

Portable sequencing in aid of fast genetics-based conservation decision making

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Kākāpō (*Strigops habroptilus*) are charismatic, nocturnal and flightless parrots, which have captivated the attention of many. Unfortunately, they reached a population low of just 51 individuals as a result of predation and habitat loss, and are now subject to intensive management to help them to recover. As part of this work, the Kākāpō Recovery Programme use information about the sex and parentage of every chick. This helps them manage kākāpō genetic diversity, by translocating certain birds to different islands, or giving a little extra help to genetically valuable or under-represented birds. It also helps them monitor how well each chick is doing and prioritize use of resources such as veterinary care. Therefore, getting this sex and parentage information as quickly as possible is invaluable to inform the many important decisions that need to be made in the first few weeks following the hatch of a kākāpō chick.

Unfortunately, the lab protocols and equipment required for standard genetic sex and parentage tests mean that they can't currently be done in the field. Instead, samples have to be transferred from the offshore islands to a lab, meaning that return of results is slow and they can't be used for management decisions during the kākāpō breeding season. However, new Oxford Nanopore portable sequencing technology has the potential to change this by allowing rapid genetic testing in the field.

With the generous help of the Birds New Zealand Research Fund, we are in the process of developing a fast, field deployable test to provide genetic information to on-the-ground conservation staff. We aim to trial and streamline a DNA extraction to sequencing protocol using nanopore technology, which could be implemented on-site as samples (e.g. egg membrane) come in from newly hatched kākāpō. We



Photo: Andrew Digby

will first test this for birds with known sex and parentage. Once the protocol is refined, we will use it for genetic sex and parentage testing of newly hatched chicks during the kākāpō breeding season which is anticipated to occur in the coming summer and autumn. We hope that this new approach will allow the Kākāpō Recovery Programme to rapidly obtain the information they need to make the best possible population management decisions.