



Best practice techniques for the translocation of North Island tomtits (miromiro, *Petroica macrocephala toitoi*) and South Island tomtits (ngirungiru, *P. m. macrocephala*)

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Cover: Tomtit male. *Photo: Herb Christophers.*

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Abstract

This document outlines best practice techniques for the translocation of tomtits (miromiro/ngirungiru, *Petroica macrocephala*). It contains methods pertaining to the translocation process, from selecting the most appropriate site and time for translocation, and capturing, housing and transporting birds, through to post-release monitoring. It is intended that this information will help to increase the success of future translocations of tomtits.

Keywords: tomtit, miromiro, ngirungiru, *Petroica macrocephala*, translocation, best practice, New Zealand

1. Introduction

The information presented in this document has been compiled from reports on seven translocations of North Island tomtits (miromiro, *Petroica macrocephala toitoi*) and South Island tomtits (ngirungiru, *Petroica m. macrocephala*) that were carried out between 1987 and 2011, and from personal communications with people who have carried out tomtit translocations. Where there were gaps in knowledge, information has been taken from the robin translocation techniques report (Collen et al. 2014), as many of the techniques that are used with robins are also considered applicable to tomtits.

This document is one of a series of reports outlining best practice techniques for the translocation¹ of New Zealand bird species. It is intended that it will be used as an advisory document for those planning the translocation of tomtits, and for those assessing translocation proposals.

Although the mechanics of translocating tomtits (capture, maintenance in captivity at the capture and/or release sites, and movement of birds in boxes) have led to the successful release of apparently healthy tomtits, the establishment of populations at release sites has proven difficult, with just two of the seven translocations being successful. This emphasises the need for particular care when selecting, and probably preparing (i.e. pest control), release sites for this species.

The described methods are based on techniques that have been used successfully during past tomtit translocations and for which reports were available (Empson 2004; Parker et al. 2004; Hughes & Parker 2005; Powlesland et al. 2013). Therefore, they are recommended as current best practice techniques for translocations of tomtits. Where there is no single best way of doing something, a range of techniques are described and, in these instances, the individual preference of the team that is translocating the tomtits comes into play. It is also important to note that the behaviour and reaction of birds to capture and translocation can vary between locations, seasons and years. Therefore, a good translocation practitioner will always closely monitor the birds in their immediate care and respond to their needs accordingly.

Confidentiality of information in this document:

1. The information made available through this document is provided on the basis that it may assist with future translocations, and is shared with people carrying out translocations and research for that purpose.
2. All information referred to within this document remains the property of those reporting or contributing the information, and this report must be properly referenced if the information is cited in other publications.

Any new information or suggested improvements to this document can be sent to the Technical Advisor – Systems Improvement, Terrestrial Ecosystems Unit, Science and Capability Group, DOC (coordinator of DOC’s translocation process)—at present this is Troy Makan (email: tmakan@doc.govt.nz).

¹ Translocation is defined by the Department of Conservation as the managed movement of live plants or animals (taonga) from one location to another. Translocation covers the entire process, including planning, transfer, release, monitoring and post-release management (up to some predetermined end point). A translocation can consist of one or more transfers.

2. Animal welfare requirements

In order to ensure the welfare of animals during translocation and to maximise the chance of a successful translocation outcome; the team of people carrying out the translocation needs to include members with suitable training and experience in the capture, handling, holding and release techniques that will be used. These expert operators are needed on site to demonstrate techniques and provide advice to less-experienced team members (such as volunteers).

When handling wildlife, the animal welfare provisions of the Animal Welfare Act 1999 and its welfare codes² (e.g. Transport within New Zealand) must be met. Note that this best practice guideline has been produced to improve the likely success of translocations of tomtits, and thus promotes a high level of care of the birds and a consideration of general animal welfare. However, it does not attempt to address each of the minimum standards listed in welfare codes.

3. Suitability of a release site for establishing a tomtit population

Managers need to be aware that sites that are on peninsulas or well connected to scrub or forest habitat outside a reserve may be marginal for the establishment of tomtit populations, regardless of the intensity of predator control within a reserve. Parlato & Armstrong (2011) analysed the results of North Island robin (*Petroica longipes*) reintroductions to 16 sites on the mainland and Great Barrier Island (Aotea Island) where predator control had been carried out. They reported that site connectivity to surrounding forested areas had a significant influence on the proportion of released birds known to establish, with the more-connected sites associated with a lower proportion of birds establishing. Although tomtits occupy a greater variety of habitats than robins, including forests, shrublands, and semi-open and edge habitats, they are also capable dispersers. For example, an adult male tomtit released on Tiritiri Matangi Island was found back at its capture site in the Hunua Ranges, which would have involved the bird flying at least 56 km to return to its territory, including a significant distance over the sea. Similarly, a juvenile tomtit that was colour-banded on Blumine Island was later found on Arapawa Island, having dispersed across c. 300 m of water (Parker et al. 2004).

The presence of robins also needs to be considered when selecting a site for the translocation of tomtits. Both South Island robins (*Petroica australis australis*) and North Island robins can be quite aggressive towards tomtits, chasing them vigorously, especially when protecting an area around their caches of stored food (Powlesland 1980; R. Powlesland, pers. obs.). Although no studies investigated the impact of robin-tomtit interactions on Tiritiri Matangi Island (where the robin population was at carrying capacity; Armstrong et al. 2000) or at Zealandia (where there was an establishing robin population), it was considered that the presence of robins at the latter site may have been, in part, why the tomtits eventually established territories and nested outside the predator-proof fence (R. Empson, Zealandia, pers. comm. 2011). By contrast, a tomtit population has established in Cape Sanctuary, despite having been introduced at the same site as where a robin population was establishing (T. Ward-Smith, Cape Sanctuary (Kidnappers), pers. comm. 2011).

² www.biosecurity.govt.nz/regs/animal-welfare/stds/codes

4. Transfer team

While it is possible for a team that includes people with little or no experience of translocations to carry out a transfer, it is vital that the team also contains sufficient people with the necessary skills, such as capturing (mist net extraction skills—not only for the target species but also for non-target species, such as bellbirds (korimako, *Anthornis melanura*)), handling, measuring and banding, disease screening (if necessary), captive husbandry, transfer, release, and post-release monitoring. If there is a need to capture and transfer a large number (30+) of tomtits over a few days, at least two catching teams will usually be needed, each with two to three people (including at least one experienced bird handler and preferably two). It is also important to remember that at least one member of the team will need to carry birds between the capture and processing sites, and there should be an experienced ‘mist netter’ at the capture site at all times. To process the birds, a processing team consisting of two to three people (including an experienced processing person to take measurements, band, etc. and someone to record data) is recommended. A captive team of one to two people is needed to look after birds that are being held in boxes or temporary aviaries.

5. Time of year for transfer

The capture and translocation of tomtits is best attempted during the non-breeding season and at a time when juveniles have reached sufficient foraging proficiency that there is a high likelihood of them being able to fend for themselves should they become separated from their parents during the transfer process. In tomtits, egg laying occurs during September–January (Heather & Robertson 2005), and so late fledglings are likely to be reasonably self-sufficient by April. Therefore, April–August is an appropriate time for translocating this species.

6. Number of transfers

In many translocations of birds (saddlebacks (tīeke, *Philesturnus carunculatus*), robins (toutouwai, *Petroica* spp.), hihi (stitchbird, *Notiomystis cincta*), whiteheads (popokatea, *Mohoua albicilla*)) and other animals, the survival of individuals is typically higher following the first transfer than any subsequent transfers. There may be several reasons for this, including the proportion and age of juveniles in the transfer group, the presence at the release site of conspecifics (i.e. other birds of the same species) from an earlier release, better survival and greater dispersal. However, this does suggest that there is probably merit in planning to carry out a single large translocation of tomtits (if sufficient can be captured), rather than transferring the same number of birds over two or more translocations. An exception to this would be where birds are being translocated to a large block of forest where dispersal beyond a managed area is likely to be a problem.

7. Composition of transfer group

Only seven translocations of tomtits have been carried out to date. Table 1 shows the various features of each of these translocations.

With the exception of the 2011 translocation to Chatham Island, there was no record of either the sex ratio or the ages (adult/juvenile) of individuals released. Therefore, due to this missing information about the composition of the transfer group combined with the limited success of the translocations (only two have resulted in populations at the release sites), it is not possible to advise on the preferred age class of individuals in the transfer group. It is important to aim for an even sex ratio in the released birds.

8. Sexing tomtits

Tomtits are easy to sex as they are sexually dimorphic³. The male has a black head, upper parts and upper chest, and white underparts, wing-bars and sides of the tail (Heather & Robertson 2005) (Fig. 1A). By contrast, the female has a brown head and upperparts, a chest that fades from brown at the top to white on the underparts, and pale buff wing-bars and sides of the tail (Fig. 1B).

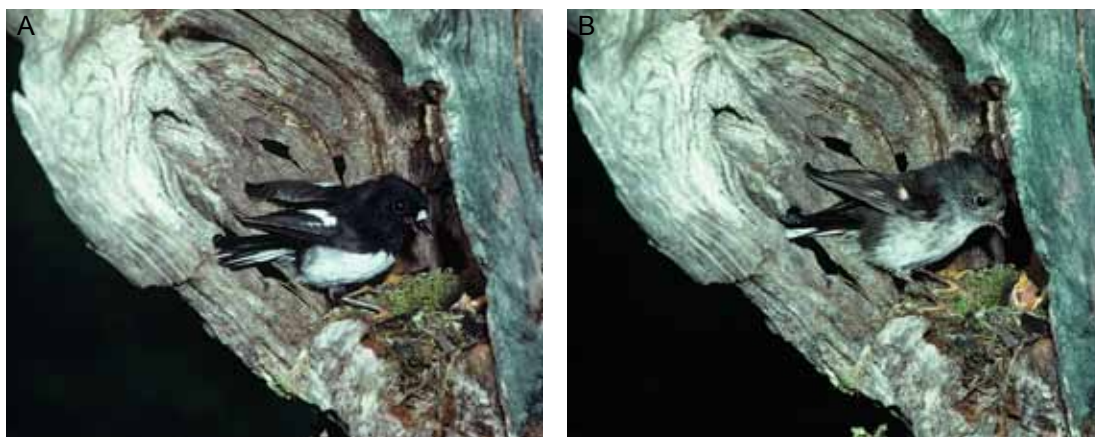


Figure 1. A. male and B. female North Island tomtit at the nest. *Photos: D. Veitch.*

³ Dimorphic—exhibiting, or occurring in, two distinct forms (Oxford University 1982).

Table 1. Some features of the seven translocations of tomtits that have occurred as at May 2013 (taken from Powlesland et al. (2013).

DATE	RELEASE SITE	NUMBER OF INDIVIDUALS			RELEASE TACTIC		BREEDING?	POPULATION ESTABLISHMENT?
		MALES	FEMALES	ADULTS	JUVENILES	IMMEDIATE		
1987	Mangere Island	Unknown	Unknown	7	1	Yes	No	Yes
1998	Chatham Island	Unknown	Unknown	20	5	Yes	No	Unknown
2001–2004	Zealandia	39	12	Unknown	Unknown	Yes	No	Yes
2004	Tiritiri Matangi Island	19	13	Unknown	Unknown	Yes	No	No
2004	Maud Island	Unknown	Unknown	6	0	Yes	No	No
2007–2008	Cape Sanctuary	16	10	Unknown	Unknown	Yes	Yes	Yes
2011	Chatham Island	16	19	0	35	No	Yes	No

9. Ageing tomtits

Juvenile tomtits are distinguishable from adults by their plumage. Juveniles have streaky crown feathering (Fig. 2), and the black and brown colouration of males and females, respectively, tends to be duller than that of adults, especially on the wings and upper chest. In addition, if tomtits are being caught during the moult in January–February, adults are likely to have a mix of worn, growing and new flight feathers, whereas all of the feathers on juveniles will be new.



Figure 2. Juvenile female Chatham Island tomtit caught in a mist net, showing streaky crown feathering. *Photo: R. Powlesland.*

10. Capture

It is fairly easy to capture tomtits when they have been pre-conditioned to accept mealworms (Knegtmans & Powlesland 1999). Tomtits can be ‘trained’ to approach for mealworms during the weeks leading up to a transfer by making a noise when feeding them, such as tapping the lid of a mealworm container against the base or clapping, so that they learn to associate the noise with receiving food from a person. It is important to offer the birds mealworms at least daily, and preferably two to three times during the first couple of days, to ensure that the birds associate the attraction sound with being fed (W. Cash, DOC, pers. comm. 2011). Taped tomtit calls (specific to the target population) can also be useful for attracting birds to a capture site, especially males (Westbrooke et al. 2003; R. Empson, pers. comm. 2011).

Mist nets (30-mm mesh size) are most often used to capture tomtits. Ideally, mist netting should be carried out in the early morning (when there is less chance of sunlight on the net) and during calm conditions (so that the net is not moving) (B. Hughes, pers. comm. 2012).

If a bird has been trained to approach for mealworms and the net is placed in its usual flight path (i.e. in a gap that is regularly flown across by the tomtit⁴, the bird is likely to fly into the net (T. Ward-Smith, pers. comm. 2011; B. Hughes, pers. comm. 2012). Alternatively, as the bird approaches the net or is perched near the net and when the catcher knows the bird is watching, mealworms can be dropped or thrown onto the ground beside the net (the bottom of the net being on the ground) on the same side as the catcher (i.e. on the opposite side from the bird) and the chances are the bird will fly into the net in its endeavour to reach the food (T. Ward-Smith, pers. comm. 2011). Whichever method is used, it should not be necessary to scare birds into the net.

⁴ Note: it takes regular observations during the habituation process to determine a bird’s usual flight path.

Where tomtits have not been habituated to approach for mealworms and a net has been set up, individuals will sometimes inadvertently end up in it (B. Hughes, pers. comm. 2012). However, sometimes a bird will need to be frightened into the net just as it touches down briefly to grab a mealworm, because tomtits often make short and slow flights between perches, meaning that they often bounce off a mist net rather than hitting it hard enough to become caught in a pocket (W. Cash, pers. comm. 2011).

If a tomtit eats two to three mealworms and then disappears without being captured, stay put. Invariably the bird will return to the site within 30 minutes, so you will have another chance to capture it.

Taped calls have been used to attract untrained tomtits to mist net sites. Having a sound system with a speaker on each side of the net means that when a bird approaches a speaker, the calls or song can be switched to the speaker on the opposite side of the net, often resulting in the bird flying into the net as it endeavours to fly directly towards the other speaker.

A drop trap—a five-sided rigid wire frame of c. 400 × 400 × 150 mm that has fine mesh covering the sides and top—was also used to catch a couple of juvenile Chatham Islands tomtits (*Petroica m. chathamensis*) on South East Island (Rangatira) in 2011 (Powlesland et al. 2013). The trap is propped up on one side with a stick that is about 120 mm long and to which a length of nylon fishing line is attached (Fig. 3). When a tomtit goes under the trap to get a mealworm on the far side from the opening, the stick is quickly tugged away, leading to the trap falling down over the bird. There is a small flap in the mesh on one side for retrieval of the bird. When Bill Cash trialled the use of a drop trap to catch tomtits on Blumine Island, he found that putting down a pile of mealworms was effective for enticing the bird to come down and stay down for long enough to allow the string to be pulled and the trap to drop.



Figure 3. South Island robin about to be caught using a drop trap.
Photo: R. Powlesland.

Once captured, transfer the bird into a black cloth bag, which can then be hung securely in a shady, quiet place for up to 30 minutes, while other birds are being caught at the site.

Be aware that you are likely to capture more males than females. This is particularly true when capturing in winter–spring, as the birds are likely to be paired at this time, and males tend to be easier to attract with taped calls and to become accustomed to feeding on mealworms.

11. Transfer to base for ‘processing’

Black cloth bags can be used to transport captured tomtits short distances from the capture location to a central site or ‘base’, where people are set up to measure, band, examine and disease-screen the birds. Tomtits should not be carried in bags for longer than 30 minutes or across difficult terrain where there is a risk of the carrier falling over—birds have occasionally been injured or killed this way. There must be only one bird per bag, and the carrier must have one hand free while walking to help avoid falls that could crush the bird.

An alternative method that was used by the team transferring South Island robins from reserves in Dunedin to Orokonui Ecosanctuary (Hegg & Jamieson 2010) could also be considered for tomtit translocations. During the transfer from the capture location (in steep terrain) to the ‘base’, the birds were still carried in cloth bird bags, but these were protected by a sturdy cardboard box fitted inside a backpack. Up to five bird bags could fit inside the cardboard box, suspended from a perch at the top of the box. The bags need to be hung in such a way that they do not swing and bang into each other, and the sides of the box should be padded. Also, note that this technique should only be used during cool conditions—otherwise birds may overheat in such confinement.

Each cloth bag should be labelled with the capture time, catcher / team name, location and gender of bird, if known.

12. Processing the birds

Processing must be carried out in a dry, sheltered, quiet and shaded area such as indoors or under a tent fly. Tarpaulins would only be suitable in calm conditions, as they can be noisy in the wind.

All of the handling (banding, disease screening, etc.) should be done immediately after removing the tomtit from the cloth bag—repeat handling should be avoided. Never try to catch a bird from a transfer box—it is very stressful for the bird, risks injuring it and may result in the bird’s escape.

Translocated tomtits are usually given individual colour band combinations, so that it is easier to monitor the survival, territory location and identity of pair members after release, thus enabling more detailed data to be obtained. If resident nestlings/juveniles are to be banded and monitored over several seasons, it may be helpful to use one colour with the metal band to specify a cohort, e.g. released birds, chicks of each season.

When using colour band combinations, the metal band must be placed below the colour bands on the leg. This is considered best practise because metal bands are heavier than colour bands. Therefore they may increase band wear on colour bands if the metal is placed above the colour band (due to the bands constantly running up and down the legs as the birds move around). Also, if the colour band becomes brittle or opens slightly the extra weight of the metal band may result in the colour band being pushed over the ankle joint, effectively preventing the bird using its toes (G. Taylor, pers. comm. 2012). Refer to the DOC banding manual (Melville 2011) for further information about banding (banding permit holders will have a copy).

A thorough disease risk assessment should have been carried out as part of the translocation proposal (following the requirements of DOC’s disease risk assessment tool (hereafter referred to as DRAT) and associated disease management workbook⁵). Often this will result in a series

⁵ This is a requirement of DOC’s Wildlife Health Standard Operating Procedure

of screening tests being required. A physical examination to detect signs of ill health and provide a general assessment of physical condition needs to be undertaken for all birds as part of processing (Fig. 4). In all cases, the types of screening and diseases of concern should be specified, and thorough notes taken. This is important not only when a parasite or disease has been found but also when it has not—failure to record both presence and absence makes summaries pointless and provides no opportunity for building knowledge to inform future translocations (Sutherland et al. 2010). Furthermore, there should be a clear statement about what will happen if parasites or diseases are detected. In many cases, this may simply result in re-release of the individual at the capture site; however, in other instances it may result in treatment before re-release or translocation. These decisions can often be developed through discussion with veterinary specialists using the DRAT process, or through consultation at the time of reviewing the screening results. If the latter approach is taken, always ensure either that the translocation team includes a specialist (vet) or that one is available for contact (particularly outside business hours).



Figure 4. A black robin (*Petroica traversi*) fledgling with an avian pox gall under its beak. Photo: D. Merton.

13. Temporary housing in aviaries

With appropriate care, tomtits awaiting transfer from the source site or being housed at a soft-release site have been held for up to four nights in a temporary aviary or overnight in a pet carry box. It is often necessary to hold tomtits in a temporary aviary for a few days while enough birds are captured for the translocation, especially when catching large numbers of birds, or when the source or release site is in a remote location. The aviary should be located in forest under a canopy—this not only provides shelter from extremes of weather, but limited experience also suggests that tomtits settle more readily in captivity in such an environment (Fig. 5). If tomtits are only being held overnight, transfer boxes are sufficient. It is preferable to use wooden boxes with shade cloth and netting on one side rather than cardboard boxes for this purpose, as they provide better ventilation and light.

On Kapiti Island, tomtits were housed in a small aviary measuring 1 m × 2 m × 2 m high that was lined with shade cloth, or in a small tent of c. 1 m × 2 m × 0.5 m high (R. Empson, pers. comm. 2011). A large aviary, c. 3 m × 3 m × 2.5 m high, was used on South East Island (Rangatira) (Chatham Islands group). In each aviary, logs containing invertebrates and leafy branches and perches were provided, and a shallow plastic dish of water was placed on the ground. Food trays were sited near the ground, with perches and vegetation placed strategically for cover to encourage the tomtits to come down to feed.



Figure 5. Aviary located in forest on South East Island (Rangatira) that was used to hold tomtits prior to transfer. Photo: R. Powlesland.

If holding adult tomtits prior to transfer, it is advisable that males and females are kept in different flights or aviaries out of sight of each other. Birds must be monitored closely to determine whether any are being regularly chased and not getting access to food. If regular aggression is occurring, all the birds must be transferred and released within a few hours, or the dominant or submissive bird held in a separate aviary. Occasional bill snapping and chasing was even seen among juveniles that were being held on Chatham Island, although this did not warrant separating the aggressive bird from the others (R. Powlesland, pers. obs.).

During the entire captive period, the birds must be treated with the utmost care and consideration to help reduce their stress levels. They need to be kept in a quiet environment—loud noises and activity nearby will scare them, so make sure that people do not have loud conversations, slam car doors or make other loud noises around the captured birds. If at all possible, site aviaries well away from people’s accommodation, and public access around them should be minimised or prevented.

Be aware that predators may visit the aviary and cause considerable stress for the occupants. For example, on Hauturu/Little Barrier Island, a morepork (ruru, *Ninox novaeseelandiae*) visited the aviaries housing whiteheads (popokatea, *Mohoua albicilla*) every night. The transfer team was not aware of this on the first night that there were birds in the aviary, but later suspected that it caused the death of two birds by repeatedly hitting the sides of the aviary. They tried to scare the morepork away using various methods but it was extremely persistent. They eventually found that covering the aviaries with vegetation prevented the morepork from hitting the sides and disturbing the roosting birds (K. Parker, Massey University, pers. comm. 2012).

13.1 Capture in the aviary on transfer day

The following method has been taken from the whitehead translocation techniques report (Powlesland & Parker 2014):

- On the day of catching and transfer, give the birds at least 1 hour of undisturbed daylight to feed.
- Have the transfer boxes well prepared in advance.
- Select a team of about six people—take care when choosing the people and make sure that they are very careful in the aviary. Birds sometimes go to ground so everyone needs to watch where they put their feet!
- Enter the aviary and starting at the end closest to the door carefully remove all of the vegetation from the aviary, preferably in two steps (i.e. into an annex and then outside the aviary). The removal of vegetation will need to be done in stages and people should be

kept at one end so that the birds can flee to the other—especially when the aviary door is open. Assign somebody by the door when it is open to ‘guard’ the air space.

- When all the vegetation has been removed, get all six people into the aviary. Two people will work with hand nets at one end of the aviary—taking a wall each and working together. Their role is to catch the birds against the walls with the nets using a controlled swing—swinging too hard will injure or kill a bird. The other four people should wait behind the catchers with black bags at the ready.
- Place the birds into the bags, and then tie them up and hang them somewhere safe, e.g. a piece of wood with nails in it can be hung up in the aviary and used for this purpose.
- The last two to three birds will be the hardest to catch—therefore, those waiting behind the catchers may need to gently coax these birds up to the ‘catching’ end of the aviary.
- Once you have finished, count all the bags to make sure that all the birds have been caught. If any are missing, conduct a very careful search of the leaf litter.
- Weigh each bird and check the metal number and colour bands against the data sheet—sort out the best system for doing this smoothly without tripping over each other and do it in the aviary in case a bird escapes.
- Stick a piece of duct tape to the top of each translocation box and record each bird’s bands as it is put into the box. See section 17 for the number of tomtits to be placed in a transfer box.
- **Important note:** This entire process needs to be done quickly but calmly as it is very stressful for the birds and the people.

14. Feeding

Water should be supplied *ad libitum* in a shallow container so that birds can drink and bathe while in the aviary, or drink when held overnight in a transfer box. Planter dishes that are c. 300–400 mm wide and 20–40 mm deep are ideal, filled with water to a depth of 15–20 mm. The addition of a rock, part of which gently slopes into the water, will help birds to access the water for bathing and drinking.

Tomtits that were being transferred from South East Island (Rangatira) and Pitt Island (Rangiauria) to Chatham Island in 2011 were housed in temporary aviaries on each island, and were fed mealworms from soon after dawn through to dusk at 1.5–2-hour intervals (Powlesland et al. 2013). The mealworms were provided on ground cleared of litter and the tops of broad logs at three sites in each aviary, so that a dominant bird could not prevent others from accessing the food. Six large or ten medium-sized mealworms were provided for each bird at each feeding time—some mealworms managed to crawl away under cover before being eaten by tomtits. Slaters were also offered; however, although tomtits fed on them, most slaters managed to retreat under litter before being eaten. On Kapiti Island, captive tomtits were offered small mealworms, wax moth larvae, maggots and compost material containing many invertebrates (R. Empson, pers. comm. 2011).

The ground in an aviary should be covered with a thick layer of litter that has been gathered not long before the first tomtits are released into the aviary. The litter provides the birds with a source of natural and familiar prey, albeit a limited amount. In addition, during the 2011 Chatham Islands transfer, two buckets of freshly gathered litter were spread in each aviary each morning to ensure that there was a continued supply of natural prey for the birds. This daily provision of litter is well worth replicating when temporarily holding tomtits in an aviary, as it ensures that birds are transported and released in the best condition possible. However, for biosecurity reasons, leaf litter should not be transported between source and release sites.

15. Tomtit husbandry

Always ensure that there is one person on the team who is dedicated to looking after the captive tomtits and their food supply. If tomtits are held as a flock in an aviary, it is important to spend time watching them to check that one or two individuals are not harassing the others. Sometimes a bird of either sex will bill snap and chase others from perch to perch. In the case of the 2011 transfers of juvenile tomtits to Chatham Island, such chasing tended to last only a minute or two. Having several branches with many twigs and foliage in the aviary helps to provide ample perches and some cover for submissive individuals to hide in.

16. Transfer box design

Figure 6 shows a temporary holding box design that was originally developed for North Island robins, but which would also be suitable for tomtits. If the birds are going to be in the boxes for only a few hours (and so no food or water needs to be provided), pet carry boxes that are loosely filled with the ends of branches that have many twigs and a lot of foliage can be used (Fig. 7). The branches provide the birds with ample perches and help to provide some cushioning if there are any sudden bumps during transfer. During tomtit transfers to Zealandia, forest litter, which contained invertebrates and to which mealworms and wax moth larvae were added, was put in the boxes.

Wooden transfer boxes can be reused once they are washed, sprayed with Trigen and dried in the sun. Cardboard pet boxes can also be reused provided that a thorough wipe with a wet cloth can adequately remove dirt and faeces, and the box is then sprayed with Trigen. If cardboard boxes are heavily soiled, they should be discarded.

17. Transport

Tomtits can also be transported in the modified pet carry boxes described in section 16—‘Transfer box design’, with only one adult or two juveniles per box.

Water must be removed before travel to avoid getting the bird(s) and box wet. If birds are being translocated immediately from the capture site (i.e. released within a few hours of capture), they will not need water.

Throughout the transfer, the birds should be kept in the shade but away from draughts. Minimise noise and vibrations as much as possible (Gilbert 2009). When birds are being transported by road, the floor of the vehicle should be lined with mattresses or foam rubber (e.g. camping sleeping mats) to reduce bumps/impacts, which in turn will reduce stress to the birds. Ensure that the boxes are secured and stable, and that the ventilation holes are not covered by neighbouring boxes or other objects.

Chatham Islands tomtits were released into aviaries at the release site and held for 2–4 days before being released, using the same husbandry as used for holding birds at the capture site—i.e. a delayed or soft-release procedure. As yet there is insufficient information from tomtit translocations to make recommendations about whether tomtits should be held temporarily at the release site or be released immediately.

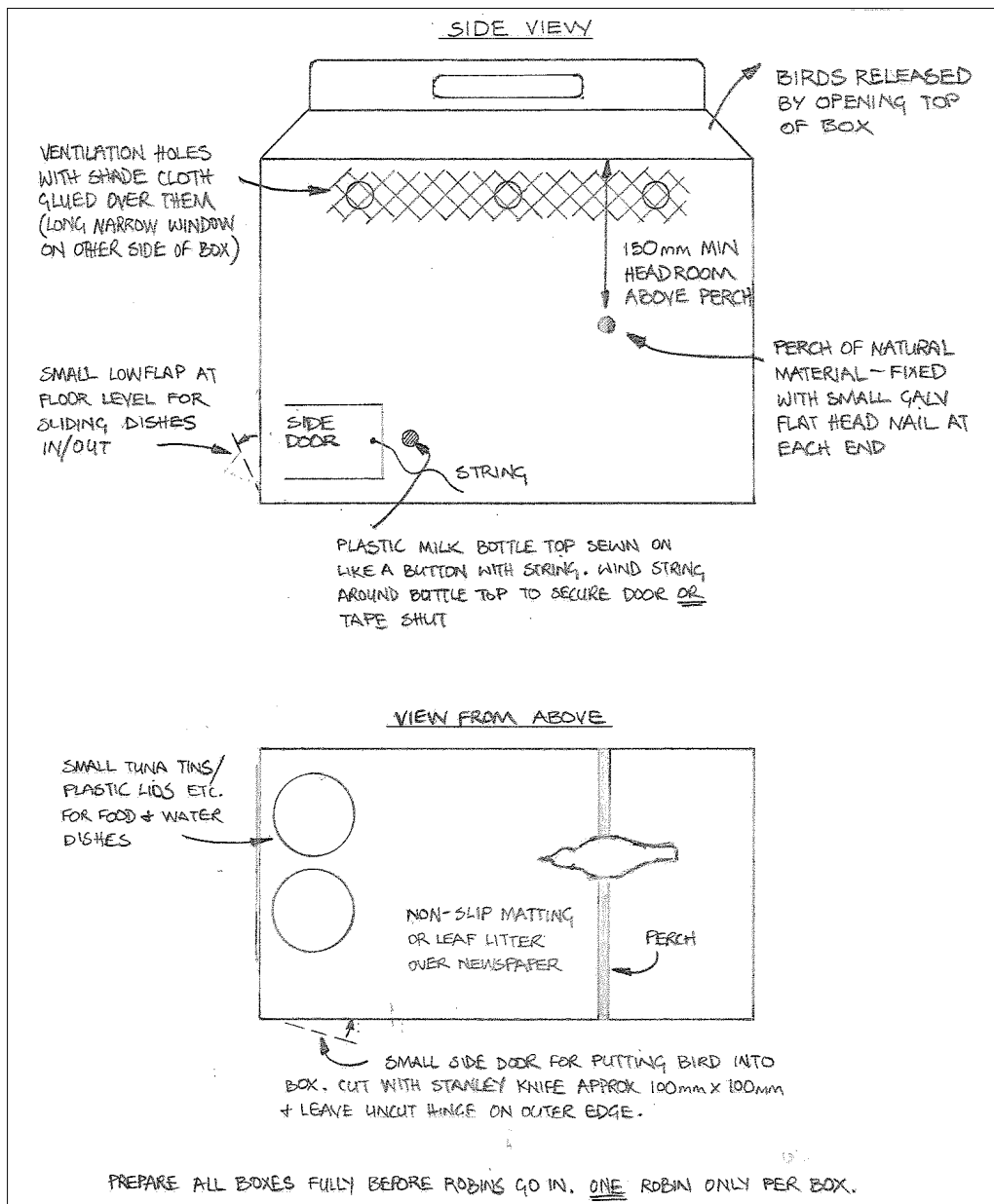


Figure 6. Temporary holding box design—based on the box design for robins by Tim Lovegrove in 2005.



Figure 7. Pet carry boxes containing twigs and foliage that are ready to receive tomtits for transfer. Photo: R. Powlesland.

18. Release

Tomtits should be released in the morning or by early afternoon at the latest. An early morning release gives the birds plenty of daylight hours to find food and shelter before evening.

Releasing birds on the same day as capture works well for short-distance transfers; however, only do so if the birds can be released by mid-afternoon (2 p.m. at the latest during winter). Otherwise, for longer distance transfers, keep the tomtits in their transfer boxes overnight with food and water, and release them the next morning.

When the time comes to release the birds, ensure that the boxes are facing towards a clear, uninterrupted, suitable escape route, with the releasers, spectators and any photographers behind the boxes. It is not appropriate to release birds in the middle of a circle of people as this means there is nowhere safe for the birds to fly to, which would be very stressful for them. If any birds fly back into the crowd, tell people to remain still.

To release the birds simply open the boxes and let them fly out in their own time. Never try to catch a bird from a transfer box—it is very stressful and risks injury to the bird. Although it is best to let the birds fly out when they are ready to depart, it is sometimes necessary to coax a bird out, especially if there is a lot of vegetation in the transfer box in which they can hide. Check the boxes very carefully after the birds have been released to make sure that all birds have left.

19. Post-release monitoring

19.1 Purpose

Post-release monitoring informs future management about translocated populations and can help to answer questions such as (Parker et al. 2013):

- Will the reintroduction be successful?
- Is management needed/sufficient?
- Will supplementary translocations be needed?
- Is genetic diversity sufficient?
- Do the translocation techniques need to be refined?
- Does release site selection need to be refined?

Monitoring must also relate back to the operational targets in the translocation proposal. The design of post-release monitoring needs to match the questions you are trying to answer and the subsequent intended use of the data.

The need for monitoring is related to uncertainties about the translocation. Attempts to establish new populations of tomtits through translocation have met with fairly limited success and so all translocations of this species need to be closely monitored.

Post-release monitoring can be used to determine where translocations have failed (Fig. 8), whether a different management approach would prevent failure if the species was translocated to the same site again and, if not, the feasibility of future translocations. For example, if monitoring shows that only males are present, there may be an issue with predators; or if pairs are present and breeding but all the offspring have disappeared, there is likely to be a problem with the retention and/or recruitment of juveniles.

On the other hand, successful translocations provide useful information for similar projects in the future.

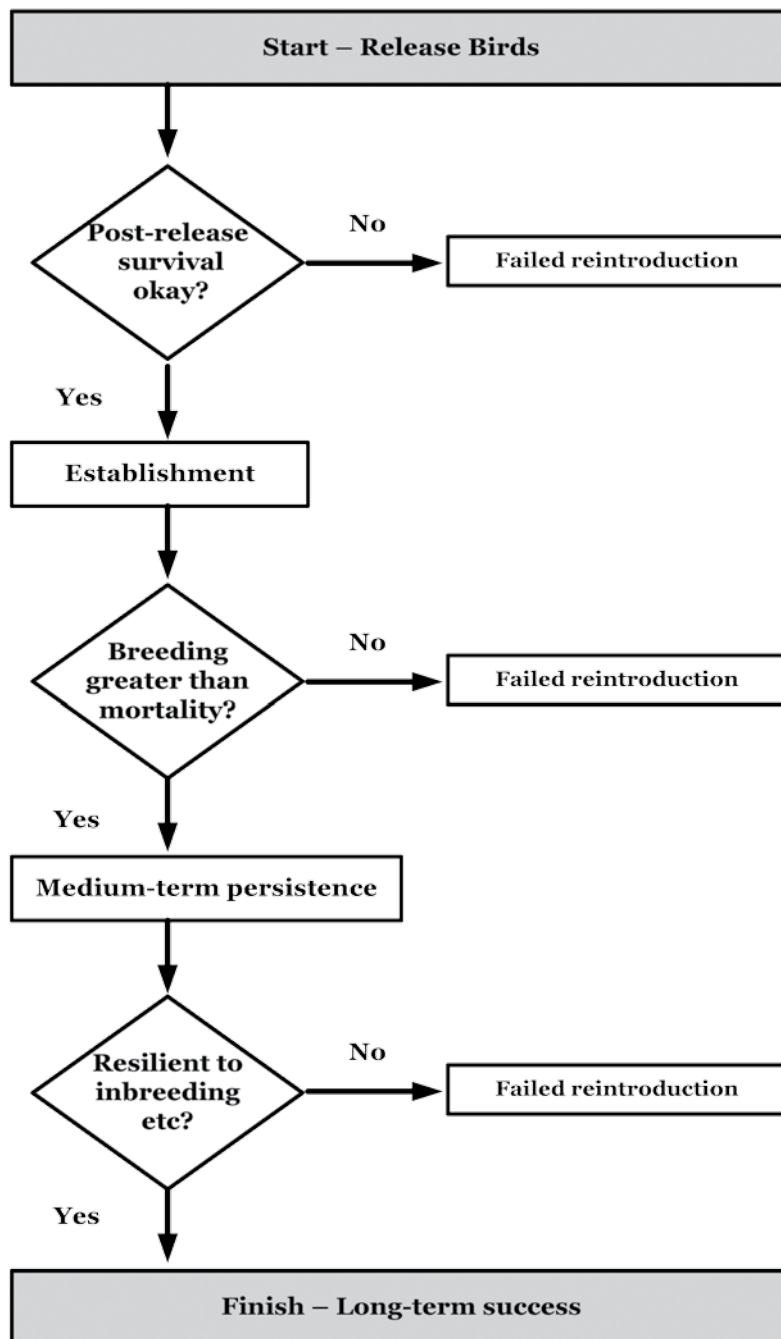


Figure 8. Determining the success or failure of a translocation (Parker et al. 2013).

19.2 Recommended monitoring

To enable suitable monitoring, released tomtits should be individually marked (colour banded) and the same search method needs to be used consistently (e.g. search points, lines or routes). Also, search effort (time spent surveying) and timing (weekly, monthly, quarterly, pre- and post-breeding surveys) must be consistent (Parker et al. 2013). Trained observers will be required and their records need to be interpretable, as different people may be analysing the records. Ideally, monitoring records should be entered into a computer spreadsheet and at least two copies saved at different locations to prevent accidental loss.

Monitoring usually involves:

- Searches of suitable habitat within the release area for the presence of released individually identifiable (colour-banded) birds (to estimate post-release survival)—if the tomtits were

trained to approach for mealworms when a distinct sound was made prior to capture, then such a procedure can be repeated at the release site to enhance the detection of birds (Powlesland et al. 2013)

- Mapping territories when pairs form (to determine post-release survival, recruitment and breeding rate)
- Monitoring nesting activities and outcomes (to determine recruitment, breeding rate and breeding success)
- Banding fledglings (to determine recruitment of juveniles)

Following initial monitoring of the newly released tomtits, breeding season monitoring should continue for a number of years until it is known whether tomtits have established at the site and are persisting in the long term, which indicates that the translocation has been successful.

A high level of commitment to monitoring is especially important for translocations to sites with a fair degree of uncertainty (e.g. small, edgy, questionable habitat). Where possible, population size should be estimated at such sites through distance sampling, site occupancy or the resighting of individually marked birds (Parker et al. 2013). Less intensive monitoring, such as annual surveys for breeding pairs, might be acceptable for translocations with a higher expectation of success, such as those to mammalian-free islands that contain excellent habitat.

20. Record keeping

It is important that good records are kept throughout the translocation process, so that methods can be assessed, lessons learnt, techniques refined and practices improved for future translocations. Knowledge sharing becomes even more important where multiple and often independent groups are translocating species.

The way in which methods and results are documented is also important. Standardisation of documentation allows factors that promote or inhibit translocation success to be evaluated, and leads us further towards evidence-based conservation. For example, while anecdotal accounts of bad weather affecting the result of a translocation may not be helpful, quantifiable information describing the weather conditions (e.g. ‘a gale force southerly for 5 hours’) will allow people to make a sound evaluation of whether this influenced the success of the project.

You should aim to record everything that is done—especially if things are done slightly differently from how they were planned. Also, it is important that records are thorough, with all components of a procedure explicitly stated, so that it is possible to differentiate something that did not happen from something that did happen but simply was not written down. For example, when recording the presence of ectoparasitic mites on birds during health examinations, record ‘seen’ and ‘not seen’ for each bird, so that a summary of ‘five birds had mites’ is meaningful; this makes it clear that every bird was actually checked for mites and so the data indicate the true prevalence of mite infection (proportion of all birds with mites), rather than potentially reflecting haphazard observations where mites were recorded if they happened to be seen but may also have been present on other birds that were not searched (giving a false prevalence).

Alongside good record keeping, reporting is also important, as this enables project managers to fully evaluate a translocation and its outcomes, and others to learn from your experience and improve the chances that future translocations will be successful. DOC’s reporting instructions (Collen & Cromarty 2011a) include a reporting template, which shows all of the information that is required to produce an informative report. This document should be read in advance of the translocation, so that you are familiar with the standardised information that needs to be included in a transfer or monitoring report. In addition, record sheets that clearly list the data to

be collected during the translocation should be prepared in advance, so that everyone involved in the translocation understands what information they need to record.

Translocation practitioners from various organisations have recently proposed a set of minimum requirements for documenting translocation planning, release methods, post-release monitoring and the writing of informative reports on project outcomes (Sutherland et al. 2010). These can be achieved by:

- Documenting the planned translocation (by completing DOC's translocation proposal form; Collen & Cromarty 2011b)
- Documenting release methods and conditions (using DOC's reporting instructions (Collen & Cromarty 2011a) as a guide)
- Documenting post-release monitoring (see section 19—'Post-release monitoring')
- Providing reports on the translocation using DOC's reporting instructions (Collen & Cromarty 2011a).

21. References

The reports that have DOCDM numbers in the following list are available on request from DOC.

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Further reading:

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Appendix 1

Details of report contributors:

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⁶ For more information, refer to: www.wmil.co.nz (viewed 1 April 2014).

⁷ For more information, refer to: www.taiko.org.nz/index.html (viewed 1 April 2014).

⁸ For more information, refer to: www.doc.govt.nz (viewed 1 April 2014).

⁹ For more information, refer to: www.visitzealandia.com/ (viewed 1 April 2014).

¹⁰ For more information, refer to: www.tiritirimatangi.org.nz (viewed 1 April 2014).

¹¹ For more information, refer to: www.haumoana.com/pages/capesanctuary.html (viewed 1 April 2014).