Kiwi Coast Kiwi Listening Blitz 2016

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Summary

The Kiwi Coast is a collaborative initiative that supports and links over 60 community-, agency- and iwi-led projects in eastern Northland to create New Zealand's first modern-day kiwi corridor.

Approximately 75,000 ha is collectively managed for pest control by the projects involved in the Kiwi Coast. This area continues to grow as new projects start, existing trapping areas expand and more communities get involved. It is expected that as pest control continues, and dog control improves, kiwi populations in eastern Northland will continue the slow and steady increase identified by Topia and Gardiner (2014), with resulting expansions in kiwi distribution.

Topia (2014) identified kiwi calls as the key means of measuring changes in kiwi distribution, and recommended that every five years the Kiwi Coast carry out a 'Kiwi Listening Blitz' to complement existing kiwi monitoring undertaken in Northland.

The '2016 Kiwi Listening Blitz' was the first to be undertaken by the Kiwi Coast. Forty-eight sites across the Kiwi Coast were surveyed for kiwi using passive acoustic recording devices (kiwi listening devices; KLDs). Kiwi calls were detected at 31of the 48 sites (~65%).

In conjunction with data from the Annual Northland Kiwi Call Count Survey and DOC maps of known high kiwi density areas, the 2016 Kiwi Listening Blitz provides a baseline of current kiwi distribution across the Kiwi Coast. This establishes a key outcome monitoring tool for the Kiwi Coast. In time, this monitoring may show changes in kiwi distribution as populations expand and return to areas where they have currently diminished to undetectable densities.

Introduction

The North Island Brown Kiwi (*Apteryx mantelli*; Figure 1) has a threatened species status of Nationally Vulnerable (Robertson et al. 2012) due to ongoing population declines. However, in eastern Northland, many managed populations of kiwi are stable or increasing. This is primarily due to sustained predator control, community engagement, and improved dog control that is being conducted by community groups in conjunction with government agencies, other organisations, and private landowners (Kiwi Coast 2013).

With increasing populations, juvenile kiwi are beginning to disperse out of areas with predator control and into areas where their survival is challenged. As a result, the need for landscape-scale conservation has been recognised, and the opportunity to create New Zealand's first kiwi corridor has arisen.

Figure 1: A North Island Brown Kiwi, the flagship species for the Kiwi Coast, Northland. Photo by Puketotara Landcare

The Kiwi Coast links community, agency, iwi and hapu led kiwi recovery projects in eastern Northland to create a kiwi corridor stretching 175 km in length from Bream Head in the south to Hihi in the north (Topia 2014). Within this corridor, a collective area of approximately 75,000 ha is actively controlled for predators by more than 60 projects, creating a mosaic of areas that are protected by conservation groups and areas that are still unprotected.

As the Kiwi Coast initiative grows, there is a need to monitor kiwi numbers and distribution within the kiwi corridor, to document the effects that conservation efforts (primarily predator trapping and improved dog control) are having on kiwi populations.

The aim of this survey was to sample current kiwi presence and absence across the Kiwi Coast where:

(a) kiwi were not known to be present at high densities (http://www.doc.govt.nz/northlandbrownkiwi); and/or

(b) there was no existing annual monitoring by human listeners.

This was the first survey, which will be repeated every five years to determine changes in kiwi distribution as a monitoring tool for the Kiwi Coast. Dispersal (i.e. new areas of kiwi presence) is a key outcome for the Kiwi Coast as it seeks to build and link kiwi populations through a functioning kiwi corridor across eastern Northland.

Methods

Survey Sites

The survey area of interest in eastern Northland was defined to exclude monitored (annual kiwi listening performed by human listeners) areas, and areas defined by the Department of Conservation (DOC) as having high kiwi density (http://www.doc.govt.nz/northlandbrownkiwi).

The survey was conducted using kiwi listening devices (KLDs), which are passive acoustic recording devices. The number and placement of KLDs was decided by a number of factors. In the first instance, a density of approximately three KLDs per 10 km^2 was decided upon. This was to ensure reasonable coverage of the area of interest within logistical constraints. KLDs were placed at least 2 km apart to prevent overlapping survey areas of individual KLDs, as the theoretical range of a KLD is approximately 800 m radius. Other factors that determined the placement of KLDs included accessibility (public land, or permission obtained from private landowners), and the availability of potentially suitable habitat.

Areas that were not surveyed included built-up areas, areas with no apparently suitable habitat (i.e. “heavily grazed” farmland), and four areas of private land for which we were not able to secure access permission (land near Kawiti Caves, Ngawha Springs, Paikauri, and Waikare).

Survey Methods

Surveys were conducted in a manner consistent with previous surveys undertaken in Northland using KLDs. This method reliably detects kiwi when they are present (P. Graham, Northland Regional Council, personal communication).

Surveys were completed between December 2015 (two surveys only) and April 2016. KLDs were deployed in the field for five consecutive fine nights. If the weather forecast predicted steady rain for a night, the KLD was left in place for an extra night to achieve five nights with fine weather. Each night consisted of six hours of recording time, beginning at dark (approximately 30–45 minutes after sunset). The period around each full moon was avoided; thus, KLDs were set out between the third quarter and first quarter moon phases.

Each KLD was affixed to a narrow tree using a bungee cord, approximately ear height off the ground, and on a high point on the landscape (Figure 2). To avoid wind noise, KLDs generally were not placed directly on the highest point, but were set slightly off the peak or ridge. Often, the listening area of interest (potentially suitable habitat) was predominantly on one side of a ridge or high point, and only one KLD needed to be deployed to cover the survey area of interest. In cases where the potentially suitable habitat surrounded the high point or ridge, two KLDs were used at the site, placed on opposing sides (e.g., east and west) of the high point. KLDs were set to sample only low frequencies (≤4 kHz).

Figure 2. A kiwi listening device (KLD) affixed to a tree using a bungee cord.

Data Analysis

Software programs Freebird and Raven Lite were used to analyse the recordings from the KLDs. Recordings were viewed as spectrograms. The number and type (male, female, or duet) of kiwi calls were recorded for each site. At sites where KLDs were deployed for more than 5 nights due to weather, all nights (hours) of recording were analysed, because it was found that kiwi sometimes called even on nights with steady rain. Therefore, due to slightly different survey lengths (30 hours to 42 hours), we analysed calls per night and calls per hour for comparability among sites.

Kiwi are described as being “detected” or “not detected” at sites, rather than as being “present” or “absent” from sites, to allow for the possibility that no calls may have been recorded during a survey despite kiwi presence. Results are presented as mean ± SD.

Results

Forty-eight sites were surveyed using KLDs. Kiwi calls were detected at 31 of the 48 sites (~65%) (Figure 3, Table 1). The number of kiwi calls detected ranged from 0 to 100 per site. This equated to 0.00–16.67 calls per night, or 0.00–2.83 calls per hour. The total number of calls detected was 886. Across all sites, the mean number of calls was 18.46 ± 23.77, the mean number of calls per night was 3.40 ± 4.40, and the mean number of calls per hour was 0.57 ± 0.73 (Table 1). As shown by the fact that the standard deviations are larger than the means, there was great variability in the number of calls detected per site.

Table 1. Number of kiwi calls detected, calls per night, and calls per hour, for 48 sites surveyed using passive acoustic recording devices (kiwi listening devices; KLDs) within the Kiwi Coast, Northland, December 2015–April 2016. Sites are ordered approximately north and west to south and east.

Area	GPS site name	Calls per site	Calls per night	Calls per hour
Paikauri	PAIKAURI	74	14.80	2.47
Taupo Bay	GRAVATT	40	8.00	1.33
Totara North	SALVATION	70	14.00	2.33
Totara North	RANFURLY	37	6.17	1.03
Whangaroa	WHANGAROA	2	0.40	0.07
Matangirau	RUSH	2	0.33	0.06
Taratara	TARA	0	0.00	0.00
Otangaroa	OTANGAROA	60	12.00	2.00
Whangaroa	BENNETT	49	9.80	1.63
Taratara	TARATARA	32	6.40	1.07
Kaeo	TE HUIA	19	3.80	0.63
Pupuke	TAKAKURI	19	3.80	0.63
Orotere	TARAIRE	6	1.00	0.17
Kaeo	TOPP	34	6.80	1.13
Pupuke	COPPERMINE	3	0.60	0.10
Takou Bay	TAKOU	22	3.67	0.61
Otangaroa	TE RANGA	29	5.80	0.97
Waiare	WAIARE	43	7.17	1.19
Pungaere	PUNGAERE	0	0.00	0.00
Puketona	QUARRY	5	0.83	0.14
Otao–Opua	OPUA	17	2.83	0.47
Ngaiotonga	NGAIO	47	7.83	1.31
Whangaruru	PAPAKAURI	0	0.00	0.00
Whangae	WHANGAE	3	0.50	0.08
Karetu	WAIKINO	10	2.00	0.33

Table 1. (Continued).

Area	GSP site name	Calls per site	Calls per night	Calls per hour
Kaikohe	RESERVOIR	42	6.00	1.00
Moerewa	MOEREWA	0	0.00	0.00
Karetu–Waikare	WAIKARE	0	0.00	0.00
Pakaraka	JACK	0	0.00	0.00
Punaruku	PUNARUKU	0	0.00	0.00
Karetu	PAKARU	12	2.00	0.33
Kaikohe	CUMBER TRIG	0	0.00	0.00
Tapuhi	NELSON RD	0	0.00	0.00
Tapuhi	WAIOTU	0	0.00	0.00
Ruapekapeka	RUAPEKA	15	2.50	0.42
Tapuhi	TAHIWI	0	0.00	0.00
Tapuhi	MINE UPPER	0	0.00	0.00
Pokapu	POKAPU	0	0.00	0.00
Motatau	MOTATAU	0	0.00	0.00
Maromaku	TOWAI	0	0.00	0.00
Kaiikanui	KAIIKANUI	100	16.67	2.78
Motatau	WETLAND	0	0.00	0.00
Tapuhi	MINE RD	5	0.83	0.14
Kaimamaku	KAIMAMAKU	35	5.83	0.97
Whananaki	HAILES	20	4.00	0.67
Otonga	OTONGA	0	0.00	0.00
Marua–Whananaki South	WAIPIPI	2	0.40	0.07
Hikurangi	GOMEZ	32	6.40	1.07
MEAN ± SD		**13.43 ± 15.36**	**2.50 ± 2.84**	**0.42 ± 0.47**

Kiwi calls were detected throughout the Kiwi Coast survey area. There was no obvious pattern of kiwi presence in relation to habitat or existing predator control efforts.

No sites surveyed in the Kiwi Coast kiwi corridor detected kiwi calling at rates ≥5 calls per hour (an indication of high kiwi density; http://www.doc.govt.nz/northlandbrownkiwi). This was not unexpected, as all survey sites were within zones indicated by previous DOC surveys to be low density kiwi calling areas.

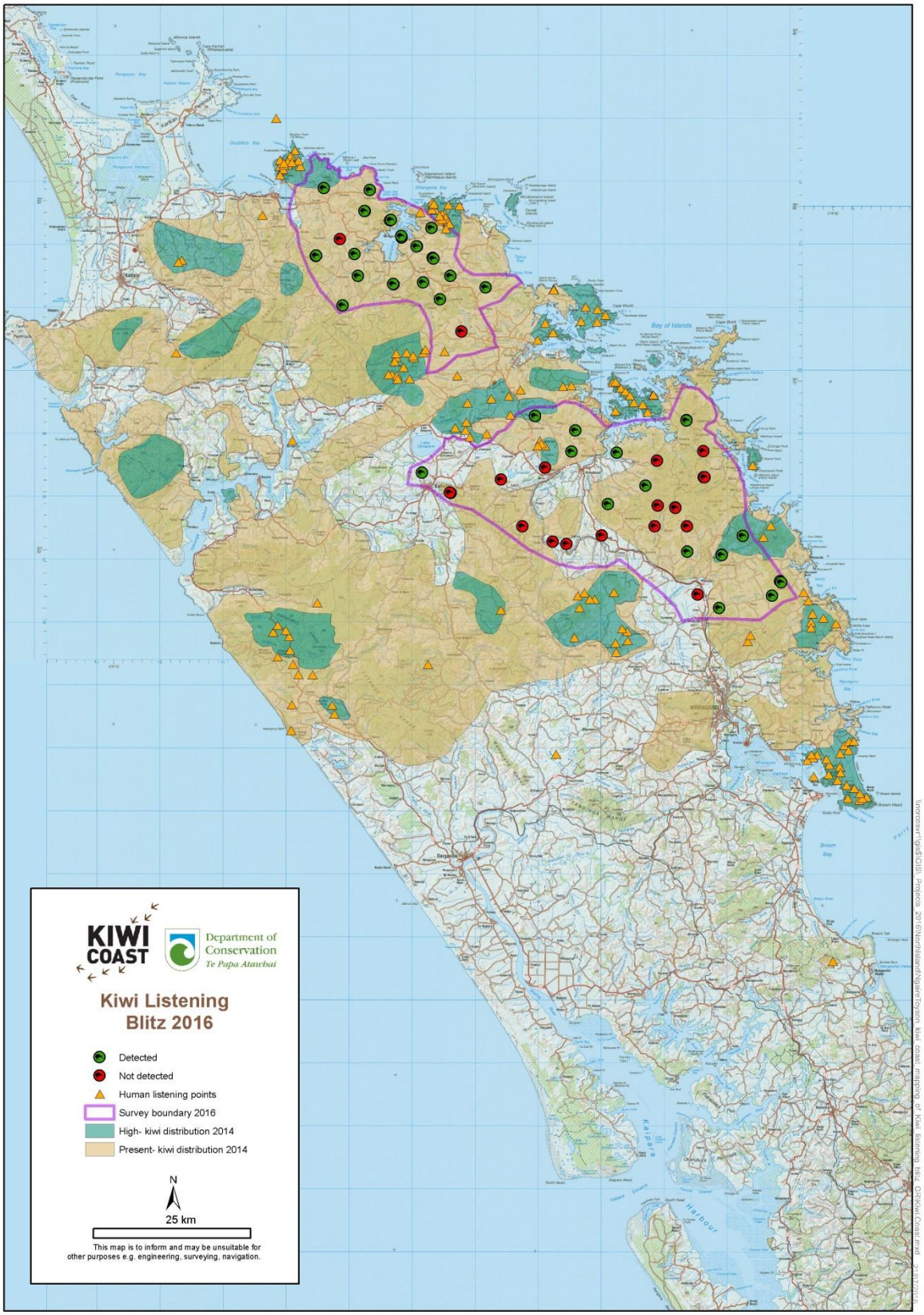

Figure 3. Map of Kiwi Coast 2016 Kiwi Listening Blitz survey sites at which kiwi were detected vs. not detected by passive acoustic recorders (kiwi listening devices; KLDs), in conjunction with existing human listening kiwi sites and areas of high and low kiwi concentrations in Northland (as determined by the Department of Conservation: http://www.doc.govt.nz/northlandbrownkiwi).

Discussion and Recommendations

In conjunction with data from the Annual Northland Kiwi Call Count Survey and DOC maps of known high kiwi density areas, the 2016 Kiwi Listening Blitz provides a baseline of current kiwi distribution across the Kiwi Coast. This establishes a key outcome monitoring tool for the Kiwi Coast. Upon five-yearly repetition, the data may show changes in kiwi distribution as kiwi populations expand and kiwi return to areas where they have currently diminished to undetectable densities.

Interestingly, seven of the sites at which kiwi were not detected were within or on the edge of Russell Forest, and kiwi were detected at only two Russell Forest sites (one within and one bordering the forest). This was contrary to expectations for such a large block of apparently suitable native bush habitat. Potentially, a critical factor needed to support kiwi populations is missing from the forest (e.g., soil type, prey availability). However, given that kiwi were present in Russell Forest in the past (e.g., Miller and Pierce 1995), the lack of detections in this survey suggests that predator control operations are required in Russell Forest if kiwi are to persist in this forest block.

Kiwi were not detected at high calling rates at any of the survey sites. Therefore, continued monitoring of these sites should initially continue to employ KLDs rather than human listeners. In part, this is because human listening methodology (which covers fewer total survey hours per site) is less likely to document kiwi when they are at such low calling rates, and in part this is to avoid human listeners losing interest in surveying these sites due to a lack of detections. Until such time as updated Best Practice documents are produced for the use of KLDs for kiwi surveys, monitoring with KLDs should continue to employ the same survey methods as described herein (and as have previously been used in Northland; P. Graham, Northland Regional Council, personal communication), so that past and future surveys will be comparable.

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