KIWI & FORESTRY

Management Guidelines for North Island brown kiwi in exotic plantation forests

Save the kiwi

The Management Guidelines for North Island Brown Kiwi in Exotic Plantation Forests has been developed by Save the Kiwi to help forest owners, managers and contractors plan and put in place kiwi friendly operations in exotic forests where kiwi live.

Cover photo credit: JPA Logging

1.0. Introduction

The North Island brown kiwi (*Apteryx mantelli*) is classified by the New Zealand Threat Classification System as 'not threatened', but conservation dependent. Under the IUCN Red List they are classified as vulnerable. In areas where kiwi are protected their populations are growing by 2% per annum or more; in areas where they aren't managed their populations continue to decline.

Over the last two decades, interest and knowledge about kiwi in plantation forests has increased, along with a feeling of responsibility and a desire to protect any kiwi that live there. This interest stems in part from a growing commitment to the natural environment, needing to comply with resource consent conditions imposed by regional councils, district councils and other territorial authorities, and in part to meet sustainable forestry certification standards.

Third party certification of sustainable management practices plays an important role in how New Zealand's plantation forests are managed. Of New Zealand's 1.7 million hectares of commercial forests, about 1.2 million hectares are independently certified, the most popular being the international Forest Stewardship Council (FSC) system.

All around New Zealand, there are now collaborative efforts to ensure kiwi can thrive in all habitats, including exotic plantation forests. In fact, the net gain for kiwi can still be positive post-harvest, if the harvest is thoughtfully planned and managed. These guidelines will help you minimise impacts on kiwi during all stages of forest management including harvest operations. They begin by providing background information about North Island brown kiwi, where they live and the threats they face. They then provide a range of management options and useful resources which you can adapt and use, depending on:

- The kiwi numbers in your area;
- The location of your blocks;
- The availability of alternative areas for kiwi to live;
- Other kiwi management projects in your area;
- Available resources and timeframes.

Photo credit: Save the Kiwi


Photo credit: Ruud Kleinpaste

2.0. North Island brown kiwi habitats & behaviours

Habitat types

Kiwi are known to survive, thrive, and breed in managed plantation forests. They move in from nearby native bush and shrub land once a growing stand has developed sufficient ground cover and insect life. Adult kiwi will successfully breed within an exotic forest, building a significant population over the plantation's lifespan. In some cases, kiwi will use both exotic and native forest (and other habitat) as part of their territories.

Kiwi often live in gullies containing native plants within the pine stands but move around extensively looking for food and a mate. That means they cross logging roads or tracks and enter cut-over areas despite the apparent lack of cover there. Kiwi are known to utilise any available cover. They love to hold up in slash piles around skids and in cutover. Another favourite spot is in pampas grass. It is possible to find kiwi in virtually any habitat, whether they are living there or just passing through.

Feeding

Kiwi are nocturnal and can move 1-2 kilometres each night. They can often be found across larger territories. Kiwi that have a mate will live in ranges that can vary between 5 to 50 hectares in which they will travel around feeding and protecting their territory from other kiwi. Their individual movements may vary according to preference; some may favour native bush and others plantation forests and, in many cases, kiwi will happily utilise both environments on a nightly basis depending on food availability.

Kiwi mainly feed on soil invertebrates, and their location varies depending on the time of year and vegetation cover. In dry periods, kiwi may move outside their normal territories to visit wet or swampy areas. Climate change has increased the frequency of droughts which means these wet areas require more protection.

Photo credit: DOC

Roosting

Kiwi roost during the day, either under the ground in burrows or on the surface under virtually any type of cover such as rank grass, slash piles in the cutover, around skids, windrows or thick shrub (such as bracken, gorse, pampas grass and toetoe), even under log stacks in the middle of logging operations.
An individual kiwi may have as many as 40 different campsites within its home range and usually roosts in a different location each day. The exception is when the male is incubating eggs on a nest.

Territories

Paired adult kiwi are territorial and can have an established home range of 5-50 hectares. They seldom move beyond its borders. Younger birds will move through an area in search of mates or a new home range, and may only be in a particular patch of bush or stand of pines for a few nights.

Breeding

Kiwi can begin breeding from 2-3 years of age and will continue to do so each year as long as they have a partner. If they're not killed by a predator or other unnatural cause, they can live for more than 40 years, or significantly less where dog predation is a factor. This means kiwi can outlive the rotation of a plantation forest.

North Island brown kiwi breeding cycle

May - August: Adult kiwi court and pair up. This is the time of year most calling takes place.

June: First clutch of two eggs is laid in a nesting burrow excavated by the male.

July - August: Main incubation period. The male will incubate the eggs for up to 80 days, until the chicks hatch. The female remains in the area and evidence suggests that she supports the male by guarding the nest.

Incubation time is a high-risk period as the male is always in the same burrow and reluctant to move, even when there is disturbance around him. Often, if he is disturbed, he will desert the nest and not return to the eggs.

September: Chicks hatch. After a few days they are independent and will move around and forage on their own. Sometimes they may be found wandering around in the daytime, and they are not yet proficient at finding secure roost sites, at times tucking themselves away in scant vegetation above the surface.

This is a high-risk time for chicks because they can fall prey to predators or suffer life threatening injury.

November: Sometimes the adult pair will produce a second clutch of two eggs, using the same or a different nest, adding a secondary risk period.

January - February: The second clutch of chicks usually hatch, but some pairs may still be breeding in March and April.

Where possible, harvesting should be avoided in August, September and October in areas where breeding kiwi are present. This gives the kiwi a chance to successfully fledge their first clutch of chicks. Care should also be taken in November, December and January as the male may be incubating a second clutch.

Harvesting compartments of the woodlot or forest will reduce impacts on kiwi by allowing non-nesting individuals to retreat into adjacent areas.
This is the typically observed pattern for many pairs of kiwi, but it is worth noting that kiwi can and do breed at other times also, so it is possible for them to be on a nest at any time of the year.

3.0. Threats to kiwi in forests

The main threats kiwi face in plantation forests are the same as in native forest where introduced mammalian predators, such as stoats, dogs, ferrets and cats are at large. However, plantation forests also bring additional hazards and risks, particularly during the planting and harvesting stages.

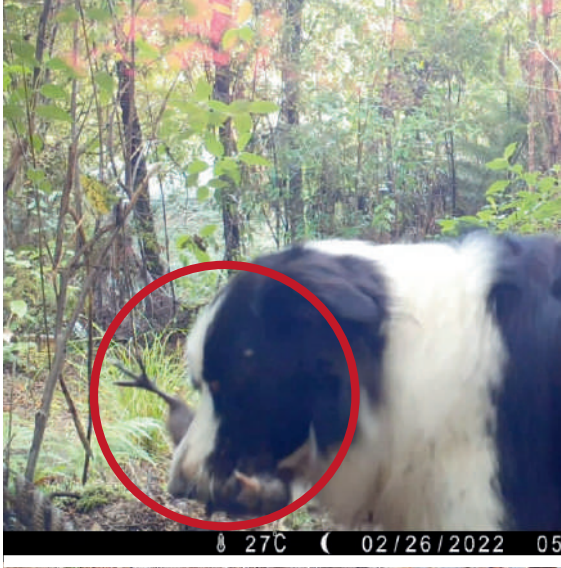
Common threats

- Predation by dogs at any life stage, usually causing death;
- Predation:
  - Adult kiwi: ferrets, and possibly possums;
  - Chicks: stoats, cats, ferrets, possums and possibly pigs;
  - Eggs: possums and pigs;
- Being run over when crossing roads at night and early morning;
- Nesting disturbance by pigs, rabbits, possums etc;
- Insufficient wet areas during droughts leading to dehydration and starvation.

Additional threats associated with forestry operations

- Habitat loss and degradation;
- Isolation of remnant kiwi populations;
- Death from falling into steep-banked ponds and fire control dams;
- Being hit by vehicles while crossing roads in the dark, especially harvest crew vehicles and logging trucks using forest roads in the early morning to get to and from the worksite;
- Being disturbed, injured, or killed during land preparation or clearing, slash-burning and harvesting.

Photo credits: DOC, Bay Bush Action, Save the Kiwi



4.0. Management options for kiwi in plantation forests

This section describes the range of management options forest owners, managers and contractors can use to help protect brown kiwi living in their woodlots.

4.1. Identify if kiwi are present in your forest

Identify whether there are any kiwi present by:

- Checking any evidence (historic and recent) and reports of calls, sightings, and kiwi sign (e.g. scat, probes, footprints, feathers);
- Carrying out call count surveys using either human listeners during the official kiwi listening window (usually May/June), or by using kiwi listening devices (acoustic recording devices or ARDs);
- Getting an accredited kiwi handler and certified kiwi dog to carry out a population check.

Identify the significance of the population by:

- Estimating the number of kiwi present in your area;
- Calculating kiwi numbers in the general area, e.g. are there several healthy populations or is yours one of only a few?;
- Determining if there is current or historic kiwi protection carried out at the site.

The management options available to provide long term protection of kiwi within your woodlot will depend on:

- The number of kiwi present;
- What stage your forestry block is at, e.g. planting, growing or harvest;
- Location of blocks to be harvested and the ability to compartmentalise them;
- The presence of enclaves of native forest which can be left intact for the kiwi to retreat to while forestry operations are underway;
- The presence of native riparian strips and wet areas which can be left intact to help minimise the effects of drought;
- Other kiwi management being carried out in your region;
- Available resources and timeframes to apply kiwi protection measures (listed in Table 1 and described in 4.2 – 5.5).

Table 1: Management options for kiwi in plantation forests

Management regime	Level of intervention	When	External input	Resources	Timeframe
Kiwi safe forestry practices	Low	Known kiwi numbers low to moderate	Low	Low	Life of forest
Pest control	Low	Kiwi population known to be stable	Low	Medium	Long term, life of forest
Operation Nest Egg (ONE)	High	More than five known pairs. Kiwi are easy to access. If the population is to be boosted quickly	High	High	Three-year miniumum
Temporary relocation of kiwi	Medium	All habitat will be removed and kiwi are under threat	High	Medium	One year for relocation
Translocation to protected habitat	Extreme	This is a last resort and a less recommended option. All habitat will be removed OR no other kiwi in the area	High	Medium $10k	One year for removal

4.2. Kiwi-safe forestry practices

Basic principals

Kiwi survive and thrive in exotic forests as long as a few simple precautions are taken. The kiwi-safe forestry practices outlined below have been peer reviewed by forest managers who agreed they could be put in place with little disruption to the silvicultural regimes and have no impact on profitability. All it takes is awareness, planning and care.

Activities

Brief all your staff and contractors and make information about kiwi and your kiwi-friendly management practices easily available. Include information from Section 5.0 on:

- How to recognise kiwi and kiwi sign;
- Emergency procedures on what to do and who to contact if kiwi are disturbed or found;
- Print the kiwi briefing papers, emergency procedures and contacts list, and have copies on site for reference by field workers (perhaps near the first aid equipment).

Awareness & information

- View the Save the Kiwi website (www.savethekiwi.nz) for information and contact details of our experienced team;
- Contact your local Department of Conservation (DOC) office and/or Save the Kiwi who can give advice;
- Brief ground crew about kiwi and what emergency procedures to follow if they find disturbed, injured or dead kiwi, or exposed kiwi eggs. Members of the ground crew could be trained to detect monitored kiwi if the logging is over a large area;
- Maintain contact with Save the Kiwi to share up-to-date information on where logging is taking place and where radio tracked kiwi are present;
- Maintain records of any kiwi sightings and/or signs and pass these onto Save the Kiwi;
- Advise all vehicle users that there are kiwi in the area, especially those using the roads at night. Kiwi are active at night and could be mistaken for a possum. Install ‘Kiwi Live Here’ hazard signs at regular intervals on roads through kiwi habitat to remind drivers to be aware that kiwi may be present on the road;
- Erect 'kiwi zone' signs at all gateways entering areas of the forest that contain kiwi, to remind people to be aware of kiwi. Signs can be obtained by contacting Save the Kiwi or the Forest Owners Association;
- Contract a kiwi practitioner to survey the woodlot.

Photo credit: Save the Kiwi

At the forest planning stage

- Plan a continuous cover forest;
- Plan small forest compartments and retain riparian and wetland areas in native vegetation;
- Leave an additional vegetated buffer around these areas where possible since kiwi may be 'flushed out' of swamps in very wet winters and need adjacent habitat to escape into. These also allow kiwi to retreat into suitable habitat during times of drought;
- Stagger woodlot ages and consider long rotation sawlog regimes rather than short rotation pulp;
- Small foresters can consider planting hardwood species in scrub light-wells, rather than clear felling.

During land preparation

- Leave pockets of bush and scrub in steep, wet, riparian and less economic areas;
- Removing vegetation manually is less dangerous for kiwi than roller crushing;
- Avoid fires, as kiwi will hide in piles of wind-rowed slash.

During the forest rotation

- Implement a pest and predator control program (refer 4.3);
- Contact Save the Kiwi if you need support in reviewing your pest and predator control plans.

Harvesting operations

- Where possible, leave escape routes for any kiwi that might be within the block to be logged. Leave gullies and other enclaves of native bush undisturbed;
- Do not drag logs through stands of native forest or fell or dump harvest waste into native gullies or enclaves of bush or scrub, as kiwi are most likely to have sought refuge there;
- Harvesting from ridgelines towards valleys or wetlands will allow kiwi to retreat from the harvesting;
- Avoid having log processing sites where kiwi may be roosting. Again, ridges will be less likely to be chosen by kiwi;
- Apply slow speed limits on roads after dusk and before dawn to avoid having kiwi run over;
- Erect signage on forest roads to remind drivers about kiwi crossing roads in the dark, e.g. ‘Kiwi Crossing’ or ‘Kiwi Live Here’ (signs can be obtained by contacting Save the Kiwi or the Forestry Owners Association).

Post-harvest operations

- Retain riparian and wetland areas with native vegetation, whether mature or regenerating;
- Avoid grazing, burning or spraying to encourage the recovery of vegetation cover and higher moisture levels;
- Avoid disturbing known kiwi habitat or retreat areas (such as slash piles) during land preparation;
- Avoid burning 'crows-nests' in which displaced kiwi often roost.

4.3. Pest control

Basic principals

Whether your forest is being planted, maintained or harvested, an animal pest and predator control programme reduces threats to kiwi (and all other species in the forest) with the least level of intervention.

Table 2: Pest control activities

Threat	Mitigation	Person responsible
Predation by dogs	Ensure forest staff, contractors and their staff do **not** bring dogs to work with them.	Forest manager
	Install signs to advocate your no-dog policy and let people know there are kiwi present.	Forest manager
	If dogs are spotted around the forest, arrange with the relevant council to trap and remove them.	Forest manager
	Ensure all dogs brought into the forest by hunters and pest control contracts both need to be there, and have a current e-certificate provided by an endorsed Kiwi Avoidance Trainer *.	Forest manager
	Consider pig control by methods other than hunting with dogs, e.g. poison or trapping.	Forest manager
	Offer Kiwi Avoidance Training by endorsed trainers for dogs that must be in the forest *.	Forest manager, local kiwi project, DOC

*To find an endorsed Kiwi Avoidance Trainer, visit www.kiwiavoidancetraining.nz.

Threat	Mitigation	Person responsible
Predation by mustelids	Establish best practice mustelid trapping in and around the forest. Use only covered traps as prescribed in the Save the Kiwi best practice guide so non-target species, including kiwi, are not caught.	Forest manager, predator control contractor, local kiwi project
Predation by cats	Set live capture and kill traps. Shoot on site.	Forest manager, predator control contractor, local kiwi project
Trapping	Ensure all pest control operations use raised set traps for possum/cat control so they do not catch kiwi. Traps need to be set at least 700mm above the ground (higher if weka are present). If a ramp is used, it must be angled at 45 degrees.	Forest manager, predator control contractor, local kiwi project
Disturbance and competition for food by rats and possums	Establish pet control for rats and possums.	Forest manager
Liberation of pigs for hunting	Liberation of pigs into the wild is illegal in New Zealand. Pigs can learn to prey on kiwi eggs and their presence can attract hunters whose dogs may not be kiwi avoidance trained.	Forest manager

4.4. Operation Nest Egg (ONE)

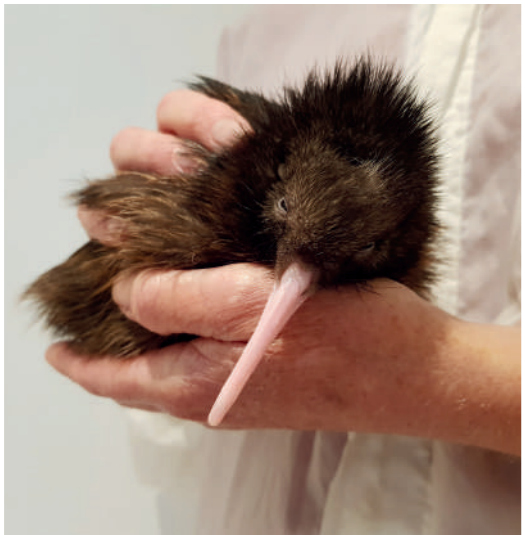
Basic principals

- A sample of the kiwi population in an area is caught and monitored to establish when breeding begins;
- Eggs and/or chicks are removed to a captive institution, safe from pests and predators;
- Juveniles are transferred to a predator-free kiwi creche until they reach about one kilogram in weight. At that size, they are better able to defend themselves against predators;
- Juvenile kiwi are returned to the forest they came from or, if suitable habitat is not available, released in another pest and predatorfree environment.

Activities

- Adult kiwi are caught by accredited kiwi handlers at night or by using certified trained dogs to locate kiwi in burrows or nests, usually during the day;
- Radio transmitters are attached to kiwi and adult males are monitored to see when breeding begins. Radio tracking is usually carried out by trained operators during the day. Tracking should initially take place weekly, and later once a month as the home range and habits are established;
- Eggs and/or chicks are removed, usually at night, normally during September and December;
- Chicks are reared in a creche or safe area until they are at least one kilogram in weight;
- Chicks are returned to native a suitable forest habitat during January - March;
- During their first year, chicks are monitored weekly, primarily to check their dispersal.

Photo credit: Save the Kiwi



4.5. Temporarily relocating kiwi

Basic principals

Moving kiwi to a temporary safe area is an option if some retained habitat is available within or near the current home range. As with the translocation process (4.6), a permit is required from DOC and professional expertise (accredited kiwi handlers) will be required to track and monitor the kiwi each day. This must be carried out daily as kiwi may return into the harvest area/their home range.

Activities

- Arrange permits;
- Notify an accredited kiwi handler that logging is about to take place;
- Before operations begin, kiwi are caught by accredited kiwi handlers, have transmitters attached and their territories are mapped;
- Contractors are briefed daily;
- If any kiwi are found during the logging, it may be necessary to halt operations while the kiwi are located, caught and removed. If a kiwi is incubating an egg and the harvesting cannot be temporarily moved until incubation is complete, the egg will need to be removed for artificial incubation. In addition, the adult male kiwi may need to be relocated to ensure they do not return to the nesting site;
- At the beginning of each day, before the contractors start work, the kiwi are located. If kiwi are in the area to be harvested that day, they are moved to an adjacent safe area.

Photo credit: Save the Kiwi

4.6. Translocating kiwi to protected habitat

Basic principals

- Translocating kiwi from their established home range to other protected habitat is the most disruptive option. It is intended to be a last resort option and is not commonly recommended. A preferred option will usually be to create a sufficiently protected environment for kiwi to survive within the home woodlot or adjacent areas;
- First, it is difficult to find every kiwi, which means lifelong pair bonds can be broken. Second, the newly translocated kiwi are often unsettled in their new home range and may wander outside their new home into unprotected areas. They may also try and return to their original home range;
- Translocation permits are required from DOC, and permission must be granted by appropriate iwi authorities and landowners;
- The kiwi must be relocated, under conditions listed in the permit, to an area approved by DOC and in consultation with mana whenua;
- This option is only to be considered, as a last resort, when all available kiwi habitat is going to be removed and no new areas are available for re-establishment in the immediate future.

Activities

If translocation is recommended, the following actions will need to take place:

- Arrange permits from DOC;
- Notify Save the Kiwi and an accredited kiwi handler(s) that logging is about to take place;
- Adults are caught by the accredited kiwi handler and radio tagged for later removal or held in captivity until a few kiwi can be moved to a new location at the same time;
- If radio tagged, the adults are all re-caught and transported to the new location on the same day. Transmitters will normally remain on the kiwi for monitoring after release;
- Kiwi are released at the new site, usually with gifting and receiving iwi representatives;
- If any kiwi are found during the logging, it may be necessary to halt operations while the kiwi are located, caught and removed. If a kiwi is incubating an egg and the harvesting cannot be temporarily moved until incubation is complete, the egg will need to be removed for artificial incubation. In addition, the adult male kiwi may need to be relocated to ensure they do not return to the nesting site;
- The translocated kiwi are monitored for survival.

5.0. Field information for staff & contractors

The information in this section can be used to help field staff and contractors understand how they can make sure kiwi living within the plantation forest are safe. You may find it useful to keep a copy on site.

- *'Kiwi briefings' can be incorporated into any routine training you hold for staff and contractors. It is a great idea to have a kiwi training session with your contractor and crew before beginning work in kiwi habitat. Save the Kiwi is happy to facilitate this training session. In addition, the Save the Kiwi website has lots of information and contact details for our experienced team (www.savethekiwi.nz).*
- *Forms to record any kiwi sightings are also a good way to collate information on when and where kiwi are seen, what the kiwi were doing and what activity was happening when the kiwi was found. See the appendix for examples of these forms that you're welcome to use.*

5.1. Recognising kiwi

Kiwi are nocturnal and can be found living in almost any habitat, including native forests, plantation forests and scrub. They may not be seen except when disturbed accidentally during the day, or when crossing roads or tracks at night. However, even if you do not see kiwi, it is possible to identify signs which indicate that kiwi are about.

Photo credit: Sara Tansy for The Capital Kiwi Project

Kiwi calls

- Kiwi call at night. On still nights, their distinctive piercing call can travel up to two kilometres;
- The male's call is an upward shrill single note, repeated 15-20 times;
- The female's call is a lower, coarse rasping cry, also repeated 15-20 times;
- Morepork calls are often confused with male kiwi, but the Morepork's call is usually lower in tone and only repeated 7-10 times.
- Weka calls may also be confused with kiwi calls.

Kiwi footprints

- In soft terrain like mud and sand, kiwi footprints show up well;
- There are three forward-facing toes, and no back-facing toe;
- Footprints can sometimes be seen in the wet mud along roadside verges;
- They are slightly larger than a hen's footprint, but heavier and more spread out than a pheasant's footprint.

Kiwi probe holes

- Kiwi feed by probing the ground with their long bills;
- They leave a cylindrical hole about 10 centimetres deep, with a small depression where the base of their bill has been pushed against the earth;
- Numerous probe holes may be found close together;
- Other things that might be mistaken for kiwi probe holes are tunnel web spider dens (but there are usually cobwebs present) or tramping poles (a more uniform shape without the depression at the top).

Photo credit: Save the Kiwi

Kiwi feathers

- Kiwi feathers are very distinctive because they are fine and not 'zipped' together like most other bird feathers. They are usually brown/grey with a hint of russet;
- Kiwi feathers are sometimes caught on vegetation, such as hook grass, but a large pile of feathers usually indicates the kiwi has been in some kind of trauma. Kiwi can shed handfuls of feathers when fleeing from a predator or fighting a rival kiwi, but still be unharmed;
- If a pile of feathers is found spread over a couple of metres, it is more likely the kiwi has died following contact with a predator or machinery. In these instances, please look for a carcass.

Kiwi burrows & roosts

- Kiwi can roost both above and below the ground;
- Nests and breeding burrows are usually dug below the ground or into a bank, and will contain a substantial amount of leaf litter and feathers;
- If disturbed, eggs may be hidden in the leaf litter (see 5.2 for advice on removing eggs);
- Kiwi eggs are large (around 120mm long), with a smooth, thin, white or off-white shell;
- It's not uncommon for two eggs to be found in one nest.

Kiwi scat

- Compared to most bird droppings kiwi leave quite large, slightly runny deposits;
- They have a distinctive smell unlike any other bird and look like a flattened messy blue/grey blob or smear with a trace of white normally around the outer edge.

Photo credit: Save the Kiwi

5.2. Procedures for emergency kiwi recovery

It is important to know how to respond to an emergency when they occur. Table 3 provides a few scenarios and the appropriate actions to take for each. When in doubt, contact your local accredited kiwi handler for advice as soon as possible.

Table 3: Procedures for emergency kiwi recovery

Scenario	Action
Kiwi seen moving during forestry operations	• If possible, leave the kiwi to move to safety on its own, and note its direction of travel. • If the kiwi is heading into a danger zone, stop operations and flush the kiwi to safety. • If the kiwi cannot be removed from danger and the operation cannot stop, be prepared for recovery of an injured or dead kiwi. • If the kiwi cannot be removed from danger and the operation can stop, call your local accredited kiwi handler or DOC to help remove the kiwi.
Kiwi caught alive and/or injured during forestry operations	• Kiwi are only allowed to be handled with a permit. Once a permit has been obtained, handle the kiwi with care. Hold firmly by both feet, or the unfeathered portion of its legs to avoid harm to handler and/or kiwi. Do not squeeze around the chest, as a kiwi's bones are very fragile. Cradle the kiwi in your arms like a baby, belly facing up. • If its legs are damaged, swaddle the whole body in a jumper or your arms, exerting even pressure around the body. Examine the kiwi for any obvious injury and note its severity. • If possible, tape the legs together where there are no feathers (electrical or masking tape can be used but don't leave the legs taped for an extended period) and wrap the kiwi loosely in a towel/jumper/coat, head included. The kiwi should stop struggling once restrained gently and in the dark. • Place the kiwi in a confined space with padding, e.g. coat/jumper/sacks, with legs still together. If a box or empty chilly bin is not available, a sack, pack or bag will do. Make sure the kiwi cannot escape. Keep it in a safe, quiet, and dark place. • Contact an accredited kiwi handler or your local DOC office. Keep notes of what happened and when to help with a diagnosis. Follow any instructions or advice as offered by experienced kiwi personnel.

Scenario	Action
Kiwi chicks caught and/or injured during any forestry operations	• Handle the kiwi chick with extreme care. • Hold gently by legs and feet, and cradle and support its body against your chest with your other hand. • Keep the kiwi warm in a jumper or beanie and put it in a small container so it is unable to escape. • Keep in a warm, quiet and safe place and call for assistance as above.
Kiwi eggs unearthed and/or disturbed during any forestry operations	• Always assume the egg is alive even if it is cold and cracked, unless it has been obviously broken and the chick inside is dead, or it is extremely smelly and slightly sticky to touch. Look for a second egg, as two eggs are usually laid per clutch. • Note the position of the eggs before removing them from the nest, and gently mark the top with a pencil if possible. • Transport the eggs in an upright position so the chick is not turned upside down and killed inside the egg. If eggs are found outside the nest, e.g. in vegetation, it may not be possible to know which is the top of the egg. If you have a flat surface (e.g. chilly bin lunch box lid), carefully place the egg in the centre and it will roll and balance with the air cell at the top. This is the correct position for transport. Mark the top and keep it this way up. • Place the egg(s) in a padded box, chilly bin or bag, with sufficient padding to stop the eggs getting damaged. Keep in a warm dry place, but do not apply any heat directly to the eggs. Contact DOC or an accredited kiwi handler, because the eggs need to be taken to a facility for artificial incubation as soon as possible. • If transporting the eggs yourself, have someone hold the box to avoid severe bumping over rough terrain. If you're on your own, strap the container into the vehicle with the seatbelt. If possible, contact the kiwi incubation centre to advise them of your expected arrival time and provide them with details of where the eggs have come from.

Forestry & kiwi: the future

The vision of Save the Kiwi is to take kiwi from endangered to everywhere. Not just in native forest: all over Aotearoa New Zealand.

The forestry industry has a key role to play in the future of kiwi conservation. Plantation forestry offers everything kiwi populations need to thrive: good habitat, good access to food and water, and (when intensive predator control is established), safety from predators.

Thank you to the many forestry sites that are already engaged in local kiwi conservation. We hope your work will inspire other companies to join this important kaupapa to take our national taonga species from endangered to everywhere.

Photo credit: Save the Kiwi

Appendix I: Key contacts

This table will be useful for recording contact details of people who can help you if you come across kiwi during your forestry operations.

Name & organisation	Contact
Save the Kiwi, Operations Manager	enquiries@savethekiwi.nz www.savethekiwi.nz
Department of Conservation	0800 HOT DOC www.doc.govt.nz
Local kiwi project	
Local kiwi handler	
Incubation facilities: • Gallagher Kiwi Burrow (Wairakei) • National Kiwi Hatchery (Rotorua) • Auckland Zoo (Auckland) • Pūkaha Mt Bruce (Wairarapa) • Napier kiwi creche (Napier)	 • 021 198 6653 • 0800 724 626 • 09 360 3800 • 06 375 8004 • 027 480 8025
District council	
Regional council	
Local dog ranger	
Local vet	

Appendix II: Estimated costs to monitor five pairs of kiwi

The table below shows the estimated costs for monitoring five pairs of kiwi, removing their eggs for incubation and release, and monitoring the released kiwi. The costs are current as of January 2024.

Initial costs	Details	Resource	Unit cost $	Total cost $
Catching	Kiwi handler with certified kiwi dog	32 hrs/mo	$75/hr	$28,800 p/a
Equipment	Tracking equipment	1x TR8 radio receiver	$3,400	$3,400
	Transmitters	20x replacements & spares	$370	$7,400
	Other field equipment	Notebooks, tape, chilly bin, scales		$500
Travel			82c/km	
			Subtotal	**$40,500**
Annual costs				
Labour	Monitoring	60 hrs/mo	$55/hr	$39,600
	Transmitter changes	3x 8hrs	$55/hr	$1,320
	Egg lifts	15x 8hrs	$55/hr	$6,600
	Miscellaneous	15x 8hrs	$55/hr	$6,600
Travel			82c/km	
Training				$10,500
Transmitters	Replacement batteries, repots	7	$300	$2,100
	New transmitters for released kiwi	5	$370	$1,850
Artificial incubation	Incubation facility & vet bills	Possibly 10 chicks	$500/chick	$5,000
			Subtotal	**$64,500**
			TOTAL	**$105,070**
			Additional cost: travel	varies

Appendix III: Kiwi interactions recording form

Use this form to record and report any kiwi interactions. These may include sightings, any kiwi sign noticed (e.g. footprints, feathers, scat, probe holes), burrows found, or possible kiwi calls heard.

Type of interaction	Actions taken	Location	Date & Time	Photo evidence Y/N
What were you doing, and what did you see or hear? *E.g. I was driving to work through the forest and noticed a kiwi wandering along the road.*	*E.g. I knew there were two empty logging trucks behind me so I called them on the RT to warm them about the kiwi. It had moved off the road into the scrub so I carried on.*	*Please describe where this happened (provide GPS if possible)* *E.g. Owera Road between markers 5 and 6*		

Type of interaction	Actions taken	Location	Date & Time	Photo evidence Y/N

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