

Monitoring kororā/little blue penguin (*Eudyptula minor*) populations on the Banks Peninsula using a portable MinION sequencing device

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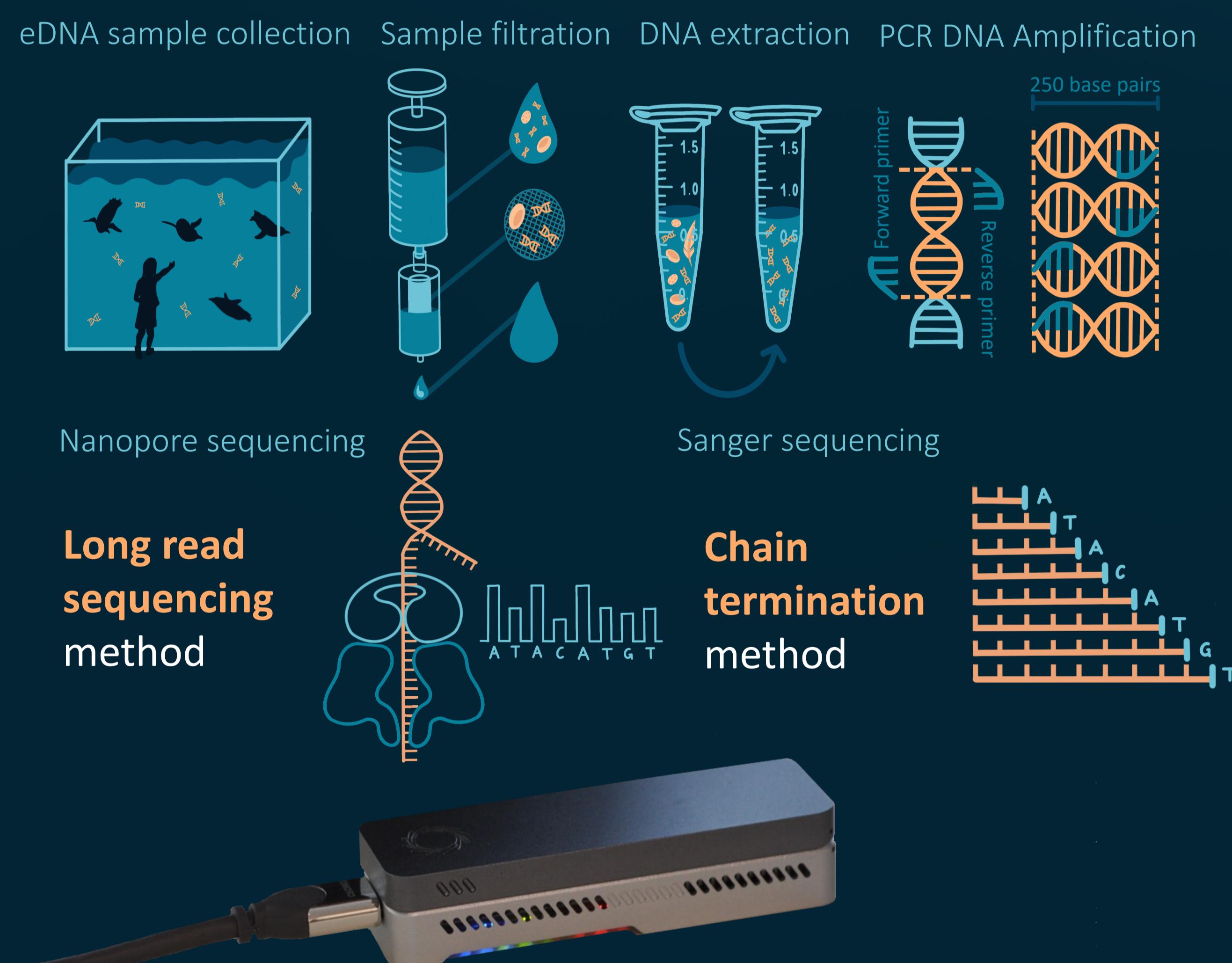
Introduction

"He kororā, he tohu oranga"
"the kororā is the sign of life."

- In Aotearoa Kororā are a **conservation dependent taonga** species.
- Canterbury is home to the unique white flippered morphotype; previously *Eudyptula minor albosignata*.
- Monitoring kororā populations can be time and labour intensive, and genetic methods are invasive.
- Using Environmental DNA**; DNA extracted from environmental samples e.g. water, is a **non-invasive method** for genetic monitoring that should be considered for assessing kororā population decline

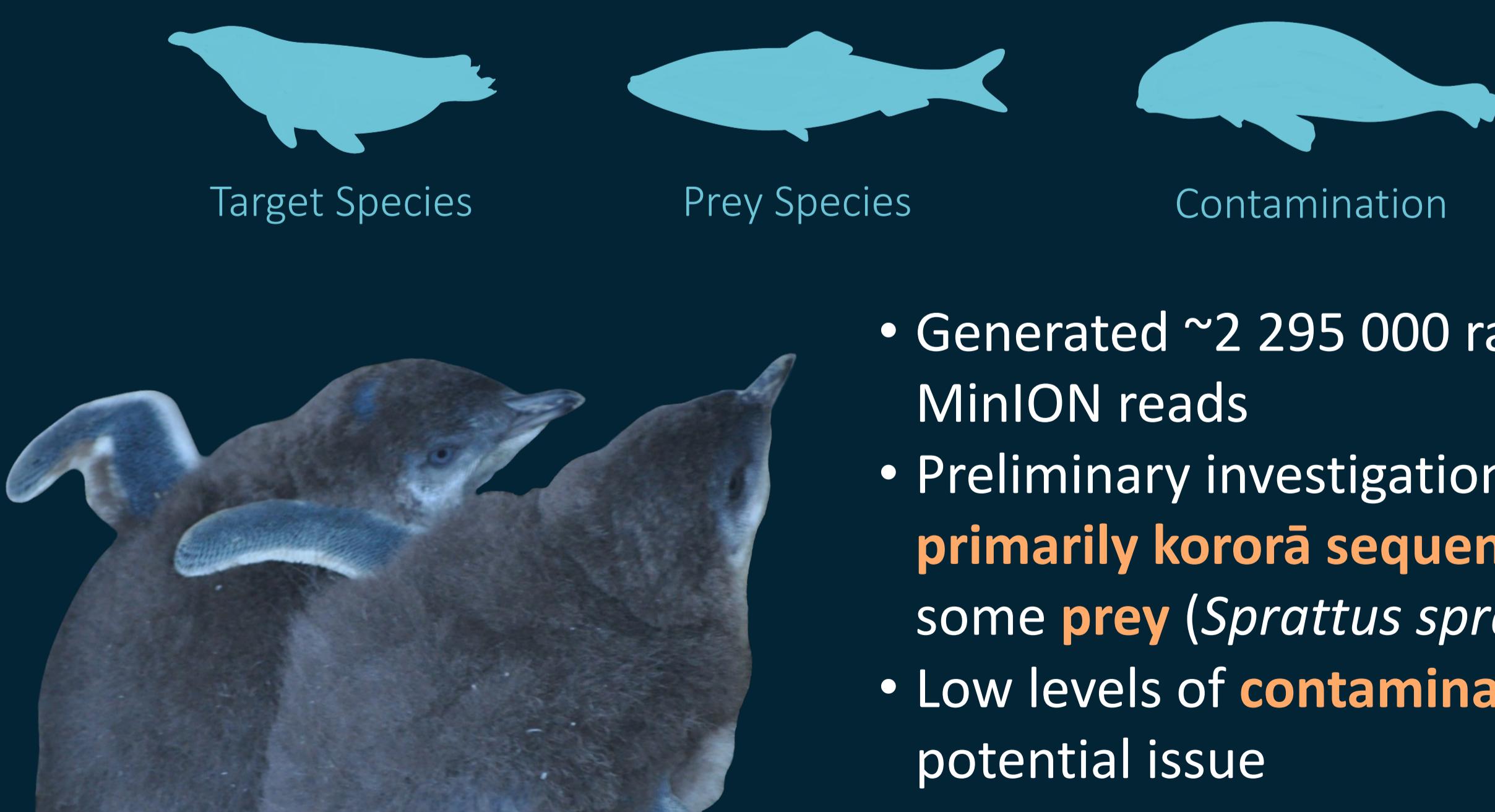
Can we use non-invasive genetic methods to monitor kororā populations in-situ?

Methods

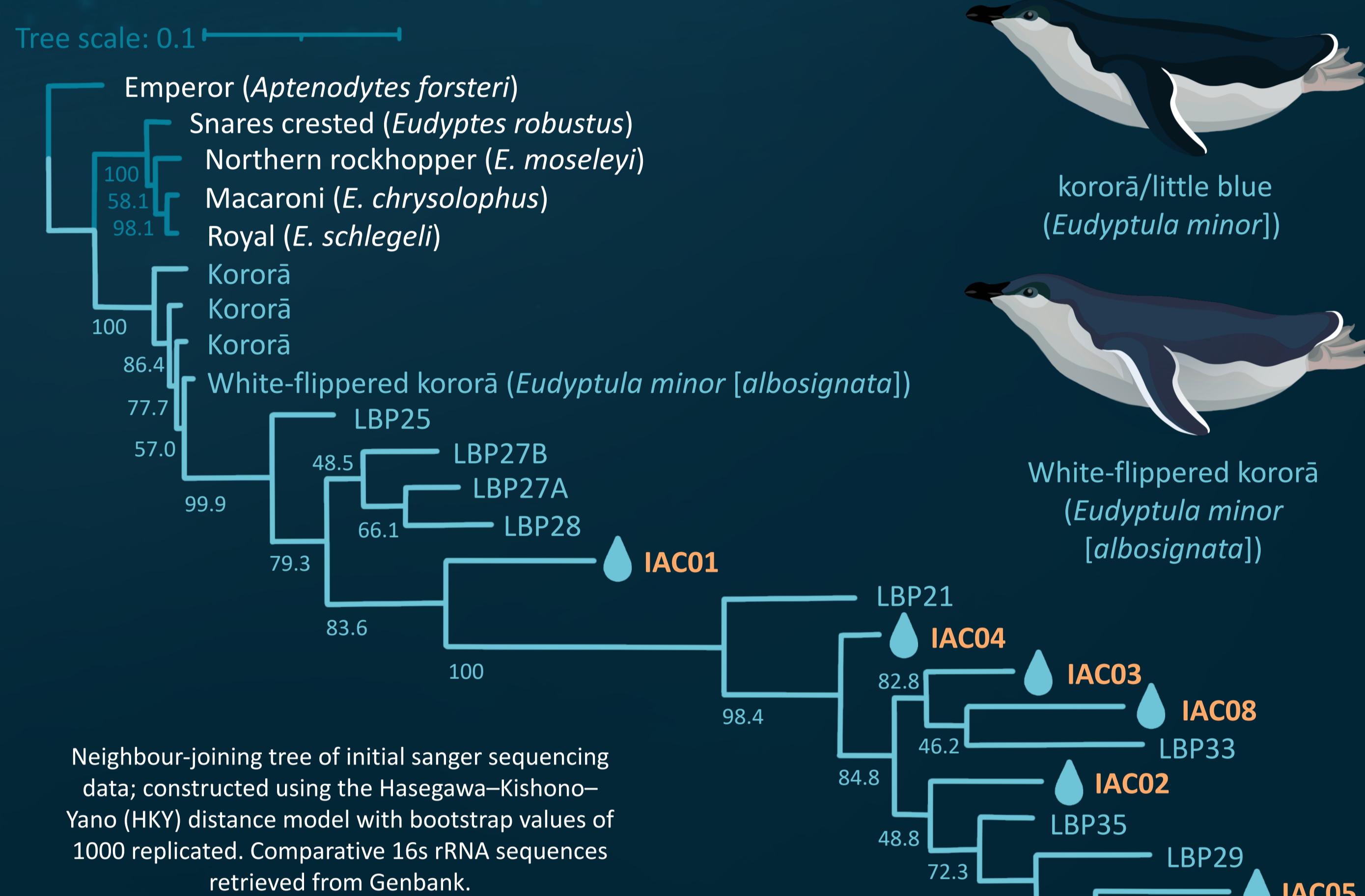


Results

Initial successful **single species detection** of kororā using eDNA and portable sequencing technology.



- Generated ~2 295 000 raw MinION reads
- Preliminary investigation= **primarily kororā sequences**, some **prey** (*Sprattus sprattus*)
- Low levels of **contamination** a potential issue



Neighbour-joining tree of initial Sanger sequencing data; constructed using the Hasegawa–Kishino–Yano (HKY) distance model with bootstrap values of 1000 replicated. Comparative 16s rRNA sequences retrieved from Genbank.

- Limited information in such a small region of DNA
- Sanger sequences identified as kororā displayed a large degree of divergence between sequences.
- Potential issues with degraded sequences

Future directions



Map of the Akaroa and Pohatu marine reserves (blue) and the nest boxes at Pohatu Penguins (orange).



White flippered kororā and chicks in a nest box at Pohatu Penguins, Pohatu/Flea Bay, Banks Peninsula; feather and faecal samples will be collected from nest boxes. Image: L. Howell

Captive kororā were detected in tank water; further work is needed to investigate individual differences

- Looking beyond single species detection; considering nanopore sequencing for **population genetics**, detecting individual variation.
- Utilise these molecular tools to investigating **factors influencing the decline in the kororā** colony at Pohatu/Flea bay using **non-invasive genetic samples** such as faeces, feathers and water.
- Developing methods for **community collaboration**, engaging with Mana Whenua, local tourist industry and the general public.

