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WILDLIFE HEALTH

Rehabilitation guide for kererū

Department of Conservation
Te Papa Atawhai

New Zealand Government

Cover: Kereru, Silverstream, Upper Hutt. *Photo: Herb Christophers*

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

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In the interest of forest conservation, we support paperless electronic publishing.

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Rehabilitation guide for kererū

This guide describes the appropriate food, housing and husbandry requirements for kererū (New Zealand pigeon, *Hemiphaga novaeseelandiae*) 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

Kererū / New Zealand pigeon (*Hemiphaga novaeseelandiae*)	Endemic	NZTCS[1] status: Not threatened
Parea / Chatham Island pigeon (*Hemiphaga novaeseelandiae*)	Endemic	NZTCS status: 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/

2. First aid

First aid is provided when the bird arrives for treatment to stabilise it and minimise pain.

This includes:

- Oral fluid therapy to manage 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 warm room (set at 28–30°C)). If the bird is alert and eating it may not need heat supplementation and can be kept at room temperatures (20–25°C).
- Holding the bird in a quiet area away from 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: https://www.doc.govt.nz/wildlife-health-course

3. Why and when do kererū 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).
- Parent birds abandoning a chick.
- The effects of inadequate supplementary food or the effects of long-term captive care and medications for rehabilitation.

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

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

- Fractures or dislocations to the coracoid (a bone in the shoulder girdle, like a human collar bone).
- Fractures to the humerus, radius or ulna bones in the wing.
- Head injuries and concussion.
- Ruptured crop.
- Signs of spinal injuries, such as partial or full paralysis of the legs and tail.
- Penetrating tooth wounds and extensive fractures after attack by 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.
- Overgrowth of oral or crop trichomoniasis infection.
- Avian respiratory aspergillosis (fungal respiratory disease)

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 kererū

Correct handling of birds minimises the risk of harm to both birds and handler(s). Before handling a bird, identify its most dangerous features and gain control of these first. The main defence mechanism of kererū are their wings (they strike out with them) and claws. When handling, control the wings and feet by wrapping the bird in a 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. Provide a stick or towel for the claws to grasp, as kererū have a strong grip reflex. Whenever handling a bird, be careful to only lightly restrain it around the chest, using a 'loose caged grip'; ensuring the bird's chest can move easily while breathing. Avoid any pressure on the chest or shoulder region if trauma is suspected. Kererū will often drop feathers during handling as a defence mechanism to escape predators, so prolonged or unnecessary handling of kererū should be avoided.

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 large birds, go to Module 1 of the DOC online wildlife health course at: https://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'. They securely hold the bird and encourage it to rest quietly whilst allowing effective monitoring and treatment (Figs 1, 2 & 3).

- Cages should allow for provision of supplementary heat via a warm room, heat pad or hot water bottle wrapped in a towel.
- Ensure the cage is sufficiently large that the kererū can easily turn around and stretch its wings, but not so large that it can fly or elude capture. Recommended dimensions are 61 cm (W) x 61 cm (H) x 71 cm (D).

- Suitable short-term housing includes modified plastic or cardboard boxes with holes inserted for air flow and large bird cages. 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. Towels, easily cleaned soft rubber matting or incontinence pads are good options. Avoid use of materials with rips, frayed edges or holes, which may entangle feet.
- Perches should be a suitable diameter (approx. 30–50 mm) for kererū claws. Natural branches can be used, or artificial perches should be covered with towels, artificial turf, rubber, foam or disposable bandage (3M Vetrap™). Perches should be approximately 40–50 mm above the floor, which allows the bird to hop up easily and avoids the tail dragging on the floor when the bird is perching. If the bird is too weak to sit on a perch, a small rolled-up towel placed on the cage floor can be provided as a temporary perch.
- 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.
- Place food and water bowls within easy reach either on the floor of the cage or at perch height, close to the door for ease of access.

Figure 1. Cage set up showing appropriate substrate and perch. *Photo: Karen Saunders, Native Bird Rescue Waiheke Island.*

Figure 2. Cage set up showing appropriate work area and coverings to provide privacy. *Photo: Karen Saunders,*

Figure 3. Hospital cage set up with food, water and branch for bird to perch on. *Photo: Kate McInnes.*

7. Diet

7.1 Natural diet

Kererū are an integral part of the forest ecosystem, ensuring dispersal of large seeds by eating the fruits of native trees, including miro (*Prumnopitys ferruginea*), karaka (*Corynocarpus laevigatus*), tītoki (*Alectryon excelsus*), tawa (*Beilschmiedia tawa*), kōwhai (*Sophora* spp.), five-finger (*Pseudopanax* spp.), patē (*Schefflera digitata*), pigeonwood (*Hedycarya arborea*), taraire (*Beilschmiedia tarairi*), pūriri (*Vitex lucens*) and wineberry (*Aristotelia serrata*). When fruit is in short supply, they will eat the foliage of native plants (such as kōwhai) but will also eat introduced legume and deciduous tree foliage such as tree lucerne (tagasaste, *Chamaecytisus palmensis*) and introduced broom (*Cytisus* spp.). 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 / hand-rearing diet

Sick or debilitated kererū often will not feed themselves at the start of convalescence. Crop-feeding a liquid diet or hand-feeding fruits and vegetables ensures that the bird receives adequate nutrition in the interim. A liquid diet such as Kaytee® exact® Hand-Feeding Formula or Harrison's Bird Foods (Recovery Formula™ or Juvenile™ Hand-Feeding Formula) is a suitable supplementary food. Pureed soft fruits can be added. The solution can be fed directly into the crop with the use of a silicon crop tube and large syringe (20–40 ml).

Liquid diets should be warmed to approximately 38–42°C. Adult birds may need crop feeding of 20–25 ml food and 20 ml of fluids twice a day. The bird should be weighed daily (before feeding) to monitor weight gain and feeding should be adjusted accordingly. If the kererū is not gaining weight on this volume of food a scoop feed can also be given at mid-day. Scoop feeding involves holding the kererū in a sitting position on a table with a towel lightly wrapped around its wings and a bowl full of the self-feeder's diet placed in front of it. The kererū is then encouraged to eat the food by the handler gently opening its beak and scooping it briefly into the food, then letting go of the head, allowing the kererū to swallow food or flick it away. Care must be taken to avoid damaging feathers around the beak with wet food; any soiled feathers should be cleaned with a misting spray bottle of water – do not rub the food into the feathers as that will damage the feathers.

Juvenile kererū will need more frequent feeding based on their age. A small chick will require feeding every 2–4 hours and the frequency of feeding required will decrease with age. Meanwhile, the volume of food required will increase with age and crop capacity. Care must be taken to ensure the crop is not overfilled and is always emptying by two-thirds between feeds. The crop should always completely empty overnight. If there is any delay in crop emptying consult your avian veterinarian. Food temperature and good hygiene of crop tubes and syringes are critical for successfully hand-rearing young birds. Habituation and imprinting on carers can impact a hand-reared kererū's chances of survival, so if any chick is hand reared, it should ideally be raised in sight of adult kererū and with minimal human interaction.

For further details on crop feeding technique go to Module 3 of the DOC online wildlife health course at https://www.doc.govt.nz/wildlife-health-course

7.3 Self-feeder's diet

A self-feeder's diet (Fig. 4) is provided to kererū that are alert and can demonstrate the ability to feed themselves. Kererū may initially require scoop-feeding to encourage them to eat this diet. The diet must provide all of the bird's nutritional requirements. A mixture of peas, corn, finely shredded silverbeet/watercress/spinach and chopped-up seasonal fruits (grapes, apple, pear, kiwifruit,

mandarin, orange, banana, blueberries, melon, pawpaw) provides a suitable diet. Rolled oats and cooked brown rice can make up to 10% of the mix. Provide slightly more food than the bird(s) consume each day. Aim to offer 100 g of kererū mix in the morning and 150 g in the afternoon. Flat dishes or elevated food bowls may help encourage kererū to eat. Ensure fresh water is always available. Recipes for kererū diets fed by wildlife clinics (Wildbase at Massey University and The Nest Te Kōhanga, Wellington Zoo) are included at the end of this document.

Figure 4. Self-feeder's diet. *Photo: Kate McInnes.*

8. Aviaries for kererū

Kererū can be moved to aviaries once they are self-feeding and are no longer require handling for medical treatments. Flight aviaries are used to allow the birds to regain strength and fitness prior to release.

9. Requirements for flight aviaries

- The aviary must have sufficient space that the kererū can gain aerial lift from lower branches and have room to fly around (Figs 5, 6). Aviaries of approximate dimensions 6 m (L) x 2.5 m (W) x 2.5 m (H) and modified shipping containers (20 ft / 6 m or 40 ft / 12 m) are suitable. Circular aviaries are preferable for flight training.
- 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 metal weld 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.

Figure 5. Flight aviary showing sheltered ends, shade cloth walls and a secure entry-way. Note metal predator control wrapping on piles. *Photo: Karen Saunders.*

Figure 6. Sheltered end of aviary showing perches of different sizes at various levels and natural vegetation in pots. *Photo: Karen Saunders.*

- 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 plant 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. Materials include branches of various diameter or PVC piping with artificial gripping material attached – such as rubber, artificial grass or closed cell foam. Provide perches at each end of the enclosure to encourage birds to fly between perches. 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.
- 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 or pea straw are good substrates that 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 (such as *Aspergillus* sp.) occur in damp humid conditions or with inadequate storage. Bark chip or wood mulch is not suitable as it quickly becomes mouldy.
- 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 can come back for food until it moves away permanently. Check your permit conditions regarding release conditions.
- 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 kererū in the aviary (such as for pre-release examination) will usually require use of a net. Use hand held nets suitable for birds with a soft, woven nylon net bag of a very small mesh size (rather than monofilament which can entangle feet). Trout landing nets with rubber coated mesh are also practical.

10. Cleaning and disinfection

- Food and water bowls are replaced twice a day. Used bowls are cleaned daily with detergent and rinsed with clean water 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 is changed daily.
- Cages are disinfected daily with a mild disinfectant such as dilute F10 or Avisafe™ (the bird must be removed during cleaning).
- Cages and equipment are thoroughly disinfected and rinsed in between use (between different patients) using stronger disinfectant 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 always be minimal faecal material or spilled food in the aviary. Hard substrate floors can be hosed clean daily. Soft substrate floors should have faecal material removed daily. Food can be provided in bowls on trays which are easy to clean and can catch any spilled food. Removable substrate can be used under favourite perches and feeding areas to enhance cleaning. Keep food and water bowls elevated to prevent birds' tail feathers from being damaged on the ground during feeding.

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 utilise other techniques, such as physiotherapy.

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.

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 kererū from the captive location and release it directly into native forest or a park. If it is possible and the location is safe, release the bird where it was 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 supplementary food for 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: https://www.doc.govt.nz/wildlife-health-course

15. Acknowledgements

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- Te Kōhanga, The Nest, Wellington Zoo: https://wellingtonzoo.com/conservation/saving-wildlife-in-the-nest-te-kohanga/

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Appendix 1

Kererū diet mix 1

- 2 apple – diced 0.5 cm
- 1 pear – diced 0.5 cm
- 2 banana – diced
- 2 kiwifruit – diced
- 1 cup mixed veges (peas, corn and carrots)
- ½ cup mixed greens (1:1:1:1 endive/silverbeet/spinach/broccoli) – finely chopped
- 12 grapes – diced
- ½ cup soaked sultanas
- ¼ cup soaked wheat
- ¼ cup mung beans
- 1 cup boiled brown rice

This mix can be frozen and thawed when needed.

Kererū diet mix 2

- 500 g watercress or silverbeet – blended
- 500 g spinach leaves
- 1 kg frozen mixed vegetables
- 500 g apples – cut to 5 mm x 5 mm cubes
- 500 g pear – cut to 5 mm x 5 mm cubes
- 500 g kiwifruit – cut to 5 mm x 5 mm cubes
- 500 g grapes – whole or halved if large
- 250 g frozen blueberries
- 250 g banana (peeled) – cut to 5 mm x 5 mm cubes
- 250 g pawpaw – cut to 5 mm x 5 mm cubes
- 250 g melon (peeled) – cut to 5 mm x 5 mm cubes
- 250 g rolled oats
- 400 g rice (cooked)

This will make 5 kg of kererū mix.

Add blueberries last to prevent the mix going mushy.

Mix well to ensure all the ingredients are evenly distributed.