

Rehabilitation guide for tūī and bellbirds



Cover: Adult tūi. *Photo: David Cook.*

New Zealand Wildlife Rehabilitation Fact Sheets are occasional publications produced to describe best practice for rehabilitation of New Zealand native species. They are available in pdf form from the Department of Conservation website (www.doc.govt.nz).

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Rehabilitation guide for tūi and bellbirds

This guide describes the appropriate food, housing and husbandry requirements for tūi (*Prothemadera novaeseelandiae* spp.) and bellbirds (*Anthornis melanura melanura*) when they are held in captivity for rehabilitation and it should be considered a reference for minimum standards of care. This guide does not cover specifics of veterinary care.

1. Species

Tūi (<i>Prothemadera novaeseelandiae novaeseelandiae</i>)	Endemic	NZTCS ¹ status: Not threatened
Chatham Island tūi (<i>Prothemadera novaeseelandiae chathamensis</i>)	Endemic	NZTCS status: Threatened
Bellbird, korimako (<i>Anthornis melanura melanura</i>)	Endemic	NZTCS status: Not threatened

A Wildlife Act Authority (DOC Permit) is required to Hold in Captivity. Go to <https://www.doc.govt.nz/get-involved/apply-for-permits/interacting-with-wildlife/holding-wildlife-for-rehabilitation/>



Figure 1. Images of the birds addressed in this guide. A. – Juvenile tūi. Photo: Dick Veitch. B. – Adult tūi. Photo: Jonathan Astin. C. – Adult male bellbird. Photo: Leon Berard. D. – Adult female bellbird on flax (*Phormium* sp.). Bird has flax pollen on its head. Photo: Andrew Walmsley.

¹ NZTCS New Zealand Threat Classification System, for more information visit <http://www.doc.govt.nz/nature/conservation-status/>

2. First aid

First aid is provided when the bird arrives for treatment to stabilise it and minimise pain. Sick or injured honeyeaters (Tūī, bellbirds and hīhī) will require immediate liquid food supplementation, as they quickly develop hypoglycemia (low blood sugar levels). Refer to the 'DIET' section below.

Other first aid includes:

- Oral fluid therapy to treat dehydration.
- A source of warmth such as heat pads or hot water bottles wrapped in a towel, or placing the bird in an incubator or a warm room (set at 28–30°C). If the bird is alert and eating it may not need heat supplementation.
- Holding the bird in a quiet area away from any disturbance (including people and pets).
- Stabilising broken bones using a bandage.

For details on oral fluid therapy and bandaging, go to Modules 3 & 7 of the DOC online wildlife health course at: <http://www.doc.govt.nz/wildlife-health-course>

3. Why and when do tūī and bellbirds require health care?

3.1 The most common causes of harm are:

- Collision (with a solid object such as a window or vehicle).
- An attack from a predator.
- A fall from height (e.g. out of a nest).
- Chicks being abandoned by parents.
- Ingestion of a toxin (e.g. nectar from a toxic plant can cause brain or central nervous system disorders).
- The effects of inadequate supplementary food or the effects of long-term captive care and medications for rehabilitation.

3.2 The most common types of injury and illness seen in tūī and bellbirds are:

- Fractures to the humerus, radius or ulna bones in the wing
- Head injuries and concussion.
- Signs of central (brain) nervous system damage, such as twisting of the head and neck, shrieking, seizures, paralysis.
- Signs of spinal injuries, such as partial or full paralysis of the legs and tail.
- Penetrating tooth wounds and extensive fractures after attack by an animal (e.g. cat).
- Oral or intestinal *Candida* sp. (yeast) infection.
- Infestation by external parasites – lice, mites, ticks.
- Infestation by internal parasites – worms and coccidia.

4. Veterinary care

A veterinary consultation is required for any bird that displays symptoms consistent with any of the conditions listed above or which is not improving as expected during care (within 1–3 days of arrival). X-rays (radiographs) are usually required to determine the best treatment for broken bones. Medications such as pain relief and antibiotics require a veterinary prescription to ensure the correct drugs and doses are used.

5. Handling tūī and bellbirds

Correct handling of birds minimises the risk of harm to both birds and handlers. Before handling a bird, identify its most dangerous features and gain control of these first. The main defence mechanism of tūī and bellbirds are their sharp, needle-like claws. When handling, control the wings and feet by wrapping the bird in a small towel (such as a hand towel or tea towel). The towel will also protect the feathers from damage and covering the head will help calm the bird. Alternatively, use the 'bander's grip' by holding the body and wings in one hand with the head exiting between the index and middle fingers. The other hand can then keep the feet under control by holding the legs above the hock. If the bird has gripped a towel or object and will not release its talons, then it may be easier to leave the bird grasping smaller items while examining it. Whenever handling a bird AVOID placing any pressure on the chest because, unlike mammals, birds do not have a diaphragm. This means that if the movement of the chest is restricted the bird will be unable to breathe. Any handling should involve only light restraint over the chest in a 'loose caged' grip, where the fingers or towel surround the bird's chest to prevent it from escaping, while still enabling the bird to breathe freely.

As the recovery of the bird progresses it will become much harder to catch. Turning the lights down low and removing the perch prior to attempting capture may be helpful. Draping a towel over the bird in the cage can also facilitate capture.

For more details on handling small passerines, go to Module 1 of the DOC online wildlife health course at <http://www.doc.govt.nz/wildlife-health-course>

6. Hospital cages

Cages used for housing critically sick and debilitated birds are referred to as 'hospital cages' (Fig. 2). The cage securely holds the bird and encourages it to rest quietly whilst allowing effective monitoring and treatment.

- Cages should allow for provision of supplementary heat via a warm room, heat pad or hot water bottle wrapped in a towel. Placing towels between birds and any direct heat sources is important to avoid accidentally burning any debilitated birds that may not be able to move away from the heat source.
- Ensure the size of the cage is sufficiently large that the bird can easily turn around and stretch its wings, but not so large that it can fly or elude capture. Recommended cage dimensions for tūī and bellbirds are 45 cm (W) x 60 cm (H) x 60 cm (D).
- Suitable short-term housing includes modified plastic or cardboard boxes with holes inserted for air flow. Long-term housing includes stainless steel veterinary animal cages with steel grille or perspex doors.
- Provide suitable substrate on the floor of the cage to prevent foot abrasions (Fig. 3). Towels, easily cleaned soft rubber matting or disposable material like incontinence pads are good options. Avoid use of materials with frayed edges, rips or holes, which may entangle feet.



Figure 2. Hospital cages for tūī and bellbirds. Photo: Annemieke Kregting.



Figure 3. Interior of a hospital cage showing soft floor covering and appropriate perches. Photo: Lisa Argilla.

- Perches should be a suitable diameter (approx. 18–25 mm) for tūi/bellbird claws. They need to be stable and cut from natural branches. Artificial or smooth branches should be covered with towels, artificial turf, rubber, foam or disposable bandage (3M Vetrap™). A small rolled-up towel placed on the cage floor can also be used as a temporary perch. Perches should be approximately 40–50 mm above the floor, which allows birds to hop up easily but also avoids their tail dragging on the floor when perching (Fig. 2). Providing fresh branches daily is a suitable alternative to artificial perches and are good enrichment for tūi and bellbirds to retreat into. Do not use poisonous plants for enrichment (such as tutu (*Coriaria* species) or rhododendron species). Safe options include: tarata/lemonwood (*Pittosporum eugenoides*), kawa kawa (*Piper excelsum*), *Coprosma* species or any plant species within the nectar-eater's natural diet.
- Cover transparent doors or whole wire cages with towels or cloth to give some privacy and to prevent attempts to escape which may cause further injury. Allow some natural light to enter the cage to encourage feeding during the day
- Place food and water bowls on the floor of the cage, close to the door for ease of access. If the bird is healthy enough to feed while perching, then elevate the bowls to avoid any tail feather damage from contact with the floor.

7. Diet

7.1 Natural diet

Tūi and bellbirds are nectar-feeders that feed on native and introduced flowering plants, honeydew (from beech forests), as well as fruits and insects. Source plant species include pūriri (*Vitex lucens*), kōwhai (*Sophora* spp.), tree fuchsia (*Fuchsia excorticata*), rewarewa (*Knightia excelsa*), flax (*Phormium* spp.), rātā and pohutukawa (*Metrosideros* spp.), wineberry (*Aristotelia serrata*), kaikōmako (*Pennantia corymbosa*), māhoe (*Melicactus ramiflorus*), ngaio (*Myoporum laetum*), rimu (*Dacrydium cupressinum*), kahikatea (*Dacrydium dacrydioides*), eucalypts, tree lucerne (tagasaste, *Chamaecytisus palmensis*) and banksias. Insects, e.g. cicadas and stick insects, are particularly important during the breeding season for chick growth. Bellbirds appear to mainly feed insects to their young, including spiders. Natural diet items can be provided to birds in aviaries to encourage natural behaviour prior to release; however, the self-feeder's diet must also be offered to fulfil all dietary needs.

7.2 Convalescent diet

A good quality honeyeater diet is a suitable supplementary food for tūi and bellbirds. For example, Wombaroo Lorikeet & Honeyeater Food is a powder that dissolves in water to create nectar (Fig. 4). Pureed soft fruits can be added. The solution can be fed directly into the crop using a silicon or rubber feeding tube or a stainless steel 'crop needle' and small syringe (3–5 ml). Many honeyeaters will quickly learn to take food directly from the syringe tip with their tongue.

- Liquid diets should be warmed to approximately 38–40°C. Adult birds may need crop feeding if they will not feed off a syringe tip. The volume fed should be based on the size of the bird, the size of the crop and their weight gain. The bird should be weighed daily in the morning (before feeding) to monitor weight gain and feeding should be adjusted accordingly. Aim to feed approximately 3–8 ml per feed. Slowly increase the volume fed based on the bird's response. Try to avoid overfeeding; if the bird starts to have nectar welling in the mouth or regurgitation occurs then stop feeding immediately. As a general rule, female tūi weighing 50–80 g can be fed up to 5 ml per feed, while males weighing 100–150 g can be fed up to 8 ml of nectar. Adults need to be given a minimum of four feeds per day and feeding may need to be more frequent, based on how much is being consumed in each feed.

- Neonatal tūi and bellbirds need to be fed every 1–2 hours, with the frequency of feeding adjusting with growth. Juveniles will need to be fed 6 times per day. Very young tūi and bellbirds require additional protein which can be provided by adding Wombaroo Insectivore Rearing mix (or similar) to the diet and by feeding insects such as small mealworms or wax moth larvae. Increase the proportion of honeyeater food after the first week.
- Tube feeding should be the last treatment given during handling, so that the bird does not regurgitate because of stress from being restrained. Observe the bird's droppings to check that it is passing faeces normally. If there is any food spilt onto the feathers around the mouth, clean the area with water using a misting spray bottle.
- Tūi and bellbirds have high energy requirements and supplementary food should be continuously available in their cages via a shallow bowl or liquid feeder. Offer fresh fruit (e.g. mandarins) cut into small pieces (Fig. 4). Gently dipping the nectar-feeder's bill into the nectar can help them to recognise that the bowl contains food. Younger birds learn to self-feed rapidly once they work out where the food is. Tall cylindrical water feeders sold for budgie aviaries can be good for placing nectar in, as the birds are less likely to tip over the bowl and accidentally splash it into their feathers.
- For further details on crop feeding techniques go to Module 3 of the DOC online wildlife health course: <http://www.doc.govt.nz/wildlife-health-course>

7.3 Self-feeder's diet

A self-feeder's diet is provided to birds that are alert and can demonstrate the ability to feed themselves. The diet must provide all of the bird's nutritional requirements. A formulated diet such as Wombaroo Lorikeet & Honeyeater Food provides a balanced diet. Providing a solution of water with honey, raw sugar or jam is only appropriate for a few days. A variety of fresh fruits cut into small pieces can be offered to provide some variety and behavioural enrichment. Provide slightly more food than the bird(s) consume each day. Ensure fresh water is always available. The recipe for honey, sugar or jam water is: 1 part sugar to 4 parts water or 1 part honey to 4 parts water or 1 part jam to 2 parts water.



Figure 4. Nectar made from Wombaroo Lorikeet & Honeyeater Food powder and fresh fruit pieces. Photo: Kate McInnes.

8. Aviaries for tūi and bellbirds

Tūi and bellbirds can be moved to aviaries once they are self-feeding and no longer requiring handling for medical treatments. Flight aviaries are used to regain strength and fitness prior to release.

9. Requirements for flight aviaries

- Small aviaries can be used for juvenile birds that are learning to fly or for adults that have been in hospital cages for more than a week, in order to regain flight skills and have their flying abilities assessed. Aviaries of approximate dimensions 2 m (L) x 1.8 m (H) x 1 m (W) are suitable for small flight aviaries.
- Larger flight aviaries (Figs 5, 6) must have sufficient space that the tūi or bellbird has room to fly around the cage and between perches. Aviaries of approximate dimensions 6 m (L) x 2 m (H) x 3 m (W). Note: an aviary exceeding these dimensions will lead to difficulties when catching birds that are ready for release.

- The aviary should be a mix of solid construction materials to provide shelter from sun, wind and rain; and open mesh to present more natural conditions and encourage natural behaviour. Allowing rain and sunshine into part of the aviary encourages birds to preen and get used to natural conditions after hospitalisation.
- Suitable construction materials include corrugated PVC or polycarbonate roofing, wood, steel or aluminium. Any galvanized materials should be scrubbed with vinegar to remove the oxidized zinc coating. Open mesh sides can be of a welded metal mesh or shade cloth. Shade cloth sides are soft and help to prevent injury if frightened or disorientated birds fly into the walls. Chicken wire mesh is not appropriate as it can cause injuries to birds.
- Additional features such as planter bags of tree lucerne, kōwhai branches or other native greenery provide enrichment and a natural food source. (Note: some New Zealand flora species are toxic to birds; for a guide to suitable species refer to <http://www.doc.govt.nz/get-involved/conservation-activities/attract-birds-to-your-garden/what-to-plant/>)
- Provide perches with a variety of diameters so the bird can move around and vary its foot grip. Appropriate materials include branches of various diameter or PVC piping with artificial gripping material attached (e.g. rubber, artificial grass or closed cell foam). Provide perches at each end of the enclosure to encourage birds to fly between them. Firmly attach perches to the aviary walls or to the aviary roof by chains.
- Birds that do not yet have full flight must be provided with multiple perches close to the aviary floor to encourage movement between them. 'Grounded' birds must be able to easily reach food and water bowls at all times. If there are several birds in one aviary, provide at least two sets of food and water bowls. One set can be elevated for the flying birds.
- Flooring substrate should either be waterproof and easily cleaned (e.g. waterproofed plywood, concrete) and/or natural materials such as stones or soil (Note: the latter is harder to keep clean and parasites may also build up over time, requiring periodic removal and replacement).
- Pine needles are easily replaced once contaminated with faeces and food. Ensure any natural substrates are dry and free of mould when collected from the environment. Fungal spores occur in damp humid conditions or with inadequate storage. Bark chip or wood mulch is not suitable as it quickly becomes mouldy.



Figure 5. Outdoor aviary. Photo: Annemieke Kregting.



Figure 6. Indoor aviary. Photo: Karen Saunders.

- Consider building the aviary with the option of a soft release mechanism (window or door) for rehabilitated birds. Soft release is when the bird has the option of leaving the aviary and is able to come back for food until it moves away permanently. Check your permit conditions regarding release.
- Ensure aviaries are predator proof at all times. Any predator traps set around the perimeter must be regularly checked. At the same time, the aviary walls should be examined for holes or diggings at the bases of the walls. Ensure the interior of any newly constructed aviary is cleared of all mammalian pests before introducing birds.
- Capturing birds in the aviary (such as for pre-release examination) will usually require use of a net. Use hand-held nets suitable for birds made with a soft, woven nylon net with a very small mesh size (rather than monofilament which can entangle feet). Trout-landing nets made with rubber-coated mesh are also practical.

10. Cleaning and disinfection

- Food and water bowls need to be replaced twice a day. This is especially important for nectar feeders, as the sugary diet can rapidly develop yeast overgrowths if not changed frequently. Used bowls must be cleaned daily with detergent, rinsed with water and then allowed to dry.
- Feeding equipment and crop tubes are disinfected daily by thorough rinsing with water and soaking in dilute disinfectant such as Milton™ antibacterial tablets or F10 Veterinary Disinfectant as per the manufacturer's instructions.
- Substrate such as towels and newspaper must be changed daily.
- Cages are disinfected daily with a mild disinfectant such as dilute F10 or Avisafe™ (always remove the bird from the cage during cleaning).
- Cages and equipment need to be thoroughly disinfected and rinsed in-between use by different patients, using stronger disinfectants such as bleach or SteriGENE™ at the manufacturer's specifications, then left for 24 hours in a well-ventilated position.
- Aviaries are cleaned as required, dependent on the amount of use and number of birds present. There should be minimal faecal material or spilled food in the aviary at all times. Hard substrate floors can be hosed clean daily. Soft substrate floors should have faecal material removed daily. Food can be provided in bowls with trays beneath which can catch any spilled food and are easy to clean. Removable substrate can be used under favourite perches and feeding areas to make cleaning easier.

11. Potential complications

The following are common complications resulting from medical care, rehabilitation or prolonged captivity. In any of the following cases, or if the bird is not recovering as expected, seek advice from an avian veterinarian, wildlife nurse/technician or an experienced wildlife rehabilitator.

11.1 Imprinting

It is important when hand-rearing chicks to prevent imprinting (bonding to or losing fear of humans). Imprinted birds cannot be released. Seek advice from experienced wildlife rehabilitators on how to prevent imprinting.

11.2 Failure to heal

Sometimes fractures do not heal adequately or wounds deteriorate. Muscles and tendons contract following prolonged restriction of movement. These issues prevent flight and therefore prohibit release of the bird. A veterinarian can potentially treat these problems with repeated surgeries or physiotherapy if the problem is picked up early enough.

11.3 Foot lesions

Inadequate perches, inappropriate substrate or prolonged captivity can lead to ‘bumblefoot’ or pododermatitis. This is seen as scabs and deep infections of the footpads. It is a serious and painful condition and should always be treated by a veterinarian.

11.4 Feather damage

Excessive damage to primary wing feathers or tail feathers may mean a loss of ability to fly and will require the bird to remain in captivity until it moults. Protect feathers from damage by careful handling, using appropriately sized cages, avoiding cages that have wire mesh sides/bases and by installing elevated perches and feeding bowls.

12. Criteria for release

- Courses of medication and treatments have been completed and injuries have healed.
- The bird is observed to be flying properly, and able to gain vertical lift.
- The bird has a good body weight and body condition.
- The feathers are in good condition.
- The bird is physically and behaviourally able to fully function in the wild.

13. Method of release

Check your DOC permit for release requirements.

Hard release: transport the tūī or bellbirds from the captive location and release them directly into native forest or a park. If it is possible and the location is safe, release the birds where they were originally found. If not, contact the local DOC office to arrange a suitable release site.

Soft release: open the cage door to release the bird at the rehabilitation location (if your permit allows this). Continue to provide access to supplementary food for a few days to weeks as required.

14. Further information

‘Wild City Neighbours’ at: <http://www.doc.govt.nz/Documents/science-and-technical/BirdRehabGuide.pdf>

Wildlife Rehabilitators Network of New Zealand (WReNNZ): <https://www.wrennz.org.nz/>

Department of Conservation online wildlife health modules: <http://www.doc.govt.nz/wildlife-health-course>

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