

Coromandel Brown Kiwi Taxon Plan

A strategic plan for the protection of Coromandel
brown kiwi
2015-2025

Christine Friis, Kevin Carter, Suzanne Clegg and Bridget Baynes

Preface

The Kiwi Recovery Plan 2008 – 2018 (Holzapfel *et al.* 2008) provides strategic direction, at a national level, to ensure the long-term viability of all kiwi taxa¹. The Kiwi Recovery Group facilitates the implementation and review of this national plan.

Regional direction for the recovery of specific kiwi taxa is detailed within independent taxon plans as the Kiwi Recovery Plan does not contain sufficient detail to guide operational plans for individual taxa. Taxon plans translate the relevant goals, objectives and actions of the Kiwi Recovery Plan into a local context for individual taxa. They are ‘best advice’ for all stakeholders regarding goals, objectives and actions, priorities and opportunities for the management of individual taxa. As such, taxon plans are key documents for the implementation of the Kiwi Recovery Plan.

Although taxon plans are more operationally-focused than the Kiwi Recovery Plan, they do not provide the level of detail of a work plan. Nor do taxon plans provide best practice or captive management advice, which is provided at a national level for all kiwi taxa elsewhere (for example, in the Kiwi Best Practice Manual (Robertson and Colbourne, 2003) and Captive Management Plan for Kiwi (Barlow, 2011)).

Taxon plans have been developed in collaboration with key stakeholders for the taxon: the Department of Conservation (DOC), tangata whenua, landowners, and community-led kiwi projects. Individual taxon plans have been peer-reviewed by the Kiwi Recovery Group to ensure that they fulfil their role as integral parts of the Kiwi Recovery Plan.

The accountability for each taxon plan rests with the Regional Director Conservation Services within the Department of Conservation, in consultation with and guidance from the Kiwi Recovery Group. In some cases the implementation and review of taxon plans will be supported by a ‘taxon group’, including key stakeholders and participants in the recovery of that taxon.

The Department has responsibilities under Te Tiriti o Waitangi, the Conservation Act and various Treaty Settlement Acts to recognise and provide for the involvement of tangata whenua in all aspects of kiwi recovery. It is recognised that within the lifetime of this plan some Treaty settlement claims within the Hauraki rohe may be finalized.

The term of this plan is 10 years, from 2015 to 2025 and will be subject to an annual progress review, with major reviews in 2020 and 2025.

¹ Species – a formally described (i.e. published in the scientific literature), base unit of taxonomic rank usually applied to groups of organisms capable of interbreeding and producing fertile off spring. Five species of kiwi are described; Brown Kiwi, rowi, tokoeka, great spotted and little spotted kiwi. Taxa – Inclusive of any level of taxonomic rank. In this context it includes the five described species and four genetically distinct provenances of kiwi currently recognised but not formally described, within each of the species NI brown (Northland, Coromandel, eastern and western) and tokoeka (Haast, Northern and Southern Fiordland and Stewart Island). Taxon – Singular, referring to single taxa.

Executive Summary

The Coromandel brown kiwi is one of eleven taxa recognized within New Zealand, and one of four distinct North Island brown kiwi (*Apteryx mantelli*) taxa. With a population of approximately 800 pairs of kiwi, the Coromandel brown kiwi are the rarest of the brown kiwi taxa. The majority of this population is found in three areas; north of Coromandel town, the Kūaotunu Peninsula and the Whenuakite/Kapowai area.

This is the first taxon plan to guide the conservation of this taxon, and is a practical guide for all individuals and groups involved in the recovery of Coromandel brown kiwi. This plan provides a framework and context for recovery planning. It also examines the current conservation status of Coromandel brown kiwi, the management and monitoring programmes currently underway, and the options for minimising population decline and restoring Coromandel brown kiwi in its historical range.

The aim of this taxon plan is *‘To restore and, wherever possible, enhance the abundance, distribution and genetic diversity...’* of the Coromandel taxon, as per the long-term goal of the Kiwi Recovery Plan (2008–2018). This plan contains 17 goals with 103 action points. These goals and actions are grouped under three theme headings: management; community relations and engagement; and research, monitoring and innovation. Each action point is prioritised, time-lined and allocates work delivery responsibilities.

Kiwi recovery work in Coromandel occurs on both private and public land and there is a very strong history of significant community (12 kiwi and restoration projects) engagement and investment in kiwi protection. Intensive protection and advocacy has halted population decline in protected areas, where kiwi are increasing at a rate of 8-10% per year (Appendix 2). However, this has been accompanied by the disappearance of kiwi from 40% of their previous known distribution in the Coromandel over the last 20 years (Stewart, 2013). This reduction in distribution has occurred on land that is not protected by predator control.

The focus for kiwi recovery in Coromandel remains the sustainable management of kiwi populations in their natural range by reducing their exposure to predators i.e. the landscape-scale control of mustelids. There are now over 45, 000 hectares of private and public conservation land under active management, protecting approximately 800 pairs of kiwi. The focus for kiwi recovery in the Coromandel is to; increase the number of kiwi protected to 1200-1500 pairs; to have increased land under protection including habitat corridors to connect populations; to have Motutapu Island as an established island sanctuary and functioning as a kōhanga site and reintroducing kiwi into their historical range; by 2025.

The recovery and protection of Coromandel brown kiwi relies on the interest, understanding, engagement and collaboration of many sectors of the community. Tangata whenua, community and landowner-led kiwi conservation projects protect two-thirds of the Coromandel brown kiwi population. The long-term sustainability of these projects requires the ongoing energy and enthusiasm of the groups and individuals involved, and ongoing funding to sustain protection efforts. Increased competition for funding between projects (both at a national and regional level) means resources for managing Coromandel brown kiwi are currently a limiting factor for some kiwi projects. The Department’s role, beyond the Moehau Kiwi Sanctuary, is seeking a wider range of ecosystem benefits from kiwi protection work, and in supporting community groups to build on their already considerable achievements.

The recovery of kiwi has greatly benefited from research and technological developments, and will continue to be dependent on sound scientific understanding and the development of adequate tools at a national level.

Dog predation is an important issue for Coromandel kiwi. Actions are targeted at reducing dog predation and focussing on increasing the number of people in the Coromandel (both living permanently on the Peninsula and on holiday) who are knowledgeable about the threats that dogs pose to kiwi. Increasing the numbers of dogs and their owners participating regularly at kiwi avoidance training sessions is of high importance.

A key part of the taxon plan is the establishment of a Coromandel Kiwi Collective (CKC), made up of all those involved in kiwi recovery in Coromandel. The Collective will facilitate the implementation of some of the actions of this plan and provide information and support to community kiwi projects and practitioners. This will ensure that all groups and individuals involved in kiwi recovery have support, access to technical and best practice information, and an avenue for networking.

The term of this plan is 2014 to 2025. It will be subject to an annual progress review, with a full review in 2020 at the halfway point of the plan.

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He kohinga whakāro mō te anga whakamua

Our collective vision for the future

Recorded by Suzanne Clegg during 2009 consultation round.

Together, the people of the Coromandel region have developed a long-term vision for kiwi. While much of it is outside the time-frame of this plan it will inspire our present work.

It is 2060. CBK are actively protected throughout their historical range. Their calling makes it difficult to sleep at night without earplugs and we wake each morning to an ear-shattering dawn chorus. Major cultural shifts over the last few decades mean that people understand and value all of Tane Mahuta's offspring and that kiwi are further protected through responsible dog ownership. The Coromandel is known as "Kiwi Country" and, in a respectful way, both locals and visitors are able to see and hear kiwi in their natural habitat. Our kiwi are no longer isolated from each other and are mixing so that they are becoming robust and able to withstand unexpected threats such as disease. People working for kiwi at grass-roots level are highly valued as innovators and many other taonga are benefiting from their kiwi protection work. Coromandel Forestry companies are reaping the rewards as leaders in sustainable, kiwi-friendly forestry management. The Department of Conservation, in partnership with iwi, are working with and supporting a myriad of dedicated community groups and private landowners to sustain this vision with the help of innovative long-term sponsorship. Our mokopuna are stepping up to continue our work.

The mauri of our kiwi has been restored.

1. Introduction

Kiwi are a taonga to Maori, have achieved iconic status nationally and are recognised as a symbol of New Zealand worldwide. Once widespread throughout New Zealand, brown kiwi are now classified as Nationally Vulnerable (Robertson *et al.* 2012), predominantly due to predation by introduced species, disturbance and habitat loss. Cooperative partnerships are responsible for significant kiwi recovery successes across New Zealand, however, kiwi continue to decline in unmanaged areas.

Kiwi are endemic to New Zealand and biologically unique. They possess several non-birdlike characteristics such as vestigial wings, hair-like feathers, no external tail, marrow-filled bones, long facial bristles, nostrils at the tip of their bill and well-developed senses of smell and hearing. Their egg is one of the largest in relation to their body size of any bird. Taxonomically, their closest relative is the elephant bird from Madagascar (Mitchell *et al.* 2014).

Five species of kiwi have been recognised to date: brown kiwi (*Apteryx mantelli*), rowi (*A. rowi*), tokoeka (*A. australis*), little spotted (*A. owenii*) and great spotted kiwi (*A. haastii*) (Burbidge *et al.* 2003). Within the brown kiwi species, four genetically and geographically separate taxa have been identified: Coromandel, Northland, western and eastern brown kiwi.

At an estimate of 1500 individuals, the Coromandel brown kiwi (CBK) taxon accounts for approximately four percent of the brown kiwi species (Holzapfel *et al.* 2008) i.e. it is the rarest taxa of North Island brown kiwi. A population estimate of 800 pairs of adult kiwi (C.Friis, [DOCDM-1430283](#)) has been projected in 2014 from survey data supplied by kiwi groups. Strongholds for CBK are identified above Coromandel town, (450 pairs), the Kūaotunu Peninsula (160 pairs) and Whenuakite/Kapowai area (120 pairs) respectively (Figure 1).

The present known range of CBK is the Coromandel Peninsula north of the Kopu-Hikuai Rd. Their range has decreased by 40% over the last 20 years, as no recent evidence of kiwi has been found south of the Kopu-Hikuai Rd to the Karangahake Gorge (Stewart, 2013) (Figure 2, figure 3).

Kiwi recovery occurs on both private and public land and there is a strong history of significant community and landowner engagement, and investment in kiwi protection on the Coromandel Peninsula. Intensive protection and advocacy has halted population decline. The current population of approximately 800 pairs exceeds the Kiwi Recovery Group's objective of securing 500 pairs. However, kiwi populations in unmanaged areas remain at high risk with low or unknown numbers.

This document is the first taxon plan dedicated to CBK. It provides guidance and is a practical guide to those involved in the recovery of the taxon and provides a regional context to the Kiwi Recovery Plan (Holzapfel *et al.*, 2008). This plan outlines current management techniques, provides an overview of the coordinated approach taken and explores options for the recovery of CBK.

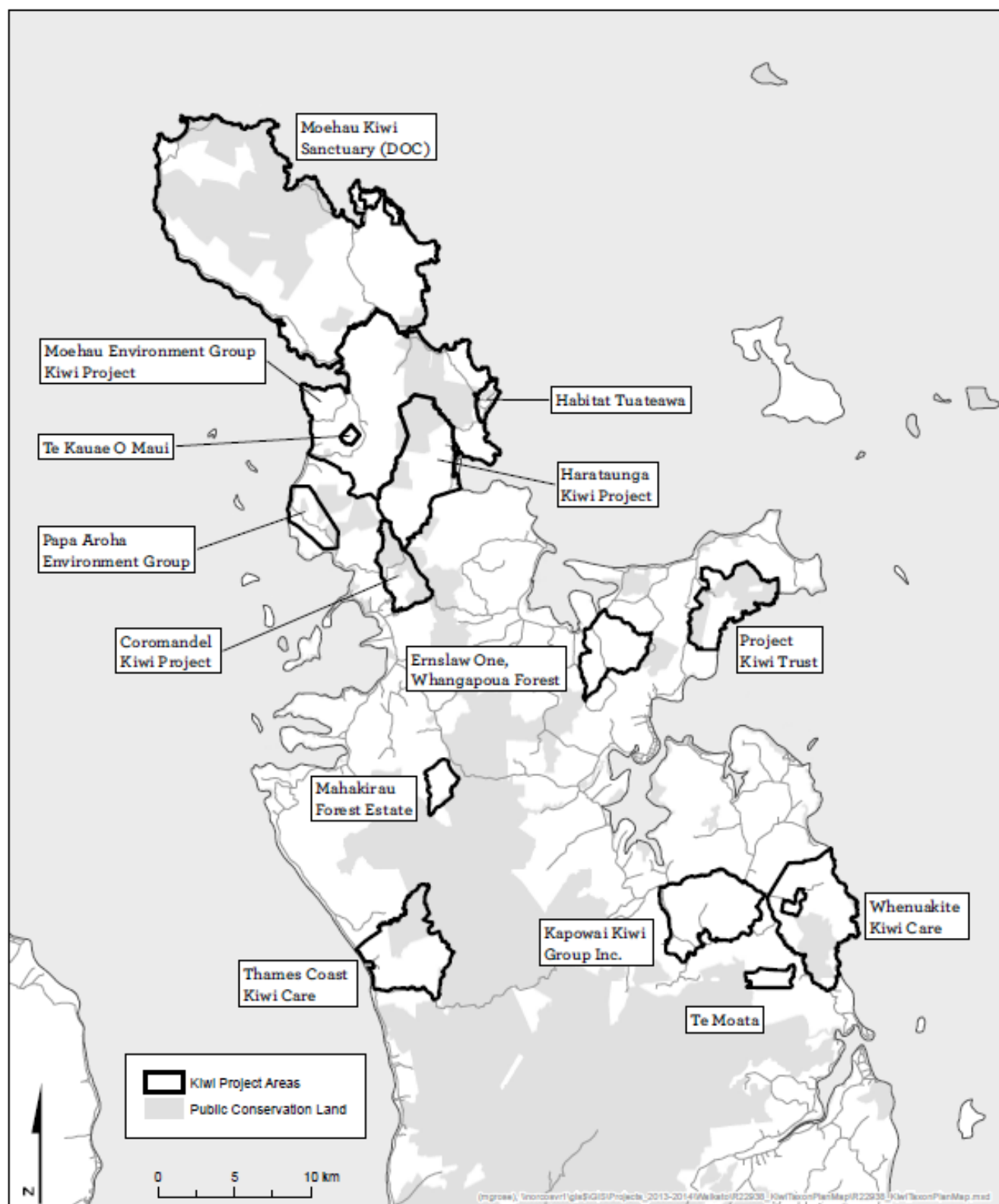


Figure 1. Coromandel brown kiwi project areas

Coromandel Brown Kiwi Taxon 2014

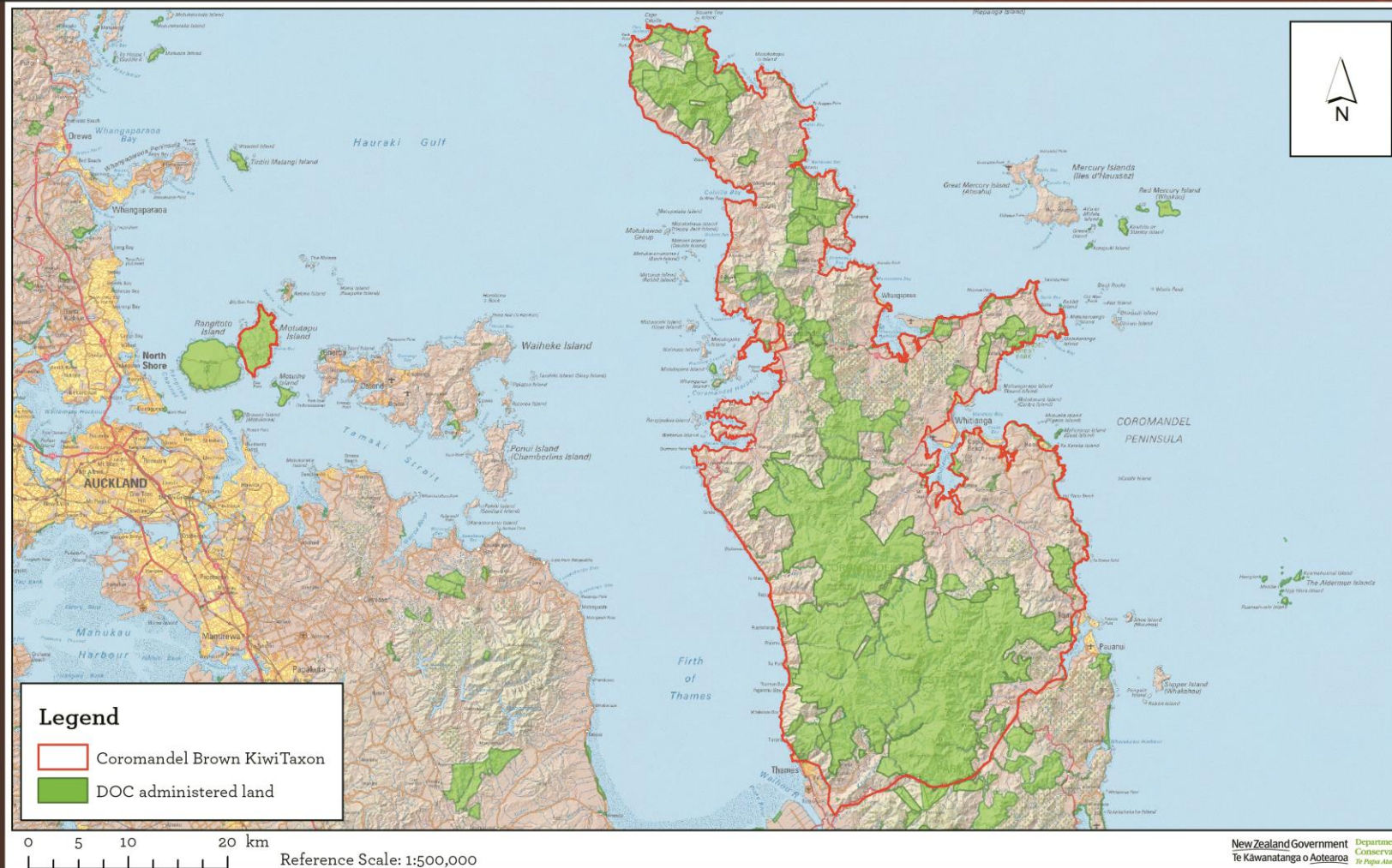


Fig. 2 Distribution of CBK

Coromandel Brown Kiwi Taxon Plan 2015-2025

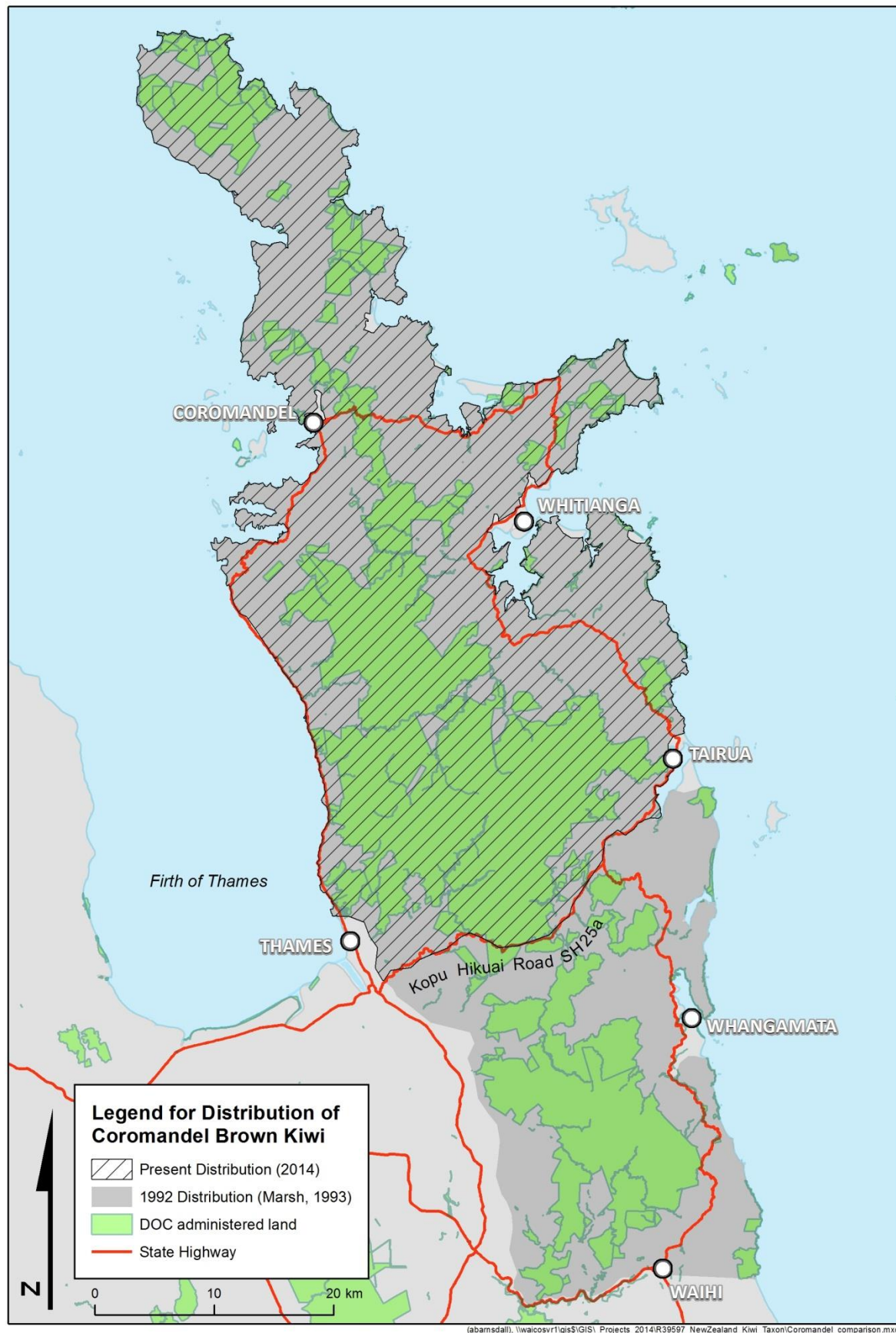


Figure 3. Coromandel brown kiwi range contraction

2. Plan term and review

The term of this plan is ten years, from 2015 to 2025 and will be subject to an annual progress review, with major reviews in 2020 and 2025.

3. Background

3.1 Taxonomy

Kiwi conservation management is significantly influenced by the classification of kiwi into separate taxa. As genetic techniques have developed, differences in kiwi that were not physically obvious have been identified, enabling kiwi to be divided up into five species and eleven discrete taxa. Each taxon has a unique historical and current distribution within the landscape, and distinctive characteristics that can be identified using genetic techniques. An understanding of these taxonomic differences is vital to ensure that genetic diversity is recognised and retained, and that appropriate management units are used. Taxa with reduced genetic diversity may produce less offspring, and be less able to cope with habitat fragmentation or disease. Ideally, management units should encourage persistence in as much of the historical range as possible.

Genetic research continues to refine kiwi taxonomy, the results of which will influence kiwi conservation management.

Four genetically and geographically distinct brown kiwi taxa have been classified in the North Island; Northland, Coromandel, western and eastern (Burbidge et al., 2003), and have most likely developed as a consequence of up to 200,000 years of physical isolation arising from volcanism and sea level change (Baker et al., 1995, Holzapfel et al., 2008).

Further research into brown kiwi taxonomy is recommended to clarify genetic differences likely within and between brown kiwi taxa (Burbidge et al, 2003). The CBK taxon type was determined from kiwi pin feathers collected from Kūaotunu Peninsula in 2002. Taxon verification for kiwi in Moehau and Whenuakite in 2014 showed that both belonged to the same taxon (Ecogene, 2014). Further testing for verification of taxon will be carried out in the Thames Coast area and areas south of Whenuakite and Thames Coast projects. A Southern CBK survey in 2012-2013, found no evidence of kiwi south of the Kopu-Hikuai Rd (State Highway 25) (Stewart 2013).

As further genetic techniques develop, and understanding of kiwi taxonomy improves, conservation management techniques and priorities are also likely to shift. The current approach taken is one of caution, where CBK are managed separately to other kiwi taxa.

3.2 Biology and ecology

Kiwi were monitored at the MKS and by Project Kiwi on the Kūaotunu Peninsula between 2000 and 2008. Most of the information in the following sections has been gained from these monitored kiwi (Appendix 6).

Morphology

The biology of the CBK is similar to other brown kiwi, with physical differences between males and females.

Adult females are approximately 22% heavier than males, and have longer bills than males (Table 1). The distinction is significant enough to allow sexing of adult kiwi using bill length. It is difficult to sex sub-adult birds using weight and bill length, in which case DNA testing of pin feather samples can be used. There is no recorded visible difference in plumage between the sexes.

CBK are a smaller size than their Northland counterparts, but comparable to western and eastern brown kiwi.

Table 1. Morphology of Moehau kiwi (H Robertson pers. comm., KRG, 2014) sourced from Moehau Kiwi database).

	Males	Females
Weight (g) minimum- mean -maximum	1420 - 1930 - 2500 (n=23)	1800 - 2488 - 3800 (n= 26)
Bill length (mm) minimum- mean -maximum	83.2 - 92.9 - 98.7 (n=27)	107.1- 121.6 -131.8 (n=29)

Bill length guide for assigning gender is 102.9 mm. This represents the midpoint between longest male and shortest female to be used as a guide for assigning gender (i.e. an individual with a bill length longer than 102.9 mm is considered female).

Breeding biology

There is anecdotal evidence that CBK are usually monogamous and can pair-bond for life. Birds may re-pair if their mate is lost. They normally first breed at 3-4 years of age, but this can vary. Data from Moehau Kiwi Sanctuary between 2000 and 2008 showed the youngest known breeder was 2.8 years old and the oldest first breeding at 4.6 years. During this same period 36% of the males did not attempt to breed (de Monchy et al. 2008). An estimated productivity of 0.38 chicks per adult kiwi per year was recorded (n=239 adult bird years monitored) (Robertson & de Monchy 2012).

Generally CBK breeding season extends throughout the year with least breeding activity between April and May (pers comm. P. Wilson Co-manager Project Kiwi, June 2014). At Moehau Kiwi Sanctuary (MKS) breeding begins in mid- July. It is not known whether the male or female excavates the burrow and prepares the nest for CBK (pers comm. D. Prince Kiwi practitioner, ex-MKS, 2013). The female lays two eggs approximately 10-15 days apart (de Monchy & Forbes, 2006). The male then incubates the two eggs typically between 70 and 80 days before the first egg hatches. The second egg hatches about a week to two weeks later. The chicks become independent of the adults a week to a month after hatch (pers comm. D. Prince, Kiwi practitioner, ex-MKS, 2013). Most pairs will lay a second clutch

of two eggs about a month after the first clutch chick's independence, often mid to late October. The time between clutches seems to vary between birds and breeding season (pers comm. D. Prince, 2013).

It is unusual for a nest to be used twice, but it does occur occasionally. Second clutches are typically laid in a different breeding burrow and may be in a burrow used in a previous breeding season. Territories do not overlap and pairs do not use the same nests as others (pers. comm. D. Prince, Kiwi practitioner, ex-MKS, 2013). While the nest is typically an excavated burrow, nests have also been found under vegetation or beneath large fallen logs and tree roots.

CBK can be easily disturbed on the nest and attempts to remove eggs during the daytime may result in nest desertion and subsequent nest failure by some kiwi (pers. comm. T. Herbert, 2013).

The data from Moehau Kiwi Sanctuary between 2000-2008 (de Monchy et al., 2008), gave the average survival rate (with varying intensities of predator control) as 65% for chicks (kiwis weighing less than 1 kg or up to 180 days old). The first 50 days of life are the most dangerous for kiwi with 81% of chick deaths occurring in this age. Survival rates for sub-adults and adults were recorded as 96.6 % (n=118 bird transmitter years) and 97.5 (n=239 bird transmitter years) respectively. The mean life expectancy was calculated at 39.8 years for adult kiwi (n= 239 bird transmitter years) once the kiwi reach adulthood.

Project Kiwi data from 1997-2004, gave the average chick survival rate (with varying intensities of predator control) as 31.4% (range 10% - 55%, n= 73). Known chick predation averaged 48.9% (range 25%-100%), (pers comm. Paula Wilson, 2014).

Calling

As with other kiwi taxa, the male and female kiwi have distinctly different calls. The male has a loud, piercing, repetitive, shrill call, with a piercing upward slurred note having 8-25 notes. In contrast the female call is a repetitive guttural sound (rasping cry) of 10-20 notes (Heather & Robertson, 2005). CBK call does sound similar to other North Island brown kiwi taxa (pers. comm. D. Prince kiwi practitioner ex-MKS, 2013).

Peak calling is usually between April and July and in the two hours after dark when birds are emerging from their burrows, making contact and territorial calls. Once breeding has started the male will not call until he comes off the nest to feed which may be anytime from dusk onwards.

Acoustic recordings of CBK at one site at Port Charles indicated that both male and female brown kiwi showed a significant decrease in calling at full moon periods (altitude-adjusted moon phase). Male and female brown kiwi showed significant variation in call rates with time of year and time of night. The seasonal variation was associated with reproduction, as demonstrated by the clear repeated peaks in calling before and after the August breeding period (July to end of September). Male and female call rates were usually elevated at the same time of year and time of night, although male call rates exhibited larger seasonal fluctuations. During the incubation period calling occurred later in the night for both sexes. The highest call rates at this one site usually occurred from the first 10 to 30% of the night, outside of the breeding period and the first 20 to 50% of the night when breeding (pers. comm. R. Colbourne, 2014).

Behaviour

Coromandel brown kiwi are known to use different shelter sites each day when they are not incubating. Research within the MKS found that daytime shelter site selection varies mainly with age and sex of the kiwi. Chicks and sub-adults mostly use surface shelters, under “tents” of dead ponga fronds and debris, providing ideal camouflage. Adults and particularly females, shelter on the surface around half the time (Forbes 2009). Use of holes as shelter sites appears to be limited by substrate and ability to excavate. Coromandel brown kiwi are known to use different shelter sites each day for an extended period of time.

Habitat / territory

While Coromandel brown kiwi are usually found where the vegetation cover is most dense, they are highly adaptable and able to survive and breed in a wide variety of habitats provided shelter and a food source are available. This includes pasture, exotic forest, cutover (but not burned) forest and shrub-lands. Thick ground cover, high moisture levels and sufficient soil depth are all important factors in terms of foraging and burrowing opportunities (pers. comm. P. Stewart).

Kiwi can disperse over large distances. At Moehau, natal dispersal ranges from 5 to 20km, with non-territorial adults dispersing on average 7.5km. Chicks have a slower dispersal rate and distance (average 834m)(Forbes, 2009). Sub-adult birds have been known to travel over 22km over a period of months (de Monchy et al., 2008).

CBK occupy territories of around 32ha in densely populated areas (Kūaotunu and parts of Moehau), with a range of 7 – 53ha (pers. comm. P. Stewart). At Whenuakite up to 14 kiwi have been heard in 83 ha of bush which equates to 6 ha/kiwi (pers comm., A. Hinds, 2014). Te Kauae o Maui Nature Reserve recorded 6 pairs in 40 ha in 2010 (pers comm. N. McCauley, 2014). This compares closely with Little Barrier Island which at 6 ha/pair (Western brown taxon) is considered to be at carrying capacity (Colbourne 2005).

Diet

Brown kiwi are soil feeders, with 76% of their diet comprising scarabaeid larvae, cicada nymphs and earthworms (Kleinpaste & Colbourne 1983). They also feed on surface-dwelling invertebrates, seeds and fruit, especially if the ground is hardened due to low rainfall. Large territories are often necessary in order to provide sufficient food (Colbourne, 2005).

3.3 Past and present distribution and population trends

Over the last century, kiwi abundance has probably declined by at least 90% in most North Island forests. Accounts by Buller (1878, 1888) suggest former densities of 40 -100 adults/km² whereas present densities seldom exceed 4 adults/km² (McLennan & Potter, 1992).

The 1991 National Kiwi Recovery Plan described the Coromandel population as sparse, extending southwards along the Kaimai Ranges to the Mamaku Plateau. A Peninsula-wide kiwi survey in 1992/93, revealed a widespread but fragmented kiwi population, with highest densities along the east coast from Whangamata northwards and from Kennedy Bay north

over the whole Peninsula (Marsh, 1993; DOCDM- 1205758). Kiwi records prior to this survey are sparse and anecdotal, giving no indication of abundance.

Southern Coromandel Peninsula

In 2012-13 kiwi survey work, sponsored by the Auckland Zoo Conservation Fund was conducted south of the Kopu-Hikua Rd. Survey sites were selected from historic data where more than three calls/hr were heard in Sid Marsh's 1992-93 kiwi survey. No kiwi sign or calls were detected from 1,640 hours of recorder and 43 hours of observer effort.

'While it is plausible that there are still isolated relict populations present, the weight of evidence from this and the previous surveys across the entire Coromandel Peninsula (Marsh, 1993) indicate the bird has disappeared from 40% of its previously known range within the Coromandel Ecological Region over the last 20 years (Stewart, 2013)(Figure 3).

It has also been noted that the eastern taxon of the brown kiwi receiving management in the Western Bay of Plenty, could migrate northwards and integrate with remnant populations of CBK (pers. comm. Hugh Robertson, 2013). Any kiwi found in these merge zones i.e. below the Kopu-Hikua Rd will need genetic analysis to determine their provenance.

Motutapu Island

CBK have been translocated to Motutapu Island in the Hauraki Gulf to form an island insurance population for the taxon.

Northern Coromandel Peninsula

The northern section of the Coromandel has been the focus of the majority of the kiwi recovery work over the last decade and is known to be concentrated in three main areas – the northern end of the Peninsula north of the Coromandel/Whangapoua Rd, the Kūaotunu Peninsula and the Whenuakite/Kapowai area (Figure 1). Together these areas hold around 800 pairs. A number of other management areas exist both on private and public conservation land, including areas of sustained possum and rat control.

Predator control over approximately 45,000ha of private and public conservation land, carried out by the Department of Conservation and community groups, has halted the immediate decline of CBK. The current estimate of the adult kiwi population in 2014 is approximately 800 pair of kiwi but caution is needed with this figure as some of the protected areas have not conducted population surveys since 2003.

Continued predator control could see the kiwi population in protected areas double over the next decade. As the Coromandel Peninsula is estimated to have suitable habitat and a carrying capacity for at least 2800 pairs (de Monchy pers. comm.) this anticipated growth is well within the capacity of the Peninsula.

The population modelling within the Moehau Kiwi Sanctuary suggests an annual population increase for kiwi of 10.1% (de Monchy *et al*, 2008) This reflects the high chick survival rate of 67%, low adult mortality and infrequent catastrophic events. Whenuakite Kiwi Care call count surveys have indicated a 14.5 % annual increase over a 9 year period (Stewart, 2010). Taking into account both managed and unmanaged areas of the Peninsula an overall annual

increase of 5-7% can be projected for all Coromandel brown kiwi. This contrasts sharply with the 2% decline of the total North Island brown kiwi population.

3.4 Threat status

The IUCN Red List of Threatened Species (2008) classifies brown kiwi as *endangered*, where the species is facing *a very high risk of extinction in the wild*.

However, the New Zealand Threat Classification System (Robertson *et al.*, 2012) classifies brown kiwi as *Nationally Vulnerable*, recognising that the rate of overall decline has reduced due to intensive conservation management.

3.5 Agents of decline and current threats

Kiwi most likely experienced natural episodes of decline and expansion in pre-human times. Volcanism and sea-level changes appear to have been major driving forces separating brown kiwi into various refugia and causing the divergence of the four recognised forms of North Island brown kiwi (Baker *et al.*, 1995).

The arrival of the first Polynesian settlers in the Coromandel area, approximately 800-1000 years ago, led to extensive reductions in kiwi distribution and abundance. Key habitat was lost through burning, kiwi were harvested for food, preyed by dogs and there may have been competition for food from introduced kiore. These pressures were exacerbated with the arrival of Europeans in the 1700's when habitat destruction accelerated through mining, gum digging and farming and further mammalian predators and competitors were introduced (McLennan *et al.*, 1996).

Current threats to Coromandel kiwi are similar to other brown kiwi and involve predation, competition for food, loss of habitat and disturbance.

3.5.1 Predation

Predators remain the primary agents of decline for kiwi populations in Coromandel. The decline of kiwi populations is halted and recovery is achieved where predators are effectively controlled.

Kiwi chicks and juveniles are predominately preyed by stoats which can kill up to 90% of chicks in unmanaged areas. Dogs pose the greatest threat to adult kiwi, both in managed and unmanaged areas. Dogs accounted for 50% of juvenile and adult kiwi deaths at the MKS. Feral cats are also known to occasionally kill juvenile kiwi, with three of 56 chick deaths attributed to cats between 2000 to 2008 in the MKS (De Monchy *et al.* 2008).

Although not common on the Coromandel Peninsula, ferrets can kill both adult and juvenile kiwi and will pose a serious threat if not controlled. Ferrets have been caught in traps in areas bordering farmland in the Tairua-Whenuakite area and, more recently, on Moehau. Ferrets are most common on the grassland-forest interface but in other areas are known to move 5 kilometres into the bush where they have been caught in possum traps (pers. comm. M. MacFarlane 2014).

3.5.2 Competition

Pigs and rats both compete for soil invertebrates critical for the growth and development of young kiwi. Kiwi chick growth rates have been seen to increase significantly with the suppression of rats within kiwi chick habitat. (Raemaekers *et al*, 2007)

3.5.3 Habitat loss and disturbance

Kiwi have been identified in significant stands of commercial forest on the Coromandel Peninsula. During the growth of the forest, kiwi are at risk from habitat disturbance during routine forest management and predation from dogs associated with pig hunting.

At harvest time, severe habitat loss threatens any kiwi present in the area and guidelines for forest managers to manage this risk can be found on the <http://www.kiwisforkiwi.org/resources/forestry/>. The Forestry Management Guidelines for North Island brown kiwi in Exotic Forests is being updated (pers. comm. W. Sporle, 2013).

Loss of kiwi habitat and fragmentation due to sub-division particularly in coastal areas is significant in the Coromandel Peninsula. Advocacy for pet free subdivisions, managed predator control and enhancement plantings could also benefit kiwi in adjacent areas.

While the Coromandel Peninsula contains almost continuous potential habitat, safe passage (i.e. predator control) for kiwi between managed areas is not always guaranteed. The emigration of highly mobile sub-adults from these areas into unmanaged areas puts them at significant risk (Stewart 2010/23).

3.6 Past and current management

Under the guidance of the first two Kiwi Recovery Plans (1991-1996 and 1996-2008), the following key actions have been undertaken for CBK.

3.6.1 Advocacy

Between 1995 and 2005 Coromandel became one of the pilot areas for intensive advocacy work with the establishment of a “Kiwi Advocate” position. Adele Smaill was contracted by the Kiwi Recovery Programme, through DOC, to raise the profile of kiwi in the Coromandel, assist with research into predator control and liaise directly with landowners, community groups and the general public. A highly successful education package was developed for schools, backed up by visits from Adele, who became known as the “Kiwi Lady”. As a direct result of Adele’s work, many community groups were established to protect kiwi and ecosystems within the Coromandel. Adele also developed and refined the kiwi avoidance training for dogs and their owners.

Since 2001 kiwi community groups and local companies have run an annual dog awareness campaign with a large banner stating that ‘Dogs that Roam Kill Kiwi’. This campaign has

included advertising, media releases and signage on the back of a local bus running between Coromandel and Hamilton. A kiwi avoidance training programme by DOC in partnership with community groups operates through January based around the key kiwi areas of Northern Coromandel, Kūaotunu Peninsula, Whenuakite/Kapowai and Thames Coast. This campaign targets holiday makers bringing their dogs into the Coromandel over summer.

The Moehau Environment Group has run a very successful annual summer programme since 2001 which includes nights of kiwi listening, conservation talks and discussion for interested parties including school groups. MKS staff and Moehau Environment Group worked together to provide opportunities for members of the public to hear and see kiwi in the wild. When the MKS moved into a maintenance phase of predator control in 2008 MEG continued to offer opportunities to see kiwi using local permitted kiwi handlers and 3-4 monitored kiwi.

Local community groups have carried the role of advocacy for the Coromandel, helped greatly by the Bank of New Zealand Save the Kiwi Trust (now 'Kiwis for kiwi') which has provided direction, funding and resource materials since 2008. Many of the community groups are actively fostering awareness by: giving regular talks to local schools; liaising with local landowners; holding information stalls at major events, advocating for kiwi in local media and hosting kiwi avoidance training sessions for dogs and their owners.

Project Kiwi has been running an effective advocacy programme utilising opportunities to show case their BNZ Operation Nest Egg (BNZONE) work by involving volunteers in the monitoring, transmitter changes, eggs lifts and chick returns since 2010. Juvenile kiwi (when travelling en route from the captive-rearing facility) are taken to local preschools, with the aim that every child in the project area will have seen a kiwi before they start school

Moehau Environment Group set up a successful display of kiwi including video footage in the Coromandel BNZ bank in 2013. This interactive display is now permanently located within the Driving Creek Sanctuary, Coromandel.

Translocation projects such as Motutapu and Rotoroa/Thames Coast will provide kiwi advocacy opportunities to iwi, community groups and the public.

3.6.2 Moehau Kiwi Sanctuary

Moehau Kiwi Sanctuary was one of five sanctuaries established in 2000 as part of the NZ Biodiversity Strategy (DOC and MfE, 2000) to determine successful management prescriptions for kiwi. MKS protects CBK, the most endangered North Island brown taxon. The other four Sanctuaries were chosen to protect tokoeka, rowi, the Northland and Western taxa of brown kiwi.

Initially, Project Kiwi on the Kūaotunu Peninsula was included as a part of the sanctuary and received Sanctuary funding for kiwi protection and management. This ended in 2005 and the project became an independent trust (Project Kiwi Trust) using BNZONE as one method to build kiwi abundance in the Kūaotunu area.

Moehau was instrumental in trialling landscape predator trapping regimes and transmitter technology (refer to Section 3.6.7 Research). The Moehau Kiwi Sanctuary covers approximately 16,000 ha on the northern tip of the Peninsula, 7107ha (42%) is managed by the Department of Conservation with remaining land being privately owned. Several community groups carry out kiwi protection to the south of the sanctuary, providing a significant buffer to predator invasion and protecting a large number of kiwi.

The kiwi management at Moehau followed on from intensive possum trapping and poisoning programmes that began in 1987, following colonisation of the area by possums in the 1970s. Possum control continues as part of ongoing Sanctuary management.

Rat poisoning trials were initially carried out in an area of 295 ha, rising to nearly 3000ha by 2007/08 (de Monchy *et al* 2009). This work has continued as part of the Sanctuary pest control management strategy. In 2013 aerial 1080 was used to control rats and possums on 4,500 ha while Feracol paste (Cholecalciferol) was applied in bait stations within the Stony Bay Rat Block (1600 Ha).

The key to the Moehau Kiwi Sanctuary's success in increasing chick survival rate was the landscape approach to mustelid trapping which had not been attempted before in New Zealand. This was complimented by toxin use of brodifacoum and 1080 which started in 1995. Research at other Kiwi Sanctuaries has shown that this influences stoat numbers and potentially increases kiwi chick survivorship and should be considered as part of pulsed predator control strategies for the future.

Detailed life history data was collected from over 360 radio-tagged birds over five years and a further 73 birds at Project Kiwi, Kūaotunu. Through this work, valuable data on chick survival, kiwi growth rates, and kiwi dispersal has been gathered.

Population surveys have shown that kiwi numbers in the sanctuary have risen from approximately 200 adults in 2000, to 430 adults in 2009, an average increase of 10.1% per year (Stewart 2010). The next population survey is scheduled for 2016.

While the sanctuary is of outstanding value to kiwi conservation, it is noted that even with constant mustelid control and kiwi avoidance training for dogs, 56 kiwi chick deaths were recorded from 2000-2008. Half of the chick deaths were a result of stoat predation, while dogs accounted for half of the deaths in sub-adult and adult kiwi (Stewart 2008). Considering the sanctuary is a "best-case" scenario in terms of predator control, the challenge remains to improve mustelid control and decrease the number of kiwi deaths by dogs.

The MKS is one of two national sanctuaries to have successfully transitioned from an active management to maintenance phase with the initial goal of protecting 100+ kiwi pairs being obtained before 2009. The current objectives of the Moehau Kiwi Sanctuary are;

1. The kiwi population within the sanctuary is maintained at 300+ breeding pairs through the intensive control of predators.
2. A secure population is established of at least 40 founders from 50 individuals on Motutapu Island by 2017. Motutapu is planned to act as a kōhanga kiwi in the future.

The work achieved at the Moehau Kiwi Sanctuary reflects the effective collaboration between the Department of Conservation, iwi, community groups, and landowners (de Monchy *et al* 2009).

3.6.3 Kiwi projects

Many community groups and landowner projects are actively managing kiwi on the Peninsula: These groups include, but are not limited to (from north to south); Moehau

Environment Group (includes Coromandel Kiwi Project), Habitat Tuatēawa, Te Kauae o Maui Nature Reserve, Harataunga Kiwi Project, Papa Aroha Environment Group, Project Kiwi (Kūāotunu Peninsula), Mahakirau Forest Estate, Thames Coast Kiwi Care, Kapowai Kiwi Group Inc., Whenuakite Kiwi Care Group, and Te Moata Charitable Trust (Figure 1).

All aim to establish or increase their kiwi populations. Many of the groups are involved in broader scale ecosystem protection (Figure 2)(Appendix 2 & 5). The total area being actively managed by these groups in 2014 was approximately 27, 000 ha.

Kiwi are also present in the Whangapoua Forest. The forest managers, Ernslaw One Ltd invest in a predator control regime and BNZONE to help build kiwi abundance in the 1400ha biodiversity block under their Ecological Mitigation Plan. They have a strict dog policy within their forest to protect kiwi over their forest. Survey work is required prior to harvesting in the Otama, New Chums, and Awaroa blocks where kiwi may be present.

The above commitments from kiwi projects represents the continued efforts of dedicated landowners and volunteers who have undertaken activities as diverse as track cutting, pest control, administration, school talks, BNZONE, dog control and kiwi call surveys over many years. It is testament to the conservation ethic and dedication of many of the Coromandel community, that the majority of CBK have some form of protection and commitment that this needs to continue into the future. Two –thirds of the CBK population is being protected by community, iwi and landowner led projects.

3.6.4 Kiwi surveying and monitoring

The first Peninsula-wide survey of kiwi on the Coromandel was carried out in 1992/93 (Marsh 1993) and was a catalyst for many kiwi protection initiatives. Some community groups then undertook intensive “baseline” surveys to estimate population size prior to predator control. The aim is to repeat these census-type surveys every five – ten years.

Moehau Kiwi Sanctuary has had two censuses in 2000 and 2009. In addition annual kiwi call counts (five stations) have been undertaken to confirm presence, relative abundance of kiwi and show general population trends in moderate to dense populations. In the 2015-2020 sanctuary strategy annual call counts (five listening stations) will stop in favour of census surveys (eighty listening stations) every five years.

Kiwi call-count monitoring began in 1994 at five sites around the Coromandel region as part of the national call-count scheme to determine trends in kiwi abundance nationwide. As community groups became involved, the number of sites increased and this method is now used by many groups to monitor kiwi populations in their management areas. Groups aim for a minimum of five listening stations in their management area and annual monitoring. Some groups value this monitoring as a way of tangibly experiencing the effect of their work as kiwi call numbers increase over the years. However, some groups have found that a combination of weather conditions, availability of volunteers and moon phases has meant that this is not always possible. Some community groups have opted to use automated recorders (e.g. MEG) or for less frequent monitoring carried out by a professional contractor as they do not have the internal capacity to do the work e.g. Whenuakite Kiwi Care have paid a contractor to survey their population every five years, from 21 sites (Appendix 2).

The ‘Kiwis for kiwi’ website has clear guidance on annual call count monitoring.

The introduction of acoustic monitors for kiwi survey work will mean benefits that recorders can be out in the field for longer periods of time than human observers and be placed in

areas by day that might be difficult to reach at night. Studies in 2012 and 2013, in MKS, used acoustic kiwi recorders in tandem with human listeners in an effort to correlate the data. Statistical analysis showed that recorders were able to detect about 64% of calls heard by human listeners up to a distance of 500 metres (Stewart, 2013). Audio recorder efficacy is improving reaching 75-80% (pers comm., P. Stewart, 2014). Surveys with recorders are presently limited to record the presence of kiwi in areas but with calibration to human listeners they are likely in the future to provide indices of relative abundance. Some community groups have begun to use recorders within their projects.

3.6.5 Bank of New Zealand Operation Nest Egg™ (BNZONE)

BNZ Operation Nest Egg™ (BNZONE) was established in 1994 using funding from the BNZ. It has since become a tool for kiwi recovery and is considered an effective technique for helping to restore depleted kiwi populations. It is widely used for establishing new populations, supplementing existing populations and maintaining recruitment in years when conventional predator control techniques fail to give adequate protection of young (Colbourne *et al.* 2005).

BNZONE results in egg and chick survival rates that are significantly higher than in the wild. BNZONE involves the removal of eggs or very young chicks from wild kiwi to be brought into captivity. Eggs are then hatched and chicks raised until they reach a weight (usually 800g – 1200g) which allows them to defend against stoats. Young kiwi are usually released back in to the wild at this time. BNZONE was developed as a way to ensure total protection of kiwi chicks after hatching and to return them to the wild once they had reached a weight that was considered to allow them to defend themselves against mustelid predators in the wild.

Despite the high financial cost of BNZONE, the benefits to kiwi recovery have been well demonstrated and the positive advocacy opportunities are large. The use of BNZONE and chick translocations as an advocacy tool has proven to be excellent for building critical conservation linkages between DOC, tangata whenua, local schools, local communities and captive-breeding institutes, and is an excellent vehicle for highlighting threats to kiwi in the media (Robertson & Colbourne 2003). It is also a valuable tool for advocating dog control messages.

BNZ Operation Nest Egg was used by the Moehau Kiwi Sanctuary for abandoned eggs only. 23 chicks were returned from Kiwi Encounter at three to five weeks old between 2000 and 2008. The majority were returned directly to the Sanctuary but some were used to supplement managed populations within the Harataunga and Thames Coast projects.

Project Kiwi uses BNZONE as part of their kiwi project having returned 92 juvenile kiwi to the Kūaotunu Peninsula between 2004 and March 2013.

Rainbow Springs, Kiwi Encounter in Rotorua has been the prime captive facility used for hatching Coromandel brown kiwi eggs and holding the chicks in a crèche until ready for return to the Peninsula. In 2012, Auckland Zoo offered their hatching facility to projects in the Coromandel.

BNZONE remains an effective method of increasing chick survivorship for small populations of kiwi. A larger population of kiwi is best protected through predator control. BNZONE's value is in rapidly increasing kiwi numbers, with strong opportunities for advocacy and education.

3.6.6 Kiwi Avoidance Training

All dogs are a threat to kiwi, regardless of breed, temperament, and training. Kiwi have a strong scent that dogs find irresistible and easy to track. Kiwi cannot fly away, and a large proportion of birds use day time shelters on the surface which offers minimal protection from dogs. The absence of a breast bone or “keel” and flight muscles leave the kiwi chest cavity vulnerable and easily crushed by a dog’s mouth.

As it is not always possible to keep dogs out of kiwi habitat, kiwi avoidance training, using kiwi-related lures and an electric dog collar, is a useful tool. Recent research indicates about 60% of kiwi avoidance trained dogs actively avoid kiwi (A. Dale in press.).

The Department of Conservation provides free kiwi avoidance training, often in partnership with local kiwi groups. Each year more than 700 dogs have been trained with approximately 70% of those being trained for the first time.

Kiwi avoidance training also provides an extremely valuable opportunity for the trainer to share information with dog owners about ways to reduce the chances of dogs coming into contact with kiwi (pers. comm., A. Smaill). Unfortunately, avoidance training does not work with all dogs so it cannot be solely relied upon to protect kiwi from dogs. Dogs continue to be a threat to kiwi as not every dog owner can be relied upon to have their dog trained or to return to have the dog tested or retrained. There are more than four thousand dogs registered (2013) on the Peninsula. Responsible owners with basic knowledge about kiwi, and obedient dogs, are needed to help protect kiwi.

All hunting permits on Conservation land north of the Kopu-Hikuai Rd require dogs to have a current kiwi avoidance training certificate. In addition, a number of community groups and private landowners, including some forest managers (e.g. Ernslaw One Ltd); require dogs entering their land to have undergone the training. Some landowners ban dogs from their property altogether e.g. private land within Whenuakite Kiwi Care Group.

3.6.7 Research

Most research undertaken for CBK has occurred at Moehau Kiwi Sanctuary and Project Kiwi on the Kuaotunu Peninsula. These kiwi sanctuary sites have been important for management trials and population modelling as well as a variety of research projects completed by staff and volunteers, including two theses (Appendix 6). This has included management trials and verification of Best Practice to maximise landscape scale trapping efficiency, including variable trapping regimes. Kiwi monitoring has given valuable information about the cause of deaths of kiwi at different life stages, CBK life-history, preferred shelter sites and kiwi dispersal patterns.

Other research includes studies on kiwi chick growth in relation to ship rat suppression and maximising the efficacy of acoustic recorder trials. The Sanctuary has also been involved in development of new technology such as the automated receiver for transmitter signals and the “smart” transmitters (“egg timer” and “chick egg timer”). In 2013 the sanctuary staff implemented a successful trap auditing protocol using data recorders which will be shared nationally in 2014.

Patrick Stewart in conjunction with the DOC Research and Development Division is using acoustic recorders to investigate moon phase effects on the frequency of kiwi calls, optimal

periods of acoustic deployment and the efficacy of recorders. Refer to Section 3.2 Biology and Ecology

Pin feathers taken from monitored kiwi at Kūaotunu were used to type the Coromandel taxon as being distinct from other North Island brown kiwi taxon. This work was carried out by Dr. Allan Baker and Maryann Burbidge (University of Ontario) using mitochondrial markers which are now available for taxon verification of CBK.

3.6.8 Other land administered by DOC

Since 1994, approximately 25,000ha of Public Conservation Land on the Thames Coast has been targeted for possum and rat control, by DOC and Waikato Regional Council (WRC) (formerly Environment Waikato), as part of the Peninsula Project. Toxins have been spread aerially and in bait stations with return intervals varying between 1-6 years depending on control success (pers. comm. A. Styche DOC Technical Officer, 2010). Annual control is considered to have influenced stoat numbers to the point where there would have been some benefit to kiwi (pers. comm., P. de Monchy previous MKS Manager.). However, six yearly rotations may have reduced benefits to kiwi as they are likely to require more frequent toxin applications. The Peninsula Project finished its operations in 2010.

From 2014 there is a projected increase in area to be treated with aerial 1080. Aerial 1080 has been used within the Whenuakite Kiwi Care Group (including Public Conservation Land) area in 2006, 2009 and 2011 with resulting increases in native birds including kiwi. These operations also kill trap avoiding stoats and feral cats.

3.6.9 Offshore Islands

The importance of an offshore island population of CBK was identified during the formation of MKS in 2000. In 2011, Motutapu Island (1550 ha) in the Hauraki Gulf was identified for CBK's island sanctuary. The translocation plan (Nelson *et al* 2013) spanning over five years will source at least 40 unrelated founders with the widest genetic diversity from throughout the Peninsula. As of June 2014 19 kiwi are on Motutapu. (Refer to Section 5.1.5 Kōhanga kiwi).

Rotoroa Island (82 ha) in the Hauraki Gulf is a proposed crèche island for a partnership between Thames Coast Kiwi Care and Auckland Zoo carrying out BNZONE

3.7 Cultural importance

Kiwi have been adopted by New Zealanders as one of our national icons and have become an emblem and symbol for New Zealand worldwide. CBK are highly valued by the tangata whenua, local communities, kiwi community groups, landowners, regional authorities and individuals. Many of these people are actively working to protect the kiwi through the protection of habitat and advocacy.

Tangata whenua have a strong cultural, spiritual and historical connection with kiwi and consider themselves the kaitiaki (guardians) of kiwi in their rohe. Iwi have traditional knowledge of kiwi and are key stake holders in kiwi recovery planning and implementation. Kahukiwi (kiwi feather cloaks) and kiwi bills are highly valued; today iwi obtain their kiwi feathers and bills with the permission and assistance of DOC. Sustaining the mauri (life force)

of such a taonga is central to the kaitiakitanga (guardianship) for Hauraki iwi (Hauraki Iwi Environmental Plan, 2009).

3.8 Key stakeholders and associates

The management and protection of CBK involves the combined efforts of tangata whenua, the Department of Conservation, 'Kiwis for kiwi', kiwi projects, landowners and managers, sponsors, captive facilities, research organisations, regional authorities, veterinarians and individuals.

Public Awareness is critical to the success of CBK recovery and raising public awareness is a goal of this plan.

For a detailed list of the key stakeholders refer to Appendix 1 CBK Key Stakeholders.

3.9 Recovery principles and preferred option for recovery

The selection of goals, objectives and actions in this plan have been directed by the following recovery principles and preferred option for recovery, contained in the Kiwi Recovery Plan (2008 – 2018):

- Prevention of extinction of any species of kiwi as the highest priority.
- Intra-specific genetic variation and distribution to be maintained or enhanced as much as is feasible within the core areas of the distribution of each taxon.
- Where possible, kiwi to be managed within their natural (pre-historical or historical) range or, if outside the range, with the overall aim of restoring them to such sites.
- Mixed-provenance populations form an integral part of recovery planning outside the core areas of distributions for each taxon.
- Kiwi recovery to, wherever possible, focus on gaining maximum benefits to the wider ecosystem.

The preferred option for CBK recovery is to sustainably manage kiwi in their natural range by reducing their exposure to predators and to set up an insurance island population.

4. Goals

4.1 Long term recovery goal

To restore, and enhance, the abundance, distribution and genetic diversity of CBK.

4.2 Goals for the term of this plan

1. Management

Goal 1.1 To maintain and enhance the current distribution of CBK so that 1200 – 1500 pairs are protected.

Goal 1.2 To minimise loss of distribution and genetic diversity of CBK.

Goal 1.3 To restore CBK to parts of their historic range.

Goal 1.4 To manage CBK using the best available tools and practice.

Goal 1.5 To secure a genetically diverse, self-sustaining island population of CBK.

Goal 1.6 To identify and establish protected habitat corridors to connect managed CBK sites/population clusters.

2. Community relations and engagement

Goal 2.1 To encourage and provide for full community involvement, including tangata whenua, in all aspects of CBK management.

Goal 2.2 To increase and strengthen support for CBK recovery across a broad range of sectors.

Goal 2.3 To sustain and increase community, iwi and corporate led projects for CBK.

Goal 2.4 To share best practice and technical information amongst CBK stakeholders to optimise recovery efforts.

Goal 2.5 To increase awareness of the threat of dogs to kiwi and opportunity for kiwi avoidance training for dogs throughout the CBK range

Goal 2.6 To increase the education and advocacy opportunities for CBK conservation.

3. Research, monitoring and innovation

Goal 3.1 To support research into new initiatives and tools for landscape-scale predator management.

Goal 3.2 To support research into improving dog control techniques including kiwi avoidance training for dogs

Goal 3.3 To support research into CBK population status, trends and carrying capacity.

Goal 3.4 To promote and support the use of kiwi best management practices by the forestry and farming sectors

Goal 3.5 To support research into gene flow and genetic diversity between populations of CBK.

5. Implementation

This section provides short-term direction for DOC, iwi and community group managers by identifying:

- What is going to happen
- Who is going to do it
- Where it is going to happen
- When it is going to happen

Three themes have been prepared (management; community relations and engagement; research, monitoring and innovation) including a number of topics. Each topic outlines the issue(s) and the objective(s), and presents an action table showing how to resolve these.

All action tables indicate which groups or individuals are accountable for the delivery of each action.

All actions have been prioritised and added to a timeline. A summary table of actions is provided in Appendix 3. Action priorities have been assigned as follows:

- **Essential:** Needs to be carried out within the timeframe and/or at the frequency specified to achieve the goals for kiwi recovery over the term of this plan. Highest risk for kiwi recovery if not carried out within the timeframe and/or at the frequency specified.
- **High:** Necessary to achieve long-term goals. To be progressed and, ideally, completed within the term of the plan; with moderate risk if not carried out within the timeframe and/or at the frequency specified.
- **Medium:** Necessary to achieve long-term goals. To be progressed within the term of the plan, but least risk if not completed within the term of the plan or within the timeframe and/or at the frequency specified.

No actions are 'extras' - a medium priority does not mean that there are no reasons to do it. Priorities are given to assist with choice, if required.

Actions are predominantly time-lined until 2020, except those relevant throughout the plan period. This reflects the increasing uncertainty in assigning timeframes beyond 5 years, and the need to review progress for all actions by 2020.

Abbreviations used are:

BNZ – Bank of New Zealand

CBK – Coromandel brown kiwi

CKC – Coromandel Kiwi Collective

DOC – Department of Conservation

KRG – Kiwi Recovery Group

K4K – Kiwis for kiwi

MKS – Moehau Kiwi Sanctuary

ONE – BNZ Operation Nest Egg

5.1 Management

On the Coromandel Peninsula, most recovery efforts for kiwi have focused on landscape predator control. Advocacy is increasing to protect kiwi as a taonga, by highlighting the threats that mustelids and dogs pose. Management has become more ecosystem-focused where kiwi habitat is managed for the benefit of all indigenous species present. Approximately 45,000ha of habitat are protected for CBK using predator control. The current population is estimated at 800 pairs of kiwi (Refer Appendix 2 Kiwi projects).

The majority of management has taken place in the northern Coromandel. There is no active management of kiwi south of the Whenuakite Kiwi Care Group, Kapowai Kiwi Group and Thames Coast Kiwi Care projects.

A variety of people, groups and organisations are involved in the protection of CBK. Future management will focus upon the coordination of efforts and information, to maximise the abundance and distribution of kiwi across as large a part of the historical range as possible. This will include the linking of existing and new recovery projects.

Competition for finite funding resources across all organisations, agencies, groups and individuals is increasingly challenging. A trend toward ecosystem-scale management in kiwi recovery where multiple native species benefit from management is preferred.

Future management objectives include identification of key threats to CBK persistence, maximising abundance and distribution across as large a historical range as possible, linking existing and new recovery projects and the consolidation of a genetically robust island population on Motutapu to benefit the CBK taxon.

Topics

5.1.1 Topic 1: Implementing Taxon Plan

Background

It is important that the strategy for CBK recovery is understood by all people involved in kiwi management. This strategy needs to be regularly reviewed and communicated to ensure that the goals remain relevant and are achieved. The Coromandel Kiwi Collective (CKC) will assist kiwi projects to apply objectives and actions of the taxon plan to their projects. It would also provide best practice information and support, and an avenue for information flow between the Kiwi Recovery Group and individual kiwi projects.

Issues

- The delivery of the following action points will require a shared effort and is subject to available resources.
- As knowledge grows and results are achieved, this plan will need to be reviewed and adapted to avoid becoming obsolete and irrelevant.
- Efforts must be coordinated and information communicated to ensure benefits are optimised.

- The successful recovery of CBK is dependent upon stakeholders working together. It is critical that tangata whenua-led initiatives, community-led initiatives and involvement of private landowners are well supported.
- Each kiwi project is unique, (refer App. 5 “Strength in Diversity”) with different tools and methods being used to protect and increase kiwi in their area. Groups want to maintain their uniqueness.

Objectives and actions

Taxon plan objective(s)				
Objective 1.1: Undertake full review of recovery progress and application of taxon plan at half way point of current plan (2014–2025). 90% of plan goals are achieved within the term of the plan, to a high standard and in collaboration with key stakeholders. Objective 1.2: To involve key agencies, groups and individuals in the taxon plan implementation and review. Objective 1.3: To ensure groups and individuals involved in CBK recovery are well supported and informed.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
1.1	To establish a review process which ensures that the taxon plan for CBK remains relevant and effectively informs annual work plans.	2020	Essential	DOC/CKC
1.2	CKC formed to participate in the facilitation, implementation, review and maintenance of the CBK taxon plan.	2014	Essential	K4K
1.3	CKC representatives will meet biannually	Biannually from 2015	Essential	CKC
1.4	The CKC will ensure relevant information regarding kiwi management is available to all stakeholders. It will also function to support and empower kiwi projects in their work.	Throughout	High	CKC

1.5	Establish and secure resourcing for Coordinator role within the CKC	Throughout	Medium	K4K/ CKC
1.6	Seek long term funding solutions for Coromandel kiwi protection work.	2016	High	CKC/ K4K
1.7	Prepare a progress report annually against taxon plan objectives and communicate to stakeholders	Annual	Medium	DOC/CKC

5.1.2 Topic 2: Best Practice

Background

Several key documents in kiwi recovery best practice have been produced in the past decade, including:

- Kiwi Best Practice Manual (Robertson & Colbourne, 2003) (*Updated draft is in progress*)
- Kiwi Husbandry Manual (Fraser & Johnson, 2009)
- Kiwi Captive Management Plan (Barlow, 2011)
- Pest and predator control guidelines
- Kiwi handling advocacy guidelines (KRG, 2014)

As new information and technology becomes available, this needs to be integrated into best practice and communicated to kiwi recovery practitioners. Documents and updates in best practice are available from the DOC website (www.doc.govt.nz) and Kiwis for kiwi (www.kiwisforkiwi.org.nz)

Issues

- Supporting documents relevant to CBK recovery need to be kept up to date.
- Current best practice information, technical advice including techniques need to be available and referred to regularly by all working with and around kiwi.
- Monitoring and data collection is vital to the ongoing development of best practice. All projects should be supported to provide this information.
- There has been some reluctance between CBK recovery practitioners to share information.
- Data collection is not coordinated for the CBK taxon.
- At times some kiwi practitioners do not follow best practice.

Objective(s) and actions

Taxon plan objective(s)				
Objective 2.1: To ensure that management of CBK is undertaken to a consistently high standard. Objective 2.2: To ensure that best practice information is current and accessible to all working with and around kiwi. Objective 2.3: To ensure that accurate and reliable data is collected from as many CBK projects as possible.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
2.1	Ensure best practice is promoted and monitored throughout the term of the plan. (cf. RPA 5.5)	Throughout	Essential	DOC/CKC/K4K
2.2	Communicate developments in best practice, management and science to stakeholders.	Throughout	Essential	DOC/CKC/K4K
2.3	Ensure appropriate Wildlife Act permits are in place, current and permit conditions follow Best Practice.	Throughout	Essential	DOC
2.4	Provide regular pest control workshops to those implementing field programmes.	Annually	High	DOC/CKC
2.5	Provide a regular CBK taxon hui.	Every 2 years from 2014	High	DOC/CKC
2.6	Distribute and encourage the use of national monitoring and data collection templates.	Throughout	High	DOC/CKC
2.7	Encourage sharing of data between CBK groups by developing a centralised database.	Throughout	High	Kiwi projects/CKC

5.1.3 Topic 3: Moehau Kiwi Sanctuary

Background

Refer to Section 3.6.2 MKS

Moehau Kiwi Sanctuary (MKS) has played an important role in CBK recovery. Success has been achieved in Moehau Kiwi Sanctuary; as a site securing CBK using landscape predator trapping networks, as a site for research into CBK ecology, population recovery and for field

trials of new transmitter and acoustic recorder technology. Success has also been achieved by using kiwi avoidance training and advocacy amongst multiple stakeholders

Issues

- Predator control is resource expensive.
- Some evidence to suggest that long-term trapping may reduce in efficacy possibly due to the build-up of trap-shy mustelids
- Toxins used in kiwi recovery are not supported by all stakeholders.
- Ferrets although only seen in low numbers throughout the Peninsula pose a significant threat to both juvenile and adult kiwi in Moehau Kiwi Sanctuary.
- Maintaining the relationship between the Department of Conservation and the community is critical for the success of the Sanctuary.

Objectives and actions

Taxon plan objective(s)				
Objective 3.1: To ensure that the Moehau Kiwi Sanctuary continues as an integral part of CBK recovery, and is visible as a site of successful management and learning. (cf. RPO 3.1) Objective 3.2: To ensure management outcomes and research findings from Moehau Kiwi Sanctuary are widely available at local and national levels (Kiwi Recovery Group).				
Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
3.1	Continue to improve and refine the control of predators in Moehau Kiwi Sanctuary using a range of tools.	Throughout	Essential	DOC
3.2	Maintain relationships and support tangata whenua, community groups and surrounding landowners associated with the Moehau Kiwi Sanctuary.	Throughout	Essential	DOC/tangata whenua/community groups/landowners/K4K
3.3	Communicate management outcomes and research findings for Moehau Kiwi Sanctuary to the wider local	Annually	High	DOC/CKC.

	community, local and national kiwi groups using a wide range of methods.			
3.4	Communicate with other sanctuary staff throughout the country and KRG by attending annual Sanctuary meetings, National hui and other networking events.	Annually	High	DOC
3.5	MKS management to visit another sanctuary by 2016	2016	Medium	DOC
3.6	Increase awareness of the impact of dogs on kiwi, with the aim of reducing this impact.	Throughout	Essential	DOC
3.7	Contribute to the development of a national database for kiwi projects.	Annually	High	DOC
3.8	Integrate ferret control into existing predator control where appropriate.	Ongoing	High	DOC/ CKC
3.9	Undertake aerial 1080 operations every 3 to 5 years where possible to not only aid in ecosystem recovery but also to reduce the risk of difficult-to-trap mustelids	Ongoing	High	DOC

5.1.4 Topic 4: Population recovery

Background

An important step in the recovery of all kiwi taxa is to provide sustained protection for a minimum number of pairs, while other recovery efforts are implemented. Such 'secure populations' need to be of sufficient size to provide confidence that a taxon will not become

extinct in the medium term. The Kiwi Recovery Plan (Holzapfel *et al.*, 2008) has identified a target of 500 breeding pairs as a minimum goal for each taxon. This goal has been achieved for CBK, with a current population estimate of 800 pairs across the range of the taxon (Refer to Appendix 2). Well managed predator control needs to continue to sustain these achievements.

Issues

- Predation, particularly from stoats, remains a key threat to CBK recovery. Ferret predation in population strongholds such as Moehau Kiwi Sanctuary is likely to have significantly negative impacts if unmanaged. Predation by dogs continues to threaten CBK.
- Predator control is fragmented.
- Juvenile CBK disperse great distances, thus they can move out of protected areas. It is unlikely that presently protected areas are at carrying capacity and so have potential to sustain more kiwi.
- Although, a significant proportion (35%, n=214 transmitter years, de Monchy, 2008) of the male kiwi in the Moehau Kiwi Sanctuary did not attempt to breed, Hugh Robertson confirmed that 500 breeding pairs would still be the minimum secure population size required for the taxon.

Objectives and actions

Taxon plan objective(s)				
Objective 4.1: To maintain a minimum of 500 active breeding pairs of CBK in areas under sustained permanent protection from key threats within the range of their former habitat.(Kiwi Recovery Plan target) Objective 4.2: To protect 1200 - 1500 pairs of kiwi across their historical range.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
4.1	Maintain the current predator control in Northern Coromandel, Kūaotunu and Whenuakite to protect a minimum secure population of at least 500 breeding pairs.	Throughout	Essential	DOC/CKC/kiwi projects
4.2	Maintain and expand the area under predator control, including protecting corridors to link kiwi so the population can expand to between 800 and 1200 - 1500 pair of kiwi.	Throughout	High	DOC/CKC

4.3	Work closely with tangata whenua and community-based projects to aid population recovery.	Throughout	Essential	DOC/CKC
4.4	Maximise effectiveness and efficiency of predator control at protected sites through review of existing management.	2016	High	DOC/CKC
4.5	To support development of strategies for prevention and responses to regional threats e.g. bio-hazards, large predation events.	2016	High	DOC/CKC

5.1.5 Topic 5: Kōhanga kiwi

Background

Kōhanga kiwi sites are sites where intensive management allows kiwi populations to grow in size to a point where carrying capacity may be reached. This enables the population to act as a source for translocation to other sites, either to supplement existing populations or establish new ones.

Predator free offshore islands are considered ideal as kōhanga kiwi sites, since they allow for rapid population growth in the absence of predators, and once carrying capacity is reached, birds need to be removed to avoid overcrowding. These 'surplus' birds can significantly aid in the recovery of mainland kiwi populations.

For CBK, Motutapu Island has been identified as an appropriate site to establish a secure population that will eventually act as a kōhanga kiwi site. Genetic modelling has determined that a founding population of at least 40 unrelated birds is required to provide a self-sustaining population with a high level of genetic diversity (Weiser *et al.* 2011).

Once the Motutapu kiwi population is established and annual breeding productivity is high (population modelling suggests 2022 if all founders are on Motutapu by 2017) a sustainable, strategic programme of translocation of kiwi to the Coromandel Peninsula can occur.

Issues

- The taxon is at risk without a population on a predator free island to improve overall security.
- Areas under predator management at which there are low densities of kiwi would benefit from supplementation to increase genetic diversity and kiwi abundance.
- The adequate number and location of additional kōhanga kiwi sites for Coromandel has not been fully assessed.

- There is a need to ensure that each proposed kōhanga kiwi management site is adequately supported in terms of resourcing and technical input and has sufficient genetic diversity (i.e. is based on enough founders) to be an appropriate source population for translocations

Best Practice for disease screening should be followed when kiwi are moved from kōhanga sites back to mainland population sites.

Objective(s) and actions

Taxon plan objective(s)				
Objective 5.1: To secure a genetically diverse, self-sustaining island population of CBK Objective 5.2: To use Motutapu Island as a kōhanga kiwi site to aid the recovery of mainland kiwi populations.				
Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
5.1	Establish a founder population of at least 40 CBK onto Motutapu	2017	Essential	DOC
5.2	Monitor the population, (call count every year, dog survey every 5 years) on Motutapu Island to determine whether the population is reaching carrying capacity.	2017 onwards	Medium	DOC
5.3	Develop a release strategy for kiwi from Motutapu to ensure birds are released at priority managed sites on the Coromandel Peninsula.	2020	Essential	CKC/DOC
5.4	Translocate birds from Motutapu Island to identified mainland sites	2022 onwards	Essential	CKC/DOC

	as per 5.3			
5.5	Investigate the need for any further kōhanga kiwi sites for CBK.	2017	High	CKC/DOC

5.1.6 Topic 6: Unmanaged populations

Background

There has been a significant increase in CBK abundance in areas under sustained predator control management (7.6-14.5 % per annum increase) according to survey data (De Monchy *et al.* 2008; Stewart 2010/21, Stewart 2010/23,) over the past decade. However, the CBK population has declined significantly in distribution and density in unmanaged areas. The disappearance of kiwi below the Kopu – Hikuai Rd in the last 20 years (Marsh 1993; Stewart, 2012/13) (refer Section 3.3) may indicate that very few kiwi are surviving outside areas of protection. This southern area received little predator control or dog avoidance training. The establishment of kiwi community group projects has been critical to the recovery of CBK.

There is little information on kiwi distribution and abundance outside of managed areas although some survey work has occurred in the southern Coromandel Peninsula in 2012/13. A better understanding of kiwi populations in unmanaged areas is required to adequately determine what level of management is needed to halt further decline of the taxon. Unless further action is taken, kiwi are likely to continue to disappear from unmanaged sites in the Coromandel. With limited resources, management priority should be given to sites with the greatest amount of gain. Criteria for priority includes population size (the bigger the better), habitat quality (to support a high density of kiwi as the population grows), proximity to other populations (ideally within 20km to allow for juvenile dispersal) and cost effectiveness.

Issues

- CBK are 'Nationally Vulnerable' (Robertson *et al.* 2012).
- There has been a 40% loss of range in the last 20 years for the CBK. This loss has occurred in the southern Coromandel.
- There is likely to be a continued reduction in the distribution of CBK in unprotected areas.
- Current distribution of CBK, outside of managed sites, above the Kopu-Hikuai Rd is unknown with only casual records being kept.
- There is no management strategy in place for fragmented, isolated populations or individuals of CBK.
- Areas of managed kiwi habitat are fragmented. This fragmentation prevents safe passage for kiwi dispersal.
- The potential and actual carrying capacity of CBK is poorly understood.
- The density and total number of CBK is not accurately known, and the rate of decline of the whole taxon is unknown.

Objective(s) and actions

Taxon plan objective(s)				
Objective 6.1: To halt the decline of CBK. (cf. RPO 10.1) Objective 6.2: To manage the CBK taxon to ensure that recruitment exceeds mortality. Objective 6.3: To ensure that unprotected kiwi populations are identified and considered for protection				
Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
6.1	Undertake a kiwi survey across CBK range to identify distribution and an index of abundance.	2015	Essential	CKC/DOC
6.2	Prioritise unprotected kiwi 'hotspots' for management and investigate options for protecting these sites.	Throughout	Essential	DOC/CKC/kiwi projects
6.3	Support community groups which contain isolated kiwi populations.	Throughout	Medium	CKC/DOC
6.4.	Support research into distribution and abundance of fragmented, isolated kiwi populations	Throughout	High	DOC/ CKC

The following actions also contribute to meeting the above objectives:
Actions 14.1 Predator management

5.1.7 Topic 7: Genetic Diversity

Background

Loss of genetic variability can lead to inbreeding and reduced fitness, resulting in poor species health, lowered levels of fertility, the inability to respond to environmental change and disease, and, potentially, extinction.

As kiwi are disappearing from unprotected areas, populations will become increasingly isolated, reducing gene exchange and increasing localised inbreeding.

A precautionary principle should be applied to management until the genetic status of this taxon is fully understood. The Kiwi Recovery Group has requested that any kiwi south of the Kopu-Hikuai Rd be genetically tested to ascertain taxon if they are to be transferred into other CBK populations (pers. comm. H. Robertson 2013).

Further genetic analysis is required to resolve the level of divergence between North Island brown kiwi populations to confirm appropriate conservation management units. Maintaining genetic diversity is also an important consideration when undertaking translocations and establishment of new populations.

Issues

- Isolated, fragmented kiwi populations are at risk genetically
- The taxon is not managed as a complete unit.
The taxonomy of all North Island brown kiwi taxa requires further investigation.
- Kiwi projects on the Coromandel Peninsula often work in isolation and are reluctant to support transfers of kiwi to promote the genetic health of CBK i.e. to manage the taxa as one conservation unit.
- The importance of genetic diversity to CBK's future is often poorly understood.

Objective(s) and actions

Taxon plan objective(s)				
Objective 7.1: To manage CBK over as much of the historic range as is possible. Objective 7.2: To minimise the loss of genetic diversity thus maintaining the genetic integrity of CBK. Objective 7.3: To begin to restore CBK populations within their historic range. Objective 7.4: To facilitate CBK dispersal and gene flow throughout their current and historical range through active predator management. .				
Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
7.1	Manage CBK as a distinct taxonomic unit. (cf. RPA 13.3)	2014	Essential	DOC/CKC/KRG
7.2	Identify and establish a minimum of two reintroduction sites within managed areas in the former extent of the CBK	2020	High	DOC/ CKC / KRG

	range.			
7.3	Support and/or undertake research on the CBK to establish fine scale diversity. If genetic structuring is found across the range of CBK, then this will be taken into account when transferring birds and establishing kōhanga kiwi.	2014	High	DOC/CKC
7.4.	Maintain genetic diversity within managed smaller populations by translocating kiwi from the larger CBK populations.	Throughout	High	DOC/ CKC/KRG

The following actions also contribute to meeting the above objectives:

Actions 14.1- 14.3

Section 5.3.1 Genetic Research

Action 5.3

Section 5.1.5 Release strategy from Motutapu

5.1.8 Topic 8: BNZ Operation Nest Egg™ (BNZONE) and Kiwi Crèches.

Background

Refer to Section 3.6.5

BNZONE takes the eggs or very young chicks from wild kiwi to be brought into captivity. Eggs are then hatched and chicks raised until they reach a weight (usually 800g – 1200g) which allows them to defend against stoats. Young kiwi are usually released back in to the wild at this time. Other alternatives to BNZONE include allowing chicks to hatch in the wild, and transferring them to a crèche site once they become independent (10–20 days old).

BNZONE and kiwi crèches provide excellent advocacy opportunities.

“Kiwi crèche” is a term used for the intensively-managed, predator free area where captive-hatched chicks can grow to a weight at which they are more able to resist stoat predation.

At time of writing (August, 2014), Project Kiwi and Ernslaw One Ltd use BNZONE provided by Kiwi Encounter. Auckland Zoo and Rotoroa Island Trust are partnering with Thames Coast Kiwi Care to undertake BNZONE using Rotoroa Island as a crèche site. Other kiwi projects are

investigating this option of management to boost population numbers, to use for advocacy and as founders for Motutapu Island.

Project Kiwi has been looking for suitable crèche sites for several years and is currently researching a crèche facility within their trapped area.

Issues

- National data on the use and success of BNZONE is not available
- The use of BNZONE lacks national coordination
- Though BNZONE does not degrade habitat, its use does not benefit other threatened species. In many cases funding would be better spent on predator control
- Facilities providing BNZONE incubation, hatching and crèching are essential and their funding is uncertain.
- Facilities cannot guarantee number of spaces each year
- Repeated BNZONE of same parent kiwi can lead to over representation of genes in the population.
- Preliminary evidence from studies on Moehau by Forbes (2009) suggests that BNZ Operation Nest Egg reared chicks, when returned at 3-5 weeks (350-400 gm), dispersed shorter distances and had a greater mortality rate than wild-reared chicks.
- This compares with studies on the Kūaotunu Peninsula where BNZONE juveniles were returned at 850 gm (3-4 months old). The survival rate of wild chicks was 31.6 % (with best practice trapping methods) compared to the chick survival rate of 70% for BNZONE juveniles, n=100, (Gillingham 2010).
- Some groups are reluctant to contribute juvenile or adult birds for translocations.

Objective(s) and actions

Taxon plan objective(s)				
Objective 8.1: To ensure that the use of BNZONE is effective and undertaken to a high standard for the recovery of the CBK taxon. (CF. RPO 17.1) Objective 8.2: To optimise the advocacy opportunities BNZONE provides. Objective 8.3: To maintain adequate crèche capacity for CBK.				
Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
8.1	Ensure that BNZONE minimum standards are followed by all CBK BNZONE projects.	Throughout	Essential	DOC/CKC
8.2	Apply Kiwi Recovery Group guidelines for when and where to use BNZONE.	Throughout	High	DOC/CKC
8.3	Support the use of BNZONE advocacy opportunities as	Throughout	Medium	DOC/ CKC/kiwi projects

	part of a projects management tools.			
8.4	Utilise the knowledge of local BNZONE practitioners	Throughout	Medium	DOC/ CKC
8.5	Identify in management plans how genetic issues will be managed to avoid over representation of prolific breeding pairs.	Throughout	High	DOC/CKC
8.6	Maintain at least one kiwi crèche site for CBK	Throughout	High	DOC/CKC

5.2 Community relations and engagement

The recovery and protection of CBK relies on the interest, understanding, engagement and collaboration of many sectors of the community. Most threats to kiwi survival are human induced, and their survival today is dependent on human action, such as controlling predators, and protecting and restoring habitat. This protection requires good advocacy to inform, motivate and publicise the actions that grow kiwi populations.

The Coromandel has a long history of successful tāngata whenua, community and landowner-led kiwi conservation projects.

The long-term sustainability of these projects requires the ongoing energy and enthusiasm of the groups and individuals involved, and ongoing funding to sustain protection efforts. To date, support for these projects has come from DOC, Kiwis for kiwi, WRC, Waikato Biodiversity Forum and many other community and private funding sources.

Topics

5.2.1 Topic 9: Advocacy

Background

Kiwi advocacy in Coromandel is increasing as the Department and kiwi projects work to raise awareness of the need to protect CBK. Advocacy includes sharing information, promoting specific issues and solutions, and assisting community groups with the management of their protected areas and advocacy programmes. A range of advocacy tools are used to maximise coverage, including regular media releases (newspaper, television, websites and Facebook), face to face talks, interpretative displays, opportunities to see and hear live kiwi, roadside banners, vehicle graphics and advertising. Resources are available for advocacy purposes from 'Kiwis for kiwi'. Target audiences include the general public, iwi, schools, tourists, possum trappers, interest groups (including hunting clubs), the forestry and farming sectors, and statutory authorities.

Issues

- There is a lack of visitor awareness of community driven and DOC kiwi conservation projects.
- Kiwi are not visible on the Coromandel. There are few opportunities for the public to see a kiwi.
- Land managers need to be engaged to provide kiwi safe practices.
- Advocacy material must be kept current and meet the target market.
- There is a lack of awareness of community kiwi project's sponsors.

Objectives and actions

Taxon plan objective(s)				
Objective 9.1: To motivate and empower people to have a positive impact on CBK recovery.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
9.1	Design key advocacy messages for the taxon and ensure they are used throughout the Coromandel.	Throughout	Essential	DOC/CKC
9.2	Develop an advocacy strategy which identifies opportunities for kiwi advocacy to occur.	Throughout	Essential	DOC/CKC
9.3	Encourage people to become actively involved in CBK protection through advocacy programmes, e.g. workshops, training, support, media releases and hunting permits. Measurement by survey.	Throughout	Essential	DOC/CKC
9.4	Produce a regular newsletter to be distributed to all CBK projects, iwi and stakeholders.	Biannually	High	CKC
9.5	Keep the K4K website updated with news and advocacy for CBK.	Throughout	Medium	CKC

9.6	Engage regional, local council and other agencies with kiwi to effectively increase CBK advocacy through these agencies.	Throughout	High	DOC/CKC
9.7	Use every opportunity to include local communities in kiwi work e.g. at kiwi releases, BNZONE, predator control.	Throughout	High	DOC/ CKC/ kiwi projects
9.8	Ensure that all advocacy programmes using live kiwi (e.g. release of kiwi) follow Best Practice as determined by the Kiwi Recovery Group.	Throughout	Essential	DOC/ CKC/ kiwi projects
9.9	Ensure success/threat stories for CBK are regularly released to the media.	Throughout	High	DOC/ CKC/ kiwi projects

The following actions also contribute to meeting the above objectives:

Action 2.5 Section 5.1.2 Hui

Action 12.3 Section 5.2.4 Advocacy statutory authorities

5.2.1 Topic 10: Dog Control Advocacy

Background

Dog and stoat predation are the leading causes of kiwi deaths in the Coromandel. Advocacy and kiwi avoidance training are the best current tools available to decrease dog predation. Refer to Sections 3.5 Agents of decline and current threats; 3.6.6 Kiwi Avoidance Training.

Issues

- Advocacy messages need to be innovative to reduce dog predation.
- Dog predation is not being recognized by some dog owners as a threat to kiwi.
- Advocacy is of prime importance at training sessions as avoidance training does not work with all dogs.

Objectives and actions

Taxon plan objective(s)				
Objective 10.1: To develop and apply innovative ideas to advocate dog control messages and methods which will reduce the impact of dogs on kiwi.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
10.1	Support all appropriate dog control advocacy programmes with the aim that 80% of visitors have received message about dogs and kiwi.	Throughout	Essential	DOC/CKC/K4K
10.2	Offer kiwi avoidance training for dogs where dogs are present in or near kiwi habitat. Ensure all kiwi avoidance workshops are used to optimise the kiwi advocacy opportunity.	Throughout	Essential	DOC/CKC/ other certified dog avoidance trainers
10.3	Ensure that workshops offering kiwi avoidance training for dogs are readily available for general community and specialist groups e.g. hunting groups. Targets include 1500 dogs receive first training by 2020; another 1500 dogs receive first training by 2025.	Throughout	Essential	DOC/CKC/ other certified dog avoidance trainers

The following actions also contribute to meeting the above objectives:

Action 3.6 Section 5.1.3 MKS dog awareness
Action 14.4 Section 5.3.1 Research Predator Control

5.2.2 Topic 11: Tangata whenua

Background

Tangata whenua have a unique relationship with kiwi that is interwoven into genealogy and tradition, whakapapa and mauri. Tangata whenua have been involved in most CBK projects to varying degrees.

Consultation with Hauraki iwi regarding the Moehau Kiwi Sanctuary has been ongoing since the beginning of the project. Engagement has varied over the years but iwi support for the Moehau kiwi sanctuary has been consistent.

DOC acknowledges that the below comments were made prior to Treaty Settlement, made during the negotiation phase and does not prejudice any future negotiations.

The Harataunga Kiwi Project was the first iwi led kiwi project in the Hauraki rohe which was setup and managed by Runanga O Ngati Porou Ki Hauraki with support from Moehau Environment Group. Runanga O Ngati Porou Ki Hauraki has had varying success with the initiative over the years. New iwi led kiwi projects will benefit from the learning's from this project. Problems this project has encountered are linked to multiple landowner issues and iwi mistrust of outside initiatives on their lands.

The consultation and planning process with tangata whenua must remain robust to encourage support and participation from iwi in all aspects of kiwi recovery management. The iwi perspective is vital in capturing the hearts and minds of their tamariki and the ordinary person which will ultimately result in the return of kiwi to all the forests of Coromandel.

Issues

- Involvement by tangata whenua in aspects of kiwi recovery and planning is variable across the Peninsula. Issues include the stretching of iwi resources because of Treaty of Waitangi settlements, a shortage of DOC staff and community group leaders confident in communicating issues to iwi.
- More involvement by iwi is likely once Treaty Settlement is complete.
- The role of iwi in kiwi recovery planning and implementation is not always understood or effectively provided for. Efforts must be made by all groups to effectively engage with iwi even when working on private land.
- The number of iwi groups on the Coromandel Peninsula means that kiwi projects must engage at the collective iwi level (Hauraki Maori Trust Board) to source information if they have no local knowledge of the tribal areas they are working in. Time for this consultation must be built into any kiwi project.

- Consultation with iwi projects on their own lands needs to be well structured and thorough with the entire life cycle of a kiwi project communicated to them from the beginning. Consultation needs to include all possible management options such as the use of independent trap line auditors, the use of toxins to control trap shy predators and the need for kiwi translocations.
- Iwi that inquired about kiwi cultural material have been informed (2013) of the process to obtain cultural materials and most kiwi material has been released to iwi for cultural purposes.
- Wiremu Peters, Ngati Maru ki Hauraki Inc. (21/08/13) responded to the Motutapu transfer plan saying, we are fundamentally opposed to ground species translocation as these creatures have their own specific habitat and territory which they have survived in for centuries.
- Pauline Clarkin, Te Kupenga O Ngati Hako Inc requests that CBK to be transferred only within the Hauraki rohe within. (pers comm. P. Clarkin, 2014).
- Danny Hitchcock, Moehau Nga Tangata Whenua does not consent to his whanau being removed from Moehau. The process of kiwi management should include the people out in the bush (gathering the information) more so that the best decisions are made for kiwi. The information gatherers can utilise their matauranga Maori (the holistic knowledge of Kiwi and their environment) which must be considered in decision making. He believes in that the Moehau April 2014 Kiwi translocation the gender imbalance would not have occurred if the information gatherers had been part of the decision making.
- Lorraine Anderson, Ngati Huarere ki Whangapoua asks that iwi are consulted and have an input into the naming of kiwi e.g. kiwi being moved to and from Motutapu. Ngati Huarere ki Whangapoua are not in favour of the use of 1080 on lands where kiwi live.
- Dave Hamon, Ngati Whanaunga and Ngati Maru, (20/06/14) believes that kiwi management on the Coromandel should concentrate on predator control and ecosystem restoration rather than translocations and BNZONE. Kiwi should be protected in their home area and he advocates for minimal handling of birds.
- Cameron Hunter, Ngati Porou, responded to a request for feedback on the draft Taxon Plan with the following (10/12/13); May I, on behalf of Harataunga Marae Trustees, commend the Department on its conservation effort in relation to our National icon and genetic identification of Northern Coromandel Kiwi in particular.

We also appreciate your communication bulletins which keep us in the information loop in the pursuit of such objectives.

Objectives and actions

Taxon plan objective(s)
Objective 11.1: Tangata whenua are given many opportunities to be involved with kiwi including tikanga and Mātauranga Maori. Objective 11.2: To facilitate tangata whenua-led initiatives to actively protect kiwi.

Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
11.1	Facilitate tangata whenua-led kiwi protection initiatives with technical support, best practice and information on funding sources.	Throughout	Essential	DOC/CKC
11.2	Encourage tangata whenua involvement in kiwi recovery. Iwi will be supported to take an active part in kiwi management e.g. to become certified kiwi handlers, young people participating in kiwi projects as part of their education.	Throughout	Essential	DOC/CKC/ kiwi projects
11.3	Facilitate tangata whenua to be involved in the CBK hui and encouraged to attend the national kiwi and Maori in Conservation hui.	Biennially from 2014	High	DOC/CKC
11.4	Encourage full tangata whenua representation in the CKC.	Throughout	Essential	DOC/CKC
11.5	Offer at least two/year marae-based advocacy and kiwi avoidance training sessions for dogs. Offer marae based skills sessions in kiwi management e.g. trapping.	Throughout	Essential	DOC/CKC
11.6	Continue to provide cultural materials (kiwi feathers and beaks) to groups/individuals.	Throughout	Essential	DOC
11.7	Engage with iwi to find out if they would like to manage the	2014-15	High	DOC/ CKC

	distribution of cultural materials (Pataka Komiti model in Northland)			
11.8	Support potential ecotourism opportunities for tangata whenua and community led projects	Throughout	Medium	CKC

5.2.3 Topic 12: Community and landowner-led initiatives

Background

The sustainable recovery of CBK is dependent upon the continued efforts of the wider community and the ability of these individuals and groups to access ongoing support. Support includes training and assistance with pest control and monitoring, habitat restoration, access to resources and funding avenues, and assistance with administration and networking.

Most Coromandel brown kiwi care groups were established during the last decade and are successfully sustaining their areas of protection. CBK have had an increasing profile. Momentum is being maintained within established kiwi projects with some growth in new projects. Some larger community and landowner projects mentor and provide support to other groups within the Coromandel.

The allocation of funding is often based on a combination of factors including priority of population or management area, the extent of community and individual support, and commitment to undertaking the work.

Issues

Community-led projects face a number of issues that endanger their long-term sustainability, including:

- Funding is getting more difficult to find and kiwi projects feel they are competing against each other. This does not foster cooperation or a taxon wide view for groups. Very few groups have sustainable funding sources.
- Working within a limited grant structure (annual to three year cycle) reduces the ability to plan long-term.
- The number of people wanting to help kiwi is increasing, which is stretching an already limited pool of available resources.
- Work is carried out mainly by volunteers, including aspects of strategic planning, funding and administration (e.g. translocation proposals) that are time consuming and require specialist knowledge and skills.
- Many groups face a lack of volunteers and are reliant on a few key individuals.

- Kiwi project members often lack the knowledge or capacity to access external funding providers.
- It is not always easy to access the latest information, e.g. best practice, land management techniques and priority sites for kiwi protection.
- Landowners and kiwi projects with small and isolated kiwi populations require support and inclusion.
- All projects require both initial and ongoing support during project set-up, training, monitoring and provision of best practice information.
- Opinion on appropriate levels of kiwi handling varies across the Coromandel kiwi projects.

Objectives and actions

Taxon plan objective(s)				
Objective 12.1: To ensure that community involvement in CBK protection is optimised, sustained and follows best practice. (cf. RPO 20.1)				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
12.1	Provide assistance to kiwi projects throughout the region with accessing funding and support (technical and best practice information), via the CKC.	Throughout	Essential	CKC
12.2	Encourage continued capacity within the Coromandel Kiwi Collective and DOC to support local kiwi projects.	Throughout	Essential	CKC/ DOC
12.3	Continue to encourage community involvement in the implementation of the CBK taxon plan and representation on the CKC.	Throughout	Essential	CKC
12.4	Provide community groups with information on priority areas for management of kiwi by 2016 and then throughout the term of the taxon plan (cf, FPA 20.4)	2015 onwards	High	CKC/DOC

12.5	Encourage kiwi projects to regularly engage with tangata whenua in their rohe and for this to become part of kiwi projects 'Best Practice'.	Throughout	Essential	DOC/CKC/ iwi
12.6	Encourage local community representation at National hui and Coromandel hui.	Biennial	High	CKC

The following topics also contribute to meeting the above objectives:

Topic 1: Support strategies

Topic 2: Best Practice

Topic 9: Advocacy

5.2.4 Topic 13: Statutory planning

Background

CBK can be found in close proximity to rural-residential areas, lifestyle lots, forestry plantations and pasture. Kiwi are vulnerable to the activities of people, not just those associated with the immediate clearance and development of land and farm forestry activities, but also ongoing lifestyle factors associated with residential areas.

The sustainable management of CBK populations requires collaboration with planning authorities. These authorities need to be aware of the distribution of kiwi, the issues surrounding their survival, and the methods by which they can assist in their recovery so that they can address these in their planning regulations, where appropriate, and enforce them, where applicable.

There are examples of land development which provide for habitat enhancement and ongoing pest management for the benefit of kiwi and other indigenous species. The benefit for kiwi is increased by pet restrictions, dog avoidance training requirements and a willingness by residents to become involved in local kiwi projects or other ecological restoration projects.

Issues

- Kiwi predation by domestic animals, dogs and cats in particular, is likely to increase with further land development and population increases.
- Land development has the potential to impact negatively upon kiwi habitat but can also provide opportunities for increased kiwi protection.
- The presence of kiwi may be seen as a liability and may potentially limit development in some cases.
- There is high demand for development on the Peninsula, especially coastal fringes (James, 2011) and lifestyle blocks within native forest.
- Councils need to be aware of the current distribution of kiwi and the issues and solutions for kiwi recovery.

- We have poor knowledge of current kiwi distribution outside of the protected kiwi project areas to provide to councils.
- Priority protection areas for kiwi will also include habitat corridors between kiwi areas.
- The support and commitment of statutory authorities is critical to minimising the effects of people, their pets, development and land modification on kiwi populations.
- Thames Coromandel District Council (TCDC) District Plan is currently (2014) under review.
- The distribution and management of kiwi is irrespective of land tenure and council jurisdiction.
- Some landowners with existing and potential kiwi habitat would like incentives to protect, retain and restore that habitat.
- Finding a balance between the needs of people and communities and kiwi is sometimes challenging.
- Kiwi practitioners and certified kiwi dogs need to be available to service the need for kiwi survey and location.

Objectives and actions

Taxon plan objective(s)				
Objective 13.1: To avoid, remedy or mitigate threats to CBK and their habitat by promoting legislative and policy changes by statutory authorities. Objective 13.2: To encourage and empower regional and local councilors and council staff to advocate for CBK.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
13.1	Encourage local and regional government involvement in the CKC.	Throughout	High	CKC
13.2	Provide a copy of the CBK taxon plan to all regional and local councils and work with staff to apply it, as appropriate. This will include information on the priority areas for kiwi management.	Throughout	High	DOC/CKC
13.3	Develop and deliver kiwi advocacy material for statutory authorities	Throughout	High	CKC/National Mentor for

	and update as required.			Advocacy
13.4	Encourage council monitoring of consent conditions when relevant to kiwi.	Throughout	High	DOC/CKC/Kiwi projects
13.5	Advocate and provide for consent conditions that protect kiwi habitat, and establish cat and dog free zones in subdivisions within high-density kiwi areas.	Throughout	High	DOC/ CKC/ WRC/ District Councils
13.6	Work closely with councils to establish consistent habitat protection, dog control and enforcement strategies.	Throughout	Essential	DOC/CKC/ WRC/District Councils
13.7	Work with councils to develop and implement the CBK habitat corridors identified in Appendix 4.	Throughout	Medium	DOC/CKC /WRC/District Councils
13.8	Work with councils to develop innovative incentives that encourage landowners to retain, enhance and protect areas of existing and potential kiwi habitat.	2015	High	DOC/CKC/ WRC/District Councils/ QEII Trust
13.9	Encourage local and regional councils to protect kiwi on council administered land where kiwi are present. This may include predator control, targeting mustelids and dog control.	2015	High	WRC/ District Councils/DOC

5.2.5 Topic 14: Development of environmental standards—forestry and farming

Background

CBK regularly utilise plantation forests and farmland as habitat. Therefore, they are vulnerable to the operational practices that frequently occur within these areas. Forest managers and farm managers/owners can make important contributions to the recovery of CBK.

In 2007, the New Zealand Forest Owners Association developed an environmental code of practice for plantation forest management. This code was designed to help forest managers, contractors and staff consider the many factors that influence forest management and operations, including kiwi habitat.

In 2008, the BNZSKT, (now Kiwis for kiwi) in collaboration with DOC, Whakatane Kiwi Trust and Environment Bay of Plenty, prepared the 'Forestry Management Guidelines for North Island brown kiwi'. This National Guideline for Management of Brown Kiwi in Exotic Forestry is available online <http://www.kiwisforkiwi.org/resources/forestry/> These practical guides for forestry managers help to ensure that adverse effects on kiwi populations within plantation forestry are minimised.

Issues

- Forestry harvesting techniques are a threat to CBK who often inhabit plantation forests.
- Guidelines on kiwi-specific forestry management have been produced but are not adequately promoted to all the forestry sector.
- Equivalent guidelines for kiwi-friendly farming practices are planned to be available in 2015.
- The industry will need the support and services of kiwi practitioners to assist with their work.
- The current distribution of kiwi is unknown outside of kiwi protected areas.
- Kiwi advocacy for forestry and farming is not specifically targeted to this audience.

Objectives and actions

Taxon plan objective(s)				
Objective 14.1: To promote and support kiwi-friendly forest management practices.				
Objective 14.2: To promote and support kiwi-friendly farm management practices.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
14.1	Identify areas of production forestry and agriculture where kiwi are present from CBK survey (Action 6.1)	2015	Essential	DOC/CKC
14.2	Identify areas where forestry	2016	Essential	DOC/CKC

	companies or landowners can undertake predator control to protect kiwi, and support landowners and land managers to implement management.			
14.3	Support and encourage the consistent use of the 'National Guidelines for Management of Brown Kiwi in Exotic Plantation Forests' within the forestry industry. This will include a target audience of owners, managers and contractors.	Throughout	Essential	DOC/ CKC/K4K
14.4	Support and encourage nationally accepted guidelines for farming to protect kiwi.	2016	High	K4K/CKC
14.5	Encourage forestry and farming sector involvement in the CKC. Send forestry and farming stakeholders Collective newsletters. (Action 9.7)	Throughout	High	CKC
14.6	Use nationally consistent key advocacy messages for management of exotic production forest which contain kiwi.	Throughout	High	DOC/CKC
14.7	Provide a copy of the CBK taxon plan to all Forestry associates, Federated Farmers of NZ Inc. representatives and other interested farmer groups and individuals.	Throughout	High	CKC/DOC

5.3 Research, monitoring and innovation

The recovery of kiwi has greatly benefited from research and technological developments, and will continue to be dependent on sound scientific understanding and development of adequate tools. Current limitations include affordability and the scale of pest management

required, as well as the monitoring and management of sporadic predation events and rogue predators (e.g. dogs and ferrets).

Exploring the most efficient and effective predator control techniques remains the most critical research required for CBK.

For information on research so far refer to Sections 3.2 Biology, Ecology; 3.6.7 Research and Appendix 6 Research papers.

Topics

5.3.1 Topic 15: Predator management

Refer to Sections 3.5 Agents of decline and current threats, 3.6.2 MKS

Background

Predators, especially stoats and dogs, remain the primary agents of decline for kiwi populations in Coromandel. The decline of kiwi populations is halted and recovery is achieved where predators are effectively controlled.

There are currently effective predator control technologies and methodologies available to protect kiwi, but they incur high labour costs. The development and application of new and more efficient technologies will allow more kiwi populations to be protected. Without further cost efficiencies unmanaged populations will continue to decline and the reintroductions of kiwi populations into their historic range will be unattainable.

Mustelids are the main predator of kiwi chicks (de Monchy *et al.* 2008). Kiwi are most vulnerable to stoat predation between 10 and 90 days after hatching (McLennan *et al.* 2004). Considerable effort has been put into developing tools to minimise stoat predation. Trapping is the most widely used tool throughout kiwi habitat in Coromandel. Results from the Whangarei Kiwi Sanctuary indicate that stoats may learn to avoid traps in continuously trapped areas. This is likely to be occurring in the Coromandel kiwi projects. Development of secondary methods to control trap-avoiding individuals and determining the optimal effort to maintain minimal stoat numbers is therefore important. Aerial and ground based 1080 operations are effective at targeting rats and possums, while cats and stoats are also killed through secondary poisoning. At present, however, these toxins must be used for the target animals only and cannot be used specifically for cats or stoats. Other toxins are being field tested e.g. PAPP which target stoats and feral cats. The use of toxins is opposed by some individuals, landowners and groups.

Dogs are the highest cause of predation in sub adult and adult kiwi, yet few tools are available to mitigate or reduce this threat. It is difficult to know the present extent of kiwi being predated by dogs. Data from the Moehau Kiwi Sanctuary is very likely to underestimate dog kill as dog numbers increase as you move south on the Peninsula. Whenuakite has recorded 5 kiwi deaths to dogs out of 6. Thames Coast had 1 of 2 monitored kiwi killed by a dog.

Kiwi avoidance training for dogs and advocacy that 'Any Dog Can Kill Kiwi' are the present tools used. Dogs live in or near kiwi habitat and also enter kiwi habitat for pig hunting and recreational walking. There is a large influx of holiday dogs in summer.

Issues

- Predation and impacts by introduced mammals adversely affect kiwi survival.
- In unmanaged areas CBK populations will continue to decline and some will become extinct.
- Kiwi are long-lived and require secure habitats throughout their life span and for the life span of following generations.
- Juvenile kiwi can disperse long distances from their natal territory. They may, therefore, leave the relative safety of an area that has predator control and enter areas of higher predator density.
- Predator control must be carried out to Best Practice in order to optimise its effect and to ensure mustelids and cats do not learn to avoid entrapment.
- Existing technologies for predator control to protect kiwi are labour intensive and not always fully effective.
- Predator trapping can remove the top predators and so lead to a growth in rat populations, to the detriment of plant and animal species vulnerable to rats.
- Ongoing predator control is expensive.
- Landscape-scale, cost-effective pest control methods are required but can be difficult across different land units.
- It is likely that dogs are also key agents of decline in areas with increasing public use.
- Kiwi Avoidance Training needs refining to maximize the gains. It does not work with all dogs.
- Kiwi Avoidance Training is labour intensive
- More dog owners need to attend the training and remember to return for testing and retraining.

Objectives and actions

Taxon plan objective(s)				
Objective 15.1: To reduce the impact of predators so that CBK recruitment and survival outweighs mortality. Objective 15.2: To support investigations to develop cost-effective large-scale predator control. Objective 15.3: To reduce kiwi deaths by dog predation by investigating, effective, innovative methods to reduce the impact on kiwi populations Objective 15.4: To refine kiwi avoidance training for dogs.				
Taxon Plan Actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery

15.1	Continue to improve and refine the control of predators (including stoats, dogs, cats and ferrets) to protect CBK.	Throughout	Essential	DOC/CKC/kiwi projects
15.2	Support and assist with the research, development and trial of predator control methodologies for key predators, including mustelids and dogs.	Throughout	Essential	DOC/CKC
15.3	Refine Kiwi Avoidance Training for dogs and, if successful, apply elsewhere.	Throughout	Essential	DOC /K4K

The following Topic also contributes to meeting the above objectives:

Topic 3: Moehau Kiwi Sanctuary dog control

5.3.2 Topic 16: Genetics and taxonomy

Background

Refer to Sections 3.1 Taxonomy; 5.1.7 Topic 7 Genetic Diversity.

It is likely that some Coromandel brown kiwi populations have passed through genetic bottlenecks. In the absence of a sound understanding of the effects of reduced genetic diversity, kiwi management needs to apply a precautionary approach by minimising loss of genetic diversity.

Important progress has been made over the last decade in understanding kiwi taxonomy (e.g. Burbridge et al. 2003; Tennyson et al. 2003; Shepherd & Lambert 2008). Coromandel brown kiwi have been identified as one of four genetically distinct North Island brown kiwi taxa, but further genetic analysis is required to ascertain the level of distinction (Burbridge et al. 2003).

Issues

- The effects of genetic bottlenecks on kiwi populations have not yet been quantified and may be significant.
- Unresolved brown kiwi taxonomy leads to uncertainties about the importance of distinct populations.
- Genetic diversity and gene flow for Coromandel brown kiwi is not known.
- Maximizing genetic diversity for Coromandel brown kiwi populations is important as their range is rapidly shrinking into areas receiving predator control.

Objectives and actions

Taxon plan objective(s)				
Objective 16 .1: To formally clarify the taxonomy of CBK. Objective 16 .2: To maximise the genetic diversity of CBK within the bounds of natural rates of genetic exchange and to ensure that new populations are established with founders which maximise genetic diversity.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
16.1	Support research into the genetic distinctiveness of CBK.	Throughout	Medium	DOC
16.2	Support research into the loss of genetic diversity of CBK.	Throughout	High	DOC
16.3	To incorporate results of genetic research into planning and management of CBK.	Throughout	High	DOC

5.3.3 Topic 17: Kiwi monitoring

Background

Refer to Section 3.6.4

The direction of recovery efforts needs to be supported with robust information about population status and trends in both managed and unmanaged kiwi populations. Several techniques can be used in order to monitor kiwi presence, activity and population trends in an area. These are:

- call-count monitoring
- territory mapping
- footprint size
- dog surveys
- telemetry
- population modelling

These monitoring techniques are described in detail in the Kiwi (*Apteryx* spp.) Best Practice Manual (Robertson & Colbourne 2003).

Issues

- Population trend monitoring requires long-term commitment that is difficult to maintain with short-term funding cycles.
- Tools for broad population trend monitoring are unsuitable for low-density (e.g. widely dispersed) populations.
- Detailed population monitoring is complex, expensive and labour intensive.
- Call-count monitoring alone does not provide robust information on population size.

- For monitoring results to be comparable across years, consistency in methodology (Best Practice) is critical.
- Information gained from kiwi monitored on Moehau between 2000 and 2008 may not be relevant to kiwi south of Moehau.
- The ecology of CBK needs further study especially the later age of first breeding being 3 years and the large proportion of Moehau non-breeders (36 % non-breeders, de Monchy *et. al.* 2008)

Objectives and actions

Taxon plan objective(s)				
Objective 17.1: To ensure that sufficient and robust information is available to assess the status and population trends of CBK. Objective 17.2: To contribute sufficient and robust information to ensure the ecology and behaviour of CBK can continue to be assessed.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
17.1	Encourage regular call-count monitoring throughout the Coromandel to monitor broad trends in kiwi populations.	Throughout	Essential	DOC/CKC
17.2	Facilitate a workshop to train community kiwi practitioners in best practice kiwi monitoring methods.	Biennially from 2015	High	DOC/CKC
17.3	Provide support to community projects so they can more	Throughout	Essential	DOC/CKC

	accurately estimate population trends through analysis of monitoring data.			
17.4	Support and assist with research into kiwi monitoring methods.	Throughout	High	DOC
17.5	Support and assist with research into kiwi ecology and behaviour.	Throughout	High	DOC
17.6	Establish a scholarship fund to do research on CBK (preference given to Coromandel students)	2017	Medium	CKC

5.3.4 Topic 18: Eco-tourism

Background

Coromandel is a major tourist destination and yet there are very few opportunities for tourists and locals to see or learn about kiwi on the Peninsula. This is an untapped advocacy opportunity which could showcase how to become involved with protecting kiwi. Eco-tourism opportunities may attract more landowners to protect their land for kiwi as it would generate an income.

Issues

- Kiwi are cryptic – people rarely have the opportunity to see or hear kiwi in their natural habitat.
- There is conflicting opinion of appropriate handling of kiwi amongst kiwi projects in the Coromandel – some groups don't approve of any handling.
- When using kiwi for advocacy there is a risk that providing the promised encounter may become the priority and the welfare of the bird becomes secondary to this.
- There is a cost to protecting kiwi and the financial gain from a tourism venture could help to offset this cost.
- Coromandel tourism operators are underutilised as a tool for advocacy and as a potential revenue generator for kiwi recovery.

Objectives and actions

Taxon plan objective(s)				
Objective 18 .1: To investigate potential eco-tourism opportunities for CBK.				
Taxon plan actions required to achieve objective(s)				
#	Action	Timeframe	Priority	Delivery
18.1	Support and assist research into	Throughout	Medium	Tangata

	risks and benefits of potential eco-tourism opportunities for CBK			whenua/CKC/ DOC
18.2	Liaise with tangata whenua and other stakeholders over potential ecotourism opportunities for CBK (Action 10.8)	Throughout	Medium	CKC/ DOC

The following actions also contribute to meeting the above objectives:

Action 9.11 Best Practice handling kiwi

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Appendix 1: Coromandel brown kiwi key stake holders

Department of Conservation (DOC)

The Department of Conservation (DOC) is the lead agency in kiwi recovery. The Moehau Kiwi Sanctuary is managed by the Department and provides a stronghold of CBK. Iwi consultation and collaboration forms an integral part of the management of Moehau which is likely to be formalised, with Treaty Settlement in 2014. Many private land owners and the Moehau Environment Group are also important partners to the sanctuary. DOC has facilitated the development of this taxon plan, and is involved in its implementation. The Department also provides technical support to the numerous CBK projects some of which are situated on public conservation land. DOC offices within the range of CBK are located in Thames and Whitianga with a field base at Coromandel town.

Tangata whenua

CBK are found throughout the rohe of many Hauraki iwi. Tangata whenua within the historical and current distribution of CBK include (as at 2013) : Ngati Hei Trust, Ngati Maru ki Hauraki Inc., Ngati Whanaunga Inc. Soc., Te Ruunanga a Iwi O Ngati Tamatera, Ngati Maru ki Hauraki Inc., Te Kupenga O Ngati Hako Inc., Runanga O Ngati Porou Ki Hauraki, Ngati Porou Ki Hauraki, Mataora, Ngati Pukenga ki Waiau, Te Patukirikiri Iwi Inc., Ngati Rahiri Tumutumu, Ngati Rongo U Charitable Trust, Ngati Tara Tokanui Trust, Raukātāuri Hapu of Ngati Huarere, Ngati Huarere ki Whangapoua, Moehau Nga Tangata Whenua, Ngati Tawhaki, Te Runanga O Ngati Puu, Ngati Paoa Trust, Ngati Tai Te Umupuia Te Waka Totara Trust.

Iwi Established Kiwi Projects

- Harataunga Kiwi Project protects the ancestral land of Ngati Porou ki Harataunga and Raukātāuri a Huarere. The Harataunga Kiwi Project aims to increase the survival rates of kiwi chicks, to raise awareness of Harataunga kiwi among iwi and the general public, to provide Kiwi Avoidance Training and to participate in conservation matters within the Harataunga rohe.

Organisations, businesses, research organisations and agencies

These include 'Kiwis for kiwi' and Queen Elizabeth II National Trust, Ernslaw One Limited and tertiary education providers.

Kiwis for kiwi

Kiwis for kiwi supports CBK projects by providing funding grants, advocacy material to support community and business engagement, national guidance for Kiwi Avoidance Training for dogs and administration of/financing the Coromandel Kiwi Collective coordinator position.

Community groups

Community groups (Appendix 2) undertake active management (pest control and BNZONE) and advocacy in the Coromandel Peninsula. The projects include (but are not limited to) Moehau Environment Group, Te Kauae o Maui Nature Reserve, Coromandel Kiwi Project, Habitat Tuatēawa, Papa Aroha Environment Group, Project Kiwi, Mahakirau Forest Estate, Kapowai Kiwi Group Inc., Whenuakite Kiwi Care, Te Moata Charitable Trust, and Thames Coast Kiwi Care.

Captive and BNZ Operation Nest Egg™ facilities

Rainbow Springs Kiwi Encounter is the captive breeding facility used by Project Kiwi to hatch and raise chicks through BNZ Operation Nest Egg. Auckland Zoo is another captive breeding facility able to hatch chicks before possible crèching on Rotorua Island.

Sponsors

Kiwi project funds are often obtained by applications to various funding agencies. 'Kiwis for kiwi', DOC and WRC are major fund suppliers. Many community groups have their own sponsors from within the local area. Zeagold sponsor egg donations for use in traps for community groups throughout the Coromandel. Some community projects look for larger corporate sponsorship from the wider Auckland area.

Regional and Local authorities

WRC, TCDC and Hauraki District Council provide dog control measures. The District and Regional Councils provide statutory planning to provide for kiwi protection and enforcement of resource consent conditions. Waikato Regional Council plays a major role in subsidising pest control and assisting community groups.

Vets and bird rescue facilities

Please contact the Department immediately 0800DOCHOT if you find an injured, sick or dead kiwi.

Veterinary support is essential for kiwi projects. Injured kiwi initially can be taken to local vets e.g. Farmers Vet Club. For major injuries and rehabilitation New Zealand Centre for Conservation Medicine at Auckland Zoo has the technical expertise and facilities to respond to injured kiwi.

Massey University Wildlife Unit treat injured kiwi and will carry out autopsy work for kiwi recovery programmes. Their wildlife veterinarians also provide advice and training as required. Kiwi Encounter in Rotorua offer a rehabilitative service but have no cost recovery agreement with the Department.

As at 2014, there are no local facilities on the Coromandel Peninsula for kiwi treatment and rehabilitation.

Individual land owners

Throughout the region, individual landowners are carrying out pest and predator control on their properties in order to encourage the recovery of kiwi populations. Some properties are self managed and others use contract trappers. Many of these managed areas are legally protected through the Queen Elizabeth II National Trust. Many private landowners support local kiwi projects by allowing access through, or management on, their land. This is an important contribution to regional kiwi recovery.

Kiwi Recovery Group

The Kiwi Recovery Group (KRG) consists of people with expert knowledge of the ecology and management needs of kiwi, and their role is to provide high-quality technical advice that achieves the security and recovery of kiwi. The KRG maintain and oversee the implementation of the kiwi recovery plan.

Appendix 2: Kiwi projects in Coromandel

The following table lists projects involved in the recovery of CBK. Information has been provided by each individual project and was correct at March 2014.

Table 1. Projects involved in the recovery of CBK

Group Name	Location of managed site	Start date	Area (ha) 2014	Form of Management e.g. trapping, BNZ ONE etc	Kiwi numbers (conservative estimates)	Comments
Department of Conservation (DOC)	Moehau Kiwi Sanctuary (MKS)	2000	16,820 ha	Mustelid trapping since 2001. 2013 – 1080 aerial operation for possums. Possum and goat control. Rat control within in some areas. Pig control by rec. hunting ballot	Baseline survey (2000) – 143 birds 2009: 215 pairs (281 individuals)	Radio telemetry study n=310 birds between 2000-2008. High chick survival rate at 67% n=162 between 2000-2008. More information available from your local DOC office quote DOCDM-342487
Moehau Environment Group(MEG) Kiwi Sanctuary	South of DOC Moehau kiwi sanctuary and west of Harataunga Kiwi project.	2000 (MEG) 2004 (MEG Kiwi sanctuary)	8600ha	Mustelid trapping since 2005 Possum, rat control in parts of MEG kiwi sanctuary	2005: 160 kiwi (doubled since 2000) 2009: est. 210 using MKS 10 % increase/annum	Active in advocacy for kiwi, and dog avoidance training. Sanctuary trapping regime set up as similar to DOC's MKS. MEG has many other projects including rat and possum control, wetland restoration. Many private landowners support project.
Karuna Falls Environment Group	Waikanae Valley, Waikawau Bay within MEG kiwi sanctuary	2005	297ha	Mustelid trapping by MEG. Pest control to protect kiwi. Possum control using traps and cyanide.	ca. 10 birds, including 4 pairs.	Pest management used that will not leave toxic residue in the food chain. No dogs/cats allowed.

Te Kauae o Maui Nature Reserve (TKOMNR)	2099 Colville Rd Within MEG kiwi sanctuary	2012	97 ha	Mustelid trapping by MEG & landowners Animal pest control (possums, rats, mice, wasps, cats, pigs, mynas) Plant pest control.	Intensive survey in over 40 ha in 2010 found 6 pairs	Intensive landscape trapping operation on private land. Definitely focus on whole ecosystem restoration.
Harataunga Kiwi Project	Kennedy Bay, East Coast	2005	4100ha	Mustelid trapping since 2006	2007 – 24 birds est.	3-way agreement between DOC, MEG and iwi. Call count baseline survey in 2007 0.62/hr.
Habitat Tuatēawa	North of Kennedy Bay almost up to Little Bay. Within MEG kiwi sanctuary	1992 (Tuatēawa Kiwi Care). 2006 (Habitat Tuatēawa)	320ha private 80ha DOC	Mustelid trapping since 2004 as part of MEG kiwi sanctuary. Control of possums, feral goats, feral cattle. Contains a rat control block. Use of first-generation anticoagulants and cholecalciferol. Presently trapping possums.	Estimates of 12-20 kiwi. Irregular monitoring.	Comprehensive management plan in place. Supported by MEG stoat trapping and DOC possum control in adjacent Coromandel Forest Park.
Papa Aroha Environment Group	North of Coromandel town.	2005		Stoat and possum control (traps and bait stations)		Supported by MEG.
Moehau Environment Group (Coromandel Kiwi Project)	East of Coromandel town	2011	1000 ha	Mustelid trapping	Kiwi call surveys show kiwi presence.	Traps are serviced by volunteers.
Project Kiwi	Kūāotunu	1996	1997 – 2007 4100 ha 2008 – now 2850 ha	Mustelid trapping includes ferret line at grass boundaries. BNZ ONE started in 2004 to build kiwi population. Possum control using traps	2001 141 pairs + 282 juvenile kiwi Population of 564 * See notes below 2010 150 pairs + 300 juvenile kiwi Population of 600 (approximately half of	31.6% chick survival (average) Approximately half the carrying capacity for the Kūāotunu Peninsula. Another call survey this year. Sponsors: SGS, Boffa Miskell Ridgeline of New Zealand

					the carrying capacity for the Kūaotunu Peninsula).	Lil Nippers, Pacific Tourways STNZ, Specialized Imports
Ernslaw One Ltd	Whangapoua	2007	1430ha	1997 - 2007 Intensive mustelid and possum trapping Radio telemetry study. 2004 – now Captive-rearing employed as an additional method to build kiwi abundance. 2009 – now Mustelid trapping. Landowner Possum and Rat poisoning	8-12 pair 2013 survey	Project Kiwi are contracted by Ernslaw One Limited to manage their biodiversity block. It is planned to have 10-15 BNZ ONE chicks/annum released into this block over the next 3 years. The need for BNZ ONE will be reassessed in 2017. A call survey will be conducted in 2016.
Whenuakite Kiwi Care	Between Tairua and Hot Water Beach.	2000	4000ha (935ha is DOC land)	Control of mustelids, feral cats, pigs, h/hogs, rodents, possums – by traps, bait stns and aerial 1080 (for rats + possums). Goats controlled since 2000	2001 - 31 birds, 2005 - 68 birds. 2010 - 98 kiwi (75 pairs) + 150 juveniles (using Project Kiwi's estimate method)	Before 2000, a survey showed kiwi numbers were plummeting. Some private landowners don't allow dogs at all. Call count monitor. 1995-97 (KRP). Territory size 70ha? 2001 was baseline popn est. 0.91/hr. Key site for EW.
Kapowai Kiwi Group Inc.	Kapowai, Parakau and parts of the Whenuakite catchments	2000	3000 ha	Control of mustelids by trapping. Use of Brodifacoum in a 200 ha core area for possums. Trapped area includes part of Coroglen Forest.	20 pair estimate 1993 - hotspot 2003 – 11 birds 2005 – cc 1.1/hr 2009 – doubling of call rate since 2005.	CC mon.1994-96 (KRP) Kiwi monitored since 1993 (hotspot) – overall drop in call rates. Baseline survey 2005. Smaller group with one paid contractor.
Thames Coast Kiwi Care Group	Te Mata, Tapu	2006	2400ha	Trapping.	2006 – 19 adult kiwi 2011- 25 individuals, 18 pairs	BNZ ONE in partnership with Rotorua Restoration Trust and Auckland Zoo plan to increase Thames Coast population and supply Motutapu founders.
Mahakirau	10km SW of	2001	580ha	Stoat, rat, possum control (bait	2009 – 5 adults	No dogs allowed. Concentrating

Forest Estate	Coromandel (309 Rd)		private land with 24 covenants	stations). Pest control initiative 2008 – 2013. 7 yrs of intensive trapping. Track cutting, trapping, monitoring.		on general health, now want to focus more on kiwi. Want a proper survey.
Te Moata	Paul Rd Tairua	1987	344 ha	Mustelid trapping has intensified since 2008. Pig, rat, goat, pig control.	5-6 (2013)	Restoration project includes wetland. Many species protected fernbird.

* Project Kiwi population estimate

The population of 64 was taken directly from Paddy's call survey report dated June 2001. This number relates to the number of individual kiwi determined to have been heard during the call survey hours over the nine survey sites. This number does not consider the hectares that the call survey did not cover. The last paragraph in the discussion of this report states in its entirety:

"The nine sites gave listening coverage of approximately 1400 ha. Although outside the scope of this survey the potential correlation of call rates to actual kiwi population and distribution is explored here to enable comparison to future surveys. Surveys in Northland at a similar time of year (Wilson .et al, unpublished) suggest that real numbers of kiwi pairs may be estimated by multiplying the detected number of female kiwi by about two. At least 24 female kiwi were detected in the survey suggesting a potential population of 48 pair in the area surveyed, with a mean territory of 29 hectares for each pair."

Therefore there could be 98 pairs over 2850 hectares.

Therefore there could be 141 pairs over the 4100 hectares on the Kūaotunu Peninsula (that the project historically monitored kiwi over).

We estimate that perhaps there is one juvenile for every adult kiwi and this is how we have arrived at the population estimates in the table above.

Appendix 3: Timeline and priorities for recovery actions for CBK

Shaded areas are years when actions should be implemented.

Priorities:

E = Essential—to be done within specified time frame and/or at the frequency required to achieve the goals for kiwi recovery over the term of this plan. Highest risk for kiwi recovery if not done within the specified time frame and/or frequency.

H = High— necessary to achieve long-term goals. To be progressed and ideally completed within the term of the plan, with moderate risk if not done within the specified time frame and/or frequency.

M = Medium—necessary to achieve long-term goals. To be progressed within the term of the plan but least risk if not completed within the term of the plan or within the specified time frame and/or frequency.

Abbreviations used

BNZONE™ Bank of New Zealand Operation Nest Egg; CBK Coromandel brown kiwi; CKC Coromandel Kiwi Collective; MKS Moehau Kiwi Sanctuary; WRC Waikato Regional Council

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1.1	To establish a review process which ensures the taxon plan for CBK remains relevant and effectively informs annual work plans.	E	DOC/CKC										
1.2	CKC formed to participate in the facilitation, implementation, review and maintenance of the CBK taxon plan.	E	K4K.										
1.3	CKC representatives will meet biannually	E	CKC										
1.4	The CKC will ensure relevant information regarding kiwi management is available to all stakeholders.	H	CKC										
1.5	Establish and secure resourcing for Coordinator role within the CKC	M	K4K/ CKC										
1.6	Seek long term funding solutions for Coromandel kiwi	M	CKC /K4K										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	protection work												
1.7	Prepare a progress report annually against taxon plan objectives and communicate to stakeholders	M	DOC/CKC										
2.1	Ensure best practice is promoted and monitored throughout the term of the plan. (cf. RPA 5.5)	E	DOC/CKC/ K4K										
2.2	Communicate developments in best practice, management and science to stakeholders.	E	DOC/CKC/ K4K										
2.3	Ensure appropriate Wildlife Act permits are in place, current and permit conditions follow Best Practice.	E	DOC										
2.4	Provide regular pest control workshops to those implementing field programmes.	H	DOC/ CKC										
2.5	Provide a regular CBK taxon hui.	H	DOC/ CKC										
2.6	Distribute and encourage the use of national monitoring and data collection templates.	H	DOC/ CKC										
2.7	Encourage sharing of data between CBK groups by developing a centralised database.	H	Kiwi Projects/ CKC										
3.1	Continue to improve and refine the control of predators in Moehau Kiwi Sanctuary using a range of tools.	E	DOC										
3.2	Maintain relationships and support tangata whenua, community groups and surrounding landowners associated with the MKS	E	DOC/iwi/community / landowners										
3.3	Communicate management outcomes and research findings for MKS to the wider local community, local and national kiwi groups ...	H	DOC/ CKC.										
3.4	Communicate with other kiwi sanctuary staff and KRG by attending annual Sanctuary meetings, National hui . . .	H	DOC										
3.5	MKS management to visit another sanctuary by 2016	M	DOC										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
3.6	Increase awareness of the impact of dogs on kiwi, with the aim of reducing this impact.	E	DOC										
3.7	Contribute to the development of a national database for kiwi projects.	H	DOC										
3.8	Integrate ferret control into existing predator control where appropriate.	H	DOC/ CKC										
3.9	Undertake aerial 1080 operations every 3 to 5 years where possible ...for ecosystem recovery and reducing difficult-to-trap stoats	H	DOC										
4.1	Maintain the current predator control in Northern Coromandel, Kūaotunu and Whenuakite to protect a minimum secure population of at least 500 breeding pairs.	E	DOC/CKC/ kiwi projects										
4.2	Maintain and expand the area under predator control. Setup protected corridors . . . so the population can expand to 1200-1500 pair of kiwi.	H	DOC/ CKC										
4.3	Work closely with tangata whenua and community-based projects to aid population recovery.	H	DOC/ CKC										
4.4	Maximise effectiveness and efficiency of predator control at protected sites through review of existing management	E	DOC/ CKC										
4.5	To support development of strategies for prevention and responses to regional threats e.g. bio-hazards, large predation events.	H	DOC/ CKC										
5.1	Establish a founder population of at least forty CBK onto Motutapu.	E	DOC										
5.2	Monitor the population on Motutapu Island to determine whether the population is reaching carrying capacity.	E	DOC										
5.3	Develop a release strategy for Motutapu Island kiwi to ensure birds are released at priority managed sites	E	DOC/ CKC										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
5.4	Translocate birds from Motutapu Island to identified mainland sites.	E	DOC/ CKC										
5.5	Investigate the need for any further kōhanga kiwi sites for CBK.	H	CKC/DOC										
6.1	Undertake a kiwi listening survey across CBK range to identify distribution and an index of abundance.	E	CKC/DOC										
6.2	Prioritise unprotected kiwi 'hotspots' for management and investigate options for protecting these sites.	E	CKC/DOC										
6.3	Support community groups which contain isolated, kiwi populations.	M	CKC/DOC										
6.4	Support research into distribution and abundance of fragmented, isolated kiwi populations	H	CKC/DOC										
7.1	Manage CBK as a distinct taxonomic unit. (cf. RPA 13.3)	E	DOC/CKC/ KRG										
7.2	Identify and establish a minimum of two reintroduction sites within the former extent of the CBK range.	M	DOC/ CKC / KRG										
7.3	Support and/or undertake research on the CBK to establish fine scale diversity. . .	M	DOC/ CKC/KRG										
7.4	Maintain genetic diversity within managed smaller populations by translocating from CBK larger populations.	H	DOC/ CKC/KRG										
8.1	Ensure that BNZONE minimum standards are followed by all CBK BNZONE projects.	E	DOC/CKC										
8.2	Apply Kiwi Recovery Group guidelines for when and where to use BNZONE.	H	DOC/CKC										
8.3	Support the use of BNZONE advocacy opportunities as part of a projects management tools.	M	DOC/ CKC/kiwi projects										
8.4	Utilise the knowledge of local BNZONE practitioners	M	DOC/CKC										
8.5	Identify in management plans how genetic issues will be managed to avoid over representation of prolific breeding	H	DOC/ CKC/kiwi projects										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	pairs.												
8.6	Maintain at least one kiwi crèche site for CBK.	H	DOC/ CKC										
9.1	Design key advocacy messages for CBK and ensure they are used throughout the Coromandel.	E	DOC/ CKC										
9.2	Develop an advocacy strategy which identifies opportunities for kiwi advocacy to occur.	E	DOC/ CKC										
9.3	Encourage people to become actively involved in CBK protection through advocacy programmes. . .	E	DOC/CKC										
9.4	Produce a regular newsletter (biannually) to be distributed to all CBK projects, iwi and stakeholders.	H	CKC										
9.5	Keep the K4K website updated with news and advocacy for CBK.	M	CKC										
9.6	Engage regional, local council and other agencies with kiwi to effectively increase CBK advocacy through these agencies.	H	DOC/ CKC										
9.7	Use every opportunity to include local communities in kiwi work . . .	H	DOC/ CKC/ kiwi projects										
9.8	Ensure that all advocacy programmes using live kiwi (e.g. release of kiwi) follow Best Practice as determined by the KRG.	E	DOC/ CKC/ kiwi projects										
9.9	Ensure success/threat stories for CBK are regularly released to the media.	H	DOC/ CKC/ kiwi projects										
10.1	Support all appropriate dog control advocacy programmes. . .	E	DOC/CKC										
10.2	Offer kiwi avoidance training for dogs where dogs are present	E	DOC/CKC/ other certified dog avoidance trainers										
10.3	Ensure that workshops offering kiwi avoidance training for dogs are readily available	E	DOC/ CKC// other certified dog avoidance trainers										
11.1	Support tangata whenua-led kiwi protection initiatives with technical support, best practice and information on funding	E	DOC/CKC										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	sources.												
11.2	Encourage tangata whenua involvement in kiwi recovery by all kiwi projects engaging with iwi in their rohe. Iwi should be supported to take an active part in kiwi management	E	DOC/CKC/ Tangata whenua										
11.3	Facilitate tangata whenua to be involved in the CBK hui and encouraged to attend the national kiwi hui and Maori in Conservation Hui.	H	DOC/CKC										
11.4	Encourage full iwi representation in the CKC	E	DOC/CKC										
11.5	Offer marae-based advocacy and kiwi avoidance training for dogs 2/yr. Offer marae based skills sessions in kiwi management . . .	E	DOC/CKC										
11.6	Continue to provide cultural materials (kiwi feathers) to groups/individuals.	E	DOC										
11.7	Engage with iwi to find out if they would like to manage the distribution of cultural materials (Pataka Komiti model in Northland)	H	DOC/ CKC										
11.8	Support potential ecotourism opportunities for tangata whenua led projects	M	CKC										
12.1	Provide assistance to kiwi projects with accessing funding and support, via the CKC.	E	CKC										
12.2	Encourage continued capacity within the CKC and DOC to support local kiwi projects.	E	CKC/ DOC										
12.3	Continue to encourage community involvement in the implementation of the CBK taxon plan and representation on the CKC.	E	CKC/DOC/ kiwi projects										
12.4	Provide community groups with information on priority areas for management of kiwi by 2015 and then throughout the term of the taxon plan. (cf, FPA 20.4).	H	CKC/ DOC										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
12.5	Encourage kiwi projects to regularly engage with tangata whenua in their rohe and for this to become part of each kiwi projects 'Best Practice'.	E	CKC/ DOC / Tangata whenua										
12.6	Encourage local community representation at National and Coromandel hui.	H	CKC										
13.1	Encourage local and regional government involvement in the CKC.	H	CKC										
13.2	Provide a copy of the CBK taxon plan to all regional and local councils and work with staff to apply it, as appropriate. . .	H	DOC/CKC										
13.3	Develop and deliver kiwi advocacy material for statutory authorities and update as required.	H	CKC/ National Mentor for Advocacy										
13.4	Encourage council monitoring of consent conditions when relevant to kiwi.	H	DOC/CKC/ Kiwi projects										
13.5	Advocate and provide for consent conditions that protect kiwi habitat . . . within high-density kiwi areas.	H	DOC/ CKC/ WRC/ District Councils										
13.6	Work closely with councils to establish consistent habitat protection, dog control and enforcement strategies.	E	DOC/ CKC/ WRC/ District Councils										
13.7	Work with councils to develop and implement the CBK habitat corridors identified in action 4.2	M	DOC/ CKC /WRC/ District Councils										
13.8	Work with councils to develop incentives that encourage landowners toprotect areas of existing and potential kiwi habitat.	H	DOC/ CKC/ WRC/ District Councils/ QEII Trust										
13.9	Encourage local and regional councils to protect kiwi on their land where kiwi are present e.g. predator and dog control.	H	WRC/District Councils/DOC										
14.1	Identify areas of production forestry and agriculture where kiwi are present from CBK survey (Action 6.1)	E	DOC/ CKC										
14.2	Identify areas where forestry companies or landowners can undertake predator control to protect kiwi, and support . . .	E	DOC/ CKC										
14.3	Support and encourage the consistent use of the 'National	E	DOC/ CKC/K4K										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Guidelines for Management of Brown Kiwi in Exotic Plantation Forests' within the forestry industry. . . .												
14.4	Support and encourage nationally accepted guidelines for farming to protect kiwi.	H	K4K/CKC										
14.5	Encourage forestry and farming sector involvement in the CKC. Send forestry and farming stakeholders CKC newsletters.	H	CKC										
14.6	Use nationally consistent key advocacy messages for management of exotic production forest which contain kiwi.	H	CKC/DOC										
14.7	Provide a copy of the CBK taxon plan to all Forestry associates, Federated Farmer of NZ Inc. reps and other interested farmers . . .	H	CKC/ DOC										
15.1	Continue to improve and refine the control of predators to protect CBK.	E	DOC/kiwi projects/ landowners										
15.2	Support and assist with the research, development and trial of predator control methodologies for key predators . . .	E	DOC/ CKC										
15.3	Refine kiwi avoidance training for dogs and, if successful, apply elsewhere.	E	DOC / K4K										
16.1	Support research into the genetic distinctiveness of CBK.	H	DOC										
16.2	Support research into the loss of genetic diversity of CBK.	H	DOC										
16.3	To incorporate results of genetic research into planning and management of CBK	H	DOC										
17.1	Encourage regular call-count monitoring throughout Coromandel to monitor broad trends in kiwi populations.	E	DOC/ CKC										
17.2	Facilitate a workshop to train community kiwi practitioners in best practice kiwi monitoring methods.	H	DOC/ CKC										
17.3	Provide support to community projects so they can more accurately estimate population trends through analysis of	H	DOC/ CKC										

Action#	Action	Priority	Delivery	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	monitoring data.												
17.4	Support and assist with research into kiwi monitoring methods.	H	DOC										
17.5	Support and assist with research into kiwi ecology and behaviour.	H	DOC										
17.6	Establish a scholarship fund to do research on CBK.	M	CKC										
18.1	Support and assist research into risks and benefits of potential ecotourism opportunities for CBK	M	Tangata whenua/ CKC/ DOC										
18.2	Liaise with tangata whenua and stakeholders over potential ecotourism opportunities for CBK	M	CKC/ DOC										

Appendix 4: Potential corridors, linking areas of current kiwi management, to allow for the safe passage of kiwi (from 2009 draft).

1. Amodeo Bay area, linking southern boundary of Moehau Environment Group area with Papa Aroha Environment Group area.
2. Ernslaw One Ltd forests, linking Kennedy Bay with Kūaotunu Peninsula.
3. Connect new area at Manaia with Mahakirau Forest Estate
4. Manaia/Mahakirau to Thames Coast Kiwi Care area – all Forest Park
5. Thames Coast Kiwi Care area to Kapowai/Whenuakite – Forest Park plus significant areas of farmland and scrub.

Note: these are only suggestions and will require checking on the ground and collaboration with landowners and statutory authorities.

Levels of protection (each subsequent level assumes the previous)

Level 1: Maintain vegetation cover, exclude stock, seek a covenant if on private land.

Level 2: Campaign for Kiwi Avoidance Training for resident dogs.

Level 3: Undertake stoat/ferret control (e.g. trapping).

Level 4: Undertake habitat restoration through possum/rat control.

Level 5: Control rabbits (they attract mustelids).

Level 6: Where no other option exists and the population is small, translocate kiwi to provide additional genetic diversity.

Collaboration between landowners, community groups, DOC and local/regional councils will be required.

Appendix 5: “Strength in Diversity”

Statements from groups on how their work contributes to the overall protection of Coromandel brown kiwi.

Moehau Kiwi Sanctuary (DOC managed on private and public conservation land, northern tip of Coromandel Peninsula):

The Moehau Kiwi Sanctuary is one of five national kiwi sanctuaries established in 2000. The sanctuary covering over 16,000 ha of which 42 % is administered by the Department with the remaining land being privately owned. Landscape predator control is maintained in the sanctuary. The following objectives appear in the draft kiwi sanctuary strategy for 2015-2020 for Moehau.

- 1. The kiwi population within the sanctuary is maintained at 300+ breeding pairs through the intensive control of predators.*
- 2. A secure population is established of at least 40 founders from 50 individuals on Motutapu Island to act as a kōhanga kiwi.*
- 3. Effective trap auditing protocols have been developed and shared nationally with other trapping projects*

Waiaro Sanctuary

‘Waiaro Sanctuary promotes holistic conservation, the kaitiakitanga way.’

Moehau Environment Group

“Moehau Environment Group is a non-profit volunteer organization dedicated to the protection and enhancement of the natural environment of the Northern Coromandel Peninsula. Their mission is to create a ‘Pest Free Zone’ in 30,000ha to achieve a standard that would allow for the re-introduction and recovery of endangered species. The group is actively protecting resident Coromandel kiwi by undertaking mustelid trapping on nearly 9000ha as well as working to advocate for kiwi protection.”

Te Kauae o Maui Nature Reserve

“TKOM was formed to conserve in perpetuity the land owned by it and the indigenous flora and fauna living on that land.

To work intensively to lower the predator numbers and improve the habitat.

Discourage hunters to come onto the land and also educate them about kiwi avoidance training and appropriate times for hunting.

Conduct kiwi call surveys every winter

Harataunga Kiwi Project (Kennedy Bay)

“Ngati Porou ki Harataunga have a strong kaupapa for kiwi in our rohe which will endure through times of uncertainty. It is important that we maintain Harataunga as a safe place for kiwi to not only survive, but thrive, so that our mokopuna will see something of the way things used to be. It will also be an important passage for kiwi from the north as they disperse and connect with other kiwi in protected areas to the south. For now we can help to keep our kaupapa alive through our kura, by giving our tamariki the opportunity to learn about the kiwi they will one day help to protect.” Te Rūnanga Ngati Porou ki Hauraki

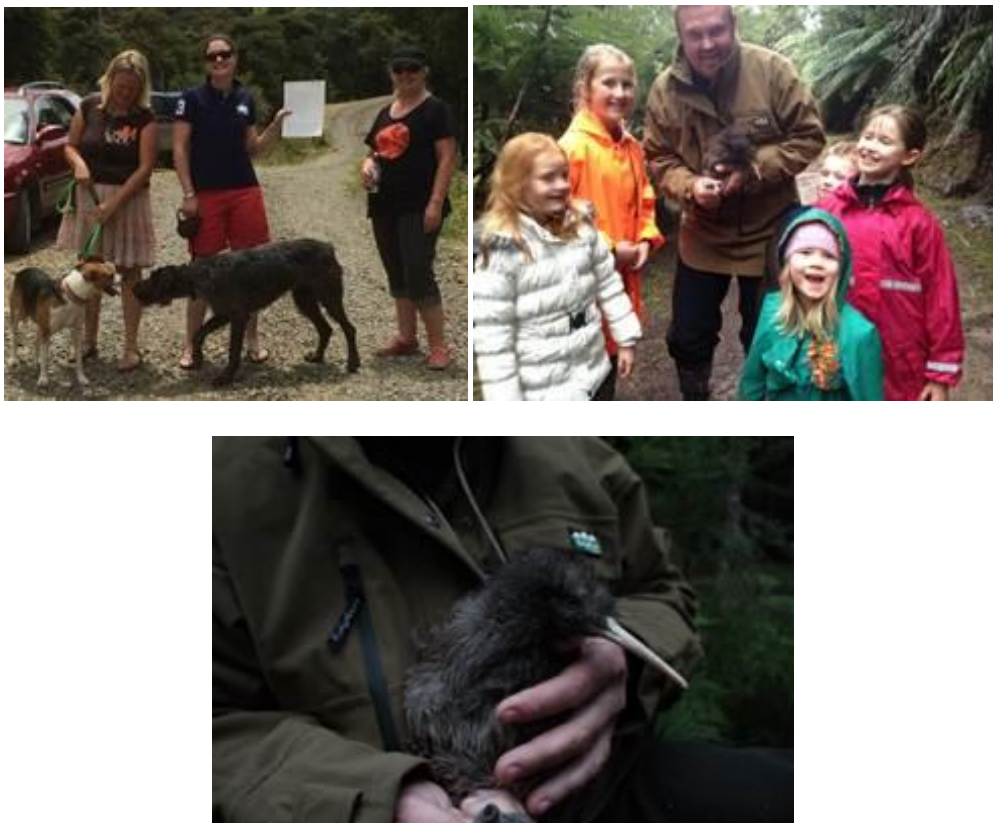
Habitat Tuatēawa (Landcare group, north of Kennedy Bay):

“Our two main objectives are to enhance the Tuatēawa sub-population of Coromandel brown kiwi and to generate support for kiwi conservation in whatever we do. Our area also serves as a safe corridor for kiwi dispersal between Moehau and the south.”

“Project Kiwi” – Kūaotunu Peninsula

Vision: “That the footprints of our taonga, the kiwi, will always be seen on the Kūaotunu Peninsula.”

The Project Kiwi Trust has been working hard at protecting and enhancing the kiwi population on the Kūaotunu Peninsula for 18 years. We are proud of what we have achieved to date as well as the continued energy and enthusiasm we have sustained as a group. The Trust currently uses a combination of pest and predator control and captive-rearing to achieve its primary objective. “



Ernslaw One Ltd Forests.

“We hope to show that, through our commitment to protecting New Zealand’s biodiversity, we can create an island of intensive predator control within an active production forest which will provide a safe haven for kiwi to thrive and increase. This will also act as a safe corridor where kiwi can move through between other managed areas as well as providing benefits to other indigenous species.”

Mahakirau Forest Estate (covenanted conservation subdivision, 309 Rd):

"We would like to be seen as a flagship development illustrating how private land with housing can be an effective conservation tool with people and kiwi living side by side. One of our objectives is to strengthen relations with TCDC and EW and transfer our knowledge on private bush subdivisions. We have a goal of overall ecosystem health and within that would like to see kiwi at carrying capacity in our area so that surplus can disperse to surrounding land".



Kapowai Kiwi Group Inc. (Kapowai, Parakau and part of Whenuakite valley)

"We at Kapowai are helping to create a predator free habitat conducive to the successful breeding and population growth of kiwi and all native flora and fauna, as a legacy for the future generations. Since our inception our dream has been to expand our area to bring us contiguous with the Whenuakite group. We achieved this in 2008 and now we look forward to these blocks becoming an ecological unit with movement of juveniles between them."

Whenuakite Kiwi Care Group (north of Tairua)

"To protect kiwi and their habitat in the Whenuakite and surrounding areas which is the southernmost population of Coromandel kiwi on the east coast. We have a 'no handling policy', an uncompromising dog control policy and utilise aerial 1080 when required. We employ an independent contractor to do a full Kiwi Call Survey every 5 years and trap all year using a variety of traps. Our success is due to committed landowners and dedicated volunteers."

Thames Coast Kiwi Care

"Thames Coast Kiwi Care's local focus is "protecting and enhancing kiwi populations on the Thames Coast" by creating safe havens for kiwi and at the same time building a sense of purpose within the community.

We are achieving this through mustelid control to protect kiwi chicks. The hope is to grow the existing population so that the community will experience increasing auditory encounters of kiwi. Whilst the group actively advocate for kiwi we hope personal encounters will raise awareness for our taonga and engender the will to protect and advocate for them.

Our wider vision is to add to the kiwi protection on the Coromandel Peninsula and contribute to Coromandel brown kiwi being part of the Peninsula's identity. Eventually, we hope that through the safe havens that have been created that kiwi populations will thrive and be able to move across the Peninsula and naturally increase the gene-pool."



Appendix 6: Research Papers from the Moehau Kiwi Sanctuary

Davies. 2007. The roosting habits of Coromandel North Island brown kiwi (*Apteryx mantelli*) in relation to growth, on the Coromandel Peninsula, North Island, New Zealand (Moehau Kiwi Sanctuary).

de Monchy, P. and Forbes, Y. 2006: Moehau Kiwi Sanctuary: the first five years. Unpublished report for Department of Conservation, Hauraki Area.

de Monchy, P., Forbes, Y., Goomes, R., Herbert, T., Mc Cauley N., Prince D. 2008. Moehau Kiwi Sanctuary Project Overview 2000-2008. Unpublished report (DOC DM-342487) for the Department of Conservation, Hauraki Area.

Edwards, H. 2008: Does suppression of Ship Rats (*Rattus rattus*) affect body weight in breeding adult male North Island Brown Kiwi (*Apteryx mantelli*)? A thesis submitted in fulfilment of the requirements for the degree of Masters in Zoology. University of Glasgow

Forbes. 2005. A review of dispersal in birds, with particular reference to kiwi.

Forbes. 2006. A review of the influence of biological and physical factors and human disturbance on the mortality of birds, with particular reference to kiwi.

Forbes, 2008 Dispersal and Mortality of North Island brown kiwi (*Apteryx australis mantelli*) at the Moehau Kiwi Sanctuary, Coromandel 2000-2008.

Forbes, Y. 2009: Natal dispersal, habitat selection and mortality of North Island Brown Kiwi (*Apteryx mantelli*) at the Moehau Kiwi Sanctuary, Coromandel. A thesis submitted in partial fulfilment of the requirements for a Master of Applied Science Environmental Studies, Auckland University of Technology.

Murdoch, F. 2008. Capture frequency of stoats (*Mustela erminea*), weasels (*Mustela nivalis*), rats (*Rattus spp.*) and European hedgehogs (*Erinaceus europaeus occidentalis*) against micro-habitat factors in the northern Coromandel, New Zealand

Raemakers, T. and P. de Monchy 2007: Does suppression of ship rats (*Rattus rattus*) affect chick growth in North Island brown kiwi (*Apteryx mantelli*)?

Stewart, P. 2010. The response of kiwi to predator control and advocacy, Moehau 2000 – 2009 Unpublished report for the Department of Conservation, Thames.

Stewart, P. 2013. Moehau Kiwi Sanctuary Call Count Survey, 2013. Unpublished Report for the Department of Conservation.

Swan. 2004. Attributes of Death Sites for Brown Kiwi in the Moehau Kiwi Sanctuary, (2000-2004).