

Forestry Management Guidelines for North Island Brown Kiwi

Whakatane Kiwi Project



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September 2007



A joint project supported by: Environment Bay of Plenty, Department of Conservation, Ngati Awa, Bank of New Zealand Save the Kiwi Trust, Rainbow Springs-Kiwi Encounter, Whakatane Kiwi Trust and Whakatane District Council.





RATIONALE:

The North Island brown kiwi (*Apteryx mantelli*) is classified as in serious decline. Radio-telemetry studies at a number of unmanaged sites indicate that North Island brown kiwi are declining at an alarming average rate of 5.8% per year (approximately halving every decade) (Robertson, H.A. 2003).

Information gathered by Department of Conservation, Royal Forest and Bird Protection Society and other groups over the last 20 years confirm that this decline is apparent in the Bay of Plenty.

In the last 5 years as commercial plantation forests (mainly of *pinus radiata*) have become ready for harvest, there has been concern and interest from forest owners and managers about the kiwi that currently reside there. This has stemmed from compliance with both regional resource consent conditions and the need to meet national forestry certification standards.

The Department of Conservation, Bay of Plenty Conservancy and Environment Bay of Plenty, through the Whakatane Kiwi Management Plan (2005-2015) are working to stabilise, protect and enhance North Island brown kiwi populations in the Whakatane District.

These guidelines have been drawn up to help minimise damage to kiwi during forestry operations.

Reference:

Robertson, H.A. 2003
Kiwi (*Apteryx mantelli*) Recovery Plan 1990 – 2006
Threaten Species Recovery Plan 50
Department of Conservation, Wellington

SCOPE OF THE MANAGEMENT GUIDELINES:

The following guidelines are intended to help forest owners, managers and operators plan for forestry operations where kiwi have been identified in the forestry blocks under management.

The guidelines have been developed through co-operative consultation between the Whakatane Kiwi Project (Department of Conservation and Environment Bay of Plenty) and representatives from forestry companies. They outline a range of options which can be adapted depending on the following factors:

- Numbers of kiwi present
- Location of blocks to be harvested
- Alternative areas for kiwi to reside
- Other kiwi management in the area
- Available resources and time frames

The guidelines are divided into the following sections:



Section 1:

North Island brown kiwi, habits and behaviour



Section 2:

Risks/threats to kiwi in plantation forests



Section 3:

Management options for kiwi in plantation forests



Section 4:

Key contacts and emergency procedures for kiwi recovery during forestry operations



SECTION 1: NORTH ISLAND BROWN KIWI, HABITS AND BEHAVIOUR

Kiwi in plantation forest

Significant populations of kiwi have been found in plantation forest, particularly where native bush is contiguous with the plantings.

In the Whakatane area, kiwi have been confirmed in the following plantation forests: Omataroa, Kiwinui, Awakeri, Ohiwa, Taneatua, Kereutahi, and Waiotahi.

Kiwi habitat

Kiwi are known to survive and thrive in managed plantation forests. They move into the area from indigenous bush and shrub land once sufficient ground cover and insect life develops under a maturing stand of pines (stands from 5-10 years onwards usually provide this cover). Some adult kiwi will successfully breed within the confines of the forest, such that a significant population can reside there prior to harvest.

Kiwi often reside in native gullies WITHIN the pine stands but will move around extensively looking for food and mates. At this point they can cross logging roads and tracks and enter the cut over areas despite the lack of cover.

Greg Moorcroft (DOC, Opotiki) catches a kiwi in recently logged pine forest



Kiwi behaviour

Feeding:

Kiwi are nocturnal and can move around 1-2 km per night feeding. They may move between native bush and plantation forest on a nightly basis, or depending on food availability, come into or leave the pines in a cyclical manner. Some may feed only in the pines and others stay firmly in native bush enclaves.

They predominately feed on soil invertebrates and the location of these will vary with time of year and vegetation cover. In dry periods the kiwi may move outside their normal territories to visit a wet or swampy area. These areas should be protected if at all possible.



Kiwi feeding in bank

Typical bush gully within pine plantation showing logged areas



Breeding:

Paired kiwi can start breeding from 3-4 years old and will continue to do so annually as long as they have partners. This continues up until they die at 40-50 years old. **Kiwi can therefore outlive the duration of a plantation forest.**

Kiwi breeding cycle in the Eastern Bay of Plenty:

- April and May: Birds pair up, courtship and maximum calling takes place
- June: **First** clutch of **two** eggs can be laid in a nesting burrow excavated by the male
- July-August: Main incubation period. The male will incubate these eggs without any assistance from the female for up to 80 days until the chicks hatch

NOTE: High Risk period: male is always in the same burrow and reluctant to move even when there is disturbance around him. However, if disturbed will probably desert the nest/eggs and not return.

- September: Chicks hatch. After a few days they are independent and will be moving around and foraging on their own. **High Risk period for chicks (predation and injury)**
- November: Possible **second** clutch of two eggs in a different nesting burrow
- January/February: Second clutch chicks usually hatch, but some birds have still been breeding in March and April

Avoiding logging in August, September and October in areas with known breeding kiwi will give resident kiwi a chance to have a first clutch and potential chicks. Staggered logging could also be an option within compartments with resident kiwi.

The breeding cycle (top to bottom): kiwi nesting burrow in pine forest; eggs in kiwi nest; kiwi chick; second clutch kiwi nesting burrow



Territories:

Paired adult kiwi can have an established territory of up to 10-50 ha, which they will be faithful to.

Younger birds will move through an area in search of mates and may only be in a particular patch of bush/stand of pines for a few nights.

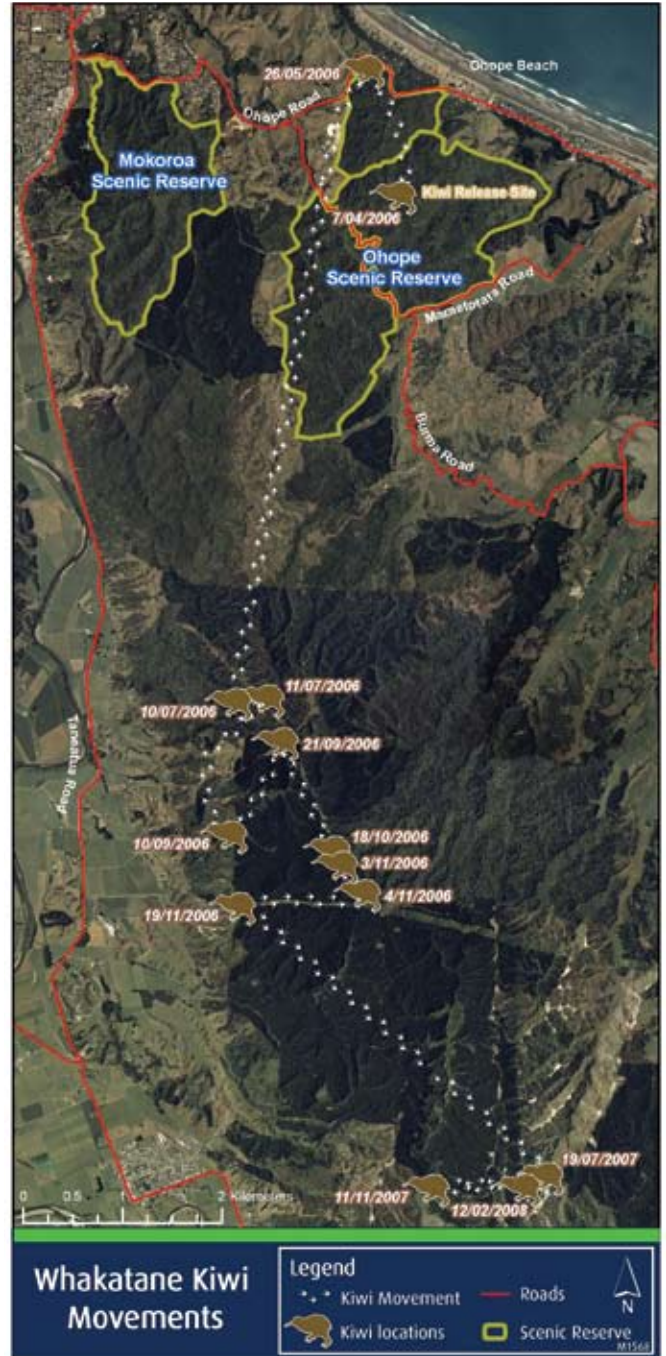
This map shows the wanderings of a sub adult female kiwi searching for a territory from 2006 to 2008.

Roosting:

Kiwi roost during the day, either under the ground in burrows or on the surface under cover such as log piles, slash piles, windrows or thick shrub including bracken, gorse, pampas grass and native Toi Toi. An individual bird may have as many as 40 different "campsites" within its territory and usually roosts in a different location each day. The exception is when the male kiwi is incubating eggs.



Kiwi roost in pampas grass



SECTION 2: RISKS AND THREATS TO KIWI IN PLANTATION FORESTS

The main threats to kiwi in plantation forest are the same as in indigenous forest where introduced mammalian predators are at large. Plantation forests also bring with them extra hazards and risks particularly during harvesting operations

Common threats to all kiwi

- Attacks by dogs usually causing death
- Leg hold traps laid on the ground for possums causing serious injury or death
- Predation:
 - Of adult kiwi by ferrets, and possibly by possums and pigs
 - Of chicks by stoats, cats, ferrets, possums and possibly pigs
 - Of eggs by possums and pigs

Additional threats to kiwi associated with forestry operations:

- Habitat loss and degradation
- Isolation of remnant populations through land management
- Kiwi death from falling into steep-banked ponds and fire control dams
- Kiwi hit by vehicles especially logging trucks at night
- Kiwi disturbed, injured or killed during land preparation or clearing, slash-burning and harvesting



Clockwise from left: Adult kiwi killed by a dog; Leg hold trap on the ground; Kiwi toes lost in trap; A cut over forest resulting in loss of kiwi habitat; Logging trucks – hazardous to kiwi.



SECTION 3: MANAGEMENT OPTIONS FOR KIWI IN PLANTATION FOREST

The presence or absence of kiwi is usually determined by a combination of the following:

- Historical evidence and reports
- Current call count surveys
- Current sightings

The significance of the kiwi population is further determined by:

- Number of kiwi thought to be present
- Number of other kiwi in locality
- Historical and current kiwi management carried out by government or private conservation organisations

The management options available to safeguard kiwi in plantation forest will depend on the following:

- Numbers of kiwi present
- Location of blocks to be harvested
- Alternative areas for kiwi to reside
- Other kiwi management in the area
- Available resources and time frames

In the Bay of Plenty a combination of kiwi protection and management has been carried out in plantation forests. These include:

- The implementation of Bank of New Zealand (BNZ) Operation Nest Egg™
- Translocation of the kiwi to protected habitat
- Implementation of pest control to benefit kiwi
- Implementation of forestry practices that reduce risk to kiwi

Table of management options for kiwi in plantation forests

Management regime	Level of intervention	When suitable	External input	Resources	Time frame
BNZ Operation Nest Egg™	High	More than 5 known pairs Easy access to birds Significant population	High	High 20K-50K/ annum	3 years minimum
Translocation to protected habitat	Extreme	All habitat removed/will be removed No other birds in area	High	Medium 10K	1 year for removal
Pest control	Low	Kiwi population known to be stable Other Kiwi habitat surrounds plantation forest BNZ Operation Nest Egg™ not feasible	Low	Medium	Long term Life of forest and replanting
Kiwi safe forestry practices	Low	Kiwi known in area, but numbers low or not considered significant	Low	Low	Life of forest

BNZ Operation Nest Egg™



Basic principles

A sample of the kiwi population in an area is caught and monitored for breeding. Eggs are removed for artificial incubation in a pest free environment (Kiwi Encounter in Bay of Plenty). Any chicks that hatch and reach 1kg in weight can be returned to the forest if suitable or released in predator controlled environments (e.g. Ohope Scenic Reserve, Moutohora, Tuhua).



Activities:

- Adult kiwi are caught by professional kiwi catchers usually working at night with trained dogs
- Radio transmitters are attached to the kiwi and the adult males are monitored for movement and breeding. Radio tracking is carried out by trained operators usually during the day (once a week initially and later once a month as the bird's territory and habits are established)
- Eggs are removed at night for artificial incubation normally during September and December
- Chicks over 1kg in weight are returned to indigenous forest/predator controlled habitat during day (January – March)
- Chicks are monitored weekly for dispersal for first year in released area



See Appendix I for estimated costs associated with this management regime based on 5 monitored pairs of kiwi

Translocation to protected habitat

Basic principles

Translocation of kiwi to protected habitat is the most disruptive way to safeguard kiwi during forestry operations. Translocation permits are required from the national Kiwi Recovery Group, and permissions must have been granted from the appropriate iwi. This option is only considered when all the available habitat for the kiwi in question is going to be removed and no new areas are available for re-colonization in the immediate future.

The birds must be re-located to an area which will not be adversely affected by the influx of new genetic material. Consideration must also be given to the fact that when moving adult birds from the wild, they may try and walk back to their home territory unless put in a contained area such as an island or fenced enclosure.

From left to right: Kiwi catching team; Radio transmitter attached to kiwi leg; Kiwi eggs removed for artificial incubation; Monitoring the released chicks



If translocation is recommended the following takes place:

- Adults caught by professional kiwi catchers and either radio tagged for later removal or held in captivity until a number can move to a new location together
- If radio tagged, the adults are all re-caught and transported to new location on the same day. Transmitters will normally be fitted to the birds for monitoring after release
- Birds are released at new site, usually with receiving and departing iwi representatives
- Birds are monitored for survival



A tagged kiwi is transported to a new location.



Kiwi are released with the blessing of local iwi

Implementation of pest control methods to benefit kiwi

Threats	Mitigation
Dogs killing kiwi	<ul style="list-style-type: none"> • Ensure forestry crews do NOT bring dogs to camp at any time • Install signs to advocate “no dog” areas and presence of kiwi • If dogs are seen in and around forest camps arrange with the appropriate District Council for dog trap to be set up, dogs caught and removed • Ensure any dogs brought into forest by other contractors (eg. pest control contractors) have valid kiwi aversion training certificates • Offer kiwi aversion training for hunters using the forest • Consider pig control by methods other than pig dogs (poison, trapping)
Predation by mustelids	Establish mustelid trapping in and around any indigenous forest areas. Boxed traps only.
Disturbance and competition for food by rats and possums	Establish possum and rat control by poison or trapping. NOTE: Only raised set traps for possum control and monitoring
Predation by cats	Set live cat traps and/or shoot on sight



Above: Dogs should not be allowed in forestry areas

Below: Rat caught in DOC 200 series trap



Forestry practices to safeguard kiwi

The following forestry practices have been discussed with forest managers and it was agreed could be implemented with little disruption to the overall forest harvesting schedule:

Awareness and information

- Brief ground crew about presence of kiwi and increase their awareness about the birds (see kiwi awareness briefing information pg 12)
- Brief ground crew on emergency procedures for kiwi recovery (disturbed/injured/dead kiwi, exposed kiwi eggs)
- Maintain contact with Whakatane Kiwi Project to ensure up to date information exchanged as to where logging taking place and where radio tracked birds are present
- Maintain records of any kiwi sightings and sign and pass onto Whakatane Kiwi Project
- Advise all vehicle users of kiwi in area, especially those using the roads at night. Kiwi and possum can look very similar until at close range

Harvesting Operations

- Where possible, leave escape routes (unlogged corridors) for any kiwi that might be within the block to be logged
- In particular leave native gullies and indigenous enclaves of bush undisturbed
- Do not drag logs through, fell or dump harvest waste into these areas as kiwi are most likely to have sought refuge

Post harvest operations

- Retain riparian and wetland areas in indigenous vegetation whether mature or regenerating. Avoid grazing, burning or spraying in order to encourage recovery of vegetative cover and higher ground moisture levels.
- Avoid disturbance of known kiwi habitat (i.e. slash piles) during land preparation.
- Avoid burning “birds-nests” in which kiwi often roost

Intervention – in the case of monitored birds in logging area

- Notification of Whakatane Kiwi Project Manager and/or kiwi field workers that logging about to take place. If possible, personnel able to relocate birds will then arrange to be on site prior to logging operations and monitor the kiwi
- Allow access to kiwi monitors to logging site prior to logging
- Halt operations while location of birds ascertained (10-15mins)
- Halt operations while birds are caught and moved if personnel on site. (30mins -1hour)
- OR halt operations while person responsible is notified and able to move birds

NOTE: Members of the ground crew could be trained to detect monitored kiwi if large area to be logged



Kiwi awareness briefing information

As kiwi are nocturnal and inhabit deep bush they are not often seen except when disturbed accidentally during the day or seen crossing the road or a track at night. However, it is possible to recognize kiwi sign with familiarisation of the following:

Kiwi calls:

- Kiwi call at night. On still nights their distinctive piercing calls can travel more than a kilometer.
- The male call is an upward shrill, single note, repeated about 15-20 times.
- The female call is a lower, coarse rasping cry, also repeated about 15-20 times.
- A morepork call is often confused with a male kiwi call but it is usually lower in tone and only repeated up to 7-10 times.
- On the CD enclosed, a variety of calls are recorded to help in the recognition of the kiwi call.

Kiwi probe holes:

Kiwi feed exclusively by probing the ground with their long bills. They leave a cylindrical hole about 10cm deep with a small conical depression where the base of the bill or face has been pushed against the earth. Two or three probe holes may be found close to each other in a cluster.



Kiwi burrows and roosts:

As already described kiwi can roost both above and below the ground. Nests/breeding burrows are usually dug below 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 emergency kiwi recovery for egg removal).



Kiwi footprints:

In soft terrain such as mud and sand, kiwi footprints show up really well. Footprints can sometimes be seen along road side verges in the wet mud. They are slightly larger than a hen's footprint, heavier and more spread out than a pheasant foot print. They leave a distinct tread pattern with each foot placed deliberately in line with the other; the tracks give the impression the kiwi know where they are heading- they don't dawdle as do pheasant.



Kiwi feathers:

Kiwi feathers are very distinctive as they are fine and not zipped together like most other bird feathers. They are usually brown with a hint of russet. The feathers are sometimes caught on vegetation such as hook grass, but a large pile of feathers usually indicates the bird has been in some kind of trauma. Kiwi can shed handfuls of feathers in flight from a predator and still be unharmed.



If a pile of feathers is found, but spread over a couple of meters, there may have been fatal contact with a predator/ machinery and a carcass should be searched for.

Kiwi faeces:

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



SECTION 4: EMERGENCY PROCEDURES AND KEY CONTACTS FOR KIWI RECOVERY

Procedures for emergency kiwi recovery

Scenario	Action
<p>Kiwi seen moving off during any forestry operations</p>	<p>If possible leave bird to move to safety and note direction of travel.</p> <p>If heading into danger zone, stop operations and if possible flush bird to safety.</p> <p>If bird cannot be removed from danger, and operation must continue, be prepared for recovery of injured or dead bird.</p> <p>If bird cannot be removed from danger, and operation can stop, call Whakatane Kiwi Project Manager for assistance to remove bird.</p> <p>In all cases, note location of bird and activity. Information can then be forwarded to Whakatane Kiwi Project.</p>
<p>Kiwi caught alive/injured during any forestry operations</p>	<p>Handle the bird with care. Hold firmly by both feet or un-feathered portion of legs to avoid harm to handler or bird. Do NOT squeeze around chest. Cradle in arms like a baby, belly upper most (see photo). If legs damaged swaddle whole body in jumper or arms exerting even pressure round all of the bird.</p> <p>Examine for any obvious injury and note severity.</p> <p>If possible tape legs together (electrical tape, masking tape,) around un-feathered portion and wrap whole bird in towel/jumper/coat, head included. Kiwi should stop struggling once restrained gently and in the dark.</p> <p>Place in confined space, with padding of coat/jumper/sacks with legs still together. If box/empty chilly bin not available, a cloth sack, pack or bag will do. Make sure the bird cannot escape. Keep in safe, quiet place.</p> <p>Contact Whakatane Kiwi Project Manager in the first instance and thereafter the most suitable names in the key contact list. Keep notes of what happened and when to help kiwi staff with diagnosis and consequent action.</p> <p>Follow any instructions or advice as offered by kiwi personnel.</p>
<p>Kiwi chicks caught/injured during any forestry operations</p>	<p>Handle the bird with extreme care. Hold gently by legs and feet and cradle/support body with other hand against your chest. Keep warm in jumper/ beanie and put in small container so unable to escape. Keep in warm, quiet safe place and call for assistance as above.</p>



Scenario	Action
<p>Kiwi eggs unearthed/ disturbed during any forestry operations</p>	<p>Assume eggs are alive even if cold and cracked unless obviously broken and the chick inside is dead, or the egg is extremely smelly and slightly sticky to touch.</p> <p>Look for second egg if only one found, as usually two eggs are laid in a single clutch.</p> <p>Note the position of the eggs before removing them from the nest and mark top with pencil if possible.</p> <p>Transport the eggs in this position so the chick inside is not turned upside down and killed.</p> <p>If eggs found outside the nest in vegetation, it may not be possible to know which is the top of the egg. If you have a flat, level surface, (chilly bin, lunch box lid), place the egg in the centre and it will roll and balance with the air cell up. This is the correct position for transport. Mark and keep it this way.</p> <p>Place in a box, chilly bin or bag, with sufficient padding to stop the eggs getting damaged. Keep in warm dry place but do not apply any heat directly to eggs.</p> <p>The eggs need to be taken to Kiwi Encounter, Rotorua asap. Contact Whakatane Kiwi Project for assistance. If transporting the eggs yourself, have someone else hold the box to avoid severe jolting over rough terrain or strap in vehicle with seat beat.</p> <p>If possible warn Kiwi Encounter of your arrival and have details of where the eggs have come from.</p>
<p>Kiwi found dead or killed during forestry operations</p>	<p>Any dead kiwi whether killed by machinery, vehicles, dogs or unknown cause can be collected by the Department of Conservation – Whakatane Kiwi Project without negative repercussions to the person handing the bird in. Valuable information can be obtained from all dead birds and these records are important for future kiwi protection and recovery.</p> <p>Place kiwi in plastic bag with any relevant details recorded on a slip of paper. These include time, date, details of location where found, cause of death if known. Any details from site of discovery, e.g. Dog footprints, cat scat etc. are also important.</p>



Marking the egg for transport



Kiwi eggs in box ready to be covered with padding for transportation

KEY CONTACTS FOR KIWI MANAGEMENT AND RECOVERY:

Name	Organisation/position	Office/home phone	Cell phone	Assist with:
Kerry Oates	Whakatane Kiwi Project – Manager	07 3070611	021 1157376	Kiwi monitoring Injured birds Kiwi management, survey
Michelle Howard	Whakatane Kiwi Project – Assistant	07 3070611	027 3784007	Kiwi monitoring Injured birds Kiwi management, survey
Dave Wills	DOC – Bio-diversity Tauranga	07 5787677	027 651 9390	Kiwi monitoring Injured birds Kiwi management, survey
Dave Paine	Environment Bay of Plenty – Animal Pest officer	0800 368267	029 3689597	Pest management
Lance Dew	Certified kiwi catcher	07 343 6302	027 4506441	Kiwi survey work, Kiwi catching, monitoring
Nick Gillingham	Kiwi contractor		021 663883	Kiwi survey work, Kiwi catching, monitoring
Rosemary Tully	Bird Rescue	07 312 9475		Injured birds including kiwi
Wendy Sporle	Bank of New Zealand, National Advocate	09 408 4241		General information on kiwi management and resources
Claire Travers	Kiwi Encounter	07 350 0440 Ext: 832	021 271 2710	Kiwi eggs, chicks and injured kiwi
Vetz 4 pets	Whakatane vet happy to treat injured kiwi	07 307 0759		Injured kiwi
Animal Control	Whakatane District Council	07 305 0500	07 306 0729 A/H	Stray Dogs

Further Information and Support

- Pest control – contact DOC, Regional Councils or landcare groups
- Kiwi Survival Guide. Bank of New Zealand Save the Kiwi Trust www.savethekiwi.org.nz
- Kiwi Information – Department of Conservation and Bank of New Zealand Save the Kiwi
- Advocacy material and kiwi DVD (including a forestry module) Bank of New Zealand Save the Kiwi Trust www.savethekiwi.org.nz



Appendix 1 – Estimated costs to monitor 5 pair of kiwi

Initial costs:	Details		Unit cost \$	Total cost \$
Catching	Kiwi catcher with dog	20 nights	500	10,000
Equipment purchase	Tracking equipment	1 TR4	1,800	1,800
		1 Aerial	400	400
	Transmitters	15 (replacements and spares)	350	5250
	Other field equipment	Notebooks, tape, chilly bin, tx kit		500
			Subtotal	17,950
Annual costs:				
Labour	Monitoring	12 x 8hrs	\$20/hr	1920
	Tx changes	3 x 2 x 8hrs	\$20/hr	960
	Egg lifts	10 x 2 x 8hrs	\$20/hr	3200
	Miscellaneous	10 x 8hrs	\$20/hr	1600
Training				1000
Transmitters	Repotts	7	200	1400
	New for released birds	5	350	1750
Artificial incubation	Kiwi Encounter and vets bills	Possible 10 chicks	500/chick	5000
			Subtotal	16,830
			Grand total	34,780