Wingspan Birds of Prey Trust

HACK-RELEASING NEW ZEALAND FALCONS: A BEST-PRACTICE MANAGEMENT GUIDE

WINGSPAN

BIRDS OF PREY FOR OUR FUTURE

CONTENTS

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Introduction

The Karearea, New Zealand falcon faces many threats in the wild. Together these threats severely impact the survival and breeding success of falcons nationwide and have led to the New Zealand falcon being classified as threatened with the risk of extinction. Wingspan is working hard trying to reduce these threats through education and advocacy. This requires large-scale changes in attitude and in the way we manage our environment, and this takes time. In the meantime more immediate hands-on action is required. Wingspan compensates for the threats to falcons by releasing captive reared falcons into the wild. In some areas this means re-establishing locally extinct populations, in others supplementing declining numbers. The following management guide outlines a detailed, best-practice step-by-step method for releasing New Zealand falcon chicks into the wild.

An Introduction to the Hack-Release Technique

>> Hack-releasing, or hacking as it is often referred to, is a soft release technique that enables young birds of prey to be released into the wild in the absence of their parents. The release technique was first developed by falconers who wanted to improve the hunting skills of their young birds by encouraging them to learn to hunt for themselves in the wild before they were re-trapped and trained to hunt for a falconer. The modern-day practice of hacking for conservation follows the same process of release and supplemental feeding, but rather than bringing the birds back into captivity, leaves the young to disperse and become independent as they would in a wild situation. The refinement and application of the hack-release technique has played a key role the recovery of many threatened raptor species around the world, including species which would have become extinct without such action such as the Peregrine falcon in North America & the Mauritius kestrel in the Indian Ocean.

Hacking involves feeding young birds in an enclosure or ‘hack-box’ until the birds are old enough to learn to fly and hunt for themselves as they become independent. The hack-box provides protection from predators while affording a view over the surrounding area, allowing the young birds to imprint on the release area and begin associating it with food. Once the young are regularly exercising in the hack-box, the front is opened allowing them to venture outside and gradually learn to fly. Without the protection of their parents, the newly fledged young are at risk from introduced predators, thus along with supplemental feeding, predator control is an important component of any hack-release.

The hack-release technique cannot be used for releasing adult falcons because they do not return to a hack box. To ensure fitness and hunting ability prior to release the rehabilitation and release of adults requires the use of traditional falconry training techniques.

If the procedures outlined in this management guide are followed, we feel that an independent, hacked New Zealand falcon will be comparable in every aspect including tolerance of man to a New Zealand falcon that has been raised in a wild nest.

Preparation

Evaluation of Release Area

>> There are several important considerations to be made when deciding where to release falcons. Firstly, the rational for the release occurring in that area should be considered and the relative benefits of the site over others assessed. Part of this assessment requires knowledge of the local falcon population, specifically whether there are any resident falcon pairs overlapping the release site. Breeding falcons are highly territorial and will harass, drive out and at worst kill young falcons that are released into an established territory so this should be avoided.

After establishing that the release area is a vacant territory, the most important consideration is whether the site provides the essential elements that young falcons require to survive. This includes suitable habitat and an adequate prey base. What hazards the site may present to young falcons also need to be carefully considered e.g. what potential predators are present, electrocution hazards (un-insulated low-voltage power poles), collision risks such as windows and traffic, drowning hazards such as water troughs etc. All of the potential hazards to falcons cannot be expected to be removed, however a thorough understanding of what hazards are present will allow many of these potential threats to be managed and minimised.

Factors to consider in terms of habitat include whether there are suitable areas for the birds to shelter from inclement weather and to roost. Falcons are very generalist in their nesting requirements; the type and proximity of suitable nesting habitat should be considered in the context of the aims of the study and the known nesting habits of the falcons in the wider region surrounding the release site.

Figure 1. Example prey base assessment notes.

Date: 12th Oct 2012	**Observer:** Rich	**Location:** 1164 Paradise Valley Road, Rotorua		
Count station	**Time**	**Species**	**Number**	**Notes**
Main paddock	9.00 – 9.30am	Blackbird	2	
		House sparrow	10	
		Small bird	25	Large flock – finches?
		Rabbit	3	Adults
		Cricket	1	
Top of hill	11.00-11.30am	Spur-winged plover	2	
		Song thrush	1	
		Silvereye	10	
		Etc…		

The prey base should be assessed by noting the species of birds, mammals and invertebrates present in the release area and their abundances. Complicated and highly accurate counts leading to species density estimates are not necessary in this case. Rather a simple methodology that provides a general impression of food availability is more suitable. For example, the prey base can be assessed by sitting on several vantage points spread over the site and noting the number of each species of bird, mammal and insect observed in half an hour into a simple table (see example Table 1.). If the observer is not experienced in identifying birds they can be grouped into more generic categories e.g. small, medium or large bird etc. These counts should be repeated several times in each season prior to the release site being chosen to ensure that there is year-round food available.

Permits

>> Before starting to build a hack-box, organising food etc. the necessary permits for releasing falcons should be gained from the Department of Conservation. A "translocation application" is required for releasing NZ falcon to supplement already existing populations or to start new populations. If the application is approved then a permit is issued. Responsibility for processing translocation proposals sits with Permission staff in DOC.

To ensure the smoothest and most pain-free route to gaining a permit we recommend:

1. Download the application form from the DOC website (http://www.doc.govt.nz/about-doc/concessions-and-permits/research-collection-and-wildlife-permits/),
2. Before you fill out the form make sure you have thoroughly read it and understand its content, and then
3. Discuss the application with a permission team staff member (who are located in Department of Conservation Shared Service Centres in Hamilton, Wellington and Christchurch).

Further to this, it is essential for any hack-release to have a nominated leader/co-ordinator, i.e. someone who can commit to the duration of the hack-release, take responsibility for feeding the birds, co-ordinate volunteers, maintain public relations and make decisions on what should be done when things do not go according to plan. Failure to nominate this person at best risks protocols not being implemented properly, at worst the premature death of the falcons. These roles and responsibilities should be determined early in the release planning process.

N.B. To ensure that people undertaking hack-releases are sufficiently skilled, prepared and committed to employing the best-practice methods outlined in this manual, Wingspan requires any individual or organisation that it partners with in a hack-release to sign a Memorandum of Understanding between them and Wingspan before any falcon chicks will be provided for release (See Appendix Two).

Hack-Box Design

Figure 2a. Hack box showing the slatted door (closed), front perch and predator proof tin sleeves and, b. the box with an open door and hack-tables fixed to the inside of the open door, c. step ladder access from behind the box & external feed tube, d. view through 'peep' hole and slatted interior door.


Kakepuku Mountain Release Project


Kakepuku Mountain Release Project


Kakepuku Mountain Release Project


Kakepuku Mountain Release Project

>> Hack-boxes can vary in design depending on the availability of local materials and the planned longevity of the programme. However, all hack boxes should meet the following criteria:

1. Provide shelter against inclement weather - including a baffle to hide behind and shelter from extreme weather;
2. Be constructed from weather resistant materials e.g. H4 plywood;
3. Be large enough to comfortably accommodate the maximum number of falcon chicks expected to be released at any one time;
4. Allow food to be provided without the birds in the box seeing who is providing it, or risking the birds escaping;
5. Allows the food to land onto a white board or hack-table (e.g. approx. 50cm x 50cm). A hack-table of the same size and colour should also be placed on the outside of the hack-box and should be able to be accessed by the birds before they can fly (once the door is opened) (Fig. 2b);

6. Have a side entrance that allows easy access to the birds inside the box without risking the birds escaping (so that sick birds can be removed, or birds taken out to attach transmitters, without risk of other birds getting out),
7. Feeding / access doors should be lockable to prevent access by the general public;
8. Feeding and access doors should be easily accessible by step-ladder and the box should include ladder props to ensure the stability of the ladder when leant against the box;
9. Include ventilation suitable to prevent overheating (without letting rain in);
10. Include removable perches that allow birds to perch at a variety of heights (e.g. one or two large rocks and/ or logs);
11. Be lined with an inert substrate at least 2cm deep. River gravel (approx. 1cm diameter), bark chips (approx. 2 cm pieces) or a mix is best (wood dust/shavings, hay or straw should be avoided as much as is practical to avoid the risk of aspergillosis – a serious respiratory disease);
12. Be inaccessible to ground predators (Fig. 2a and the Predator Control section below);
13. Have viewing holes that allow the birds to be observed wherever they are in the box (including behind the baffle);
14. Have a barred/slatted, not mesh, door (to prevent feather damage) that provides a wide view of their surroundings – ideally this should be slatted on the inside and mesh covered on the exterior;
15. Have a door that can be lowered quietly and remotely without disturbing the birds in the box; and
16. Have multiple perches leading off from the front of the box so that birds can venture out and explore once the door is opened and to provide multiple options for landing from different directions.

NB. The provision of water for drinking or bathing within the hack-box is not required (the birds will get all the water they need from their food).

The standard design that Wingspan uses is based on the design developed by the Peregrine fund in the USA. A detailed description of the design and dimensions of this hack box can be found on the Peregrine fund website http://www.peregrinefund.org/docs/pdf/research-library/manuals/manual-hacking.pdf. We have found that this size box is ideal to release three New Zealand falcons at a time (but four birds can be released from this size box if necessary). This design can be made more long-lasting by adding reinforcing timber to the base of the box (taking care to ensure ample drainage through the bottom of the box is maintained). Another slight modification that can be considered is a main door that opens horizontally one half at a time (a 'half horizontal door') so that birds can be released in stages with more advanced birds being able to exit the box earlier than those that are less developed (this approach is outlined in more detail in the Opening the Hack-Box section below).

Locating the Hack-Box

>> Wild New Zealand falcon nests are often located ½ to ¾ of the way up a slope, have a wide view of the surrounding area and are sheltered from prevailing weather. Although a hack-box does not necessarily need to be on a slope, it should provide a good view over the surrounding release area and the side of the hack-box that is open should be angled so that the birds inside are sheltered from the worst of the prevailing weather.

Thought should be also given to where the birds are likely to make their initial flights and how far away areas that provide shelter are located. Small bushes within 10-20m of the box can provide ideal crash landing sites for early flights and can provide a climbing frame up which young birds can scramble to get the height to fly again and get away from ground-based predators. Alternatively small fence posts provide ideal perches for birds that have only just been released and side struts will make them easier to climb in the initial days after release. Large trees such as macrocarpa, stands of pines or mature bush, within 50-100m of a hack-box provide ideal perches and the essential cover required to protect young birds from aerial predators such as magpies and harriers. These also make for ideal vantage points and safe roost sites. Facing a hack-box towards these features will increase the

chances of the birds quickly finding them and increase their probability of survival in the first few days after release.

Predator Control

>> Introduced predators pose a large threat to New Zealand falcons, especially whilst in the nest and in the first few weeks after fledging. This is especially the case when birds are hack-released as they lack the protection that their parents would usually provide.

Mustelids, feral cats, hedgehogs and possums should be trapped prior to falcon chicks being released. Traps should be regularly spaced over as wide an area of the release site as possible, but a ring of traps centred on the hack-box, spaced approximately 50m apart, offers a good basic level of protection. Advice on the types of traps to use, and where to obtain them can be gained from your local DOC office. All traps must be closed, or well hidden before the birds are released to prevent accidental trapping of inquisitive young falcons. Although young falcons rarely scavenge, poisons that have the potential to bio-accumulate should not be used around the immediate release area. This includes most of the commonly available rodenticides (e.g. Brodifacoum, Pest-off, Warfarin, Talon etc.).

Magpie numbers should also be controlled before and during the first few weeks of release as they are also a major threat to falcons while they are learning to fly. Their numbers should be controlled using a combination of trapping and shooting. Magpies quickly become adept at avoiding being shot and employing magpie distress calls and dummy magpies is sometimes necessary to reduce numbers significantly. Double door entry magpie trap cages with mirrors can also be relatively effective if set and cleared regularly in the months leading up to the release. Again, care must be taken to close these traps once the young falcons are released to avoid them accidentally being trapped.

Cats and possums especially will be attracted to the hack-box by the chicks themselves and by the leftover food within the box. To prevent predators climbing into the box it is important to mount the hack-box on stilts approximately 2m off the ground and to wrap the legs with protective tin wraps (Fig. 2a).

Pet cats should be kept indoors during the first week after the hack-box is opened. Likewise dogs should be kept away from the release site during this vulnerable phase as falcon chicks spend large amounts of time on the ground soon after release and are unable to flee predators for much of this time.

Sourcing and Preparing Food for Falcons

>> It is important to organise a reliable source of food before any commitment is made to establish and undertake a hack-release. This should include a variety of food types to ensure the chicks have a well-rounded diet. For example, this could include a mixture of day old chicks (culled cockerels) from a local hatchery, wild birds such as small finches and feral pigeon, and the occasional rabbit.

Day old chicks can be procured relatively cheaply from a local hatchery. Although they will probably be the most convenient food source and will often make up the bulk of the diet provided, they should not be the sole food item provided as they contain limited nutrients. Day olds should have their yolk sacs removed (but not be gutted) to reduce build-up of putrid matter in the hack box (also the yolk is very high in phosphorus and can interfere with bone development in young falcons).

As well as providing the necessary nutrients, supplying wild birds also encourages young falcons to identify these items as food once they are in the wild and beginning to hunt. Wild birds should be frozen to kill parasites and disease that could be passed on to the falcons. When providing wild birds it is also important to consider where

these have come from and what risks may be associated with them. For example, birds that have spent lots of time in areas where large amounts of agricultural herbicides are used may contain harmful quantities of these chemicals that could be potentially harmful. Avoid using road-killed animals unless you yourself have hit them. Only steel shot should be used to shoot prey items and should be removed before feeding to falcons. If you cannot be 100% sure that steel shot has been used (and not lead) do not feed this prey to the falcons, even small amounts of lead can be very harmful to falcons. For example, if a rabbit is shot in the chest, only the back and hind limbs might be useful as food. Avoid using rabbits, hare, duck, pheasant, and feral pigeons that have been shot using lead from a shotgun. Hare is a very good food for the falcons but would need to be cut into small portions (e.g. halved legs). Poisoned or gassed prey items should not be provided as food with the exception of those killed with carbon dioxide. It is useful to bare the breast meat of wild birds to encourage feeding. Large items such as feral pigeon and hare should be split into portions no bigger than about 200g. If feral pigeons are to be used as food then the head and crop, including any food held within it, should be carefully removed prior to feeding. It is essential that feral pigeons be frozen for several days, before being thawed and fed to the falcons.

Although seemingly providing lots of food rabbit meat is lean and provides relatively little in terms of energy for growing falcons. It is however useful as a supplemental food source, especially if the lungs, liver and kidneys are left attached to the meat fed. Again, care should be taken to remove all shot from a carcass and rabbits should be provided in relatively small fragments (e.g. individual legs, 1/3 of back) rather than as a whole carcass to prevent larger items spoiling before they have been eaten.

Frozen food should be thoroughly thawed before being fed to falcons and care must be taken not to cook the food during the thawing process.

Public Relations

>> One of the most important elements of any hack-release is public relations. Keeping people local to the hack-release site informed is essential to gaining their support and to overcoming any perceived conflicts resulting from the releases. At the very least informing people and taking the time to discuss the releases with local people before they start will save untold time and stress later on. At best people will take ownership of the programme and will want to become actively involved in feeding and monitoring the birds. Most importantly involving the community will enable you to keep track of the birds as they disperse away from the hack site (this is especially helpful if young falcons fly away from the hack-site before they can hunt for themselves). A short educational newsletter that outlines the plans to release falcons dropped into local letterboxes (see example letter in Appendix One), along with short articles in the local press are recommended.

People that keep chickens and dove/pigeons are initially often very concerned about falcons being released near to them and some of the public may be anxious that the number of birds that visit their gardens may be affected by the release of falcons. It is very important to take the time to talk personally with those that have these concerns and public talks that educate people about the wonders of falcons can be very effective at reaching larger numbers of people. Many falcons are shot every year, largely through a lack of appreciation of this wonderful bird – taking the time to educate people and involve the community in releases provides the opportunity for a wider ownership of the release programme and can significantly reduce extreme negative behaviour. Following up any letter drops, press articles or talks with an annual newsletter that informs people of the outcomes of the releases is an excellent way of keeping the community involved and increasing support for the programme.

Five useful falcon facts to consider in terms of public relations:

1. New Zealand falcons are threatened with extinction in the wild and are found nowhere else in the world;
2. New Zealand falcons are our natural predator, and are an essential part of a healthy New Zealand environment;
3. Falcons feed on prey in relation to the preys' abundance in the environment. In most cases there are far more introduced species (e.g. finches) than native species, thus introduced birds will make up the vast majority of most falcons diet. Where falcons prey largely on native species this is an indication of a healthy, thriving native ecosystem. New Zealand falcons will not noticeably reduce the number of native species in any area;
4. If falcons begin to harass local chickens and doves, keeping the chooks/doves locked up in the chook house/dove cot for a few days will result in the falcons moving on to an easier food source very quickly; and
5. People should be aware that it is illegal to shoot or harm falcons in any way. Anyone that does this can be prosecuted under the Wildlife Act 1953. This should not be used as a threat as this can do more harm than good – but sometimes it is worth calmly noting that this is the case.

Maintenance

>> After each hack (well before birds are placed in the hack-box in the following year) leftover food must be removed, the substrate replaced if necessary and the inside of the box cleaned with diluted household disinfectant. The integrity of the box (including predator proofing) and that all doors open and close easily and quietly should be checked at the same time (oiling the hinges at regular intervals helps with this).

Hack-release procedure

Figure 3. Timing of key elements of the hack release process.

Timing (weeks):	**1 2 3 4**	**4 5 6**	**6 7**	**6 7**	**On-going**
Hack release stage:	Chicks captive reared	Chicks in hack-box	Chicks released once exercising regularly	Intensive 'babysitting' of fledglings	On-going monitoring
Feeding protocol:	Fed by parents or hand fed taking care to avoid imprinting	Fresh food placed anonymously into hack-box at same time daily	Fresh food placed onto hack-table outside box at same time daily	Fresh food placed onto hack-table outside box at same time daily	Fresh food provided while birds remain regularly sighted
Public relations:	Mail out to local residents early in planning phase i.e. before chicks hatched		Press release in local media requesting sightings		Annual newsletter to local residents

Chick Transfer

>> Chicks should be transferred from captivity once they are between three and four weeks old. They should be transferred in a suitable carry case that is dark enough to keep them calm, while well ventilated enough to keep them cool (e.g. a cat box covered with shade cloth). There is no need to put food in the carry case unless they are to be transported for more than about three hours. A suitable ground layer should be provided for them to grip onto, e.g. an old towel or a strip of astro-turf (not newspaper). If being transported by car they should be kept out of direct sunlight and secured in a place where airflow can be maintained. During transport overheating of the chicks is a considerable risk. Care must be taken to ensure there is plenty of ventilation in an around the transport box. Avoid placing the transport box in the boot of a car, especially if it is a sedan, as exhaust fumes can leak in through the back of the vehicle. Arrangements with Airport Management Staff need to be made in advance if chicks are to be transported by plane; where possible they should be taken on as hand luggage, alternatively they can be handed over to airport staff on the runway (making sure to note that airflow needs to be maintained around the box) and placed in the hold with a 'Fast bag' label to be collected as you exit the aircraft. Birds should not be checked into the hold at the check-in counter.

On arrival at the hack-box check the main door is securely locked, and place the equivalent of two day old chicks per falcon (see Fig 4. for conversion chart) onto the hack table within the hack-box. Once food is in the hack-box, with the help of a second person carefully remove each falcon chick from the carry box and place them into the hack-box facing away from you - this will discourage them from running back towards you and through any gaps between your hands and the open door. Although the falcon chicks cannot fly at this age they can still run at a fair speed and if care is not taken they can escape into low vegetation and be very difficult to retrieve! Once all the chicks are in the hack-box, lock the side door and leave the birds to settle. Resist the urge to keep checking the box as this will unsettle and stress the birds. You want the falcon chicks to think of the hack-box as a safe and secure retreat so that after it is opened they will want to return to it.

Chick Feeding in the Hack-Box

>> After the chicks first day in the hack-box the amount of food should be increased to the equivalent of four day old chicks per falcon chick. To ensure that humans are not associated with the provision of food, care needs to be taken to approach the hack-box without being seen. This includes approaching quietly and most of all not talking while approaching or placing food in the hack-box. Food should be provided through a chute or small hatch that leads to the hack-table in the box that allows the person providing the food to remain hidden from the birds at all times and does not allow the birds to escape when opened (see hack-box design). It is important to resist the urge to peek at the birds through the food hatch or the front door – they must only be viewed through the very small spy holes placed strategically around the box.

To establish a routine that will aid the falcon chicks to know what time of day to come back for food once they are released, it is important to provide food at the same time every day (both while the birds are in the box and once they are released).

The exact amount of food provided every day should be judged by how much food is left over from the previous day, the more food that is left uneaten the less that needs to be provided (to ensure that excess food does not build up in the box). Be aware that some birds including starlings and magpies may not be eaten by the falcon chicks as some dislike the taste of the meat. As a general rule food should be increased to (the equivalent of) six day old chicks per falcon chick over the week following the falcon chicks being placed in the hack-box. However, if there are only males in the hack box, then it may not be necessary to provide more than four day old equivalents

per falcon chick per day. Feed the falcon chicks in the box every day all the way up to the day before the hack-box is opened.

Figure 4. Food conversion chart

One small bird e.g. Sparrow or Finch	The equivalent of:	¾ to 1 day old chick
One medium sized bird e.g. Blackbird or Starling	The equivalent of:	2 day old chicks
One large bird e.g. Feral pigeon frame	The equivalent of:	4 day old chicks
One adult rabbit leg	The equivalent of:	2 to 3 day old chicks

N.B. Never provide live food to the chicks in the hack-box. Apart from being unnecessarily stressful and cruel to the prey, the falcon chicks will damage their feathers, cere or bill; or worse, when trying to catch the prey within the confined space of the hack-box.

Opening the Hack-Box

>> Falcon chicks should remain in the box for approximately three weeks, but this is not a fixed rule, the day of release should be judged on the behaviour of the falcon chicks in the box i.e. once the birds are exercising their flight muscles almost constantly and appear to be eager to start flying the box should be opened. Males develop far quicker than females so the timing of the release should be based on the development of the most proficient male.

To give the falcons the best chance of finding a safe roost before nightfall, the hack-box should be opened early in the morning. The night before the release climb up to the box and unlock the main door so that it can be easily opened the following morning with minimal disturbance, place the usual amount of food onto the hack-table outside of the hack-box, tie-the food down with string (to stop it blowing away and to stop the falcons flying off with the food – hence encouraging them to feed on the hack-table) and leave the falcons to settle for the night. On the morning of the release **quietly** approach the hack-box in a way that avoids being seen and ensure that if more than one person is required to open the box that a helper is available ahead of time. If the falcon chicks appear stressed and are leaping around in the box before the release, pause, wait for them to calm down and then gently lower the door of the box, secure it so it cannot be blown by the wind (careful thought into hack-box design is required to make this possible without being seen) and retreat taking care not to be seen.

If a 'half horizontal door' is being used, just release the top half of the door. Once all the falcons have left the hack-box (which may take several days), return and lower the whole door so it lies flat to make access as easy as possible.

On opening the door the most developed falcons will usually walk out and within ½ - 1hr start making its first attempts at flight from the box. On occasion birds may bolt from the box and fly a large distance. This is usually caused by the box either being opened too late or the birds being disturbed during the opening of the hack-box. If

this happens there is not allot that can be done. Keep track of the bird as much as possible but take care not to disturb it further, in most cases a combination of the birds left in the box and hunger brings these birds back to the box. Females are less inclined to bolt like this and often act as a magnet to bring back the more developed males. On the other hand some birds will not leave the box or simply explore the perches around the box for the first day after it is opened. This is how they would naturally fledge the nest so under no circumstances should they be encouraged to fly by disturbing them deliberately (even if this continues for several days).

If using a 'half horizontal door' design, birds that are less well developed are more inclined to remain in the box longer while those that are more developed will start to jump out of the open top half and explore. In theory this should allow the box to be opened slightly earlier and reduce the chances of the birds bolting from the box – however the downside is that this means that food needs to be provided both inside and outside of the box if the birds have not left the box in the first few days after it is opened (food should not be provided for the first three days after the door is opened unless there is no food remaining on the hack-table – see further details below). Great care must be taken not to flush the remaining birds out of the box when putting food inside if the decision is made to provide food to the chicks while the half-door is open and they are still inside.

Once the door has been opened the falcons should be observed continuously for the first few days (ideally they should be intensively monitored for the first week to two weeks after the door is opened) - so that their initial movements can be monitored and as much as is practical they can be kept safe from harm e.g. by deterring any harriers or cats that may come to investigate. Unless there is a specific reason to do so - do not approach the hack-box or the hack-table during the first three days after the box is opened unless all the food has been removed from the hack-table during this time. It is important that the birds feel safe around the box and leaving the food on the hack-table will encourage birds that have left to return to roost in the safety of the box. Be aware however that it may not be the falcons removing the food, the food can sometimes be blown off the table or harriers may occasionally remove the food. If you have reason to believe that food is being removed then extra should be provided.

If the falcon chicks are not returning to or feeding from the hack-table attached to the hack-box within three days of their first flights, it may be necessary to erect other hack-tables in the area from which supplemental food can be provided. After three days or after all the food has been removed from the hack-table outside the box (whichever comes first) continue the usual feeding regime (N.B. there is no need to tie the food to the hack-table after the initial 3 days after release). Again, as much as is practically possible try not to disturb the birds when placing food on the hack-table.

Continue to provide the same amount of food they were provided in the hack-box every day until the falcons are seen to cache the food (take the food away and hide it without eating it). Once caching appears to be occurring in all birds gradually reduce the amount of food provided over the following week down to two day old equivalents per day per falcon. Over the following weeks gradually reduce the food further to two day olds per falcon two out of every three days, then two day olds per falcon every second day, until one day old equivalent is provided per falcon every three days. Maintain supplemental food at this level until the falcons are no longer returning for food.

Monitoring

>> Monitoring is an essential part of any release programme. Without suitable monitoring it is difficult to establish how successful the releases have been. Perhaps more importantly a lack of monitoring makes it difficult to identify and subsequently resolve any problems with the releases.

The type of monitoring required depends on the objectives of the release but must also be realistic about the time and resources available. However, all releases should include careful and thorough collection of important data.

The reasons for hack-releasing falcons can be split into two broad types, those that aim to:

1. **Restore** a locally extinct population of falcons; and
2. **Supplement** a population of falcons.

Intensive monitoring is more important when the aim is to restore a locally extinct population than when supplementing a population of falcons that occurs in the wider area. Restoration involves identified goals, long-term commitment and multiple release sites spread over the target area. In order to use limited funds as efficiently as possible, a clear understanding of how effective the releases are is key to ensuring success (which should be measured as the number of birds released that successfully breed). For example, intensive monitoring is necessary to establish what the main causes of death of young falcons are and how these can be managed, or releases adapted to improve survival. The more intensive and long-term the monitoring, the more information can be gained and the more a programme can be refined to maximise success per limited conservation dollar. Because of this monitoring as part of a restoration programme will often require the attachment of radio transmitters to individual falcons so that their movements and survival can be tracked. Transmitters should be attached using a back-pack harness made of tubular 3-4mm polyester or Teflon ribbon and where practical should include a weak-link. To ensure the best fit transmitters should only be fitted once the chicks are flying and have reached their adult weight and body shape. If transmitters need to be fitted earlier (e.g. pre-release) then the falcons should be re-trapped once they have been flying for a number of weeks to check and fine tune the harness fitting.

Whether the releases aim to restore or supplement a population the types of data collected are the same, it is the intensity of the monitoring and data collection that varies. For example, by individually colour banding individual birds, relying on reports of colour bands from the public and undertaking strategic searches for falcon nests in the region in the years following the releases, although providing limited data, will if maintained provide important information on the success of the release programme.

Collecting data in a simple spread-sheet ensures that data is recorded in a consistent and useful format. The main factors that need to be recorded into such a spread-sheet include:

1. Information on individual marking, e.g. colour-band combinations;
2. The date and age each falcon was placed in the hack-box and the age they were released;
3. Roughly how long each falcon was fed for (or how long food was taken) and at what age they dispersed away from the site;
4. The time and location(s) each individual was observed after they dispersed away from the site;
5. The cause and time of death of each falcon; and
6. Any information on suspected or confirmed breeding of the birds released.

An example of a spread-sheet suitable for collecting this data is provided below (Fig. 5). Because there are often many interesting and unforeseeable events that will occur during a release it is also very useful to keep a field notebook in which these can be written. However, this should only supplement data recorded into the spread-

sheet and not replace it. Get into the habit of filling in the spread-sheet as part of your daily routine (e.g. when you feed the birds) failure to do so always results in valuable information being lost.

Figure 5. Example of a spread-sheet suitable for monitoring the hack-release of New Zealand falcon

RELEASE SITE:	**KAREAREA MOUNTAIN**

Address:	1164 Paradise Valley Road Rotorua	**Map co-ordinates:**	38° 5'38.68"S 176°10'41.87"E

Co-ordinator:	Mr N.Z. Falcon

Contact details:	Tel: 07 357 4469 Email: Wingspan.nz@gmail.com

Identification	**Left leg**	H-13635	Etc…
	Right leg	Yellow	
	Transmitter no.	15+0	
	Sex	M	
Captive management	**Date hatched**	1-Nov-12	
	Parent reared	Y	
	Hand-reared	N	
	Parent & hand-reared	N	
Hack-box design	**Full door hack-box design**	Y	
	Half door hack-box design	N	
Pre-release	**Date put in hack-box**	25-Nov-12	
	Age put in hack-box (days)	25	
	Date hack-box opened	20-Dec-12	
	Age released (days)	50	
Initial period post-release	**Day 1 (Max. Distance moved from hack-box - m)**	20	
	Day 2	50	
	Etc… (Repeat every day until not seen at hack-site)		
	Date last observedevery day at hack-site	20-Dec-12	
	Date first observed caching food	12-Jan-13	
	Date last observed taking supplemental food	20-Jan-13	
	Date last observed at hack-site	20-Jan-13	
On-going offsite reports	**Location observed (take Lat. & Long from Google Earth)**	38° 5'38.68"S 176°10'41.87"E	
	Date observed	25-Jan-13	
	Distance from hack-release site (km)	20	
	Etc… (Repeat for each new observation)		
Breeding records	**Nest location (take Lat. & Long from Google Earth)**	38° 5'38.68"S 176°10'41.87"E	
	Date nest located	26-Dec-15	
	Stage of nest when located	3 eggs	
	Paired with	Unbanded female	
	Nest outcome	1 male fledged	
	ID of any chicks banded	H-53647 (L) Red (R)	

Acknowledgements:

We would particularly like to thank Janice and Laurie Hoverd and the Kakepuku Release Programme for their comments on the initial drafts of this hack-release manual.

Appendices

Appendix One: Example letter suitable for advertising the intent to release falcons to the local community

30th November, 2012
1164 Paradise Valley Road

Dear neighbour,

Kakepuku Mountain Conservation Project, with the support of Wingspan Birds of Prey Trust plans to release captive bred, juvenile New Zealand falcons in an attempt to bolster their declining numbers in the region. The Karearea, New Zealand falcon is only found in New Zealand and is at risk of extinction in the wild. By releasing these birds we hope to help support the conservation of this spectacular and unique bird of prey.

Two juvenile female falcons will be released in early December near Kakepuku walkway car park. They should remain in this neighbourhood over the next few months. They require supplementary feeding as they learn to hunt for themselves. Therefore it is imperative that we locate their whereabouts so we can provide the food. Their self-caught prey include; crickets, cicadas, mice, rats, rabbits and introduced birds e.g. sparrow, mynah and blackbirds.

To keep track of these birds once they begin to disperse we will need your help. If you see or hear either of these birds, would you please note the date and place you observed them.

Please telephone Mr N.Z. Falcon at 07 357 4469 if you think you have sighted a falcon. They are different from the larger Australasian Harrier Hawk and are half the size. They do not soar in circles on the thermals but have a swift more direct flight. Karearea make a 'mewing' noise or a loud 'kek-kek-kek'. For more information on how to identify a falcon and on the conservation work that Wingspan Birds of Prey Trust undertakes please visit our website www.Wingspan.co.nz

Kakepuku Mountain Release Project

Thank you for taking the time to report these birds.

Kind regards

Mr N.Z. Falcon

Appendix Two: Memorandum of Understanding Template for falcon releases

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) is entered into by and between:

Wingspan Birds of Prey Trust (Wingspan) and Insert Name of Partner Organisation / Individual on Insert Date

A. Purpose of this MOU: The purpose of this MOU is to 1. clearly outline the role of each party in the agreed partnership to release falcons and, 2. to ensure that best practice methodologies are adhered to at all times.

B. Roles and Responsibilities:

Wingspan agrees to:

Responsibility/Activity
1. Maintain regular contact with the partner organisation (through a nominated staff member),
2. Provide clarification of the methods outlined in the hack-release manual where required,
3. Endorse the application for DOC permits where required,
4. Support any application for funding required to undertake the hack-release,
5. Provide metal ID banded falcon chicks to the partner organisation for release aged between three and four weeks old,
6. Complete any health checks required before transfer to the hack-box,
7. Communicate any changes that may affect the timing or number of falcon chicks to be released as they occur (e.g. pairs laid earlier than expected, fewer pairs bred than anticipated, chicks proposed for release are not fit enough to release etc.),
8. Provide all background documentation relevant to each bird e.g. parentage, permit numbers etc.
9. Will organise flights if required to transport chicks to the hack-release site (N.B. who will pay for these flights will be determined on a case by case basis but is not automatically the responsibility of Wingspan),
10. Be available to answer any questions throughout the hack-release process, and
11. Appropriately acknowledge and represent the partner organisation in all media articles related to the hack-release(s) that Wingspan has agreed to provide chicks for.

Insert Name of Partner Organisation / Individual agrees to:

Responsibility/Activity
1. Adhere to all of the recommendations outlined in the Wingspan hack-release manual (e.g. will provide a suitable carry case for transporting the falcon chicks etc.),
2. Submit progress reports (e.g. a short email) to a nominated Wingspan staff member on a monthly basis, including information on: a. progress with permits, b. hack-box construction, c. success in securing a reliable food source, and d. any other issue(s) that may delay or affect the success of the hack-release.
3. Obtain the appropriate DOC permits before the start of the falcon breeding season (no later than August of the year of release),
4. Collect the falcon chicks from Wingspan and transport them to the release site (unless alternative arrangements have been made),

Continued on next page…

…continued from previous page.

5.	Will organise transmitters and radio-tracking of falcons should radio-telemetry be required,
6.	Take full responsibility for the wellbeing of the falcon chicks once they leave the Wingspan facility up to the point that they are hunting for themselves,
7.	Once the hack-box is opened provide weekly emails to Wingspan summarising the week's events,
8.	Collect the data outlined in Figure 5 of the hack-release manual and submit a spread sheet of this data to Wingspan twice a year (in March and again in August), and
9.	Appropriately acknowledge and represent Wingspan in all media articles related to the hack-release(s) that they have agreed to undertake in partnership with Wingspan.

C. Health & Safety: Both parties will do everything they reasonably can (via verbal and written advice) to ensure that the activities that they have agreed to partner in will not result in any harm or injury to any person(s) in either organisation. However, partner organisations cannot take responsibility for the safety of any individuals outside of their organisation.

D. This Memorandum of Understanding is the complete agreement between:

Wingspan Birds of Prey Trust and Insert Name of Partner Organisation / Individual may be amended only by written agreement signed by each of the parties involved.

WINGSPAN BIRDS OF PREY TRUST

Authorized Official:
Signature Printed Name and Title:
Address:
Telephone(s):
E-Mail Address:

Insert Name of Partner Organisation / Individual *****

Authorized Official:
Signature Printed Name and Title:
Address:
Telephone(s):
E-Mail Address:

* If a University student is running the hack-release then the students' supervisor is responsible for the student meeting the above requirements. The supervisor, NOT the student, should therefore be the signatory on this MOU.

PLEASE SIGN AND RETURN THE COMPLETED FORM TO:
Wingspan Birds of Prey Trust, 1164 Paradise Valley Road, Rotorua,
or scan and email a copy to Wingspan.nz@gmail.com

WINGSPAN

BIRDS OF PREY FOR OUR FUTURE

Registered Charitable Trust since 1992

Wingspan Birds of Prey Trust
1164 Paradise Valley Road
Rotorua
New Zealand

07 357 4469
Wingspan.nz@gmail.com