

# Conservation translocations and their influence on song diversity in the North Island saddleback / tīeke (*Philesturnus rufusater*)<sup>1</sup> Kyle Sutherland<sup>1</sup>, Michelle Roper<sup>1</sup>, Kevin Parker<sup>2</sup> & Dianne Brunton<sup>1</sup>

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## Project Overview:

In the spring of 2019, fieldwork was conducted on three separate populations of North Island saddleback / tīeke (*Philesturnus rufusater*) to answer three separate questions aimed at understanding the role cultural evolution in shaping song dialect patterns of the species. This research is the focus of a Masterate of Science thesis undertaken at Massey University in the School of Natural and Computational Sciences.

The three questions in mind were:

1. Does cultural complexity increase when saddleback sourced from three different, culturally divergent populations were simultaneously reintroduced to an area to form a new population?
2. Have song types changed over one decade?
3. Can song types change over a single generation?

To answer these questions, we collected high quality digital song recordings from tīeke at the field sites and analysed these recordings with specialist bioacoustics analysis software<sup>1</sup>. The success of this field season was fundamentally due to the Projects Assistance Fund provided by Birds New Zealand which allowed us to acquire the necessary equipment.

### 1. Tāwharanui – *multiple sourced translocations*

The population of tīeke at Tāwharanui Regional Park were negatively impacted by recent incursions of invasive mammalian predators. Cats, rats, possums and stoats dramatically decreased the tīeke population that was established here in 2012. Tīeke are poor flyers and are known to be highly susceptible to predation by invasive predators. In December 2017, the population of tīeke at Tāwharanui was approximately 300 individuals. This reduced to approximately 75 individuals by September 2019 – less than the original number of 90 individuals used to establish the population. This demonstrates the importance of continuous trapping and removal of pests and serves as a reminder of how quickly an endemic population of birds can become vulnerable due to a few exotic species. We expect the decline in individuals to directly influence the cultural complexity of the population, as the birds at Tāwharanui have essentially experienced a ‘bottleneck’ event. The population appears to have consolidated to the inner area of the regional park, and the decline in numbers seems to have levelled off. Prior to the population decline, our prediction was that there would be more cultural complexity at Tāwharanui when compared to other populations of similar age, given the unique conservation strategies employed to establish the population – thus maximising both cultural and genetic diversity through multiple source populations. However, given the bottleneck, we now predict diminished cultural complexity. Once predators have been effectively controlled, it is likely that a full recovery of the population will occur. The data collected as a part of my study will provide a baseline for future work on song dialects and for understanding how rapidly song cultures evolve in tīeke. An exciting side-note was that during the field season we were able to video capture a saddleback actively hunting, killing and eating a mouse! The first recorded event of this behaviour can be seen at:

<https://www.youtube.com/watch?v=LHzyevQmBGk>

## 2. Motuihe – a decade after establishment

After 10 years the population of tīeke at Motuihe are flourishing, with an estimated number of individuals exceeding 300 on the island. This is largely due to the replanting effort conducted by the Motuihe Trust and its hardworking, dedicated volunteers. The vegetation cover has significantly changed; with paddocks being replanted they are now mixed forests – suitable saddleback habitat. Consequently, due to high population growth at this site, we predict current cultural diversity to be significantly higher than immediately after translocation. Recordings from the two time periods will be compared, and an initial review of recordings has found that older song types still persist within the population, but many “new” songs have formed on the island as well. This is likely due to cultural mutation and song learning errors over the last 10 years, coupled by more available habitat and a growing population.

## 3. Shakespear – song changes within one generation

Song data was successfully collected at Shakespear Regional Park. The success of this fieldwork was in part thanks to the help and cooperation by Tāmaki Leadership Centre Manager CPO J.D. Harrison and Shakespear Regional Park’s head ranger Bruce Harrison and staff. All tīeke in the park were identified and mapped, and a majority of male tīeke’s song repertoires were recorded. It should be noted that three pairs of saddleback set their territories within the three active firing ranges on the military land. Consequently, their songs were not fully recorded. There was a mix of mature and first year tīeke throughout the park on territory, though interestingly the tīeke from Tāwharanui seemed to have segregated themselves and were all found with territories together on the east side of the park, whereas a majority of the birds from Tiritiri Matangi were found grouped to the west. Preliminary analysis indicate that song sharing among tīeke can be predicted by the repertoires of neighbouring territories, but one cannot use physical distance to predict spectral similarities in song within the population. This latter finding may be due to the relatively small size (2km<sup>2</sup>) and interconnectedness of the park; spectral variables are seen to be quite different between populations of tīeke<sup>2</sup>, but perhaps not from within populations.

### Project Completion:

This project hit several unpredictable hurdles including COVID-19. This has delayed the completion of the thesis which is now scheduled for December 2020. All fieldwork was completed earlier in the year and currently the statistical analysis and writing is underway and on track to meet this new deadline.

1: <https://koe.io.ac.nz/>

2: Parker K.A., Anderson M.J., Jenkins P.F. and Brunton D.H. (2012). The effects of translocation-induced isolation and fragmentation on the cultural evolution of bird song. *Ecology Letters*. 15: 778–785.