# David Medway Scholarship – Summary Report

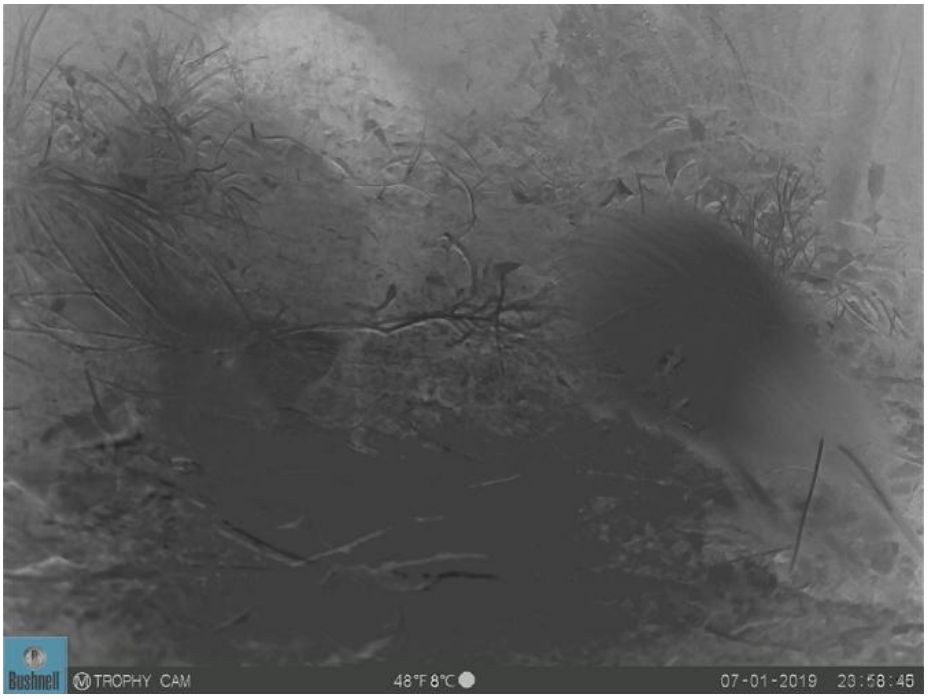
## An investigation into camera traps as a tool for monitoring kiwi (Jane Tansell)


Kiwi (Apteryx spp.) are one of New Zealand's national taonga/taoka (treasures) that are our responsibility and privilege to protect. To inform protective management, we need to monitor kiwi population responses to management, for which a non-invasive method that can detect all age classes has previously been lacking. Camera traps are non-invasive monitoring devices, which are increasingly used with recently developed analyses to monitor cryptic terrestrial species around the world. To facilitate the application of these methods to kiwi, we explored the method with benchmarking against existing kiwi monitoring methods.

We deployed 34 camera traps over three years in Orokonui Ecosanctuary, as well as 29 acoustic recorders. We also carried out detector dog surveys to compare the number of juveniles detected. We deployed 17 camera traps in Rotokare Scenic Reserve and 18 camera traps in the Cape Sanctuary to examine their effectiveness in higher kiwi density areas.

We constructed a stereo camera by chaining two off-the-shelf trail cameras together to trigger from one PIR sensor and briefly trialled the stereo camera at Orokonui. The stereo camera method using two trail cameras was capable of giving surprisingly accurate bill measurements, but further work in necessary to achieve repeatability. This stereo-camera trial is being prepared for journal submission and we plan further articles on other aspects of the systematic camera trapping work.

We were able to obtain credible population densities and trends. Kiwi detections can be maximised by using a detector dog team to select camera sites and through camera orientation. It is not necessary to use lures to increase detections. Realistic population estimates were obtained using spatial presence-absence (SPA) analysis with an optimal survey length of four months, during peak incubation. Cameras and acoustic recorders gave similar (and realistic) population estimates using SPA. Camera traps and detector dog surveys found a similar number of juvenile kiwi. Estimates obtained using Royle-Nichols analysis likely underestimated populations but correctly indicated population trend direction and magnitude, while the index-manipulation-index method did not give a biologically accurate estimate of population density.




Composite of three kiwi images overlaid with adjusted opacity to determine relative size; from behind to front images are positive, negative, negative and clearly show female (left, positive), male/sub-adult (left, negative), juvenile (right, negative). The juvenile is mid-step moving forward, but one leg remains at the same distance from the camera as the other birds.

Systematic camera trapping is capable of monitoring the whole kiwi population, including female and young kiwi that are usually under-recorded by other methods. Systematic camera trapping paired with spatial presence-absence analysis performed well in the low density population at Orokonui Ecosanctuary. Camera monitoring shows much promise as another useful noninvasive tool in the kiwi monitoring toolbox. We are grateful to Birds NZ and the David Medway Scholarship for funding assistance to carry out this phd work through Lincoln University.