

Public eDNA databases provide insights into biodiversity dynamics: Exotic species and Indigenous perspectives

Starsha Bird, Shaun Wilkinson, Ang McGaughran



Biodiversity

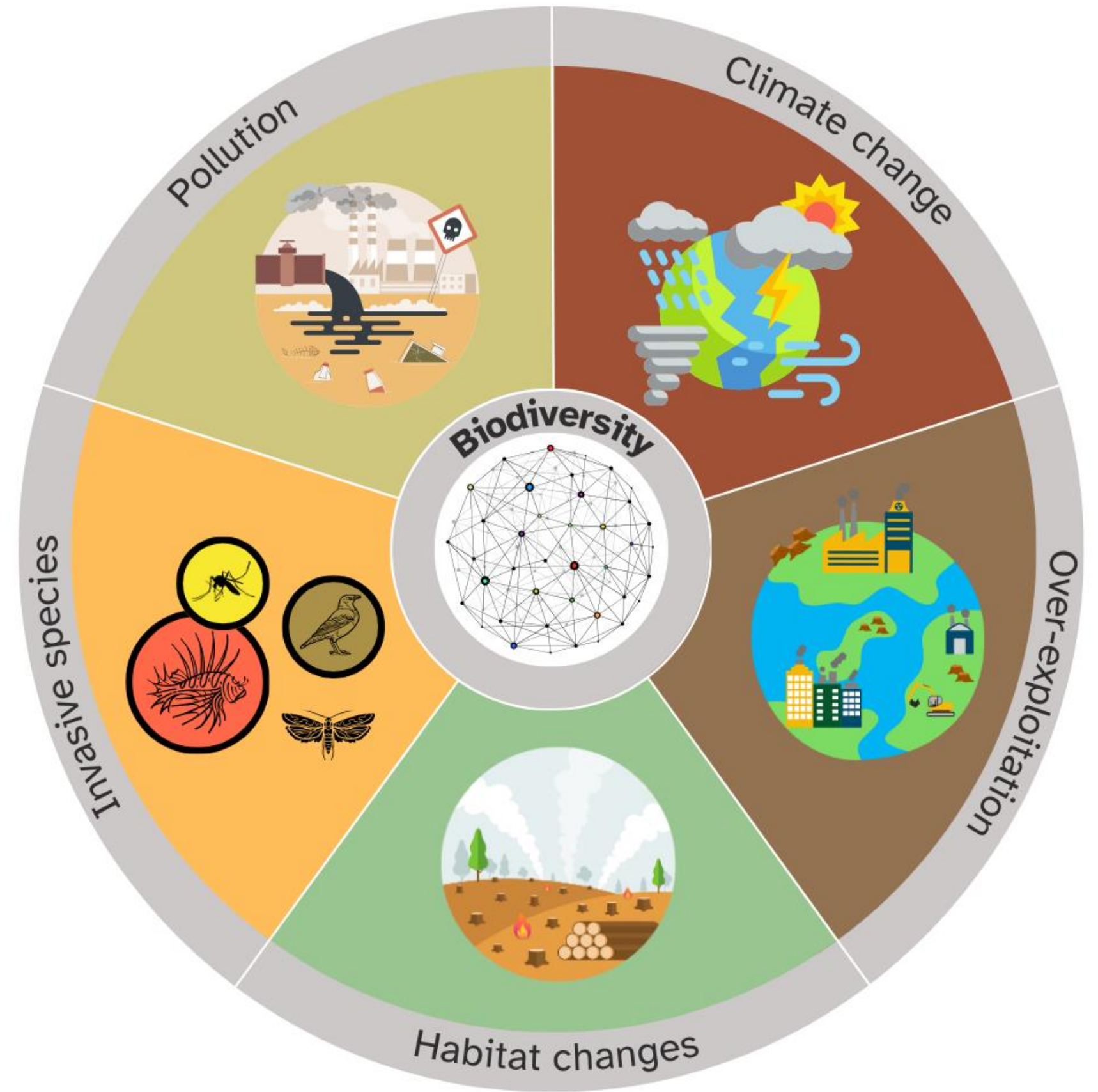
Essential for sustaining all life on Earth

Variety = healthy ecosystems

Ao/NZ biodiversity irreplaceable



**Unfortunately,
biodiversity is
rapidly declining
worldwide...**



Invasive species

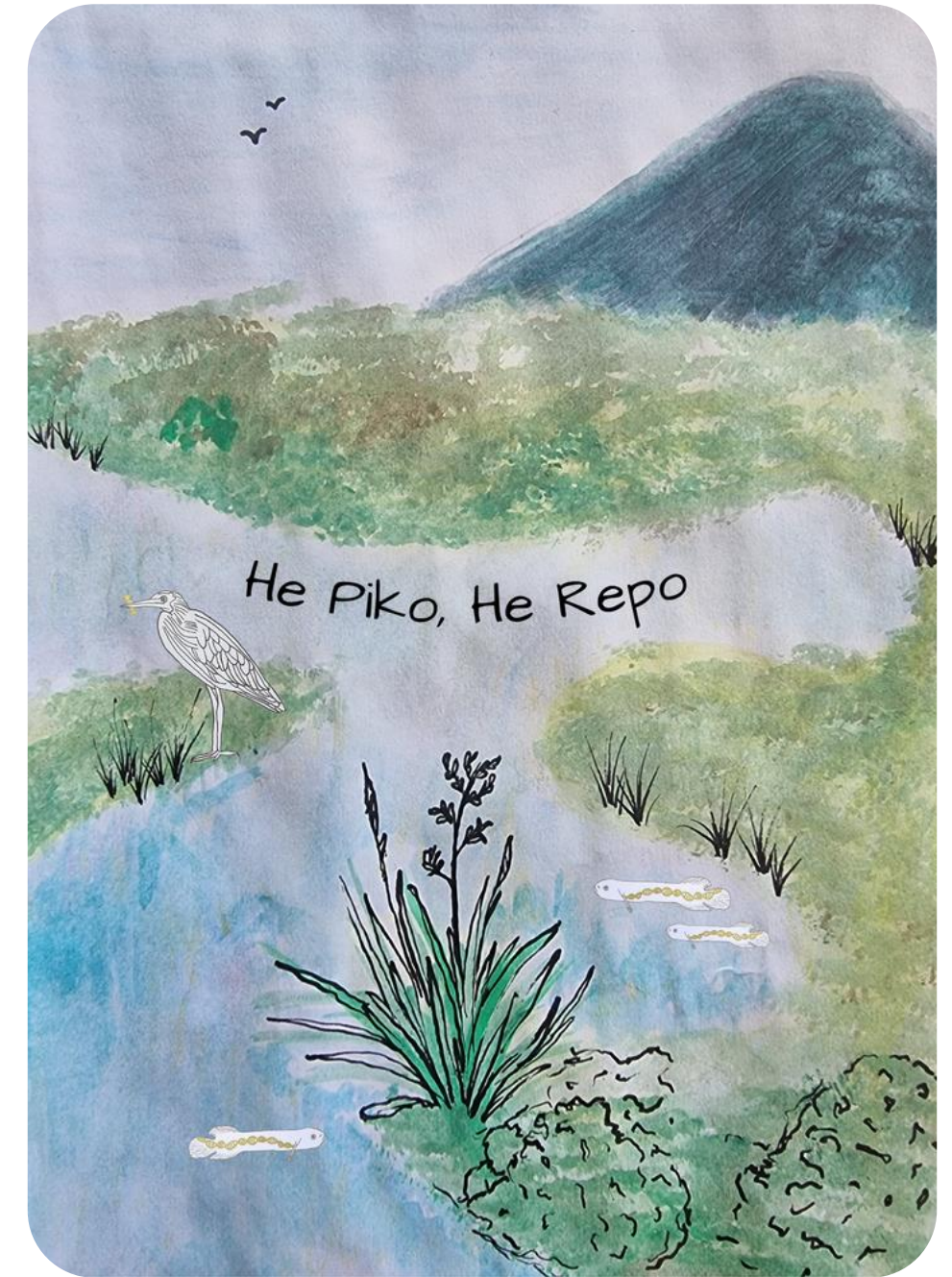
Rapidly expand demographically and spatially beyond their native range; facilitated by humans and cause a negative impact

Threaten ecosystem services, native species, and the economy



Credit: Jessica Miku (Wellington Artist)

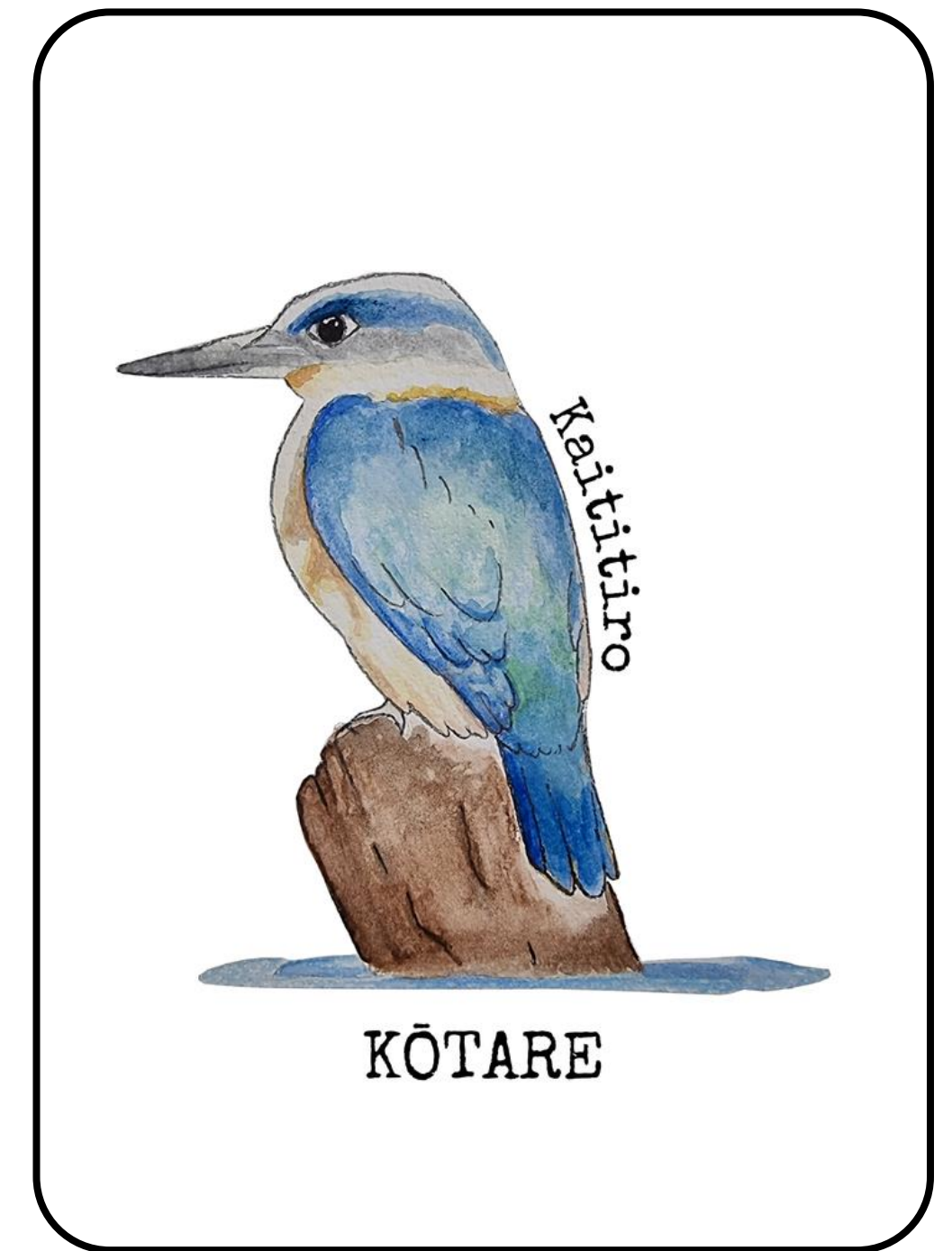
Aotearoa New Zealand wetlands



Opuatia Wetland, Waikato (Ao/NZ)



**Yet, we know little about
how native and exotic
biodiversity varies across
spatial scales**



**We explored spatial
biodiversity patterns
across Ao/NZ wetlands**



WILDERLAB



Map

Table



Search by sample/job number [?](#)

Show advanced options

Enter search term

Search by species/taxon [?](#)

Enter taxon/species name or taxon ID

Start date

13-Feb-2022

End date

12-Feb-2025

Passcode (optional) [?](#)

Enter passcode if applicable



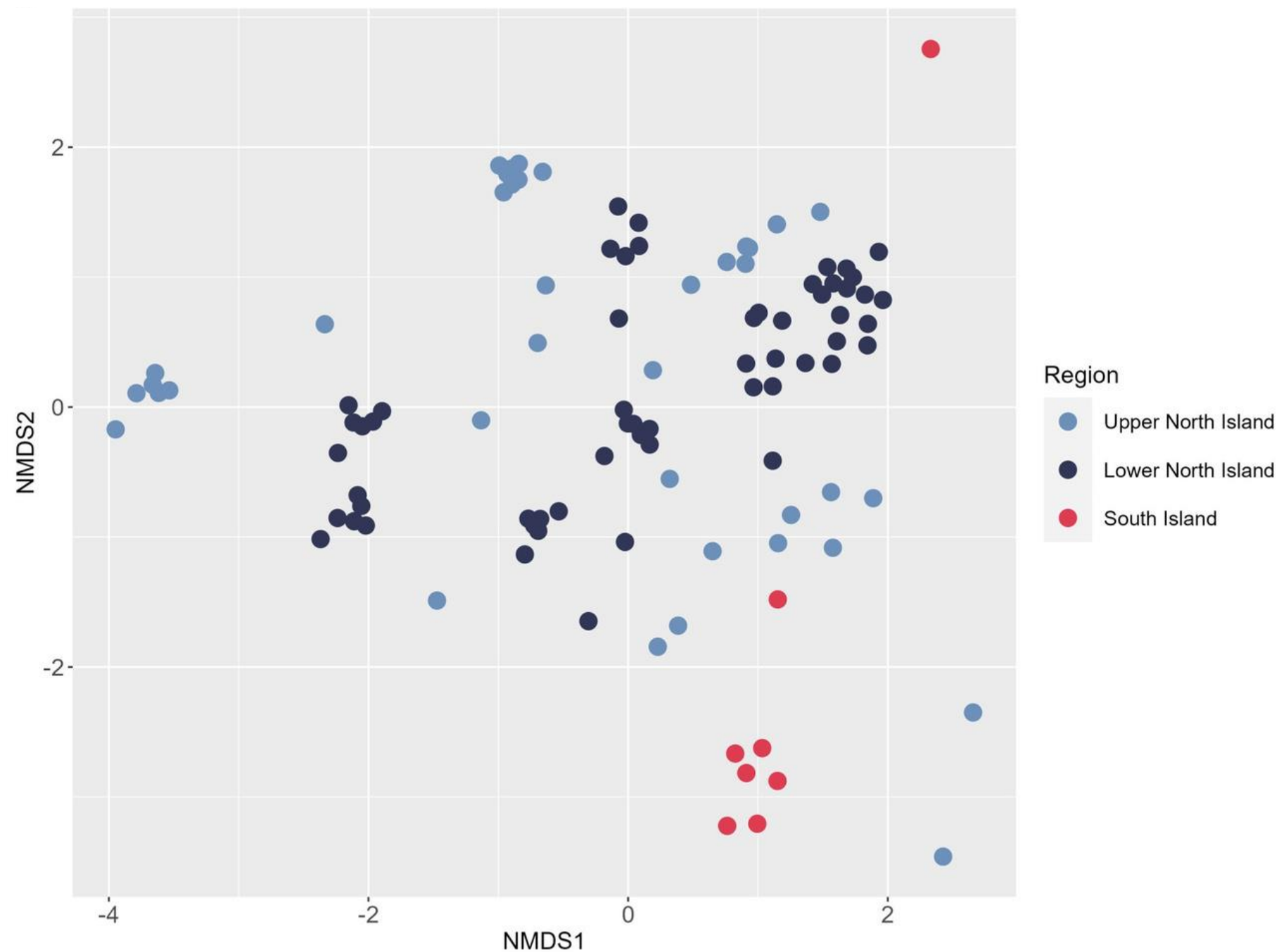
Search



WILDERLAB



Spatial biodiversity differences



We observed differences in biodiversity over a broad spatial scale

$F_{2,23} = 1.4104$; $P = 0.001$; PERMANOVA;

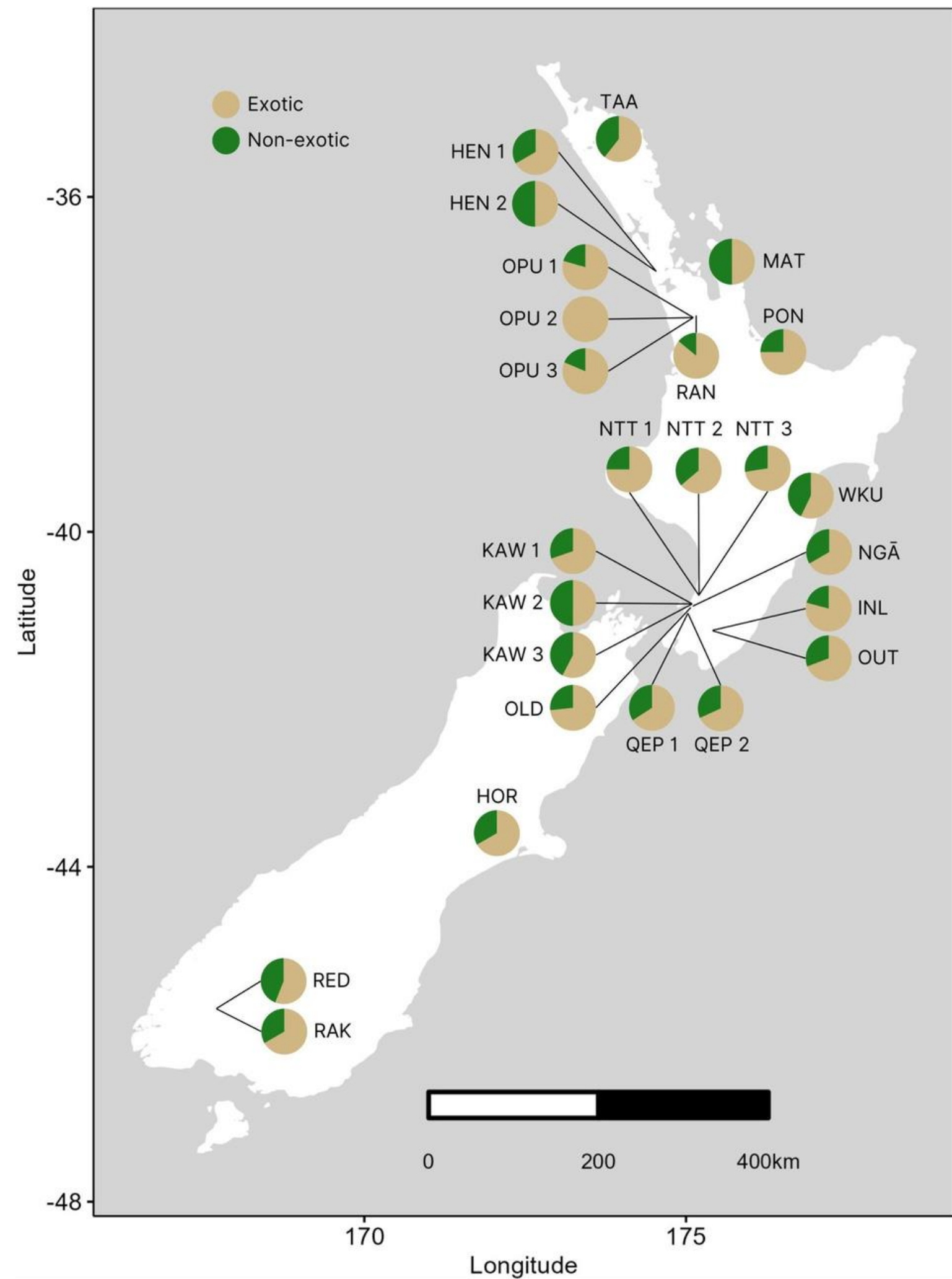
$F_{2,23} = 13.572$; $P = 0.001$; PERMDISP

Exotic vs non-exotic

Exotic = organism introduced to Ao/NZ outside its native geographic range

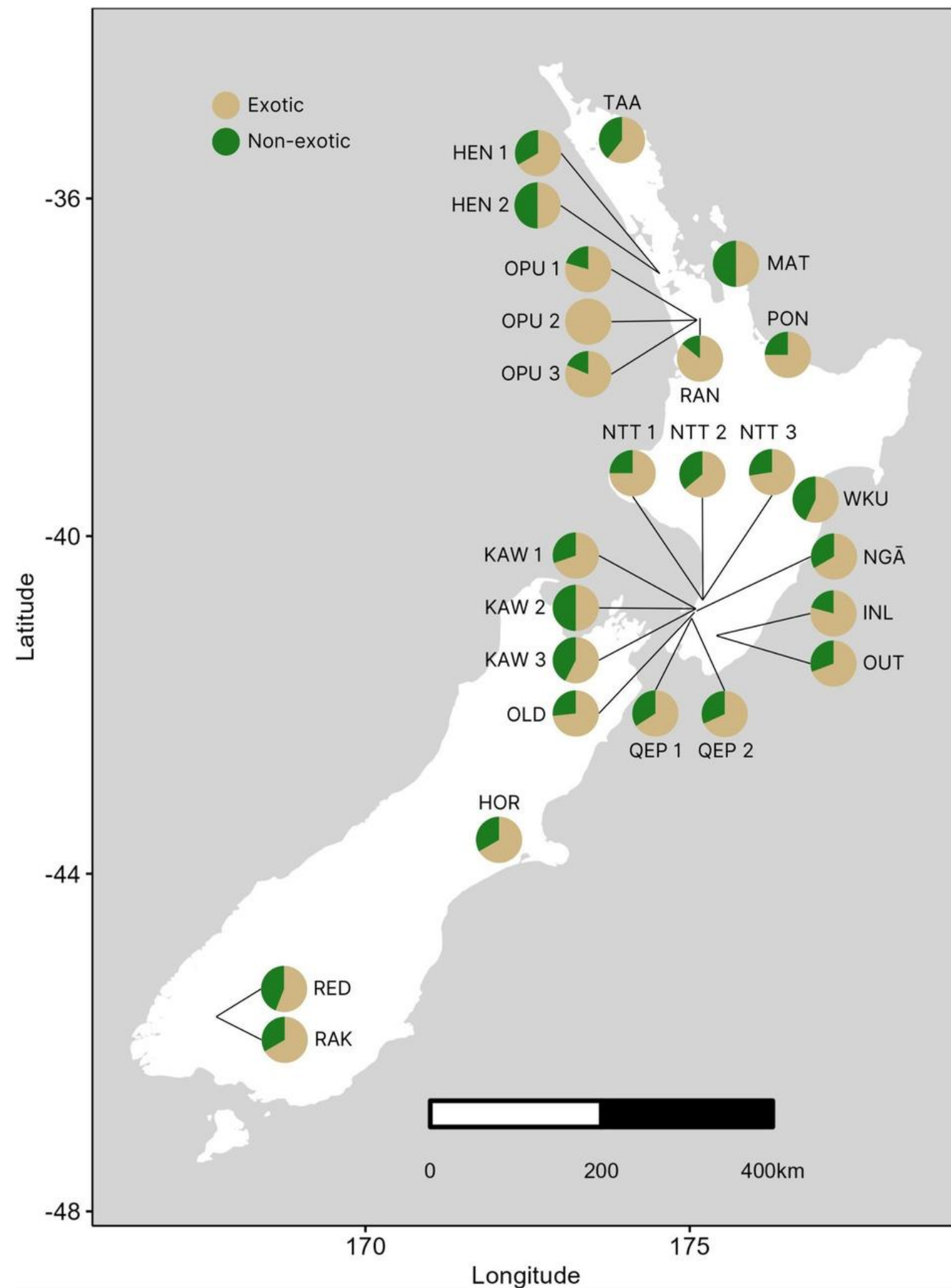
Non-exotic = Ao/NZ native and endemic species

Classified biostatus 264/319 species, with 55 status unknown



Exotic vs non-exotic

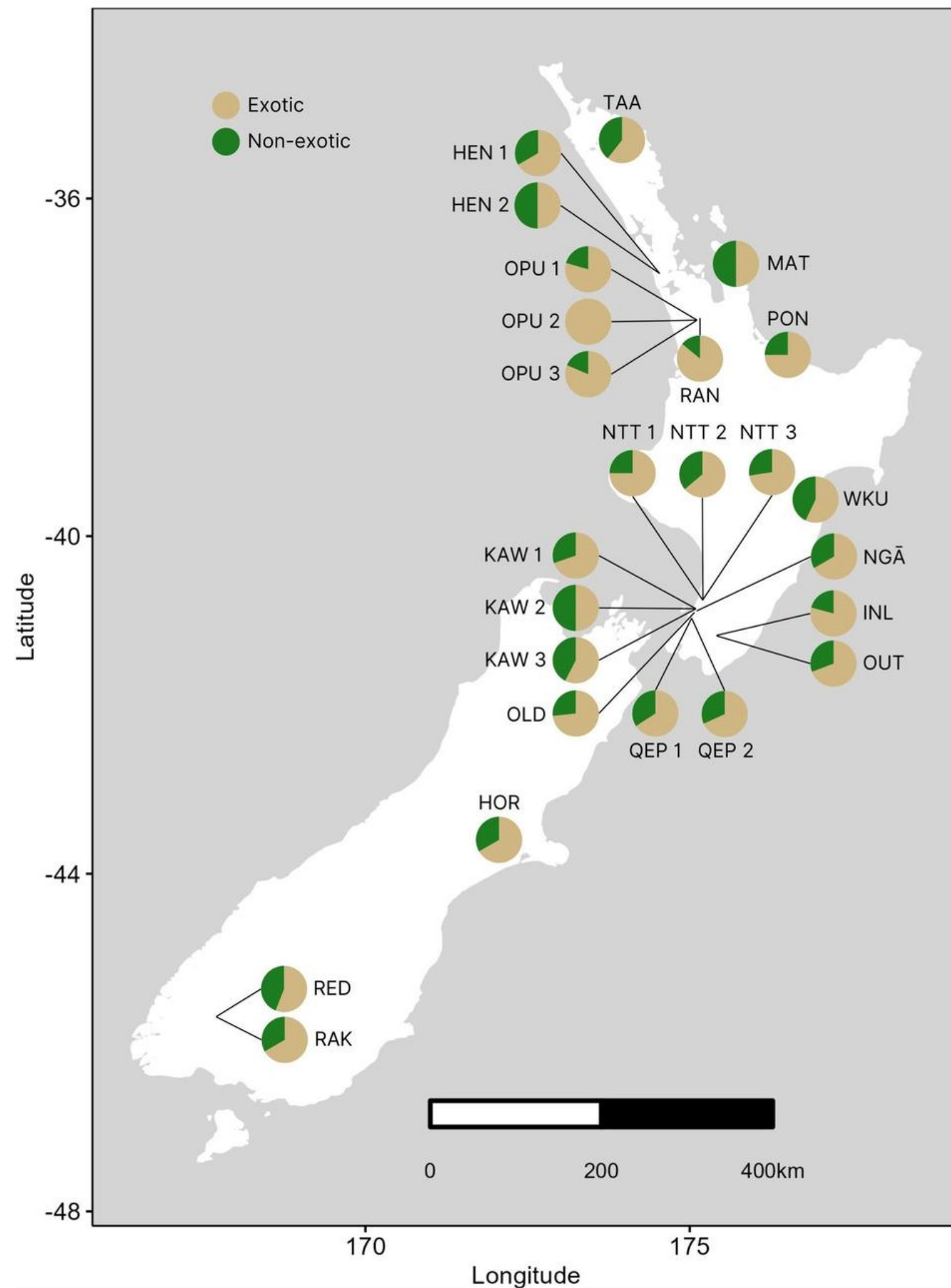
Alarmingly, all locations harboured $\geq 50\%$ exotic species detection



Exotic vs non-exotic

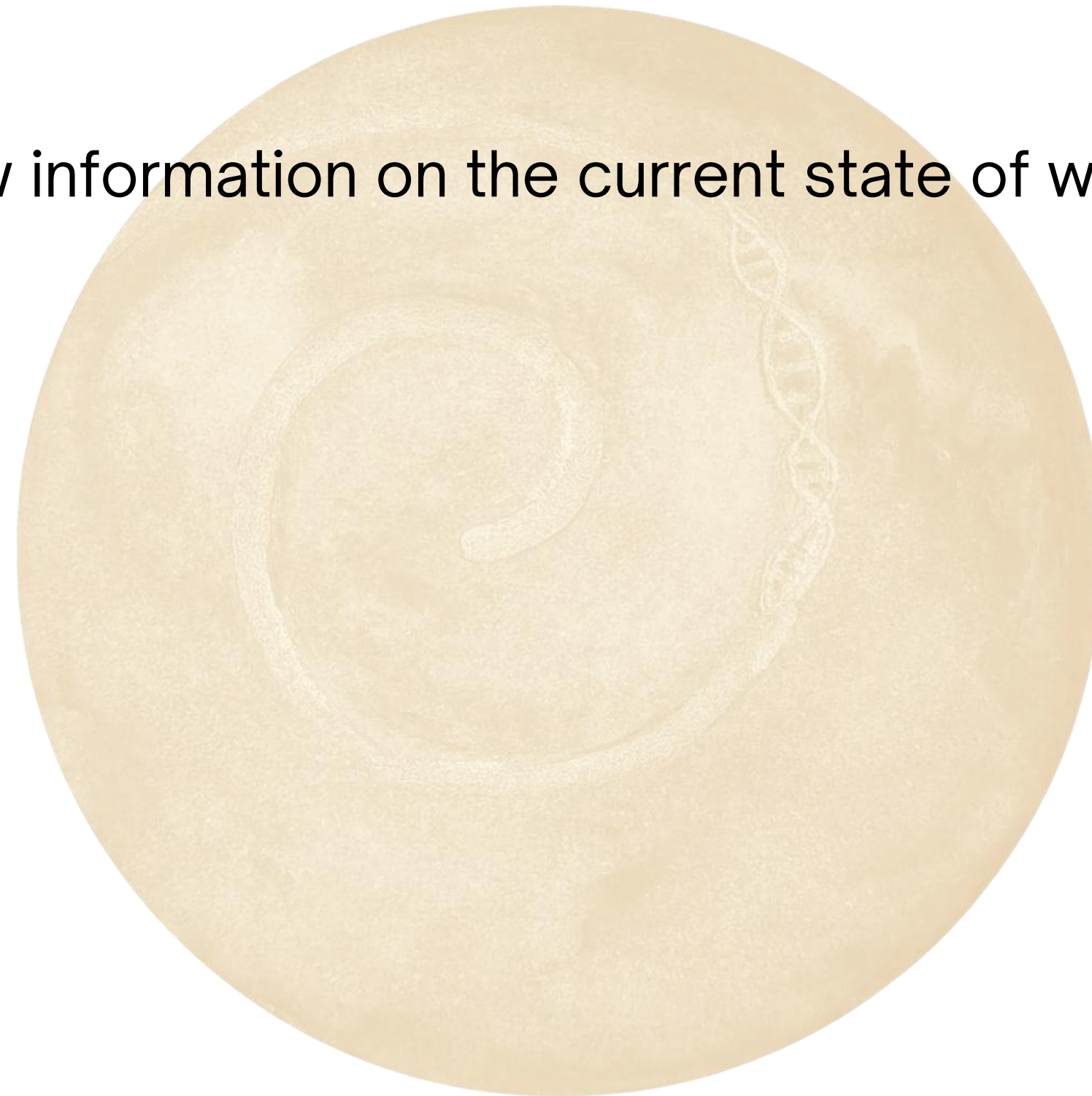
Alarmingly, all locations harboured $\geq 50\%$ exotic species detection

Note, this finding is based the number of exotic/non-exotic species; does not correspond to biomass



Value of public databases

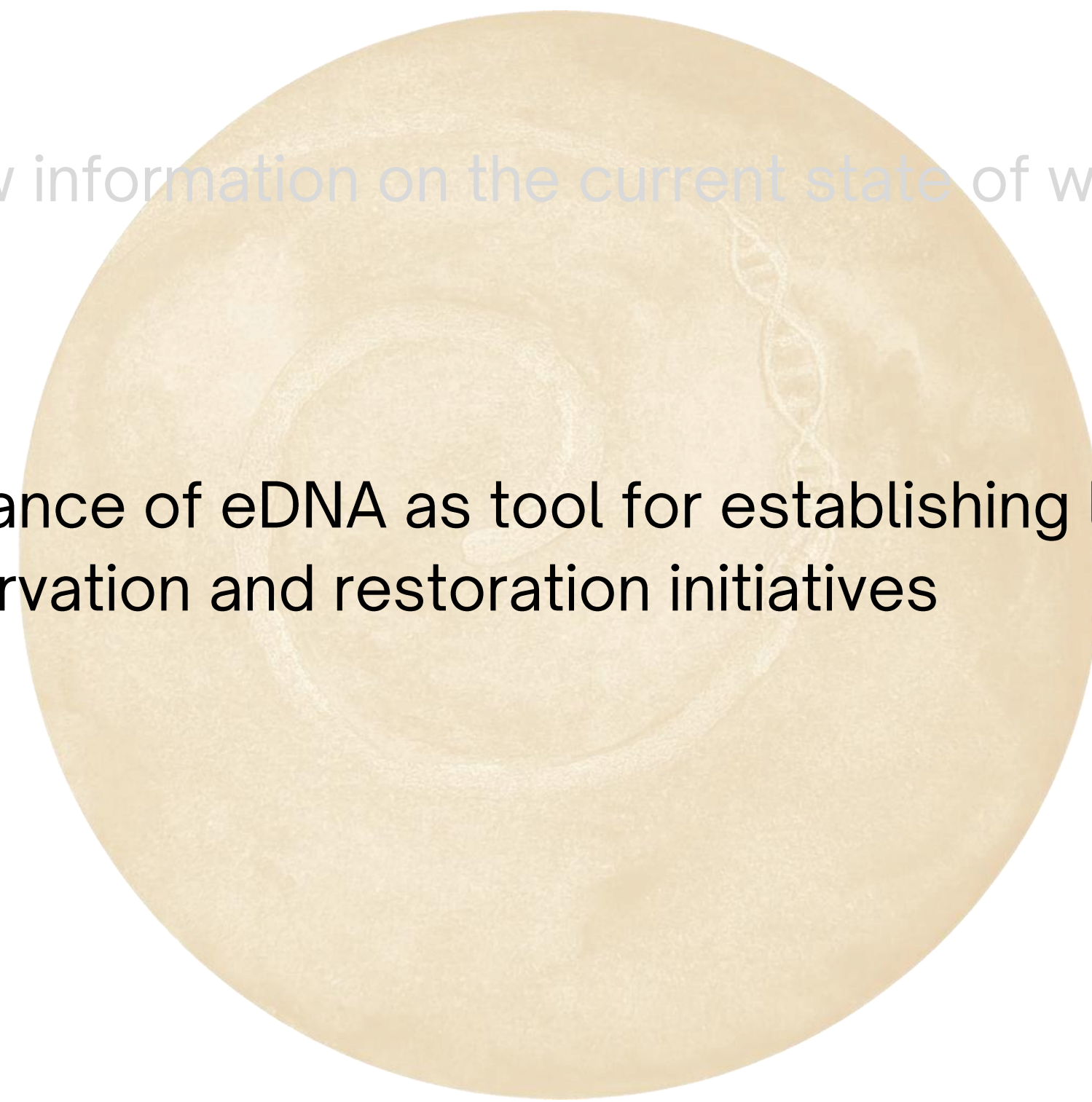
Our results provide new information on the current state of wetland biodiversity in Ao/NZ



Value of public databases

Our results provide new information on the current state of wetland biodiversity in Ao/NZ

Highlighted the significance of eDNA as tool for establishing long-term spatial data that can support conservation and restoration initiatives



Value of public databases

Our results provide new information on the current state of wetland biodiversity in Ao/NZ

Highlighted the significance of eDNA as tool for establishing long-term spatial data that can support conservation and restoration initiatives

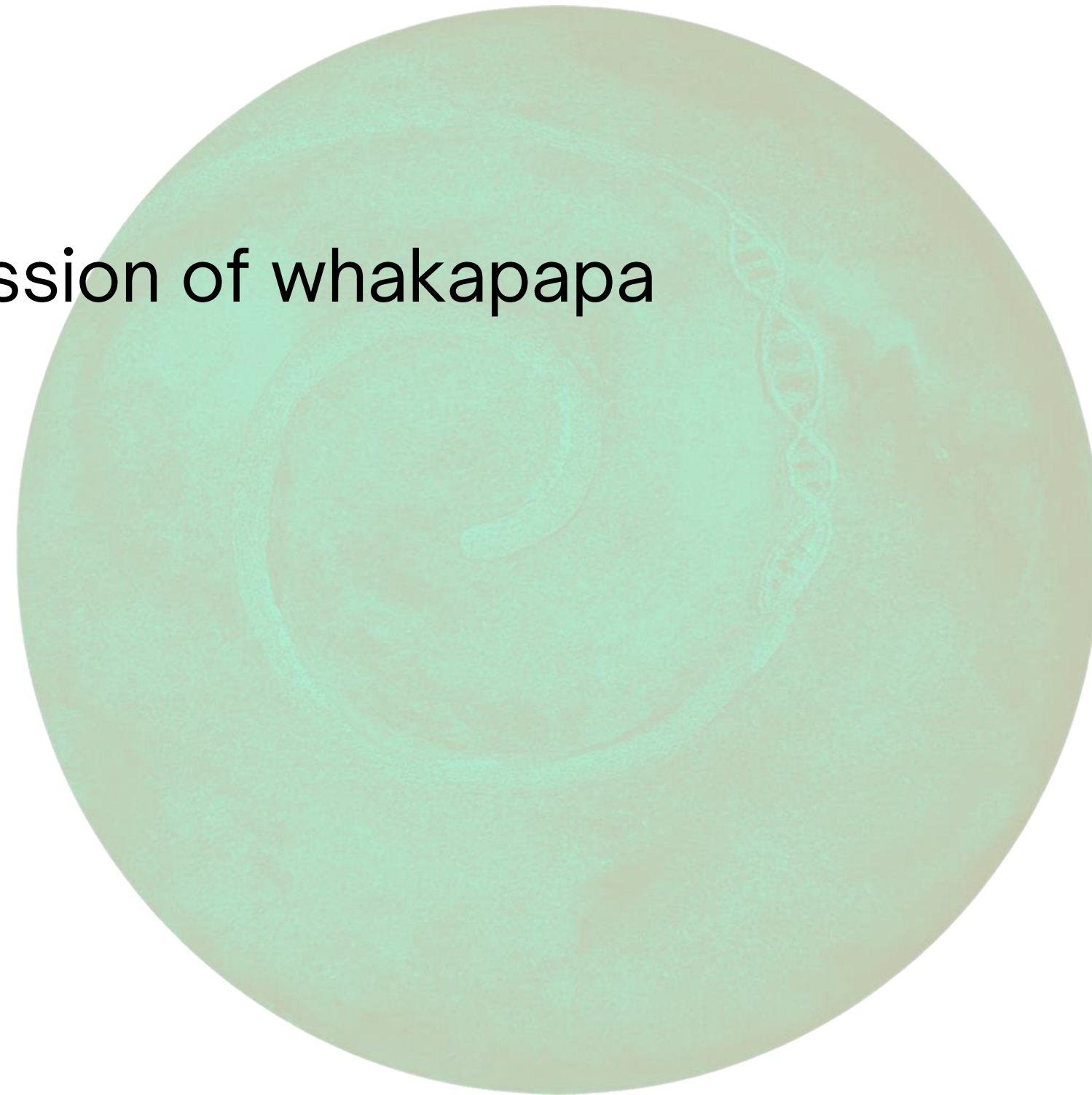
Repurposing data from public databases allows for broader insights that go beyond the objectives of a single study

Cultural considerations



Cultural considerations

DNA physical expression of whakapapa



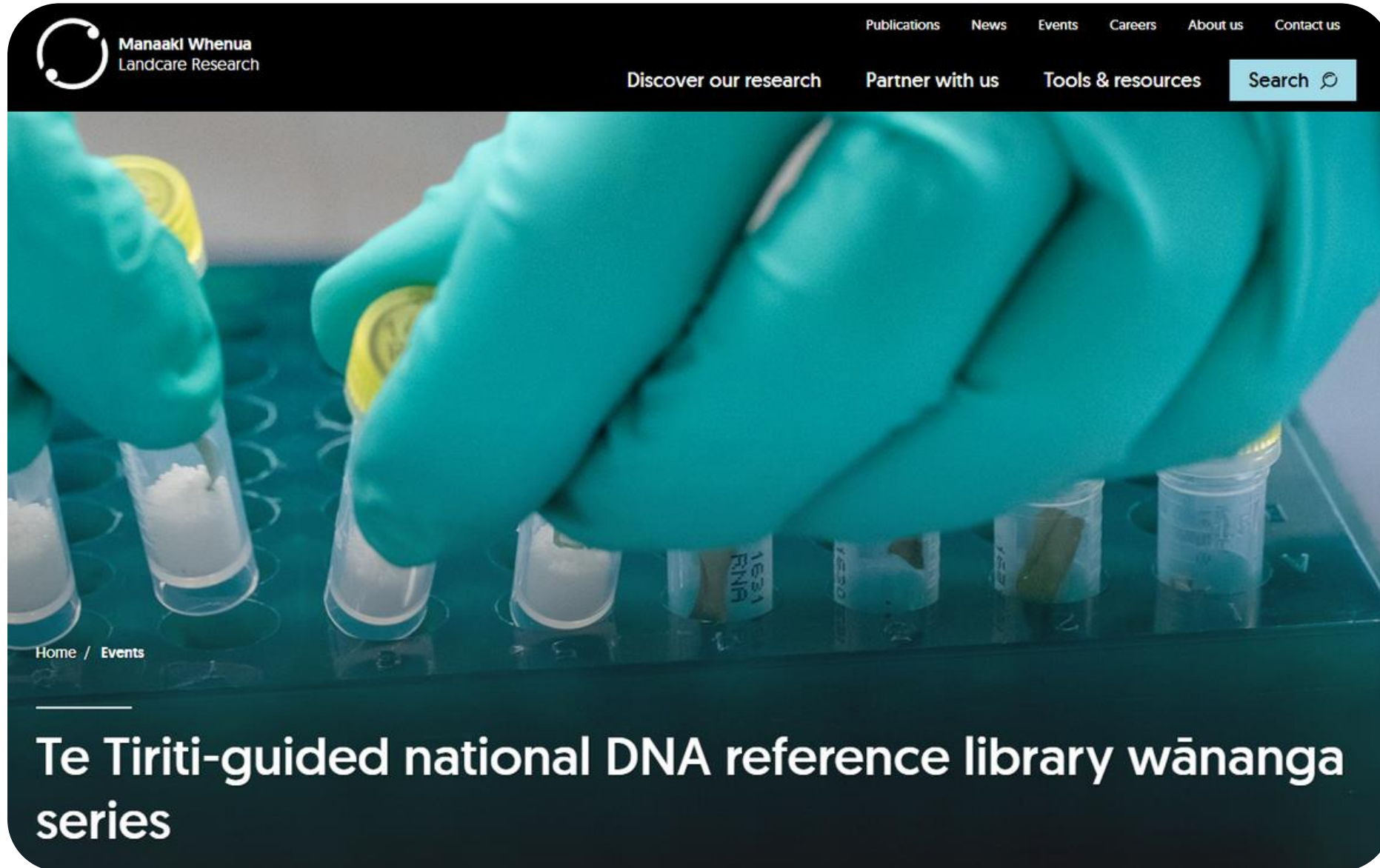
Cultural considerations

DNA physical expression of whakapapa

Taonga species are woven into our waiata, pūrākau, and cultural practices



Kōrero and guidelines underway



Manaaki Whenua
Landcare Research

Publications News Events Careers About us Contact us

Discover our research Partner with us Tools & resources Search

Home / Events

Te Tiriti-guided national DNA reference library wānanga series

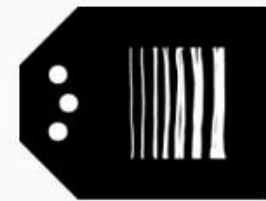
INFOSHEET - JULY 2024
eDNA, DNA reference
libraries and Kaitiakitanga



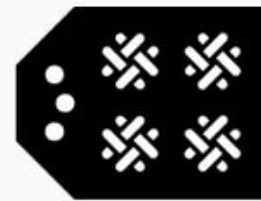
Kōrero and guidelines underway

Provenance Labels

Provenance Labels identify the group or sub-group which is the primary cultural authority for the material, and/or recognizes other interest in the materials.



BC Provenance
(BC P)



BC Multiple
Communities
(BC MC)



BC Clan
(BC CL)

Protocol Labels

Protocol Labels outline traditional protocols associated with access to this material and invite viewers to respect community protocols.



BC Consent
Verified
(BC CV)



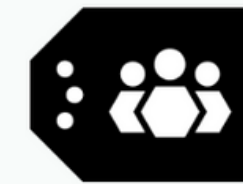
BC Consent Non-
Verified
(BC CNV)

Permission Labels

Permission Labels indicate what activities the community has approved as generally acceptable. Other uses require direct engagement with primary cultural authorities.



BC Research Use
(BC R)



BC Open to
Collaboration
(BC CB)



BC Open to
Commercialization
(BC OC)



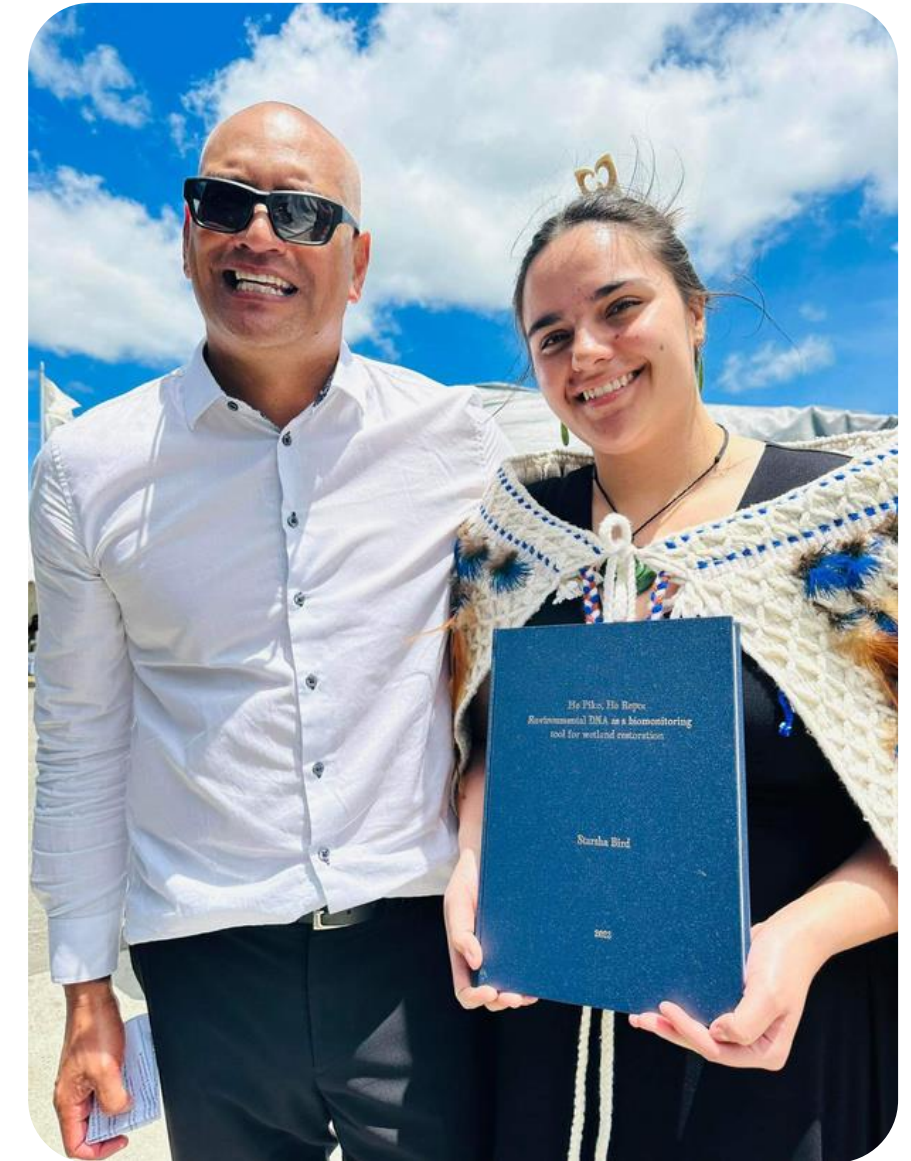
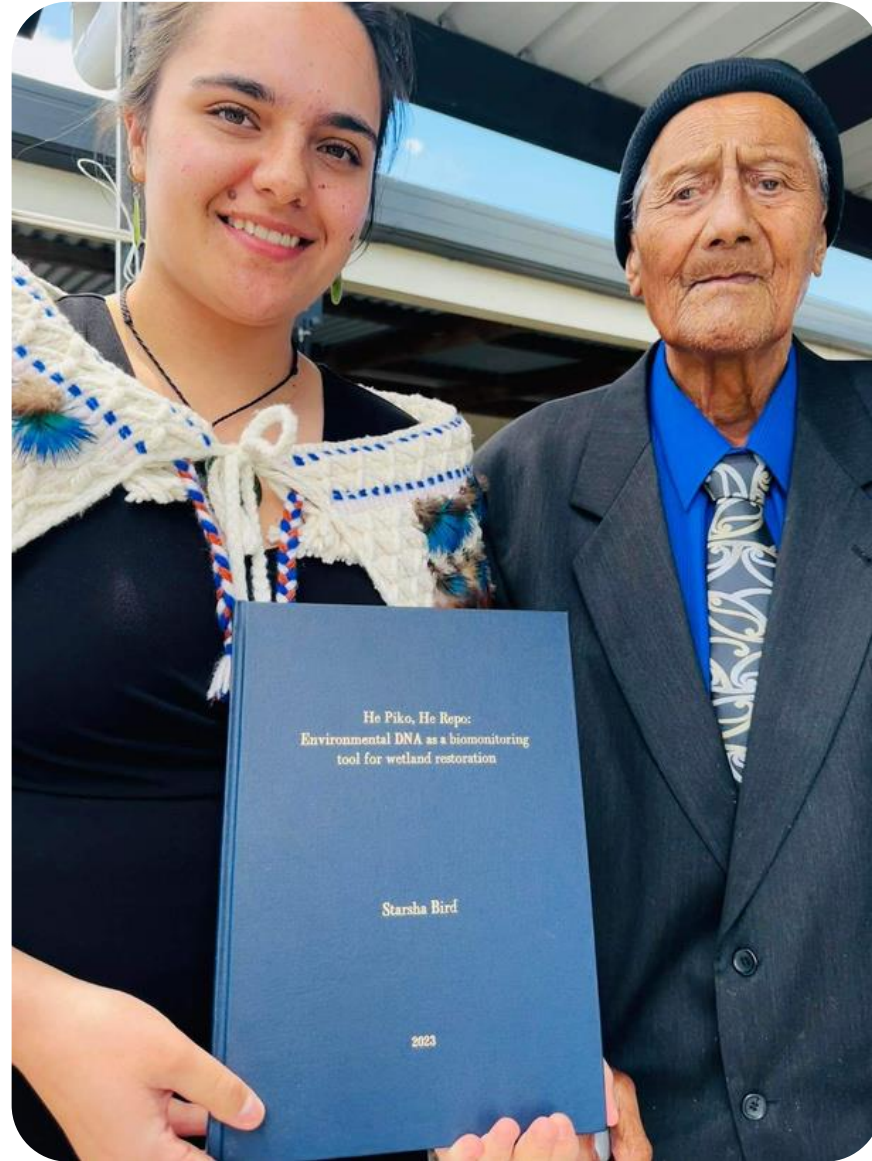
BC Outreach
(BC O)



BC Non-
Commercial
(BC NC)

My experience

Ako; learning together



My experience

Empowerment and reconnection



My experience

Whakawhanaungatanga; fostering lasting relationships





New Zealand Journal of Zoology

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/tnzz20

Wetland biodiversity in Aotearoa New Zealand: an eDNA perspective on exotic and non-exotic species

Starsha Bird, Shaun Wilkinson & Angela McGaughran

To cite this article: Starsha Bird, Shaun Wilkinson & Angela McGaughran (05 Jun 2024): Wetland biodiversity in Aotearoa New Zealand: an eDNA perspective on exotic and non-exotic species, New Zealand Journal of Zoology, DOI: [10.1080/03014223.2024.2359685](https://doi.org/10.1080/03014223.2024.2359685)

To link to this article: <https://doi.org/10.1080/03014223.2024.2359685>



Mihi | Acknowledgements



Dr Shaun Wilkinson
Founder and CEO
Wilderland



Dr Ang McGaughran
Senior Lecturer
Te Whare Wānanga o Waikato



Pātai | Questions

