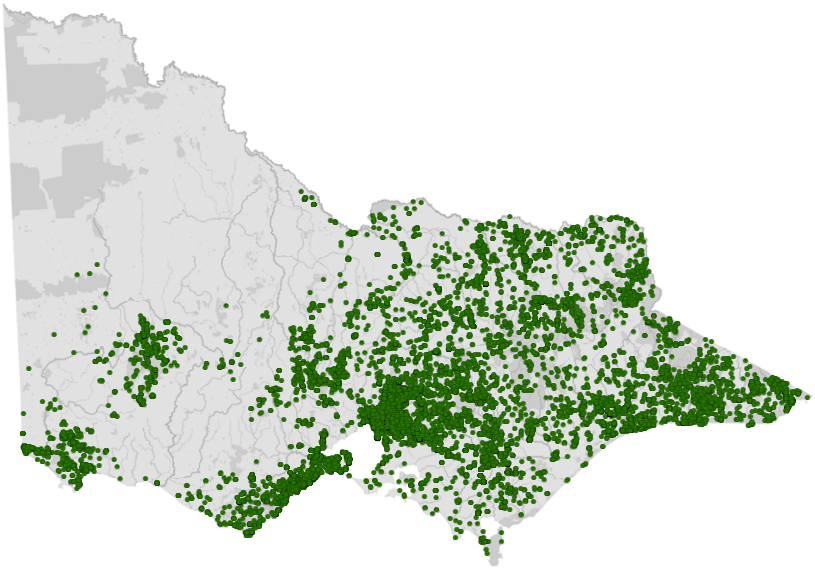
Species	Long-billed corella *(Cacatua tenuirostris)*
Behaviour	Diurnal. Singles to flocks of thousands. Resident within 3 km
Foraging Style	Digs for roots, corms
Diet	**Seeds of commercial crops**: wheat, barley, oat, canola, sunflower **Seeds of commercial nuts**: walnut, chestnut, hazelnut, almond, apple and herbs **Insects**: beetles, moths, flies
Longevity	20 years
Nesting	July–November
Breeding season	July–November
Incubation length	August–December
Nesting location	On decayed debris, in tree hollow
Developmental stage at hatching	Altricial
Fledgling	January–March
Age at dispersal	3–4 months
Age at maturity	1 year

Species	Magpie lark *(Grallina cyanoleuca)*
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

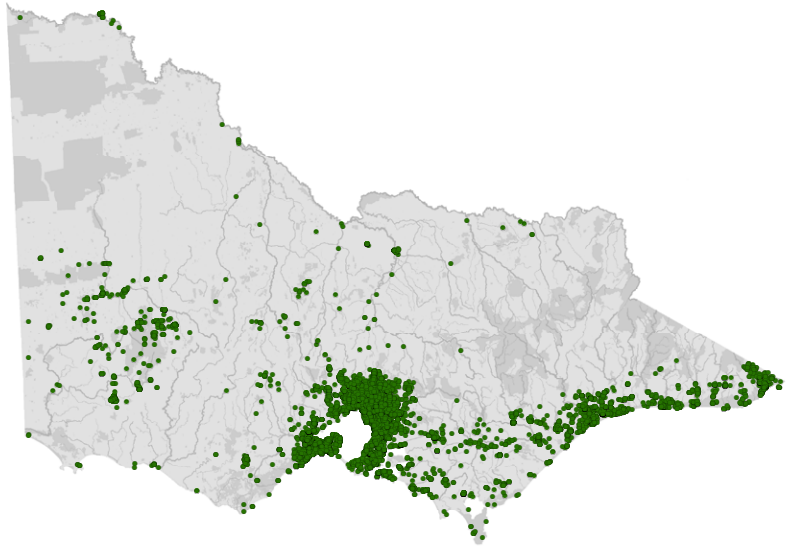
Species	Magpie lark *(Grallina cyanoleuca)*
General appearance	Small black and white bird. Male: black throat and white eyebrow. Female: white throat with no eyebrow
Conservation status*	Common
Adult morphometrics	Body weight: Male: 64–118 g. Female: 70–95 g Head and body length: 250–300 mm Wing chord: Male: 168–195 mm. Female: 162–185 mm Tail length: Male: 111–141 mm. Female: 108–136 mm
Habitat	Grassland with some trees, farmland Urban: park, garden, streets
Home range	8–10 ha
Behaviour	Diurnal. Pairs, family parties. Non-migratory and defend territory through year
Foraging Style	Forages on ground
Diet	**Invertebrates**: cockroaches, moths, flies, crickets, ants, wasps, earthworms, snails, flat worms, termites **Seeds**: grasses, *Setaria*, rushes
Longevity	10 years
Nesting	August–November
Breeding season	August–December
Incubation length	August–December
Nesting location	On horizontal branch, often over water, or on artificial structure
Developmental stage at hatching	Altricial
Fledgling	September–January
Age at dispersal	2–4 months
Age at maturity	2 years

Species	Noisy miner *(Manorina melanocephala)*
 Photo credit: Ian McCann, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Grey brown, black crown, white forehead and yellow bill
Conservation Status*	Common
Adult morphometrics	Body weight: Male: 40–90 g. Female: 46–74 g Head and body length: 240–280 mm Wing chord: Male: 125–154 mm. Female: 119–148 mm Tail length: Male: 111–142 mm. Female: 108–130 mm
Habitat	Open forests – do not like understorey Urban: parks, gardens
Home range	0.01–10/ha
Behaviour	Diurnal. Colonial, males defend colony. Non-migratory
Foraging Style	Forages in foliage or on ground
Diet	**Invertebrates**: spiders, butterflies, ants, crickets, flies **Fruit**: wattle, eucalyptus, saltbush, fig, *Prunus* **Seeds**: goosefoots, clover, figs, oats **Nectar**: *Jacaranda*, *Callistemon*, *Eucalyptus*, *Melaleuca, Grevillea*, *Hakea*, *Fuchsia*, *Banksia*
Longevity	7–9 years

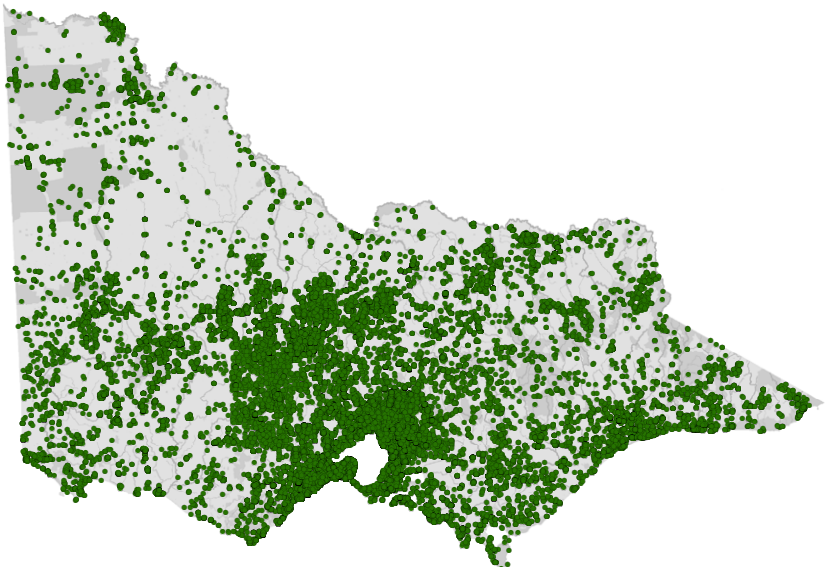
Species	Noisy miner *(Manorina melanocephala)*
Nesting	June–December
Breeding season	August–January
Incubation length	August–February
Nesting location	In fork of leafy branch
Developmental stage at hatching	Altricial
Fledgling	September–March
Age at dispersal	2 months
Age at maturity	1 year

Species	Pied currawong *(Strepera graculina)*
 Photo credit: Ian McCann, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Mainly black with white wing, rump, base and tip of tail
Conservation status*	Common
Adult morphometrics	Body weight: Male: 259–385 g. Female: 243–324 g Head and body length: 440–500 mm Wing chord: Male: 257–290 mm. Female: 243–258 mm Tail length: Male: 196–224 mm. Female: 182–208 mm

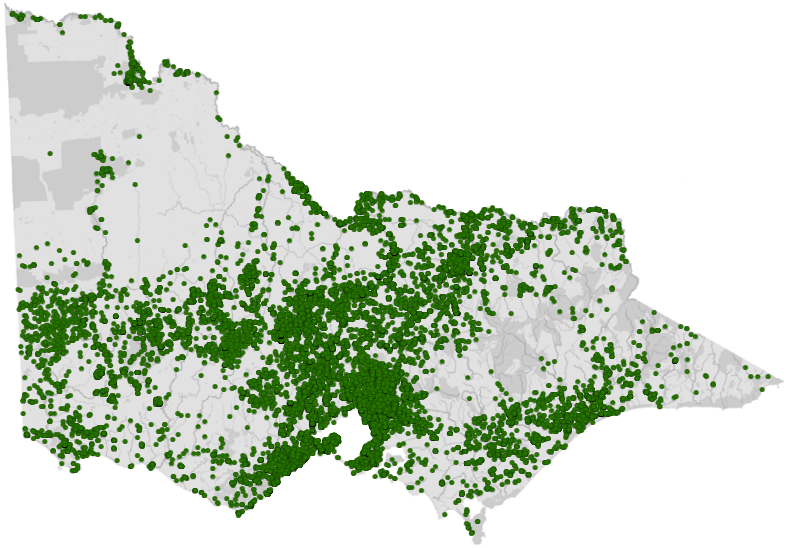
Species	Pied currawong *(Strepera graculina)*
Habitat	Open dry forest, farmland, logged areas Urban: town landscapes
Home range	0.7–16 ha
Behaviour	Diurnal. Singles, pairs, flocks in autumn/winter. Resident
Foraging Style	Forages on ground, trunks, in foliage
Diet	**Invertebrates**: spiders, beetles, cicadas, wasps, moths, centipedes, ants, dragonflies, snails, earthworms **Vertebrates**: sparrows, pigeons, rosellas, wrens, skinks, crabs, mice **Seeds, fruit**: oat, *Setaria*, wattle, lilly pilly, figs, wide range of shrubs – native and introduced
Longevity	15 years
Nesting	August–December
Breeding season	August–November
Incubation length	September–January
Nesting location	In leafy tree-fork
Developmental stage at hatching	Altricial
Fledgling	October–February
Age at dispersal	2 months
Age at maturity	1 year

Species	Rainbow lorikeet *(Trichoglossus molucannus)*
 Photo credit: Tracey-Ann Hooley, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large blue headed lorikeet with red breast, green wings
Conservation status*	Common
Adult morphometrics	Body weight: Male: 92–169 g. Female: 84–162 g Head and body length: 260–310 mm Wing chord: Male: 143–168 mm. Female: 142–156 mm Tail length: Male: 104–166 mm. Female: 121–165 mm
Habitat	Wet to dry forests Urban area: parks, gardens
Home range	0.05–5 birds/ha
Behaviour	Diurnal. Pairs to flocks. Follow local flowering trees
Foraging Style	Feeds in foliage and blossoms; raids gardens
Diet	**Nectar and pollen**: *Eucalyptus*, *Melaleuca*, *Callistemon*, *Banksia* **Fruit**: camphor laurel, fig **Seeds**: She-oak
Longevity	15 years
Nesting	May–February
Breeding season	August–November

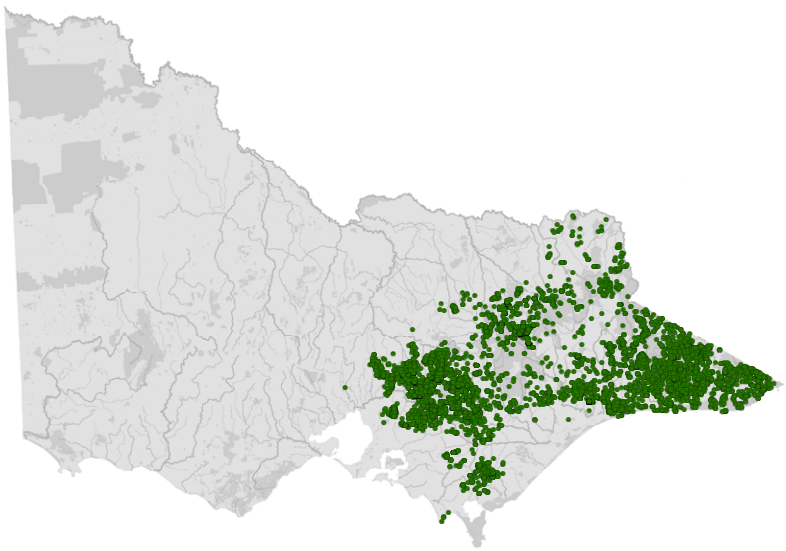
Species	Rainbow lorikeet *(Trichoglossus molucannus)*
Incubation length	August–December
Nesting location	On decayed debris in tree hollow
Developmental stage at hatching	Altricial
Fledgling	October–February
Age at dispersal	2–3 months
Age at maturity	18–24 months

Species	Red wattlebird *(Anthochaera carunculata)*
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large brown honeyeater with red wattle near ear, yellow on belly. Juvenile: lacks wattles
Conservation status*	Common
Adult morphometrics	Body weight: Male: 100–120 g. Female: 84–110 g Head and body length: 330–370 mm Wing chord: Male: 142–171 mm. Female: 140–161 mm Tail length: Male: 150–182 mm. Female: 136–160 mm
Habitat	Variety of forest from heath to dry Urban: parks, gardens, vineyards

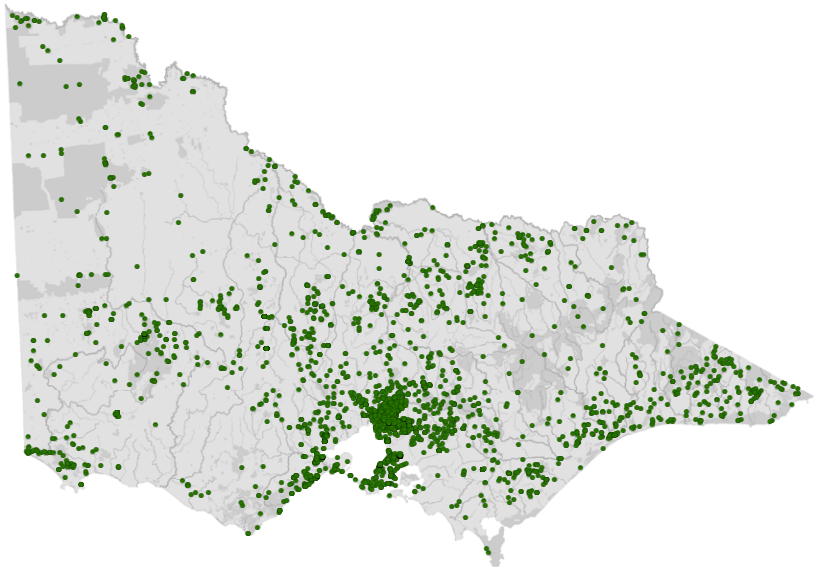
Species	Red wattlebird *(Anthochaera carunculata)*
Home range	0.05–3/ha
Behaviour	Diurnal. Singles, pairs, nomadic flocks. Nest territory 50–200 m diameter
Foraging Style	Takes insects in flight
Diet	**Nectar** and manna from over 30 *Eucalyptus* spp., *Callistemon*, *Banksia*, *Melaleuca*, *Grevillea* **Invertebrates**: beetles, moths, spiders, cicadas, honeydew, ants, mantids, wasps, lerps
Longevity	5–7 years
Nesting	July–November
Breeding season	July–December
Incubation length	July–December
Nesting location	In tree fork or on bark against trunk
Developmental stage at hatching	Altricial
Fledgling	August–January
Age at dispersal	2 months
Age at maturity	1 year

Species	Sulphur-crested cockatoo *(Cacatua galerita)*
 Photo credit: Nick Talbot	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large white cockatoo with long yellow crest
Conservation status*	Common
Adult morphometrics	Body weight: Male: 815–980 g. Female: 815–915 g Head and body length: 450–500 mm Wing chord: Male: 302–391 mm. Female: 310–385 mm Tail length: Male: 161–218 mm. Female: 151–199 mm
Habitat	Wet and dry forest, grassland, farmland Urban: gardens, golf courses, pine plantation
Home range	0.28 birds/ha–1 bird/153 ha
Behaviour	Diurnal. Flocks can number in hundreds. Resident, mainly non-migratory
Foraging Style	Feeds on ground in grassland, or in trees
Diet	**Seeds** of commercial crops: wheat, barley, oat, maize, sorghum, sunflower, canola **Nuts**: walnut, almond, hazelnut, pistachio Native grass seeds, eucalyptus seeds Bark, green leaves, onion grass **Fruits**: native plum, figs **Insects**: moths, flies, ant eggs, crickets, beetles

Species	Sulphur-crested cockatoo *(Cacatua galerita)*
Longevity	20–40 years
Nesting	August–January
Breeding season	July–December
Incubation length	August–December
Nesting location	On decayed debris in tree hollow
Developmental stage at hatching	Altricial
Fledgling	September–January
Age at dispersal	3 months
Age at maturity	1 year

Species	Superb lyrebird *(Menura novaehollandiae)*
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large greyish-brown bird. Male has lyre shaped outer tail feathers
Conservation status*	Common

Species	Superb lyrebird *(Menura novaehollandiae)*
Adult morphometrics	Body weight: Male: 1.0–1.1 kg. Female: 880–890 g Head and body length: Male: 800–980 mm. Female: 740–840 mm Wing chord: Male: 270–301 mm. Female: 231–270 mm Tail length: Male: Longest Median: 645–800 mm Longest Filamentary: 486–750 mm Longest Lyrate: 542–713 mm Female: Longest Median: 290–505 mm Longest Filamentary: 377–396 mm Longest Lyrate: 289–473 mm
Habitat	Moist forest
Home range	0.1–0.5 birds/ha
Behaviour	Diurnal. Solitary. Non-migratory, territorial
Foraging Style	Feeds on the ground, roosts in trees at night
Diet	**Invertebrates**: cockroaches, beetles, earwigs, fly larvae, moths, centipedes, spiders and earthworms **Vertebrates**: occasional lizards and frogs **Seeds**
Longevity	20 years
Nesting	June–October
Breeding season	June–October
Incubation length	June–October
Nesting location	On or near the ground, hidden in vegetation
Developmental stage at hatching	Altricial
Fledgling	September–November
Age at dispersal	8–9 months
Age at maturity	Males 6–9 years

Species	Tawny frogmouth *(Podargus strigoides)*
 Photo credit: Zoos Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Yellow eyes, male mainly grey with black streaks, female more brown
Conservation status*	Common
Adult morphometrics	Body weight: Male: 180–520 g Female: 157–555 g Head and body length: 340–530 mm Wing chord: Male: 250–295 mm Female: 220–280 mm Tail length: Male: 183–229 mm Female: 167–225 mm
Habitat	Open forest, pasture, roadsides Urban: parks, gardens
Home range	0.1–0.2 birds/ha
Behaviour	Most active at dusk. Pairs, family parties. Non-migratory, small territory
Foraging Style	Glides from above to catch prey
Diet	**Invertebrates**: moths, beetles, cockroaches, earthworms, molluscs, crustaceans, spiders **Vertebrates**: mice, frogs, sparrows, small birds

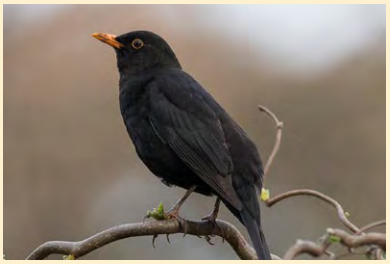
Species	Tawny frogmouth *(Podargus strigoides)*
Longevity	14 years
Nesting	August–December
Breeding season	August–December
Incubation length	August–December
Nesting location	On horizontal fork, or uses old nest of other species
Developmental stage at hatching	Semi-altricial
Fledgling	January–February
Age at dispersal	2 months
Age at maturity	1 year

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit **https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list**.

1.2.1. Feral species

Occasionally, feral bird species, such as those listed in **Table 1.2**, come into care. They must be euthanised as they are a pest and pose a threat to many native species.

Table 1.2 Introduced species commonly found in Victoria

Introduced species	Common blackbird *(Turdus merula)*
General appearance  Photo credit: David Paul, Museums Victoria	Adult male: Glossy black plumage, blackish-brown legs, a yellow eye-ring and an orange-yellow bill Adult female: Sooty-brown with a dull yellowish-brownish bill, a brownish-white throat and some weak mottling on the breast
Adult morphometrics	Body weight: Male: 81–120 g. Female: 88–111 g Head and body length: 240–290 mm Wing chord: Male: 126–132 mm. Female: 118–119 mm Tail length: Male: 103–110 mm. Female: 92–107 mm

Introduced species	Common myna *(Acridotheres tristis)*
General appearance  Photo credit: David Paul, Museums Victoria	Brown body, black hooded head and a bare yellow patch behind the eye
Adult morphometrics	Body weight: 115–145 g Head and body length: 220–260 mm Wing chord: Male: 130–141 mm. Female: 125–138 mm Tail length: Male: 82–87 mm. Female: 78–88 mm

Introduced species	Common starling *(Sturnus vulgaris)*
General appearance  Photo credit: David Paul, Museums Victoria	Glossy black, with a purple and green shine. The tips of the body feathers have large white spots
Adult morphometrics	Body weight: Male: 75–98 g. Female: 76–94 g Head and body length: 190–230 mm Wing chord: Male: 119–130 mm. Female: 115–127 mm Tail length: Male: 60–68 mm. Female: 59–65 mm

Introduced species	House sparrow *(Passer domesticus)*
General appearance  Photo credit: Ian McCann, Museums Victoria	Small, compact bird. The female is mostly buff coloured, while the male has boldly coloured head markings, a reddish back and grey underparts
Adult morphometrics	Body weight: Male: 23–33 g. Female: 25–33 g Head and body length: 140–180 mm Wing chord: Male: 73–82 mm. Female: 70–77 mm Tail length: Male: 50–60 mm. Female: 50–58 mm

Introduced species	Rock dove *(Columba livia)*
General appearance  Photo credit: David Paul, Museums Victoria	Dark bluish-grey head, neck, and chest with glossy yellowish, greenish, and reddish-purple iridescence along its neck and wing feathers
Adult morphometrics	Body weight: 238–380 g Head and body length: 290–370 mm Wing chord: Average 223 mm Tail length: 95–110 mm

Introduced species	Spotted turtle-dove *(Spilopelia chinensis)*
General appearance  Photo credit: David Paul, Museums Victoria	Rosy buff below shading into grey on the head and belly. A black half collar on the back and sides of the neck with white spots at the two tips
Adult morphometrics	Body weight: Male: 110–205 g. Female: 110–192 g Head and body length: 280–320 mm Wing chord: Male: 139–167 mm. Female: 139–164 mm Tail length: Male: 115–192 mm. Female: 119–162 mm

1.3 Animal and human safety considerations

In general, animals in the wild have limited contact with people, pets, and the hustle and bustle of our daily lives. When sick, injured or orphaned wild animals come into care this unnaturally close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity for birds is in **Section 1.6.2**.

The following information relates to some of the human and animal health and safety considerations specifically related to the rehabilitation of birds.

1.3.1. Human safety considerations

- Parrot species have strong beaks that can inflict serious bite injuries that bruise or break the skin. Kookaburras, magpies and corvids also have sharp beaks to be mindful of. Additionally, magpies, parrots, wattlebirds and currawongs have sharp claws that can puncture and scratch the skin.
- Care is required with adult emus. They have extremely powerful legs with sharp claws that can inflict significant injury. Emu handling should only be attempted by those who are trained to do so safely.
- Some birds can carry diseases that are transmissible to people (zoonoses). Psittacosis is a common zoonosis, caused by *Chlamydia psittaci,* and frequently diagnosed in crimson rosellas and other parrot species. See **Table 1.5** for more information.

1.3.2. Animal safety considerations

- Honeyeaters and other small birds can be suffocated by compression of their chest if held too tightly in the hand.
- Pigeons and some other species may drop feathers as a defence mechanism, this can make them challenging to restrain in a firm grip.
- It is not acceptable to place birds into stockings due to the risk of suffocation and feather damage. A dark coloured pillowcase is a more suitable tool to assist with restraining small birds. Ensure the pillowcase is turned inside out so nails do not get snagged on thread.

1.4 Capture, restraint, and transport

STOP

STOP – A visual examination must be done BEFORE the animal is captured. This applies to the initial capture from the wild as well as prior to captures which occur during time in captive care. See Section 1.4.1 *for information on what to look for when conducting a visual health assessment.*

Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned bird species.

1.4.1. Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture, looking for evidence of injury/ severe disease or deterioration and observe their breathing as demonstrated in the following table.

It is important to understand that because avian species are flock animals, they mask signs of illness and injury so as not to appear weak in the flock and vulnerable to predators. This is why it is very important to take visual observations from a distance, to view the actual state of the animals, as they are likely to appear healthy on initial visual assessment. A bird showing obvious signs of illness should be considered extremely unwell and in need of immediate veterinary attention.

Table 1.3 Visual health observations in birds

	What to look for
Demeanour	• Bright, alert • Responds to humans with threat display or avoidance • Upright posture
Behaviour	• Interested in surroundings • Exhibiting natural species behaviour such as hopping from branch to branch • Feeding or flight
Movement and posture	• Stands and/or perches on both legs. Some species may stand on one leg from time to time, reinforcing the need for time spent observing • Wings are held against the body and do not droop • Head is in a normal position
Breathing	• Regular pattern • No open mouth or noisy breathing (birds may open mouth breathe when hot or stressed)

1.4.2. Equipment

- **A cloth** can be used to cover the bird during capture. The cloth may vary from a blanket, bath towel to tea-towel depending on the species and size of the bird.
- **Leather gloves** can be used to protect the hands during capture of the bird. Care must be taken not to squeeze the bird too tightly as leather gloves can reduce the ability of the handler to feel the amount of restraint they are applying.
- **A pillowcase** can be used to contain the bird for a short period. This must be turned inside out to ensure the bird does not get caught in loose thread.
- **Handheld nets and fishing nets** may be useful for capturing birds. Choose the appropriate gauge of the net for the species being captured.
- **A transport container** such as a pet carry cage, cardboard box or ventilated plastic tub can be used to transport the bird once it has been caught. Cardboard boxes are ideal, except for parrots which can potentially chew their way out. Soft canvas pet carriers work well as the birds are less likely to damage themselves or their flight feathers. Wire cages should not be used, unless the interior is lined with shade-cloth or cardboard, due to the risk of feather damage. Transport containers should allow the bird to stand, turn around and stretch its wings but not gain lift. Towels or cotton sheets may be used for flooring. Ensure that there are no loose threads present that could entangle the feet.

Figure 1.2 A box suitable for transporting small (under approximately 100 g) birds

Photo credit: Zoos Victoria

1.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques for some specific situations are outlined in the following section.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

The appropriate method of restraint varies for different bird species. When handling birds, it is important to restrain the head and confine the wings.

Restraint of parrots

Place a towel over the hand that will be used to capture the parrot. Restrain the bird's head using the 'pistol' grip. This is done by placing the index finger and thumb on either side of the head through the towel. Alternatively, the three-fingered grip can be used where the middle finger and thumb are placed on either side of the bird's head and the index finger is placed on top of the head for more stability. Be mindful that once the head is restrained, the wings may flap in an attempt to escape. It is vital the handler works quickly to restrain the wings to prevent injury. Use the towel to wrap the bird while maintaining the grip on the head. The towel wrap is also used to restrain the legs and tail to prevent clawing of the handler. The bird can then be lifted and the towel edges folded around the bird to restrain the wings within the bulk of the towel (see **Figure 1.4**).

Restraint of magpies, kookaburras and tawny frogmouths

These bird species can be restrained in a towel as described for parrots.

Restraint of pigeons and doves

Place one hand underneath the bird. The thumb and little finger can then be used to restrain the wings and tail while the other fingers secure the legs.

A towel may also be used to wrap around the whole bird to prevent flapping (see **Figure 1.4**).

Restraint of small birds

A 'ringers' grip can be used with fingers either side of the head. The body of the bird is supported in the palm of one hand (See helmeted honeyeater **Figure 1.3**).

Restraint of emus

Manual restraint of adult emus should only be attempted by experienced rehabilitators and should be avoided if possible. Juvenile emus, up to about 8 kg, can be restrained by approaching from behind to avoid being kicked and holding the bird around the body.

Figure 1.3 a. Restraint of a large parrot demonstrating the three-fingered grip. The feet and wings are restrained in the other hand. b. A helmeted honeyeater restrained with fingers either side of the head.

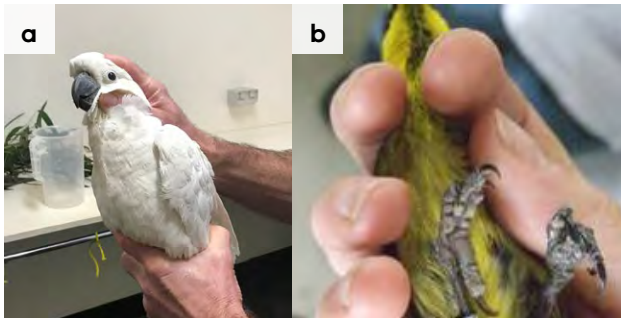


Photo credit: Zoos Victoria and Anne Fowler

Figure 1.4 A cockatoo is restrained with a towel.

Photo credit: Zoos Victoria

Figure 1.5 Restraint of a juvenile crimson rosella demonstrating the three-fingered grip.

Photo credit: Zoos Victoria

Capture next to a road

- The capture should be planned to avoid chasing the bird into oncoming traffic. Although it may not be able to fly, it may still be able to run quickly.
- It is important to remember wildlife rehabilitator safety when rescuing birds that are next to roads. Birds may still be mobile and the capture may need to be planned with more than one person to keep the animal, wildlife rehabilitators and the public from harm. Where appropriate, use signage to warn oncoming traffic.
- Throw a large towel or net over the bird to confine it and pick it up.
- If the bird is a fledgling it may have landed on the ground after its first flight and could take some time to fly back up onto a branch. Before 'rescuing' the bird, scan the area for adults or a nest. In many instances the parents will be nearby and will return to assist their chick. Some fledglings may spend two to three days on the ground being assist fed by parents before flying. However, fledglings can be injured falling from nests or during their initial flight. Always assess the bird for injuries before leaving it for the parents.
- To avoid a fledgling being predated or being exposed to the elements there is an option to place the fledgling in a fake nest (for example hanging basket or bucket with nesting material and holes in the bottom to allow water drainage) to enable the parents to care for the fledgling until it is ready to fledge. See **Section 1.9.3** for more details.

Entanglement

- This includes entanglement in netting over fruit trees, barbed wire and fishing line. Usually two operators are required to free these birds. One holds the bird to avoid unnecessary struggling, while the other cuts the net, line or wire. For entanglements where the bird can be restrained appropriately and removed in less than five minutes, cut the bird free with scissors or wire cutters. Wear eye and hand protection if cutting wire.
- For entanglements that may take longer than five minutes or where the line has cut through the skin, free the bird by cutting the material around the bird. It can then be transported to a veterinarian with the remaining line attached. Removal of entangling material can occur under anaesthesia to avoid further damage to skin and feathers. Ask the person who reported the strike to keep cats, dogs, children and other dangers away from the bird to give it sufficient time to recover by itself. Alternatively, ask them to scoop the bird up in a towel and place it in a container. If the bird cannot fly off normally after an hour or shows signs of neurological impairment it should be taken to a vet for assessment.
- Prolonged conscious handling of birds when they are struggling can lead to capture myopathy and death.

Window strike

- Ask the person who reported the strike to keep cats, dogs, children and other dangers away from the bird to give it sufficient time to recover by itself. Alternatively, ask them to scoop the bird up in a towel and place it in a container. If the bird cannot fly off normally after an hour or shows signs of neurological impairment it should be taken to a vet for assessment.

Luring birds that can still fly

- Birds with leg or eye injuries may still be able to fly. In such cases it may be possible to use food to lure them into a confined area before capture with a net.
- When attempting capture of birds that can fly, it is important to make a clear plan before attempting capture as often you will only get one chance.

Emu capture

- Emus are particularly sensitive to capture myopathy during capture attempts.
- Emu captures will require several people to herd the bird into a horse-float or similar vehicle.
- An emu that is caught in a fence may require sedation before removal.
- Emus can inflict serious damage to humans when they strike with their feet. They cannot kick backwards so should be approached from that direction.

1.4.4. Transport

- Birds should be transported individually. Clutches of chicks are the exception and should be transported together.
- Ensure that the transport container has adequate ventilation and is not exposed to direct sunlight during travel.
- A towel or sheet may be used as a cage cover to reduce visual stress, while ensuring ventilation is not impacted. (See **Figure 1.6**)
- The interior of the vehicle should be below 25°C.
- Food and water are not required for travel times of less than two hours.
- Noise during transport (for example voices and music) should be kept to a minimum.
- Domestic animals should not be present in the vehicle.
- Disinfect transport carriers with a suitable disinfectant, such as F10SC or Virkon S, at the recommended concentration and contact time between birds. Virkon S must be rinsed after disinfection.

Figure 1.6 Transport box is covered with a towel to minimise visual stress, noting the towel has allowed room for ventilation.

Photo credit: Zoos Victoria

1.5 Monitoring animal health and welfare

The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release must be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and rapidly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult. An example of the importance of this is that bird bones heal much faster than mammal bones. Delay in veterinary assessment may render a bird unsuitable for rehabilitation because the fracture was not diagnosed and treated soon enough.

Templates for record-keeping of visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessment on arrival and on effective monitoring of the health and welfare of individuals in care – minimising human-animal interactions and stress to the animal maximises successful release back to the wild.

1.5.1. Physical examination

Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated when required any time the carer has the animal in the hand, such as for an enclosure change. However, if a full physical exam is not conducted, body condition and weight should be assessed every time the animal is in the hand for other reasons. Carers should make sure scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or an injury.

Always record the physical examination findings, so that you can compare findings as the animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines**.

Examinations should be conducted in a quiet location, away from any domestic animals. Depending on the species, one or two people should conduct the handling, while a second or third person takes notes. All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum, with careful monitoring for any signs of distress (such as panting, salivating, vocalisation, or sudden deterioration in demeanour). If these are seen, the examination should be stopped immediately, and the animal returned to its catch bag, transport box or enclosure and allowed to recover.

Species specific considerations:

Physical examination is stressful for a conscious bird and should be conducted as efficiently as possible. Parrots, in particular, will likely vocalise while being examined.

Limit handling to five minutes.

- Return the bird to its cage if it starts open mouth breathing, closes its eyes or becomes weak in the hand.
- Two people will be required to examine larger birds. One person restrains the bird, while the second person examines the wings and legs for any abnormalities.
- Feathers should be checked for damage or absence. A bird that has been on the ground will often have broken tail feathers that may be stained with dirt and faeces.
- The cloaca should be checked to ensure it is clean.

Bird identification manuals can be used to check the feathering to determine if the bird is a juvenile or adult. For example juvenile crimson rosellas have a variable number of green feathers.

Table 1.4 Physical examination of birds

	What to look for
Body weight	• Record body weight on arrival and at least weekly while in care. • Be aware of what is normal for the species. Birds that are underweight or emaciated should trigger a veterinary assessment. • In most species, a greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice. It is important to understand what is normal for species in care – smaller species are less likely to tolerate weight loss.
Body condition	Body condition of the bird can be scored by palpating the amount of muscle over the keel (See **Figure 1.7**) • **Under condition:** The keel bone is easily felt and the pectoral muscles are concave. • **Ideal condition:** The keel bone can be felt and the pectoral muscles are rounded. • **Over condition:** Difficult to feel the keel bone as the pectoral muscles rise above it.
Hydration status	Assessment: • Skin in featherless areas returns to normal position in less than 1 second, when pinched. • Skin slides easily across the pectoral muscles. • If the eyes are sunken, skin doesn't slide easily over pectoral muscles, or skin tenting occurs then assume the bird to be moderately to severely dehydrated.
Eyes	• Normal eyes should both be open, shiny and clear, with no discharge. • Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical.
Beak	• Normal shape for the species. • Not overgrown, flaky or fractured. • Upper and lower beak align when closed.

	What to look for
Mouth	• Normal colouration for the species. • No blood present. • No evidence of foreign materials. • No discharge.
Nostrils	• Clean and clear. • No discharge, for example blood.
Skin	• Not dry, flaky or cut/injured. • No bruising.
Feathers	• Free from parasites. • Clean, sleek, shiny. • Not damaged, broken or missing. • Powder down present in parrots. • Preen gland present on upper side of the base of the tail feather in many species.
Vent/cloaca	• Clean, free of faeces or urates (not caked on).
Legs	• Legs appear symmetrical and are not deviated. • Animal can stand normally. • Animal can grip with both feet normally. • No wounds, swelling or exposed bone or muscle present. • Bottom surface of feet has no evidence of wounds or disease. • Nails not broken or missing.
Wings	• Capable of normal flight. • Able to manually extend wings fully, without resistance, each wing extends equally. • No wounds, swelling, bruising or exposed bone or muscle present.
Sex determination	• Plumage colour may vary between the sexes of some bird species. • Body weight/size may vary between the sexes (see **Table 1.1**).

Figure 1.7 a. Reduced muscle mass next to the keel in an emaciated (under conditioned) king parrot. b. A sulphur-crested cockatoo in ideal body condition.

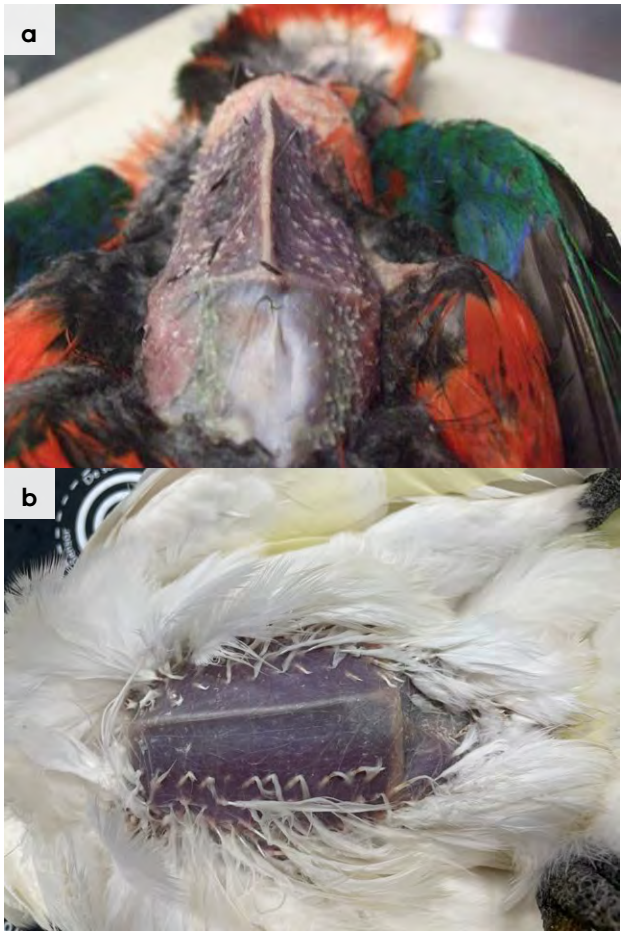


Photo credit: Anne Fowler and Zoos Victoria

Figure 1.8 Keel photo of ideal body condition in a tawny frogmouth.

Photo credit: Zoos Victoria

Figure 1.9 An overweight (over conditioned) tawny frogmouth with bulging pectoral muscles.

Photo credit: Anne Fowler

1.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- ☑ demeanour
- ☑ food consumption
- ☑ faecal/urine output
- ☑ behaviour observed
- ☑ medical treatment provided
- ☑ evidence of overnight activity.

The following is recorded weekly:

- ☑ weight
- ☑ body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- A visual check in the morning is recommended, when the cage is cleaned and food and water are changed.
- Note the bird's demeanour and behaviour every time food is introduced or taken away, the animal is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- Note faecal consistency daily and ensure it is normal for the species. Most bird species should pass solid faeces, pasty white urates and liquid urine, which may not be detectable if it has soaked into the substrate. This will be passed at the same time, as one excretion. If diarrhoea is noticed, a faecal sample should be collected and submitted to the veterinarian for assessment as soon as possible to determine the cause. Do not treat on suspicion of a bacterial or parasitic infection as this can make definitive diagnosis very difficult and potentially prolong the course of the disease.

1.5.3. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 1.5 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 1.5 Common injuries and clinical signs of emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduce drug efficacy.		
Unable to fly normally **Drooping wing** **Swollen wing** **Bruising over wing** **Fractures** **Dislocation**	Found adjacent to road/suspect motor vehicle accident Window strike Caught in wire or netting Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • If the wing is dragging on the ground a light bandage can be wrapped around the bird's wing and body to provide some support and relief from pain and discomfort. • Collision injuries may result in fractures within the pectoral girdle (the bones that support the wings). On observation the bird may still be able to fly but be unable to sustain flight or get normal lift. • Assessment by a veterinarian is required to determine whether surgery or splinting is needed in order for the injury or fracture to heal. Bird bones heal faster than mammal bones. To ensure the best welfare outcomes it is important to seek veterinary assessment as soon as possible. Medication for pain is required for fractures as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Birds with wing injuries will need initial confinement. • The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care. • Once the fracture has healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to **Section 1.9** for more detail).

Injury or clinical signs	Possible causes	Carer observations and response
Unable to stand normally **Swollen leg, foot or toe** **Bruising over leg** **Wounds present** **Nail injuries** **Fractures** **Dislocation** **Hip injury**	Found adjacent to road/suspect motor vehicle accident Window strike Caught in wire or netting Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Assessment by a veterinarian is required to determine whether surgery or splinting is needed in order for the injury or fracture to heal. Bird bones heal faster than mammal bones. To ensure the best welfare outcomes it is important to seek veterinary assessment as soon as possible. Medication for pain is required for fractures as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Birds with leg injuries will need initial confinement, and perhaps modified/low perching. • The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care. • Once the injury is healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to **Section 1.9** for more detail).
Head trauma **Eye injuries/blood in eye** **Eyelid swelling** **Beak injuries** **Blood in mouth** **Lethargy, sleepy** **Response to stimulus slow** **Head hanging down** **Fluffed feathers**	Found adjacent to road/suspect motor vehicle accident Window strike Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Birds with head trauma should be housed in a dark, quiet enclosure for 48 hours. If the bird does not improve or deteriorates over this time it may need to be euthanised.

Injury or clinical signs	Possible causes	Carer observations and response
Bleeding **Puncture wounds** **Bruising**	Found adjacent to road/suspect motor vehicle accident Window strike Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Assessment by a veterinarian is required to determine whether surgery or suturing is needed in order for the injury to heal and to assess for other injuries such as fractures. Medication for pain or infection may be required as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Monitor wounds to ensure that they are healing. Ongoing re-assessment during rehabilitation is required to ensure healing is progressing as expected and the animal is tolerating time in care.
Poor body condition **Emaciation**	Undetermined disease process Failure to thrive Old injury present, such as a fracture	• Assessment by a veterinarian is required to determine if there is a disease present and to assess for other injuries such as old fractures. • Generally, animals presenting in poor body condition have likely been suffering for some time and prognosis is poor. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered. • The degree of condition loss can determine whether the animal is a candidate for rehabilitation. • Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A, Chapter 4 Biosecurity & Hygiene. • Where a disease is suspected anything coming in contact with the infected or suspect bird should be discarded or disinfected. See **Section 1.6.2 Enclosure hygiene & biosecurity**. As a precaution, wear gloves and a face mask to avoid inhaling any aerosols.

Injury or clinical signs	Possible causes	Carer observations and response
Poor body condition **Emaciation** **Respiratory signs** **Open mouth breathing** **Raspy breathing** **Gurgly breathing** **Discharge from eyes** **Discharge from nares** **Warty growths on the bare skin of the face and legs** **White cheesy material in the mouth**	Undetermined disease process Psittacosis Aspergillosis Poxvirus Gape worm and/or throat worm Trichomoniasis	• Assessment by a veterinarian is required to determine if there is a disease present. The veterinarian will prescribe treatment if indicated. • Euthanasia may be required for the welfare of the animal. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered if treatment is indicated. • Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A, Chapter 4 Biosecurity & Hygiene. • Psittacosis – euthanasia is usually indicated due to the human health risk. • Aspergillosis – Aspergillosis is caused by an environmental fungus that is present in all indoor and outdoor environments as part of normal microbiological ecosystems. Birds become infected by inhaling fungal spores. Stress secondary to captivity, trauma, parasites or malnutrition makes disease more likely. Once clinical signs develop treatment is rarely successful. • Poxvirus – Common in magpies, magpie larks and currawongs. Treatment as prescribed by a veterinarian. Keep birds in an insect screened enclosure or inside a building to avoid transmission by mosquitoes to other birds. • Gape worm and/or throat worm – Common in magpies. Birds become infected by ingesting the invertebrate intermediate host. Both can be treated with parasiticides. Consult a veterinarian. • Trichomoniasis – A protozoan disease commonly seen in pigeons but has been diagnosed in other species as well. Seek veterinary attention for diagnosis and possible treatment. Give medication as prescribed. Following treatment, recheck the mouth of birds at an interval determined by the attending veterinarian. Crop feeding may be required if the bird cannot feed itself.

Injury or clinical signs	Possible causes	Carer observations and response
Missing, abnormal and/or broken feathers particularly on the head **Overgrown and/or fractured beak** **Lack of powder down in cockatoos** **Abnormally coloured feathers**	Psittacine beak and feather disease (PBFD)	• Caused by a virus. • The disease is progressive and there is no treatment. • Affected birds are euthanized. • Anything coming in contact with the infected bird should ideally be discarded, or disinfected. Refer to Part A, Chapter 4 Biosecurity & Hygiene.
Damaged feathers **Increased grooming behaviour** **Warty growths on the bare skin of the face and legs**	External parasites – mites, flat flies and lice	• Assessment by a veterinarian is required to determine if there is a disease present. The veterinarian will prescribe treatment if indicated. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered if treatment is indicated. • Feather mites are found in the vane of the feathers. • *Cnemidocoptes* is the scaly leg or scaly face mite and causes similar lesions to poxvirus infections. It is commonly seen in currawongs, parrots and lyrebirds. • Lice will crawl onto human skin when the bird is handled but will not survive.
Diarrhoea	Bacteria, viruses, protozoa, internal parasites	• Assessment by a veterinarian is required to determine if there is a disease present. The veterinarian will prescribe treatment if indicated. • Submit a fresh faecal sample to a veterinarian for diagnosis. • Give medication as directed. • Bacteria such as *Salmonella* will also cause diarrhoea in people. Wash hands with soap and water after handling birds. • *Spironucleus* is a protozoan commonly seen in juvenile king parrots and galahs in autumn and winter. Affected birds are frequently emaciated. Prognosis is poor. • Assist feeding using crop tubes may be indicated until the bird is eating by itself. • Ensure a high level of hygiene and remove all faeces every 24 hours to break the life cycle of the parasites.

Injury or clinical signs	Possible causes	Carer observations and response
Unable to fly and/or stand **Soft rubbery bones and/or beak** **Multiple fractures with no obvious signs of trauma**	Metabolic bone disease (rickets)	• Assessment by a veterinarian is required to determine if there is a disease present. The veterinarian will prescribe treatment if indicated. • Common in young carnivorous birds such as kookaburras, currawongs and magpies that have been fed a boneless meat diet such as mince or chicken hearts. • Immediately correct the diet. See Table 1.8. • Provide access to natural sunshine for at least an hour each day. • Give oral calcium as prescribed. • Severely affected birds will need to be euthanised.

Figure 1.10 A tawny frogmouth with head trauma. Note the presence of blood in the bird's left eye.

Photo credit: Anne Fowler

Figure 1.11 Various manifestations of PBFD. a. A sulphur-crested cockatoo with an overly long beak and feather loss on the head. b. The rump feathers of a sulphur-crested cockatoo showing pinched and bleeding dander feather follicles (arrow). c. A rainbow lorikeet with a loss of primary wing feathers and tail feathers. d. an Australian king parrot with abnormal yellow feathers amongst the normal green feathers. Note the loss of tail feathers.

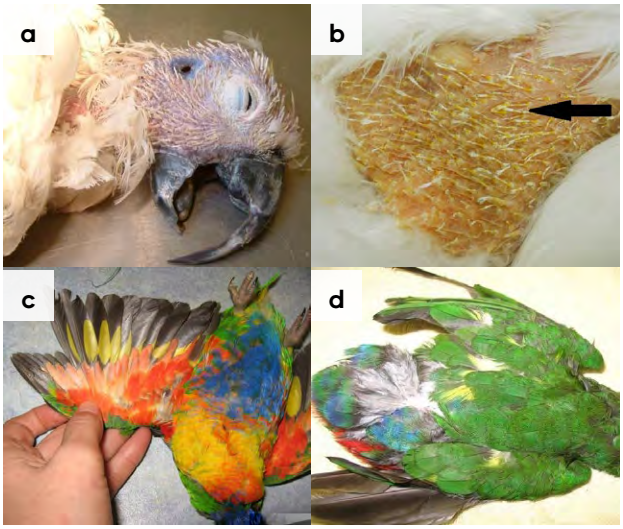


Photo credit: Anne Fowler

Figure 1.12 a. Gapeworm protruding from the larynx of a magpie (arrow). b. Throat worm nodules in the mouth of a magpie (arrow).

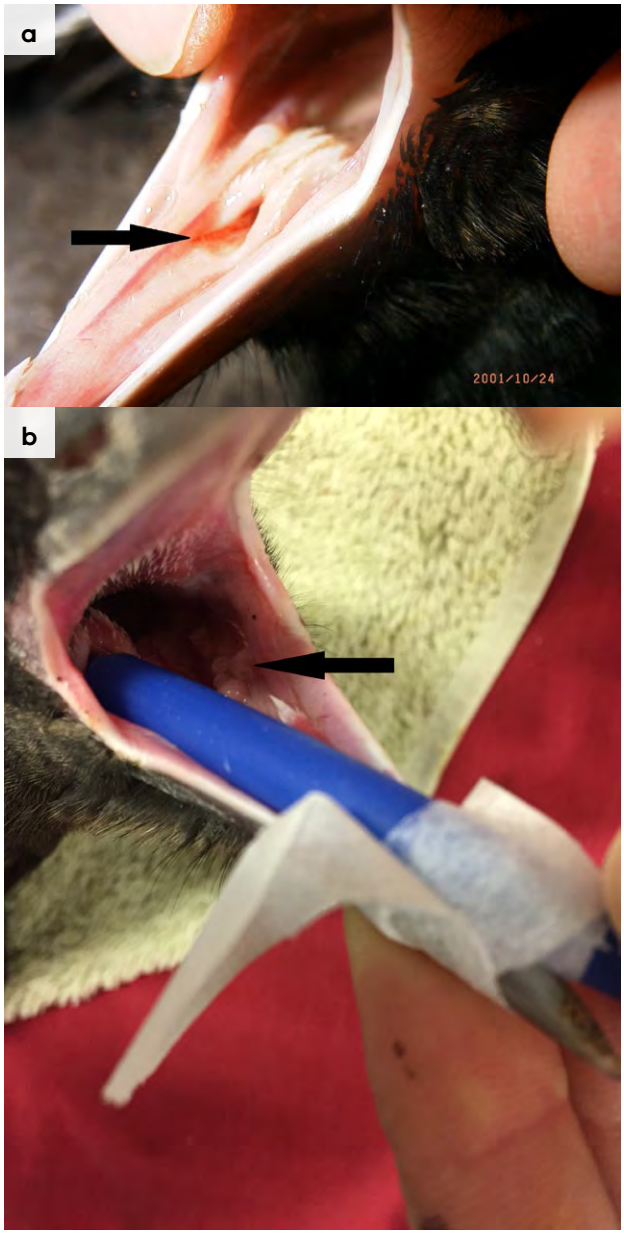


Photo credit: Zoos Victoria

Figure 1.13 a. Severe pox lesion on the 3rd toe of a juvenile magpie. b. Severe pox lesion on the foot of a juvenile magpie.

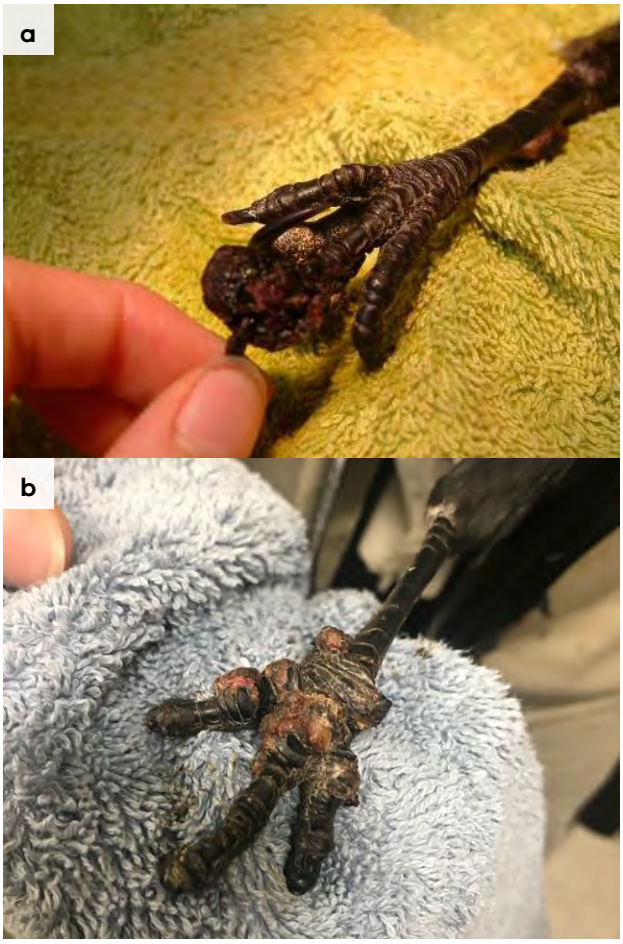


Photo credit: Anne Fowler and Jenny Steele

Figure 1.14 A magpie with a soft, rubbery beak, caused by metabolic bone disease.

Photo credit: Zoos Victoria

1.5.4. Administering treatment during rehabilitation

- Oral medication can be placed in a food item for carnivorous birds, such as kookaburras and ravens. If the bird does not eat the item, it may need to be force fed or dosed directly orally.
- Oral medication can be delivered into the mouth via syringe or directly into the crop using a crop needle. Only experienced carers that have been trained in the technique should use a crop needle as it is possible to inadvertently deliver the medication into the trachea or damage or rupture the crop.
- If giving medication into the mouth, ensure that the bird swallows the dose and does not aspirate the medication.
- Most medications can be delivered orally. In the rare instance where a veterinarian has prescribed an injectable drug, the drug should be injected either side of the keel, into the pectoral muscles.

1.6 Housing

Below are several key considerations when housing adult birds in care. Other parameters that can be just as important as enclosure size include availability of sunlight, wind protection, sunshade and type of perches. The dimensions recommended in this chapter are suggestions based on Healesville Sanctuary aviary sizes. There is no 'one size fits all' rule and it is important to continually assess the welfare of the bird and tailor aviaries and aviary size to suit the requirements of the bird.

1.6.1. General housing information for birds

- Birds should be housed out of sight, sound or smell of domestic animals as these are common predators. Change out of clothes that have been worn around dogs or cats to minimise exposure to pet scent.
- Throughout rehabilitation, depending on the injury, birds should be housed individually in intensive care holding and progress to intermediate and pre-release enclosures. It is important to support the progression of rehabilitation to release through changes to enclosure as fitness increases.

1.6.2. Enclosure hygiene & biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain excellent levels of hygiene to avoid inadvertently transferring diseases between animals, and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water before and after handling birds, and between animals in care, to minimise the spread of disease.
- Ideally examination gloves should be worn and changed between each animal.
- Left-over food and faecal matter and casts should be removed daily from enclosures.
- When an animal vacates an enclosure, it must be cleaned and disinfected. Substrate should be completely replaced and furniture, such as branches or boxes made of unsealed wood, should be discarded as they cannot be effectively disinfected.
- Enclosures should be disinfected with products such as F10 SC or bleach at the recommended concentrations and contact times. If Psittacine Beak and Feather Disease Virus (PBFDV) is diagnosed, Virkon S must be used to kill the virus, at the recommended concentration and contact time. Virkon S and bleach must be rinsed off following the appropriate disinfection times.

1.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care. **Table 1.6** describes the housing type, suggested dimensions and requirements at each stage of care. For information on housing birds during hand raising see **Section 1.8**.

Table 1.6 Rehabilitation housing for adult birds

Intensive care housing			
Indications for use	**Suggested min. dimensions**		**Suggested requirements**
Sick and injured birds should be placed initially in intensive care housing. Housing must be large enough for a bird to stand up, turn around and spread its wings.	Finches	Floor area: 0.3x 0.3 m (0.09 m^2) H: 0.4 m	**ENCLOSURE CONSTRUCTION** • Human humidicrib, veterinary incubator (Rcom, Vetario, Kimani), cat or dog carrier cage or melamine hot box. **ENCLOSURE FURNISHING** • Newspaper, thin cotton sheets or towelling can be used as flooring. • Birds that are unable to stand can be supported by rolling a towel into a U-shape or donut and placing it around the bird. Alternatively the bird can be placed in a food bowl lined with a towel or paper. • A low natural horizontal branch/perch can be used for perching birds that is approximately 2/3 of the circumference of their feet when clasping a branch. • Perching made of dowel or smooth surfaces should be avoided. • In the beginning, when the bird is still very weak, the perch does not need to be high but should allow the bird to perch on the floor/ground with its tail feathers clearing the floor/ground to avoid feather damage. • When the patient is more stable, the perch must be high enough that the tail feathers will not become contaminated with faeces. • The cage may be covered with a towel or sheet to provide privacy. **ENVIRONMENTAL VARIABLES** • Ideal temperature for sick and injured adult birds is 28°C. The temperature should be monitored with a thermometer. • If necessary, provide heat with a ceramic or incandescent light suspended from above the bird at one end of the enclosure. • Heat could also be supplied with a heat pad below or beside the bird. • It is important to clean and disinfect with F10SC or Virkon S between birds. • The bird should be able to experience normal daylight patterns, even if housed inside (e.g. indoor lights go on at dawn and off at dusk).
	Neophemas, lorikeets (except rainbow)	Floor area: 0.4 x 0.4 m (0.16 m^2) H: 0.3 m	
	Rosellas, cockatiels, rainbow lorikeets, bronzewing pigeons	Floor area: 0.4 x 0.4 m (0.16 m^2) H: 0.3 m	
	King parrots, kookaburras, galahs, corellas	Floor area: 0.5 x 0.5 m (0.25 m^2) H: 0.5 m	
	Sulphur-crested cockatoos	Floor area: 0.5 x 0.5 m (0.25 m^2) H: 0.5 m	

Intensive care housing			
Indications for use	**Suggested min. dimensions**		**Suggested requirements**
Sick and injured birds should be placed initially in intensive care housing. Housing must be large enough for a bird to stand up, turn around and spread its wings.	Sulphur-crested cockatoos	Floor area: 0.5 x 0.5 m (0.25 m^2) H: 0.5 m	**PROVISION OF FOOD/WATER** • A shallow water bowl is provided for drinking water and to provide humidity. • Food and water bowls should be readily accessible to birds unable to move around the enclosure. • Bowls must not be placed under perches or where the bowls may be contaminated with faeces.

<table>
<tr><th colspan="4">Intermediate housing (treatment/cage rest)</th></tr>
<tr><th>Indications for use</th><th colspan="2">Suggested min. dimensions</th><th>Suggested requirements</th></tr>
<tr><td rowspan="5">This type of housing is used for birds that no longer require heating but still need to be confined post-surgery or to facilitate the delivery of medication.</td><td>Finches</td><td>Floor area: 0.5 x 0.5 m (0.25 m^2)
H: 0.5 m</td><td rowspan="5">ENCLOSURE CONSTRUCTION
Dog carrier cage or powder-coated bird cage large enough that the bird can move around, but not so large as to permit flight.
Adult birds are housed individually.
Parrots can destroy thin wire and wooden cages.
Galvanised wire is not recommended due to the risk of heavy metal poisoning if the bird chews the wire.
ENCLOSURE FURNISHING
Newspaper can be used as flooring.
If the bird is able to perch, wire floors are suitable.
Use perches made from natural wood where the bird's foot covers 2/3 of the perch circumference.
If the perch is too wide the sole will develop excessive wear.
If the perch is too narrow the nails may puncture the pad.
Place the perch perpendicular to the cage door.
Birds perceive a frontal approach as typical of predators.
A side-to-side approach is less stressful.
The inside of the cage should be lined with shade-cloth to prevent damage to feathers.
Towels placed over the cage will provide privacy.
Native branches with leaves placed inside the cage at the front will give a sense of security and provide the opportunity for foraging.
ENVIRONMENTAL VARIABLES
It is important to clean and disinfect with F10SC or Virkon S between birds.
PROVISION OF FOOD/WATER
Food bowls should be shallow with a diameter at least one to two times beak length.
Birds imprint onto coloured bowls. Clear glass or natural colours are preferable.</td></tr>
<tr><td>Neophemas, lorikeets (except rainbow)</td><td>Floor area: 0.5 x 0.6 m (0.30 m^2)
H: 0.6 m</td></tr>
<tr><td>Rosellas, cockatiels, rainbow lorikeets, bronzewing pigeons</td><td>Floor area: 0.5 x 0.6 m (0.30 m^2)
H: 0.6 m</td></tr>
<tr><td>King parrots, kookaburras, galahs, corellas</td><td>Floor area: 0.5 x 0.6 m (0.30 m^2)
H: 0.6 m</td></tr>
<tr><td>Sulphur-crested cockatoos</td><td>0.5 x 0.6 m (0.30 m^2)
H: 0.6 m</td></tr>
</table>

<table>
<tr><th colspan="4">Pre-release</th></tr>
<tr><th>Indications for use</th><th colspan="2">Suggested min. dimensions</th><th>Suggested requirements</th></tr>
<tr><td rowspan="3">A pre-release aviary needs to be large enough for the bird to regain flight fitness and become acclimatised to the weather. The bird needs to be able to flap its wings at least ten times before the end of the flight. For example, an aviary 2 m long is the minimum for a bird weighing up to 300 g. Aviary width should be at least twice the width of the bird's extended wingspan.</td><td>Finches</td><td>Floor area:
3 x 2 m (6 m^2)
H: 2 m
Increased floor area per additional bird:
3 m^2</td><td rowspan="3">ENCLOSURE CONSTRUCTION
A double door, or aviary with an airlock, is useful to prevent accidental escapes.
Under floor wire and solid sides are required to stop vermin and predators.
At least one third of the aviary should be covered and at least three quarters of the area of one wall should be open weave mesh. This provides the bird with protection from the weather and access to natural sunlight.
Galvanised wire is not recommended due to the potential for heavy metal poisoning.
If there is no alternative, ensure the galvanised wire has been outdoors for at least 6 months and, after assembling the aviary, sprinkle it with vinegar and brush with a metal brush.
A false roof made of bird netting can be placed 20–30 cm below the roof of the aviary. This may prevent head trauma if birds are startled and fly upwards.
ENCLOSURE FURNISHING
A concrete floor is ideal for perching species, as it is easy to clean.
This can be covered with a layer of leaf mulch for ground dwelling species to avoid foot damage. This is replaced each time a new bird enters the aviary.
Provide perches of varying diameter.
Pots of shrubs can be moved in or out, depending upon species housed in the aviary. Parrots will chew shrubs.
Pots of seeding grasses can be used to encourage natural feeding for appropriate species.
Branches with leaves can be used to provide the bird with a place to hide.
A bowl of water of a sufficient size for bathing can be placed in the aviary and changed daily.
Native vines can be trained over the aviary to provide screening.</td></tr>
<tr><td>Neophemas, lorikeets (except rainbow)</td><td>Floor area:
4 x 2 m (8 m^2)
H: 2 m
Increased floor area per additional bird:
4 m^2</td></tr>
<tr><td>Rosellas, cockatiels, rainbow lorikeets, bronzewing pigeons</td><td>Floor area:
4 x 3 m (12 m^2)
H: 3 m
Increased floor area per additional bird:
6 m^2</td></tr>
</table>

<table>
<tr><th colspan="4">Pre-release</th></tr>
<tr><th>Indications for use</th><th colspan="2">Suggested min. dimensions</th><th>Suggested requirements</th></tr>
<tr><td rowspan="2">A pre-release aviary needs to be large enough for the bird to regain flight fitness and become acclimatised to the weather. The bird needs to be able to flap its wings at least ten times before the end of the flight. For example, an aviary 2 m long is the minimum for a bird weighing up to 300 g. Aviary width should be at least twice the width of the bird's extended wingspan.</td><td>King parrots, kookaburras, galahs, corellas</td><td>Floor area:
5 x 3 m (15 m^2)
H: 3 m
Increased floor area per additional bird:
7.5 m^2</td><td rowspan="2">SPECIES
• Birds are housed individually but flock birds can be housed with others of the same species if they originate from the same area, to reduce the risk of disease transmission.
• Do not house predator (e.g. currawongs, kookaburras, magpies) and prey species in the same enclosure and avoid visual contact, even if in different aviaries.
PROVISION OF FOOD/WATER
• Food items may be scattered in the mulch or placed on spiky short branches or perches. Provide multiple feeding stations and perches for each bird in the aviary.</td></tr>
<tr><td>Sulphur-crested cockatoos</td><td>Floor area:
5 x 5 m (25 m^2)
H: 3 m
Increased floor area per additional bird:
12.5 m^2</td></tr>
</table>

Figure 1.15 A veterinary incubator used as intensive care housing for a magpie.

Photo credit: Zoos Victoria

Figure 1.16 a. A pre-release aviary suitable for large insectivorous birds, such as lyrebirds. Note the mulch floor for foraging and provision of branches for hides and perches. b. A pre-release aviary suitable for medium sized birds, such as parrots, magpies or kookaburras. Note the concrete floor for easy cleaning.

Photo credit: Zoos Victoria

1.7 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe how an animal is responding to food on offer and inform future choices.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

Diets for a range of bird species are listed in **Table 1.7** and **Table 1.8**. Birds should be weighed weekly unless there are concerns about food consumption, in which case birds should be weighed daily.

Table 1.7 Captive diets for parrots, nectarivorous birds and insectivorous birds

Species	Captive diet fed daily
Crimson rosella	15 g parrot pellets/small seed 20 g sprouted seed (recipe in **Table 1.9**) 20 g fruit/vegetables[1] 30 g greens, grasses[2] 5 g insects
Eastern rosella	15 g parrot pellets/small seed 20 g sprouted seed 20 g fruit/vegetables 30 g greens, grasses 5 g insects
Galah	25 g parrot pellets/small seed 20 g sprouted seed 3–5 seeding grasses 3 tree branches[3] 10 g mealworms, moths
Long-billed corella	40 g parrot pellets/medium seed 20 g sprouted seed 10 g nuts 30 g fruit/vegetables 5 g mealworms, moths
Red wattlebird	35 ml lorikeet and honeyeater food[4] 3–5 flowering branches[3] 20 g crickets, mealworms 30 g fruit/vegetables Native insects on branches[5]
Noisy miner	25 ml lorikeet and honeyeater food 30 g fruit/vegetables 10 g small seeds 20 g cricket, mealworms

Species	Captive diet fed daily
Sulphur-crested cockatoo	40 g parrot pellets/medium seed 20 g sprouted seed 10 g nuts 3–5 seeding grasses 5 tree branches 40 g fruit/vegetables 5 g mealworms
Magpie lark	20 g crickets, fly pupae, mealworms, earthworms 40 g egg or meat and insectivore mix

Species	Captive diet fed daily
Rainbow lorikeet	40 ml lorikeet and honeyeater mix 30 g fruit/vegetables 2 g mealworms 3 flowers (1 gum, 1 *Callistemon*, 1 other)
Superb lyrebird	500 g earthworms 10 g fly pupae, mealworms, maggots 150 g egg or meat and insectivore mix

1 Fruits include chopped melons, grapes, berries, banana, pears and occasionally apple. Vegetables include sweet potato, peas, beans, corn, carrot, zucchini and capsicum.

2 Select grasses from areas that have not been sprayed with herbicides. Rinse all items well before offering them. Green food suitable for parrots and pigeons includes sow thistle, millet, winter grass, chick weed, silver beet, spinach, Chinese vegetables, endive, dark green lettuces and dandelion.

3 Branches with flowers or fruits from species such as *Banksia*, *Hakea*, *Casuarina* and wattles for parrots and *Grevillea*, *Callistemon*, *Melaleuca* and *Eucalyptus* for nectarivorous birds. Place in water to maintain freshness.

4 Commercially available lorikeet and honeyeater mix. Home-made nectar mixes should not be used. Commercial wet mixes are preferable to dry forms. If the ambient temperature is more than 25°C the nectar offered in the morning should be removed and replaced with fresh nectar in the middle of the day to avoid bacterial overgrowth. If this is not possible an alternative is to offer nectar in the morning then remove and replace in the afternoon, ensuring that there are alternative food items available during the day when nectar is not available.

5 Insects including crickets, mealworms, moths and fly pupae must make up 30–50 per cent of the diet for honeyeaters.

Figure 1.17 A wide, shallow food bowl with greens, soaked seed and chopped fruit and vegetables for a parrot.

Photo credit: Zoos Victoria

Figure 1.18 a. A bowl of feed suitable for honeyeaters. b. Suitable feed for finches.

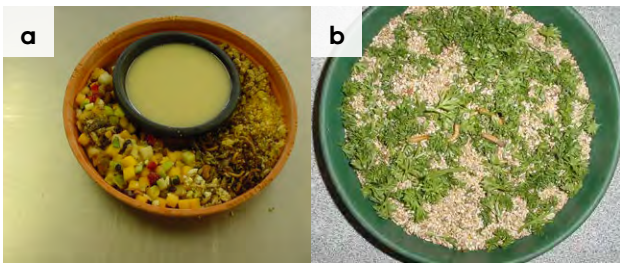


Photo credit: Zoos Victoria

Table 1.8 Captive diets for omnivorous birds and native pigeons

Common name	Daily captive diet
Laughing kookaburra	30 g thawed frozen mice or thawed frozen day-old chicks 50 g crickets, mealworms, earthworms
Tawny frogmouth	40 g thawed frozen mice 50 g crickets, mealworms
Australian raven	30 g thawed frozen mice, or 1-day old chicks 50 g crickets, mealworms, earthworms 50 g chopped vegetables coated with insectivore mix
Australian magpie	30 g chopped mice 50 g crickets, mealworms, earthworms 100 g meat mix
Pied currawong	30 g thawed frozen mice 50 g crickets, mealworms, earthworms 50 g fruit and veg 10 g small seeds 100 g meat mix
Grey butcherbird	40 g egg or meat and insectivore mix 10–20 g crickets, mealworms, earthworms
Crested pigeon	100 g seed* 50 g sprouted seed 3 seeding grasses 50 g fruit/vegetables 2 g mealworms
Common bronzewing	100 g seed 50 g sprouted seed 100 g fruit/vegetables 3 seeding grasses 2 g mealworms

* Pigeon seed (contains millet, panicum, cracked maize, wheat, dun peas and sorghum). It is important to include some legumes (for example peas) in the diet.

Table 1.9 Sprouted seed recipe

Note: it is important to follow this recipe carefully. Sprouted seed if not carefully managed may grow bacteria and make animals sick.

Suitable seeds	Millet, panicum, canary, wheat, sunflower, barley, oats, mung beans.
Step 1	Place required amount of seed into a container and cover with warm water.
Step 2	Add an antibacterial agent such as chlorhexidine (Aviclens) at a rate of 5ml Aviclens to 10L water and soak overnight.
Step 3	Rinse the soaked seeds with cold water.
Step 4	Drain off the water and put the seeds in a tray.
Step 5	Continue rinsing the seeds at 4–6-hour intervals until the tips of the roots appear. This usually takes 24 to 48 hours depending on temperature.
Step 6	Give the seeds a final rinse before soaking them for 10 minutes in Aviclens.
Step 7	Rinse and drain the seeds and they are ready for use. Sprouted seeds keep for up to two days in the refrigerator. If any mould is detected (black spots, grey filaments, mouldy odour), discard the whole batch and clean trays thoroughly with bleach (3 ml per litre of water).

1.8 Hand raising

Hand raising record templates for growth, development, feeding and other observations can be found in the appendices to Part A.

1.8.1. Equipment required for hand raising

- Hand raising utensils. See **Table 1.10**.
- Hand raising diet. See **Table 1.11**.
- Artificial nest in an intensive care unit or box containing a heat lamp/heat pad and thermometer. See **Table 1.13**.
- Tissues/wipes for cleaning the bird.
- Scales.
- Record charts.

1.8.2. Growth, development and care of orphaned young

Table 1.10 describes different techniques used to feed orphaned birds. **Table 1.11** lists a range of diets used to feed different bird groups. Feeding frequency and the ambient temperature required by birds at different stages of development are listed in **Table 1.12**.

Diets for growing birds need to provide adequate nutrients for normal growth. If unsure of the species, the bird should be fed as if it is an insectivore. An emergency diet for young birds is to mix Wombaroo Insectivore mix with a boiled egg. Young birds should be fed 15–20 per cent of their bodyweight in divided feeds daily.

Table 1.10 Methods of feeding orphaned birds

Crop needle	Used for birds with crops (e.g. parrots, pigeons). A crop needle is attached to a syringe containing the food. It is passed down the oesophagus until it reaches the crop. Rehabilitators need to be trained in the use of a crop needle so that it is not inadvertently passed into the trachea or damages the delicate lining of the crop. This training can be provided by other experienced rehabilitators, aviculturists or veterinary staff.
Rubber feeding tube	Used for pigeons. It should never be used for parrots as they can bite through it. The tube is passed into the mouth and oesophagus until it reaches the crop or the bottom of the neck. Rehabilitators need to be trained in its use so that is not inadvertently passed into the trachea.
Spoon feeding	Either via a purpose-built spoon feeder or a bent teaspoon. The food is placed onto the spoon and then placed at the opening of the beak. The bird should scoop food into its mouth using the top beak. It is likely to bob its head during feeding.
Tweezers	The food item is held in the tweezers. The side of the beak is tapped with the tweezers, which should stimulate the bird to open its mouth. The food is placed towards the back of the mouth.
Syringe feeding	Food is placed into the open beak using a syringe. This method carries a risk of the bird aspirating food material so is seldom recommended.

Figure 1.19 Crop feeding a rainbow lorikeet with a crop needle and syringe.

Photo credit: Zoos Victoria

Table 1.11 Diets for orphaned young of various bird groups

Type of bird	Example	Examples of diets to feed
Omnivorous birds	Laughing kookaburra, magpie	10 g meat with 2 teaspoons Wombaroo Insectivore mix, pinkie mice, insects
Granivorous birds	Pigeons, galahs, rosellas, cockatoos	Wombaroo Granivore mix, Passwells handrearing mix or Vetafarm handrearing mix
Nectarivorous parrots	Rainbow lorikeet	Wombaroo Lorikeet/Honeyeater mix
Nectarivorous birds	Honeyeaters, red wattlebird	Equal parts Wombaroo Insectivore mix and Wombaroo Lorikeet/Honeyeater mixed into a paste
Insectivorous birds	Silvereye, wrens, swallows, magpie larks	5 teaspoons Wombaroo Insectivore mix or 1 teaspoon Wombaroo Granivore mixed with mashed boiled egg and fed as a crumble, insects

Table 1.12 Feeding frequency and ambient temperature requirements for young altricial* birds

Type of bird	Example	Unfeathered (35°C)	Feathered (32°C)	Fledgling (28°C)
Small insectivores and nectarivores	Swallows, silvereye	15 minutes during daylight	20 minutes	30 minutes
Medium insectivores and nectarivores	Magpie lark Red wattlebird	30 minutes	1 hour	6 hours
Large insectivores, omnivores and nectarivores	Kookaburra Rainbow lorikeet	30 minutes	6 hours	6 hours
Granivores	Galah Pigeons Doves	2 hours	4 hours	12 hours

*Precocial birds are offered food continuously

It is important to weigh the chicks daily and record the amount of food fed. After feeding, the chicks should be cleaned around the mouth to avoid a build-up of excess food that can lead to skin disease.

Intensive care housing is also suitable for nestlings, which may be kept in nests in heated enclosures. See **Table 1.6** and **Table 1.3** and **Figure 1.20** and **Figure 1.21**. This will differ with the type of orphan and its stage of development.

Precocial birds, such as emus, must be housed with other juvenile birds of the same species to prevent imprinting. Their heating requirements are the same as altricial birds that are at a similar stage of development. They may be self-feeding and active from an early age. They should be moved to an outside aviary once they are feathered.

Altricial birds should be housed with other juveniles of the same species wherever possible. They are born naked and require heating via an incubator or other heated enclosure. When unfeathered, place these birds in a substitute nest. Once feathered they no longer require heat. Move to an aviary when fledging. Provide young birds a minimum of one hour of sunshine daily. See **Table 1.14** for the development stages of various bird species.

Table 1.13 Nest types suitable for orphans

Species	Type of nest	Captive housing
Tawny frogmouth	Sparse, open, stick nests	Branches to perch on
Magpie, currawong, raven, red wattlebird	Formed, open stick nests	Plastic basket or tub, esky, cardboard box
Magpie lark	Formed, cup nests	Margarine or ice-cream container covered with a light cloth
Swallow	Enclosed mud nests	Cardboard box with hole
Eastern rosella, galah, sulphur-crested cockatoo, rainbow lorikeet, laughing kookaburra	Cavity	Cardboard box (shoebox, wine cask) with lid and small hole opening

Figure 1.20 a. An ice-cream container used as a nest for a clutch of nestling rainbow lorikeets. b. A cat carry cage with a heat pad below the paper is used for rearing fledglings. The young birds are sitting in plastic food containers.

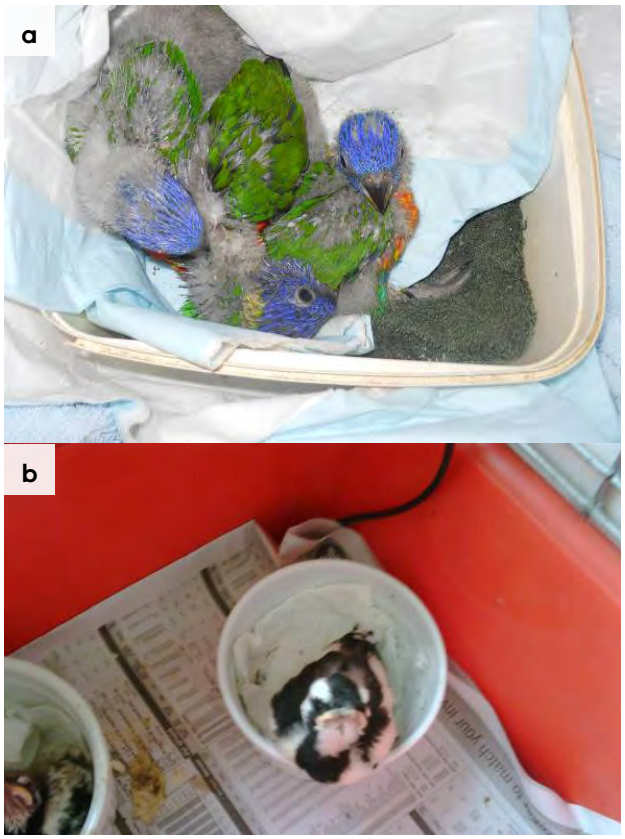


Photo credit: Anne Fowler

Figure 1.21 Juvenile magpie in a veterinary incubator.

Photo credit: Zoos Victoria

Table 1.14 Development stages for a range of bird species

Common name	Eyes open	Age at fledging (weeks)	Age at release (weeks)	Release weight (g)
Australian magpie	7–10 days	6–7	10–16	250–280
Australian raven	By 12 days	5 – 6	16 – 20	460–500
Crested pigeon	3 days	2	4	150–180
Crimson rosella	4 days	4–5	8	115–140
Eastern rosella	4 days	5	8	85–110
Galah	15–18 days	7	11–14	250–280
Laughing kookaburra	14 days	5	12	> 330
Long-billed corella	7 days	6–8	8–11	380–410
Magpie lark	8 days	3	7–10	55–90
Noisy miner	3–4 days	2	4–7	45–60
Pied currawong	14 days	4–5	11–12	250–280
Rainbow lorikeet	14 days	7	8–9	75–100
Red wattlebird	7 days	2–3	6	80–100
Sulphur-crested cockatoo	8 days	10	16	580–600
Tawny frogmouth	10 days	4	6–8	180–200

1.8.3. Imprinting

Imprinting is a common problem with hand-reared orphan birds. Some suggestions to prevent this include:

- Raising birds with other birds of the same species and a similar age. The maximum number of birds to group together should reflect normal clutches when young, for example up to six for rosella species and two to three for magpies.
- Raise young birds in the presence of older birds of the same species.
- Have the bird face a mirror while it is fed.
- Use hand puppets placed over the human hand during feeding of young birds.
- Avoid being affectionate or talking to birds and avoid any non-essential handling or physical contact.
- Avoid raising birds within sight or smell of domestic animals.
- Offer wild and native food from a young age so that the bird learns to feed itself and does not rely on humans for food.
- Once fledged, raise young birds outside so that they can see and hear other birds of the same species that are found in the local area.

Fostering involves non-related birds of the same species taking over the care of orphaned individuals. This has been shown to work well with white-winged choughs (within the first month of fledging), laughing kookaburras and magpies. As parents of the species provide not only food but education, every effort to foster an individual in the wild should be made when possible in preference to rearing in captivity. Once the adult birds have been shown to feed the young, fostering is deemed to be successful.

1.9 Release protocol

Ideally, wild animals will be rehabilitated and released in a short timeframe. If this is not possible and the animal is in care for significant extended periods, ensure that the animal is regularly assessed against the welfare domains to support decision-making. Animals in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for the animal.

1.9.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support better outcomes once back in the wild. Animals should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following information should be used to guide decision-making regarding release suitability for birds:

- ☑ Individual is in a state of good health – presenting injury/sickness is completely resolved.
- ☑ For birds that have had fractured bones or head trauma, a pre-release examination by a veterinarian is recommended to determine that the original injury has healed. This may involve radiographs of the fracture site to determine the extent of healing.
- ☑ Flight should be critically observed, if possible, with an experienced rehabilitator. The ability to gain lift, negotiate the environment and land are required for successful release.
- ☑ The feathers and feet should be checked for damage sustained during care prior to release.
- ☑ Birds take 10–14 days without exercise to lose fitness. Whenever possible, they should be released before this time.
- ☑ Birds should be able to fly strongly upwards to avoid predation. A bird should be able to gain 2 m in height within 2–4 m in distance.
- ☑ The bird should be able to fly for 2–3 minutes or 10 laps of the pre-release aviary and should not be open-mouth breathing for longer than 30 seconds after the end of the process.
- ☑ The bird should be able to demonstrate agility in moving around the aviary by changing direction and avoiding branches and perches.
- ☑ The bird should be able to land well on a perch.
- ☑ Individual is within a healthy weight range and appropriate body condition (see **Table 1.1**).
- ☑ Individual displays ability to actively forage and consume natural foods.
- ☑ Individual displays appropriate predator avoidance behaviour and is not imprinted on people.

1.9.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered.

- Orphaned birds should be released when they reach their release age/weight as outlined in **Table 1.14**. Adult birds should be released as soon as possible.
- Diurnal birds should be released in the morning, after dawn and before midday.
- Nocturnal birds should be released 1–2 hours after dark.
- The time of release should consider the fact that birds need sufficient time to orient themselves in their territory. They need time to find a safe roost before their natural resting time.

- Although most birds are non-migratory in their lifestyles, some species may move large distances to follow food. The rehabilitator needs to be aware that holding a bird for a long period of time may preclude it from being able to access sufficient seasonal food. If this occurs the bird must be euthanised to prevent it from starving.
- Unless natural nesting sites have been destroyed, the provision of nest-boxes is not necessary.
- Avoid release of birds when the forecast is for strong winds or storms for the following three days.

1.9.3. Release checklist

Check all of the requirements of your authorisation are being met, and consider the following:

Release of adults and orphaned birds that have reached their release age/weight

☑ Take the bird as close as possible to the point-of-encounter and open the cage door. Allow the bird to fly away.

Return juvenile bird with artificial nest

☑ In situations where the nest has been destroyed, a young bird can be returned to the location where it was found using an artificial nest.

☑ This must be done within 24–48 hours of the destruction of the original nest.

☑ The artificial nest may be as simple as a small plastic bucket, with holes in the bottom for drainage, suspended in the branches of a tree.

☑ A stick should be placed from the bottom to the top of the bucket, on an angle to allow the chick or parents to move in and out of the bucket easily.

☑ The young bird is fed and then placed in the nest.

☑ The nest is monitored to ensure that the parents return to the young bird.

☑ If the parents have not returned to feed the bird in 4–6 hours the young bird is returned to care.

☑ This may be repeated on the following day and is suitable for nestlings of any species.

Return juvenile bird without a nest

☑ This technique can be used for tawny frogmouths and magpies.

☑ Juvenile tawny frogmouths can be returned to the tree where the original nest was found.

☑ The adult should be identified to be close by before the young bird is left.

☑ Magpies leave their young in different trees within their territory once the young are partly feathered.

☑ Juvenile magpies are returned to the location where they were found in their parent's territory and placed into branches of a shrub or tree.

☑ The young are observed until the parent's return, which may take some hours, and should be seen to be fed by the parent before they are left.

1.10 Key references and additional reading

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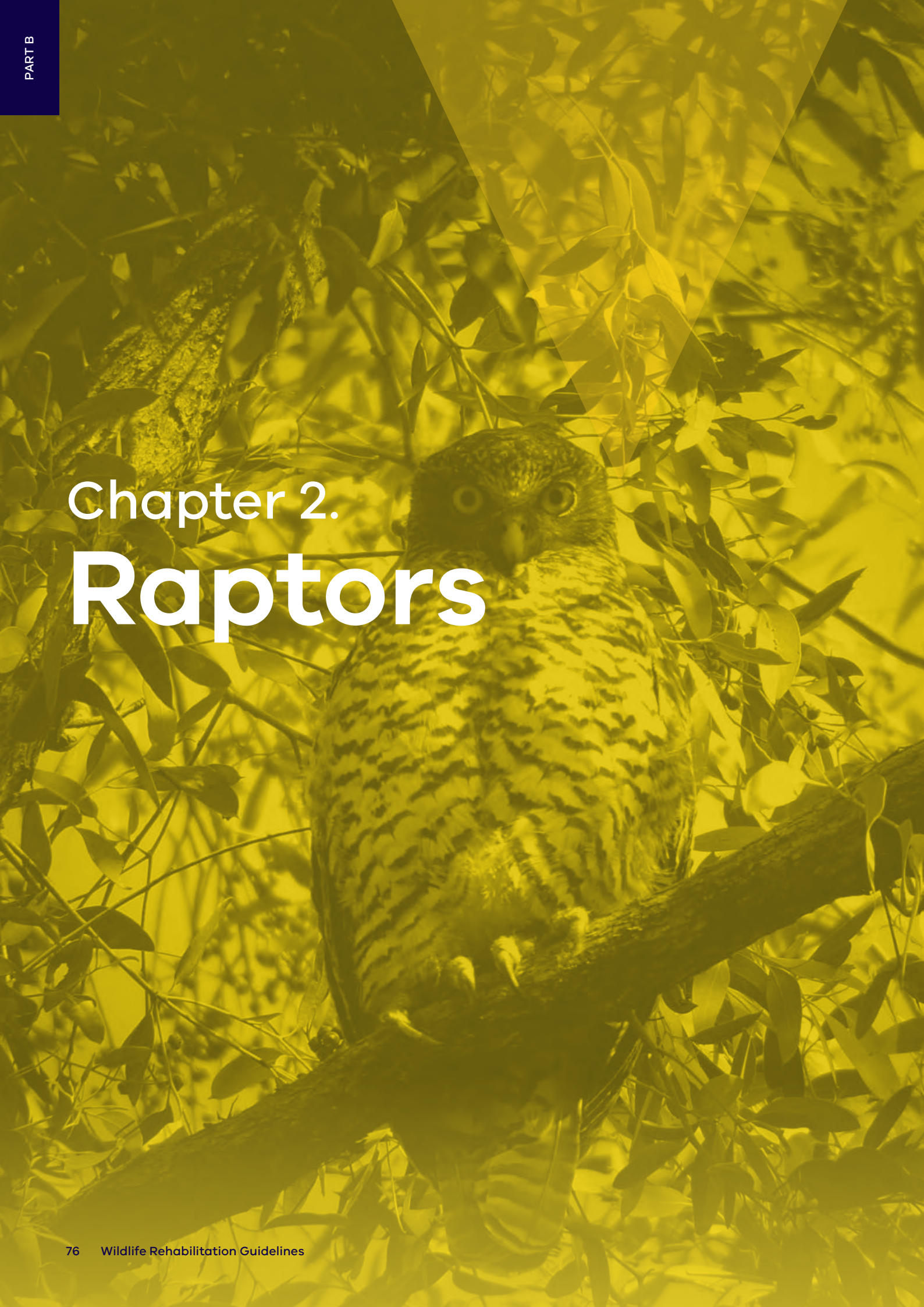


Chapter 2.
Raptors

Contents

Photo credit: Victor Hurley

In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: **https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers**.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.

2.1 Introduction

Raptors, also known as birds of prey, have very specific housing, rehabilitation and release requirements. They should only be rehabilitated by wildlife shelter operators with specialised facilities, experienced in their care and knowledgeable about individual species needs. A close working relationship with a veterinarian interested in birds, ideally with raptor expertise, is essential for successful rehabilitation of this group of birds. As top predator species, raptors must be optimally fit for release to ensure survival. It is essential that time in care and progression through rehabilitation considers the specific requirements for each individual species.

Barking owl, masked owl, powerful owl, sooty owl, grey falcon, grey goshawk and white-bellied sea eagle are listed as threatened in Victoria under the Victorian *Flora and Fauna Guarantee Act 1988* and the grey falcon is also listed federally under the *Environment Protection and Biodiversity Conservation Act 1999 List of Threatened Fauna*.

STOP

STOP – If a threatened species comes into care, please STOP and refer to your authorisation for mandatory conditions including notification and release requirements.

When raptors come into care it is the responsibility of the wildlife rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition, and an environment appropriate to the stage of rehabilitation. The focus should be on the bird's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the bird's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. For example, a bird with a fractured wing must be confined and not allowed to attempt flight until that fracture has healed. It can then be allowed a staged return to free flight. Further information about the five domains of animal welfare is in Part A of these guidelines.

2.2 Species information

Profiles for the raptor species found in Victoria are detailed in the following tables. They do not describe all of the raptor species found in Victoria. Morphometric data was obtained from the Australian Bird Study Association Inc. website (**https://absa.asn.au/**). Wing chord is the distance from the wrist joint to the end of the longest primary feather (see **Figure 2.1**). For assistance in identification of raptor species, refer to the recommended reading and reference material at the end of this chapter.

Figure 2.1 Avian wing showing measurement of wing chord

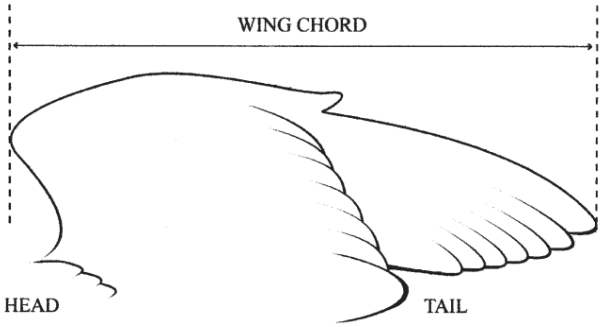
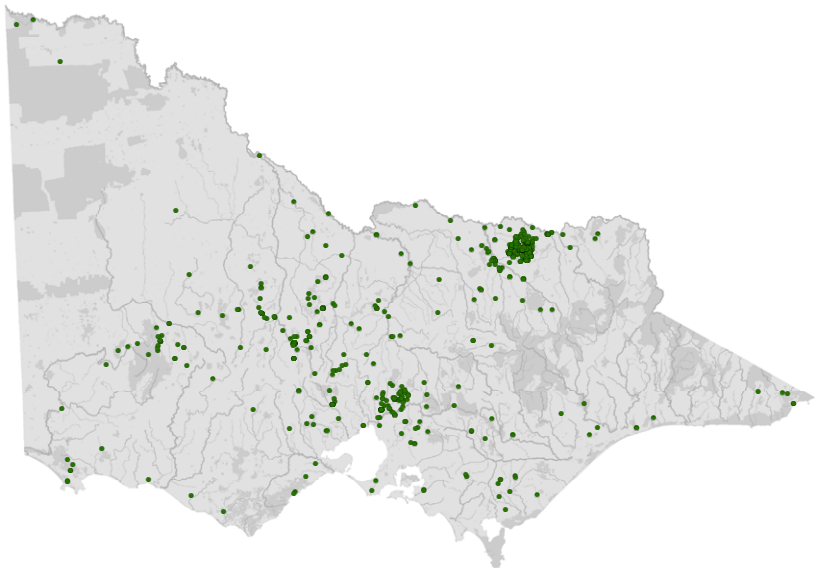
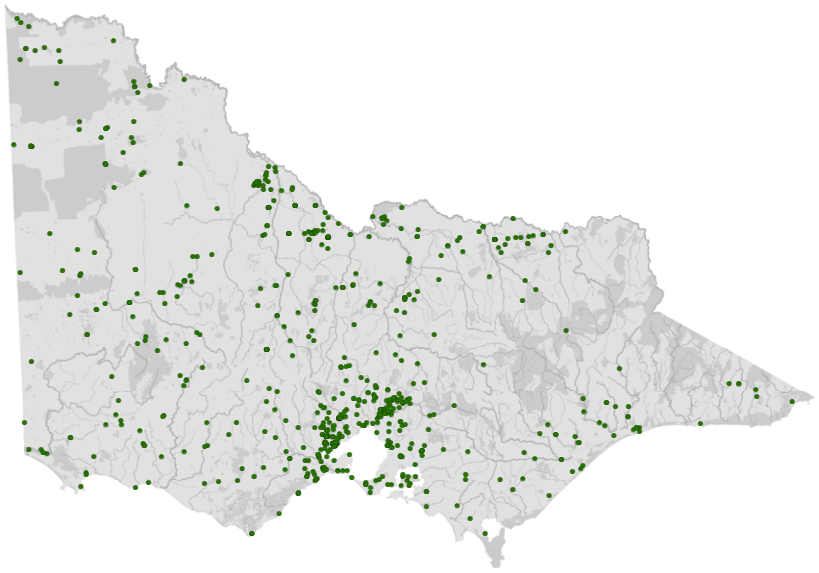


Photo credit: Zoos Victoria

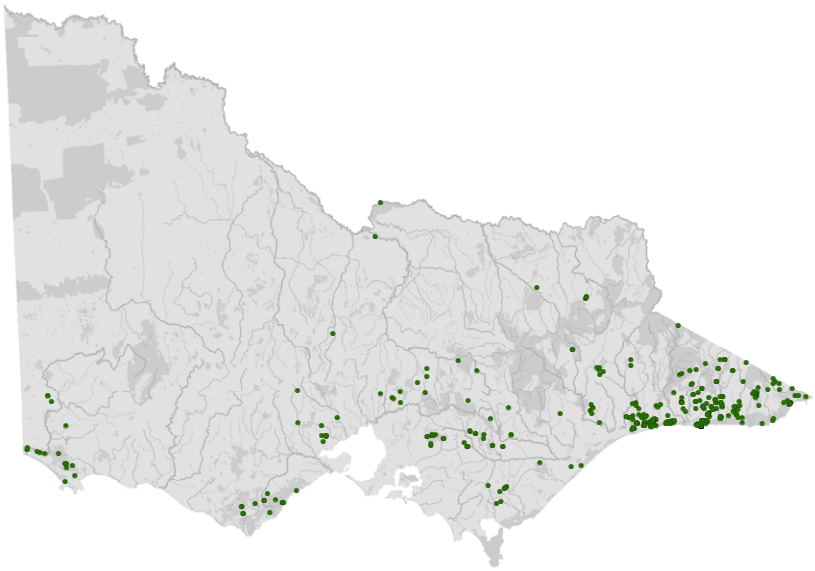
Table 2.1 Species Profiles: Nocturnal birds of prey that commonly come into care

Species	Barking owl (*Ninox connivens*)
 Photo credit: Rohan Bilney	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**

Species	Barking owl (*Ninox connivens*)
General appearance	Adults: Large bright yellow eyes. Almost no facial mask. Upperparts brownish-grey. Underparts white, streaked brownish-grey. White spots on wings Juveniles: Incomplete collar. Flanks and breasts similar to adults
Conservation status*	Critically endangered
Adult morphometrics	Body weight: Male: 639–960 g. Female: 380–846 g Head and body length: 350–450 mm Wing chord: Male: 299–325 mm. Female: 277–317 mm Tail length: Male: 164–179 mm. Female: 152–182 mm
Habitat	Dry forest
Home range	30–200 ha Territorial
Natural activity peak	Crepuscular
Foraging style	Hunt from perch, pounce on ground, strike in foliage
Diet	Birds and mammals when breeding Insects when not breeding
Movement	Resident
Nesting time	July–September
Laying	August–November
Nest location	Tree hollows
Fledgling	October–January
Age at dispersal	4 months
Age at maturity	10–24 months

Species	Barn owl (*Tyto alba*)
 Photo credit: Chris Lindorff, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	White, heart shaped facial disc. Upperparts grey to yellow with sparse black and white spots. White below with sparse dark spots Similar to the masked owl, however the barn owl is smaller and less bulky
Conservation status*	Common
Adult morphometrics	Body weight: Male: 250–418 g. Female: 258–470 g Head and body length: 320–400 mm Wing chord: Male: 268–291 mm. Female: 280–296 mm Tail length: Male: 107–123 mm. Female: 111–126 mm
Habitat	Grassland, farmland. Arid to rainforest
Home range	100 ha
Natural activity peak	Nocturnal and sometimes crepuscular
Foraging style	Hunt from perch, hover and search
Diet	Mice, rats, birds, reptiles
Movement	Resident but can follow rodents
Nesting time	Responds to food availability
Laying	August–December

Species	Barn owl (*Tyto alba*)
Nest location	Deep hollow in live or dead tree
Fledgling	September–January
Age at dispersal	3 months
Age at maturity	10–11 months

Species	Masked owl (*Tyto novaehollandiae*)
 Photo credit: Indra Bone, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Black-bordered facial disc. Colour varies from white to blackish above and chestnut below Similar to the barn owl, however the masked owl is generally darker and larger
Conservation status*	Critically endangered
Adult morphometrics	Body weight: Male: 352 – 603 g. Female: 476 – 706 g Head and body length: Male: 330–410 mm. Female: 390 – 500 Wing chord: Male: 292–323 mm. Female: 320–356 mm Tail length: Male: 121–147 mm. Female: 135–136 mm
Habitat	Forests, open woodland, farmland
Home range	< 1000 ha Territorial

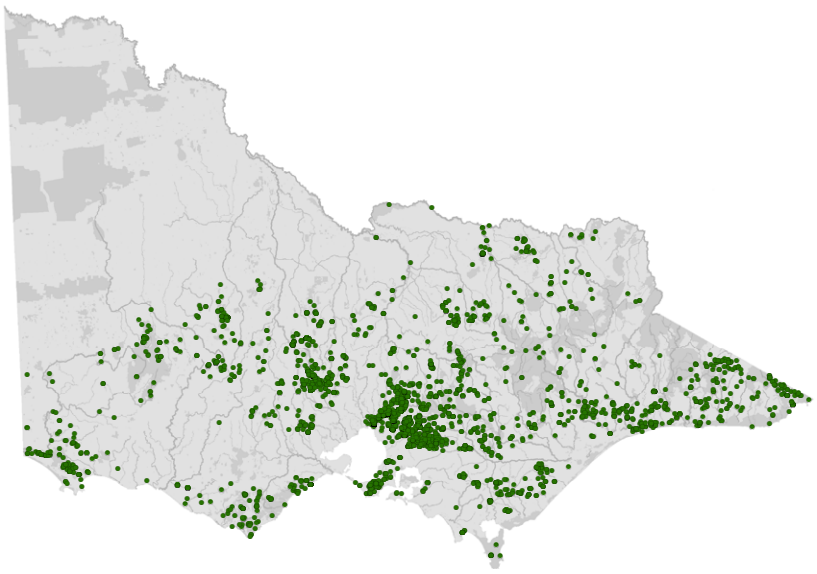
Species	Masked owl (*Tyto novaehollandiae*)
Natural activity peak	Nocturnal
Foraging style	Hunt from perch, takes prey in the trees or on the ground
Diet	Possums, mice, rats, rabbits
Movement	Resident
Nesting time	Any month, mostly autumn to winter
Laying	September–October
Nest location	Hollow eucalypt, bare ground of cave
Fledgling	November–January
Age at dispersal	4–6 months
Age at maturity	1 year

Species	Powerful owl (*Ninox strenua*)

a. Adult above
b. Juveniles in nest hollow (after banding)

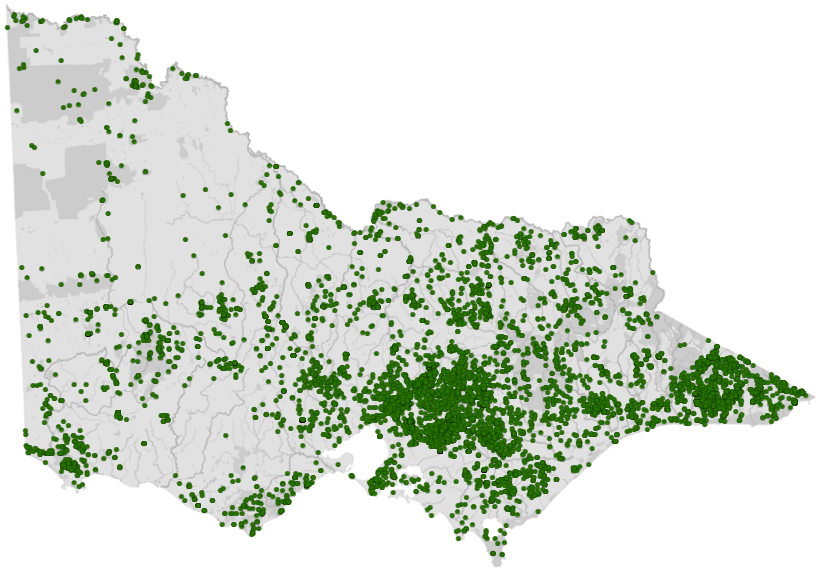
Photo credit: Victor Hurley

Distribution map

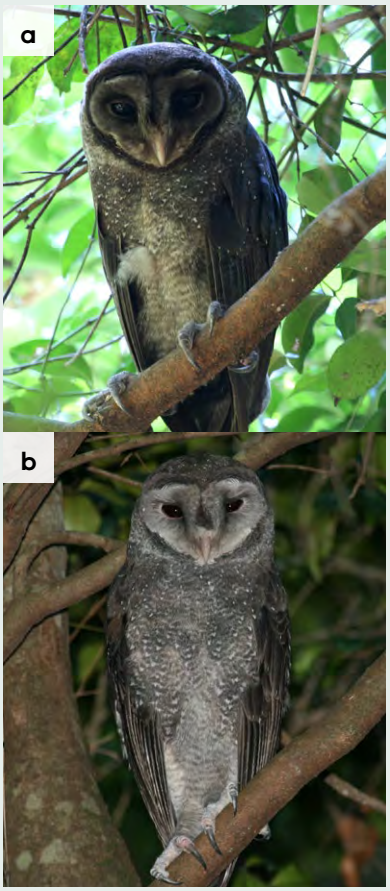
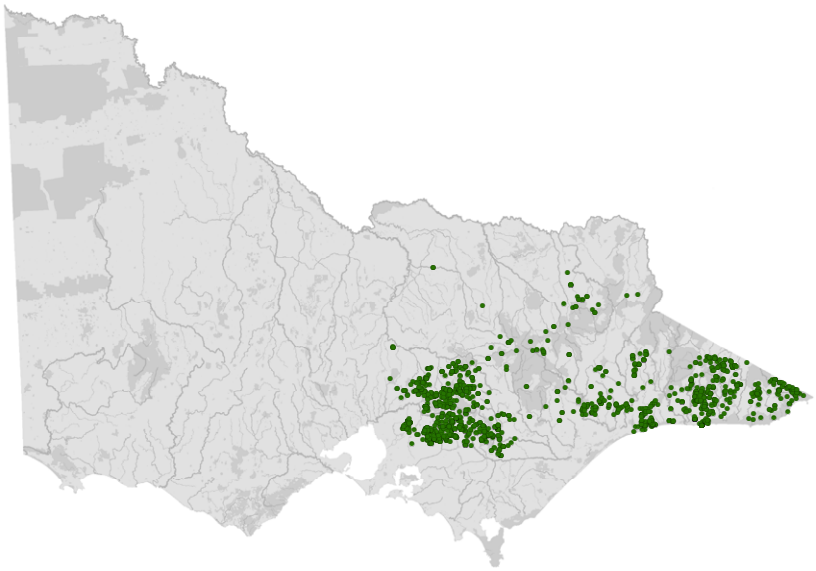


Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

Species	Powerful owl (*Ninox strenua*)
General appearance	Adult: Smallish, dark yellow eyes. Short, broad head. Upperparts, tail, dark greyish-brown with indisticnt off-white bars. Underparts whitish with dark greyish-brown chevrons Juvenile: White underparts and crown contrast with small dark streaks and dark eye patches
Conservation status*	Vulnerable
Adult morphometrics	Body weight: Male: 995–2220 g. Female: 1040–1465 g Head and body length: 450–650 mm Wing chord: Male: 385–420 mm. Female: 379–413 mm Tail length: Male: 231–267 mm. Female: 235–262 mm
Habitat	Mountain forests, woodlands, pine plantations
Home range	400–4000 ha Territorial
Natural activity peak	Nocturnal
Foraging style	Hunt from perch, strike in foliage
Diet	Ringtail possums, gliders
Movement	Resident
Nesting time	June–September
Laying	August–November
Nest location	Hollow tree trunk or limb
Fledgling	October–February
Age at dispersal	6–7 months
Age at maturity	2 years

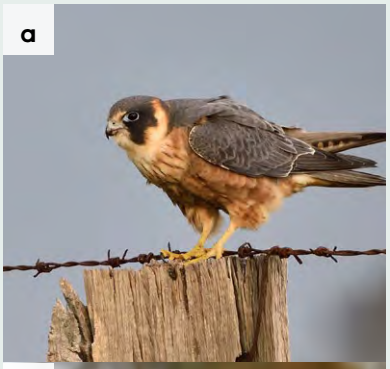
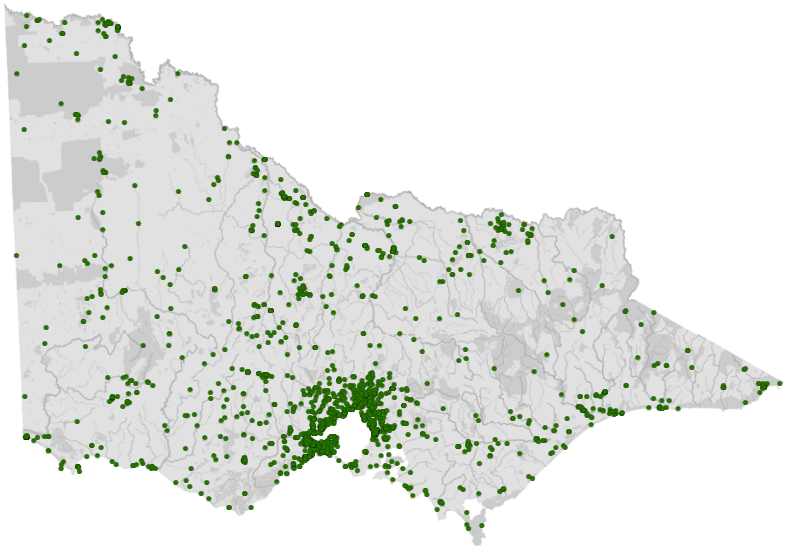
Species	Southern boobook owl (*Ninox boobook*)
a  b  a. Adult b. Juvenile Photo credit: Bernie McRitchie and David Whelan	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult: Distinct dark facial discs contrast sharply with surrounding pale borders. Eye green-yellow. Upperparts dark chocolate-brown. Upperwing coverts, scapulars spotted off-white. Underparts reddish-brown. Upper breast mottled buff becoming reddish-brown. White-streaked belly Juvenile: Crown whitish, streaked darker centrally. Facial discs very distinct. Upperparts dark chocolate-brown, profusely spotted white and buff. Underparts downy white. Tawny wash on upper breast
Conservation status*	Common
Adult morphometrics	Body weight: Male: 176 – 321 g. Female: 195 – 370 g Head and body length: 270–360 mm Wing chord: Male: 217–251 mm. Female: 222–251 mm Tail length: Male: 117–147 mm. Female: 122–153 mm

Species	Southern boobook owl (*Ninox boobook*)
Habitat	Arid to rainforest where trees are present
Home range	5–50 ha Territorial
Natural activity peak	Nocturnal and crepuscular
Foraging style	Strike prey in air, on foliage or ground
Diet	Mice, bats, small birds Invertebrates: spiders, beetles, moths
Movement	Resident
Nesting time	August–October
Laying	September–November
Nest location	Live tree hollows
Fledgling	November–February
Age at dispersal	4 months
Age at maturity	2 years

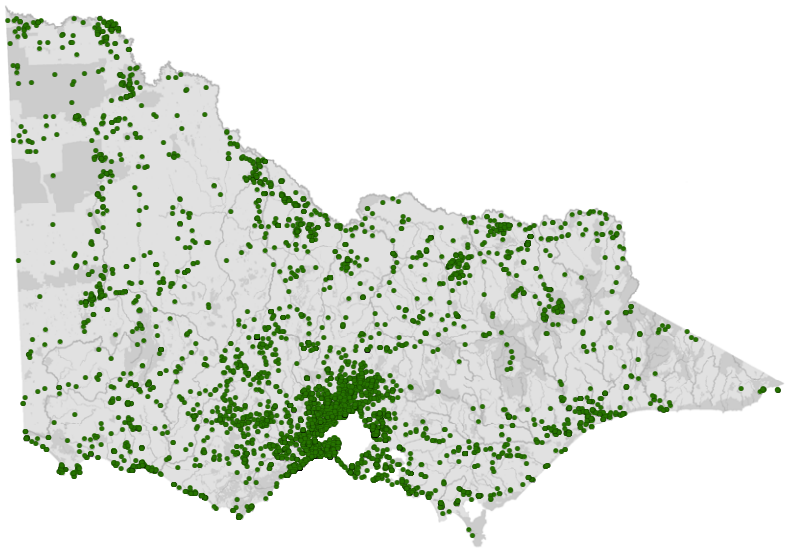
Species	Greater sooty owl (*Tyto tenebricosa*)
 a. Adult b. Juvenile Photo credit: Rohan Bilney	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Oval grey facial disc outlined in black. Upperparts and underparts dark charcoal-grey, densely whitish flecked. Belly paler grey, mottled whitish
Conservation status*	Endangered
Adult morphometrics	Body weight: Male: 452–565 g. Female: 753–1040 g Head and body length: 370–430 mm Wing chord: Male: 254–300 mm. Female: 310–340 mm Tail length: Male: 120–135 mm. Female: 151–171 mm
Habitat	Tall wet forests with dense understorey
Home range	3400–4300 ha for males <870 ha for females Territorial

Species	Greater sooty owl (*Tyto tenebricosa*)
Natural activity peak	Nocturnal
Foraging style	Hunt from perch, takes prey in the trees or on the ground
Diet	Ringtail possums, gliders, rats
Movement	Resident
Nesting time	April–June, but also autumn, spring
Laying	May–July
Nest location	Hollow tree trunk or high cavity in cave
Fledgling	July–September
Age at dispersal	4–5 months
Age at maturity	1 year

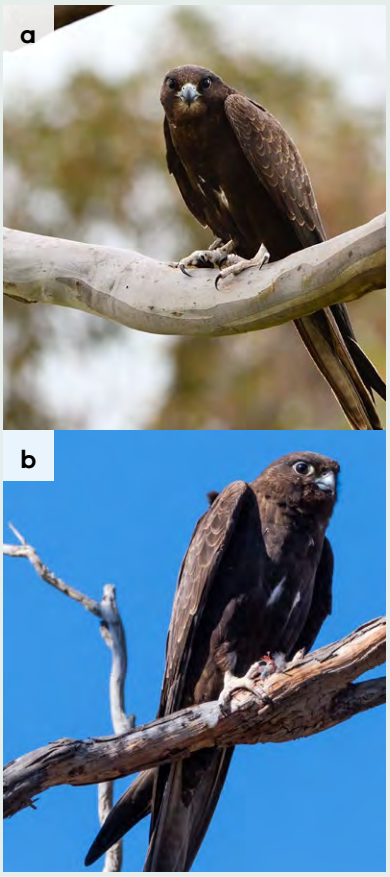
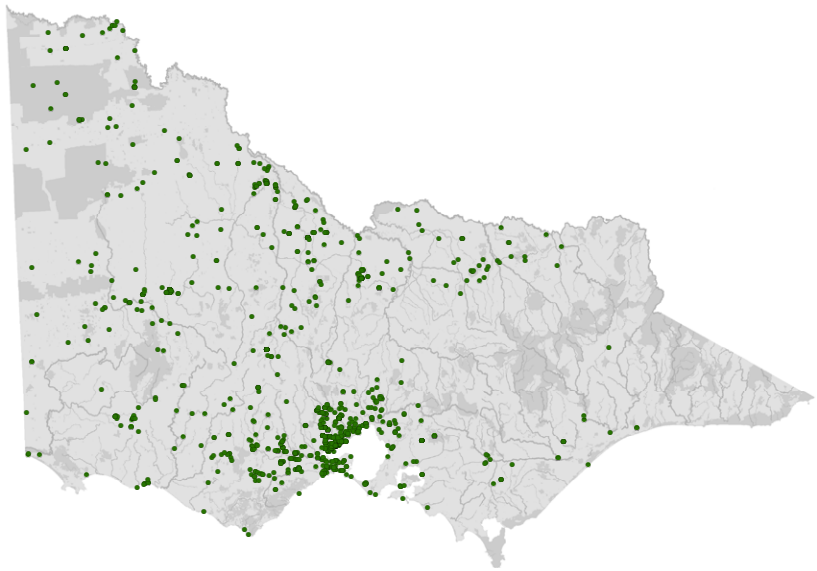
Table 2.2 Species Profiles: Diurnal birds of prey that commonly come into care

Species	Australian hobby (*Falco longipennis*)
a  b  a. Adult b. Juvenile Photo credit: Bernie McRitchie	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Cap and mask black for adults and paler for juveniles. Forehead and half-collar whitish for adults and buff to ruset in juveniles
Conservation status*	Common
Adult morphometrics	Body weight: Male: 132 – 280 g. Female: 190 – 365 g Head and body length: 300–360 mm Wing chord: Male: 228–250 mm. Female: 254–276 mm Tail length: Male: 114–135 mm. Female: 128–147 mm
Habitat	Woodland, grassland, wetlands, suburban
Natural activity peak	Diurnal and crepuscular
Foraging style	Catch birds in air, soars at dusk for flying insects
Diet	Birds <75 g, sparrow, starling, songbirds, insects, rats, mice

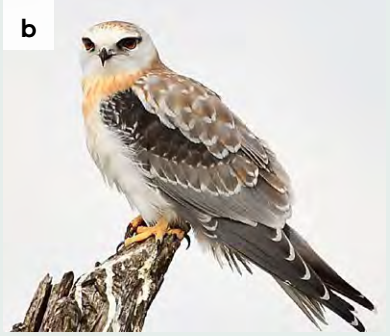
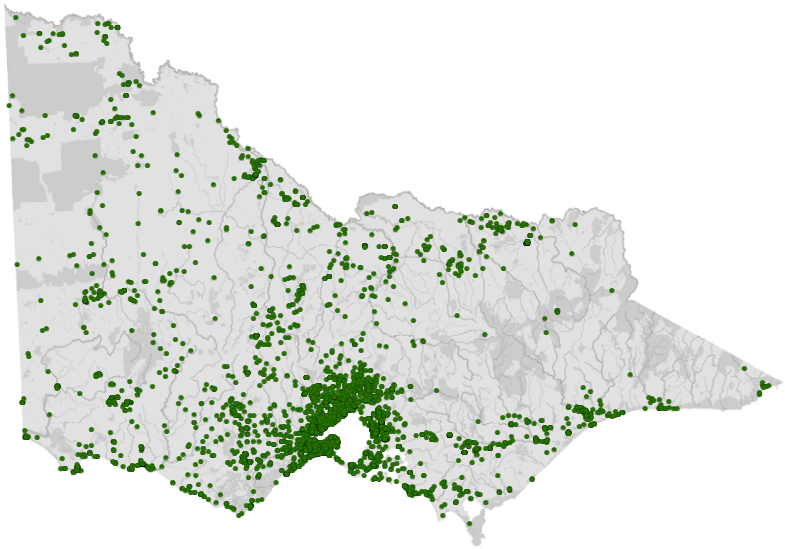
Species	Australian hobby (*Falco longipennis*)
Movement	Non-migratory, seasonally dispersive, some migrate
Nesting time	August–November
Laying	August–October
Nest location	Usurped nest of other raptor or corvid, usually in tall living tree
Fledgling	November–January
Age at dispersal	4 months
Age at maturity	1 year

Species	Australian kestrel (*Falco cenchroides*)
 Photo credit David Whelan (male) Bernie McRitchie (female)	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult male: Grey head, pale rufous back and wings. Whitish underparts with fine dark streaks Female/juvenile: Head and tail pale rufous
Conservation status*	Common

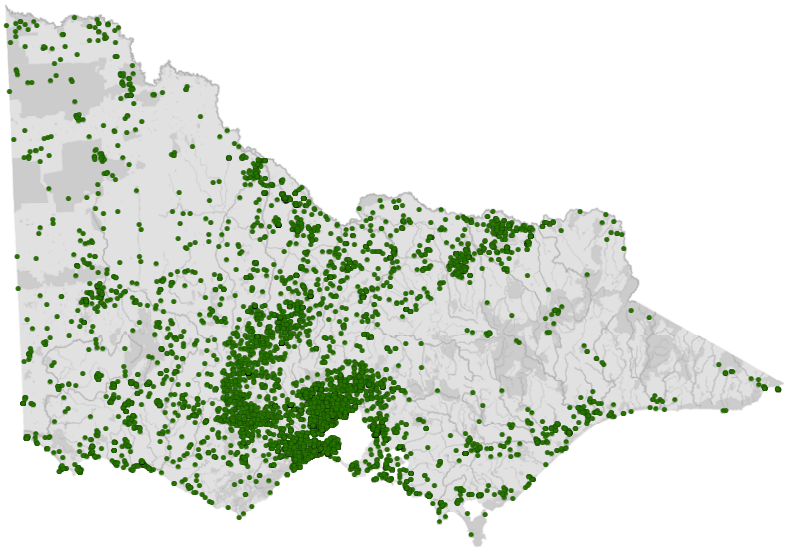
Species	Australian kestrel (*Falco cenchroides*)
Adult morphometrics	Body weight: Male: 121 – 195 g. Female: 115 – 255 g Head and body length: 280–360 mm Wing chord: Male: 235–260 mm. Female: 248–273 mm Tail length: Male: 146–168 mm. Female: 151–176 mm
Habitat	Open and wooded country, heath, mallee
Home range	1–10 ha, shared with other kestrels
Natural activity peak	Diurnal
Foraging style	Hover or flush prey on ground
Diet	Mice, small birds (sparrow, starling), skinks, insects
Movement	Resident in Victoria
Nesting time	Late September – early November
Laying	August–December
Nest location	Cliff edge, tree hollow, mine-shaft, building
Fledgling	January–February
Age at dispersal	2 months
Age at maturity	1 year

Species	Black falcon (*Falco subniger*)
 a. Adult b. Juvenile Photo credit: David Whelan & Bernie McRitchie	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult: Large sooty brown falcon. Old birds acquire a whitish forehead and throat Juvenile: Darker than adult with faint narrow bars under wings and tail
Conservation status*	Critically endangered
Adult morphometrics	Body weight: Male: 510 – 710 g Female: 610–1000 g Head and body length: 450–560 mm Wing chord: Male: 347–376 mm. Female: 386–424 mm Tail length: Male: 200–226 mm. Female: 227–257 mm
Habitat	Plains, grassland, foothills, wetlands
Natural activity peak	Diurnal
Foraging style	High speed vertical stoop, often pirates prey from other raptors
Diet	Small birds, ducks, quail, parrots, mammals (rabbits, mice), reptiles, insects

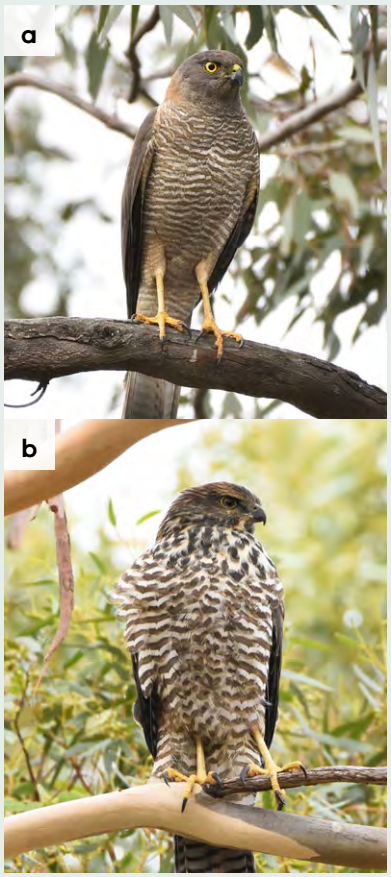
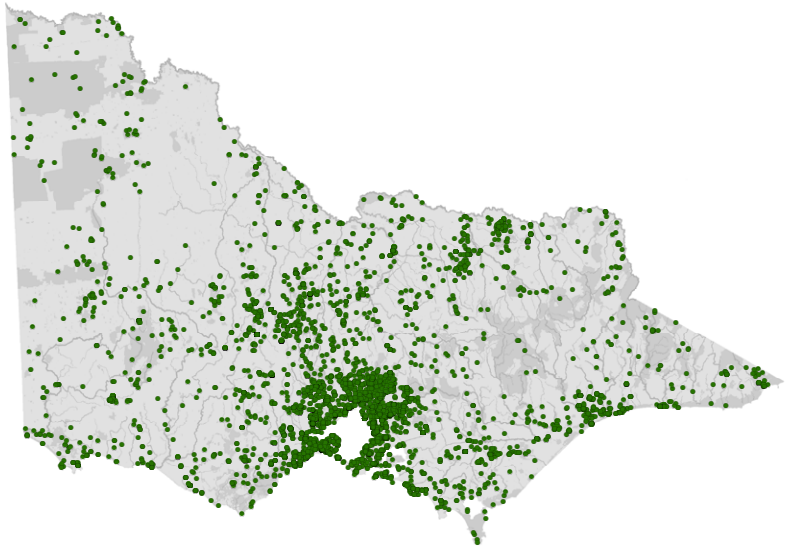
Species	Black falcon (*Falco subniger*)
Movement	Nomadic, dispersive
Nesting time	June–December
Laying	July–December
Nest location	Old or usurped nest of other raptor or corvid
Fledgling	September–January
Age at dispersal	2 months
Age at maturity	Unknown

Species	Black-shouldered kite (*Elanus axillaris*)
a  b  a. Adult b. Juvenile Photo credit: Bernie McRitchie	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult: White head, body and tail, black shoulders and red eyes Juvenile: Spotted brown to golden-tan on head, neck, breast and back
Conservation status*	Common
Adult morphometrics	Body weight: Male: 181–295 g, Female: 270–340 g Head and body length: 350–380 mm Wing chord: Male: 274–309 mm. Female: 283–318 mm Tail length: Male: 133–155 mm. Female: 138–155 mm

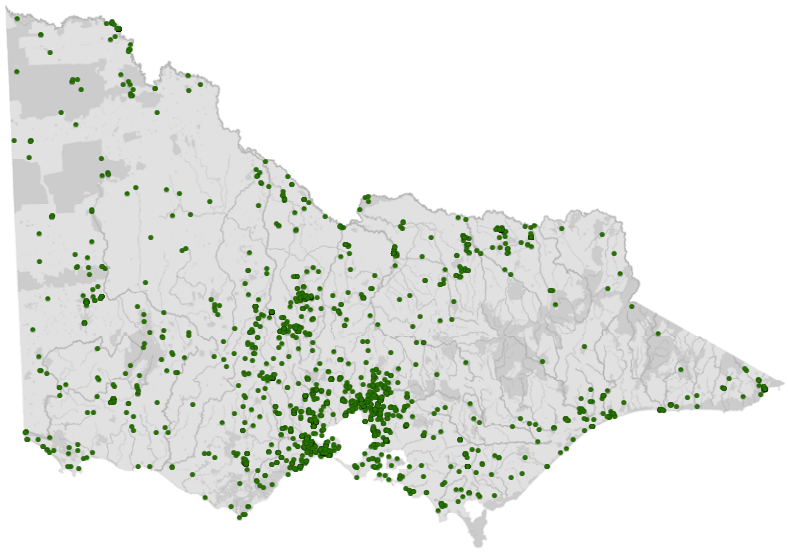
Species	Black-shouldered kite (*Elanus axillaris*)
Habitat	Open country and grasslands 30–150 cm high, farmland
Home range	Nestlings can move 50 km from home
Natural activity peak	Diurnal and crepuscular
Foraging style	Hover and drop feet first onto prey from 10–30 m
Diet	Mice, rats, rabbits, sparrows, starlings, quail, frogs, skinks, grasshoppers, insects
Movement	Resident in high-rainfall areas
Nesting time	March–August, depends on food
Laying	March–October
Nest location	10 m up tree in dense foliage
Fledgling	May–November
Age at dispersal	2 months
Age at maturity	1 year

Species	Brown falcon (*Falco berigora*)
 Photo credit: Bernie McRitchie (male on the left, female on the right)	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

Species	Brown falcon (*Falco berigora*)
General appearance	Adult: Brown above, with dark marks below and behind eye. Underparts either whitish with dark streaks and brown thighs, or blotched brown and white, or wholly dark brown. Underwings barred Juvenile: Darked underparts
Conservation status*	Common
Adult morphometrics	Body weight: Male: 316–590 g, Female: 430–860 g Head and body length: 400–500 mm Wing chord: Male: 299–351 mm. Female: 329–390 mm Tail length: Male: 169–220 mm. Female: 248–288 mm
Habitat	Open woodlands, plains, alpine meadows, farmland, coastal dunes
Home range	Unknown
Natural activity peak	Diurnal and crepuscular
Foraging style	Sloping glides to seize prey on ground, hunts on foot
Diet	Rabbits, birds, snakes, lizards
Movement	Non-migratory, nomadic
Nesting time	August–November
Laying	July–November
Nest location	Tree hollow, may renovate nest of another raptor or corvid
Fledgling	January – March
Age at dispersal	2–3 months
Age at maturity	3 years males 2 years females

Species	Brown goshawk (*Accipiter fasciatus*)
 a. Adult b. Juvenile Photo credit: Bernie Ritchie	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: Head grey. Eye bright yellow. Body slate-grey or dark brown above. Rufous collar across nape. Underparts finely barred rufous and white. Wings rounded, slate-grey or dark brown above, buff and rufous below. Legs long yellow Juvenile: Head streaked chocolate, rufous and white. No rufous collar. Body dark brown above, off-white with chocolate barring below. Wings dark brown above, off-white with chocloate barring below
Conservation status*	Common
Adult morphometrics	Body weight: Male: 250–415 g. Female: 465–740 g Head and body length: 400–550 mm Wing chord: Male: 255– 273 mm. Female: 289–314 mm Tail length: Male: 185–220 g. Female: 220–250 mm
Habitat	Open and wooded country, rainforest
Home range	500 ha, but can nest within 10 ha of others
Natural activity peak	Crepuscular

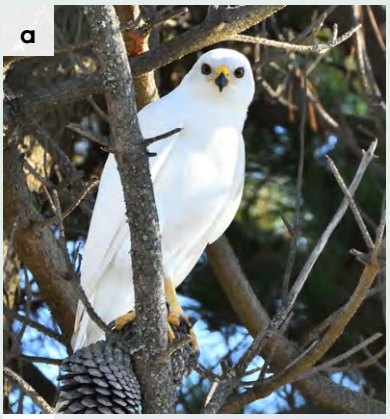
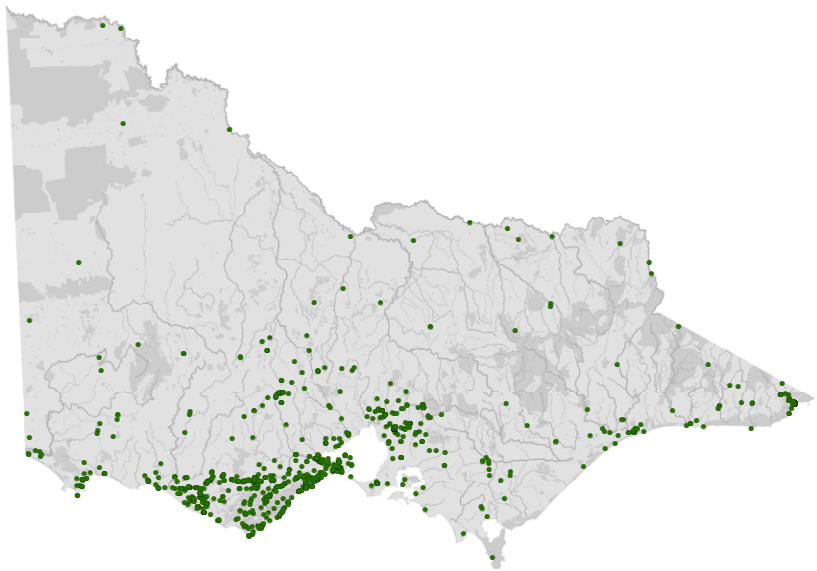
Species	Brown goshawk (*Accipiter fasciatus*)
Foraging style	Hunt from perch, can catch in air or on ground
Diet	Small mammals, reptiles, frogs, insects
Movement	Adult non-migratory, young migratory
Nesting time	Early September – late October
Laying	August–November
Nest location	Nest within 50 m of water
Fledgling	October–January
Age at dispersal	2 months
Age at maturity	1–2 years

Species	Collared sparrowhawk (*Accipiter cirrocephalus*)
a  b  a. Adult b. Juvenile Photo credit: David Whelan	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Colours and markings similar to brown goshawk but much smaller and finer

Species	Collared sparrowhawk (*Accipiter cirrocephalus*)
Conservation status*	Common
Adult morphometrics	Body weight: Male: 101–156 g. Female: 162–300 g Head and body length: 290–380 mm Wing chord: Male: 196–216 mm. Female: 228–250mm Tail length: Male: 141–155 mm. Female: 162–180 mm
Habitat	Forest, woodland, scrub, farmland
Home range	Unknown
Natural activity peak	Diurnal and crepuscular
Foraging style	Preys on other bird species in air
Diet	Small birds caught in flight, small mammals, lizards, insects
Movement	Resident, partly migratory
Nesting time	August–December
Laying	August–December
Nest location	In live tree, mistletoe clump, or old nest of other raptor
Fledgling	October–March
Age at dispersal	2 months
Age at maturity	1 year

Species	Grey falcon (*Falco hypoleucos*)
 Adult Photo credit: Gary Porter	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: Pale grey with black streak under eye and yellow cere, eye-ring, legs and feet Juvenile: Darker with heavier streaks on underparts
Conservation status*	Vulnerable
Adult morphometrics	Body weight: Male: 335–336 g. Female: 515–568 g Head and body length: 300–450 mm Wing chord: Male: 276–297 mm. Female: 313–337 mm Tail length: Male: 131–145 mm. Female: 154–176 mm
Habitat	Lightly treed inland plains, pastoral lands, timbered watercourses
Home range	Unknown
Natural activity peak	Diurnal
Foraging style	Stoops from high, pursuit at treetop height, or hunts from perches
Diet	Mostly birds, particularly pigeons and parrots, with occasional small mammals, reptiles and insects
Movement	Non-migratory, dispersive
Nesting time	June–November

Species	Grey falcon (*Falco hypoleucos*)
Laying	August–November
Nest location	Refurbished nest of other raptor or corvid, usually high in leafy eucalypt near water
Fledgling	October–February
Age at dispersal	Several months
Age at maturity	Unknown

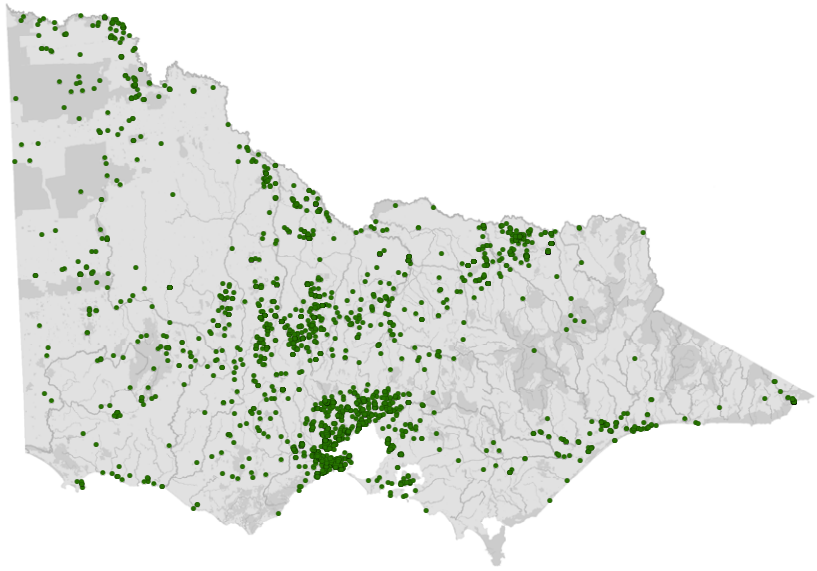
Species	Grey goshawk (*Accipiter novaehollandiae*)
a  b  a. Adult b. Juvenile Photo credit: Zoos Victoria (grey morph) Bernie McRitchie (white morph juvenile)	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: Two colour morphs: white with yellow or red eyes, or may be grey above and whitish below with fine grey bars Juvenile: Similar but broader chest barring
Conservation status*	Endangered

Species	Grey goshawk (*Accipiter novaehollandiae*)
Adult morphometrics	Body weight: Male: 238–422 g. Female: 530–894 g Head and body length: 400–550 mm Wing chord: Male: 242–275 mm. Female: 281–328 mm Tail length: Male: 166–204 mm. Female: 205–241 mm
Habitat	Rainforest, forest, tall woodlands, open country
Home range	Unknown
Natural activity peak	Diurnal
Foraging style	Hunt from perch, catch prey in trees or on the ground
Diet	Rabbits, possums, bats, birds, snakes, lizards, frogs, insects
Movement	Non-migratory, seasonally dispersive
Nesting time	September–December
Laying	August–November
Nest location	High in live tree
Fledgling	October–February
Age at dispersal	2 months
Age at maturity	Unknown

Species	Little eagle (*Hieraaetus morphnoides*)

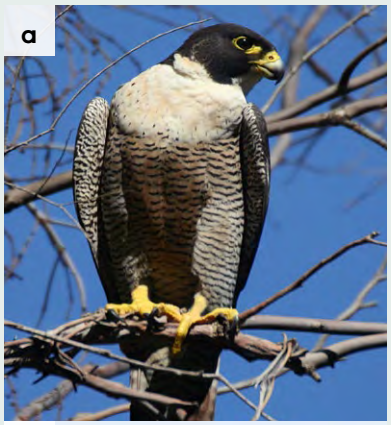
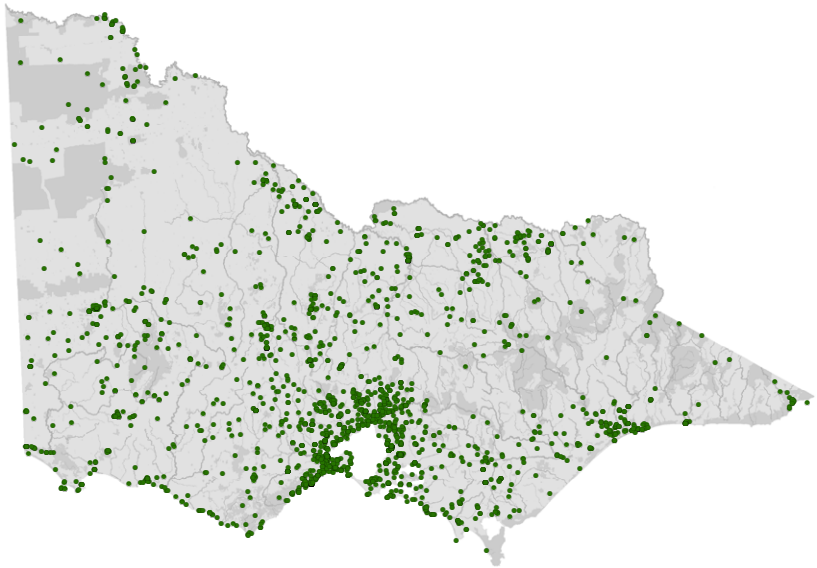
Photo credit: top to bottom - David Whelan (adult female) [light morphs], Bernie McRitchie (juvenile), David Whelan (adult) [dark morph], Bernie McRitchie (juvenile) [dark morph]

Distribution map

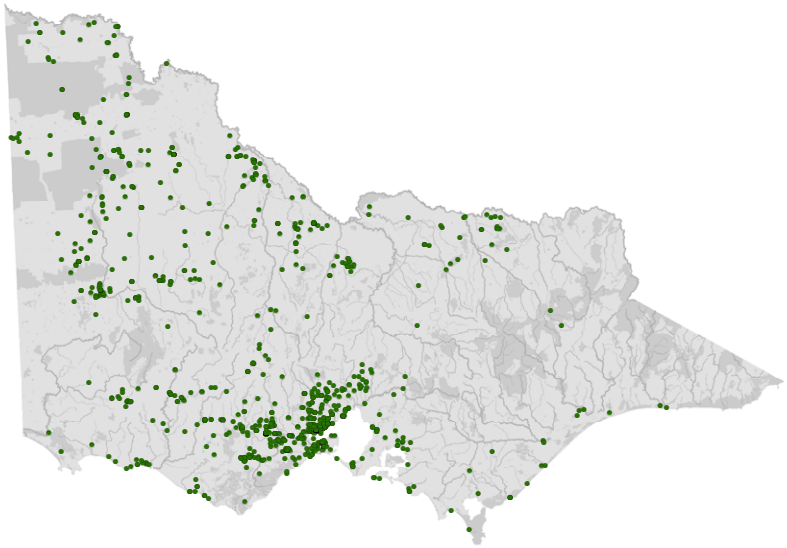


Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

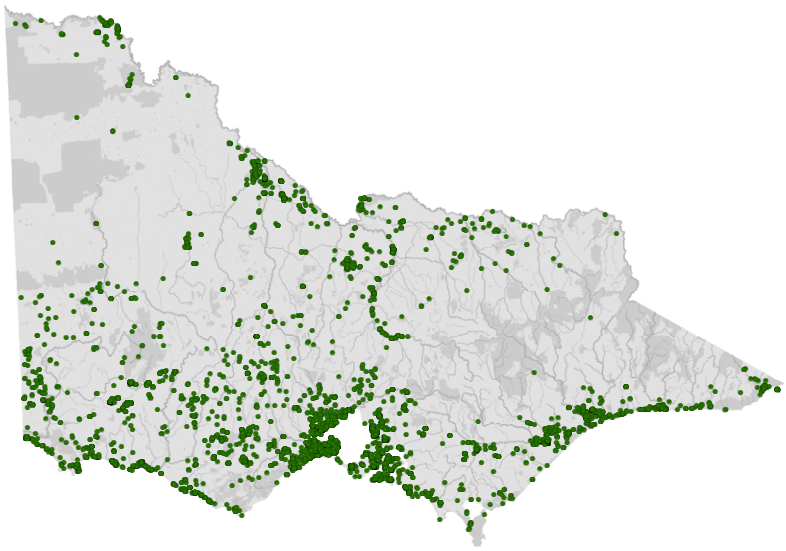
Species	Little eagle (*Hieraaetus morphnoides*)
General appearance	Adult: Light morph: Head buff to pale rufous with blackish streaks on cheeks. Blackish crown feagthers extending into a short crest. Upperparts brown, paler on nape and scapulars, with a distinct pale band across the wing. Underparts white with fine black streaks and a buff to rufous wash, especially on breast. Underwing has rufous leading edge and white oblique band contrasting with grey-barred secondaries and black-tipped ouiter primaries. Tail barred. Dark morph: Head and underparts light brown with black streaks. Leading edge and oblique band on underwing dark brown Juvenile: Light morph: Head and underparts richer rufous, less streaked. Dark morph: More rufous-brown than adults, less streaked
Conservation status*	Vulnerable
Adult morphometrics	Body weight: Male: 440–810 g. Female: 745–1120 g Head and body length: 450–550 mm Wing chord: Male: 332–396 mm. Female: 367–413 mm Tail length: Male: 170–214 mm. Female: 194–293 mm
Habitat	Plains, foothills, open forests, river red gums on watercourses
Home range	Unknown
Natural activity peak	Diurnal
Foraging style	Soaring or hunting from a perch, taking prey in trees or on the ground
Diet	Rabbits, possums, parrots, starlings, quail, carrion
Movement	Adults non-migratory or part-migratory, young dispersive
Nesting time	July–October
Laying	August–October
Nest location	Stick nest, high in leafy tree, may use old nest of other raptor or corvid
Fledgling	October–December
Age at dispersal	4 months
Age at maturity	Unknown

Species	Peregrine falcon (*Falco peregrinus*)
a  b  a. Adult b. Juvenile Photo credit: Victor G. Hurley	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: Crown and cheeks black. Upperparts slate-blue. Underparts white or buff with fine black bars Juvenile: Upperparts tinged brown. Underparts buff with heavy dark streaks
Conservation status*	Common
Adult morphometrics	Body weight: Male: 500–660 g. Female: 657–965 g Head and body length: 340–580 mm Wing chord: Male: 270–295 mm. Female: 304–342 mm Tail length: Male: 127–148 mm. Female: 146–170 mm
Habitat	Woodland, grassland, wetland
Home range	650–750 ha
Natural activity peak	Diurnal to occasional crepuscular Solitary, territorial
Foraging style	High speed vertical stoop from height

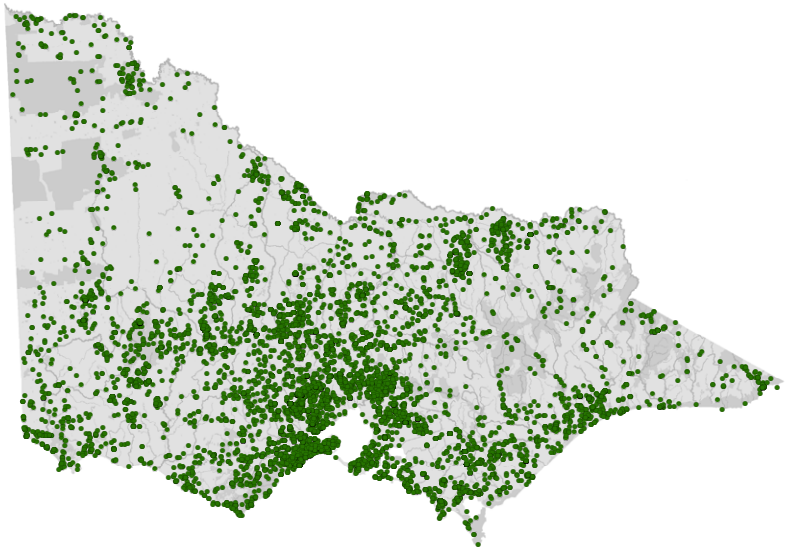
Species	Peregrine falcon (*Falco peregrinus*)
Diet	Birds: quail, ducks, pigeons, starlings, sparrows, parrots. Insects: moths, cicadas, locusts
Movement	Non-migratory, some post-breeding dispersal
Nesting time	Mid-August–November
Laying	August–January
Nest location	Tree hollow, cliff, stick nest, buildings
Fledgling	October–March
Age at dispersal	4–5 months
Age at maturity	2 years

Species	Spotted harrier (*Circus assimilis*)
a  b  a. Adult b. Juvenile Photo credit: David Whelan	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**

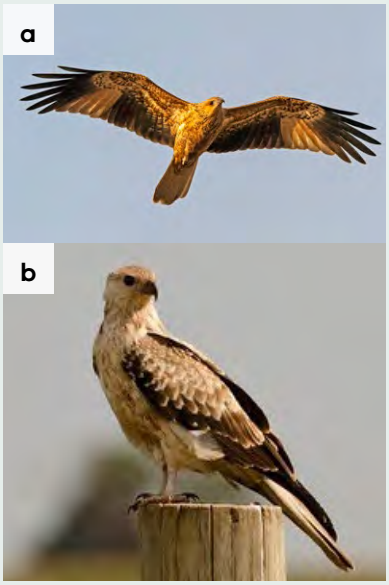
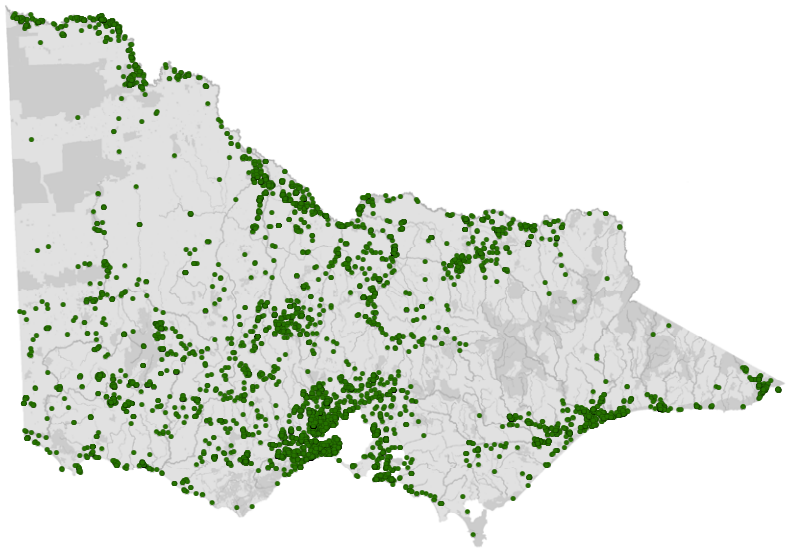
Species	Spotted harrier (*Circus assimilis*)
General appearance	Adult: Upperparts blue-grey. Wings with prominent black tips. Face and underparts chestnut with numerous white spots. Tail prominently barred and slightly wedge-shaped Juvenile: First year is dark brown and buff above, pale buff with brown streaks below. Second year is like an adult but white streaks, not spots, below
Conservation status*	Common
Adult morphometrics	Body weight: Male: 412–537 g. Female: 530–745 g Head and body length: 580–610 mm Wing chord: Male: 376–412 mm. Female: 432–467 mm Tail length: Male: 232–265 mm. Female: 266–297 mm
Habitat	Grassy plains, scrublands, mallee, open woodlands
Home range	550 ha
Natural activity peak	Diurnal
Foraging style	Slow flying followed by dropping onto prey on the ground
Diet	Quail, songbirds, mice, rats, lizards, rabbits
Movement	Non-migratory, dispersive, partly-migratory
Nesting time	August–December or February–April
Laying	September–October
Nest location	Note that this species can build a nest in a live tree and is also known to nest on the ground in tall reeds or grassy vegetation especially various field crops
Fledgling	November–January
Age at dispersal	3 months
Age at maturity	2 years

Species	Swamp harrier (*Circus approximans*)
a  b  a. Adult b. Juvenile Photo credit: Bernie McRitchie and David Whelan	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	A large slim-bodied raptor, with long slender legs and a long tail, rounded at the tip. It is mainly dark brown above and the white rump is prominent. It has an owl-like face mask. Females are larger with rufous underparts, while the smaller male is lighter underneath. The legs and eyes are yellow Adult: combination of prominent white rump from above the base of the tail Juvenile: First year is dark brown and buff above, pale buff with brown streaks below. In the second year, the juvenile's appearance is similar to an adult's
Conservation status*	Common
Adult morphometrics	Body weight: Male: 520-720 g. Female: 700-1,035 g Head and body length: 500–600 mm Wing chord: Male: 406-425 mm. Female: 421-455 mm Tail length: Male: 219–250 mm. Female: 241–261 mm
Habitat	Wetlands, coastal heathlands, farmlands and rarely far from water

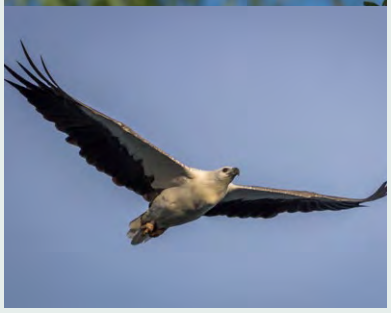
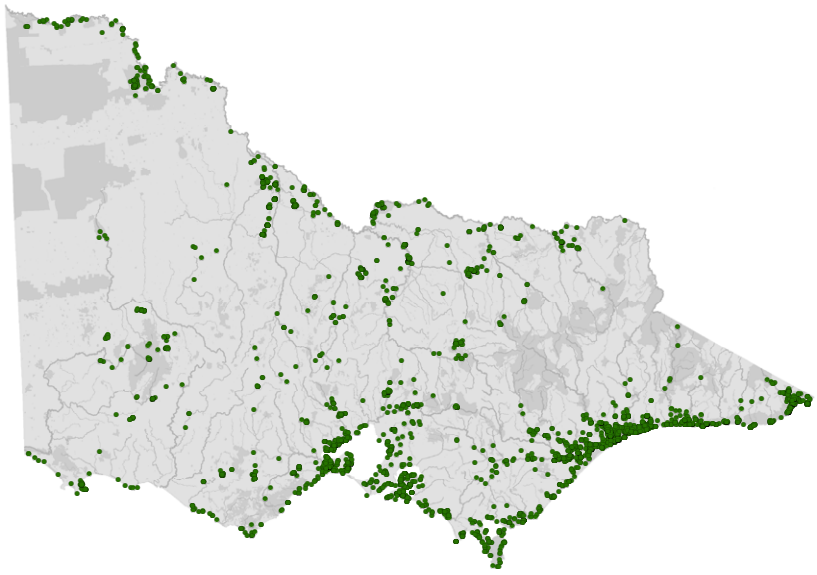
Species	Swamp harrier (*Circus approximans*)
Home range	550 ha
Natural activity peak	Diurnal
Foraging style	Slow flying over water, reedbeds or grass/croplands followed by dropping onto prey on the ground
Diet	Quail, waterbirds, mice, rats, lizards, rabbits
Movement	One of the few raptors in Australia that makes a regular seasonal migration to escape Tasmania's winter. Tasmanian Swamp Harriers spend the cooler months in south-east Australia returning to Tasmania to breed in late winter-spring
Nesting time	September–May
Laying	September–December
Nest location	Note that this species nests entirely on the ground in reed thickets, tall grassy vegetation especially various field crops
Fledgling	November–January
Age at dispersal	3 months
Age at maturity	2 years

Species	Wedge-tailed eagle (*Aquila audax*)
a  b  a. Adult b. Juvenile Photo credit: David Whelan	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: Sooty-black with tawny hackles on nape. Pale brown wing coverts and undertail coverts. Tail long and wedge-shaped End of first year to fourth or fifth year: Paler than adult. Dark brown with golden-brown nape, uppertail coverts and wing coverts. Whitish undertail coverts. Birds become darker with age
Conservation status*	Common
Adult morphometrics	Body weight: Male: 2025 – 3250 g. Female: 3350 – 4805 g Head and body length: 1000–1200 mm Wing chord: Male: 553–622 mm. Female: 603–703 mm Tail length: Male: 352–420 mm. Female: 376–482 mm
Habitat	Open country and woodland
Home range	250–350 ha
Natural activity peak	Diurnal, territorial

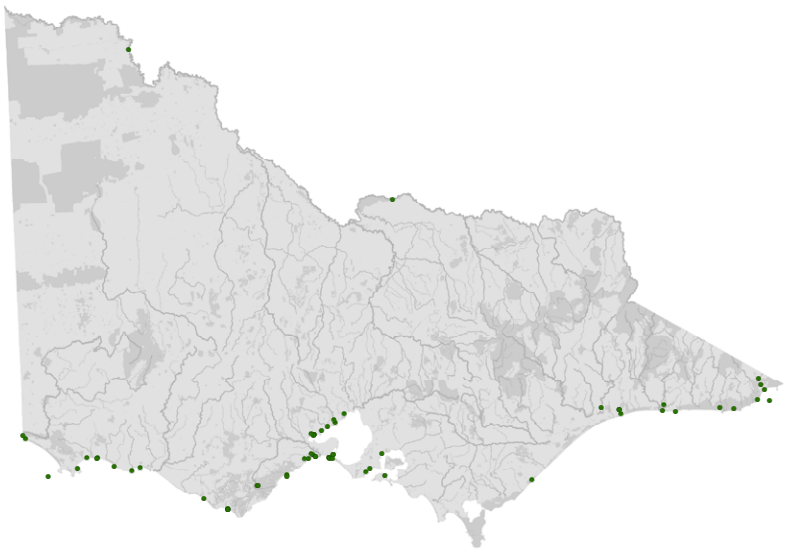
Species	Wedge-tailed eagle (*Aquila audax*)
Foraging style	Soar at height, take prey on ground
Diet	Carrion, kangaroos, rabbits, lizards, birds
Movement	Resident Young can move 100 km
Nesting time	April–September, depends on food
Laying	Year round
Nest location	Tallest tree in area. Tree may be live or dead. Large nest
Fledgling	Year round
Age at dispersal	8–9 months
Age at maturity	6–7 years

Species	Whistling kite (*Haliastur sphenurus*)
 a. Adult b. Juvenile Photo credit: David Whelan and Nick Talbot	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: Sandy-fawn with brown wings and black flight feathers. Underwing pattern has a distinctive broad pale brown leading edge turning at right angles near the end of the wing and crossing to the trailing edge, separating black outer primaries from black secondaries Juvenile: Brown back spotted with white

Species	Whistling kite (*Haliastur sphenurus*)
Conservation status*	Common
Adult morphometrics	Body weight: Male: 650–710 g. Female: 830–980 g Head and body length: 500–600 mm Wing chord: Male: 392–430 mm. Female: 396–459 mm Tail length: Male: 232–277 mm. Female: 243–292 mm
Habitat	Mostly associated with wetlands, will hunt further afield
Home range	2–40 ha
Natural activity peak	Diurnal Communal
Foraging style	Soaring, take from air, ground, water
Diet	Carrion, fish, insects, rabbits, mice, quail, galahs, starlings, pigeons
Movement	Communal roost
Nesting time	July–November
Laying	October–December
Nest location	Tall tree near water
Fledgling	December–January
Age at dispersal	3 months
Age at maturity	1 year

Species	White-bellied sea eagle (*Haliaeetus leucogaster*)
  Photo credit: Shutterstock	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult: White with grey back, rump, wings and base of tail Juvenile: Brown with lighter markings. Paler on head and rump. Whitish bulls-eye in wings. Tail whitish, shading to light brown at the tip. Birds become lighter with age
Conservation status*	Endangered
Adult morphometrics	Body weight: Male: 2120 – 2900 g. Female: 3000–3900 g Head and body length: 750–850 mm Wing chord: Male: 527–572 mm. Female: 581–633 mm Tail length: Male: 225–278 mm. Female: 263–298 mm
Habitat	Coasts, estuaries, islands, large rivers, inland lakes
Home range	Unknown
Natural activity peak	Diurnal
Foraging style	Hovers low over prey, or makes swooping dive from a height to seize prey from water surface
Diet	Birds: ducks, ibis, egrets, parrots Reptiles: turtles, skinks, snakes Fish, mammals, crustaceans, carrion

Species	White-bellied sea eagle (*Haliaeetus leucogaster*)
Movement	Non–migratory, dispersive
Nesting time	June–December
Laying	June–September
Nest location	Stick nest in tall live tree or on ground
Fledgling	October–January
Age at dispersal	5–6 months
Age at maturity	5–7 years

Species	Eastern Osprey (*Pandion cristatus*)
  Photo credit: Friends of the Osprey (adult male above, 2 juveniles and adult female on right on bottom image)	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**

Species	Eastern Osprey (*Pandion cristatus*)
General appearance	Distinctively bicoloured plumage: dark brown above, white head, neck and underparts contrasting with thick dark brown eye-stripe Adult male: white "cap" breast and belly Adult female and juveniles: dark vertical marking on breast, reducing to a 'necklace' and white "cap" in adult females
Conservation status*	Rare vagrant
Adult morphometrics	Body weight: Male: 990 – 1,080 g. Female: 1,200–1,910 g Wing chord: Male: 391–463 mm. Female: 423–470 mm Tail length: Male: 166–210 mm. Female: 179–208 mm
Habitat	Coasts, estuaries, islands, large rivers, inland lakes. Very limited occurrences in Victoria
Home range	Unknown
Natural activity peak	Diurnal
Foraging style	Hovers low over prey, or makes swooping dive from a height to seize prey from water surface
Diet	Fish, cuttlefish, crustaceans, carrion
Movement	Non–migratory, dispersive
Nesting time	June–December
Laying	July–September
Nest location	Stick nest in tall live tree or on ground
Fledgling	October–January
Age at dispersal	3–5 months
Age at maturity	2–3 years

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit **https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list**.

2.3 Animal and human safety considerations

In general, animals in the wild have limited contact with people, pets and the hustle and bustle of our daily lives. When sick, injured or orphaned wild animals come into care, this unnaturally close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity raptors is in **Section 2.6.2**.

The following information relates to human and animal health and safety considerations specifically related to the rehabilitation of raptors.

Physical examination is stressful for a conscious bird and potentially dangerous for the rehabilitator. It should be conducted as efficiently as possible.

2.3.1. Human safety considerations

- The talons of raptors are sharp and can easily penetrate human skin and damage muscles and tendons.
- Smaller raptors can bite deep enough to cause bleeding.
- Raptors will attempt to strike with their feet but may try to bite if their feet are restrained. Larger raptor species are very strong and require the handler to be capable of managing restraint of that species.
- For the largest species (eagles), two handlers will be required.

2.3.2. Animal safety considerations

- Care is required not to damage the cere (a fleshy covering at the base of the upper beak), wings, feathers or talons, while in care.

2.4 Capture, restraint, and transport

STOP

STOP – A visual examination must be done BEFORE the animal is captured. This applies to the initial capture from the wild as well as prior to captures which occur during time in captive care. See Section 2.4.1 *for information on what to look for when conducting a visual health assessment.*

Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned raptors.

2.4.1. Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture, looking for evidence of injury/ severe disease or deterioration and observe their breathing as demonstrated in the following table.

Table 2.3 Visual health observations in raptors

	What to look for
Demeanour	Bright, alert, responds to humans with threat display, upright stance
Behaviour	Interested in its surroundings. Not sitting with wings fluffed
Movement and posture	Stands and/or perches. Wings are held against the body and do not droop
Breathing	Regular. No open mouth or noisy breathing

2.4.2. Equipment

When selecting appropriate capture and restraint equipment, it is important to consider the species and size of the raptor and adjust accordingly. Talons are very sharp in all species and additionally very strong in some.

- **Towels** of various sizes can be used for restraint. Towels can also be used to line transport enclosures or rolled up to allow birds to grasp them in their talons.
- **Leather gloves** can be used for capture if the handler feels they are required. Once proficient at capture, towels are preferred for increased sensitivity.
- **Blankets** can be used to restrain larger birds such as eagles.
- **A solid bag**, such as a calico bag on a hoop, can be used to capture birds. A transport container such as a pet carry cage, cardboard box or ventilated plastic tub can be used to transport the bird once it has been caught. Soft canvas pet carriers work well as the birds are less likely to damage themselves or their flight feathers. Wire cages should not be used, unless the interior is lined with shade-cloth or cardboard, due to the risk of feather damage. Transport containers should allow the bird to stand, turn around and stretch its wings but not gain lift.
- **Soft perches** can be formed from a rolled towel or tubes of closed-cell foam.

Figure 2.2 a. Pet carrier cage suitable for transporting a small raptor except that all wire mesh surfaces should be covered with shade cloth on the inside to avoid feather damage. Note the attached perch at a height suitable for the bird, so the tail feathers are elevated, and towel on the floor of the cage. A towel should also be used to cover the entire pet carrier – be mindful not to impede airflow. b. A soft pet pack can be used for raptors and is a good option as it reduces the chance of feather damage.

Photo credit: Zoos Victoria

Photo credit: Zoos Victoria

2.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques for some specific situations are outlined in the following section. Capture and restraint of raptor species should only be attempted by experienced handlers.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

Note that some species will instinctively roll onto their back as a defence, with talons in the air, so you need to be sure what position the bird is in under the blanket to ensure you don't grab the bird directly on the talons.

- The raptor should be approached with a large towel or blanket held in front of the person undertaking the capture. The towel is placed over the raptor's head, which should cause the bird to relax somewhat. The legs can be grasped by sliding the hands down either side of the body. Work your hands from the outside of the blanket/towel around the bird to locate the top of its legs. Use one hand per leg and firmly grip around the top of the bird's legs, at the level of the hock joint (left hand left leg, right hand right leg).
- Wrap the blanket/towel loosely around the bird to prevent the wings from flapping.
- The bird should now feel securely restrained. Do not let go of the legs. Depending on the species, they may feel very strong against your grip.
- Make sure the bird's head remains covered.
- Wrap the towel around the body to restrain the wings.
- To reduce stress on the bird do not stare directly at their eyes/face. Animals with forward facing eyes are predators and the bird will be stressed by this.

Figure 2.3 a. Restraint of a wedge-tailed eagle. b. Restraint of a powerful owl. Note how the hands are placed to restrain the legs.

Photo credit: Zoos Victoria

2.4.4. Transport

- Birds should be transported individually.
- Ensure that the transport container has adequate ventilation and is not exposed to direct sunlight during travel.
- A towel or sheet may be used as a cage cover to reduce visual stress, while ensuring ventilation is not impacted.
- The interior of the vehicle should be below 25°C to prevent overheating.
- Food and water are not required for travel times of less than two hours.
- Noise during transport (for example voices, music) should be kept to a minimum.
- Domestic animals should not be present in the vehicle.
- Disinfect transport carriers with a suitable disinfectant, such as F10 or Virkon, between birds.

2.5 Monitoring animal health and welfare

The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release should be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and quickly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. Fractures and eye injuries are common in raptor species, these injuries can sometimes not be obvious. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult.

Templates for record-keeping of visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessment on arrival and on effective monitoring of the health and welfare of individuals in care. Minimising human-animal interactions and stress to the animal maximises successful release back to the wild.

2.5.1. Physical examination

Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated as required any time the carer has the animal in the hand, such as for an enclosure change. The minimum acceptable assessment, each time the animal is handled, is body condition assessment and body weight. It is good practice for carers to ensure weighing scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or injury.

Always record the physical examination findings, so that you can compare findings as the animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines.**

Examinations should be conducted in a quiet location, away from domestic animals. Only two people should handle the animal, while a third person takes notes. All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum, with careful monitoring for any signs of distress such as panting, salivating, vocalisation or sudden deterioration in demeanour. If these are seen, the examination should be stopped immediately and the animal returned to its catch bag, transport box or enclosure and allowed to recover.

Species specific considerations:

- Physical examination is stressful for a conscious bird and potentially dangerous for the rehabilitator. It should be conducted as efficiently as possible.
- All equipment necessary to facilitate the exam should be prepared prior to capturing the animal.
- Raptors will attempt to strike with their feet but may try to bite if their feet are restrained. Larger raptor species are very strong and require the handler to be capable of managing restraint of that species.
- Always keep handling time to a minimum and actively observe the animal for signs of distress during handling. It is ok to give the animal a break and complete the exam later.
- Return the bird to its cage if it starts open mouth breathing, closes its eyes or becomes weak in the hand.

- Two people will be required to examine any raptor. One person holds the bird, ensuring that the feet are restrained at all times, while the second person examines the wings, legs and head for any abnormalities.
- A bird that has been on the ground for any length of time will often have broken tail feathers that may be stained with dirt and faeces.
- Bird identification manuals can be used to check the feathering to determine if the bird is a juvenile or adult for example a blackish-brown wedge-tailed eagle will be at least seven years old. Younger birds appear reddish-brown.
- **Table 2.4** provides additional guidance on what to look for during physical examinations.

Table 2.4 Physical examination of raptors

	What to look for
Body weight	• Record body weight on arrival and at least weekly while in care. • A greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice. It is important to know what a normal weight for a species is. Smaller animals will have less tolerance for body weight changes.
Body condition	Body condition of the bird can be scored by palpating the amount of muscle over the keel (see **Figure 2.4**). • **Under condition:** The keel bone is easily felt and the pectoral muscles are concave. • **Ideal condition:** The keel bone can be felt and the pectoral muscles are rounded. • **Over condition:** Difficult to feel the keel bone as the pectoral muscles rise above it.
Hydration status	• Skin in featherless areas (e.g. pinched skin on feet or pushed skin over keel) should fall down within 1 second or easily slides across the pectoral muscles. • If the eyes are sunken, skin doesn't slide easily over pectoral muscles, or skin tenting occurs then assume the bird to be moderately to severely dehydrated.
Eyes	• Normal eyes should be open, shiny and clear, with no discharge. • Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical.
Beak	• Normal shape for the species. • Not overgrown, flaky or fractured. • Able to close normally. • Upper and lower beak align when closed.
Mouth	• Normal colouration for the species. • No blood present. • No evidence of foreign materials. • No discharge.

	What to look for
Nostrils	• Clean and clear. • No discharge, for example blood.
Cere	• Intact. • No bleeding or other obvious damage.
Skin	• Not dry, flaky or cut/injured. • No bruising.
Feathers	• Free from parasites. • Clean, sleek, shiny. • Not damaged, broken or missing. • Preen gland present on upper side of the base of the tail feather in many species.
Vent/cloaca	• Clean, free of faeces and urates (not caked on).
Legs	• Legs appear symmetrical and are not deviated. • Animal can stand normally. • Animal can grip with both feet normally. • No wounds, swelling or exposed bone or muscle present. • Bottom surface of feet has no evidence of wounds or disease. • Nails not broken or missing.
Wings	• Capable of normal flight. • Able to manually extend wings fully, without resistance, each wing extends equally. • Able to manually extend wings fully. • No wounds, swelling or exposed bone or muscle present.
Sex determination	• Weight may give some indication of sex (see **Table 2.1** and **Table 2.2**). • Larger, heavier birds tend to be female but there may be overlap in some species. • Thin females will be lighter and may be mistaken for males.

Figure 2.4 An emaciated (under conditioned) wedge-tailed eagle.

Photo credit: Zoos Victoria

2.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- ☑ demeanour
- ☑ food consumption
- ☑ faecal/urine output
- ☑ behaviour observed
- ☑ medical treatment provided
- ☑ evidence of overnight activity.

The following is recorded weekly:

- ☑ weight
- ☑ body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- A visual check in the morning is recommended – when the cage is cleaned and food and water are changed.
- Note the bird's demeanour and behaviour every time food is introduced or taken away, the animal is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- Raptors can be quite nervous animals and may injure themselves while in care. Check the cere for damage and monitor for broken/damaged feathers daily. If the bird is injuring itself it may need to be moved to a larger enclosure or to a quieter location.
- Note faecal consistency daily. The bird should pass solid brown faeces, pasty white urates and liquid urine, which may not be detectable if it has soaked into the substrate. If diarrhoea is noticed, a faecal sample should be collected and submitted to the veterinarian for assessment as soon as possible. Do not treat on suspicion of a bacterial or parasitic infection, as this can make definitive diagnosis very difficult and potentially prolong the course of the disease.

2.5.3. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 2.5 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 2.5 Common injuries and clinical signs of and emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and drug efficacy.		
Unable to fly normally **Drooping wing** **Swollen wing** **Bruising over wing** **Fractures** **Dislocation**	Found adjacent to road/suspect motor vehicle accident Window strike Caught in wire or netting Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • If the wing is dragging on the ground a light bandage can be wrapped around the bird's wing and body to provide some support and relief from pain and discomfort. • Collision injuries may result in fractures within the pectoral girdle (the bones that support the wings). On observation the bird may still be able to fly but be unable to sustain flight or get normal lift. • Assessment by a veterinarian is required to determine whether surgery or splinting is needed in order for the injury or fracture to heal. Bird bones heal faster than mammal bones. To ensure the best welfare outcomes it is important to seek veterinary assessment as soon as possible. Medication for pain is required for fractures as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Birds with wing injuries will need initial confinement. • The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care. • Once the fracture has healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to **Section 2.9** for more detail).

Injury or clinical signs	Possible causes	Carer observations and response
Unable to stand normally **Swollen leg, foot or toe** **Bruising over leg** **Wounds present** **Nail injuries** **Fractures** **Dislocation** **Hip injury**	Found adjacent to road/suspect motor vehicle accident Window strike Caught in wire or netting Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Assessment by a veterinarian is required to determine whether surgery or splinting is needed in order for the injury or fracture to heal. Bird bones heal faster than mammal bones. To ensure the best welfare outcomes it is important to seek veterinary assessment as soon as possible. Medication for pain is required for fractures as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Birds with leg injuries will need initial confinement, and perhaps modified/low perching. • The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care. • Once the injury is healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to **Section 2.9** for more detail).
Head trauma **Eye injuries/blood in eye** **Eyelid swelling** **Beak injuries** **Blood in mouth** **Lethargy, sleepy** **Response to stimulus slow** **Head hanging down** **Fluffed feathers**	Found adjacent to road/suspect motor vehicle accident Window strike Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Birds with head trauma should be housed in a dark, quiet enclosure for 48 hours. If the bird does not improve or deteriorates over this time it may need to be euthanised.

Injury or clinical signs	Possible causes	Carer observations and response
Bleeding **Puncture wounds** **Bruising**	Found adjacent to road/suspect motor vehicle accident Window strike Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Assessment by a veterinarian is required to determine whether surgery or suturing is needed in order for the injury to heal and to assess for other injuries such as fractures. Medication for pain or infection may be required as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Monitor wounds to ensure that they are healing. • Ongoing reassessment during rehabilitation is required to ensure healing is progressing as expected and the animal is tolerating time in care.
Poor body condition **Emaciation**	Undetermined disease process Failure to thrive Old injury present, such as a fracture	• **Assessment by a veterinarian is required to determine if there is a disease present and assess for other injuries such as old fractures.** • Generally, animals presenting in poor body condition have likely been suffering for some time and prognosis is poor. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered. • The degree of condition loss can determine whether the animal is a candidate for rehabilitation. • Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A Chapter 4 Biosecurity & Hygiene. • Where a disease is suspected anything coming in contact with the infected or suspect bird should be discarded or disinfected using bleach, Virkon or F10SC at the recommended concentration and contact time. Virkon S and bleach must be rinsed following disinfection.

Injury or clinical signs	Possible causes	Carer observations and response
Poor body condition **Emaciation** **Respiratory signs** **Open mouth breathing** **Raspy breathing** **White cheesy material in the mouth**	Undetermined disease process Aspergillosis *Serratospiculum* Trichomoniasis	• **Assessment by a veterinarian is required to determine if there is a disease present.** The veterinarian will prescribe treatment if indicated. • Euthanasia may be required for the welfare of the animal. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered if treatment is indicated. • Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A Chapter 4 Biosecurity & Hygiene. • Where a disease is suspected anything coming in contact with the infected or suspect bird should be discarded or disinfected using bleach, Virkon S or F10SC at the recommended concentration and contact time. Virkon S and bleach must be rinsed following disinfection. • Aspergillosis – Aspergillosis is caused by an environmental fungus that is present in all indoor and outdoor environments as part of normal microbiological ecosystems. Birds become infected by inhaling fungal spores. Stress secondary to captivity, trauma, parasites or malnutrition makes disease more likely. Raptors may benefit from prophylactic antifungals while convalescing. Consult a veterinarian. • Once clinical signs develop treatment is rarely successful. • *Serratospiculum* – is an air sac worm commonly found in falcons. Birds with low burdens may be treated with parasiticides as determined by a veterinarian. • Trichomoniasis – A protozoan disease commonly seen in pigeons and raptors that eat pigeons. Seek veterinary attention for diagnosis and possible treatment. Give medication as prescribed. Following treatment, recheck the mouth of birds at an interval determined by the attending veterinarian. Crop feeding may be required if the bird cannot feed itself.

Injury or clinical signs	Possible causes	Carer observations and response
Weakness **Inability to fly** **Seizures** **Pallor** **Prolonged bleeding or bruising**	Poisoning – lead, organophosphates, anticoagulant	• **Seek urgent veterinary attention.** • Lead poisoning occurs if raptors scavenge carcasses that have been shot. Pellets lodged in a raptor's muscles do not cause lead poisoning. • Anticoagulant poisoning occurs secondarily to consuming poisoned rodents. • Give medication as prescribed. Many anticoagulants are long lasting. Affected birds may require treatment with Vitamin K for up to 28 days.
Sudden death	Poisoning Trauma Herpesvirus infection	• **Submit the bird to a veterinarian for a necropsy to determine the cause of death.** • Herpesvirus is carried normally by feral pigeons. It causes no disease in pigeons but can kill raptors. • Do not feed feral pigeons to raptors.
Damaged feathers **Increased grooming behaviour**	External parasites – mites, flat flies and lice, inappropriate housing	• **Seek veterinary advice.** • Feather mites are found in the vane of the feathers. • Lice will crawl onto human skin when the bird is handled but will not survive. • Treat ectoparasites as directed by a veterinarian. • Ensure that the bird is housed appropriately in an enclosure of a suitable size for the species. • Perches or blocks, depending on species, should be placed high enough to prevent the feathers from touching the ground or faeces. • To protect the tail feathers, raptors may benefit from tail guards. A tail guard is made of a lightweight sheet of plastic, such as a plastic pocket, that encloses the tail feathers and is secured to the base of the tail with a low adhesive tape such as Micropore. Do not use Elastoplast as it leaves a sticky residue on the feathers. Monitor the tail guard and replace as needed. • A bird of prey with more than two broken primary feathers on each wing should not be released until it has passed through a moult and the feathers have been replaced. As moulting generally occurs in spring, this could take up to a year for most species and up to two years in the case of wedge-tailed eagles.

Injury or clinical signs	Possible causes	Carer observations and response
Diarrhoea	Bacteria Viruses Protozoa Internal parasites	• **Assessment by a veterinarian is required to determine if there is a disease present.** The veterinarian will prescribe treatment if indicated. • Submit a fresh faecal sample to a veterinarian for diagnosis. • Give medication as directed. • Bacteria such as *Salmonella* will also cause diarrhoea in people. Wash hands with soap and water after handling birds. • Ensure a high level of hygiene and remove all faeces every 24 hours to break the life cycle of the parasites.
Lameness **Skin of the soles of the feet appears pink and thin** **Sole of the foot is ulcerated** **Plug of dead tissue in ulcer**	Bumblefoot	• **Seek veterinary attention.** • Bumblefoot is an infection of the foot, commonly caused by poor husbandry. • Give medication as directed. • Do not allow birds to stand on concrete or other abrasive surfaces. • Offer a variety of perches made from natural wood that are wide enough so the bird can stand on the perch without the talons potentially piercing the sole of the foot. • Perches can be covered with Astroturf or rubber to cushion the feet. • Overweight birds are prone to bumblefoot.

Figure 2.5 A radiograph of a raptor with gunshot pellets. The impact has fractured the coracoid (arrow).

Photo credit: Zoos Victoria

Figure 2.6 An Australian hobby with broken tail feathers that could have been prevented with a tail guard.

Photo credit: Zoos Victoria

Figure 2.7 a. A southern boobook owl with an advanced trichomoniasis lesion on the roof of the mouth. The mouth should appear pink. The slit in the mouth is obscured by a yellow growth. b. The lungs of a bird at necropsy: normal pink lung is seen on the right and aspergillus infection is visible as white and blue fluffy areas.

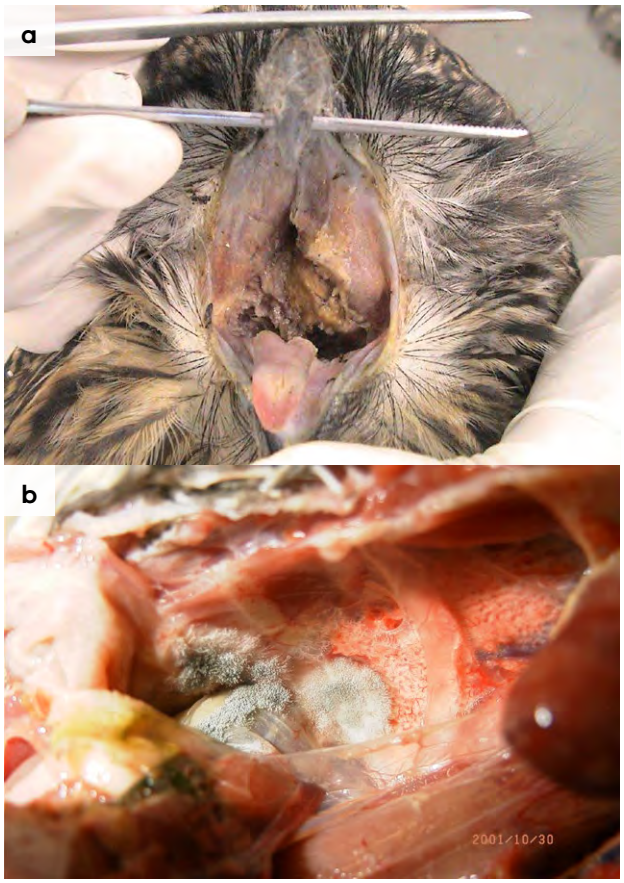


Photo credit: Zoos Victoria

Figure 2.8 a. A raptor with a relatively mild bumblefoot lesion on its first digit. b. A wedge-tailed eagle with a severe bumblefoot lesion on the sole of its foot, likely necessitating euthanasia.

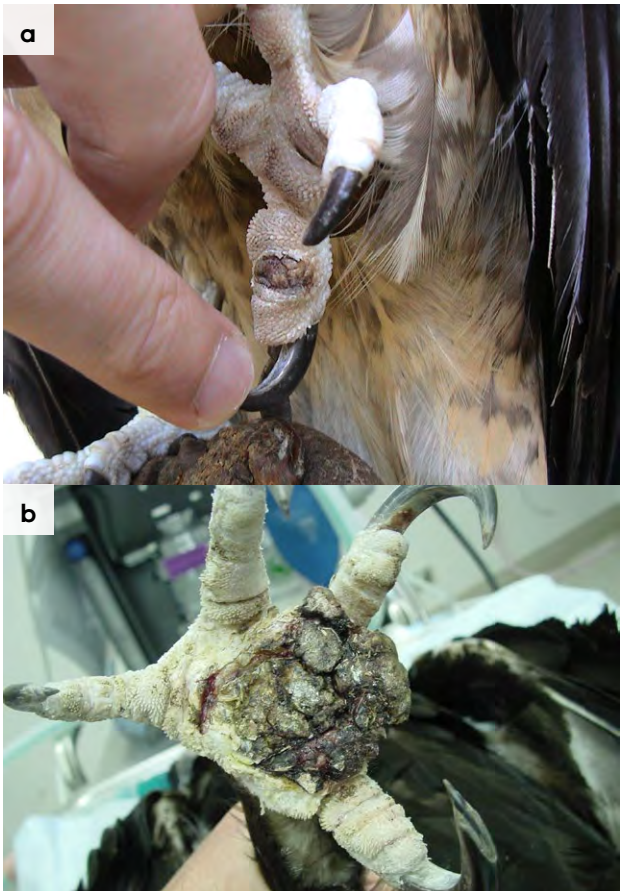


Photo credit: Zoos Victoria

2.5.4. Administering treatment during rehabilitation

- Oral medication can usually be placed in a food item as raptors are generally fed whole prey. If the bird does not eat the item it may need to be force fed.
- If giving medication directly into the mouth, ensure that the bird has time to swallow and does not aspirate the medication.
- Most medications can be delivered orally. In the rare instance where this is not possible the drug should be injected either side of the keel, into the pectoral muscles.

2.6 Housing

Below are several key considerations when housing adult raptors in care. Other parameters that can be just as important as enclosure size include availability of sunlight, wind protection, sunshade and type of perches. The dimensions recommended in this chapter are suggestions based on Healesville Sanctuary aviary sizes. There is no 'one size fits all' rule and it is important to continually assess the welfare of the bird and tailor aviaries and aviary size to suit the requirements of the bird.

2.6.1. General housing information for raptors

- Raptors should be housed out of sight, sound or smell of domestic animals. Change out of clothes that have been worn around dogs or cats to minimise exposure to pet scent.
- Always house adult raptors individually.

2.6.2. Enclosure hygiene & biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain the highest levels of hygiene to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water before and after handling birds, and between animals in care, to minimise the spread of disease both to humans and animals.
- Ideally, examination gloves should be worn and changed between each animal.
- Left-over food and faecal matter and casts should be removed daily from enclosures.
- When an animal vacates an enclosure, it must be cleaned and disinfected. Substrate should be completely replaced and furniture, such as branches or boxes made of unsealed wood, should be discarded as they cannot be effectively disinfected.
- Enclosures should be disinfected with products such as F10 SC or bleach at the recommended concentrations and contact times. Bleach must be rinsed off following the appropriate disinfection time.

2.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care. **Table 2.6** describes the housing type, suggested dimensions and requirements at each stage of care. For information on housing animals during hand raising see **Section 2.8**.

Table 2.6 Rehabilitation housing for adult raptors

Intensive care housing		
Indications for use	**Suggested min. dimensions**	**Suggested requirements**
Intensive care housing is suitable for sick or injured raptors that require short-term care for three to five days. The size of the enclosure will depend upon the size of the raptor. As a rule, the bird should be able to stand upright and turn around in the enclosure without the feathers hitting the wall. Birds are housed individually.	Raptor <1 kg e.g. Kestrel, Australian hobby falcon Enclosure: 0.5 (L) x 0.5 (W) (0.25 m^2) x 0.5 m (H)	**ENCLOSURE CONSTRUCTION** • Human humidicrib, veterinary incubator (Rcom, Vetario, Kimani), cat or dog carry cage or melamine hot box. **ENCLOSURE FURNISHING** • Newspaper, thin cotton sheets or towelling can be used as flooring. • Birds that are unable to stand can be supported by rolling a towel into a U-shape or donut and placing it around the bird. • Alternatively the bird can be placed in a food bowl lined with a towel or paper. • Wire doors should be covered on the inside with shade-cloth or cardboard to reduce possible feather damage. • The cage may be covered with a towel or sheet to provide privacy. **ENVIRONMENTAL VARIABLES** • Ideal temperature for sick and injured adult birds is 28°C. The temperature should be monitored with a thermometer. • If necessary, provide heat with a ceramic or incandescent light suspended from above the bird at one end of the enclosure. • Heat could also be supplied with a heat pad below or beside the bird. • It is important to clean and disinfect with F10 between birds. • The bird should be able to experience normal daylight patterns, even if housed inside (e.g. indoor lights go on at dawn and off at dusk). **PROVISION OF FOOD/WATER** • Dead food items can be left on a log. They should not be placed on the floor. • Insects may be placed in a cat-litter tray or similar. • Water bowls should be cleaned and fresh water supplied daily.
	Raptor > 1kg e.g. Wedge-tailed eagle, little eagle Enclosure: 1.0 (L) x 1.0 (W) (1.0 m^2) x 1.0 m (H)	

Intermediate housing (treatment/cage rest)		
Indications for use	**Suggested min. dimensions**	**Suggested requirements**
Intermediate housing is suitable for raptors that no longer require heating but need medication and some confinement due to their injuries. The enclosure should be large enough that the bird can move around, but not so large as to permit flight. Raptors should be housed individually.	Raptor <1 kg e.g. Kestrel, Australian hobby falcon Enclosure: 0.6 (L) x 0.5 (W) (0.3 m^2) x 0.6 m (H) Raptor > 1kg e.g. Wedge-tailed eagle, little eagle Enclosure: 2.0 (L) x 2.0 (W) (4.0 m^2) x 2.0 m (H)	**ENCLOSURE CONSTRUCTION** • Raptors do not cope well in open enclosures – therefore, a solid walled enclosure is recommended. • The walls may be constructed of tin, brick or vertical slats of timber. **ENCLOSURE FURNISHING** • For all species, shade-cloth needs to be placed on the inside of any wire throughout the enclosure to reduce feather damage. • Newspaper can be used as flooring for smaller raptors. • A concrete or earth floor with sand or pea gravel is suitable for larger raptors. • Offer a variety of perching surfaces made from natural wood, where the bird's foot covers 2/3 of the perch circumference. • A perch or block, in the case of falcons, should be high enough that the bird's tail feathers do not touch the ground. • Astroturf is an ideal perch covering as it can be cleaned and disinfected. • Old mountain bike tyres mounted over perches work well for wedge-tailed eagles and larger raptors. • Soft artificial grass can also be wrapped around perches or used on flat perching surfaces such as ledges. **ENVIRONMENTAL VARIABLES** • Remove faeces and uneaten food daily. • It is important to clean and disinfect with F10 between birds. • The bird should be able to experience normal daylight patterns, even if housed inside (e.g. indoor lights go on at dawn and off at dusk). **PROVISION OF FOOD/WATER** • Dead food items can be left on a log. They should not be placed on the floor. • Insects may be placed in a cat-litter tray or similar. • Water bowls should be cleaned and fresh water supplied daily.

<table>
<tr><th colspan="3">Pre-release</th></tr>
<tr><th>Indications for use</th><th>Suggested min. dimensions</th><th>Suggested requirements</th></tr>
<tr><td rowspan="2">The pre-release enclosure needs to be large enough that the raptor can gain a degree of fitness, the larger the better.

As a guide, the bird needs to be able to flap its wings at least ten times before the end of the flight. It should be at least twice the width of the bird's extended wingspan.

Large species, such as wedge-tailed eagles, will gain fitness more quickly in even larger enclosures and a minimum length of 10 m is recommended. A circular aviary could also be used to stimulate continuous flight.

Raptors, such as peregrine falcons, are unlikely to achieve sufficient fitness for release in an aviary and should be transferred to experienced raptor wildlife rehabilitators for fitness training.

Raptors should be housed individually.</td><td>Raptor <1 kg

e.g. Kestrel, Australian hobby falcon

Enclosure:
5 (L) x 3 (W)
(15 m^2) x 2 m (H)</td><td rowspan="2">ENCLOSURE CONSTRUCTION
• Solid vertical wooden slats can be used.
• Any wire surfaces should be covered with shade-cloth.
• The floor can be concrete, grass or earth covered with sand or pea gravel.
• Bird netting can be used to roof the aviary.
• At least one third of the aviary should be covered to protect the bird from the weather.

ENCLOSURE FURNISHING
• Provide a variety of ledges or branches as perches. The size should vary but the diameter needs to be wide enough that the talons do not completely encircle the perch.
• Other perch ideas include tyres, coconut fibre, door mats and artificial grass.

PROVISION OF FOOD/WATER
• Dead food items can be left on a log or perch.
• Water bowls should be cleaned and fresh water supplied daily.</td></tr>
<tr><td>Raptor > 1kg

e.g. Wedge-tailed eagle, little eagle

Enclosure:
10 (L) x 6 (W)
(60 m^2) x 3.0 m (H)</td></tr>
</table>

Figure 2.9 Intensive housing for a powerful owl. Note the Astroturf on the floor to prevent bumblefoot should the bird choose to perch on the ground.

Photo credit: Zoos Victoria

Figure 2.10 a. Intermediate housing for a wedge-tailed eagle. Note that both a stump and branch perch are offered. The stump perch has Astroturf on it. b. Pre-release stage for housing small raptors.

Photo credit: Zoos Victoria

2.7 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe how an animal is responding to food on offer and inform future choices.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

Note: Fresh water should be always available and provided in a stable/non-spill bowl or automatic drinker. Water should be changed daily.

- Some birds will not recognise dead prey as food and can be stimulated to feed by opening the abdominal cavity of the prey to reveal the liver and other abdominal organs.
- Some raptors will not recognise white mice as food items, but will eat brown-coloured mice.

STOP

STOP – Please refer to your authorisation for mandatory conditions regarding live feeding.

- Frozen food items should be defrosted overnight in the refrigerator and then offered at room temperature.
- Unsuitable foods for raptors include feral pigeons, due to the health risks associated with trichomoniasis and herpesvirus, pieces of red meat without bone and dog or cat food.
- The amount to feed a bird of prey daily will vary with size and body condition. As a general guideline:
  - < 250 g – feed 20–30 per cent of bodyweight daily.
  - 250–500 g – feed 15–20 per cent of bodyweight daily.
  - > 500 g feed 10–15 per cent of bodyweight daily.
- Do not let a raptor starve for more than 48 hours before beginning assist feeding. For birds that are in poor body condition, assist feeding should be performed from the first day in care, after dehydration is corrected.
- Very sick or emaciated raptors need a low roughage diet in the short term. Hills a/d tinned food (available at vet clinics) is ideal initially, followed by small pieces of quail breast or diced chicken heart, moistened with water or electrolytes and egg yolk. When the raptor is eating on its own and gaining weight it can be moved onto its regular diet.

Table 2.7 Captive diets for birds of prey

Common name	Captive diet
Barn owl	Mice, day-old chicks
Barking owl	
Masked owl	
Powerful owl	
Sooty owl	
Southern boobook owl	
Australian hobby	Sparrows, starlings, quail, day-old chicks, mealworms, occasional mice
Australian kestrel	Day-old chicks, mice, mealworms
Black-shouldered kite	Day-old chicks, mice
Collared sparrowhawk	
Brown goshawk	Day-old chicks, mice, weaner rat
Grey goshawk	Day-old chicks, mice, weaner rat
Grey falcon	
Spotted harrier	
Whistling kite	
Black falcon	
Brown falcon	
Peregrine falcon	Quail, sparrows, occasional mice or weaner rats
Wedge-tailed eagle	Day-old chicks, mice, weaner rat or rabbit
White-bellied sea eagle	
Little eagle	

Figure 2.11 Examples of captive diet for raptors. a. Day-old chicks and a portion of rabbit. b. A portion of rabbit, day-old chick, mouse, rats and a quail.

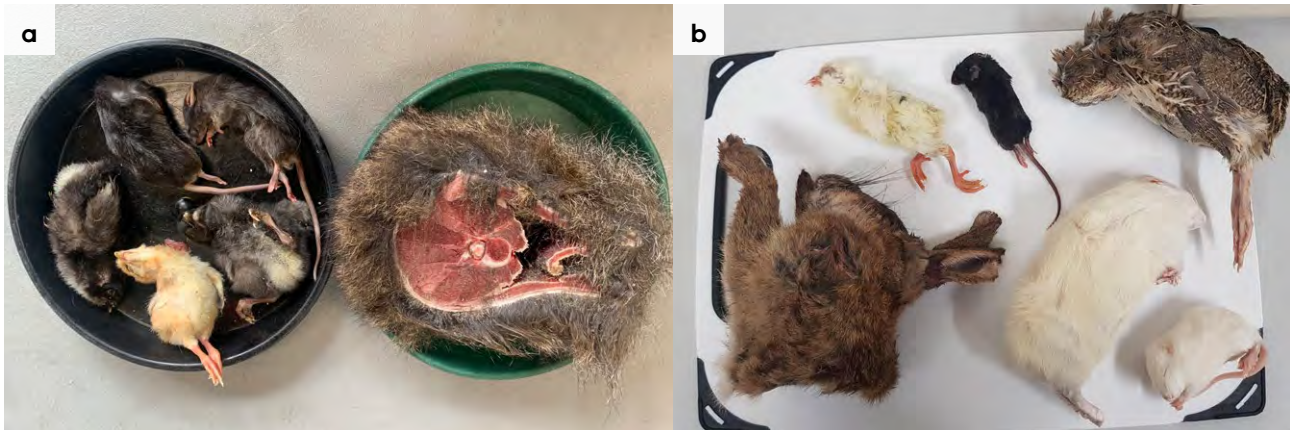


Photo credit: Zoos Victoria

2.8 Hand raising

Hand raising recording templates for growth, development, feeding and other observations can be found in the appendices to Part A of these guidelines.

2.8.1. Equipment required for hand raising

- A brooder box that is thermostatically controlled.
- Blunt ended forceps.
- Small bowl.
- Fresh food (rats, mice, quail).
- Tissues/wipes for cleaning the bird.
- Scales – kitchen bench top scales
- Record charts.

2.8.2. Growth, development and care of orphaned young

- It is rare for young raptors less than 10 days of age to come into care. **Table 2.8** and **Table 2.9** provide guidance on determining the ages of some common species.
- **Table 2.10** indicates the type of food to be offered and the feeding frequency for chicks of different ages.
- For chicks one to 10 days of age, the brooder box should be kept at 30°C. This temperature is gradually reduced as the chicks start to regulate their own body temperature. If it is too hot the chicks will tend to sprawl in the box. If too cold the chicks will huddle together.
- The feeding frequency in **Table 2.10** is a guide. Feed until the chick's crop is full and only offer more food once the crop is empty.
- Encourage the chicks to feed from a bowl as soon as possible to minimise the possibility of imprinting.

Table 2.8 Development stages for some raptor species

Species	First down	Second down	First flight	Independence
Australian hobby	4 days	14 days	35 days	105–115 days
Australian kestrel	4 days	9 days	30 days	51 days
Goshawk	3–4 days	12 days	26–31 days	47–66 days
Peregrine falcon	4 days	14 days	40 days	115–130 days

Table 2.9 Determining age for some raptor species

Species	Wing chord/age	Wing chord/age	Wing chord/age
Australian hobby	13.0 cm/22 days	16.0 cm/27 days	25.0 cm/41 days
Brown falcon	13.0 cm/20 days	16.0 cm/24 days	25.0 cm/37 days
Brown goshawk	11.4 cm/17 days	17.5 cm/25 days	25.5 cm/37 days
Collared sparrowhawk	11.4 cm/18 days	17.5 cm/27 days	25.5 cm/40 days
Peregrine falcon	13.0 cm/20 days	16.0 cm/24 days	25.0 cm/37 days
Whistling kite	13.0 cm/26 days	16.0 cm/30 days	25.0 cm/44 days

Table 2.10 Type of food and feeding frequency

Age	Food	Feeding frequency
1–10 days	Minced rat/mouse with skin, head, feet, tail and intestines removed	Every two hours
10–15 days	Chopped rat/mouse with skin, head, tail and intestines removed	Every four hours
15–25 days	Whole food: skinned and gutted rodents or plucked quail	Chick should be self-feeding. Leave food for the whole day

2.8.3. Imprinting

Imprinting is a common problem with hand-reared orphan raptors. An imprinted raptor may appear tame, beg for food or 'scream' at humans for food. Return to the parents should be attempted whenever possible. If this cannot be achieved, successful methods of rearing orphaned birds of prey include:

- Hacking: nestlings are placed in a box containing appropriate perches, or blocks, at the site where they were found, approximately two weeks before fledging. The box should be placed high enough off the ground to reduce the risk of mammalian predators gaining access. Box sizes are 1 m x 1 m x 1 m for small raptors and 2 m x 2 m x 2 m for large raptors. Birds should be self-feeding from a bowl before being placed in the hack box. Food is left in the box once per day. This continues after fledging, when the door is opened, until all the birds have dispersed.
- Use of hand-puppets: Nestlings are fed by a hand-puppet designed to resemble the parent bird. Feed through a hatch if possible and do not let the bird see that a person is attached to the puppet.
- Play recordings of adult feeding calls and nestling calls from internet videos of the same species to further mask other auditory cues such as doors opening or footsteps leading up to feeding time. Wear soft-soled shoes and avoid talking or noises such as placing feed bowls on hard surfaces etc.
- Provide a mirror so the bird believes it has a sibling.
- Avoid being affectionate or talking to birds and avoid any non-essential handling or physical contact.
- Avoid raising birds within sight or smell of domestic animals.

2.9 Release protocol

Ideally, wild animals will be rehabilitated and released in a short timeframe. If this is not possible and the animal is in care for significant extended periods, ensure that the animal is regularly assessed against the welfare domains to support decision-making. Animals in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for the animal.

2.9.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support improved outcomes once back in the wild. Animals should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following information should be used to guide decision-making regarding release suitability for raptors:

- ☑ Individual is in a state of good health – presenting injury/sickness is completely resolved.
- ☑ If the bird can be released within two weeks of arrival, minimal fitness will be lost.
- ☑ For birds that have had fractured bones or head trauma, a pre-release examination by a veterinarian is recommended to determine that the original injury has healed. This may involve radiographs of the fracture site to determine the extent of healing.
- ☑ Flight should be critically observed, if possible, with an experienced rehabilitator. The ability to gain lift, negotiate the environment and land are required for successful release.
  - The feathers should be checked for damage sustained during care prior to release. There should be no more than two broken flight feathers on each wing.
  - Birds should be able to fly strongly upwards to avoid predation. A bird should be able to gain 2 m in height within 2– 4 m in distance.
  - The bird should be able to fly for two to three minutes or 10 laps of the pre-release aviary and should not be open-mouth breathing for longer than 30 seconds after the end of the process.
  - The bird should be able to demonstrate agility in moving around the aviary by changing direction and avoiding branches and perches.
  - The bird should be able to land well on a perch.
- ☑ Individual is within a healthy weight range and appropriate body condition (refer to **Table 2.1**).
- ☑ Individual displays ability to actively forage and consume natural foods.
- ☑ Individual displays appropriate predator avoidance behaviour and is not imprinted on people.

2.9.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered. For more information on the ecological characteristics and requirements of raptors that may help with their release, please refer to **Table 2.1**.

- ☑ Adult birds should be released as soon as possible.
- ☑ Diurnal birds of prey should be released before midday.
- ☑ Nocturnal birds of prey should be released in the evening.
- ☑ Avoid release during times of high wind or storms.
- ☑ Do not release birds when the temperature is forecast to be greater than 38°C on any of the following three days.

2.9.3. Release checklist

Check all of the requirements of your authorisation are being met, and consider the following:

Release of juvenile bird using a hack box

- ☑ A hack box is placed at the release site and the juvenile bird fed in this box. See **Section 2.8.3**.
- ☑ Once the bird has reached release age/weight, the hack box door is opened and the bird left to fly off in its own time.

Release of adults and orphaned birds that have reached their release age/weight

- ☑ Limit the number of people at the release.
- ☑ Take the bird as close as possible to the point-of-encounter and open the cage door.
- ☑ Allow the bird to fly away.

2.10 Key references and additional reading

Day, N. and Simpson, K. 2019. Field Guide to the Birds of Australia, 8th edition. Penguin Australia, Pty, Ltd., Melbourne.

Debus, S. 2019. Birds of Prey of Australia. CSIRO Publishing, Clayton South.

Duer, R.S. and Gage, L.J. 2020. Hand-Rearing Birds, 2nd Edition. John Wiley & Sons Inc., Hoboken.

Marchant, S. and Higgins, P.J. (eds). 1993. Handbook of Australian, New Zealand and Antarctic Birds. Volume 2 Raptors to Lapwings. Oxford University Press, Oxford.

Naisbitt, R. and Holz, P. 2004. Captive Raptor Management and Rehabilitation. Hancock House Publishers, Surrey.

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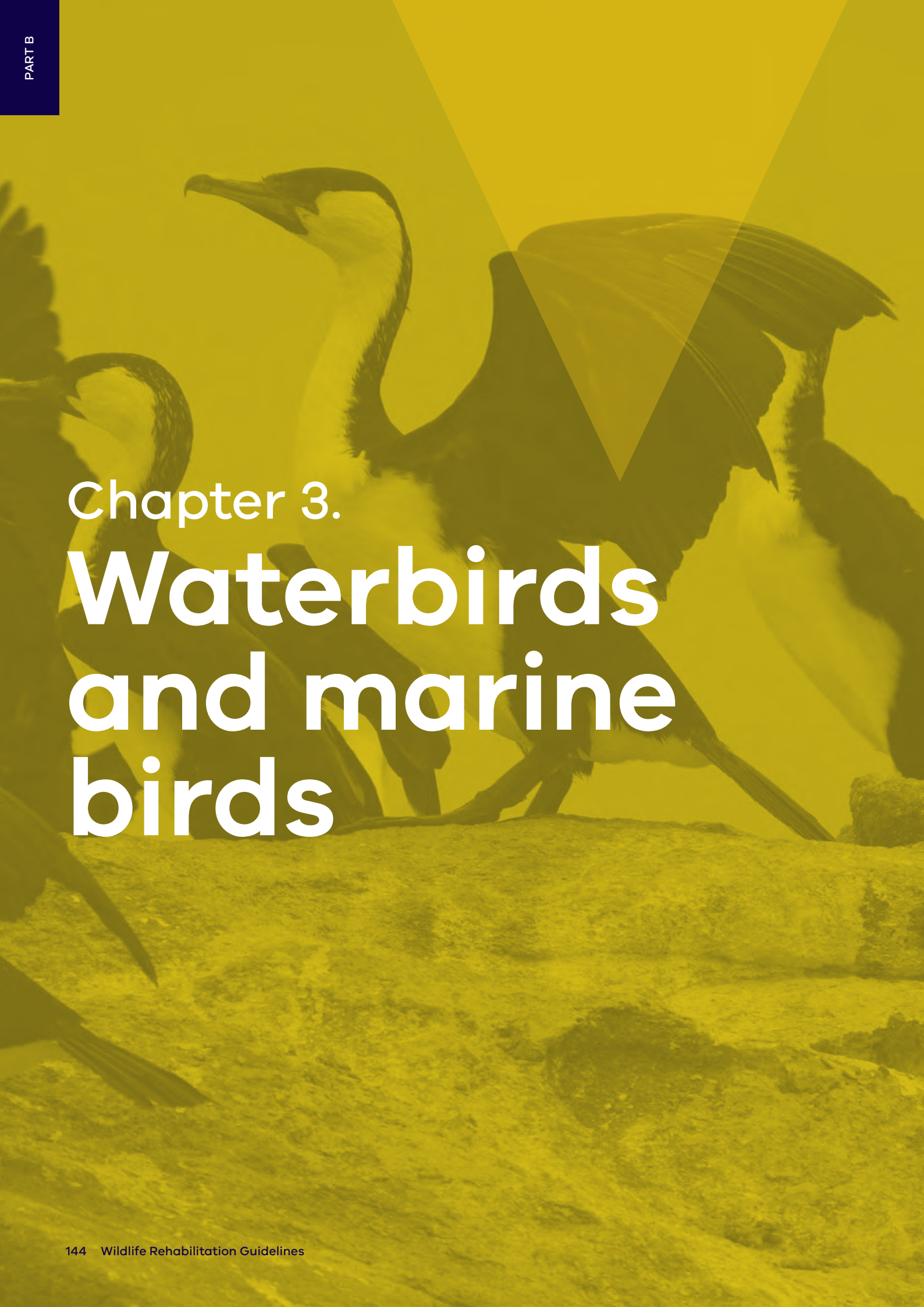
Olsen, P. 2005. Wedge-tailed Eagle. CSIRO Publishing, Collingwood.

Acknowledgements: Victor Hurley, David Whelan, Bernie McRitchie, Jonny Schoenjahn.



Chapter 3.
Waterbirds and marine birds

Contents

Photo credit: Tracey-Ann Hooley, Museums Victoria

In Victoria, sick, injured or orphaned wildlife can only be rehabilitated by a wildlife shelter operator or foster carer who is authorised under section 28A of the Victorian *Wildlife Act 1975* (Wildlife Act). Wildlife rehabilitators are subject to strict conditions. The mandatory requirements that they must meet are set out in the Wildlife Shelter and Foster Carer Authorisation Guide issued under the Wildlife Act. These conditions enforce the minimum standards required for the humane treatment and successful rehabilitation of wildlife in care. The Wildlife Rehabilitator Authorisation Guide: Things You Need To Know explains how wildlife rehabilitators can meet these mandatory requirements and can be found here: **https://www.vic.gov.au/wildlife-rehabilitation-shelters-and-foster-carers**.

The Victorian Wildlife Rehabilitation Guidelines have been developed to incorporate evidenced-based best practice in wildlife care and rehabilitation to equip rehabilitators to deliver positive welfare outcomes for individual animals in their care from first aid to post-release into the wild.

You must comply with the conditions of your authorisation. These guidelines must be read in conjunction with the conditions of your authorisation.

3.1 Introduction

This chapter focusses on the husbandry, care and welfare of waterbirds and marine birds. Water birds include freshwater bird species that swim, such as ducks and swans, and waders such as moorhens, coots, ibis, lapwings and herons. Marine birds or seabirds are those species that live in or around salt water. Of these, coastal species such as penguins, pelicans and gulls are much more likely to come into care than the more pelagic species, such as albatrosses.

Marine birds require specialist housing and access to large amounts of fish and should only be rehabilitated by wildlife shelter operators experienced in their care in the region where they were found. As they may be found in large numbers, naturally high mortality rates in juvenile and adult birds can occur as a consequence of sporadic food shortages. However, mass mortality events may also reflect the emergence of novel diseases. If there is a disease outbreak (for example botulism in birds) or a mass-die-off of wildlife, report it to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours) immediately.

The Department of Energy, Environment and Climate Action (DEECA) recommends all penguins (little penguins and larger Sub-Antarctic penguins), albatrosses and petrels to be rehabilitated at a location that has suitable facilities and expertise. If one of these species comes into care, contact either Zoos Victoria's Marine Response Unit on 1300 245 678 or the Phillip Island Nature Park on (03) 5951 2800.

When birds come into care it is the responsibility of the wildlife rehabilitator to ensure that the five domains of animal welfare are satisfied. These include providing optimal nutrition and an environment appropriate to the stage of rehabilitation. The focus should be on the animal's return to health and release, which is facilitated through regular collaboration with a veterinarian. It is also important to consider the bird's mental state and ability to exhibit normal behaviours without detrimentally affecting its recovery. Welfare may be temporarily compromised by the necessity of a gradual return to normal activity, depending on its stage of rehabilitation. For example, a bird with a fractured wing must be confined and not allowed to attempt flight until that fracture has healed. It can then be allowed a staged return to free flight. Further information about the five domains of animal welfare is in Part A of these guidelines.

3.2 Species information

Profiles for some common waterbird and marine bird species found in Victoria are detailed in the following tables. Morphometric data was obtained from the Australian Bird Study Association Inc. website (**https://absa.asn.au**). Wing chord is the distance from the wrist joint to the end of the longest primary feather (see **Figure 3.1**). For assistance in identification of waterbird and marine bird species, refer to the recommended reading and reference material at the end of this chapter.

Figure 3.1 Avian wing showing measurement of wing chord.

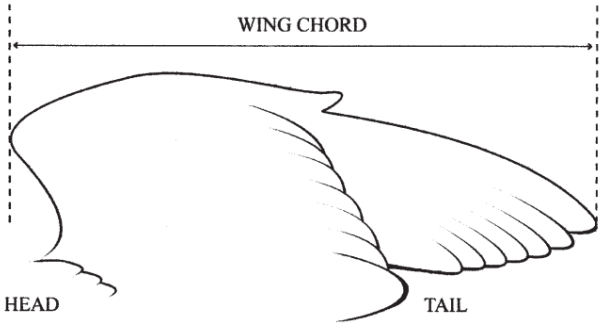
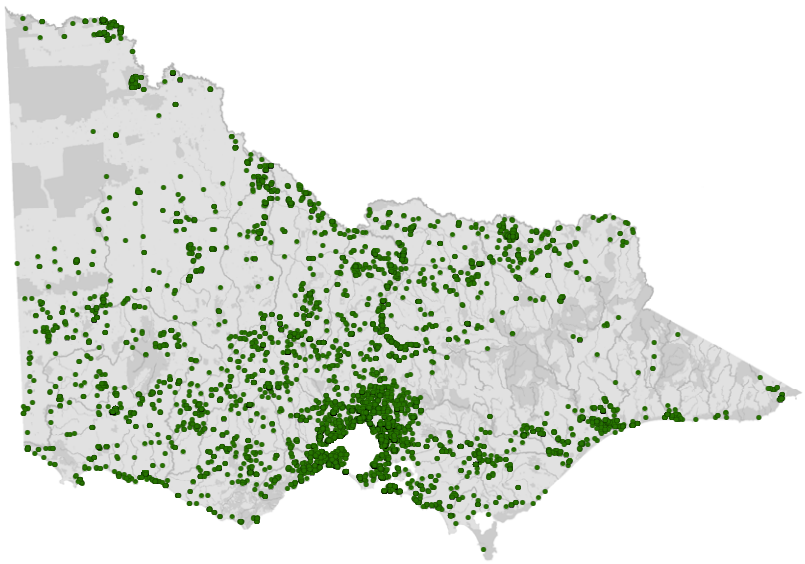
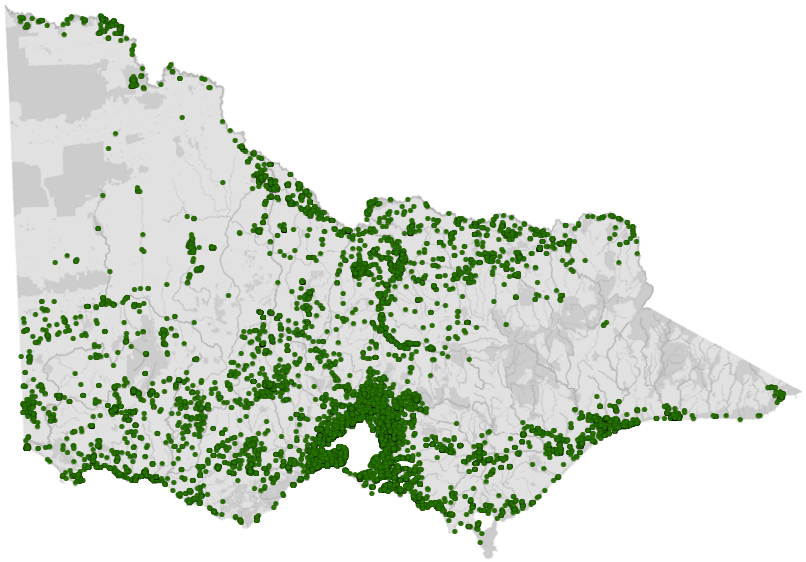


Image credit: Zoos Victoria

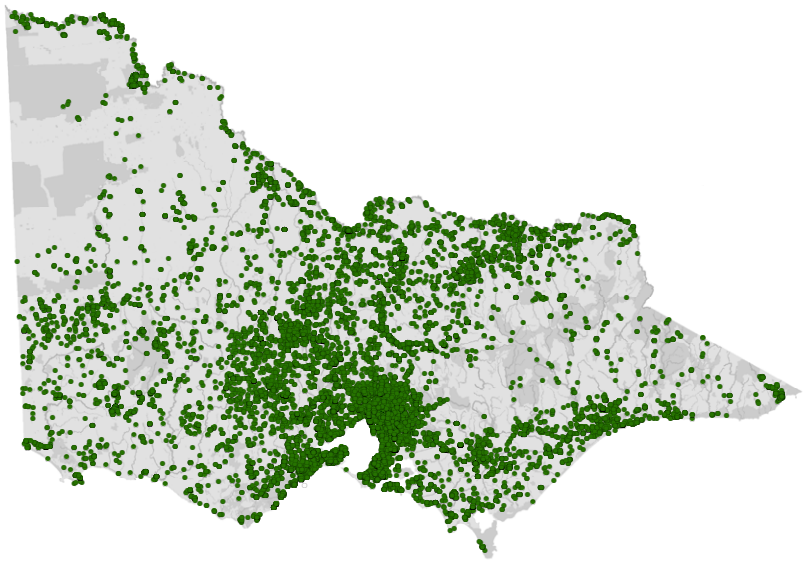
Table 3.1 Species profiles: Waterbirds

Species	**Australasian grebe (*Tachybaptus novaehollandiae*)**
 Photo credit: David Paul, Museums Victoria	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**

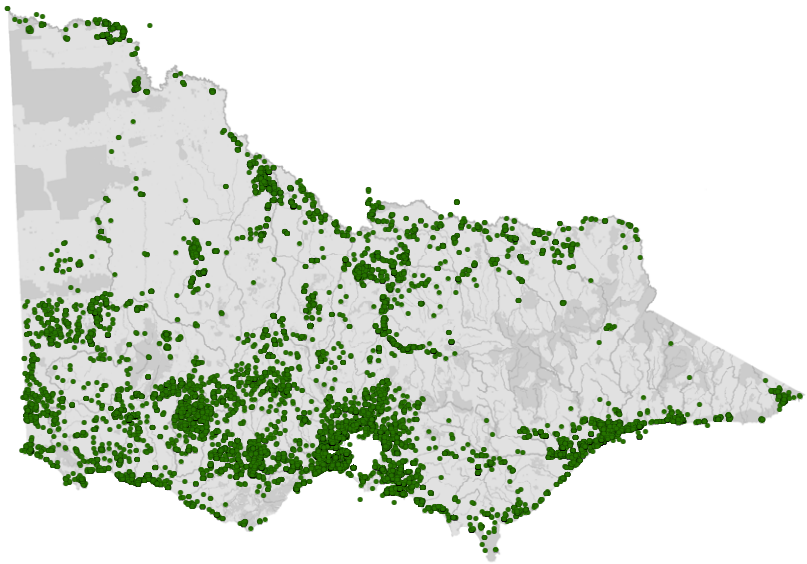
Species	Australasian grebe (*Tachybaptus novaehollandiae*)
General appearance	Brownish with dark head, narrow chestnut streak on side of head, yellow eye and broad white wing stripe
Conservation status*	Common
Adult morphometrics	Body weight: 170–280 g Head and body length: 230–250 mm Wing chord: Male: 105–113 mm. Female: 105–107 mm
Habitat	Freshwater waterways. Still, shallow fresh waters, occasionally on sheltered bays
Home range	0.1–0.5 ha
Natural activity peak	Diurnal
Foraging style	Feeds on surface and in shallows
Diet	Fish, crustaceans, insects
Movement	Non-migratory, nomadic
Social behaviour	Communal
Nesting time	August–December
Nest location	Anchored floating mound of water plants
Age at dispersal	2 months
Age at maturity	1 year

Species	Australian white ibis (*Threskiornis molucca*)
 Photo credit: Mark Norman, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	White bird with black naked head and neck. Black feathers near tail
Conservation status*	Common
Sexual dimorphism	Males have a longer bill Male: 183.5–197.1 mm Female: 149.1 mm–158.4 mm
Adult morphometrics	Body weight: Male: 1700–2350 g. Female: 1300–2120 g Head and body length: 650–750 mm Wing chord: Male: 355–398 mm, Female: 355–372 mm Tail length: Male: 120–134 mm, Female: 122–130 mm
Habitat	Wide range of wetlands, grasslands. Freshwater wetlands, irrigated areas, tidal mudflats, public gardens
Home range	Not reported
Natural activity peak	Diurnal
Foraging style	Feeds in pastures, freshwater wetlands, tidal areas
Diet	Fish, crustaceans, insects
Movement	Non-migratory, dispersive

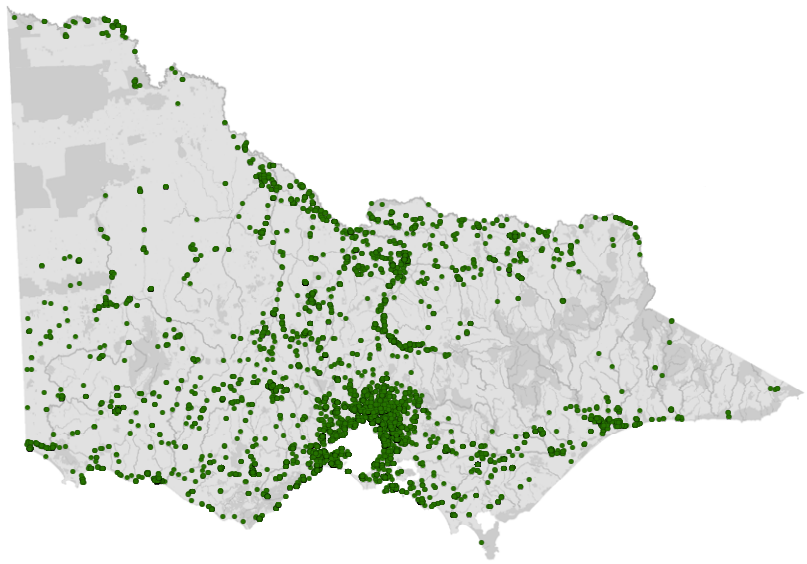
Species	Australian white ibis (*Threskiornis molucca*)
Social behaviour	Communal
Nesting time	June–December
Nest location	Over water in dense trees, on island, in trampled vegetation; in colonies
Age at dispersal	2–3 months
Age at maturity	3 years

Species	Australian wood duck {*Chenonetta jubata*)
 Photo credit: Anne Fowler	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Greyish duck with dark maned head. Male (right) has a dark brown head. Female (left) has a paler brown head
Conservation status*	Common
Sexual dimorphism	Male: Head and upper neck chocolate brown Female: Head and neck pale brown with a white line above and below the eye
Adult morphometrics	Body weight: Male: 700–955 g. Female: 660–980 g Head and body length: Male: 480 mm, Female: 470 mm Wing chord: Male: 265–293 mm, Female: 270–280 mm Tail length: Male: 87–105 mm, Female: 94–106 mm

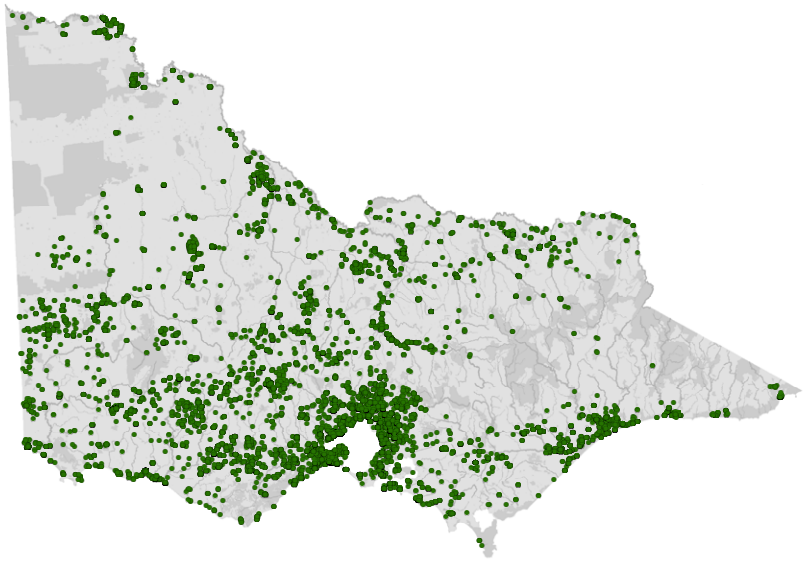
Species	Australian wood duck (*Chenonetta jubata*)
Habitat	Woods, grasslands, pastures, open woodlands, dams, lakes, wetlands
Home range	Mean 5800 ha. Standard deviation 2900 ha
Natural activity peak	Diurnal
Foraging style	Dabbles, upends in shallows, feeds in grasslands, irrigated crops
Diet	Grasses, clover
Movement	Non-migratory, dispersive
Social behaviour	Communal
Nesting time	September–November
Nest location	In hollow, over or far (up to 1.5 km) from water
Age at dispersal	3 months
Age at maturity	1 year

Species	Black swan (*Cygnus atratus*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large black swan with white wingtips

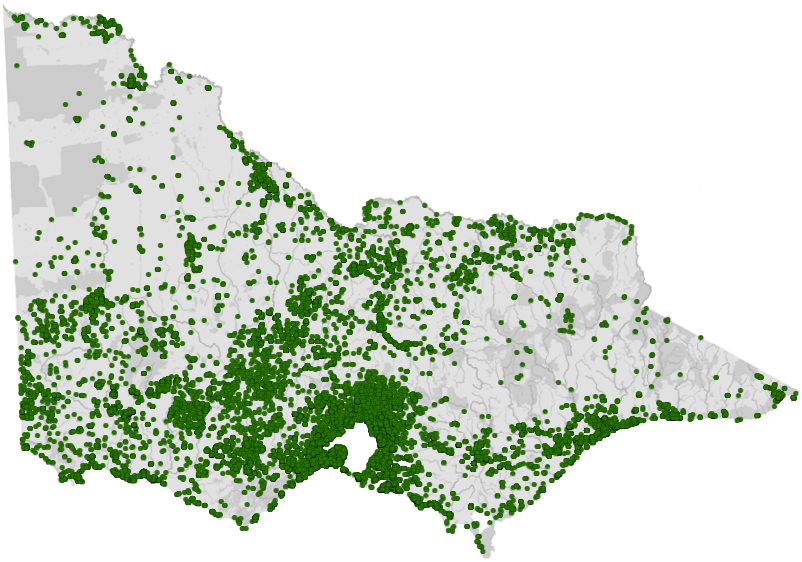
Species	Black swan (*Cygnus atratus*)
Conservation status*	Common
Adult morphometrics	Body weight: Male: 4500–8750 g. Female: 3700–7200 g Head and body length: 1100–1400 mm Wing chord: Male: 410–508 mm, Female: 445–467 mm Tail length: Male: 104–130 mm, Female: 107–112 mm
Habitat	Large open waters, tidal mudflats, permanent swamps and lakes, sheltered estuaries and bays, occasionally open sea
Home range	2–60 ha
Natural activity peak	Diurnal
Foraging style	Surface dabbling, feeding in shallows, upending
Diet	Grasses, aquatic plants, insects, molluscs
Movement	Non-migratory; nomadic and dispersive
Social behaviour	Varies with season
Nesting time	April–October, but any month after suitable rain
Nest location	Large heap, in shallow water or on islands; occasionally in colonies
Age at dispersal	>6 months
Age at maturity	1–2 years

Species	Dusky moorhen (*Gallinula tenebrosa*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Dusky brown with red frontal shield, thin bill with yellow tip and white patches on each side of the undertail
Conservation status*	Common
Adult morphometrics	Body weight: Male: 490–720 g. Female: 330–680 g Head and body length: 350–400 mm Wing chord: Male: 197–223 mm, Female: 189–213 mm Tail length: Male: 64–82 mm, Female: 63–77 mm
Habitat	Well-vegetated wetlands, farm dams, rivers with grassy banks, trees or scrub on banks
Home range	0.1–0.3 ha
Natural activity peak	Diurnal
Foraging style	Forages ashore and on water surface
Diet	Aquatic plants, seeds, insects, molluscs
Movement	Non-migratory, dispersive
Social behaviour	Solitary
Nesting time	August–March

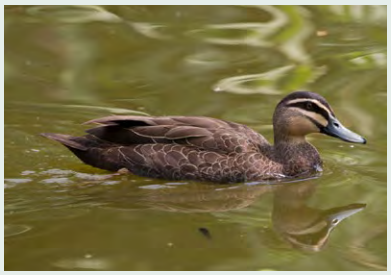
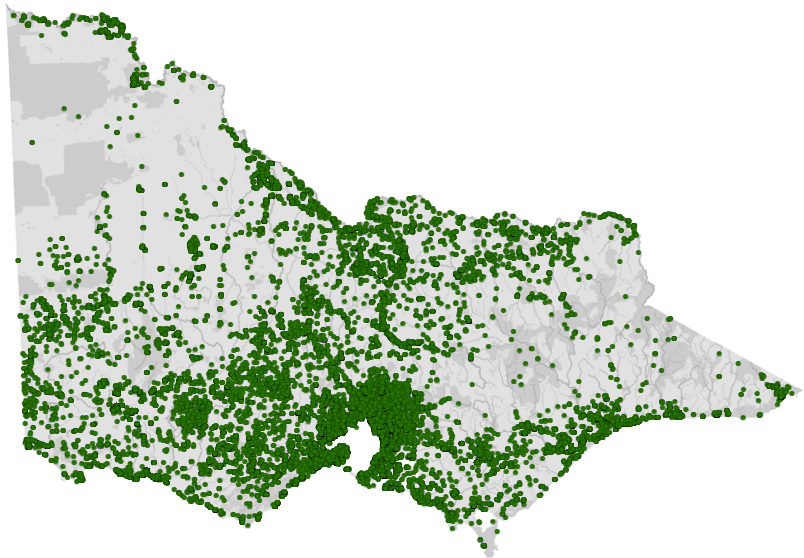
Species	Dusky moorhen (*Gallinula tenebrosa*)
Nest location	In or near water in vegetation, on stump or low branch
Age at dispersal	2 months
Age at maturity	1–2 years

Species	Eurasian coot (*Fulica atra*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Black with white frontal shield and beak
Conservation status*	Common
Adult morphometrics	Body weight: Male: 480–660 g. Female: 470–610 g Head and body length: 350–390 mm Wing chord: Male: 173–194 mm, Female: 169–181 mm Tail length: Male: 48–51 mm, Female: 44–53 mm
Habitat	Large fresh or brackish waters with underwater vegetation, occasionally sheltered coastal inlets
Home range	Reported to travel up to a mean of 295 km with a standard deviation of 230 km
Natural activity peak	Diurnal
Foraging style	Dives for plant food

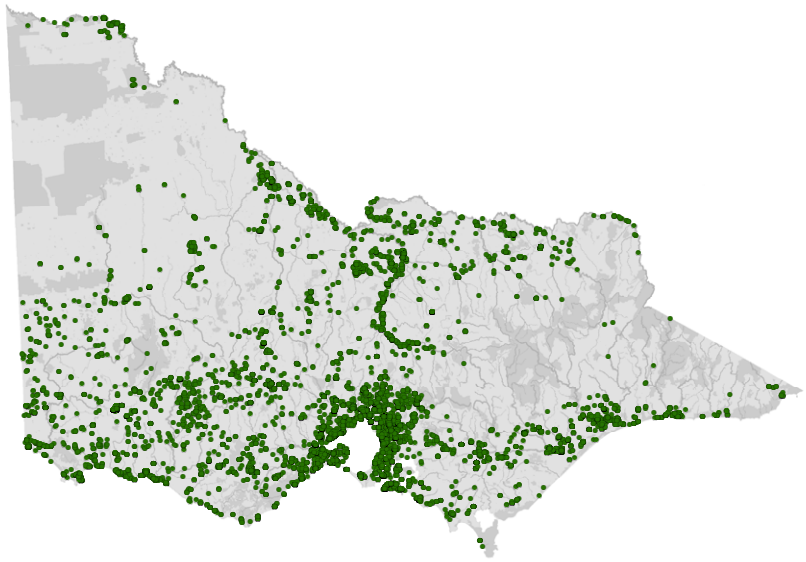
Species	Eurasian coot (*Fulica atra*)
Diet	Aquatic plants, seeds, insects, molluscs
Movement	Nomadic, dispersive
Social behaviour	Solitary
Nesting time	Mainly August–February, but any time when conditions suitable
Nest location	On bottom in shallow water or on low island, stump or log
Age at dispersal	Young independent by 2 months but stay with adults until following spring
Age at maturity	1 year

Species	Masked lapwing (*Vanellus miles*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Large plover with yellow facial wattles and black patch on the side of the neck
Conservation status*	Common
Adult morphometrics	Body weight: Male: 230–300 g. Female: 190–300 g Head and body length: 300–370 mm Wing chord: Male: 244–268 mm. Female: 238–258 mm Tail length: Male: 101–114 mm. Female: 96–110 mm

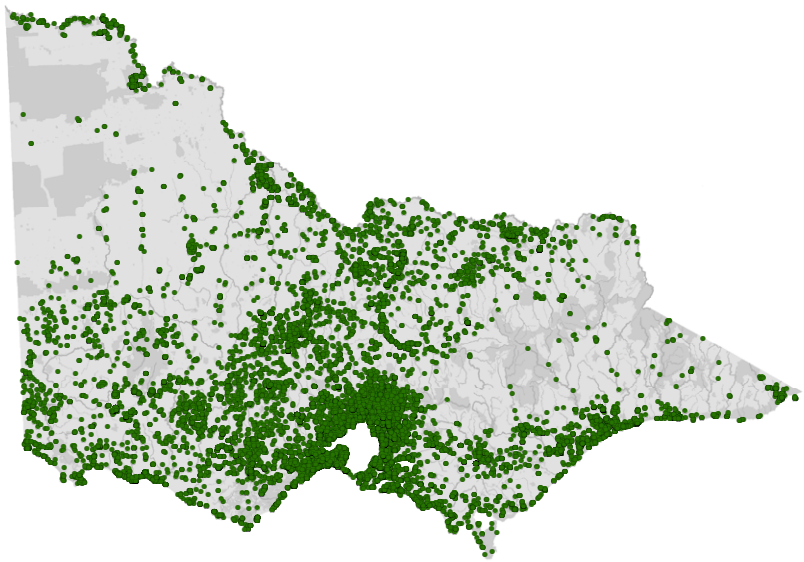
Species	Masked lapwing (*Vanellus miles*)
Habitat	Flooded ground, paddocks with dams, beaches, gardens
Home range	1–15 ha
Natural activity peak	Diurnal
Foraging style	Forages on saltmarshes, mudflats, shores of lakes and rivers, and pasture
Diet	Insects, larvae, molluscs, worms, frogs, some plants and seeds
Movement	Non-migratory, nomadic or part-migratory
Social behaviour	Solitary
Nesting time	June–October
Nest location	Scrape or shallow cup of twigs, grass or pebbles, on ground or small hummock in water
Age at dispersal	7–8 months
Age at maturity	1 year

Species	Pacific black duck (*Anas superciliosa*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Large dark duck with two dark lines on a buff face, green or purple speculum and white underwing lining

Species	Pacific black duck (*Anas superciliosa*)
Conservation status*	Common
Sexual dimorphism	Male: Black crown, back and rump Female: Crown, back and rump more brown than black
Adult morphometrics	Body weight: Male: 800–1400 g. Female: 600–1400 g Head and body length: 470–600 mm Wing chord: Male: 250–283 mm. Female: 230–265 mm Tail length: Male: 81–99 mm. Female: 73–95 mm
Habitat	Any suitable water including roadside and backyard ponds, dams, tidal mudflats; prefers large permanent waters with plentiful vegetation
Home range	2–3 ha
Natural activity peak	Diurnal
Foraging style	Dabbles, upends in shallows, forages among wetland vegetation
Diet	Grasses, seeds, aquatic plants, molluscs, crustaceans, insects
Movement	Non-migratory and nomadic
Social behaviour	Communal
Nesting time	June–December
Nest location	Often in stump or tree hollow, on ground in vegetation, old nest of corvid
Age at dispersal	2–3 months
Age at maturity	1 year

Species	Australasian Swamphen (*Porphyrio melanotus*)
 Photo credit: Mark Norman, Museums Victoria	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Blue or purple breast and red frontal shield and bill
Conservation status*	Common
Adult morphometrics	Body weight: Male: 780–1300 g. Female: 680–1250 g Head and body length: 440–480 mm Wing chord: Male: 267–291 mm. Female: 262–285 mm Tail length: Male: 95–109 mm. Female: 95–105 mm
Habitat	Margins of swamps, lakes, shallow rivers with dense vegetation, urban watercourses
Home range	0.7–3.0 ha
Natural activity peak	Diurnal
Foraging style	Scavenges dead birds, fish
Diet	Aquatic plants, seeds, insects, molluscs
Movement	Non-migratory, dispersive
Social behaviour	Solitary

Species	Australasian Swamphen (*Porphyrio melanotus*)
Nesting time	July–December
Nest location	On trampled-down vegetation
Age at dispersal	2 months
Age at maturity	1–2 years

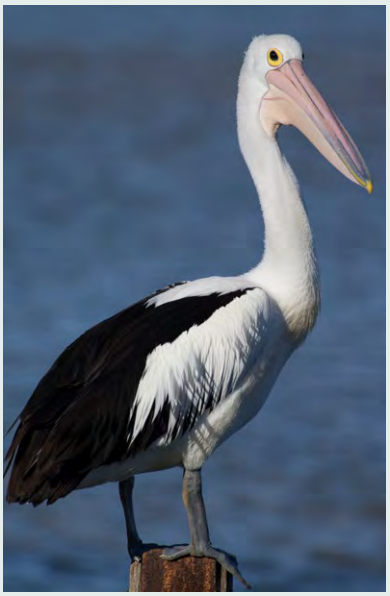
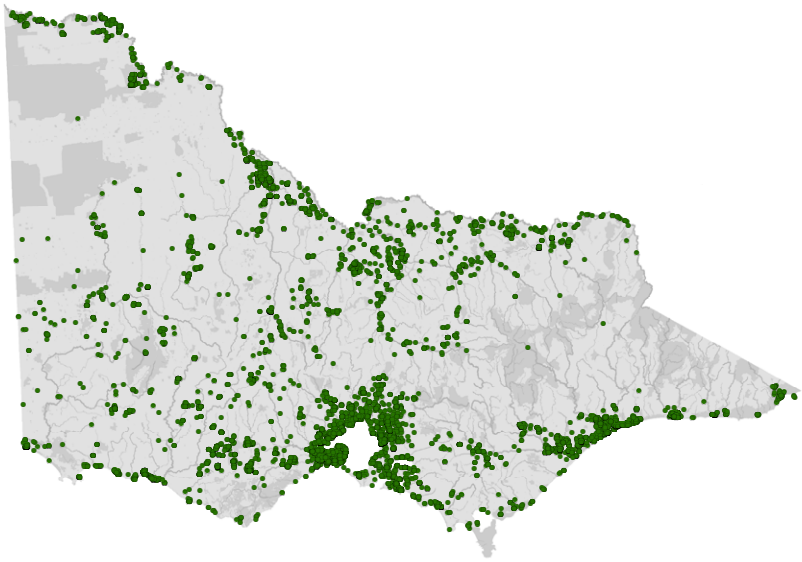
Species	White-faced heron (Egretta *novaehollandiae*)
 Photo credit: Mark Norman, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Grey heron with a white face
Conservation status*	Common
Adult morphometrics	Body weight: Male: 500–690 g. Female: 460–560 g Head and body length: 660–680 mm Wing chord: Male: 316–341 mm. Female: 305–323 mm Tail length: Male: 124–140 mm. Female: 120–137 mm
Habitat	Shallow wetlands, saltmarsh, tidal mudflats, beaches
Home range	Several ha
Natural activity peak	Diurnal
Foraging style	Feeds in wetlands, standing and waiting, stalking, dashing

Species	White-faced heron (Egretta *novaehollandiae*)
Diet	Fish, crustaceans, insects
Movement	Dispersive or part-migratory
Social behaviour	Solitary
Nesting time	September–November
Nest location	In leafy branch 5–12 m high; sometimes far from water
Age at dispersal	2 months. Fledging takes place at 5–6 weeks away from nest site. Adults continue to feed fledged young away from nest site and will be left alone while parents are out foraging
Age at maturity	2–4 years

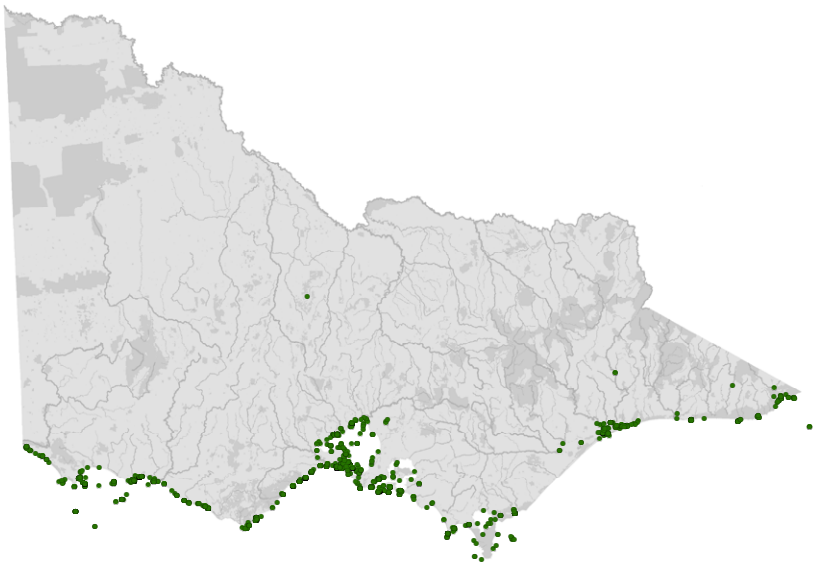
Table 3.2 Species profiles: Marine birds

Species	Australasian gannet (*Morus serrator*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	White bird with golden head and black primaries, secondaries and central tail feathers
Conservation status*	Common

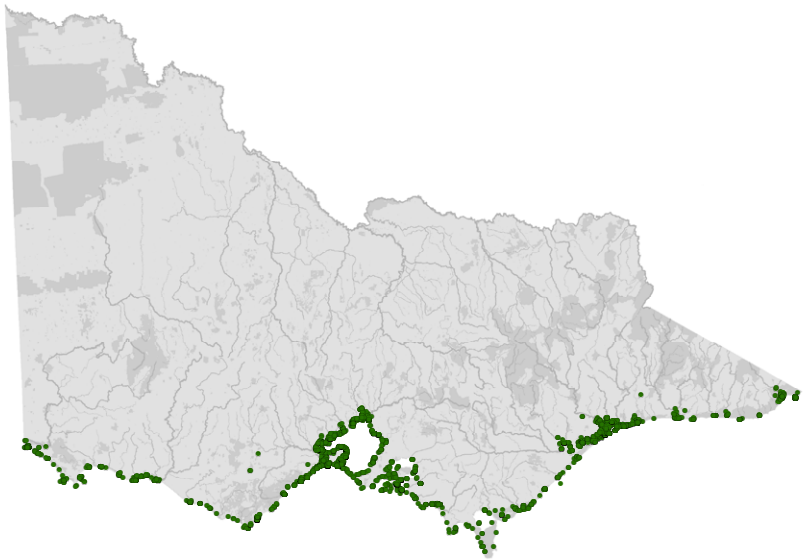
Species	Australasian gannet (*Morus serrator*)
Adult morphometrics	Body weight: 2000–2600 g Head and body length: 840–910 mm Wing chord: Male: 400–485 mm. Female: 455–480 mm Tail length: Male: 203–228 mm. Female: 200–230 mm
Habitat	Coastal waters
Feeding range	Average 268 km (86–450 km)
Natural activity peak	Diurnal
Foraging style	Fly low above sea, plunge for prey
Diet	Fish
Movement	Non-migratory, migratory and dispersive; some are present at colonies all year
Social behaviour	Solitary
Nesting time	July–February
Nest location	Pedestal of compact earth, guano, seaweed on islands, rocks, navigation structures
Age at dispersal	4 months
Age at maturity	4–5 years

Species	Australian pelican (*Pelecanus conspicillatus*)
 Photo credit: Tracey-Ann Hooley, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large predominantly white bird with black feathers along the back, tail and wings. Enormous bill and pouch
Conservation status*	Common
Adult morphometrics	Body weight: Male: 6000–8000 g. Female: 3000–6000 g Head and body length: 1600–1800 mm Wing chord: Male: 560–690 mm. Female: 541–605 mm Tail length: Male: 154–225 mm. Female: 147–182 mm
Habitat	Large shallow waters, coastal and inland, occasionally open sea, islands, mudflats
Feeding range	Up to several hundred kilometres
Natural activity peak	Diurnal
Foraging style	Singly prey stealthily on fish, groups encircle fish, plunge heads in unison
Diet	Fish, crustaceans
Movement	Dispersive, highly nomadic
Social behaviour	Communal

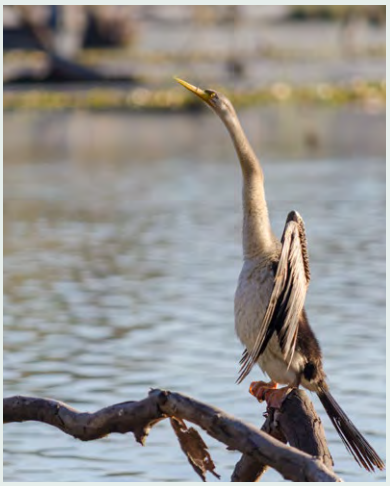
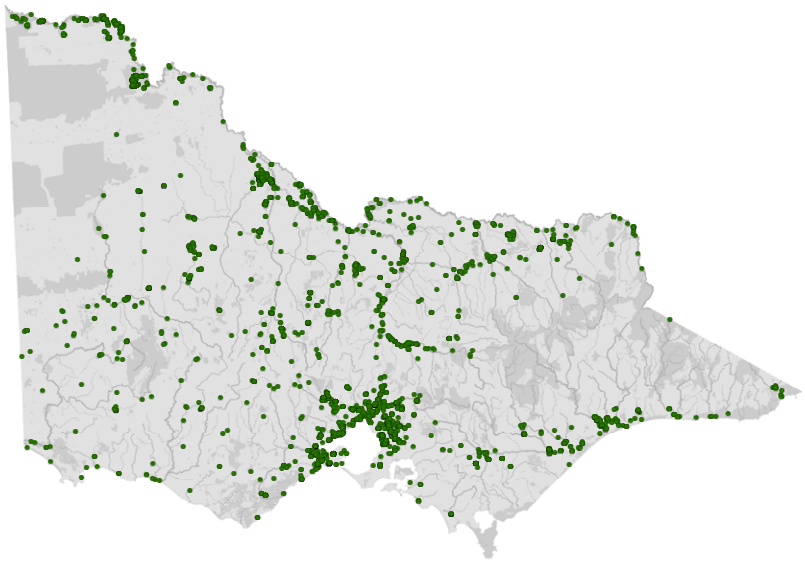
Species	Australian pelican (*Pelecanus conspicillatus*)
Nesting time	Almost year round, mostly August to November
Nest location	In small to very large colonies, usually on bare islands; occasionally in vegetation over water
Age at dispersal	6–8 months. While birds fledge at this age, they are most commonly supplementary fed by parents until around 6–8 month of age. Many birds at dispersal age that come into care are therefore not independent birds.
Age at maturity	1–2 years

Species	Black-faced cormorant (*Phalacrocorax fuscescens*)
 Photo credit: Tracey-Ann Hooley, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large black and white cormorant with a naked black face. Upperparts, legs and feet are black, underparts are white. Blue-green eyes
Conservation status*	Common
Adult morphometrics	Body weight: Male: 1600–3100 g. Female: 1200–3000 g Head and body length: 610–690 mm Wing chord: Male: 262–290 mm. Female: 250–266 mm Tail length: Male: 92–125 mm. Female: 91–115 mm

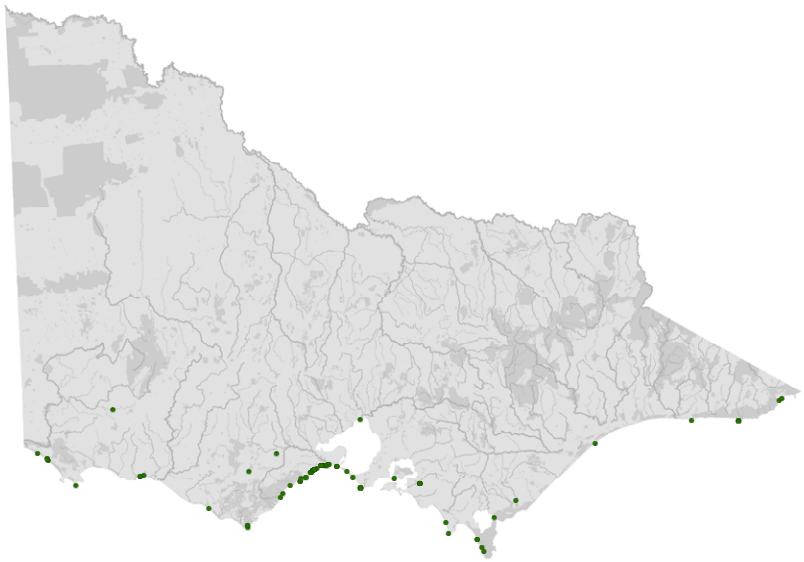
Species	Black-faced cormorant (*Phalacrocorax fuscescens*)
Habitat	Coastal waters, ashore on isolated rock stacks or rocky headlands, seldom on beaches
Home range	Not reported
Natural activity peak	Diurnal
Foraging style	Diving
Diet	Fish, squid, insect larvae, crustaceans
Movement	Non-migratory
Social behaviour	Solitary
Nesting time	September–February
Nest location	In colony on rock shelf or rock face of island or stack
Age at dispersal	Unknown
Age at maturity	2–3 years

Species	Crested tern (*Thalasseus bergii*)
 Photo credit: Rodney Start, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large tern with a yellow bill and black crest on the crown and nape

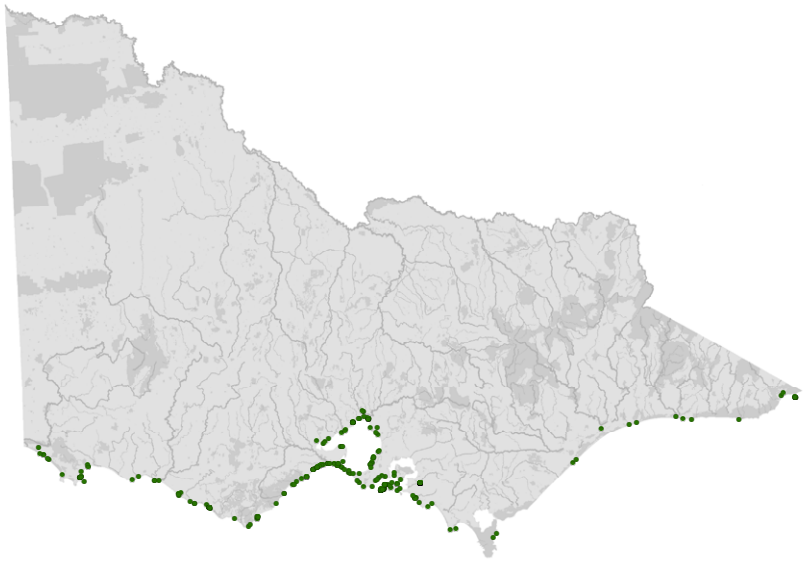
Species	Crested tern (*Thalasseus bergii*)
Conservation status*	Common
Adult morphometrics	Body weight: Male: 215–370 g. Female: 190–290 g Head and body length: 460–490 mm Wing chord: Male: 315–368 mm. Female: 325–360 mm Tail length: Male: 130–194 mm. Female: 120–180 mm
Habitat	Coastal, offshore waters, beaches, salt swamps, lakes, larger rivers
Feeding range	Up to 400 km
Natural activity peak	Diurnal
Foraging style	Plunges, often offshore
Diet	Fish, crustaceans
Movement	Non-migratory, dispersive
Social behaviour	Communal
Nesting time	September–January
Nest location	In scrape or on rock, in colony of thousands on island
Age at dispersal	2 months
Age at maturity	3 years

Species	Darter (*Anhinga novaehollandiae*)
 Photo credit: Tiffany Garvie, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large black or greyish-brown bird with a long thin neck and pale streaks on the wing
Conservation status*	Common
Sexual dimorphism	Male: Head and neck brownish black. Upper wings and back glossy black with prominent white central streaks and spots on the wing coverts. Tail black Female: Head, neck and body grey-brown with the same wing markings as the male
Adult morphometrics	Body weight: Male: 1200–2100 g. Female: 900–2600 Head and body length: 860–940 mm Wing chord: Male: 329–373 mm. Female: 304–375 mm Tail length: Male: 183–240 mm. Female: 177–238 mm
Habitat	Larger shallow waters, fresh and salt, seldom open sea
Home range	Prefers nesting in wetlands >100 ha. Disperses during non-breeding season up to 2,000 km
Natural activity peak	Diurnal
Foraging style	Diving

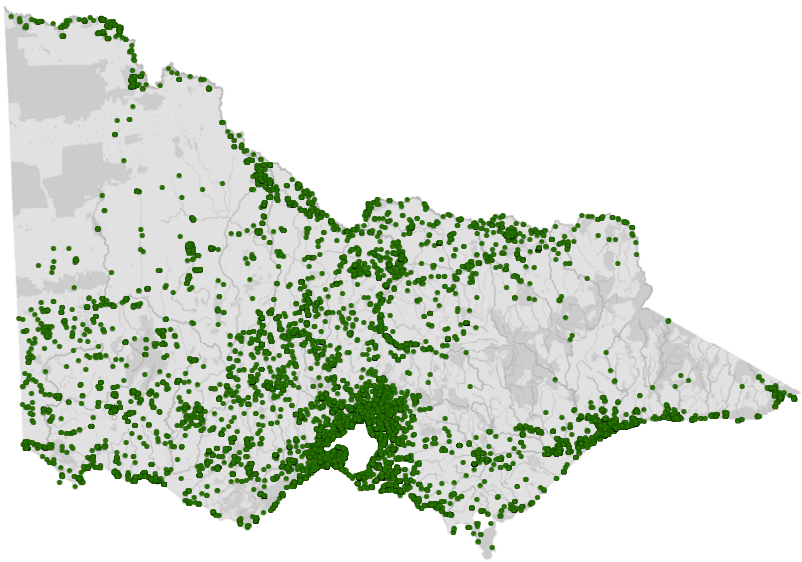
Species	Darter (*Anhinga novaehollandiae*)
Diet	Fish, squid, insect larvae, crustaceans
Movement	Moves coastward in summer
Social behaviour	Solitary
Nesting time	September–February
Nest location	In dead or live tree over water, usually in small colony
Age at dispersal	2 months
Age at maturity	2 years

Species	Fairy prion (*Pachyptila turtur*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Small pale grey bird with a darker "W" pattern across the upperwing and a dark tip to the tail
Conservation status*	Common
Adult morphometrics	Body weight: Male: 117–180 g. Female: 108–170 g Head and body length: 250 mm Wing chord: Male: 170–189 mm. Female: 170–188 mm Tail length: Male: 79.7–96.7 mm. Female: 80.6–94.5 mm
Habitat	Coastal waters

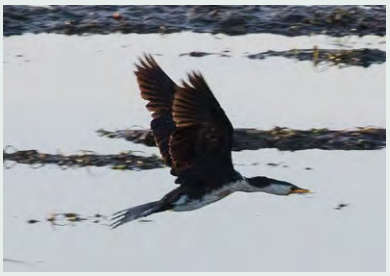
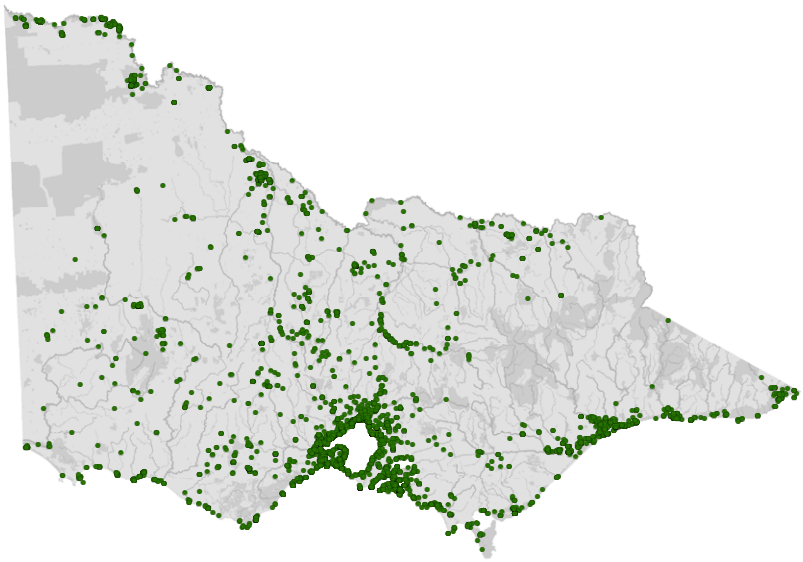
Species	Fairy prion (*Pachyptila turtur*)
Feeding range	≥ 320 km
Natural activity peak	Fishes in daytime; comes and goes from roosting site in darkness
Foraging style	Bounces over surface picking up plankton, swims underwater and bobs up to swallow food on surface
Diet	Fish, crustaceans
Movement	Non-migratory, dispersive
Social behaviour	Communal
Nesting time	September–March
Nest location	Slender burrow, under vegetation or in rock crevice, mostly in island colonies
Age at dispersal	2 months
Age at maturity	5 years

Species	Little penguin (*Eudyptula minor*)
 Photo credit: Ian R McCann, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Small blue-grey to blackish-grey penguin with whitish underparts
Conservation status*	Common

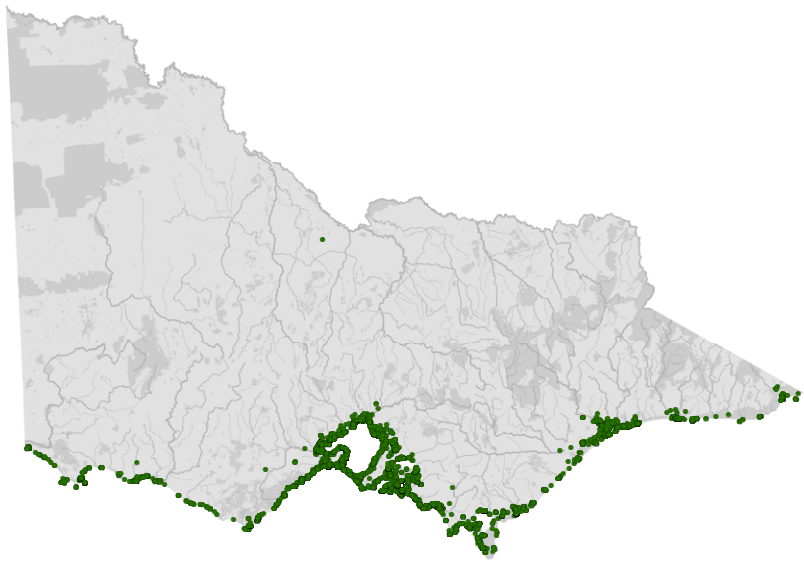
Species	Little penguin (*Eudyptula minor*)
Adult morphometrics	Body weight: 900 g–1500 g Head and body length: 400–450 mm Flipper length: 110–140 mm Bill length: 30–40 mm
Habitat	Oceans, bays, around jetties/piers
Feeding range	14–20 km
Natural activity peak	Fishes in daytime; comes and goes from roosting site in darkness
Foraging style	Concentrates shoals of small fish by circling, then charges, swallowing underwater
Diet	Fish, squid, krill
Social behaviour	Communal
Nesting time	August to February
Nest location	Mostly on islands; in short burrow or under vegetation, rock cavities, under houses or boats
Age at dispersal	2 months
Age at maturity	2-3 years

Species	Little pied cormorant (*Microcarbo melanoleucos*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**

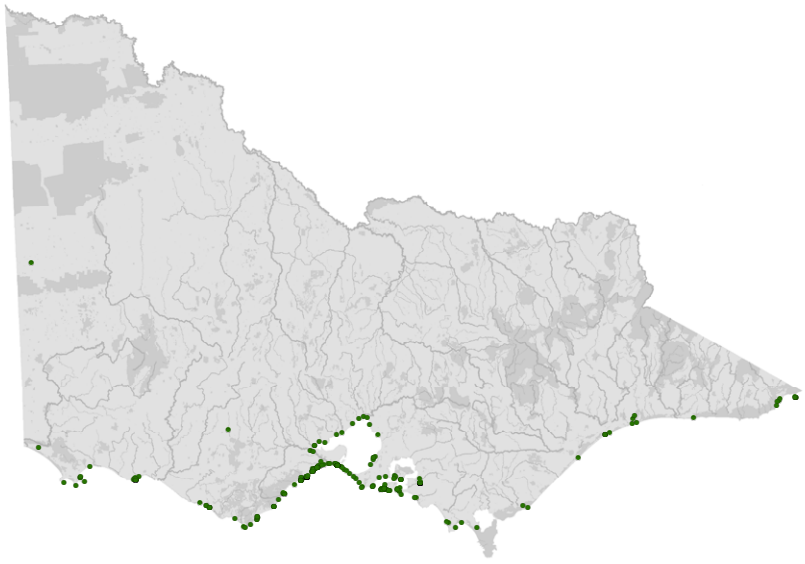
Species	Little pied cormorant (*Microcarbo melanoleucos*)
General appearance	Small black and white cormorant with yellow bill
Conservation status*	Common
Adult morphometrics	Body weight: Male: 700–900 g. Female: 400–900 g Head and body length: 550–650 mm Wing chord: Male: 226–244 mm. Female: 215–242 mm Tail length: Male: 141–167 mm. Female: 140–167 mm
Habitat	Coasts, islands, estuaries, inland waters, roadside ditches
Home range	Prefers nesting in wetlands > 100 ha
Natural activity peak	Diurnal
Foraging style	Diving, usually fishes alone
Diet	Fish, squid, insect larvae, crustaceans
Movement	Non-migratory and nomadic
Social behaviour	Solitary
Nesting time	Almost any month, mostly September–February
Nest location	Trees, bushes above water, occasionally on ground or on ledges, alone or in colonies of few to thousands
Age at dispersal	Unknown
Age at maturity	2–3 years

Species	Great pied cormorant (*Phalacrocorax varius*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Large black and white cormorant with an orange and yellow face
Conservation status*	Common
Adult morphometrics	Body weight: Male: 1500–2200 g. Female: 1000–1900 g Head and body length: 650–850 mm Wing chord: Male: 287–356 mm. Female: 277–353 mm Tail length: Male: 128–170 mm. Female: 102–162 mm
Habitat	Coastal waters with sloping shorelines, large inland lakes and rivers
Feeding range	Usually within 100–300 m of shore but has been recorded feeding up to 5 km from shore
Natural activity peak	Diurnal
Foraging style	Diving
Diet	Fish, squid, insect larvae, crustaceans
Movement	Non-migratory and nomadic
Social behaviour	Solitary
Nesting time	All seasons
Nest location	In colonies on ground on islands, mangroves, trees over water, navigation structures

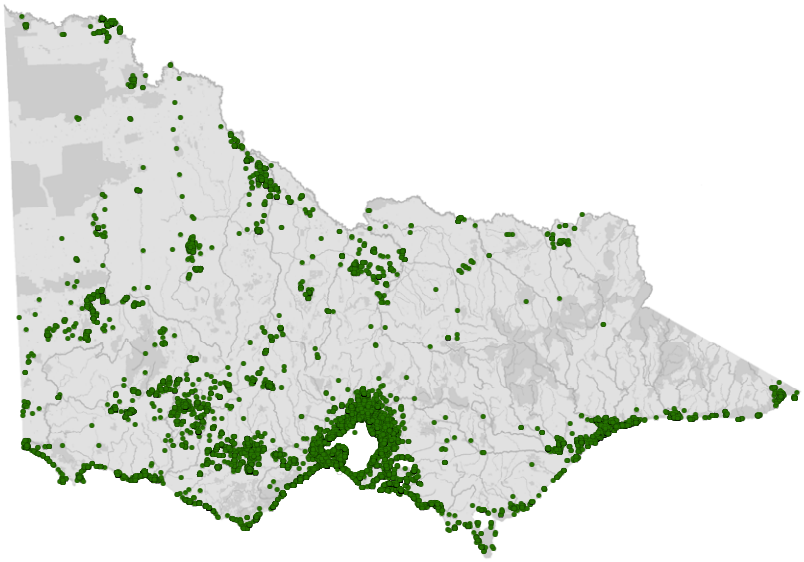
Species	Great pied cormorant (*Phalacrocorax varius*)
Age at dispersal	4–5 months
Age at maturity	2–3 years

Species	Pacific gull (*Larus pacificus*)
 Photo credit: Mark Norman, Museums Victoria	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Large black-backed gull with a black band in the tail and a massive yellow bill with a red tip
Conservation status*	Common
Sexual dimorphism	Male larger than female, especially bill length. Male: 59.5–64.9 mm Female: 50.3–57.3 mm
Adult morphometrics	Body weight: Male: 1200–1800 g. Female: 910–1400 g Head and body length: 580–660 mm Wing chord: Male: 446–477 mm. Female: 425–450 mm Tail length: Male: 165–183 mm. Female: 159–174 mm
Habitat	Coasts, bays, offshore islands, swamps, garbage tips
Home range	Not reported
Natural activity peak	Diurnal

Species	Pacific gull (*Larus pacificus*)
Foraging style	Flies along the shoreline searching for food. It frequents estuaries, bays and harbours and is occasionally found in farmland and coastal rubbish dumps
Diet	Aquatic invertebrates such as molluscs, squid, crabs and sea urchins, fish, small seabirds, eggs, nestlings and carrion
Movement	Adults non-migratory, young dispersive
Social behaviour	Communal
Nesting time	September–December
Nest location	In elevated position, in pairs, loose colonies on offshore islands
Age at dispersal	2–3 months
Age at maturity	4–5 years

Species	Short-tailed shearwater (*Ardenna tenuirostris*)
 Photo credit: David Paul, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Dark brown bird with a short rounded tail
Conservation status*	Common

Species	Short-tailed shearwater (*Ardenna tenuirostris*)
Adult morphometrics	Body weight: Male: 460–610 g. Female: 480–640 g Head and body length: 400–450 mm Wing chord: Male: 262–288 mm. Female: 269–284 mm Tail length: Male: 74–87 mm. Female: 75–91 mm
Habitat	Coastal waters
Feeding range	150–200 km from colonies
Natural activity peak	Fishes in daytime; comes and goes from roosting site in darkness
Foraging style	Diving, surface feeding
Diet	Fish, krill, cephalopods
Movement	Migrates May–August to north Pacific, returns end of September
Social behaviour	Communal
Nesting time	October–April
Nest location	In burrow, usually under tussocks, in very large island colonies
Age at dispersal	3–4 months
Age at maturity	5 years

Species	Silver gull (*Chroicocephalus novaehollandiae*)
 Photo credit: Tracey-Ann Hooley, Museums Victoria	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

Species	Silver gull (*Chroicocephalus novaehollandiae*)
General appearance	White head, tail and underparts with a light grey back and black tipped wings
Conservation status*	Common
Adult morphometrics	Body weight: Male: 220–400 g. Female: 190–320 g Head and body length: 400–450 mm Wing chord: Male: 283–315 mm. Female: 275–299 mm Tail length: Male: 108–123 mm. Female: 100–121 mm
Habitat	Coastal waters, urban areas, garbage tips
Feeding range	Up to 40 km
Natural activity peak	Diurnal
Foraging style	Aerial feeding, surface feeding, ground feeding, scavenging
Diet	Fish, crustaceans
Movement	Non-migratory and dispersive
Social behaviour	Communal
Nesting time	August–December
Nest location	On ground, low shrub, jetties
Age at dispersal	2 months
Age at maturity	2 years

*From the *Flora and Fauna Guarantee Act 1988* Threatened List June 2023. This list is updated regularly throughout the year. For the most current list, please visit **https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list**.

3.3 Animal and human safety considerations

In general, animals in the wild have limited contact with people, pets and the hustle and bustle of our daily lives. When sick, injured and orphaned wild animals come into care this unnatural close contact can carry risks to the health and safety of both people and animals. For general information on biosecurity and approaches to minimise these risks see Part A of these guidelines. Specific information on enclosure hygiene and biosecurity for waterbirds and marine birds is in **Section 3.6.2**.

The following information relates to human and animal health and safety considerations specifically related to the rehabilitation of marine birds and waterbirds.

3.3.1. Human safety considerations

- The wings of large birds such as swans, pelicans and gannets can bruise the body of the handler.
- Birds with snake-like necks (for example darters, gannets, herons and ibis) will strike at the face and eyes of the handler. The tips and edges of their bills are sharp and can break human skin or cause the loss of an eye. It is important to wear suitable personal protective equipment, such as goggles and handling gloves.
- Sharp claws can break human skin.
- Some species may regurgitate stomach contents when handled.
- Waterbirds can carry zoonotic bacteria and viruses.
- The pelican has a large sharp hook at the tip of its maxilla (upper bill) which can cause skin injury.
- Gannets have a large sharp 'spine' on the underside of their maxilla (upper bill) which can cause skin injury.

3.3.2. Animal safety considerations

- It is important to be familiar with species behaviour and anatomy when attempting handling.
- Long-legged birds (for example herons and egrets) have a high risk of developing capture myopathy and leg fractures if not captured and transported appropriately.
- Do not block the nostrils of any bird while restraining the beak with the hand.
- Gannets have no nostrils, so it is important not to hold the beak completely closed.
- Pelicans must be restrained with one finger in between the upper and lower beaks so they can breathe adequately. See **Figure 3.2**.

Figure 3.2 Pelican restrained with one finger held between the upper and lower beaks to prevent suffocation.

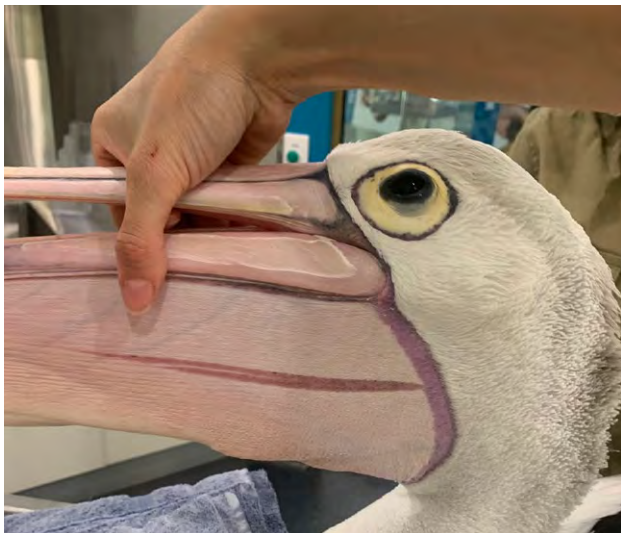


Photo credit: Zoos Victoria

3.4 Capture, restraint, and transport

STOP

STOP – A visual examination must be done BEFORE the animal is captured. This applies to the initial capture from the wild as well as prior to captures which occur during time in captive care. See Section 3.4.1 *for information on what to look for when conducting a visual health assessment.*

Refer to Part A of these guidelines for general advice on wildlife welfare, biosecurity and hygiene, and record requirements. The following information relates to the capture, restraint, and transport of sick, injured and orphaned waterbirds and marine birds.

3.4.1. Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by one person, and from a distance which provides a clear view of the animal with as little disturbance as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture. Check for evidence of injury/severe disease or deterioration and assess their breathing as demonstrated in the following table.

Table 3.3 summarises common normal characteristics to assist with diagnosing illnesses and injuries. The chart is intended as a guide and is not exhaustive.

Table 3.3 Visual health observations in marine birds and waterbirds

	What to look for
Demeanour	• Bright, alert • Responds to humans with threat display or attempts to escape • Avoids capture
Behaviour	• Interested in its surroundings and any food that is offered • Preens
Movement and posture	• Stands and/or perches on both legs. Some species may stand on one leg from time to time, reinforcing the need for time spent observing • Wings are held against the body and do not droop. Some species will spread wings to air dry, specific species knowledge is important • Head is in a normal position
Breathing	• Regular pattern • No open mouth or noisy breathing (birds may open mouth breathe when hot or stressed)

3.4.2. Equipment

When selecting appropriate capture and restraint equipment, it is important to consider the species-specific behaviours and adjust accordingly.

Personal protective equipment (PPE) includes:

- **Safety glasses** for eye protection when handling birds with snake-like necks.
- **Protective clothing** such as long-sleeved shirts and trousers or non-absorbent disposable overalls when rescuing birds that are oiled, as the oil can be absorbed through human skin.
- **Rigger's gloves** to protect hands from beaks.
- Examination gloves to protect a waterbird's feathers from residue on hands.
- **Closed shoes.**

Other equipment includes:

- **Sheets or towels** to restrain birds during capture and transportation. These are preferable to blankets which may cause overheating.
- **Nets** to capture or trap waterbirds. Net gauge must be appropriate for the species.
- **Long-handled fishing nets** to catch marine birds.
- **A transport container** of a size suitable for the bird species. The bird must be able to stand, stretch its neck and turn around. Enclosure length should be no less than 20 per cent longer than the bird and no more than twice the length of the bird. The width should be 50 per cent of the minimum length.
  - Plastic dog carry cages can be used to transport larger waterbirds.
  - Soft sided pet packs can be used to minimise feather damage (**Figure 3.3**).
  - Adequately ventilated cardboard boxes are suitable for smaller species.
- Ensure adequate ventilation around the enclosure. Do not stack multiple enclosures as this may block the ventilation holes.
- Be mindful of temperature during transport. Water birds have insulated feathers and can be prone to overheating.
- If using dog carriers with a metal grid door, a covering over the mesh on the inside (for example shade cloth) is useful to prevent trauma or parts of the bird becoming tangled.
- Rubber matting can be used as flooring during transport. Towels placed over the matting provide a surface that allows the bird to grip the towel with its nails and thus stand firmly. Newspaper becomes slippery when wet with urine and faeces and its use during transport should be avoided. It is important to prevent the bird from having its toes protrude through the bottom of the transport container as this can result in injuries.

Figure 3.3 Soft sided pet packs can be used to minimise wing damage

Photo credit: Zoos Victoria

Figure 3.4 Soft sided pet packs being used to transport adult and juvenile black swans (cover has been removed just before release)

Photo credit: Zoos Victoria

3.4.3. Technique

It is beyond the scope of these guidelines to outline techniques for every situation that may be encountered. Examples of techniques are outlined in the following section.

In addition to this information, for further advice please also refer to the recommended reading list, zoological institutions, veterinarians and/or wildlife experts. Inexperienced rescuers should request assistance where possible.

- Rapid immobilisation of the beak before restraint of the rest of the bird.
- Restrain birds with snake-like necks by keeping a gentle but secure hold of the base of the head.
- Hold the bird's body level with the waist. This will prevent the bird from being able to bite the handler on the face.
- Restrain long-legged birds by holding their legs where they meet the body.
- Cover the head and eyes in a towel to minimise stress.
- Netting techniques will vary with species and scenarios. Be mindful of potential injuries caused by the net, such as hitting the bird with the rim, or injuries or feather damage from being entangled in the net.

Restraint of little penguins

Little penguins can be wrapped in a towel to prevent flapping of the wings, and the body held with one hand. Ensure the wings are held down in their natural position. The head can be restrained in the other hand by supporting the beak in the palm of the hand, with the fingers circling the beak. Penguins are prone to overheating and should not be wrapped for extended periods or remain wrapped during transport.

Restraint of small birds: shearwaters, prions, ducks

Use a towel to wrap the wings and body. Ensure the wings are held down in their natural position. The towel may also be used to cover the bird's head. Alternatively, restrain the head with one hand either from behind the head or by holding the beak between the fingers and thumb.

Restraint of large birds: gannets, pelicans

Grab the bill from above with one hand. Take care not to cover the nostrils. Pass the other hand around the body to restrain the wings. The feet may be tucked up to the body. A towel can be used to confine the legs and wings.

Figure 3.5 Manual restraint of a black swan.

Photo credit: Zoos Victoria

Figure 3.6 a. A radjah shelduck is restrained with hands gently circling the body. Larger waterbirds are restrained with the hands holding the wings. Gloves should always be worn when handling waterbirds. b. Restraint of a little penguin. Note the head is restrained.

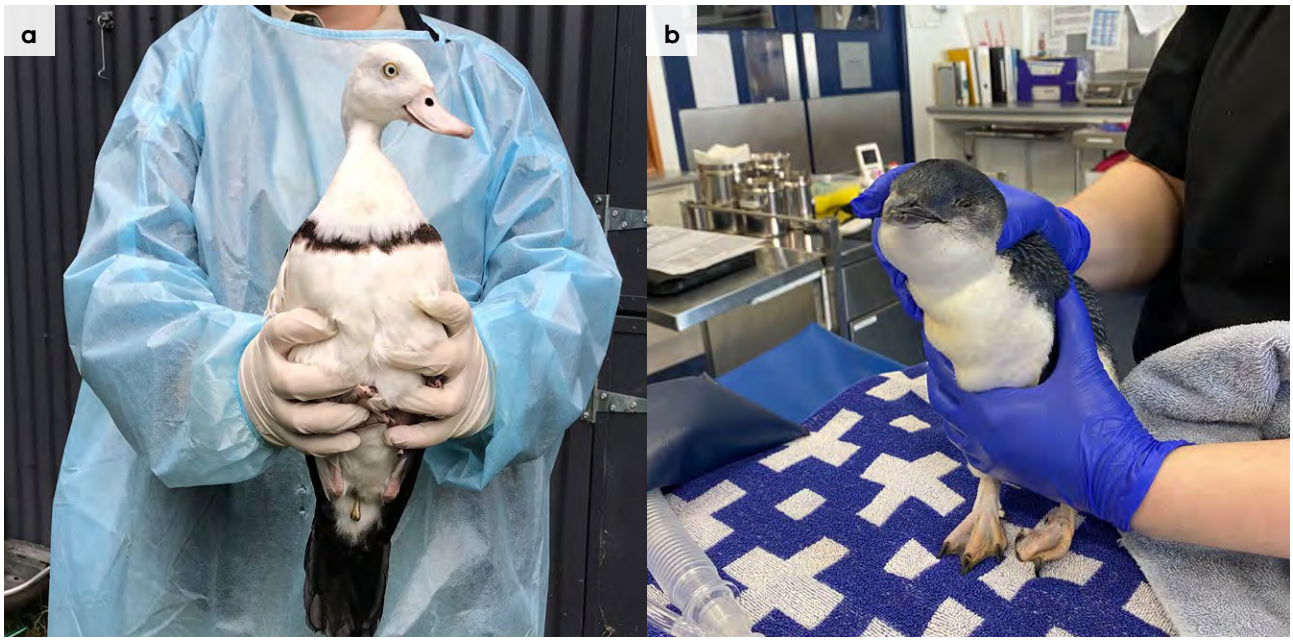


Photo credit: Zoos Victoria

Mother duck and young in suburbia

Ducks may become trapped in backyard pools or stormwater drains. Some scenarios will require the young to be caught. They can be placed in a box for temporary holding. Always attempt to return ducklings to the mother. This can be achieved by placing the box in a sheltered area, under bushes, near the closest watercourse to where the ducklings were found. Ensure the mother knows they are there and can access the ducklings. Alternatively, the ducklings may be removed from the box, if the mother is nearby, as they will readily return to her. If attempting to reunite, you must remain in the area, at a distance, to observe and ensure successful reuniting. It is important to remember that Australian wood ducks are excellent climbers and prefer to nest in tree hollows.

Entanglement

Waterbirds and marine birds may become entangled in fishing line, fishing nets or plastic debris. Report an entangled waterbird to Zoos Victoria's Marine Response Unit on 1300 245 678. Birds can often be caught at fishing spots, such as jetties or fish cleaning benches, as the birds have become habituated to the proximity of humans at these sites.

'Stranded' on beach

Waterbirds and marine birds may be stranded on beaches when oiled or sick. Unless the bird is very depressed or unwell, it may be difficult to capture. A rehabilitator needs to stand between the bird and the water as waterbirds and marine birds will instinctively head toward water if threatened. Incidences of oiled birds should always be reported to the DEECA Customer Contact Centre on 136 186.

3.4.4. Transport

- Waterbirds and marine birds may become overheated during transportation. An ambient temperature of 23–27°C is preferred for transport. Avoid travelling in the heat of the day.
- A towel or sheet may be used as a cage cover to reduce visual stress, while ensuring ventilation is not impacted.
- Birds should be transported individually.
- Water is not required for journeys of less than one hour.
- Avoid feeding prior to travel as marine birds are likely to regurgitate.
- Domestic animals should not be present in the vehicle.
- Disinfect transport carriers with a suitable disinfectant, such as F10 SC or Virkon S, at the recommended concentration and contact time between birds. Virkon S must be rinsed off after disinfection.

3.5 Monitoring animal health and welfare

The goal of wildlife rehabilitation is to address health and welfare concerns quickly and effectively so wildlife can be released back to the wild as soon as possible. Decision-making from the time of capture through to release should be guided by an accurate understanding of the animal's true state of health and welfare. Careful monitoring throughout the rehabilitation period ensures that significant issues, or deterioration in health condition, are identified immediately and quickly addressed.

It is preferred that all sick, injured or orphaned wildlife be assessed by a veterinarian to ensure that non-obvious signs of trauma or disease can be assessed and treated as soon as practicable. No medication should be provided prior to this assessment, as this can mask clinical signs and make an accurate health assessment by the veterinarian very difficult. An example of the importance of this is that bird bones heal much faster than mammal bones. Delay in veterinary assessment may render a bird unsuitable for rehabilitation because the fracture was not diagnosed and treated soon enough.

Templates for record-keeping of visual and physical observations and daily care can be found in Part A of these guidelines.

This section provides guidance on health assessment on arrival and on effective monitoring of the health and welfare of individuals in care. Minimising human-animal interactions and stress to the animal maximises successful release back to the wild.

3.5.1. Physical examination

Once visual observations are complete, and the animal is stable enough to withstand capture and handling, a basic physical examination should be conducted. This can be repeated when required any time the carer has the animal in the hand, such as for an enclosure change. However, if a full physical exam is not conducted, body condition and weight should be assessed every time the animal is in the hand for other reasons. Carers should make sure weighing scales are available and ready to use before capturing the animal. Physical examinations are also required if the carer notices any changes suggestive of deteriorating health or injury.

Always record the physical examination findings, so that you can compare findings as the animal's rehabilitation progresses. This ensures any health concerns are identified as soon as possible, and the carer can plan release as soon as appropriate. **A template for recording physical examination findings can be found in the appendices to Part A of these guidelines.**

Examinations should be conducted in a quiet location, away from domestic animals. Only one person should handle the animal, while a second person takes notes. All other people should move away, and noise kept to a minimum. Handling should also be kept to a minimum, with careful monitoring for any signs of distress (such as panting, vocalisation or sudden deterioration in demeanour). If these are seen, the examination should be stopped immediately, and the animal returned to its catch bag, transport box or enclosure and allowed to recover.

Species specific considerations:

- Always wear examination gloves to protect feathers.
- Where possible, keep the bird wrapped in a towel which limits its ability to flap its wings and provides coverage of its head to reduce stress.
- Physical examination is stressful for a conscious bird and should be conducted as efficiently as possible.
- Always keep handling time to a minimum and actively observe the animal for signs of distress during handling. It is ok to give the animal a break and complete the exam later. Be mindful of water birds overheating more rapidly than other bird species, due to their insulated feathers.
- Return the bird to its cage if it starts open mouth breathing, closes its eyes or becomes weak in the hand.
- Two people will be required to examine larger birds. One person restrains the bird, while the second person examines the wings and legs for any abnormalities.
- Feathers should be checked for damage or absence. A bird that has been on the ground will often have broken tail feathers that may be stained with dirt and faeces.
- Bird identification manuals can be used to check the feathering to determine if the bird is a juvenile or adult. For example juvenile silver gulls have brown feathering on their wings.

Table 3.4 Physical examination of waterbirds and marine birds

	What to look for
Body weight	• Record body weight on arrival and at least weekly while in care. • A greater than 10% change in body weight is cause for concern, and the carer should seek veterinary advice. It is important to know what a normal weight for a species is. Smaller animals will have less tolerance for body weight changes.
Body condition	Body condition of the bird can be scored by palpating the amount of muscle over the keel. For some bird species, such as ibis and herons, this is not as useful as it is normal for the birds to have prominent keel bones. • **Under condition:** The keel bone is easily felt and the pectoral muscles are concave. • **Ideal condition:** The keel bone can be felt and the pectoral muscles are rounded. • **Over condition:** Difficult to feel the keel bone as the pectoral muscles rise above it.
Hydration status	• Skin in featherless areas returns to normal position in less than 1 second, when pinched. • Skin slides easily across the pectoral muscles. • If the eyes are sunken, skin doesn't slide easily over pectoral muscles, or skin tenting occurs then assume the bird to be moderately to severely dehydrated.

	What to look for
Eyes	• Normal eyes should both be open, shiny and clear, with no discharge. • Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical.
Beak/Bill	• Normal shape for the species. • Not overgrown, flaky or fractured. • Able to close normally. • Upper and lower beak align when closed. • No evidence of netting or fishing line.
Mouth	• Normal colouration for the species. • No blood present. • No evidence of foreign materials or fishing line. • No discharge.
Nostrils	• Clean and clear. • No discharge, for example blood. • Salt crystals may be seen in pelagic species.
Skin	• Not dry, flaky or cut/injured. • No bruising.
Feathers	• Free from parasites. • Clean, sleek, shiny. • Waterproofing intact. • Not damaged, broken or missing. • Preen gland present on upper side of the base of the tail feather in many species. • No oil or other foreign substances present. • Evidence of moulting.
Legs	• Legs appear symmetrical and are not deviated. • Animal can stand normally. • Animal can grip with both feet normally. • No wounds, swelling or exposed bone or muscle present. • No fishing line present.
Feet	• Bottom surface of foot is smooth and intact, with no evidence of wounds or disease. • No wounds, redness, swelling or ulceration. • Nails not broken or missing.

	What to look for
Wings	• Capable of flight. • Able to manually extend wings fully without resistance, each wing extends equally. • No wounds, swelling, bruising or exposed bone or muscle present.
Sex determination	• Plumage colour may vary between the sexes of some bird species. • Body weight/size may vary between the sexes (See **Table 3.1** and **Table 3.2**).

Figure 3.7 Emaciated little penguin. Skin removed to show the underlying pectoral muscles

Photo credit: Zoos Victoria

3.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

- ☑ demeanour
- ☑ food consumption
- ☑ faecal/urine output
- ☑ behaviour observed
- ☑ medical treatment provided
- ☑ evidence of overnight activity.

The following is recorded weekly:

- ☑ weight
- ☑ body condition.

Over time, regular monitoring will also help to develop carer skills and knowledge, as regular observations and recording will result in a deep understanding of the expected behaviour and response to treatment for the species in care.

Species specific considerations:

- A visual check in the morning is recommended, when the cage is cleaned and food and water are changed.
- Note the bird's demeanour and behaviour every time food is introduced or taken away, the animal is medicated or the enclosure is cleaned. Pay particular attention to any changes that have occurred since the previous day.
- Note faecal consistency daily. This can be challenging as waterbirds frequently defaecate in the water. Waterbird faeces tend to be sloppy and voluminous compared with faeces produced by other bird species. If abnormal faeces are detected, a sample should be collected and submitted to the veterinarian for assessment as soon as possible. Do not treat on suspicion of a bacterial or parasitic infection, as this can make definitive diagnosis very difficult and potentially prolong the course of the disease.

3.5.3. Common presenting injuries and clinical signs of emerging health conditions

Clear guidance on conditions that may require euthanasia can be found in Part A of these guidelines.

Table 3.5 lists common clinical signs and possible causes of injury/disease. Carers should be aware that these are not exhaustive. Aside from first aid, carers should avoid administering medications prior to the provision of veterinary advice.

Unusual clinical signs or mass mortality events – a number of animals dying or found dead at the same time, with similar signs – may indicate an emergency animal disease, an emerging/new infectious disease or an environmental/human related toxicity which needs further investigation. Report these immediately to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours).

Table 3.5 Common injuries and clinical signs of emerging health conditions seen on presentation or during care

Injury or clinical signs	Possible causes	Carer observations and response
Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduced drug efficacy.		
Unable to fly normally **Drooping wing** **Swollen wing** **Bruising over wing** **Fractures** **Dislocation**	Found adjacent to road/suspect motor vehicle accident, boat strike Window strike Caught in wire, fishing line or netting Fish hook injury Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • If the wing is dragging on the ground a light bandage can be wrapped around the bird's wing and body to provide some support and relief from pain and discomfort. • Collision injuries may result in fractures within the pectoral girdle (the bones that support the wings). On observation the bird may still be able to fly but be unable to sustain flight or get normal lift. • Assessment by a veterinarian is required to determine whether surgery or splinting is needed in order for the injury or fracture to heal. Bird bones heal faster than mammal bones. To ensure the best welfare outcomes it is important to seek veterinary assessment as soon as possible. Medication for pain is required for fractures as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Birds with wing injuries will need initial confinement. • The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care. • Once the fracture has healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to pre-release section for more detail). • Ensuring feather water proofing is also an important pre-release marine and water birds.

Injury or clinical signs	Possible causes	Carer observations and response
Unable to stand normally **Swollen leg, foot or toe** **Bruising over leg** **Wounds present** **Nail injuries** **Fractures** **Dislocation** **Hip injury**	Found adjacent to road/suspect motor vehicle accident, boat strike Window strike Caught in wire, fishing line or netting Fish hook injury Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Assessment by a veterinarian is required to determine whether surgery or splinting is needed in order for the injury or fracture to heal. Bird bones heal faster than mammal bones. To ensure the best welfare outcomes it is important to seek veterinary assessment as soon as possible. Medication for pain is required for fractures as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Birds with leg injuries will need initial confinement, and perhaps modified/low perching. • The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care. • Once the injury is healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to pre-release section for more detail).
Head trauma **Eye injuries/blood in eye** **Eyelid swelling** **Beak injuries** **Blood in mouth** **Lethargy, sleepy** **Response to stimulus slow** **Head hanging down** **Fluffed feathers**	Found adjacent to road/suspect motor vehicle accident, boat strike Window strike Caught in wire, fishing line or netting Fish hook injury Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Birds with head trauma should be housed in a dark, quiet enclosure for 48 hours. If the bird does not improve or deteriorates over this time it may need to be euthanised.

Injury or clinical signs	Possible causes	Carer observations and response
Bleeding **Puncture wounds** **Bruising**	Found adjacent to road/suspect motor vehicle accident, boat strike Window strike Caught in wire, fishing line or netting Fish hook injury Predation injury caused by raptor, fox, cat or dog Gunshot	• **Seek urgent veterinary attention.** Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding. • Place the bird in a small transport box to restrict movement. • Assessment by a veterinarian is required to determine whether surgery or suturing is needed in order for the injury to heal and to assess for other injuries such as fractures. Medication for pain or infection may be required as prescribed by the veterinarian. • Euthanasia may be required for the welfare of the animal. • Give prescribed medication. • Monitor wounds to ensure that they are healing. Ongoing reassessment during rehabilitation is required to ensure healing is progressing as expected and the animal is tolerating time in care.
Poor body condition **Emaciation**	Undetermined disease process Failure to thrive Old injury present such as a fracture	• **Assessment by a veterinarian is required to determine if there is a disease present and assess for other injuries such as old fractures.** Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A Chapter 4 Biosecurity & Hygiene. • Generally, animals presenting in poor body condition have likely been suffering for some time and prognosis is poor. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered. • The degree of condition loss can determine whether the animal is a candidate for rehabilitation. • Where a disease is suspected, anything coming in contact with the infected or suspect bird should be discarded or disinfected. See **3.6.2. Enclosure hygiene and biosecurity**. As a precaution, wear gloves and a face mask to avoid inhaling any aerosols.

Injury or clinical signs	Possible causes	Carer observations and response
Poor body condition **Emaciation** **Respiratory signs** **Open mouth breathing** **Raspy breathing** **Gurgly breathing** **Discharge from eyes** **Discharge from nares**	Undetermined disease process Aspergillosis Avian influenza	• **Assessment by a veterinarian is required to determine if there is a disease present.** The veterinarian will prescribe treatment if indicated. • Euthanasia may be required for the welfare of the animal. • Wild population health should be a consideration when determining the animal as a candidate for rehabilitation. • Shelter biosecurity practices should also be considered if treatment is indicated. • Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A Chapter 4 Biosecurity & Hygiene. • Where a disease is suspected anything coming in contact with the infected or suspect bird should be discarded or disinfected using bleach, Virkon S or F10 SC at the recommended concentration and contact time. Virkon S and bleach must be rinsed following disinfection. • As a precaution, wear gloves and a face mask to avoid inhaling any aerosols.
Little penguin in poor body condition with fluffy feathers and old ragged feathers that appear grey or brown instead of blue. See Figure 3.8.	Normal moult Failure to moult	• **Seek veterinary assessment.** • Penguins replace all their feathers over a 17-day period between February and May and may lose up to 50% of their body weight. • Do not intervene unless the penguin is obviously injured or appears listless. • If the penguin appears obviously unwell, seek advice from Zoos Victoria's Marine Response Unit or contact the Phillip Island Nature Park, as affected birds often have underlying disease resulting in a failure to moult properly. • Following veterinary assessment and rehydration, assisted-feeding may be required (see **Section 3.7.2**). Penguins with feather loss/mid moult may benefit from some supplemental heat, e.g. the opportunity to use a heat lamp. Care should be taken to ensure the animal can move away from the heat source when required. • The penguin is ready for release when it weighs at least 1 kg, the moult is complete and the feathers are waterproof.

Injury or clinical signs	Possible causes	Carer observations and response
Shearwaters that are weak, emaciated and found on the beach	Extreme weather event Storms High winds Insufficient food supplies Juveniles Aged birds	• **Seek advice and support from Zoos Victoria's Marine Response Unit or Phillip Island Nature Park.** • Birds should be urgently assessed by a veterinarian, who will provide instructions regarding possible treatment, hydration and feeding. • Natural migratory event occurs between September and December. • Some aged or juvenile birds will fail to migrate. • Insufficient food, or weather extremes can interfere with migration. • Birds may be blown off course, become disoriented, exhausted and end up in areas where they cannot gain adequate lift to fly back on course. • Shearwaters assessed as being in poor body condition, and not responding rapidly to supportive care must be euthanised. • Shearwaters assessed and healthy must be returned to the wild as soon as possible (within 2–3 days) as they will lose fitness and become stressed in captivity.
Fishing line wrapped around legs or wings or coming out of the bird's mouth. See Figure 3.9.	Fishing hook and/or line ingestion and/or entanglement	• **Seek veterinary attention.** • Do not cut line that is hanging out of the mouth as this can be used to assist in retrieval of the hook. • If the line coming out of the mouth is short, use a small piece of masking tape to fix the line to the side of bird's head/neck area. During the stress of restraint/transport they often instinctively swallow any hanging line. • Do not attempt to remove hooks if they have penetrated the skin, as anaesthesia will be required. • X-rays must be taken to determine the true internal location of fishing hooks. There also may be more than one hook. Surgical intervention to safely remove it may be required.

Injury or clinical signs	Possible causes	Carer observations and response
Lethargy **Regurgitation** **Green diarrhoea Convulsions** **Head tremors** **Ataxia** **Inability to stand and/ or wings dragging on the ground. See Figure 3.10.**	Heavy metal poisoning	• **Seek veterinary attention as medical treatment will be required.** • Heavy metals that are commonly ingested include lead, zinc and occasionally copper. • Waterbirds that dabble on the floor of waterways may gain access to lead shot that has been deposited in the sediment layers. It is not permitted to use lead shot for recreational hunting in Victoria, however many tonnes are still present in the sediment of waterways. • Marine birds can eat lead sinkers when they take bait and tackle. • Only metal in the gut (not the muscles) of a bird will cause heavy metal poisoning. • Provide supportive care, with towelling placed around the bird to keep it upright. Assist feed if necessary.
Lethargy **Ataxia** **Inability to stand and/ or wings dragging on the ground**	Botulism	• **Seek veterinary attention.** • Clinical signs are similar to heavy metal poisoning. • Caused by a toxin produced by the bacterium, *Clostridium botulinum*. Conditions that favour botulism include warm weather, water temperature above 29°C, and the presence of dead animals (such as fish) or vegetation on the edge of the waterway. Susceptible birds consume the toxin when they eat insects or carrion that contains the toxin. The deaths of these birds perpetuate the cycle as maggots, which are resistant to the effects of the toxin and concentrate it, build up and poison new birds that feed on them. • There is no cure and only supportive treatment can be offered.
Weakness **Paralysis** **Convulsions** **Death**	Thiamine (vitamin B1) deficiency	• **Seek veterinary advice.** • Occurs in seabirds that are fed thawed, frozen fish as thawing destroys vitamin B1. • Provide Vetafarm Seabird tablets at 1 tablet per kilogram of bird, daily in their thawed frozen fish.

Injury or clinical signs	Possible causes	Carer observations and response
Lameness **Swollen foot** **Sole of the foot appears red and/or ulcerated** **Necrotic tissue present. See Figure 3.12.**	Bumblefoot	• **Seek veterinary attention.** • Give medication as directed. • Aquatic and marine birds are particularly prone to developing bumblefoot during rehabilitation if appropriate substrate and perching are not provided. • More likely to develop if birds are fed a diet low in vitamin A and/or enclosure hygiene is poor. • Ensure that the bird is fed a nutritionally complete diet. • Ensure perches and enclosure set-up, including ponds, is correct for the species. • Perches should be wide enough to ensure that the toes do not touch, but the foot curls ¾ of the way around the branch. Flat-footed waterbirds need broad, flat perches such as logs. Perches may be wrapped in small towels, Vetrap or Astroturf. See **Table 3.7** for flooring suggestions. • The feet of all birds in captivity should be checked regularly. Husbandry changes must be made if there are signs of flaky skin, redness, swelling or excessive wear on the sole.
Open mouth and/or raspy breathing. See Figure 3.13.	Aspergillosis	• **Seek veterinary advice.** • Aspergillosis is caused by an environmental fungus that is present in all indoor and outdoor environments as part of normal microbiological ecosystems. • Disease may be seen in immunocompromised birds, especially when ventilation is poor and/or humidity is high. • Birds become infected by inhaling fungal spores. • Stress secondary to captivity, trauma, parasites, oiling or malnutrition makes disease more likely. • Waterbirds may benefit from prophylactic antifungals while convalescing. Consult a veterinarian. • Once clinical signs develop treatment is rarely successful.

Injury or clinical signs	Possible causes	Carer observations and response
Young bird with droopy wings that it cannot lift into their normal position. See Figure 3.14.	Angel wing	• **Seek veterinary advice.** • Occurs when the weight of the growing flight feathers is too heavy for the muscles of the wrist and the wing twists outward. • A diet high in protein and low in some minerals predisposes to this condition so careful diet selection is crucial for growing water birds. • More prevalent in slow-growing birds such as black swans. • Monitor large waterbirds for this condition throughout growth. Ensure that a balanced diet is given with sufficient space for walking and wing-flapping. • If any deviation from normal growth occurs veterinary attention must be sort as early intervention can result in resolution. If left untreated in the early phase, birds will be unsuitable for release and require euthanasia.
Oil on feathers	Oil spill at sea or exposure to oil at industrial or other sites	• See Table 3.6

Figure 3.8 Moulting little penguin.

Photo credit: Johanna Geeson

Figure 3.9 a. Little penguin with fishing line injury. b. Note where the fishing line has cut into the bird's skin and muscle.

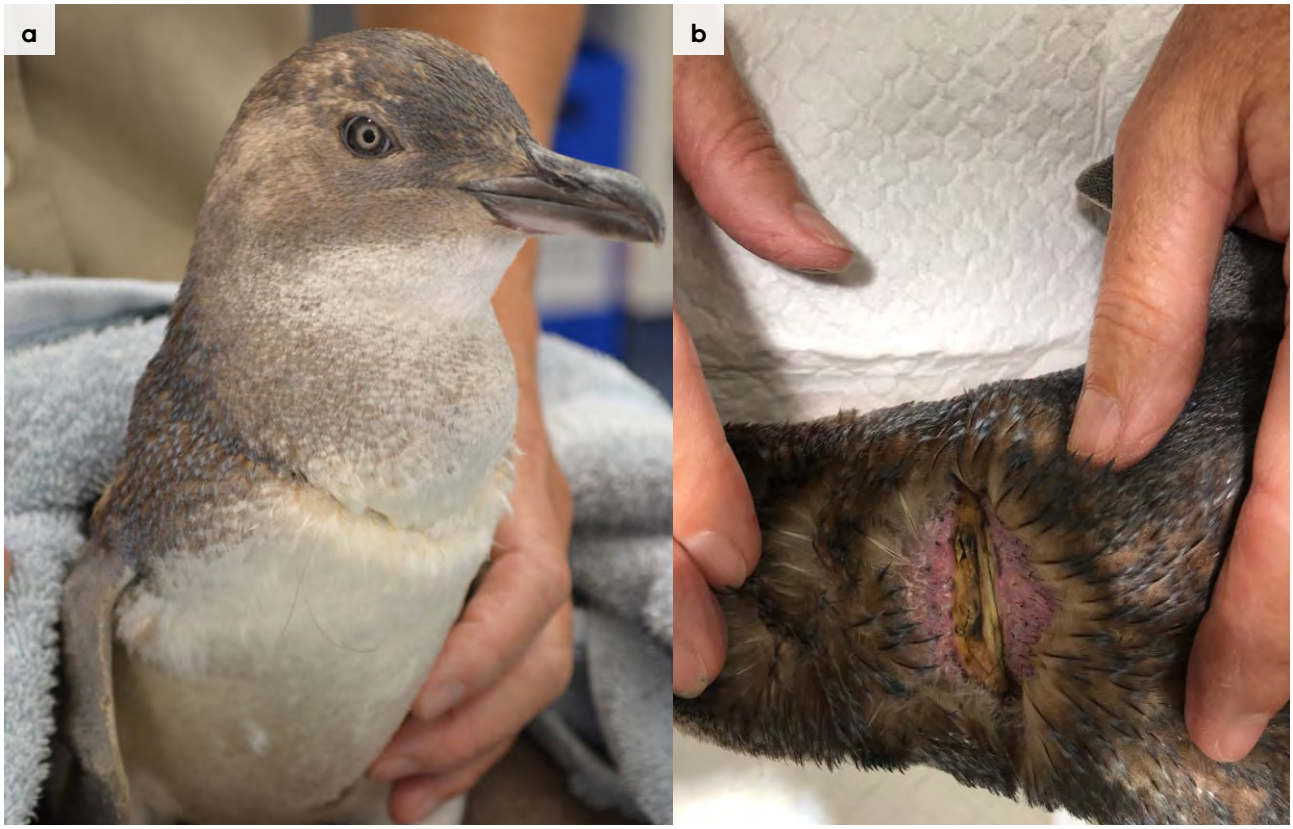


Photo credit: Zoos Victoria

Figure 3.10 a. Fishing tackle wrapped around the leg of a pied cormorant. b. An X-ray of a silver gull that has swallowed a fish hook.

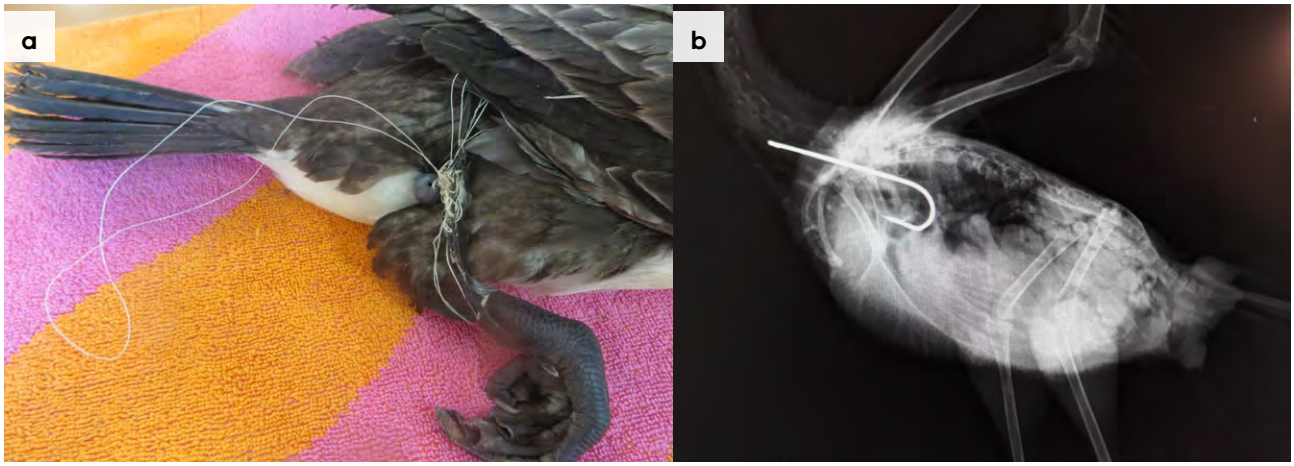


Photo credit: Zoos Victoria

Figure 3.11 A black swan with heavy metal poisoning. Note green diarrhoea and inability to lift the head

Photo credit: Zoos Victoria

Figure 3.12 Bumblefoot lesions in two waterbirds. a. A mild bumblefoot lesion. b. A much more severe bumblefoot lesion. Note the large plug of dead tissue in the sole of the foot. Regular monitoring should prevent mild lesions from reaching this stage.

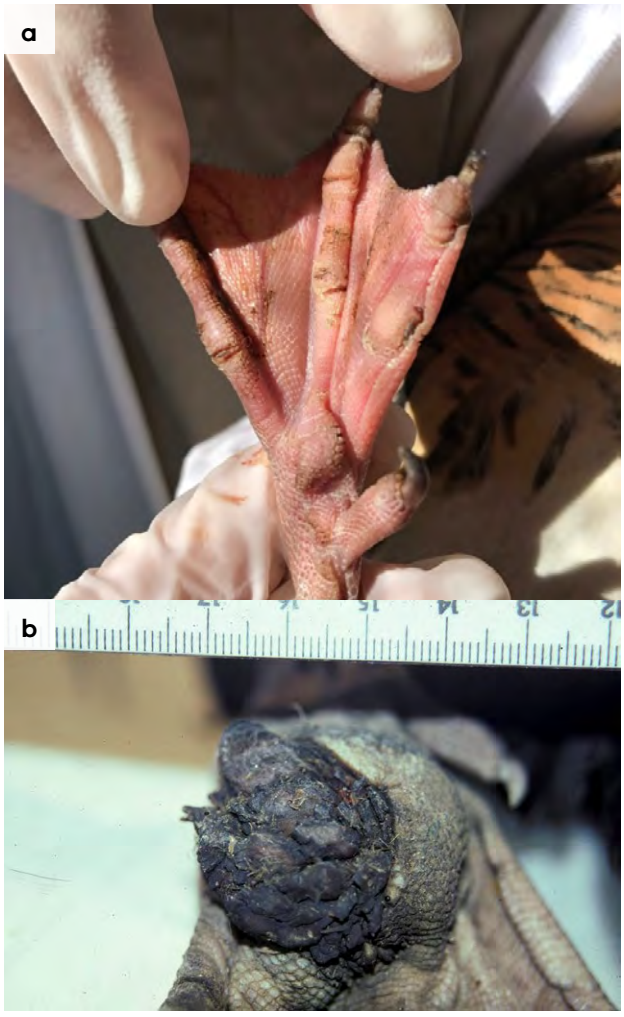


Photo credit: Zoos Victoria

Figure 3.13 A necropsy of a bird affected with aspergillosis. Note the grey-green fungi in the bird's air sac (arrow).

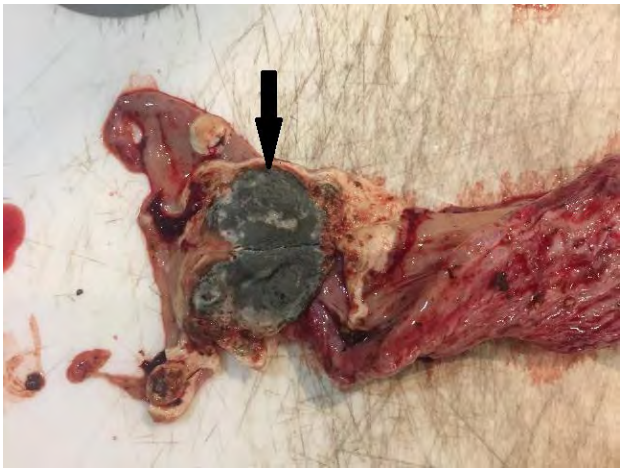


Photo credit: Zoos Victoria

Figure 3.14 A juvenile wood duck with angel wing. Note the bilateral wing droop.

Photo credit: Zoos Victoria

Table 3.6 Treatment of oiled water birds

The treatment and care of birds impacted by oil is challenging and should only be attempted by those with knowledge and expertise in managing these cases. Washing birds is extremely stressful for the bird and ingestion of oil causes illness. Veterinary support should be sought for oil impacted birds.

Stabilisation before washing
Wipe excess oil off the bird using a towel or paper.
Weigh the bird.
Remove oil from the eyes, nostrils and mouth with swabs and cotton buds.
Flush eyes with 0.9% saline. If the eyes are inflamed, treat with water-based eye ointments containing antibiotics.
A veterinarian should collect blood for prognostic assessment and to determine what supportive measures are required.
Give warm fluids (37–38°C) using a feeding tube or crop needle/tube depending on the species anatomy. Most aquatic/marine species will require stomach-tubing as they will not have a crop. Oral electrolytes such as Lectade or Vytrate are suitable and can be given at a rate of 15–30 ml/kg at each feed. Fluids are given three to four times over the first 24 hours. Only wildlife rehabilitators who have been trained in this technique should tube birds to minimise the risk of aspiration.
Place the bird in a quiet, warm environment at 25–28°C where heat lamps or heat pads provide a heat gradient. Ensure good ventilation as the oil will release toxic chemicals that can be inhaled by both birds and humans. Food can be given after the first 24 hours in care or once dehydration has been corrected.
Reassess the bird prior to washing to ensure that injuries have not been missed and the bird is a suitable candidate for washing based on its physical examination and blood results.
Washing
At least 20 minutes before washing, tube-feed the bird with warm oral electrolytes. If the bird becomes weak during washing, the procedure must be stopped, and the bird returned to a warm environment and reassessed.
Fill three large plastic containers with water between 39–41°C. Measure the temperature of the water with a thermometer and ensure the required water temperature is maintained during washing. Washing liquid surfactants perform best at higher temperatures, and it is important not to allow the bird to become cold.
Add detergent to the water at 1–5% of water volume. Suitable detergents for removing oil from birds include Dawn or Fairy.
A team of three people is needed to wash one bird. One person holds the bird and the second person washes it. The third person fills tubs of water, assists with restraint and provides any other assistance required. The handler should direct the bird's head slightly downwards to prevent water entering nostrils.

Washing (continued)
Wear gloves when washing the bird. The handler's gloves must be cleaned of oil residue between each tub to ensure that recontamination is not occurring.
To prevent eye irritation due to oil residue or soapy water, protect with eye lubricant.
Gently wipe the feathers with a soft wash cloth or gloved hands – moving against the grain for soft body feathers and with the grain for primary and secondary feathers. A toothbrush can be used around the head. Do not rub the feathers.
Squeeze oily water from the feathers prior to moving the bird to a new tub. Ensure the water temperature is between 39–41°C.
Move the bird to a new tub once the water in the tub becomes dirty with oil. Ensure the water temperature is between 39–41°C. Several tubs of warm water with detergent may be required for a single bird. The bird is ready to be rinsed when the water is no longer oily, and the bird appears clean.
Wash time, exclusive of rinsing, should take no longer than 15 minutes in total. If the bird is still oily, then it will need to be washed again on the following day.
After washing, rinse the bird with a gentle spray to remove the detergent. Wash feathers by directing the spray of the water against the grain of soft feathers, and with the grain of primary and secondary feathers. The water used must be between 39–41°C.
Water will bead off the feathers and down will fluff up once detergent is properly rinsed from them.
Take the bird to a warm room for drying. Provide heating with heat lamps, air-conditioning or small fan-heaters to keep the temperature of the room between 25–30°C. Do NOT rub the feathers dry with towels. Do NOT use hair dryers.
Once dry, move the bird to a new clean holding pen where it can be fed and given more electrolytes.
Check for oil and feather waterproofing
On the day after cleaning, an experienced carer or veterinarian should check the bird to see if it is clean of oil.
If it is not, the bird can be cleaned again either that day or on a following day.
If the bird appears clean, it will need a swim test of several hours duration to test waterproofing of the feathers.
Observe the bird for signs of waterproofing when in water. Provide access to a haul out area in the pool so the bird may exit the water if desired. Ideally, birds should be tested in warmed water to encourage time spent swimming without becoming cold if not completely waterproofed. If the bird appears wet and agitated in the water, cease waterproofing test. Allowing birds to become cold due to non-waterproofed feathers is contrary to stabilising health.

Check for oil and feather waterproofing check (continued)

If the bird is wet and cold after the waterproofing test, it should be returned to the drying room until dry. It is then returned to the holding pens and the swim test repeated on the following day.

Ensure the pool used for waterproofing test is assessed for oil residue on water's surface or sides of the pool to avoid recontamination.

If the bird is still not waterproof, it will need to be reassessed by a veterinarian.

Pre-release health check

All birds that have undergone oiling should have a pre-release health check performed by a veterinarian.

Figure 3.15 **An oiled heron being washed.**

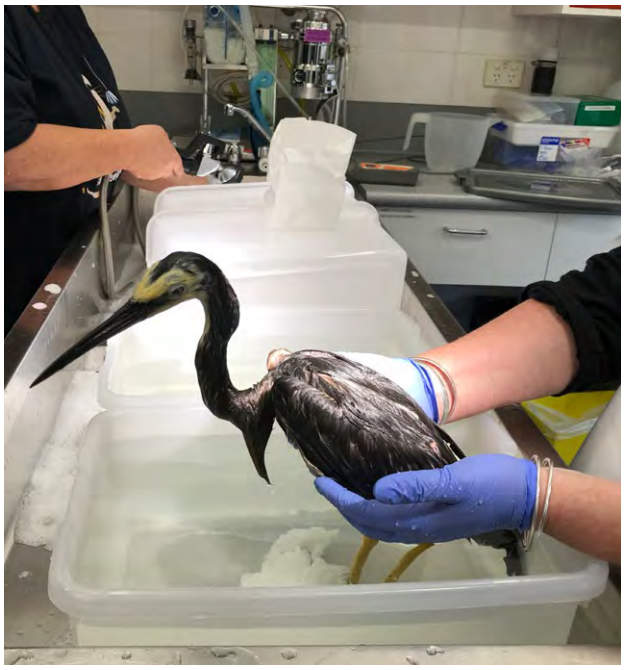


Photo credit: Zoos Victoria

3.5.4. Administering treatment

- Oral medication can be placed in a fish for fish eating birds as they generally consume it whole. If the bird does not eat the fish it may need to be assist-fed.
- For other species, oral medication can be delivered by crop needle, feeding tube or directly into the mouth. Only experienced carers or those that have been trained in the technique should use a crop needle or stomach feeding tube as it is possible to inadvertently deliver the medication into the trachea or rupture the crop or stomach. It is important to know which species have a crop.
- If giving medication into the mouth, ensure that the bird has time to swallow and does not aspirate the medication.
- Most medications can be delivered orally. In the rare instance where this is not possible the drug should be injected either side of the keel, into the pectoral muscles. If multiple injections are required, it is important to record and rotate injections sites. The muscle over the keel can be thought of as four quadrants.

3.6 Housing

Below are several key considerations when housing adult animals in care. Other parameters that can be just as important as enclosure size include availability of sunlight, wind protection, sunshade and type of perches. The dimensions recommended in this chapter are suggestions based on Healesville Sanctuary aviary sizes. There is no 'one size fits all' rule and it is important to continually assess the welfare of the bird and tailor aviaries and aviary size to suit the requirements of the bird.

3.6.1. General housing information for marine birds and waterbirds

Marine birds such as petrels and penguins are best cared for by specialised facilities with trained personnel. As many of the pelagic species have specialised housing requirements, it is in the best interest of the bird to promptly place it in an appropriate facility. Wherever possible send all marine birds to the Phillip Island Nature Park available on (03) 5951 2800, or Zoos Victoria via the Marine Response Unit available on 1300 245 678.

Grebes have very specific housing requirements. As they spend their lives on water, they should not be housed in an aviary but in a pool with a water level deep enough for swimming and diving. Provide shelter with natural vegetation. Grebes are known for mistaking wet roads for waterways and can suffer broken legs and internal damage when trying to land on the road's surface.

Waterbirds and seabirds are particularly prone to developing aspergillosis. It is important that all enclosures have good air flow and ventilation, and that enclosure hygiene is maintained to a high standard to minimise the probability of this disease occurring.

3.6.2. Enclosure hygiene and biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain the highest levels of hygiene to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

Species specific considerations:

- Wash hands with soap and water before and after handling birds, and between animals in care, to minimise the spread of disease both to humans and animals, such as *Salmonella*.
- Ideally, examination gloves should be worn and changed between each animal. This is particularly important in species that rely on intact and waterproof feathers for survival.
- Left-over food and faecal matter and casts should be removed at least daily from enclosures.
- When an animal vacates an enclosure, it must be cleaned and disinfected. Substrate should be completely replaced and furniture, for example branches or boxes made of unsealed wood, should be discarded as they cannot be effectively disinfected.
- Enclosures should be disinfected with products such as F10 SC or bleach at the recommended concentrations and contact times. Bleach must be rinsed off following the appropriate disinfection time.

3.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care. **Table 3.7** describes the housing type, suggested dimensions and requirements at each stage of care. For information on housing animals during hand raising see **Section 3.8**.

Table 3.7 Rehabilitation housing for adult marine birds and waterbirds

Intensive care housing		
Indications for use	**Suggested min. dimensions**	
Short term critical care. Intensive care housing is suitable for sick or injured waterbirds and seabirds that require short-term care for three to five days. All adult birds should be housed individually with sufficient space to stand upright and turn around without the feathers hitting the wall of the enclosure.	Small waterbirds and marine birds (<2 kg) e.g. duck, cormorant, heron	Floor area: 0.40 x 0.40 m (0.16 m^2) H: 0.4 m
	Large waterbirds and marine birds (>2 kg) e.g. swan, pelican	Floor area: 0.70 x 0.70 m (0.49 m^2) H: 0.7 m

	Suggested requirements
	ENCLOSURE CONSTRUCTION • Human humidicrib or veterinary incubator, e.g. Vetario, Kimani, cat or dog carry cage/pet pack, purpose-built enclosures such as reptile enclosures, or melamine hotboxes. Soft-sided pet carriers come in a range of sizes and are the ideal choice for minimising feather damage in water birds. • Wire enclosures should not be used. • Cardboard will deteriorate rapidly unless it has a waterproof lining. • Solid plastic crates with towels for flooring are very easy to clean. They can be scrubbed, sanitised and dried quickly. • It is important to minimise the potential for tail and wing feather damage from the housing. • Towels or blankets can be used for flooring. • Keel cushioning is required to prevent pressure sores in grebes. • Marine carpeting, artificial turf or rubber matting can also be used. Examples include the matting used in caravan annexes, hotel bar matting or closed cell foam rubber. • Avoid tiles, concrete, straw, newspaper and wood. • Newspaper becomes slippery when wet and wood is difficult to clean and disinfect, unless it is completely sealed. • Flooring may need to be cleaned of faeces twice daily. **ENCLOSURE FURNISHING** • Perching birds (herons, cormorants) need natural logs and branches. • A plastic children's seashell can be lined with blankets and towels to create a soft nest for larger marine birds to sit in. • Debilitated large birds (pelicans, swans) can be housed in a child's portacot with a sheet secured over the top as a roof. **ENVIRONMENTAL VARIABLES** • The enclosure should be well-ventilated. • Supplemental heat may be required on a case-by-case basis. • The bird should be able to experience normal daylight patterns, even if housed inside (e.g. indoor lights go on at dawn and off at dusk). **PROVISION OF FOOD/WATER** • Water is provided in a wide dish. It should be wide and long enough that the bird can place its entire beak into the container.

Intermediate housing (treatment/cage rest)			
Indications for use	**Suggested min. dimensions**		
Intermediate housing is suitable for waterbirds and marine birds that require medication and some confinement due to their injuries. Birds are housed individually. The enclosure needs to be of sufficient size for a bird to stand and to extend its wings fully.	Small waterbirds and marine birds (<2 kg) e.g. duck, cormorant, heron	Floor area: 0.80 x 0.50 m (0.40 m^2) H: 0.5 m	
	Large waterbirds and marine birds (>2 kg) e.g. swan, pelican	Floor area: 1.0 x 1.0 m (1.0 m^2) H: 1.0 m	

	Suggested requirements
	ENCLOSURE CONSTRUCTION • Wire mesh should be avoided as birds may damage their feathers, wings or feet. • If a wire aviary must be used, it should be covered on the inside with a tarpaulin or thick sheet of plastic. • Solid walled enclosures, such as those used for raptors, are preferred. • Marine carpet, artificial grass or closed-cell foam with holes can be used as flooring. • Flooring should be promptly cleaned when soiled. **ENCLOSURE FURNISHING** • A children's wading pool can be used for smaller waterbirds. • Ensure that ramps are present so that the birds can get out of the water. • A simple perch for waterbirds is a tyre with sand in it placed next to the pool. • Hang towels in the enclosure for privacy. • Provide mirror near feeding area for social species of birds. **ENVIRONMENTAL VARIABLES** • The enclosure should be well-ventilated. • Some birds may benefit from the opportunity to use supplementary heat in an aviary (e.g. a heat lamp). • The bird should be able to experience normal daylight patterns. **PROVISION OF FOOD/WATER** • Food bowls need to be wide and of a low profile to allow beak access and prevent spillage.

Pre-release		
Indications for use	**Suggested min. dimensions**	
Pre-release housing is used for adult birds prior to release and young birds between fledging and independence. The enclosure should be as large as possible and of sufficient size for birds to gain a degree of fitness and provide opportunities for them to fly, feed and acclimatise to the weather. Avoid mixed-species housing whenever possible. If mixed-species housing is necessary, ensure only compatible species are housed together and disease transmission is minimised by only housing animals of a similar health status together.	**Little penguin** Nest box – one per bird Ramp leading into and out of water	Min water depth: 0.3 m Min water surface area: 2.9 m x 1.8 m (5.2 m^2) Floor area per bird: 5 m x 5 m (25 m^2) H: 2 m Increased floor area per additional bird: 12.5 m^2
	Shearwater Nest box Sloped ramp with rubber matting into water	Min water depth: 0.3–0.5 m Min water surface area: 2.9 m x 1.8 m (5.2 m^2) Floor area per bird: 8 m x 2 m (16 m^2) H: 2 m Increased floor area per additional bird: 8 m^2
	Heron Branches on and in water Pond deep enough to hunt fish	Min water depth: 0.3–0.5 m Min water surface area: 1.0 m x 1.0 m (1 m^2) Floor area per bird: 5 m x 5 m (25 m^2) H: 2 m Increased floor area per additional bird: 12.5 m^2
	Australian pelican Logs in and out of water	Min water depth: 0.7 m Min water surface area: 3 m x 3 m (9 m^2) Floor area per bird: 8 m x 3 m (24 m^2) H: 2 m Increased floor area per additional bird: 12 m^2
	Tern, gull, prion Rocks, logs for perching	Min water depth: 0.25 m Min water surface area: 1 m x 1 m (1 m^2) Floor area per bird: 6 m x 5 m (30 m^2) H: 2 m Increased floor area per additional bird: 15 m^2
	Cormorant, darter, gannet Branches as perches over water	Min water depth: 0.3–0.5 m Min water surface area: 1 m x 1 m (1 m^2) Floor area per bird: 5 m x 5 m (25 m^2) H: 2 m Increased floor area per additional bird: 12.5 m^2

Suggested requirements
ENCLOSURE CONSTRUCTION • Cyclone mesh can be used. • Totally enclose with wire to ensure predators cannot gain access to the birds. • Place shade-cloth along the lower edge to provide a visual barrier. • Cover part of the enclosure to provide protection from the weather. • Wading birds require shallow areas of water to provide natural feeding opportunities. • Suitable substrates include clean fine sand (raked regularly to prevent it compacting), closed cell foam camping mats, conveyor belt rubber or lawn. Using a range of suitable substrates often promotes good foot health in water birds. Avoid loose sand covering rubber matting as it can be abrasive on feet. **ENCLOSURE FURNISHING** • Branches of varying widths can be used for perches. Waterbirds often like to perch above the water. • Logs can be placed leaning into the water. An outdoor wooden table can be used as an island for perching in the middle of the pool. • Rubber matting may be used over ramps that lead out of water. • Rubber tyres filled with sand can also be used as perches. Nest boxes can be made from a wooden box or half a large PVC pipe. • Provide mirror for social species of birds if housed alone. **ENVIRONMENTAL VARIABLES** • A mister system may be required for cooling on days over 30°C. • Penguins are reluctant to enter water that is colder than 12°C. • Fresh water can be salted with 10 kg of aquarium salt per 300 litres of water. • Approximately 10–20% of the water volume should be changed daily. • Agitating the water will encourage swimming. • Food, faeces, feathers and oil should be removed from the surface of the water and solids siphoned from the bottom of the pool daily. • Dirty water will reduce waterproofing. • Ideally, salt water chlorination with a sand filter and pump should be used. • Fresh water can be used for marine and estuarine birds in the short term. However, the salt glands will shrink over time. See **Section 3.7.2** for information on re-establishing salt tolerance. **PROVISION OF FOOD/WATER** • Food bowls should be sturdy and large. • As food may be offered in water, containers should be refreshed and cleaned daily.

Pre-release		
Indications for use	**Suggested min. dimensions**	
As above.	**Small waders (lapwing, moorhen, coot, swamphen)** Plenty of hides	Min water depth: 0.25 m Min water surface area: 1 m x 1 m (1 m^2) Floor area per bird: 6 m x 5 m (30 m^2) H: 2 m Increased floor area per additional bird: 15 m^2
	Black swan Sloped ramp with rubber matting into water	Min water depth: 0.5 m Min water surface area: 1 m x 1 m (1 m^2) Floor area per bird: 10 m x 5 m (50 m^2) H: 2 m Increased floor area per additional bird: 25 m^2
	Duck, grebe Branches as perches over water	Min water depth: 0.3–0.5 m Min water surface area: 1 m x 1 m (1 m^2) Floor area per bird: 5 m x 5 m (25 m^2) H: 2 m Increased floor area per additional bird: 12.5 m^2

Figure 3.16 Example of an intermediate enclosure for a swan

Photo credit: Zoos Victoria

Figure 3.17 Intensive care enclosure for a black swan.

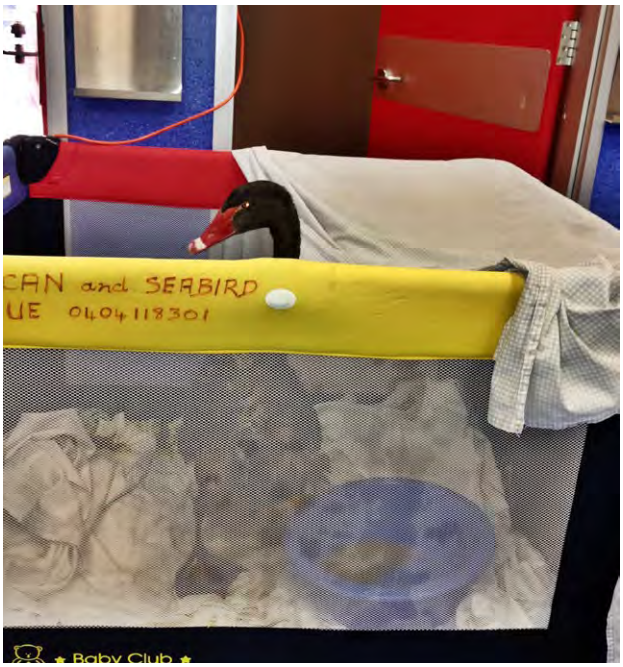


Photo: Zoos Victoria

	Suggested requirements
	As above.

Figure 3.18 An intermediate enclosure for a duck. Note the smooth plastic sides and floor to facilitate cleaning and minimise the risk of injury.

Figure 3.19 Pre release enclosures for water birds. Note the pond with branches above and in the water for perching. Branches are used to provide areas to hide.

Photo: Zoos Victoria

3.6.4. Waterproofing and feather protection

Possible causes for a loss of waterproofing include:

- Exposure to oil or similar substance. See **Table 3.6**.
- Fish oil from the fish used as food being transferred from the wildlife rehabilitator's hands to the bird's feathers during restraint and feeding or the bird regurgitating into the water in which it is swimming.
- Contamination of the feathers with faeces or urates.
- Damage to feathers during transport or housing.
- Failure to feed sufficient or appropriate food. Preening requires a large amount of energy and sick or starved birds lack the energy to preen.
- Poor nutrition may also affect the gland's secretion ability.
- Topical creams and ointments for eyes and skin affecting waterproofing. Oil-based ointments should not be used on birds.
- Loss of feathers post veterinary procedures like wound care or surgery.
- Abnormal feathering (for example failure to complete moult).

A bird that is ready for release should remain waterproof after three hours spent continuously in water. The bird should float high in the water. The downy insulation feathers will be dry underneath the outer contour feathers and the water will run in beads off the feathers. The bird should be active in the water.

A non-waterproof bird will swim low in the water and have damp contour and insulation feathers. It may shiver and fluff up. It may attempt to leave the water or appear agitated.

If water is subsequently found on the skin or down feathers, the bird is not waterproof. Areas to check are under the wing, around the neck, vent and legs. When waterproofing is effective, drops of water should form beads on the feathers.

Figure 3.20 A little penguin that is not waterproof. Note the wet and open appearance of the feathers, and the low position of the bird in the water.

Photo credit: Phillip Island Nature Park

To waterproof the bird:

- Slowly increase the period of time spent in water. If penguins have access to water and land in the enclosure and are being force fed, they do not tend to swim as often. Monitored forced swimming in a deep pool may be needed.
- If the bird chooses to sit out of the water, mist the bird with water several times a day to encourage preening.
- Place the bird back in the pool after assist feeding. The more time spent with access to clean water and preening, the more quickly the bird will become waterproof.
- If the bird is not waterproof after two swims in the pool it should be reassessed, washed again (if an oiling case) or given more time to preen out of water between swims.

3.7 Feeding and nutrition

Keeping daily records of food offered (item and volume fed) and food consumed is good practice and will allow the rehabilitator to observe how an animal is responding to food on offer and inform future choices.

Please note: Food suppliers and specific products mentioned in these guidelines are intended as examples only. Other suitable products may also be available.

Note: Fresh water must always be available and provided in a stable/non-spill bowl or automatic drinker. Water must be changed daily.

3.7.1. Feeding waterbirds

Table 3.8 Waterbird diets

Species	Diet in captivity	Amount
Lapwings	Crickets, grasshoppers, earthworms, Wombaroo Insectivore mix with boiled egg	50 g invertebrates such as crickets, fly pupae, mealworms or earthworms, 80 g Wombaroo Insectivore mix Offer in a flat, shallow bowl
Moorhen, swamphen, coot	Greens* Insects: mealworms, fly pupae, crickets	100 g insects, 100 g greens, 100 g pellets Offer in flat, shallow bowl
Herons, egrets, ibis, grebes	Whitebait, whiting Insects: fly pupae, mealworms, crickets	Offer whiting daily May take fish in water Offer 100 g insects in a shallow bowl
Black swan	Chick crumble or duck pellets, sprouted seed, greens*	400 g pellets, 200 g greens, 100 g chopped fruit, 200 g mealworms, earthworms Offer insects and greens in a shallow bowl with water
Australian wood duck	Grass, clover, chick crumble	200 g pellets, 100 g greens, 30 g insects Offer in a bowl
Pacific black duck	Grass: *Paspalum*, *Poa* spp., sprouted seed Insects: mealworms, fly pupae Chick crumble	100 g grass and greens 200 g pellets, 30 g insects and 50 g sprouted seed can be offered in shallow water

* Greens include chopped endive, silver beet, iceberg lettuce, spinach, peas, corn, duck weed, dandelion, milk thistle, dock, chickweed, seeding millet and winter grass

3.7.2. Feeding marine birds

Feeding fresh fish is preferable. However, it is illegal to feed live fish. Frozen fish are often used for convenience and to minimise the risk of transmitting parasites. Fish should not be stored frozen for longer than three months. Do not feed tinned fish, fish that are stale or rotten or individual quick frozen fish as they contain high levels of salt.

Table 3.9 Marine bird diets

Species	Diet in captivity	Amount and frequency
Little penguin	Small whiting, pilchards	150–250 g daily (about 5–6 fish given twice daily) Assist-feed then handfeed
Gannet	Pilchards, whiting (offered warm)	5–6 twice daily Assist-feed then offer in water
Gulls, terns, prions	White bait, whiting, pilchards, squid	At least 3 whiting or pilchards fed twice daily
Shearwater	Fish, marine invertebrates	
Pelican	Whiting, mullet	600–750 g daily (10–20 whiting, 1–2 mullet given over two feeds)
Cormorants, darter	Whiting or pilchards, white bait, handful of mealworms	6–8 fish fed twice daily, mealworms offered in dish daily, may offer in water. Assist feed generally required

Follow veterinary directions regarding hydration and nutrition. Adequate re-hydration must occur before being fed. Suitable re-hydration products include Vytrate, Lectade or Vetafarm Spark. Any bird that is not eating its full quota of fish will require oral electrolytes and force feeding daily. See **Table 3.10**.

Intensive care diets that can be force-fed during the first few days in care include:

- EmerAid IC Piscivore, Hills a/d, Royal Canin Recovery, or Eukanuba High Calorie, mixed with water and tube-fed.
- Pureed fish mixed with Vytrate. This must be supplemented with Vetafarm Seabird tablets: 1 tablet/kg bird.
- Granivore mixed with water and tube-fed for water fowl. Add blended greens (frozen spinach) to recipe if prolonged tubing is required.

Table 3.10 Assist feeding

Defrost fish in the refrigerator overnight. Do not defrost in water as this leaches nutrients from the fish.
Vetafarm Seabird tablets (1 tablet/kg bird) should be placed inside the fish, which should then be dipped into iodised salty water (10 g/L) or fresh seawater before feeding.
Restrain the bird with a towel and hold it between the knees.
Open the mouth with one hand and place the fish into the mouth with the other. Push it down the throat past the opening of the windpipe.
Feed fish head first. See **Figure 3.21**.
Ensure that the oil from the fish does not contaminate the feathers. Clean the bird's mouth after assist feeding by spraying with, preferably, salt water to prevent fish oils getting on feathers and causing waterproofing problems.
Birds should be left alone after assist feeding as they may regurgitate if stressed.

Figure 3.21 Fish are fed to the bird headfirst and horizontally.

Photo credit: Zoos Victoria

13.7.3 Salt tolerance

Marine birds normally drink sea water, which contains 3 per cent salt, and excrete it using a salt gland that sits above their nostrils. When a bird has not had access to salt during rehabilitation, for a period of seven days or more, it loses its ability to tolerate salt. Pelagic birds such as shearwaters and petrels are more likely to be affected. This condition occurs less frequently in cormorants, pelicans and penguins.

There are several methods used to increase or maintain a bird's salt tolerance:

- Increase salt supplementation slowly, over at least seven days, prior to release. This is done by stomach tubing the bird with 1 per cent salt solution daily for three days. If no adverse clinical signs occur, increase to 2 per cent for the next three days. Then increase to 3 per cent on the day prior to release.
  - A 1 per cent salt solution is made by mixing 10 g of salt with 1L of water.
  - A 2 per cent salt solution is made by mixing 20 g of salt with 1L or water.
  - A 3 per cent salt solution is made by mixing 30 g of salt with 1L of water.
- Salt tablets can be given at 100 mg/kg bodyweight daily for the duration of the rehabilitation period to birds housed with fresh-water pools.

- Provide the bird with a pool in the pre-release enclosure with either seawater or fresh water which has had 3 per cent salt added to it.

These methods must be followed correctly due to potential salt toxicity.

In a bird with a normally operating salt gland, excreted salt can be seen running down the bill. This must be visible prior to release.

Figure 3.22 Diagram of the location of the salt glands and salt coming out of the nostrils.

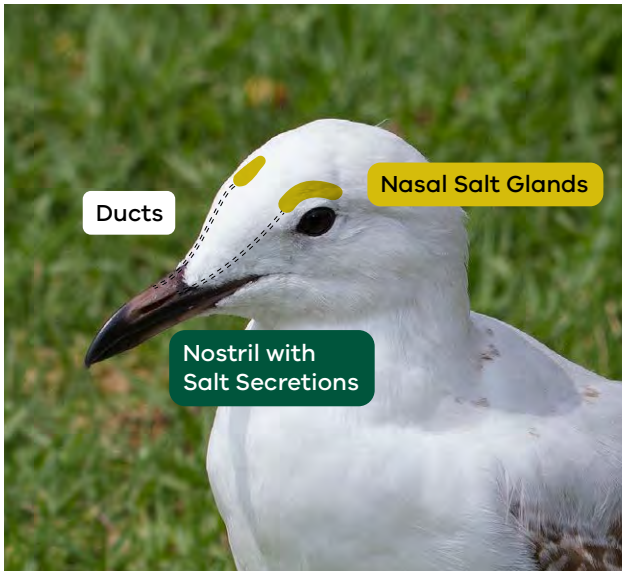


Image permission: David Paul, Museums Victoria

3.8 Hand raising

Hand raising recording templates for growth, development, feeding and other observations can be found in the appendices to Part A of these guidelines.

3.8.1. Equipment required for hand raising

- Appropriate diet. See **Table 3.8** and **Table 3.9**.
- Supplements, if required.
- Intensive care unit (see **Figure 3.24**) or a box containing a 25 or 40 W heat lamp/heat pad and thermometer at one end to provide a heat gradient.
- Assist and/or force-feeding utensils, such as a crop needle, rubber feeding tube or tweezers.
- Tissues/wipes for cleaning the bird.
- Scales.
- Record charts.

Figure 3.23 An ibis chick in an Rcom bird Intensive care unit or brooder.

Photo credit: Zoos Victoria

Figure 3.24 A chick under heat lamp, with towel nest and soft toy.

Photo credit: Zoos Victoria

3.8.2. Growth, development and care of orphaned young

- **It is important to determine if the chick is altricial or precocial.** Precocial birds are born with their eyes open and a covering of down. They can walk and swim after a few hours of hatching and are self-feeding. Waterbirds are precocial. Altricial birds are born with eyes closed, naked or mostly naked and are unable to leave the nest. They depend on their parents for food, heat and protection. Many of the marine bird species are altricial, while some, such as gulls and terns, are semi-precocial. They can walk but tend to stay in the nest and are fed by their parents.
- Precocial chicks are fed an adult diet (See **Table 3.8**) and offered food continuously. They still require heat and should initially be maintained at 32°C. This is gradually reduced to ambient temperature as their feathers grow and develop. A water dish should be provided but must be shallow enough that the chicks cannot drown.

- Ducklings and cygnets in particular will feel more secure if provided with a feather duster or teddy to replicate a parent. Position next to a mirror and under heat source. Food dish reflected in the mirror will assist feeding, particularly with single birds.
- Altricial chicks need an initial temperature of 35°C, if unfeathered. This is gradually reduced to ambient as their feathers grow and develop.
- Waterbird chicks prefer to peck at red, yellow or green objects. Offer fly pupae and moving food such as earthworms, mealworms and blood worm larvae in a shallow dish of water.
- Wombaroo Insectivore mix can be offered to waterbird chicks in a wide and shallow bowl. Tap at the food with tweezers to stimulate pecking. If chicks do not self-feed they will need to be assist-fed using a crop needle or rubber feeding tube.
- For swamphens and related species, drop food items in front of them to encourage the young birds to pick them up. The young are insectivorous.
- Marine bird chicks are also fed an adult diet (see **Table 3.9**). Place fish in the water. Chicks are unlikely to recognise these initially as food and should be assist-fed until they are self-feeding or if they lose more than 10 per cent body weight. See **Table 3.10** for a description of the technique.
- Orphaned waterbirds and marine birds must be weighed daily, and the amount of faeces passed noted. If eating, they will gain weight and produce many droppings. Failure to gain weight or defaecate is an indication to start assist-feeding.

3.8.3. Imprinting

Imprinting is a common problem with hand-reared orphan birds. To minimise the likelihood of imprinting:

- Raise chicks with other birds of the same species and a similar age.
- Foster chicks by using non-related adult birds of the same species to take over their care. Caution is required with black swans as they may injure or kill cygnets that are not their own. As parents of the species provide not only food but education, every effort to foster an individual in the wild should be made, in preference to rearing it in captivity. Once the adult birds are feeding the young, fostering is deemed to be successful.
- Have the bird face a mirror while it is being fed.
- Feed the bird wearing a hand puppet that resembles the parent bird.
- Avoid being affectionate or talking to birds and avoid any non-essential handling or physical contact.
- Avoid raising birds within sight or smell of domestic animals.
- Place an artificial stuffed toy or dummy of the parent species with the orphan. See **Figure 3.25**.

Figure 3.25 A black swan cygnet with a stuffed toy adult swan

Photo credit: Zoos Victoria

3.9 Release protocol

Ideally, wild animals will be rehabilitated and released in a short timeframe. If this is not possible and the animal is in care for significant extended periods, ensure that the animal is regularly assessed against the welfare domains to support decision-making. Animals in care for extended periods may have a reduced ability to survive in the wild. Talk to your veterinarian and consider whether euthanasia will provide the best welfare outcome for the animal.

3.9.1. Pre-release assessment

Pre-release assessment of animals in care is essential to support improved outcomes once back in the wild. Animals should be assessed based on body condition, fitness and the ability to engage in natural species-specific behaviours prior to release.

The following check list should be used to guide decision-making regarding release suitability for waterbirds and marine birds:

- ☑ For birds that have had fractured bones or head trauma, a pre-release examination by a veterinarian is recommended to determine that the original injury has healed. This may involve radiographs of the fracture site to determine the extent of healing.
- ☑ Birds take 10–14 days without exercise to lose fitness. Whenever possible, they should be released before this time.
- ☑ Flight should be critically observed, if possible, with an experienced rehabilitator. The ability to gain lift, negotiate the environment and land are required for successful release.
- ☑ There are no more than two broken flight feathers on each wing.
- ☑ Adult birds should be released at or higher than their arrival weight.
- ☑ Penguin weight ranges are hugely varied, particularly if they are first year birds. Assessing body condition, size and age class are the most accurate ways of predicting ideal weight. Additionally, there are marked differences in average weights/sizes between St Kilda and Phillip Island Nature Park colonies.
- ☑ Penguins should be released once they weigh 1 kg. Failure to gain this weight means that the bird should be evaluated further by a veterinarian or transferred to Phillip Island Nature Park for specialist care.
- ☑ Juvenile short-tailed shearwaters can be released once they reach 500 g.
- ☑ Bumblefoot lesions are either absent or mild (see **Figure 3.12**). Mild lesions are more likely to resolve if the bird is released rather than remaining in captive care.
- ☑ Individual displays ability to actively forage and consume natural foods. Hand-reared birds need to be assessed on their ability to catch and eat their natural diet prior to release. Dead fish can be made to appear live by placing them in a pool with a running hose that creates currents. Insects such as mealworms and earthworms can be placed in water to provide foraging opportunities for swamphens, herons and other wading birds.
- ☑ Individual displays appropriate predator avoidance behaviour and is not imprinted on people.

3.9.2. At the release site

Post release survival will be maximised by ensuring that both the release site and the way in which the animal is released are carefully considered.

- Marine birds may be blown many kilometres inland. These birds should not be released at the point of capture but returned to the coast for release provided it is within their home range and in accordance with your authorisation. Some pelagic bird species will need to be released at sea from a boat.

- Birds that have been oiled due to an overt spill should only be released after discussion with biologists and government agencies. Release must not be performed until all the oil has been removed from the site where the birds are likely to return.
- Many waterbirds have adapted well to urban areas, and the watercourse where they live may be man-made such as irrigation channels, drains and water running next to roadsides. For more information on the ecological characteristics and requirements of waterbirds and marine birds that may help with their release, please refer to **Table 3.1**, **Table 3.2** and **Table 3.11**.

Table 3.11 Characteristics of release sites for waterbirds and marine birds

Species	Release site	Comments
Darter, cormorants	Estuary, wetland, lake, river	Smooth, quiet water with branches for perching. Strong site fidelity.
Australian wood duck	Dams, creeks, lake, irrigation channels	Watercourse with short grass nearby. Adults are paired.
Pacific black duck	Shallow or deep watercourses	Shallow wetlands with open water preferred.
Herons	Shallow watercourses	Vary in location from headlands next to beaches, to small and large watercourses.
Ibis	Swamp, wetland	Feeds in shallow water.
Black swan	Lakes, lagoons	Flock on large estuaries. Do not release adult onto dam where a pair is breeding. Generally territorial with strong site fidelity.
Cormorants	Lake, river, wetland. Estuarine area for black faced cormorants	Waterway with branches for perching.
Lapwing, moorhen, swamphen, coot	Short grass area next to water	Suitable locations include farmland, lawn, roadside nature strips. Show strong site fidelity.
Grebe	Freshwater lake or river	Release at the edge of the lake or river in an area of still water. Strong site fidelity. Will only leave site if inadequate food and only make this flight under nightfall to avoid predation.
Gulls	Beach	Low tide, other gulls present.
Terns, prions	Beach	Release into light offshore winds.

Species	Release site	Comments
Little penguin	Beach	Penguins should be released before dawn to avoid predation. Wild penguins leave burrows 1–2 hours before dawn in the wild to avoid predation from gulls/marine birds. Also provides adequate time for birds to forage upon release. Do not release if the water is choppy.
Australian pelican	Estuary, lake	Release on shore where other pelicans are seen.
Australasian gannet	Open water	Calm weather.
Shearwaters	Open water, end of a jetty	Release at night to avoid predation by large gulls. Release over a calm ocean with no breakers or they will wash back in.

For more information on the ecological characteristics and requirements of marine birds and waterbirds that may help with their release, please refer to **Table 3.11**.

3.9.3. Release checklist

Check all of the requirements of your authorisation are being met, and consider the following:

Release of waterbirds

- ☑ Release waterbirds in the morning as they are diurnal.
- ☑ Open the door of the transport crate at the selected release site and allow the bird to leave of its own accord.
- ☑ Ducklings, and other waterbirds that have been reared together, should be released as a group provided the release site is within their home range and in accordance with your authorisation.

Release of marine birds

- ☑ Marine birds should be released on an empty stomach as they are likely to regurgitate during transport to the release site.
- ☑ Release them in an area where they can run into a headwind on high ground next to the ocean to enable them to gain lift.
- ☑ Migratory birds, such as shearwaters and prions, should be released at least one month prior to migration. Short-tailed shearwaters leave in April and return in September each year. Fairy prions leave to breed on offshore islands from July onwards.
- ☑ If they arrive during the migration they should be treated and released as quickly as possible, within a maximum of two weeks. Otherwise they should be euthanised as they will be unable to successfully complete the migration.
- ☑ Do not release birds on days with forecast temperatures over 38°C or when severe storms are forecast in the following three days.

3.10 Key references and additional reading

Duer, R.S. and Gage, L.J. 2020. Hand-Rearing Birds, 2nd Edition. John Wiley & Sons Inc., Hoboken.

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