

Leveraging genomics for distribution and fitness monitoring of kākāpō and takahē

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The kākāpō (*Strigops habroptilus*) and takahē (*Porphyrio hochstetteri*) are critically endangered flightless bird species endemic to New Zealand that have become central to the development of national institutional and societal conservation consciousness. Given that the current habitat of both species is limited to managed predator-free territories that have nearly reached capacity, the expansion of kākāpō and takahē to their original habitat will require detailed monitoring of their population development, reproduction success, and resilience to thus far circumvented threats such as predation and anthropogenic impact. Together with the Kākāpō/Takahē Recovery Teams and Ngāi Tahu, we will leverage environmental DNA (eDNA) monitoring as a cost-efficient, non-invasive and scalable approach that will lead to real-time insights into both, distribution and genetic diversity of the two species.

eDNA monitoring is a powerful approach to determine the presence of a species due to detection of its DNA in environmental samples such as water, soil or faeces. To benchmark the sensitivity of this approach for kākāpō and takahē detection, we collected soil samples at various distances from kākāpō hotspots on Whenua Hou last year and are going to collect takahē-associated environmental samples this summer. We will additionally probe different genomic approaches to obtain whole-genome information from these samples, which can give us insights into the genetic diversity and therefore fitness of these populations.

We thank Birds NZ for providing us with a generous research grant that has allowed us to initiate eDNA monitoring of kākāpō and takahē.

