

Chapter 3.

# Waterbirds and marine birds

# Contents

|             |   |            |
|-------------|---|------------|
| <b>3.1</b>  | <b>Introduction</b>   | <b>147</b> |
| <b>3.2</b>  | <b>Species information</b>  | <b>148</b> |
| <b>3.3</b>  | <b>Animal and human safety considerations</b>                               | <b>177</b> |
| 3.3.1.      | Human safety considerations   | 177        |
| 3.3.2.      | Animal safety considerations  | 177        |
| <b>3.4</b>  | <b>Capture, restraint, and transport</b>                                    | <b>178</b> |
| 3.4.1.      | Visual observations   | 178        |
| 3.4.2.      | Equipment   | 179        |
| 3.4.3.      | Technique   | 180        |
| 3.4.4.      | Transport   | 182        |
| <b>3.5</b>  | <b>Monitoring animal health and welfare</b>                                 | <b>183</b> |
| 3.5.1.      | Physical examination  | 183        |
| 3.5.2.      | Ongoing monitoring of health and welfare                                    | 186        |
| 3.5.3.      | Common presenting injuries and clinical signs of emerging health conditions | 187        |
| 3.5.4.      | Administering treatment   | 200        |
| <b>3.6</b>  | <b>Housing</b>  | <b>201</b> |
| 3.6.1.      | General housing information for marine birds and waterbirds                 | 201        |
| 3.6.2.      | Enclosure hygiene and biosecurity   | 201        |
| 3.6.3.      | Housing types   | 201        |
| 3.6.4.      | Waterproofing and feather protection  | 211        |
| <b>3.7</b>  | <b>Feeding and nutrition</b>  | <b>212</b> |
| 3.7.1.      | Feeding waterbirds  | 212        |
| 3.7.2.      | Feeding marine birds  | 213        |
| <b>3.8</b>  | <b>Hand raising</b>   | <b>216</b> |
| 3.8.1.      | Equipment required for hand raising   | 216        |
| 3.8.2.      | Growth, development and care of orphaned young                              | 216        |
| 3.8.3.      | Imprinting  | 217        |
| <b>3.9</b>  | <b>Release protocol</b>   | <b>218</b> |
| 3.9.1.      | Pre-release assessment  | 218        |
| 3.9.2.      | At the release site   | 218        |
| 3.9.3.      | Release checklist   | 220        |
| <b>3.10</b> | <b>Key references and additional reading</b>                                | <b>221</b> |



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

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

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

## 3.1 Introduction

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

Marine birds require specialist housing and access to large amounts of fish and should only be rehabilitated by wildlife shelter operators experienced in their care in the region where they were found. As they may be found in large numbers, naturally high mortality rates in juvenile and adult birds can occur as a consequence of sporadic food shortages. However, mass mortality events may also reflect the emergence of novel diseases. If there is a disease outbreak (for example

botulism in birds) or a mass-die-off of wildlife, report it to the Emergency Animal Disease Watch Hotline on 1800 675 888 (24 hours) immediately.

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

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

## 3.2 Species information

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

**Figure 3.1** Avian wing showing measurement of wing chord.

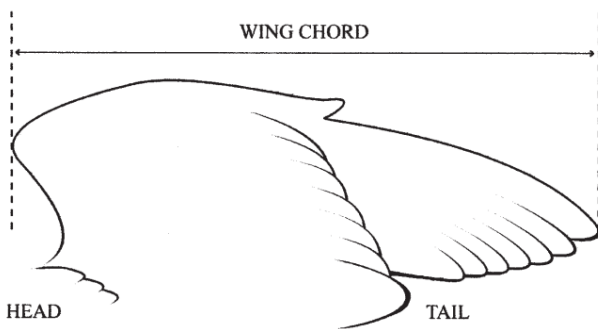

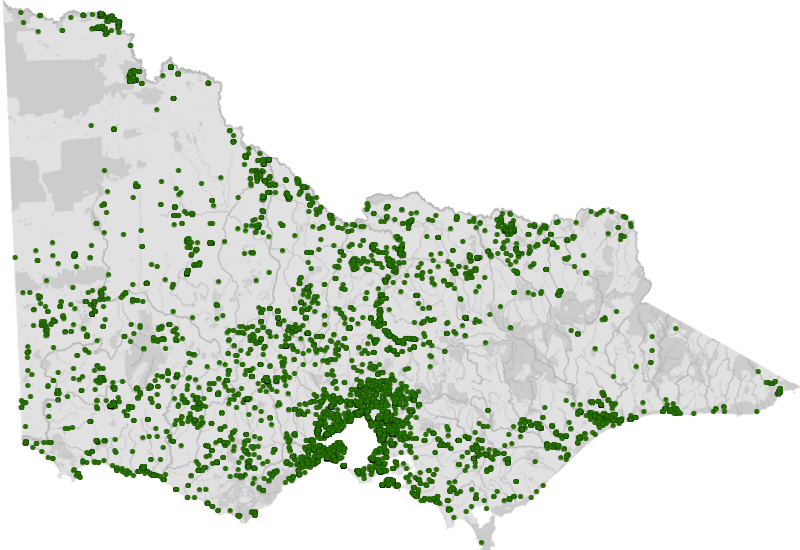


Image credit: Zoos Victoria

**Table 3.1** Species profiles: Waterbirds

| Species   | Australasian grebe ( <i>Tachybaptus novaehollandiae</i> )  |
|---|--|
|  <p data-bbox="129 1671 384 1720">Photo credit: David Paul, Museums Victoria</p> | <p data-bbox="560 1395 772 1422">Distribution map</p>  <p data-bbox="560 2018 1286 2067">Data source: Victorian Biodiversity Atlas Jan 2023<br/><a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</a></p> |

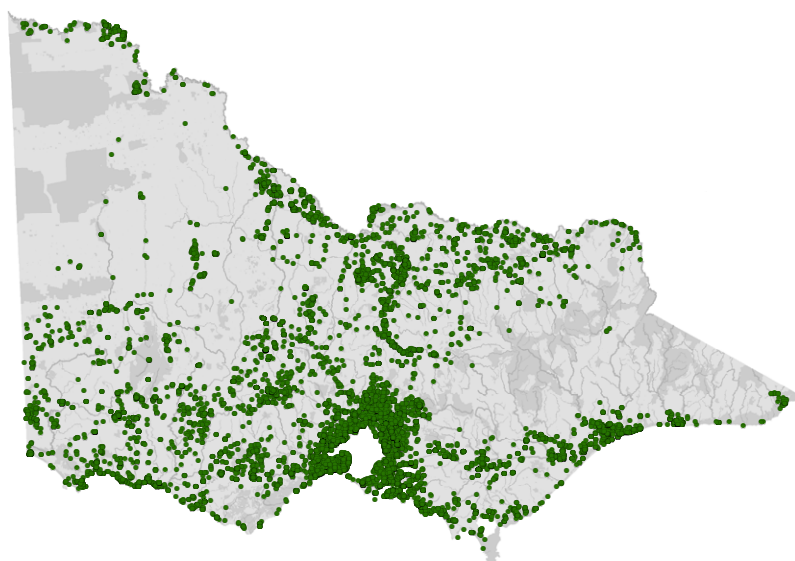
| Species               | Australasian grebe ( <i>Tachybaptus novaehollandiae</i> )  |
|-----------------------|--|
| General appearance    | Brownish with dark head, narrow chestnut streak on side of head, yellow eye and broad white wing stripe        |
| Conservation status*  | Common   |
| Adult morphometrics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

## Species

Australian white ibis (*Threskiornis molucca*)

Photo credit: Mark Norman,  
Museums Victoria

## Distribution map


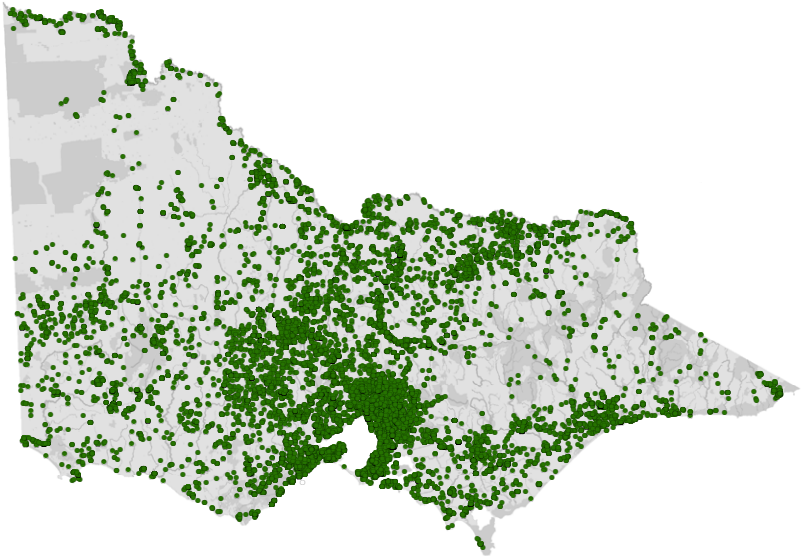


Data source: Victorian Biodiversity Atlas Jan 2023

[www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas](http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas)

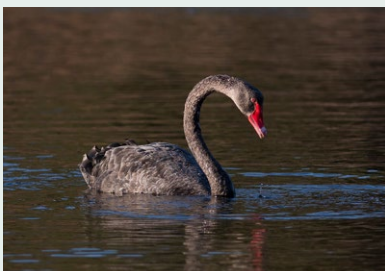
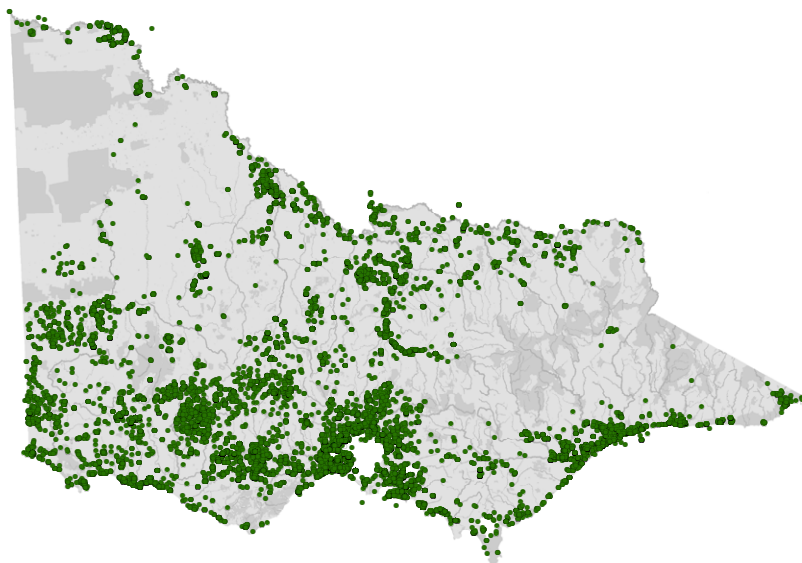
|                              |  |
|------------------------------|--|
| <b>General appearance</b>    | White bird with black naked head and neck. Black feathers near tail  |
| <b>Conservation status*</b>  | Common   |
| <b>Sexual dimorphism</b>     | Males have a longer bill<br>Male: 183.5–197.1 mm<br>Female: 149.1 mm–158.4 mm  |
| <b>Adult morphometrics</b>   | Body weight: Male: 1700–2350 g. Female: 1300–2120 g<br>Head and body length: 650–750 mm<br>Wing chord: Male: 355–398 mm, Female: 355–372 mm<br>Tail length: Male: 120–134 mm, Female: 122–130 mm |
| <b>Habitat</b>               | Wide range of wetlands, grasslands. Freshwater wetlands, irrigated areas, tidal mudflats, public gardens   |
| <b>Home range</b>            | Not reported   |
| <b>Natural activity peak</b> | Diurnal  |
| <b>Foraging style</b>        | Feeds in pastures, freshwater wetlands, tidal areas  |
| <b>Diet</b>                  | Fish, crustaceans, insects   |
| <b>Movement</b>              | Non-migratory, dispersive  |

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

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



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

| Species   | Black swan ( <i>Cygnus atratus</i> )   |
|---|--|
|  <p>Photo credit: David Paul, Museums Victoria</p> | <p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023<br/> <a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</a></p> |
| General appearance  | Large black swan with white wingtips   |

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

## Species

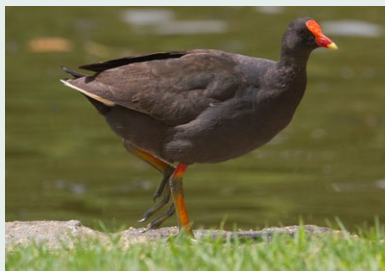
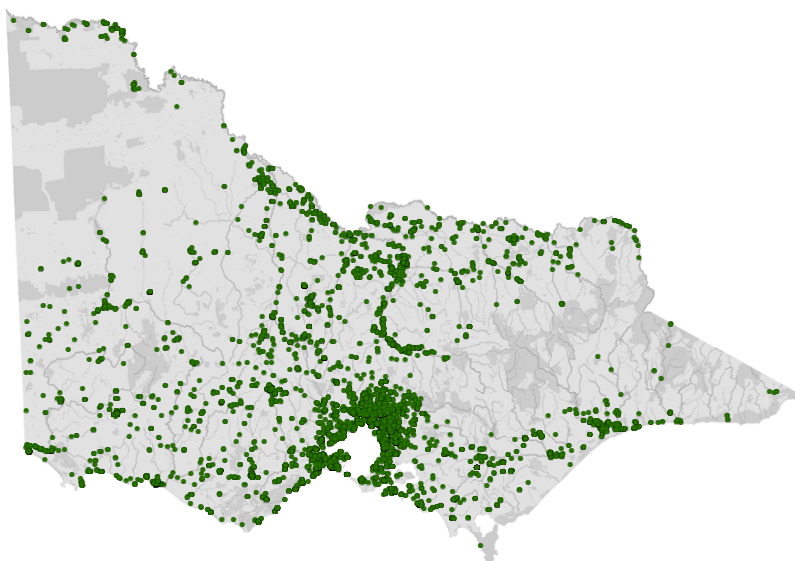
Dusky moorhen (*Gallinula tenebrosa*)

Photo credit: David Paul,  
Museums Victoria

## Distribution map



Data source: Victorian Biodiversity Atlas Jan 2023

[www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas](http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas)

|                              |  |
|------------------------------|--|
| <b>General appearance</b>    | Dusky brown with red frontal shield, thin bill with yellow tip and white patches on each side of the undertail   |
| <b>Conservation status*</b>  | Common   |
| <b>Adult morphometrics</b>   | Body weight: Male: 490–720 g. Female: 330–680 g<br>Head and body length: 350–400 mm<br>Wing chord: Male: 197–223 mm, Female: 189–213 mm<br>Tail length: Male: 64–82 mm, Female: 63–77 mm |
| <b>Habitat</b>               | Well-vegetated wetlands, farm dams, rivers with grassy banks, trees or scrub on banks  |
| <b>Home range</b>            | 0.1–0.3 ha   |
| <b>Natural activity peak</b> | Diurnal  |
| <b>Foraging style</b>        | Forages ashore and on water surface  |
| <b>Diet</b>                  | Aquatic plants, seeds, insects, molluscs   |
| <b>Movement</b>              | Non-migratory, dispersive  |
| <b>Social behaviour</b>      | Solitary   |
| <b>Nesting time</b>          | August–March   |

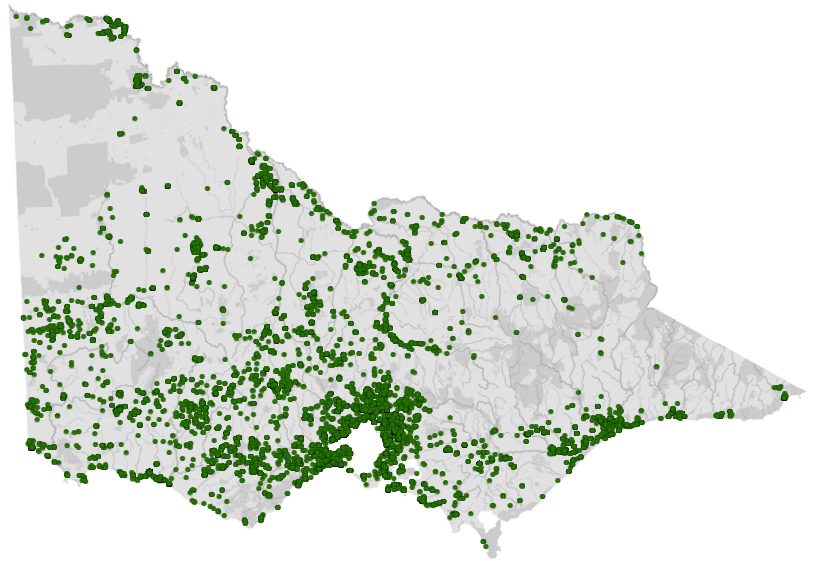
| Species          | Dusky moorhen ( <i>Gallinula tenebrosa</i> )           |
|------------------|--|
| Nest location    | In or near water in vegetation, on stump or low branch |
| Age at dispersal | 2 months   |
| Age at maturity  | 1–2 years  |

| Species | Eurasian coot ( <i>Fulica atra</i> ) |
|---------|--------------------------------------|
|---------|--------------------------------------|



Photo credit: David Paul, Museums Victoria


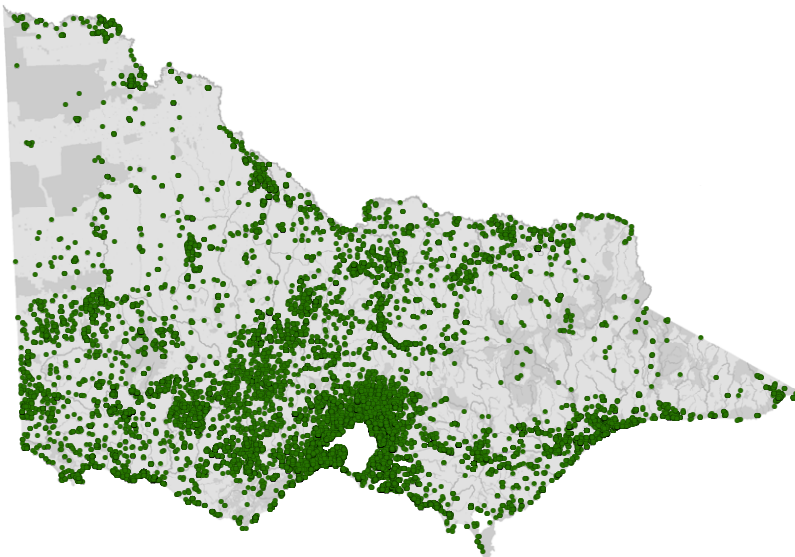
#### Distribution map



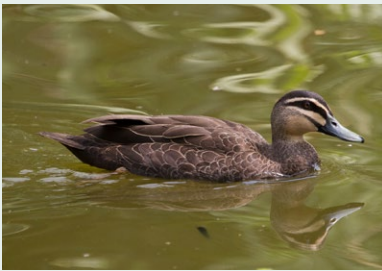
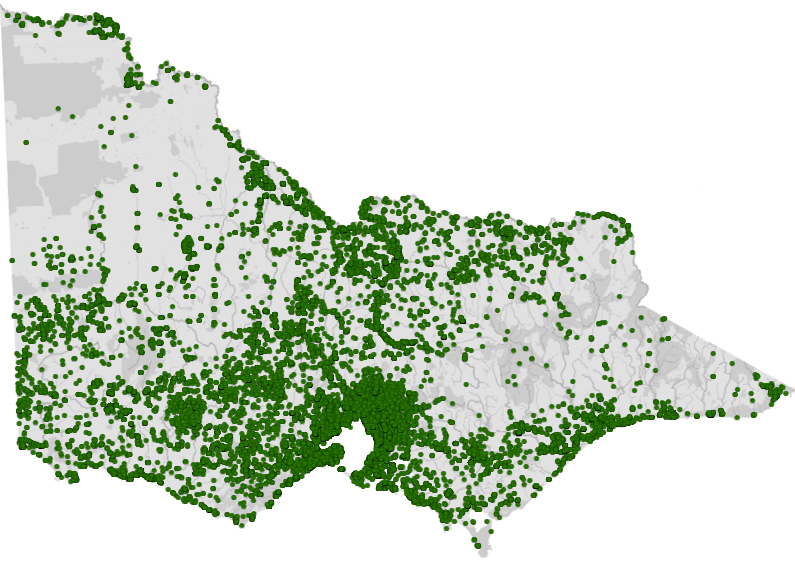
Data source: Victorian Biodiversity Atlas Jan 2023  
[www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas](http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas)

|                       |  |
|-----------------------|--|
| General appearance    | Black with white frontal shield and beak   |
| Conservation status*  | Common   |
| Adult morphometrics   | Body weight: Male: 480–660 g. Female: 470–610 g<br>Head and body length: 350–390 mm<br>Wing chord: Male: 173–194 mm, Female: 169–181 mm<br>Tail length: Male: 48–51 mm, Female: 44–53 mm |
| Habitat               | Large fresh or brackish waters with underwater vegetation, occasionally sheltered coastal inlets   |
| Home range            | Reported to travel up to a mean of 295 km with a standard deviation of 230 km  |
| Natural activity peak | Diurnal  |
| Foraging style        | Dives for plant food   |

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

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

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

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

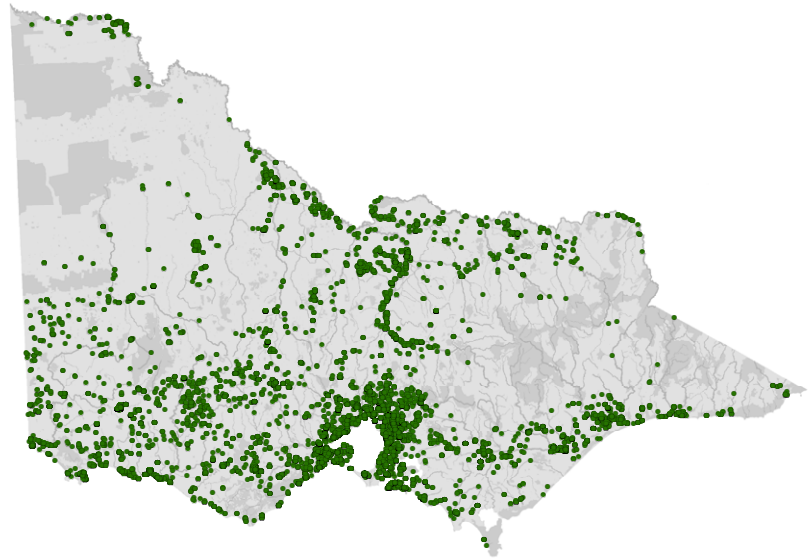
| Species               | Pacific black duck ( <i>Anas superciliosa</i> )  |
|-----------------------|--|
| Conservation status*  | Common   |
| Sexual dimorphism     | Male: Black crown, back and rump<br>Female: Crown, back and rump more brown than black   |
| Adult morphometrics   | Body weight: Male: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

## Species

Australasian Swamphen (*Porphyrio melanotus*)

Photo credit: Mark Norman,  
Museums Victoria

## Distribution map


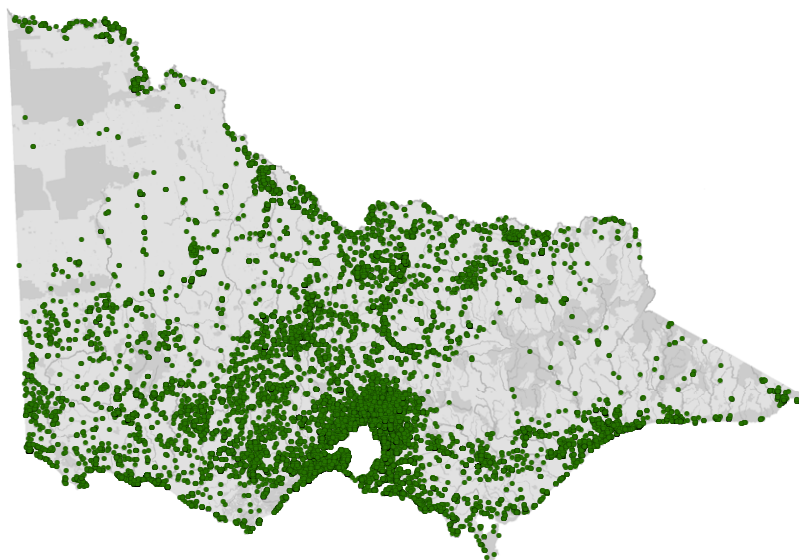


Data source: Victorian Biodiversity Atlas Jan 2023  
[www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas](http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas)

|                              |  |
|------------------------------|--|
| <b>General appearance</b>    | Blue or purple breast and red frontal shield and bill  |
| <b>Conservation status*</b>  | Common   |
| <b>Adult morphometrics</b>   | Body weight: Male: 780–1300 g. Female: 680–1250 g<br>Head and body length: 440–480 mm<br>Wing chord: Male: 267–291 mm. Female: 262–285 mm<br>Tail length: Male: 95–109 mm. Female: 95–105 mm |
| <b>Habitat</b>               | Margins of swamps, lakes, shallow rivers with dense vegetation, urban watercourses   |
| <b>Home range</b>            | 0.7–3.0 ha   |
| <b>Natural activity peak</b> | Diurnal  |
| <b>Foraging style</b>        | Scavenges dead birds, fish   |
| <b>Diet</b>                  | Aquatic plants, seeds, insects, molluscs   |
| <b>Movement</b>              | Non-migratory, dispersive  |
| <b>Social behaviour</b>      | Solitary   |


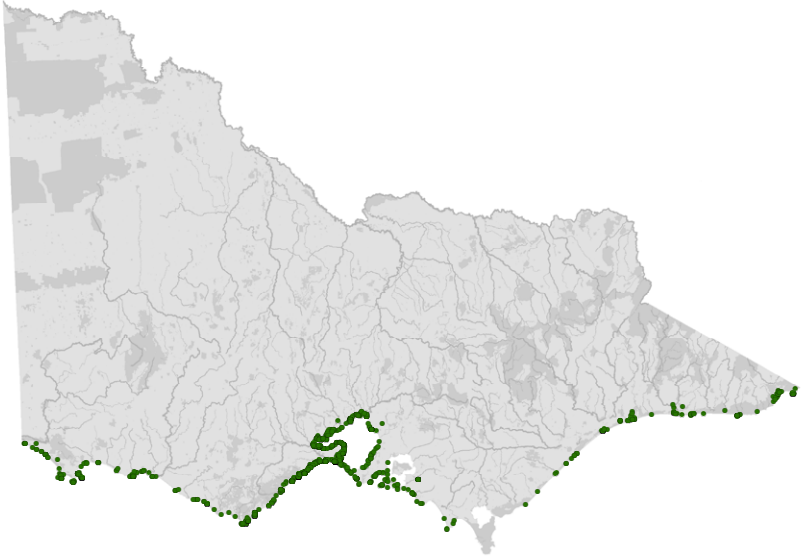


| Species          | Australasian Swamphen ( <i>Porphyrio melanotus</i> ) |
|------------------|--|
| Nesting time     | July–December  |
| Nest location    | On trampled-down vegetation                          |
| Age at dispersal | 2 months   |
| Age at maturity  | 1–2 years  |


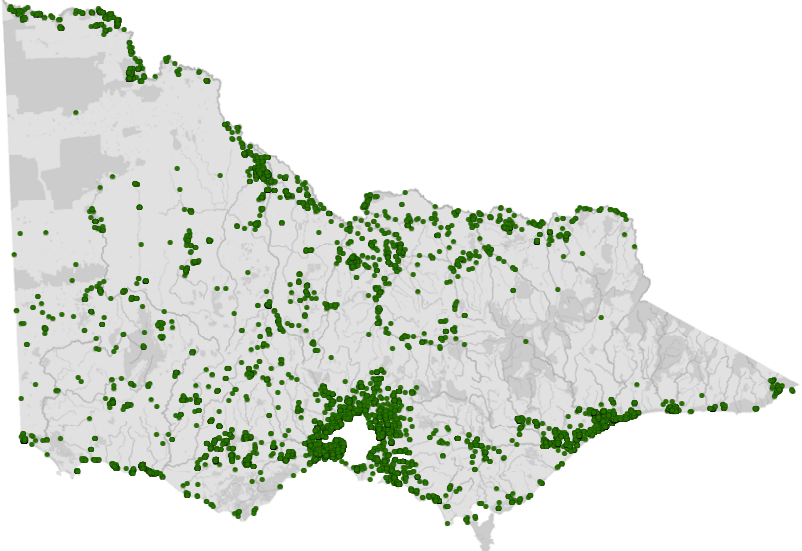
| Species   | White-faced heron ( <i>Egretta novaehollandiae</i> )   |
|---|--|
|  <p>Photo credit: Mark Norman, Museums Victoria</p> | <p><b>Distribution map</b></p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023<br/> <a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-b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

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


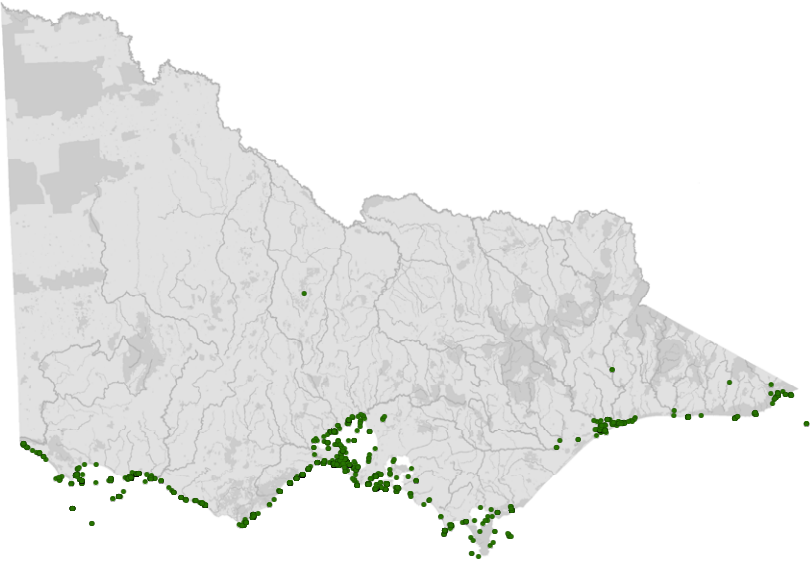
**Table 3.2** Species profiles: Marine birds

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


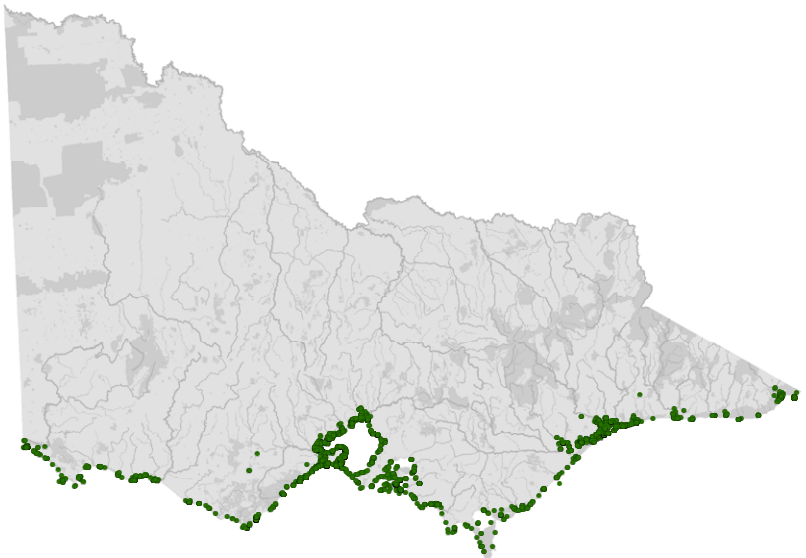
| Species               | Australasian gannet ( <i>Morus serrator</i> )   |
|-----------------------|---|
| Adult morphometrics   | Body weight: 2000–2600 g<br>Head and body length: 840–910 mm<br>Wing chord: Male: 400–485 mm. Female: 455–480 mm<br>Tail length: Male: 203–228 mm. Female: 200–230 mm |
|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

| Species  | Australian pelican ( <i>Pelecanus conspicillatus</i> )   |
|--|--|
|  <p data-bbox="204 920 544 969">Photo credit: Tracey-Ann Hooley, Museums Victoria</p> | <p data-bbox="635 324 847 353">Distribution map</p>  <p data-bbox="635 947 1361 996">Data source: Victorian Biodiversity Atlas Jan 2023<br/><a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</a></p> |
| <b>General appearance</b>  | Large predominantly white bird with black feathers along the back, tail and wings. Enormous bill and pouch   |
| <b>Conservation status*</b>  | Common   |
| <b>Adult morphometrics</b>   | <p data-bbox="635 1216 1326 1245">Body weight: Male: 6000–8000 g. Female: 3000–6000 g</p> <p data-bbox="635 1263 1110 1292">Head and body length: 1600–1800 mm</p> <p data-bbox="635 1310 1294 1339">Wing chord: Male: 560–690 mm. Female: 541–605 mm</p> <p data-bbox="635 1357 1251 1386">Tail length: Male: 154–225 mm. Female: 147–182 mm</p>  |
| <b>Habitat</b>   | Large shallow waters, coastal and inland, occasionally open sea, islands, mudflats   |
| <b>Feeding range</b>   | Up to several hundred kilometres   |
| <b>Natural activity peak</b>   | Diurnal  |
| <b>Foraging style</b>  | Singly prey stealthily on fish, groups encircle fish, plunge heads in unison   |
| <b>Diet</b>  | Fish, crustaceans  |
| <b>Movement</b>  | Dispersive, highly nomadic   |
| <b>Social behaviour</b>  | Communal   |


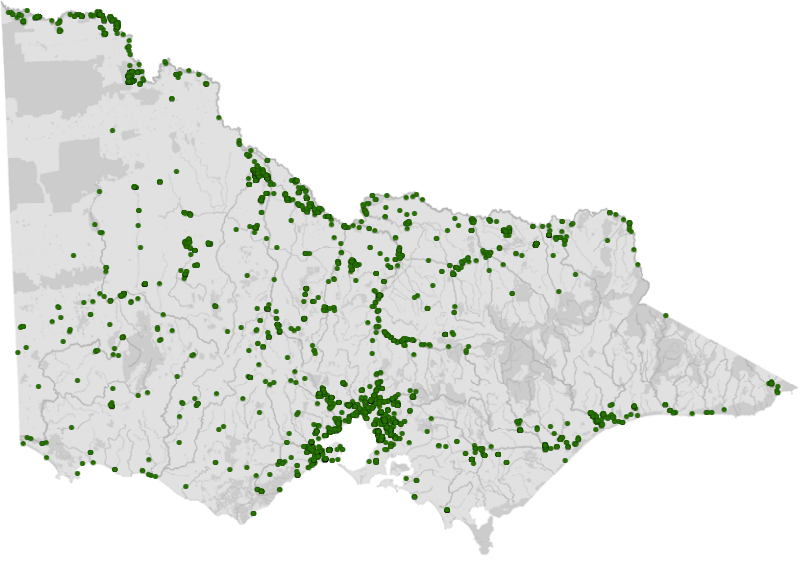
| Species          | Australian pelican ( <i>Pelecanus conspicillatus</i> )  |
|------------------|---|
| Nesting time     | Almost year round, mostly August to November  |
| Nest location    | In small to very large colonies, usually on bare islands; occasionally in vegetation over water   |
| Age at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

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

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


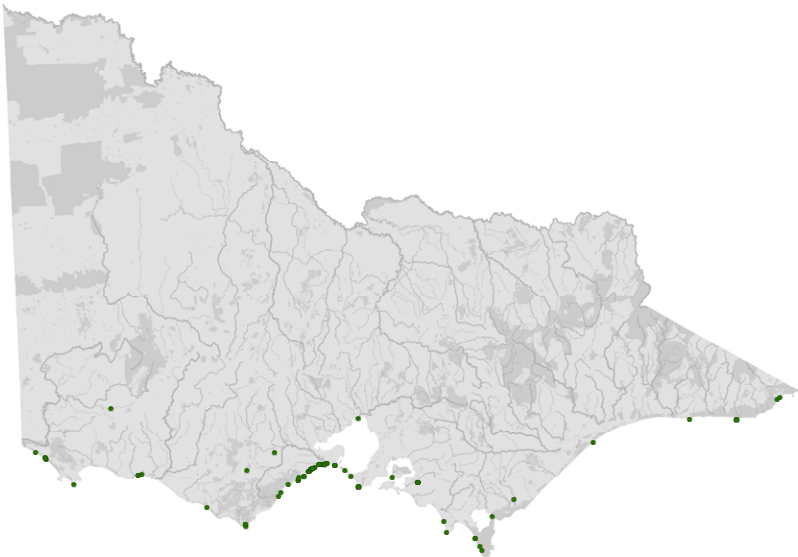
| Species   | Crested tern ( <i>Thalasseus bergii</i> )  |
|---|--|
|  <p>Photo credit: Rodney Start, Museums Victoria</p> | <p>Distribution map</p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023<br/> <a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas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

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

| Species   | Darter ( <i>Anhinga novaehollandiae</i> )  |
|---|--|
|  <p data-bbox="204 801 494 862">Photo credit: Tiffany Garvie, Museums Victoria</p> | <p data-bbox="635 320 849 353"><b>Distribution map</b></p>  <p data-bbox="635 945 1364 1003">Data source: Victorian Biodiversity Atlas Jan 2023<br/><a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</a></p> |
| <b>General appearance</b>   | Large black or greyish-brown bird with a long thin neck and pale streaks on the wing   |
| <b>Conservation status*</b>   | Common   |
| <b>Sexual dimorphism</b>  | <p data-bbox="635 1209 1412 1317">Male: Head and neck brownish black. Upper wings and back glossy black with prominent white central streaks and spots on the wing coverts. Tail black</p> <p data-bbox="635 1332 1396 1400">Female: Head, neck and body grey-brown with the same wing markings as the male</p>  |
| <b>Adult morphometrics</b>  | <p data-bbox="635 1438 1268 1471">Body weight: Male: 1200–2100 g. Female: 900–2600</p> <p data-bbox="635 1487 1093 1520">Head and body length: 860–940 mm</p> <p data-bbox="635 1536 1292 1570">Wing chord: Male: 329–373 mm. Female: 304–375 mm</p> <p data-bbox="635 1585 1260 1619">Tail length: Male: 183–240 mm. Female: 177–238 mm</p>   |
| <b>Habitat</b>  | Larger shallow waters, fresh and salt, seldom open sea   |
| <b>Home range</b>   | Prefers nesting in wetlands >100 ha. Disperses during non-breeding season up to 2,000 km   |
| <b>Natural activity peak</b>  | Diurnal  |
| <b>Foraging style</b>   | Diving   |




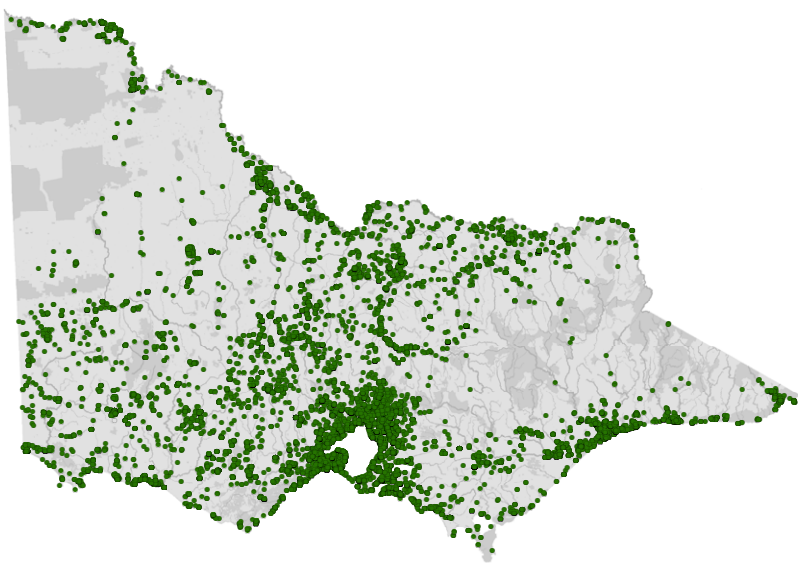
| Species          | Darter ( <i>Anhinga novaehollandiae</i> )                |
|------------------|--|
| Diet             | Fish, squid, insect larvae, crustaceans                  |
| Movement         | Moves coastward in summer                                |
| Social behaviour | Solitary   |
| Nesting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

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

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

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

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

| Species   | Little pied cormorant ( <i>Microcarbo melanoleucos</i> )   |
|---|--|
|  <p>Photo credit: David Paul, Museums Victoria</p> | <p><b>Distribution map</b></p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023<br/><a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</a></p> |

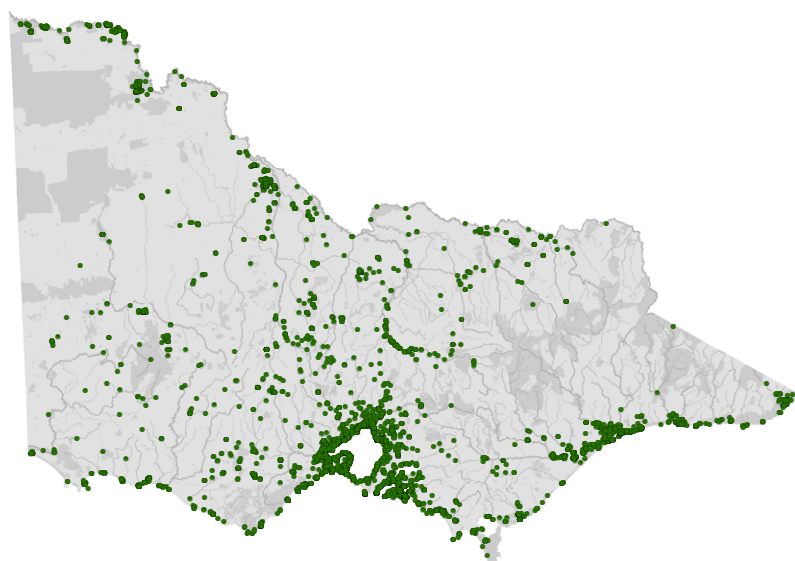
| Species               | Little pied cormorant ( <i>Microcarbo melanoleucos</i> )   |
|-----------------------|--|
| General appearance    | Small black and white cormorant with yellow bill   |
| Conservation status*  | Common   |
| Adult morphometrics   | Body weight: Male: 700–900 g. Female: 400–900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

## Species

Great pied cormorant (*Phalacrocorax varius*)

Photo credit: David Paul,  
Museums Victoria

## Distribution map




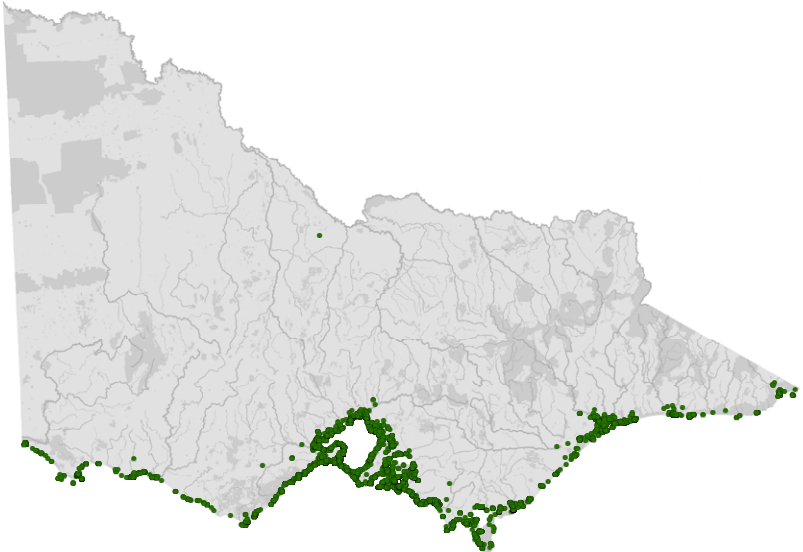
Data source: Victorian Biodiversity Atlas Jan 2023

[www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas](http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas)



|                              |  |
|------------------------------|--|
| <b>General appearance</b>    | Large black and white cormorant with an orange and yellow face   |
| <b>Conservation status*</b>  | Common   |
| <b>Adult morphometrics</b>   | Body weight: Male: 1500–2200 g. Female: 1000–1900 g<br>Head and body length: 650–850 mm<br>Wing chord: Male: 287–356 mm. Female: 277–353 mm<br>Tail length: Male: 128–170 mm. Female: 102–162 mm |
| <b>Habitat</b>               | Coastal waters with sloping shorelines, large inland lakes and rivers  |
| <b>Feeding range</b>         | Usually within 100–300 m of shore but has been recorded feeding up to 5 km from shore  |
| <b>Natural activity peak</b> | Diurnal  |
| <b>Foraging style</b>        | Diving   |
| <b>Diet</b>                  | Fish, squid, insect larvae, crustaceans  |
| <b>Movement</b>              | Non-migratory and nomadic  |
| <b>Social behaviour</b>      | Solitary   |
| <b>Nesting time</b>          | All seasons  |
| <b>Nest location</b>         | In colonies on ground on islands, mangroves, trees over water, navigation structures   |

| Species          |  | Great pied cormorant ( <i>Phalacrocorax varius</i> ) |
|------------------|--|--|
| Age at dispersal |  | 4–5 months   |
| Age at maturity  |  | 2–3 years  |


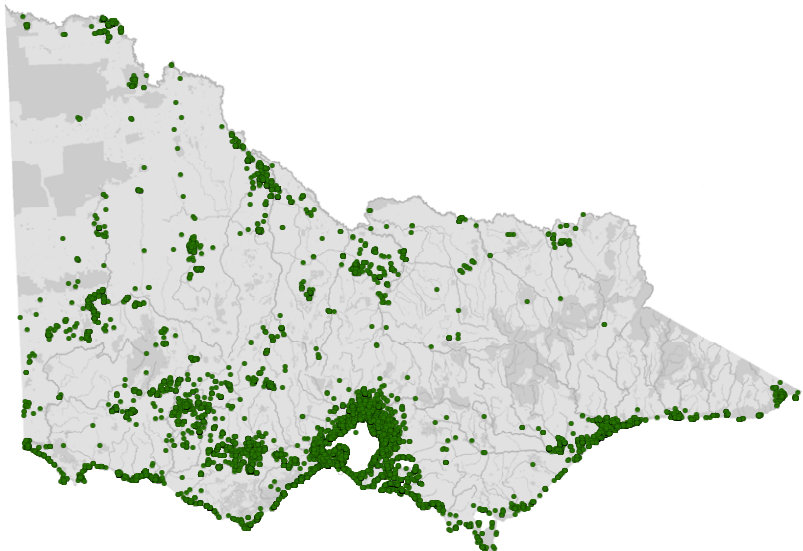
  

| Species  |   | Pacific gull ( <i>Larus pacificus</i> )  |
|--|---|--|
|  <p>Photo credit: Mark Norman, Museums Victoria</p> | <b>Distribution map</b>  <p>Data source: Victorian Biodiversity Atlas Jan 2023<br/> <a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atl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

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

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

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

| Species  | Silver gull ( <i>Chroicocephalus novaehollandiae</i> )   |
|--|--|
|  <p>Photo credit: Tracey-Ann Hooley, Museums Victoria</p> | <p><b>Distribution map</b></p>  <p>Data source: Victorian Biodiversity Atlas Jan 2023<br/><a href="http://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas">www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas</a></p> |



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

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

## 3.3 Animal and human safety considerations



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

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

### 3.3.1. Human safety considerations

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

### 3.3.2. Animal safety considerations

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

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



Photo credit: Zoos Victoria

## 3.4 Capture, restraint, and transport



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

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

### 3.4.1. Visual observations

Visual observations of wildlife should be conducted prior to any attempts to capture the animal. This is just as important prior to the first capture from the wild as it is before any capture conducted while an animal is in captive care. Observations should be conducted quietly, by one person, and from a distance which provides a clear view of the animal with as little disturbance

as possible. Visual observation should focus on the animal's demeanour, behaviour, movement and posture. Check for evidence of injury/ severe disease or deterioration and assess their breathing as demonstrated in the following table.

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

**Table 3.3** Visual health observations in marine birds and waterbirds

| What to look for     |  |
|----------------------|--|
| Demeanour            | <ul style="list-style-type: none"> <li>Bright, alert</li> <li>Responds to humans with threat display or attempts to escape</li> <li>Avoids capture</li> </ul>  |
| Behaviour            | <ul style="list-style-type: none"> <li>Interested in its surroundings and any food that is offered</li> <li>Preens</li> </ul>  |
| Movement and posture | <ul style="list-style-type: none"> <li>Stands and/or perches on both legs. Some species may stand on one leg from time to time, reinforcing the need for time spent observing</li> <li>Wings are held against the body and do not droop. Some species will spread wings to air dry, specific species knowledge is important</li> <li>Head is in a normal position</li> </ul> |
| Breathing            | <ul style="list-style-type: none"> <li>Regular pattern</li> <li>No open mouth or noisy breathing (birds may open mouth breathe when hot or stressed)</li> </ul>  |

### 3.4.2. Equipment

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

#### Personal protective equipment (PPE) includes:

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

#### Other equipment includes:

- **Sheets or towels** to restrain birds during capture and transportation. These are preferable to blankets which may cause overheating.
- **Nets** to capture or trap waterbirds. Net gauge must be appropriate for the species.
- **Long-handled fishing nets** to catch marine birds.
- **A transport container** of a size suitable for the bird species. The bird must be able to stand, stretch its neck and turn around. Enclosure length should be no less than 20 per cent longer than the bird and no more than twice the length of the bird. The width should be 50 per cent of the minimum length.
  - Plastic dog carry cages can be used to transport larger waterbirds.
  - Soft sided pet packs can be used to minimise feather damage (**Figure 3.3**).
  - Adequately ventilated cardboard boxes are suitable for smaller species.
- Ensure adequate ventilation around the enclosure. Do not stack multiple enclosures as this may block the ventilation holes.
- Be mindful of temperature during transport. Water birds have insulated feathers and can be prone to overheating.

- If using dog carriers with a metal grid door, a covering over the mesh on the inside (for example shade cloth) is useful to prevent trauma or parts of the bird becoming tangled.
- Rubber matting can be used as flooring during transport. Towels placed over the matting provide a surface that allows the bird to grip the towel with its nails and thus stand firmly. Newspaper becomes slippery when wet with urine and faeces and its use during transport should be avoided. It is important to prevent the bird from having its toes protrude through the bottom of the transport container as this can result in injuries.

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



Photo credit: Zoos Victoria

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



Photo credit: Zoos Victoria

### 3.4.3. Technique

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

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

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

#### Restraint of little penguins

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

#### Restraint of small birds: shearwaters, prions, ducks

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

#### Restraint of large birds: gannets, pelicans

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

**Figure 3.5** Manual restraint of a black swan.



Photo credit: Zoos Victoria

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

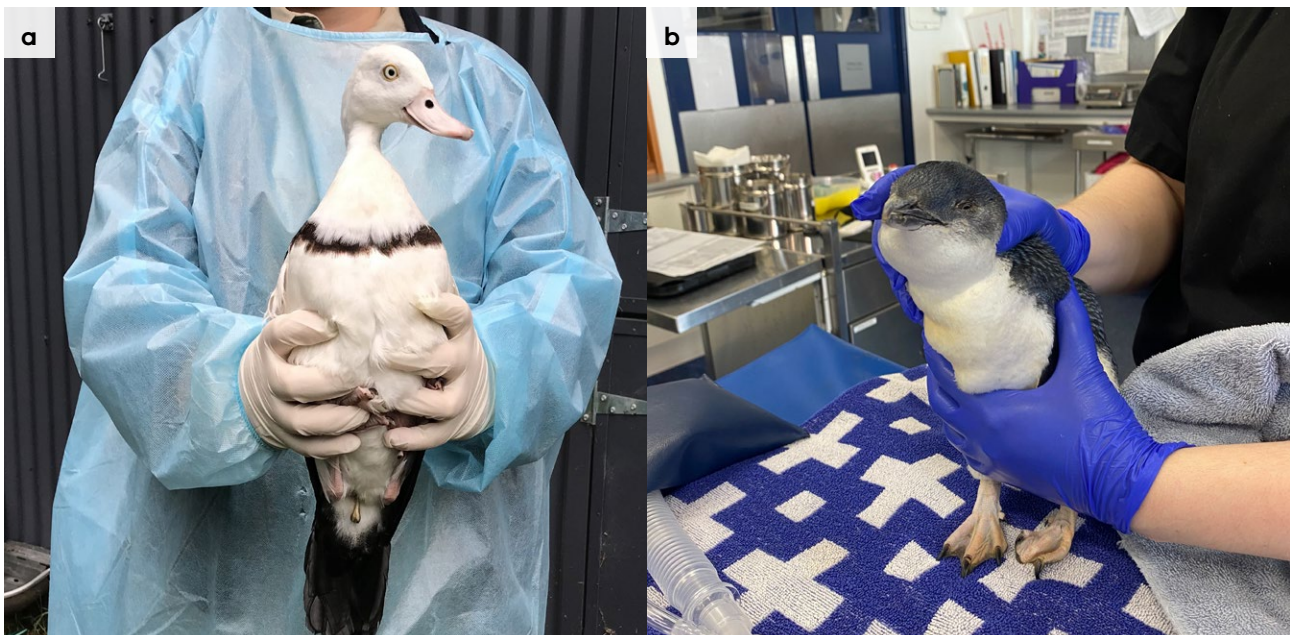


Photo credit: Zoos Victoria

### Mother duck and young in suburbia

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

### Entanglement

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

### 'Stranded' on beach

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

### 3.4.4. Transport

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

## 3.5 Monitoring animal health and welfare



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

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

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

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

### 3.5.1. Physical examination

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

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

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



**Species specific considerations:**

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

**Table 3.4 Physical examination of waterbirds and marine birds**

| What to look for        |   |
|-------------------------|---|
| <b>Body weight</b>      | <ul style="list-style-type: none"> <li>• Record body weight on arrival and at least weekly while in care.</li> <li>• 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.</li> </ul>  |
| <b>Body condition</b>   | <p>Body condition of the bird can be scored by palpating the amount of muscle over the keel. For some bird species, such as ibis and herons, this is not as useful as it is normal for the birds to have prominent keel bones.</p> <ul style="list-style-type: none"> <li>• <b>Under condition:</b> The keel bone is easily felt and the pectoral muscles are concave.</li> <li>• <b>Ideal condition:</b> The keel bone can be felt and the pectoral muscles are rounded.</li> <li>• <b>Over condition:</b> Difficult to feel the keel bone as the pectoral muscles rise above it.</li> </ul> |
| <b>Hydration status</b> | <ul style="list-style-type: none"> <li>• Skin in featherless areas returns to normal position in less than 1 second, when pinched.</li> <li>• Skin slides easily across the pectoral muscles.</li> <li>• 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.</li> </ul>   |

| What to look for |  |
|------------------|--|
| <b>Eyes</b>      | <ul style="list-style-type: none"> <li>• Normal eyes should both be open, shiny and clear, with no discharge.</li> <li>• Basic internal structures of eyes (e.g. pupil, iris) appear symmetrical.</li> </ul>   |
| <b>Beak/Bill</b> | <ul style="list-style-type: none"> <li>• Normal shape for the species.</li> <li>• Not overgrown, flaky or fractured.</li> <li>• Able to close normally.</li> <li>• Upper and lower beak align when closed.</li> <li>• No evidence of netting or fishing line.</li> </ul>   |
| <b>Mouth</b>     | <ul style="list-style-type: none"> <li>• Normal colouration for the species.</li> <li>• No blood present.</li> <li>• No evidence of foreign materials or fishing line.</li> <li>• No discharge.</li> </ul>   |
| <b>Nostrils</b>  | <ul style="list-style-type: none"> <li>• Clean and clear.</li> <li>• No discharge, for example blood.</li> <li>• Salt crystals may be seen in pelagic species.</li> </ul>  |
| <b>Skin</b>      | <ul style="list-style-type: none"> <li>• Not dry, flaky or cut/injured.</li> <li>• No bruising.</li> </ul>   |
| <b>Feathers</b>  | <ul style="list-style-type: none"> <li>• Free from parasites.</li> <li>• Clean, sleek, shiny.</li> <li>• Waterproofing intact.</li> <li>• Not damaged, broken or missing.</li> <li>• Preen gland present on upper side of the base of the tail feather in many species.</li> <li>• No oil or other foreign substances present.</li> <li>• Evidence of moulting.</li> </ul> |
| <b>Legs</b>      | <ul style="list-style-type: none"> <li>• Legs appear symmetrical and are not deviated.</li> <li>• Animal can stand normally.</li> <li>• Animal can grip with both feet normally.</li> <li>• No wounds, swelling or exposed bone or muscle present.</li> <li>• No fishing line present.</li> </ul>  |
| <b>Feet</b>      | <ul style="list-style-type: none"> <li>• Bottom surface of foot is smooth and intact, with no evidence of wounds or disease.</li> <li>• No wounds, redness, swelling or ulceration.</li> <li>• Nails not broken or missing.</li> </ul>   |

### What to look for

|                          |  |
|--------------------------|--|
| <b>Wings</b>             | <ul style="list-style-type: none"> <li>• Capable of flight.</li> <li>• Able to manually extend wings fully without resistance, each wing extends equally.</li> <li>• No wounds, swelling, bruising or exposed bone or muscle present.</li> </ul> |
| <b>Sex determination</b> | <ul style="list-style-type: none"> <li>• Plumage colour may vary between the sexes of some bird species.</li> <li>• Body weight/size may vary between the sexes (See <b>Table 3.1</b> and <b>Table 3.2</b>).</li> </ul>                          |

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

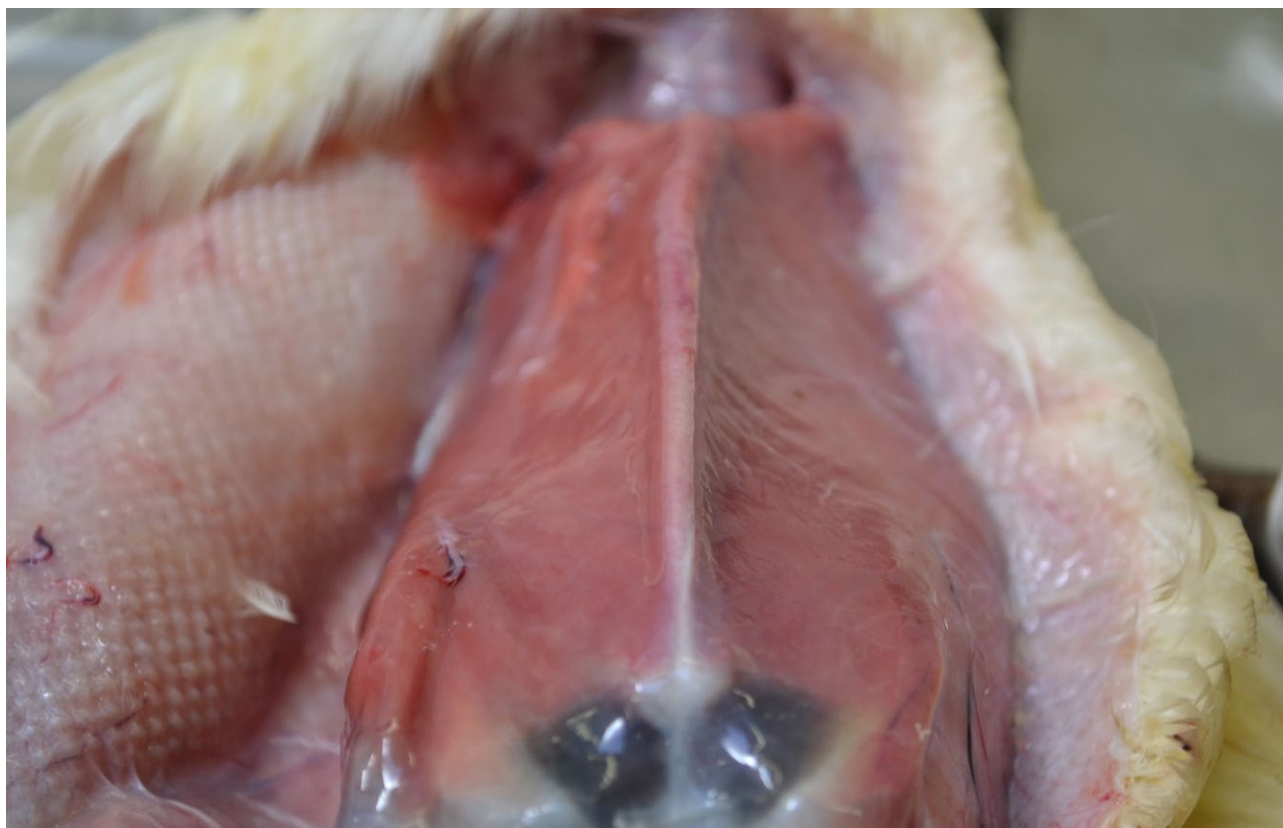


Photo credit: Zoos Victoria

### 3.5.2. Ongoing monitoring of health and welfare

The aim of wildlife rehabilitation is to ensure animals recover and can be released back to the wild as quickly as possible. Careful, daily monitoring is required to ensure that animals are responding as expected to the treatment being provided and so that any deterioration or welfare concerns can be identified and addressed as

soon as possible. Rehabilitators should ensure that record-keeping is a priority to maximise positive welfare outcomes. Templates to assist wildlife rehabilitators to record and monitor wildlife health and welfare can be found in the appendices to Part A of these guidelines. These records will be valuable tools to share with veterinarians to support decision-making.

The following is recorded daily:

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

The following is recorded weekly:

- weight
- body condition.

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

#### Species specific considerations:

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

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

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

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

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

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

| Injury or clinical signs   | Possible causes  | Carer observations and response  |
|--|--|--|
| <p>Note: Do not provide pain relief or other medication, including antibiotics, unless under veterinary guidance and supervision, as these can have severe side effects, particularly in dehydrated/shocked animals. Use of antibiotics when not indicated can contribute to antimicrobial resistance and reduced drug efficacy.</p> |  |  |
| <p>Unable to fly normally</p> <p>Drooping wing</p> <p>Swollen wing</p> <p>Bruising over wing</p> <p>Fractures</p> <p>Dislocation</p>   | <p>Found adjacent to road/suspect motor vehicle accident, boat strike</p> <p>Window strike</p> <p>Caught in wire, fishing line or netting</p> <p>Fish hook injury</p> <p>Predation injury caused by raptor, fox, cat or dog</p> <p>Gunshot</p> | <ul style="list-style-type: none"> <li>• <b>Seek urgent veterinary attention.</b> Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding.</li> <li>• Place the bird in a small transport box to restrict movement.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• Euthanasia may be required for the welfare of the animal.</li> <li>• Give prescribed medication.</li> <li>• Birds with wing injuries will need initial confinement.</li> <li>• The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care.</li> <li>• Once the fracture has healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to pre-release section for more detail).</li> <li>• Ensuring feather water proofing is also an important pre-release marine and water birds.</li> </ul> |

| Injury or clinical signs  | Possible causes  | Carer observations and response  |
|---|--|--|
| <p>Unable to stand normally</p> <p>Swollen leg, foot or toe</p> <p>Bruising over leg</p> <p>Wounds present</p> <p>Nail injuries</p> <p>Fractures</p> <p>Dislocation</p> <p>Hip injury</p>                                       | <p>Found adjacent to road/suspect motor vehicle accident, boat strike</p> <p>Window strike</p> <p>Caught in wire, fishing line or netting</p> <p>Fish hook injury</p> <p>Predation injury caused by raptor, fox, cat or dog</p> <p>Gunshot</p> | <ul style="list-style-type: none"> <li>• <b>Seek urgent veterinary attention.</b> Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding.</li> <li>• Place the bird in a small transport box to restrict movement.</li> <li>• 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.</li> <li>• Euthanasia may be required for the welfare of the animal.</li> <li>• Give prescribed medication.</li> <li>• Birds with leg injuries will need initial confinement, and perhaps modified/low perching.</li> <li>• The animal should be reassessed throughout rehabilitation to ensure healing is progressing as expected and is tolerating the time in care.</li> <li>• Once the injury is healed, fitness is regained by slowly increasing the amount of flight exercise that the bird receives over one to two weeks (refer to pre-release section for more detail).</li> </ul> |
| <p>Head trauma</p> <p>Eye injuries/blood in eye</p> <p>Eyelid swelling</p> <p>Beak injuries</p> <p>Blood in mouth</p> <p>Lethargy, sleepy</p> <p>Response to stimulus slow</p> <p>Head hanging down</p> <p>Fluffed feathers</p> | <p>Found adjacent to road/suspect motor vehicle accident, boat strike</p> <p>Window strike</p> <p>Caught in wire, fishing line or netting</p> <p>Fish hook injury</p> <p>Predation injury caused by raptor, fox, cat or dog</p> <p>Gunshot</p> | <ul style="list-style-type: none"> <li>• <b>Seek urgent veterinary attention.</b> Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding.</li> <li>• Place the bird in a small transport box to restrict movement.</li> <li>• 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.</li> </ul>   |

| Injury or clinical signs                               | Possible causes  | Carer observations and response   |
|--|--|---|
| <p>Bleeding</p> <p>Puncture wounds</p> <p>Bruising</p> | <p>Found adjacent to road/suspect motor vehicle accident, boat strike</p> <p>Window strike</p> <p>Caught in wire, fishing line or netting</p> <p>Fish hook injury</p> <p>Predation injury caused by raptor, fox, cat or dog</p> <p>Gunshot</p> | <ul style="list-style-type: none"> <li>• <b>Seek urgent veterinary attention.</b> Do not delay transfer to a veterinarian to apply first aid, other than to stop excessive bleeding.</li> <li>• Place the bird in a small transport box to restrict movement.</li> <li>• 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.</li> <li>• Euthanasia may be required for the welfare of the animal.</li> <li>• Give prescribed medication.</li> <li>• 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.</li> </ul>   |
| <p>Poor body condition</p> <p>Emaciation</p>           | <p>Undetermined disease process</p> <p>Failure to thrive</p> <p>Old injury present such as a fracture</p>  | <ul style="list-style-type: none"> <li>• <b>Assessment by a veterinarian is required to determine if there is a disease present and assess for other injuries such as old fractures.</b> Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A Chapter 4 Biosecurity &amp; Hygiene.</li> <li>• Generally, animals presenting in poor body condition have likely been suffering for some time and prognosis is poor.</li> <li>• Wild population health should be a consideration when determining the animal as a candidate for rehabilitation.</li> <li>• Shelter biosecurity practices should also be considered.</li> <li>• The degree of condition loss can determine whether the animal is a candidate for rehabilitation.</li> <li>• Where a disease is suspected, anything coming in contact with the infected or suspect bird should be discarded or disinfected. See <b>3.6.2. Enclosure hygiene and biosecurity</b>. As a precaution, wear gloves and a face mask to avoid inhaling any aerosols.</li> </ul> |

| Injury or clinical signs  | Possible causes   | Carer observations and response  |
|---|---|--|
| <p>Poor body condition</p> <p>Emaciation</p> <p>Respiratory signs</p> <p>Open mouth breathing</p> <p>Raspy breathing</p> <p>Gurgly breathing</p> <p>Discharge from eyes</p> <p>Discharge from nares</p> | <p>Undetermined disease process</p> <p>Aspergillosis</p> <p>Avian influenza</p> | <ul style="list-style-type: none"> <li>• <b>Assessment by a veterinarian is required to determine if there is a disease present.</b> The veterinarian will prescribe treatment if indicated.</li> <li>• Euthanasia may be required for the welfare of the animal.</li> <li>• Wild population health should be a consideration when determining the animal as a candidate for rehabilitation.</li> <li>• Shelter biosecurity practices should also be considered if treatment is indicated.</li> <li>• Carers should consider the risks of zoonotic disease and act accordingly, refer to Part A Chapter 4 Biosecurity &amp; Hygiene.</li> <li>• Where a disease is suspected anything coming in contact with the infected or suspect bird should be discarded or disinfected using bleach, Virkon S or F10 SC at the recommended concentration and contact time. Virkon S and bleach must be rinsed following disinfection.</li> <li>• As a precaution, wear gloves and a face mask to avoid inhaling any aerosols.</li> </ul>                                 |
| <p>Little penguin in poor body condition with fluffy feathers and old ragged feathers that appear grey or brown instead of blue. See <a href="#">Figure 3.8</a>.</p>                                    | <p>Normal moult</p> <p>Failure to moult</p>                                     | <ul style="list-style-type: none"> <li>• <b>Seek veterinary assessment.</b></li> <li>• Penguins replace all their feathers over a 17-day period between February and May and may lose up to 50% of their body weight.</li> <li>• Do not intervene unless the penguin is obviously injured or appears listless.</li> <li>• If the penguin appears obviously unwell, seek advice from Zoos Victoria's Marine Response Unit or contact the Phillip Island Nature Park, as affected birds often have underlying disease resulting in a failure to moult properly.</li> <li>• Following veterinary assessment and rehydration, assisted-feeding may be required (see <a href="#">Section 3.7.2</a>). Penguins with feather loss/mid moult may benefit from some supplemental heat, e.g. the opportunity to use a heat lamp. Care should be taken to ensure the animal can move away from the heat source when required.</li> <li>• The penguin is ready for release when it weighs at least 1 kg, the moult is complete and the feathers are waterproof.</li> </ul> |



| Injury or clinical signs  | Possible causes   | Carer observations and response   |
|---|---|---|
| <p>Shearwaters that are weak, emaciated and found on the beach</p>                                  | <p>Extreme weather event</p> <p>Storms</p> <p>High winds</p> <p>Insufficient food supplies</p> <p>Juveniles</p> <p>Aged birds</p> | <ul style="list-style-type: none"> <li>• <b>Seek advice and support from Zoos Victoria's Marine Response Unit or Phillip Island Nature Park.</b></li> <li>• Birds should be urgently assessed by a veterinarian, who will provide instructions regarding possible treatment, hydration and feeding.</li> <li>• Natural migratory event occurs between September and December.</li> <li>• Some aged or juvenile birds will fail to migrate.</li> <li>• Insufficient food, or weather extremes can interfere with migration.</li> <li>• Birds may be blown off course, become disoriented, exhausted and end up in areas where they cannot gain adequate lift to fly back on course.</li> <li>• Shearwaters assessed as being in poor body condition, and not responding rapidly to supportive care must be euthanised.</li> <li>• Shearwaters assessed and healthy must be returned to the wild as soon as possible (within 2–3 days) as they will lose fitness and become stressed in captivity.</li> </ul> |
| <p>Fishing line wrapped around legs or wings or coming out of the bird's mouth. See Figure 3.9.</p> | <p>Fishing hook and/or line ingestion and/or entanglement</p>   | <ul style="list-style-type: none"> <li>• <b>Seek veterinary attention.</b></li> <li>• Do not cut line that is hanging out of the mouth as this can be used to assist in retrieval of the hook.</li> <li>• If the line coming out of the mouth is short, use a small piece of masking tape to fix the line to the side of bird's head/neck area. During the stress of restraint/transport they often instinctively swallow any hanging line.</li> <li>• Do not attempt to remove hooks if they have penetrated the skin, as anaesthesia will be required.</li> <li>• X-rays must be taken to determine the true internal location of fishing hooks. There also may be more than one hook. Surgical intervention to safely remove it may be required.</li> </ul>  |

| Injury or clinical signs   | Possible causes                  | Carer observations and response  |
|--|----------------------------------|--|
| <p>Lethargy</p> <p>Regurgitation</p> <p>Green diarrhoea</p> <p>Convulsions</p> <p>Head tremors</p> <p>Ataxia</p> <p>Inability to stand and/or wings dragging on the ground. See Figure 3.10.</p> | Heavy metal poisoning            | <ul style="list-style-type: none"> <li>• <b>Seek veterinary attention as medical treatment will be required.</b></li> <li>• Heavy metals that are commonly ingested include lead, zinc and occasionally copper.</li> <li>• Waterbirds that dabble on the floor of waterways may gain access to lead shot that has been deposited in the sediment layers. It is not permitted to use lead shot for recreational hunting in Victoria, however many tonnes are still present in the sediment of waterways.</li> <li>• Marine birds can eat lead sinkers when they take bait and tackle.</li> <li>• Only metal in the gut (not the muscles) of a bird will cause heavy metal poisoning.</li> <li>• Provide supportive care, with towelling placed around the bird to keep it upright. Assist feed if necessary.</li> </ul> |
| <p>Lethargy</p> <p>Ataxia</p> <p>Inability to stand and/or wings dragging on the ground</p>  | Botulism                         | <ul style="list-style-type: none"> <li>• <b>Seek veterinary attention.</b></li> <li>• Clinical signs are similar to heavy metal poisoning.</li> <li>• Caused by a toxin produced by the bacterium, <i>Clostridium botulinum</i>. Conditions that favour botulism include warm weather, water temperature above 29°C, and the presence of dead animals (such as fish) or vegetation on the edge of the waterway. Susceptible birds consume the toxin when they eat insects or carrion that contains the toxin. The deaths of these birds perpetuate the cycle as maggots, which are resistant to the effects of the toxin and concentrate it, build up and poison new birds that feed on them.</li> <li>• There is no cure and only supportive treatment can be offered.</li> </ul>                                     |
| <p>Weakness</p> <p>Paralysis</p> <p>Convulsions</p> <p>Death</p>   | Thiamine (vitamin B1) deficiency | <ul style="list-style-type: none"> <li>• <b>Seek veterinary advice.</b></li> <li>• Occurs in seabirds that are fed thawed, frozen fish as thawing destroys vitamin B1.</li> <li>• Provide Vetafarm Seabird tablets at 1 tablet per kilogram of bird, daily in their thawed frozen fish.</li> </ul>   |

| Injury or clinical signs  | Possible causes      | Carer observations and response   |
|---|----------------------|---|
| <p>Lameness</p> <p>Swollen foot</p> <p>Sole of the foot appears red and/or ulcerated</p> <p>Necrotic tissue present. See Figure 3.12.</p> | <p>Bumblefoot</p>    | <ul style="list-style-type: none"> <li>• <b>Seek veterinary attention.</b></li> <li>• Give medication as directed.</li> <li>• Aquatic and marine birds are particularly prone to developing bumblefoot during rehabilitation if appropriate substrate and perching are not provided.</li> <li>• More likely to develop if birds are fed a diet low in vitamin A and/or enclosure hygiene is poor.</li> <li>• Ensure that the bird is fed a nutritionally complete diet.</li> <li>• Ensure perches and enclosure set-up, including ponds, is correct for the species.</li> <li>• Perches should be wide enough to ensure that the toes do not touch, but the foot curls <math>\frac{3}{4}</math> of the way around the branch. Flat-footed waterbirds need broad, flat perches such as logs. Perches may be wrapped in small towels, Vetrap or Astroturf. See <b>Table 3.7</b> for flooring suggestions.</li> <li>• The feet of all birds in captivity should be checked regularly. Husbandry changes must be made if there are signs of flaky skin, redness, swelling or excessive wear on the sole.</li> </ul> |
| <p>Open mouth and/or raspy breathing. See Figure 3.13.</p>  | <p>Aspergillosis</p> | <ul style="list-style-type: none"> <li>• <b>Seek veterinary advice.</b></li> <li>• Aspergillosis is caused by an environmental fungus that is present in all indoor and outdoor environments as part of normal microbiological ecosystems.</li> <li>• Disease may be seen in immunocompromised birds, especially when ventilation is poor and/or humidity is high.</li> <li>• Birds become infected by inhaling fungal spores.</li> <li>• Stress secondary to captivity, trauma, parasites, oiling or malnutrition makes disease more likely.</li> <li>• Waterbirds may benefit from prophylactic antifungals while convalescing. Consult a veterinarian.</li> <li>• Once clinical signs develop treatment is rarely successful.</li> </ul>   |

| Injury or clinical signs  | Possible causes  | Carer observations and response   |
|---|--|---|
| Young bird with droopy wings that it cannot lift into their normal position. See Figure 3.14. | Angel wing   | <ul style="list-style-type: none"> <li>• <b>Seek veterinary advice.</b></li> <li>• Occurs when the weight of the growing flight feathers is too heavy for the muscles of the wrist and the wing twists outward.</li> <li>• A diet high in protein and low in some minerals predisposes to this condition so careful diet selection is crucial for growing water birds.</li> <li>• More prevalent in slow-growing birds such as black swans.</li> <li>• Monitor large waterbirds for this condition throughout growth. Ensure that a balanced diet is given with sufficient space for walking and wing-flapping.</li> <li>• If any deviation from normal growth occurs veterinary attention must be sort as early intervention can result in resolution. If left untreated in the early phase, birds will be unsuitable for release and require euthanasia.</li> </ul> |
| Oil on feathers   | Oil spill at sea or exposure to oil at industrial or other sites | <ul style="list-style-type: none"> <li>• See <b>Table 3.6</b></li> </ul>  |

**Figure 3.8** Moulting little penguin.



Photo credit: Johanna Geeson

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

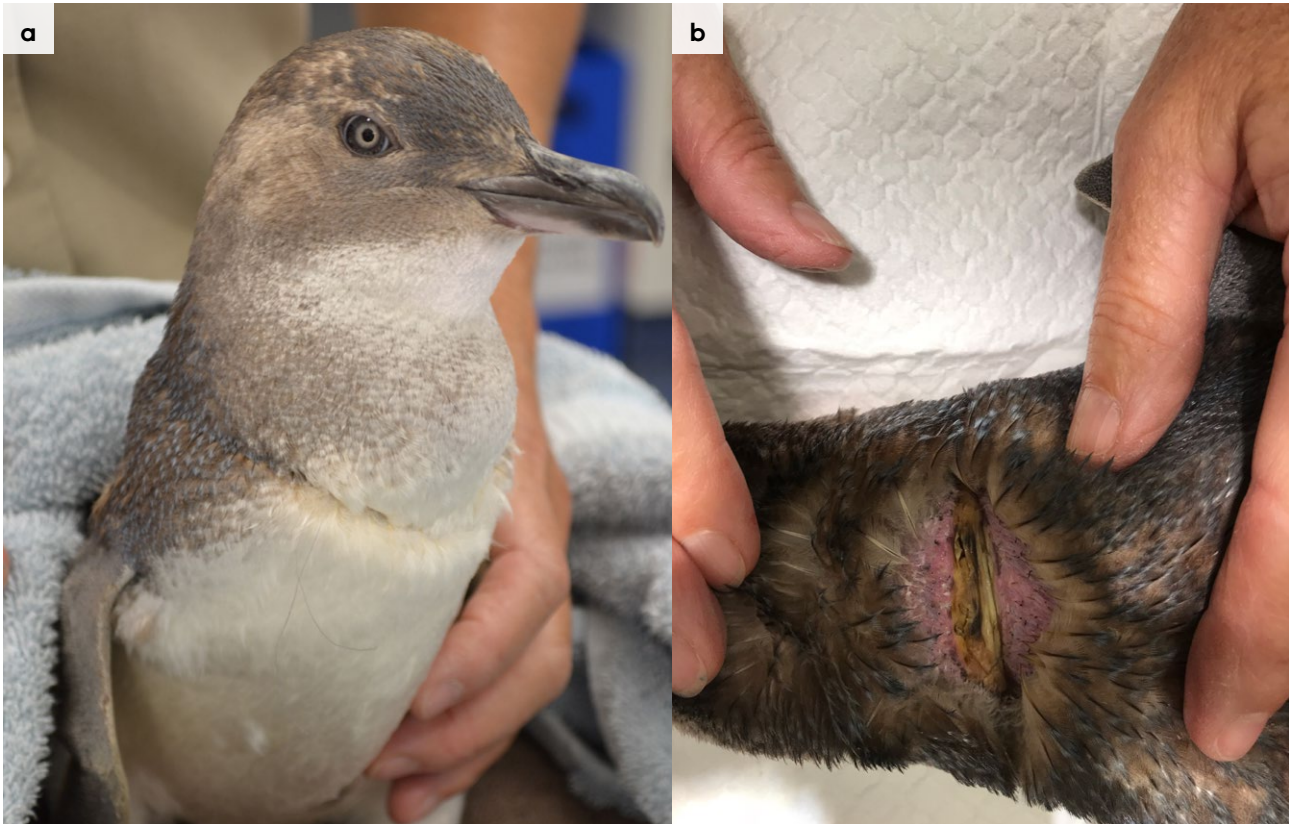


Photo credit: Zoos Victoria

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

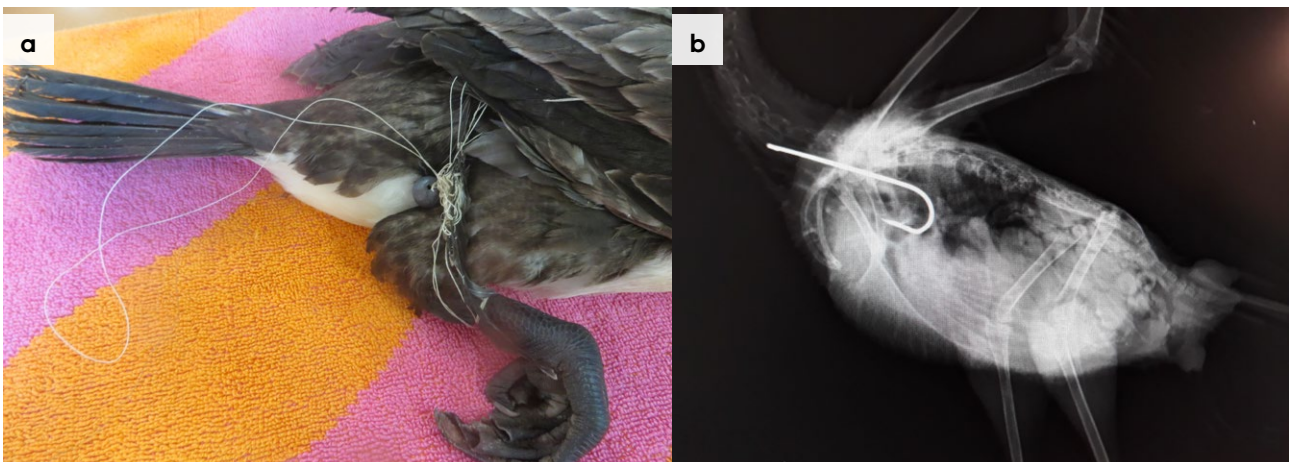


Photo credit: Zoos Victoria

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



Photo credit: Zoos Victoria

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



Photo credit: Zoos Victoria

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

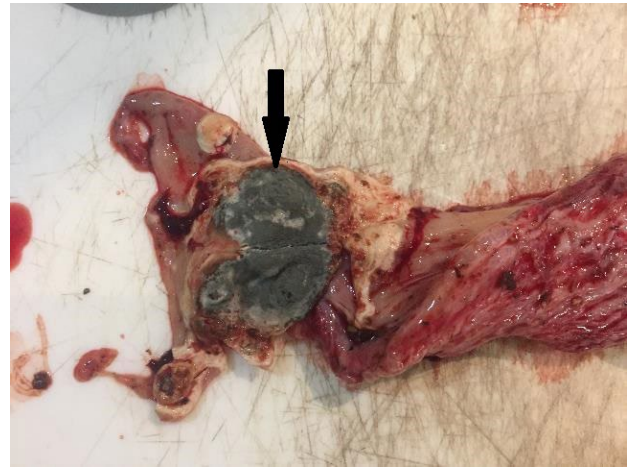


Photo credit: Zoos Victoria

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



Photo credit: Zoos Victoria

### Table 3.6 Treatment of oiled water birds

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

#### Stabilisation before washing

Wipe excess oil off the bird using a towel or paper.

Weigh the bird.

Remove oil from the eyes, nostrils and mouth with swabs and cotton buds.

Flush eyes with 0.9% saline. If the eyes are inflamed, treat with water-based eye ointments containing antibiotics.

A veterinarian should collect blood for prognostic assessment and to determine what supportive measures are required.

Give warm fluids (37–38°C) using a feeding tube or crop needle/tube depending on the species anatomy. Most aquatic/marine species will require stomach-tubing as they will not have a crop. Oral electrolytes such as Lectade or Vytrate are suitable and can be given at a rate of 15–30 ml/kg at each feed. Fluids are given three to four times over the first 24 hours. Only wildlife rehabilitators who have been trained in this technique should tube birds to minimise the risk of aspiration.

Place the bird in a quiet, warm environment at 25–28°C where heat lamps or heat pads provide a heat gradient. Ensure good ventilation as the oil will release toxic chemicals that can be inhaled by both birds and humans. Food can be given after the first 24 hours in care or once dehydration has been corrected.

Reassess the bird prior to washing to ensure that injuries have not been missed and the bird is a suitable candidate for washing based on its physical examination and blood results.

#### Washing

At least 20 minutes before washing, tube-feed the bird with warm oral electrolytes. If the bird becomes weak during washing, the procedure must be stopped, and the bird returned to a warm environment and reassessed.

Fill three large plastic containers with water between 39–41°C. Measure the temperature of the water with a thermometer and ensure the required water temperature is maintained during washing. Washing liquid surfactants perform best at higher temperatures, and it is important not to allow the bird to become cold.

Add detergent to the water at 1–5% of water volume. Suitable detergents for removing oil from birds include Dawn or Fairy.

A team of three people is needed to wash one bird. One person holds the bird and the second person washes it. The third person fills tubs of water, assists with restraint and provides any other assistance required. The handler should direct the bird's head slightly downwards to prevent water entering nostrils.

### Washing (continued)

Wear gloves when washing the bird. The handler's gloves must be cleaned of oil residue between each tub to ensure that recontamination is not occurring.

To prevent eye irritation due to oil residue or soapy water, protect with eye lubricant.

Gently wipe the feathers with a soft wash cloth or gloved hands – moving against the grain for soft body feathers and with the grain for primary and secondary feathers. A toothbrush can be used around the head. Do not rub the feathers.

Squeeze oily water from the feathers prior to moving the bird to a new tub. Ensure the water temperature is between 39–41°C.

Move the bird to a new tub once the water in the tub becomes dirty with oil. Ensure the water temperature is between 39–41°C. Several tubs of warm water with detergent may be required for a single bird. The bird is ready to be rinsed when the water is no longer oily, and the bird appears clean.

Wash time, exclusive of rinsing, should take no longer than 15 minutes in total. If the bird is still oily, then it will need to be washed again on the following day.

After washing, rinse the bird with a gentle spray to remove the detergent. Wash feathers by directing the spray of the water against the grain of soft feathers, and with the grain of primary and secondary feathers. The water used must be between 39–41°C.

Water will bead off the feathers and down will fluff up once detergent is properly rinsed from them.

Take the bird to a warm room for drying. Provide heating with heat lamps, air-conditioning or small fan-heaters to keep the temperature of the room between 25–30°C. Do NOT rub the feathers dry with towels. Do NOT use hair dryers.

Once dry, move the bird to a new clean holding pen where it can be fed and given more electrolytes.

### Check for oil and feather waterproofing

On the day after cleaning, an experienced carer or veterinarian should check the bird to see if it is clean of oil.

If it is not, the bird can be cleaned again either that day or on a following day.

If the bird appears clean, it will need a swim test of several hours duration to test waterproofing of the feathers.

Observe the bird for signs of waterproofing when in water. Provide access to a haul out area in the pool so the bird may exit the water if desired. Ideally, birds should be tested in warmed water to encourage time spent swimming without becoming cold if not completely waterproofed. If the bird appears wet and agitated in the water, cease waterproofing test. Allowing birds to become cold due to non-waterproofed feathers is contrary to stabilising health.



### Check for oil and feather waterproofing check (continued)

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

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

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

### Pre-release health check

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

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



Photo credit: Zoos Victoria

### 3.5.4. Administering treatment

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

## 3.6 Housing

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

### 3.6.1. General housing information for marine birds and waterbirds

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

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

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

### 3.6.2. Enclosure hygiene and biosecurity

General information about hygiene and biosecurity can be found in Part A of these guidelines. New diseases emerge frequently and sick and injured animals in care are often more susceptible to picking up pathogens from the environment. It is important to maintain the

highest levels of hygiene to avoid inadvertently transferring diseases between animals and from humans, and to protect the wild population where the animal will eventually return to.

#### Species specific considerations:

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

### 3.6.3. Housing types

Different set ups are required for animals at different stages of treatment and care.

**Table 3.7** describes the housing type, suggested dimensions and requirements at each stage of care. For information on housing animals during hand raising see **Section 3.8**.

**Table 3.7** Rehabilitation housing for adult marine birds and waterbirds

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

## Suggested requirements

### ENCLOSURE CONSTRUCTION

- Human humidicrib or veterinary incubator, e.g. Vetario, Kimani, cat or dog carry cage/pet pack, purpose-built enclosures such as reptile enclosures, or melamine hotboxes. Soft-sided pet carriers come in a range of sizes and are the ideal choice for minimising feather damage in water birds.
- Wire enclosures should not be used.
- Cardboard will deteriorate rapidly unless it has a waterproof lining.
- Solid plastic crates with towels for flooring are very easy to clean. They can be scrubbed, sanitised and dried quickly.
- It is important to minimise the potential for tail and wing feather damage from the housing.
- Towels or blankets can be used for flooring.
- Keel cushioning is required to prevent pressure sores in grebes.
- Marine carpeting, artificial turf or rubber matting can also be used. Examples include the matting used in caravan annexes, hotel bar matting or closed cell foam rubber.
- Avoid tiles, concrete, straw, newspaper and wood.
- Newspaper becomes slippery when wet and wood is difficult to clean and disinfect, unless it is completely sealed.
- Flooring may need to be cleaned of faeces twice daily.

### ENCLOSURE FURNISHING

- Perching birds (herons, cormorants) need natural logs and branches.
- A plastic children's seashell can be lined with blankets and towels to create a soft nest for larger marine birds to sit in.
- Debilitated large birds (pelicans, swans) can be housed in a child's portacot with a sheet secured over the top as a roof.

### ENVIRONMENTAL VARIABLES

- The enclosure should be well-ventilated.
- Supplemental heat may be required on a case-by-case basis.
- The bird should be able to experience normal daylight patterns, even if housed inside (e.g. indoor lights go on at dawn and off at dusk).

### PROVISION OF FOOD/WATER

- Water is provided in a wide dish. It should be wide and long enough that the bird can place its entire beak into the container.

### Intermediate housing (treatment/cage rest)

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

### Suggested requirements

#### ENCLOSURE CONSTRUCTION

- Wire mesh should be avoided as birds may damage their feathers, wings or feet.
- If a wire aviary must be used, it should be covered on the inside with a tarpaulin or thick sheet of plastic.
- Solid walled enclosures, such as those used for raptors, are preferred.
- Marine carpet, artificial grass or closed-cell foam with holes can be used as flooring.
- Flooring should be promptly cleaned when soiled.

#### ENCLOSURE FURNISHING

- A children's wading pool can be used for smaller waterbirds.
- Ensure that ramps are present so that the birds can get out of the water.
- A simple perch for waterbirds is a tyre with sand in it placed next to the pool.
- Hang towels in the enclosure for privacy.
- Provide mirror near feeding area for social species of birds.

#### ENVIRONMENTAL VARIABLES

- The enclosure should be well-ventilated.
- Some birds may benefit from the opportunity to use supplementary heat in an aviary (e.g. a heat lamp).
- The bird should be able to experience normal daylight patterns.

#### PROVISION OF FOOD/WATER

- Food bowls need to be wide and of a low profile to allow beak access and prevent spillage.

## Pre-release

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

### Suggested requirements

#### ENCLOSURE CONSTRUCTION

- Cyclone mesh can be used.
- Totally enclose with wire to ensure predators cannot gain access to the birds.
- Place shade-cloth along the lower edge to provide a visual barrier.
- Cover part of the enclosure to provide protection from the weather.
- Wading birds require shallow areas of water to provide natural feeding opportunities.

- Suitable substrates include clean fine sand (raked regularly to prevent it compacting), closed cell foam camping mats, conveyor belt rubber or lawn. Using a range of suitable substrates often promotes good foot health in water birds. Avoid loose sand covering rubber matting as it can be abrasive on feet.

#### ENCLOSURE FURNISHING

- Branches of varying widths can be used for perches. Waterbirds often like to perch above the water.
- Logs can be placed leaning into the water. An outdoor wooden table can be used as an island for perching in the middle of the pool.
- Rubber matting may be used over ramps that lead out of water.
- Rubber tyres filled with sand can also be used as perches. Nest boxes can be made from a wooden box or half a large PVC pipe.
- Provide mirror for social species of birds if housed alone.

#### ENVIRONMENTAL VARIABLES

- A mister system may be required for cooling on days over 30°C.
- Penguins are reluctant to enter water that is colder than 12°C.
- Fresh water can be salted with 10 kg of aquarium salt per 300 litres of water.
- Approximately 10–20% of the water volume should be changed daily.
- Agitating the water will encourage swimming.
- Food, faeces, feathers and oil should be removed from the surface of the water and solids siphoned from the bottom of the pool daily.
- Dirty water will reduce waterproofing.
- Ideally, salt water chlorination with a sand filter and pump should be used.
- Fresh water can be used for marine and estuarine birds in the short term. However, the salt glands will shrink over time. See [Section 3.7.2](#) for information on re-establishing salt tolerance.

#### PROVISION OF FOOD/WATER

- Food bowls should be sturdy and large.
- As food may be offered in water, containers should be refreshed and cleaned daily.



## Pre-release

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

**Figure 3.16** Example of an intermediate enclosure for a swan



Photo credit: Zoos Victoria

**Figure 3.17** Intensive care enclosure for a black swan.

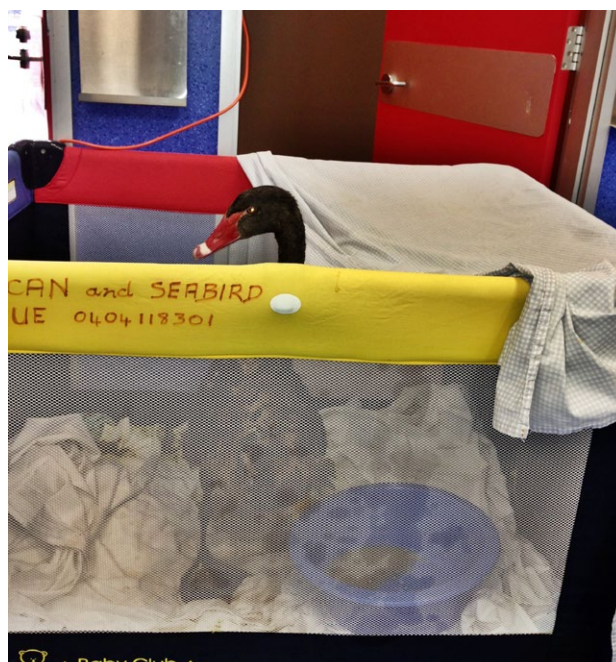


Photo: Zoos Victoria

**Suggested requirements**

As above.

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



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



Photo: Zoos Victoria

### 3.6.4. Waterproofing and feather protection

Possible causes for a loss of waterproofing include:

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

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

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

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

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



Photo credit: Phillip Island Nature Park

To waterproof the bird:

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

## 3.7 Feeding and nutrition



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

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

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

### 3.7.1. Feeding waterbirds

**Table 3.8** Waterbird diets

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

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

### 3.7.2. Feeding marine birds

Feeding fresh fish is preferable. However, it is illegal to feed live fish. Frozen fish are often used for convenience and to minimise the risk of transmitting parasites. Fish should not be stored

frozen for longer than three months. Do not feed tinned fish, fish that are stale or rotten or individual quick frozen fish as they contain high levels of salt.

**Table 3.9 Marine bird diets**

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

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

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

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

**Table 3.10** Assist feeding

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Defrost fish in the refrigerator overnight. Do not defrost in water as this leaches nutrients from the fish.

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Vetafarm Seabird tablets (1 tablet/kg bird) should be placed inside the fish, which should then be dipped into iodised salty water (10 g/L) or fresh seawater before feeding.

---

Restrain the bird with a towel and hold it between the knees.

---

Open the mouth with one hand and place the fish into the mouth with the other. Push it down the throat past the opening of the windpipe.

---

Feed fish head first. See **Figure 3.21**.

---

Ensure that the oil from the fish does not contaminate the feathers. Clean the bird's mouth after assist feeding by spraying with, preferably, salt water to prevent fish oils getting on feathers and causing waterproofing problems.

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Birds should be left alone after assist feeding as they may regurgitate if stressed.

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

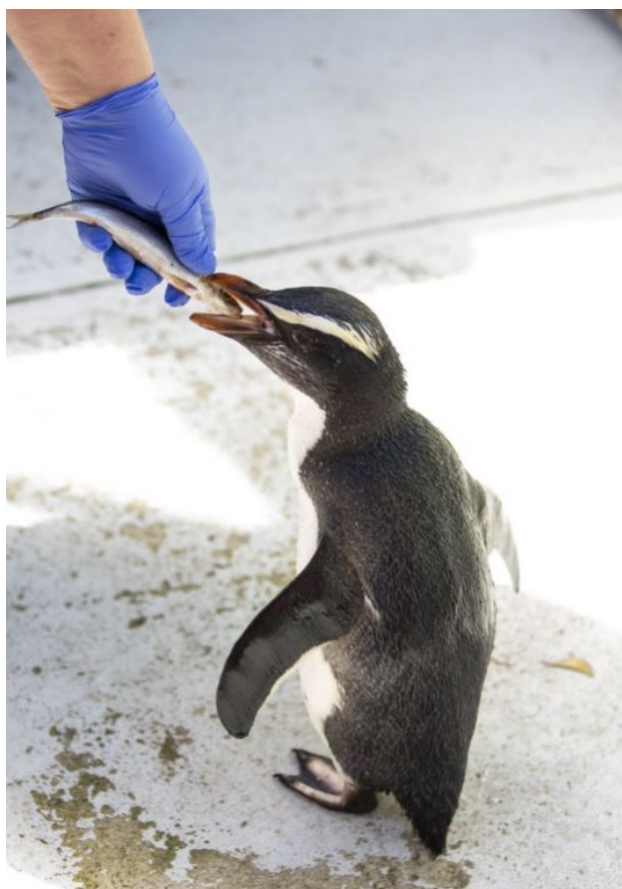


Photo credit: Zoos Victoria

### 13.7.3 Salt tolerance

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

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

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

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

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

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

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

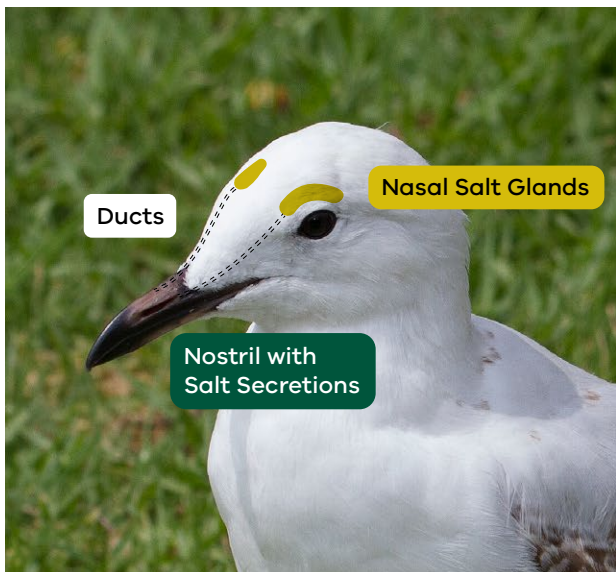


Image permission: David Paul, Museums Victoria



## 3.8 Hand raising

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

### 3.8.1. Equipment required for hand raising

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

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



Photo credit: Zoos Victoria

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



Photo credit: Zoos Victoria

### 3.8.2. Growth, development and care of orphaned young

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

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

### 3.8.3. Imprinting

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

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

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



Photo credit: Zoos Victoria

## 3.9 Release protocol

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

### 3.9.1. Pre-release assessment

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

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

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

### 3.9.2. At the release site

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

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

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

**Table 3.11** Characteristics of release sites for waterbirds and marine birds

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

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

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

### 3.9.3. Release checklist

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

#### Release of waterbirds

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

#### Release of marine birds

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

## 3.10 Key references and additional reading

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

Fowler, A. 2021. Husbandry and Disease of Water-birds and Seabirds, 7<sup>th</sup> edition. FaunaOz Education, Stirling.

Marchant, S. and Higgins, P.J. (eds) 1990. Handbook of Australian, New Zealand and Antarctic Birds. Volume 1: Ratites to Ducks. Oxford University Press, Melbourne.

Stahel, C. and Gales, R. 1987. Little penguin. New South Wales University Press, Kensington.

Walraven, E. 2004. Rescue and rehabilitation of oiled birds: field manual. Zoological Parks Board of NSW, Mosman.