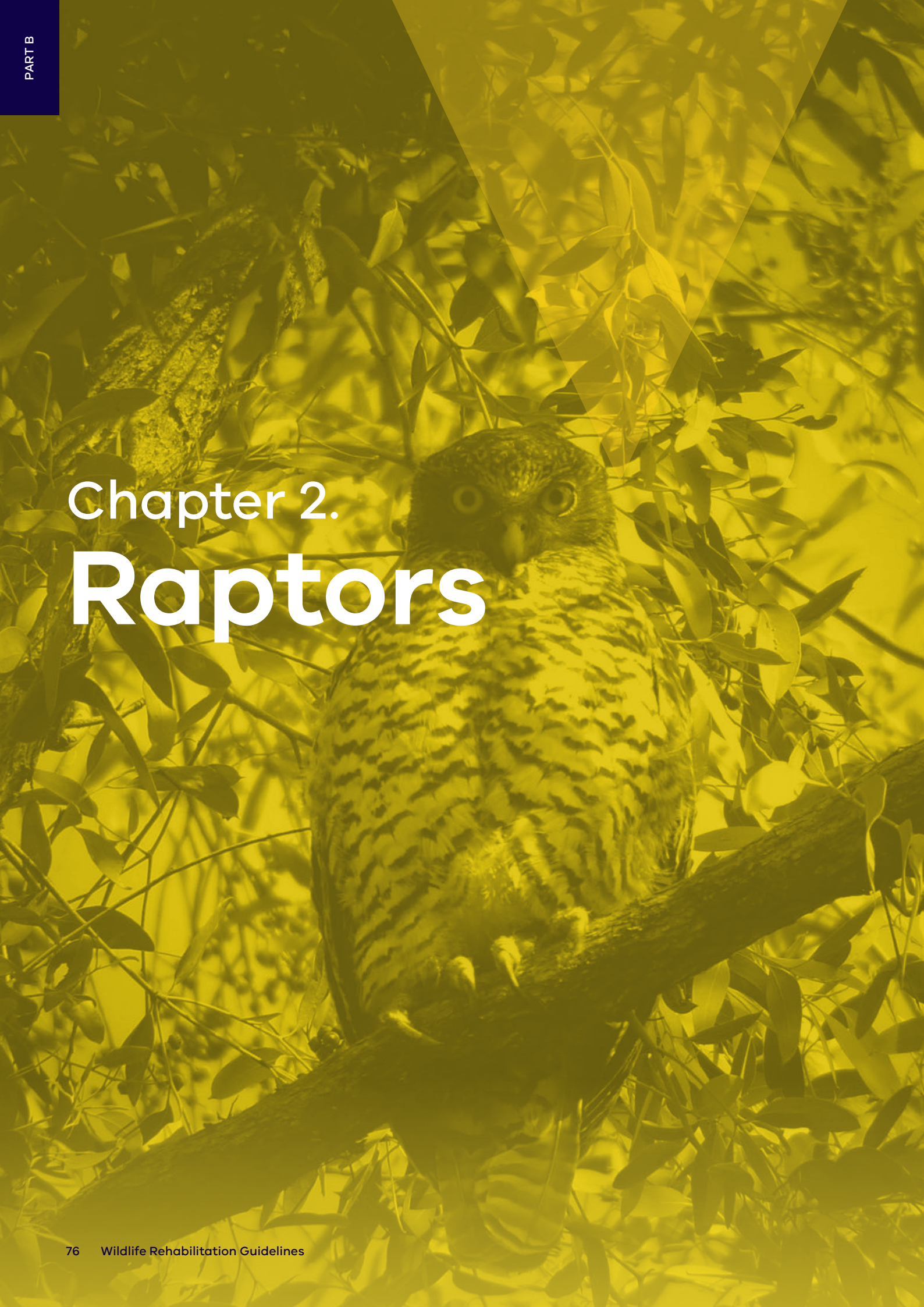


Chapter 2.
Raptors

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

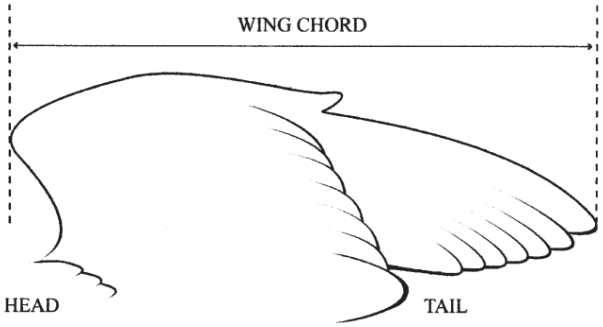
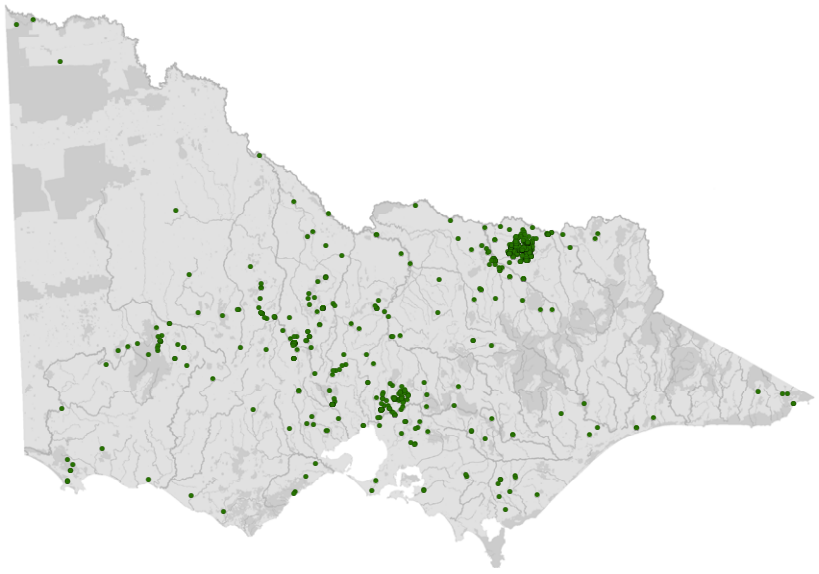
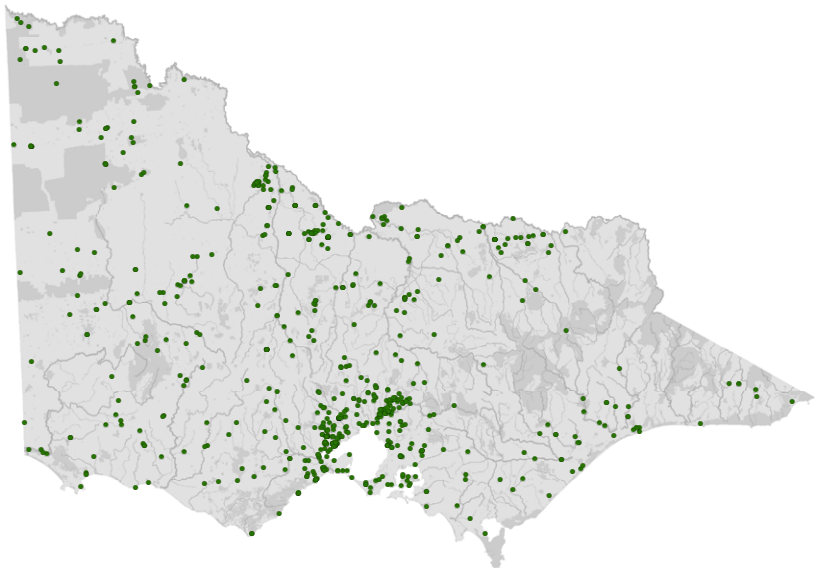


Photo credit: Zoos Victoria

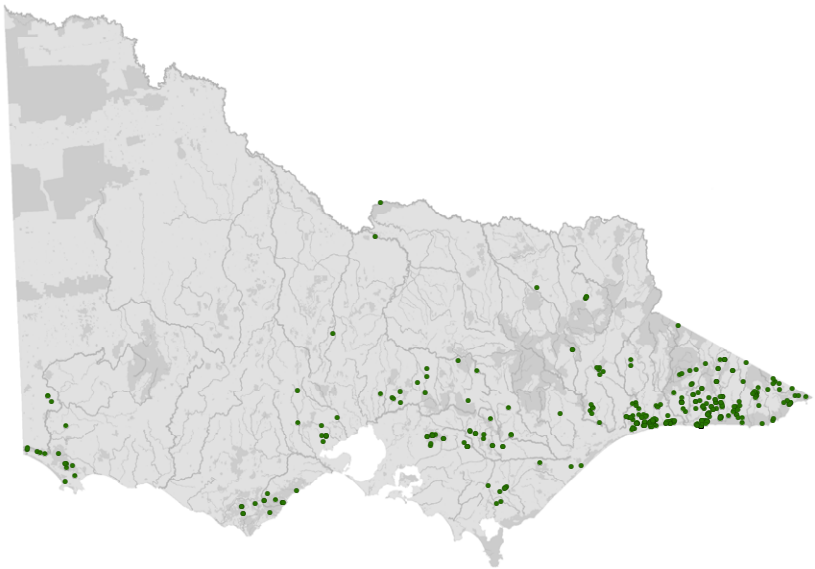
Table 2.1 Species Profiles: Nocturnal birds of prey that commonly come into care

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**

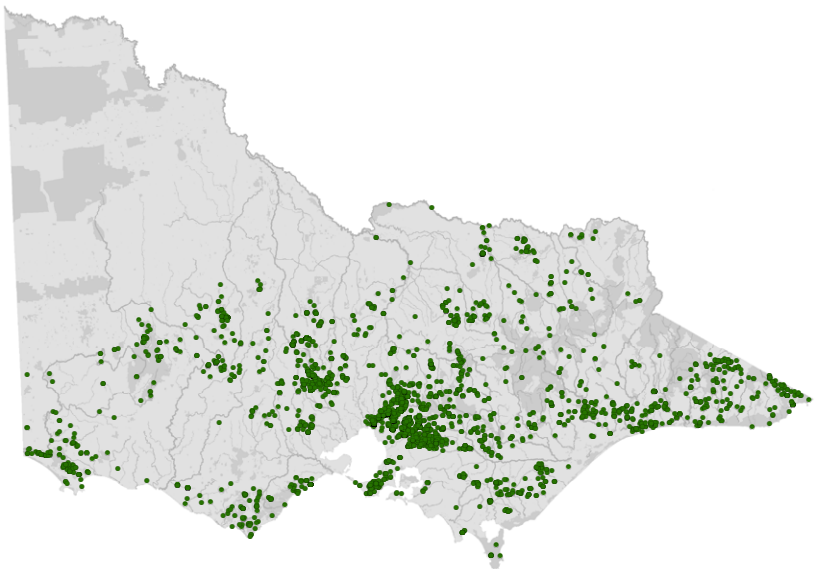
Species	Barking owl (*Ninox connivens*)
General appearance	Adults: Large bright yellow eyes. Almost no facial mask. Upperparts brownish-grey. Underparts white, streaked brownish-grey. White spots on wings Juveniles: Incomplete collar. Flanks and breasts similar to adults
Conservation status*	Critically 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

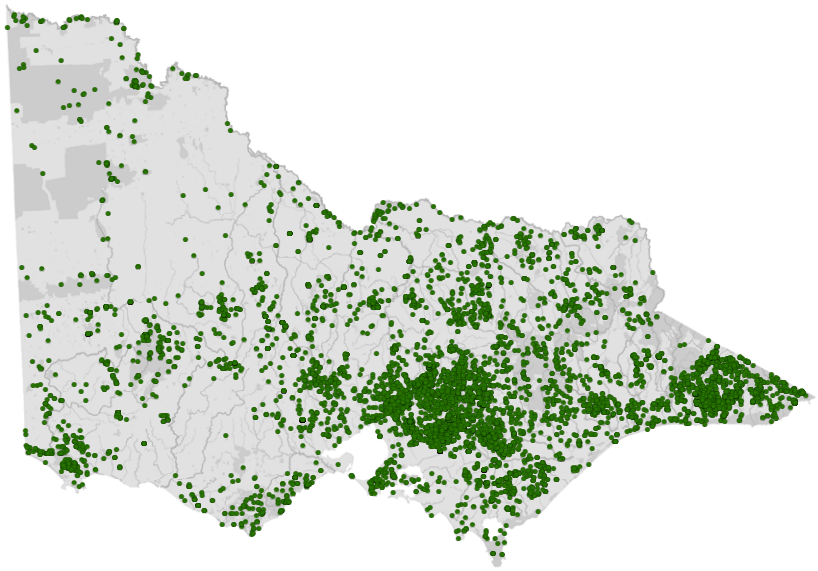
Species	Barn owl (*Tyto alba*)
Nest location	Deep hollow in live or dead tree
Fledgling	September–January
Age at dispersal	3 months
Age at maturity	10–11 months

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

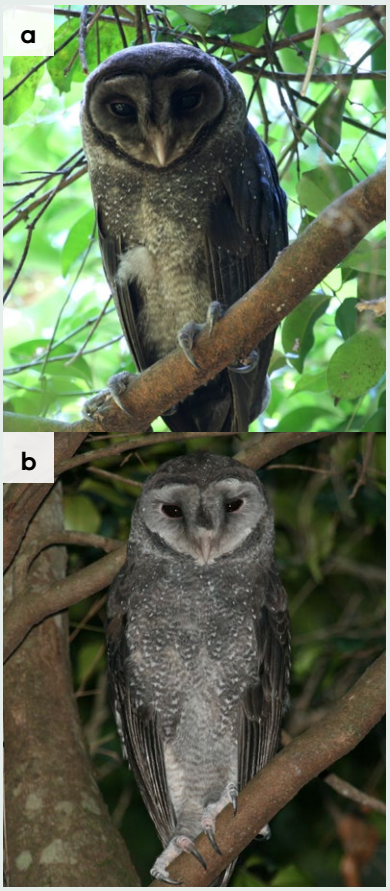
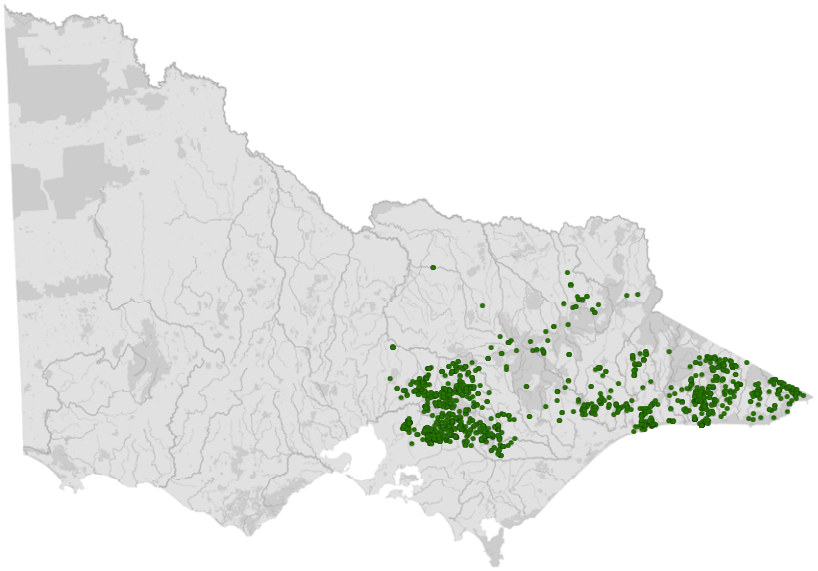
Species	Masked owl (*Tyto novaehollandiae*)
Natural activity peak	Nocturnal
Foraging style	Hunt from perch, takes prey in the trees or on the ground
Diet	Possums, mice, rats, rabbits
Movement	Resident
Nesting time	Any month, mostly autumn to winter
Laying	September–October
Nest location	Hollow eucalypt,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

Species	Powerful owl (*Ninox strenua*)
a  b  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

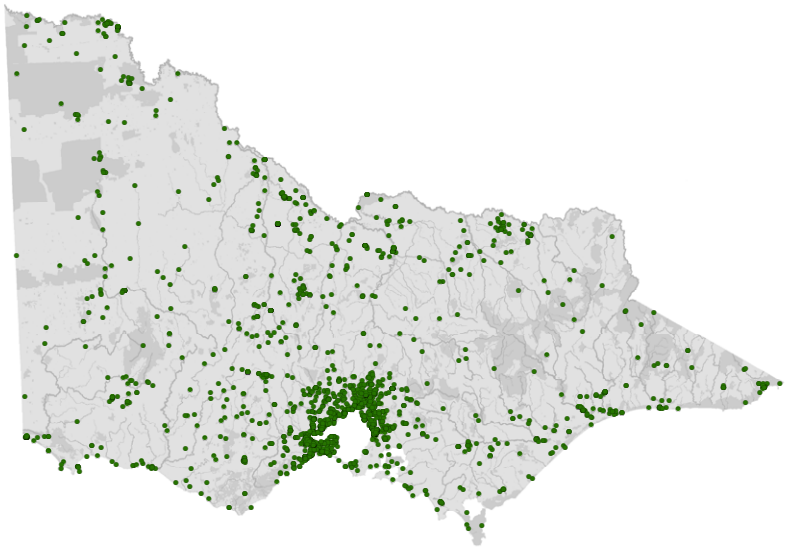
Species	Southern boobook owl (*Ninox boobook*)
a  b  a. Adult b. Juvenile Photo credit: Bernie McRitchie and David Whelan	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 **www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas**
General appearance	Adult: Distinct 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

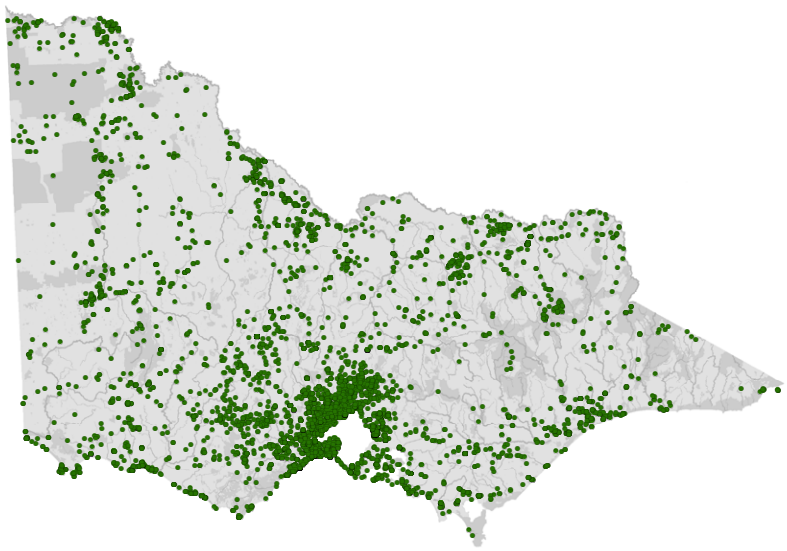
Species	Greater sooty owl (*Tyto tenebricosa*)
 a. Adult b. Juvenile Photo credit: Rohan Bilney	Distribution map  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Oval grey facial disc outlined in black. Upperparts 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

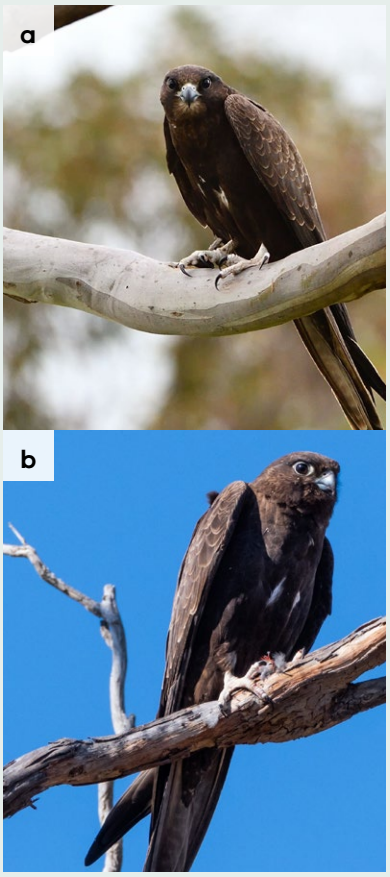
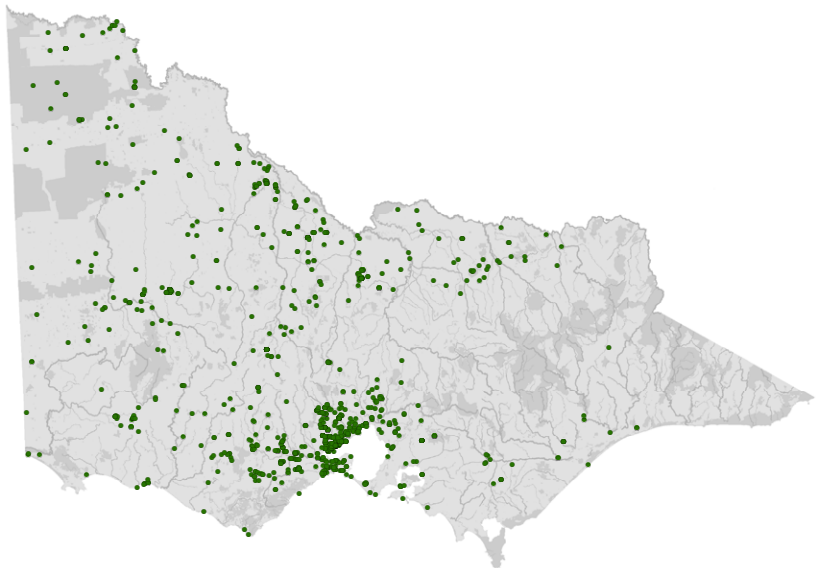
Table 2.2 Species Profiles: Diurnal birds of prey that commonly come into care

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

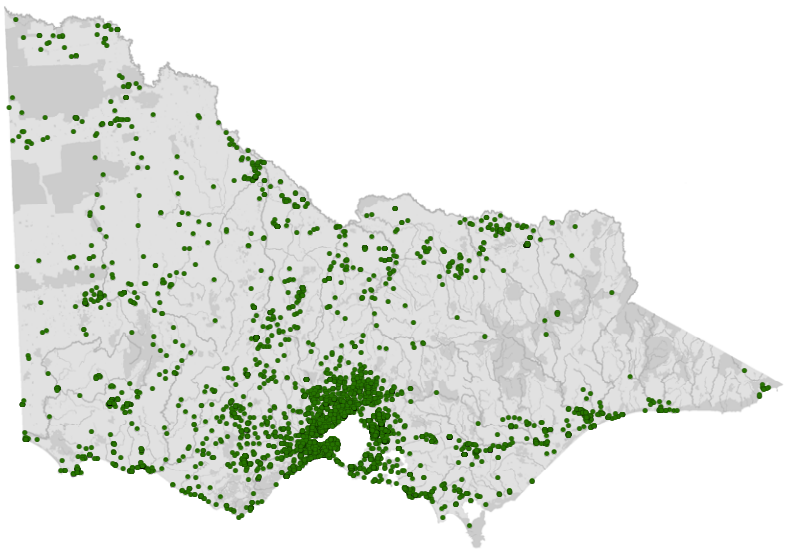
Species	Australian hobby (*Falco longipennis*)
Movement	Non-migratory, seasonally dispersive, some migrate
Nesting time	August–November
Laying	August–October
Nest location	Usurped nest of other raptor or corvid, usually in tall living tree
Fledgling	November–January
Age at dispersal	4 months
Age at maturity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

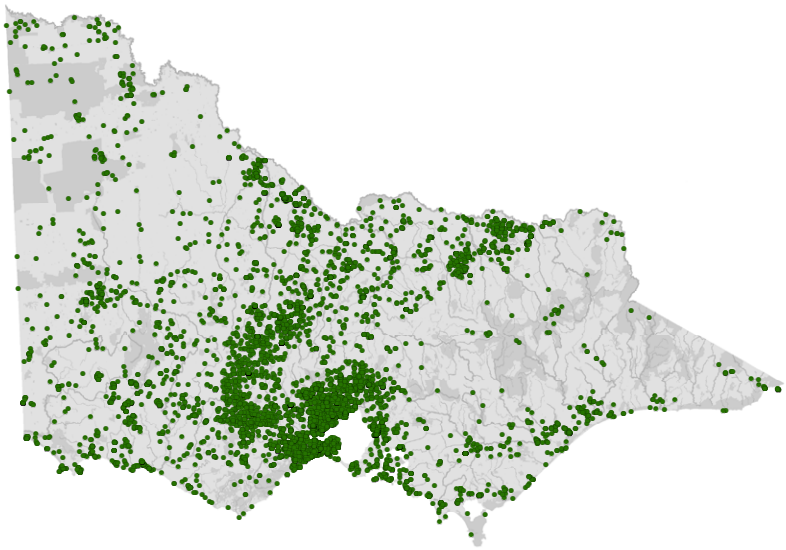
Species	Australian kestrel (*Falco cenchroides*)
Adult morphometrics	Body weight: Male: 121 – 195 g. Female: 115 – 255 g Head and body length: 280–360 mm Wing chord: Male: 235–260 mm. Female: 248–273 mm Tail length: Male: 146–168 mm. Female: 151–176 mm
Habitat	Open and wooded country, heath, mallee
Home 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

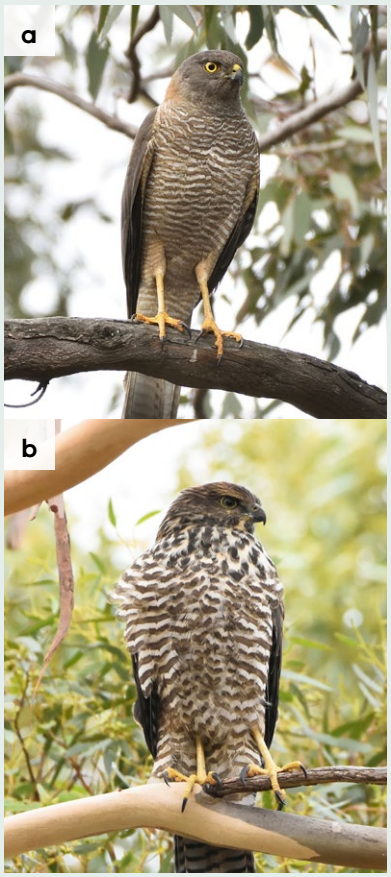
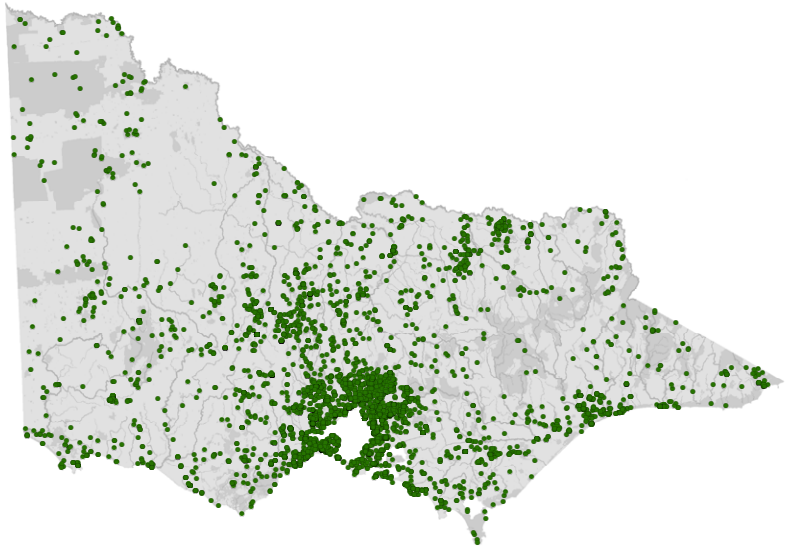
Species	Black falcon (*Falco subniger*)
Movement	Nomadic, dispersive
Nesting time	June–December
Laying	July–December
Nest location	Old or usurped nest of other raptor or corvid
Fledgling	September–January
Age at dispersal	2 months
Age at maturity	Unknown

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

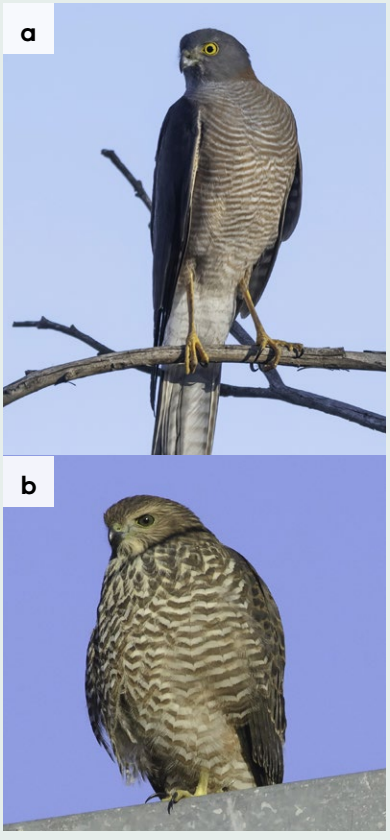
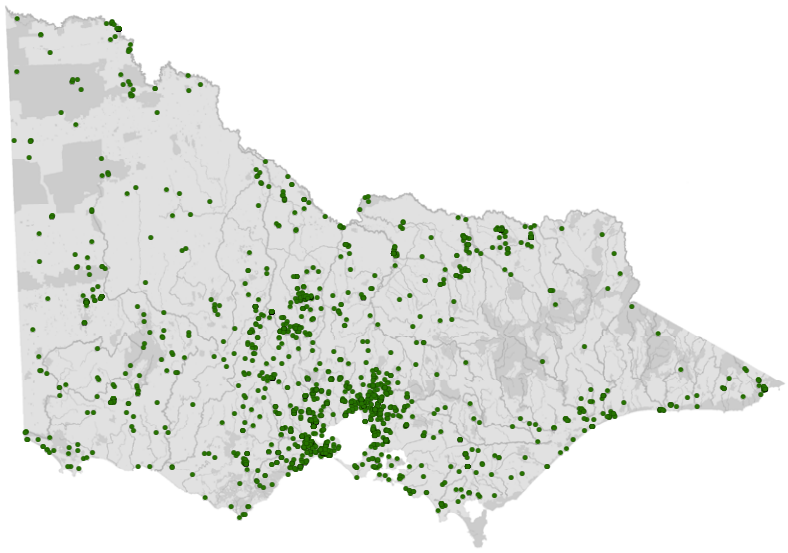
Species	Black-shouldered kite (*Elanus axillaris*)
Habitat	Open country and grasslands 30–150 cm high, farmland
Home range	Nestlings can move 50 km from home
Natural activity peak	Diurnal and crepuscular
Foraging style	Hover and drop feet first onto prey from 10–30 m
Diet	Mice, rats, rabbits, sparrows, 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

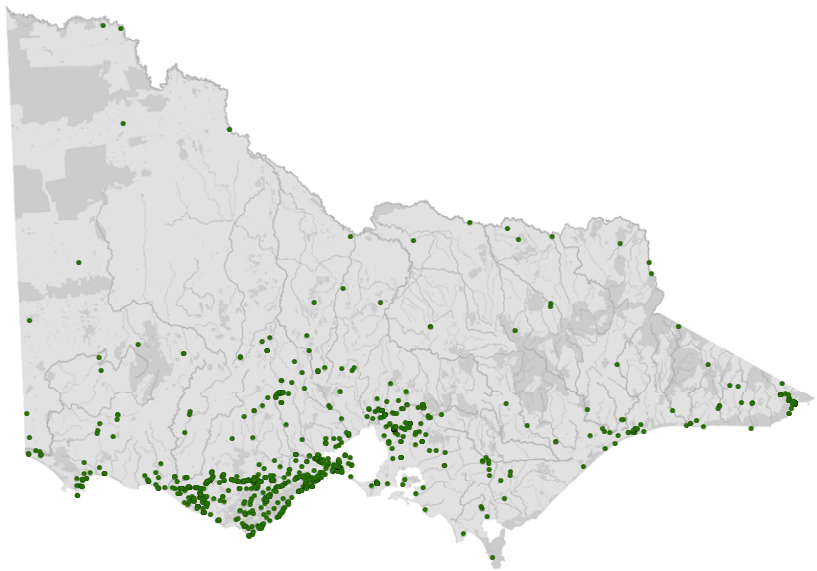
Species	Brown goshawk (*Accipiter fasciatus*)
Foraging style	Hunt from perch, can catch in air or on ground
Diet	Small mammals, reptiles, frogs, insects
Movement	Adult non-migratory, young migratory
Nesting time	Early September – late October
Laying	August–November
Nest location	Nest within 50 m of water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

Species	Collared sparrowhawk (*Accipiter cirrocephalus*)
 a. 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

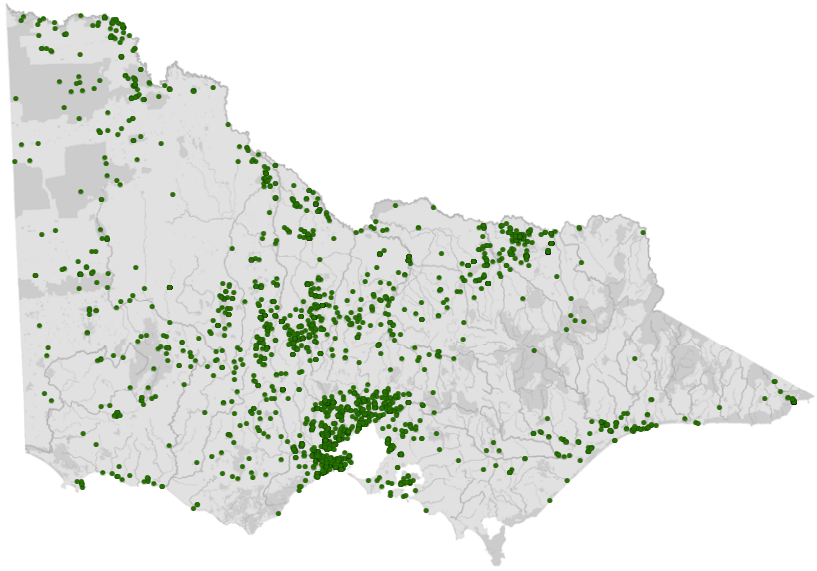
Species	Grey goshawk (*Accipiter novaehollandiae*)
a  b  a. Adult b. Juvenile Photo credit: Zoos Victoria (grey morph) Bernie McRitchie (white morph juvenile)	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
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*)

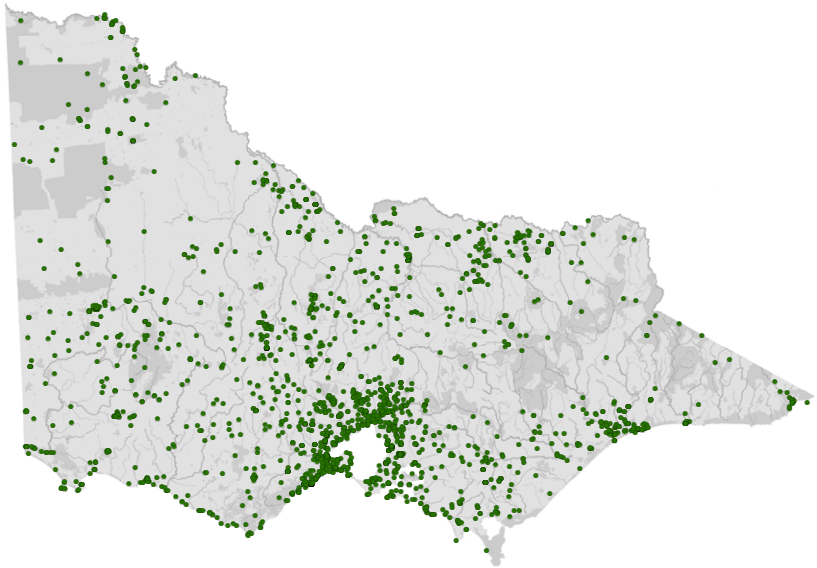
Photo credit: top to bottom - David Whelan (adult female) [light morphs], Bernie McRitchie (juvenile), David Whelan (adult) [dark morph], Bernie McRitchie (juvenile) [dark morph]

Distribution map

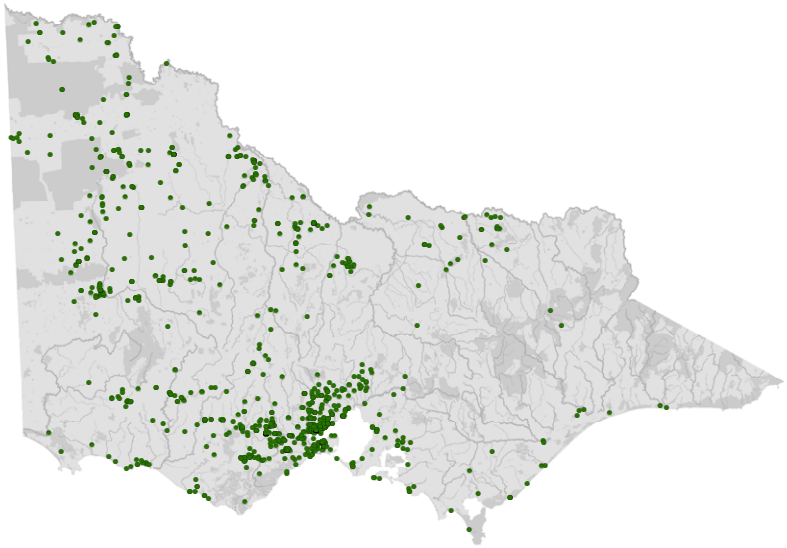


Data source: Victorian Biodiversity Atlas Jan 2023
www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

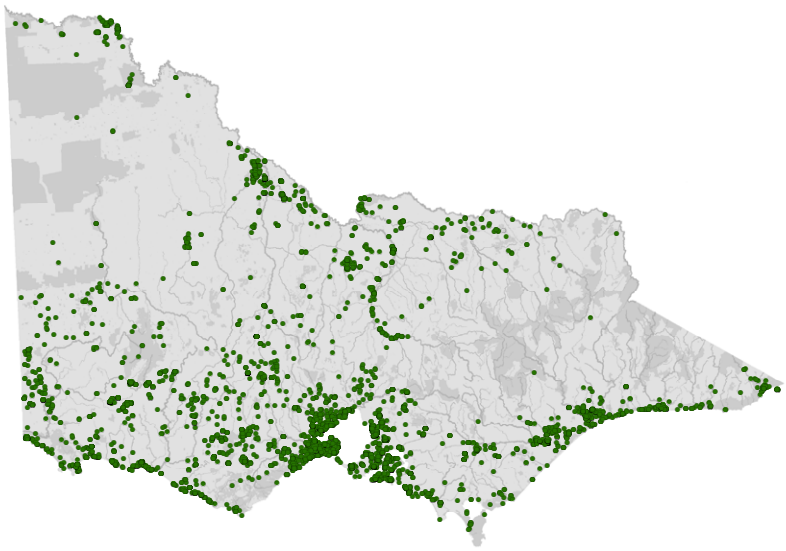
Species	Little eagle (*Hieraaetus morphnoides*)
General appearance	Adult: Light morph: Head buff to pale rufous with blackish streaks on cheeks. Blackish crown feagthers extending into a short crest. Upperparts brown, paler on nape and scapulars, with a distinct pale band across the wing. Underparts 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

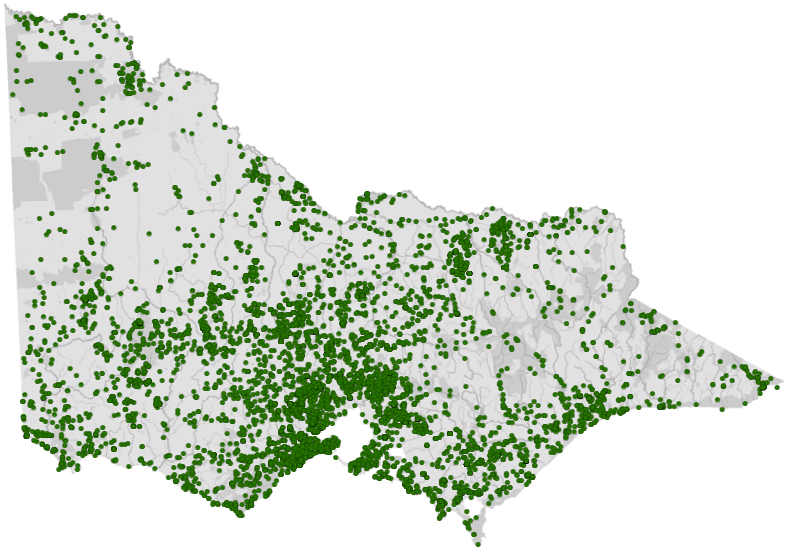
Species	Peregrine falcon (*Falco peregrinus*)
Diet	Birds: quail, ducks, pigeons, starlings, sparrows, parrots. Insects: moths, cicadas, locusts
Movement	Non-migratory, some post-breeding dispersal
Nesting time	Mid-August–November
Laying	August–January
Nest location	Tree hollow, cliff, stick nest, buildings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

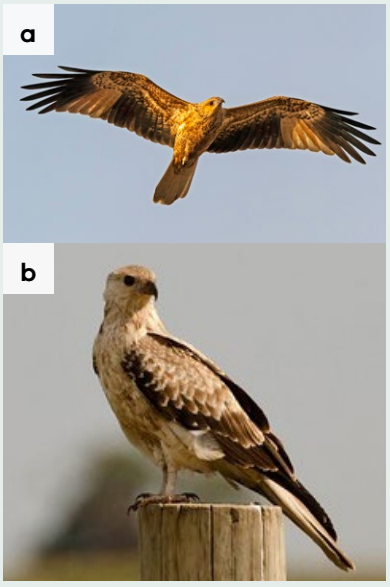
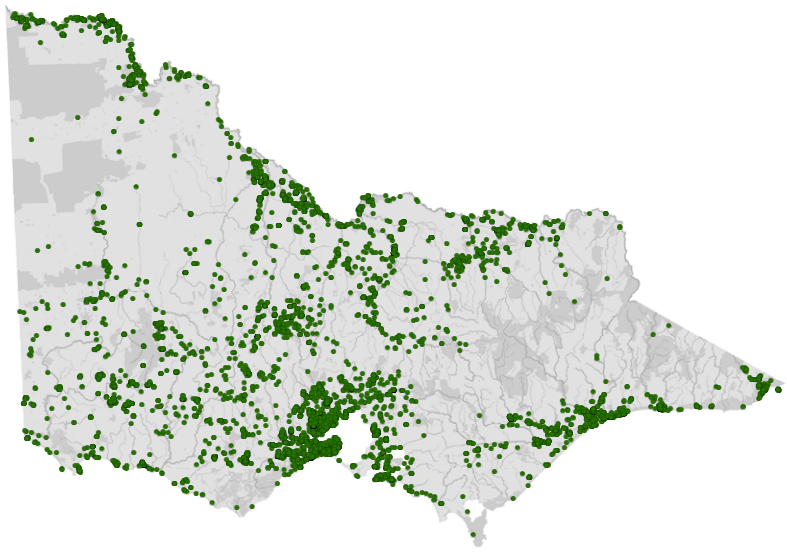
Species	Spotted harrier (*Circus assimilis*)
General appearance	Adult: Upperparts blue-grey. Wings with prominent black tips. Face and underparts chestnut with numerous white spots. Tail prominently barred and slightly wedge-shaped Juvenile: First year is dark brown and buff above, pale buff with brown 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

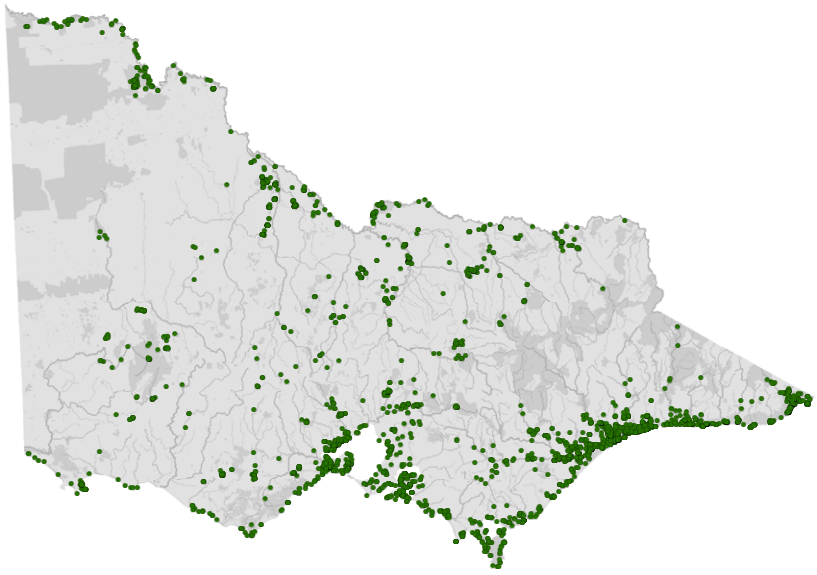
Species	Swamp harrier (*Circus approximans*)
Home range	550 ha
Natural activity peak	Diurnal
Foraging style	Slow flying over water, reedbeds or grass/croplands followed by dropping onto prey on the ground
Diet	Quail, waterbirds, mice, rats, lizards, rabbits
Movement	One of the few raptors in Australia 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

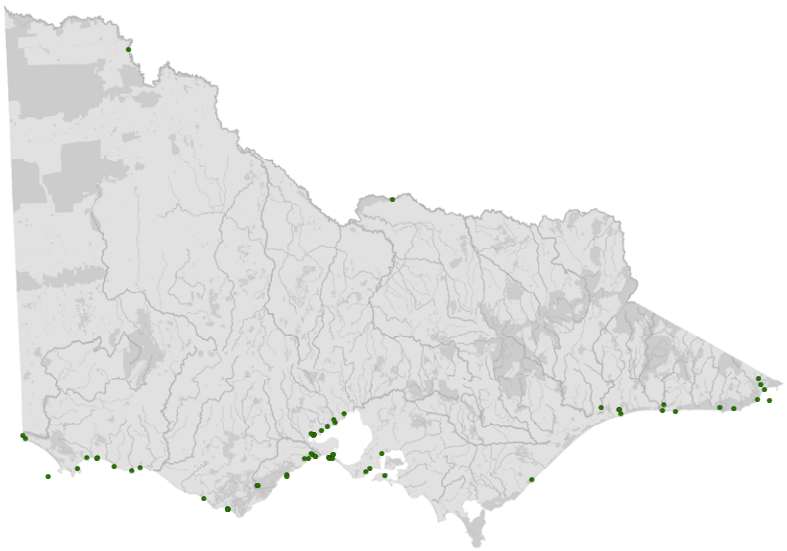
Species	White-bellied sea eagle (*Haliaeetus leucogaster*)
 Photo credit: Shutterstock	**Distribution map**  Data source: Victorian Biodiversity Atlas Jan 2023 www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas
General appearance	Adult: White with grey back, rump, wings and base of 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.

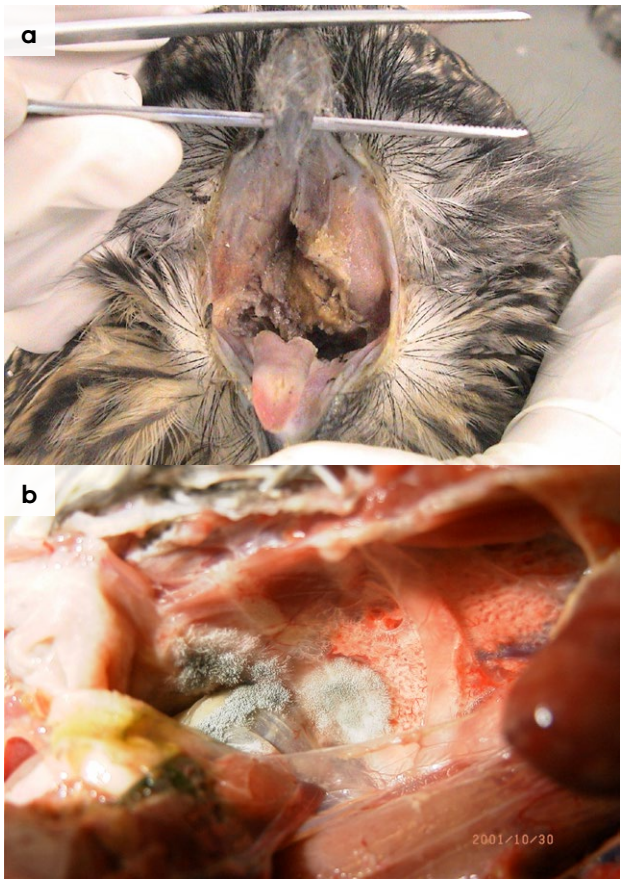


Photo credit: Zoos Victoria

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.

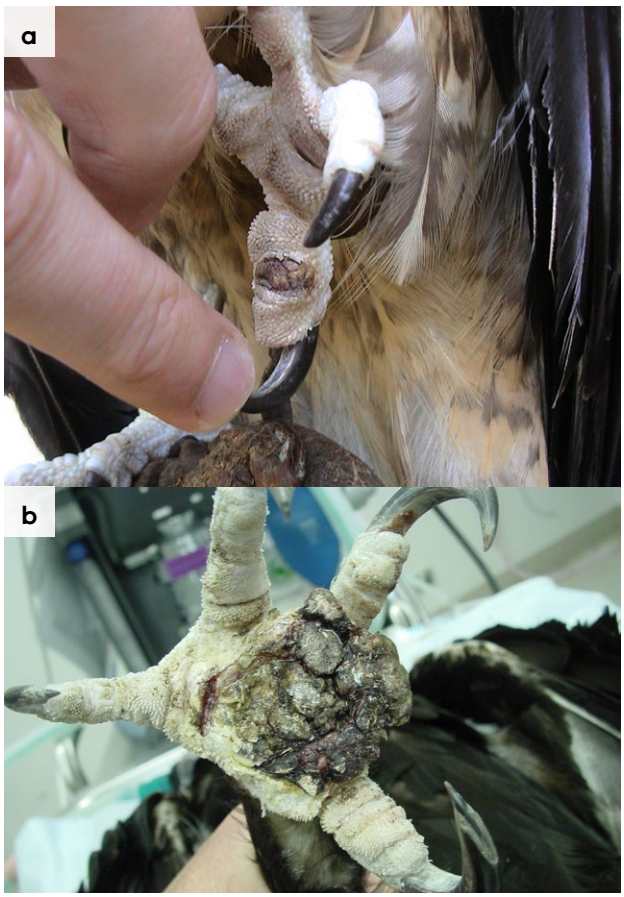


Photo credit: Zoos Victoria

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)	

<table>
<tr><th colspan="3">Intermediate housing (treatment/cage rest)</th></tr>
<tr><th>Indications for use</th><th>Suggested min. dimensions</th><th>Suggested requirements</th></tr>
<tr>
<td rowspan="2">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.</td>
<td>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)</td>
<td rowspan="2">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.</td>
</tr>
<tr>
<td>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)</td>
</tr>
</table>

<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.

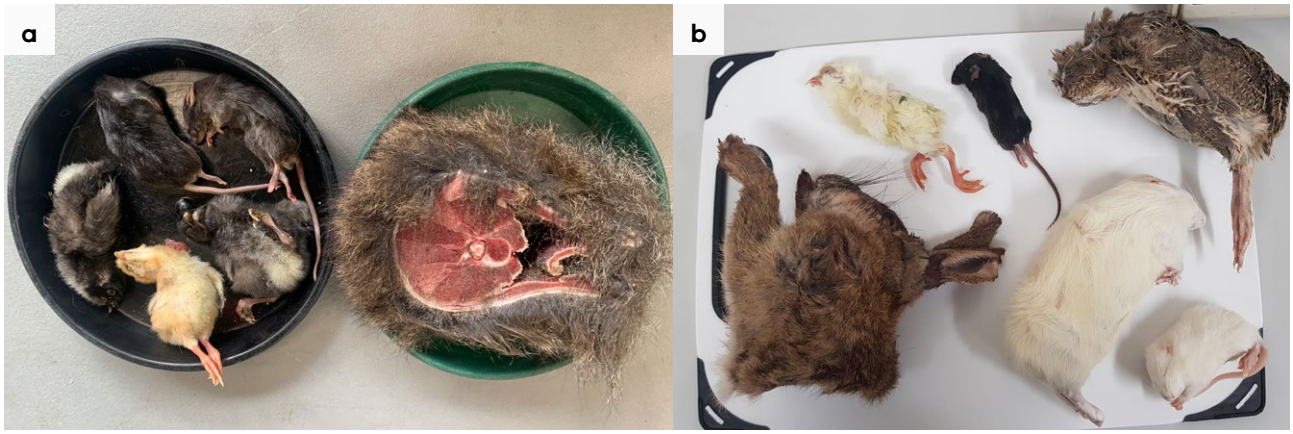


Photo credit: Zoos Victoria

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.

Olsen, P. 1995. Australian Birds of Prey: The biology and ecology of Raptors. University of New South Wales publishing, Sydney.

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

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