Presentation: Using drone technology in sand dune research

Dr Hannah Buckley, Department of Ecology
Lincoln University
Hannah.Buckley@lincoln.ac.nz

Conference sponsors

Te Kaunihera-ā-Rohe o Ngāmotu
NEW PLYMOUTH DISTRICT COUNCIL
newplymouthnz.com

Department of Conservation
Te Papa Atawbai

Taranaki Regional Council

Sand dune ecology research at Lincoln University

Dr Hannah Buckley

Department of Ecology
Lincoln University

Exploring the use of high resolution drone data for dune ecology

- Collaboration
  - Brad Case, Lincoln University
  - James Griffiths, Dept. Conservation
  - Stephen Hartley, Victoria University of Wellington
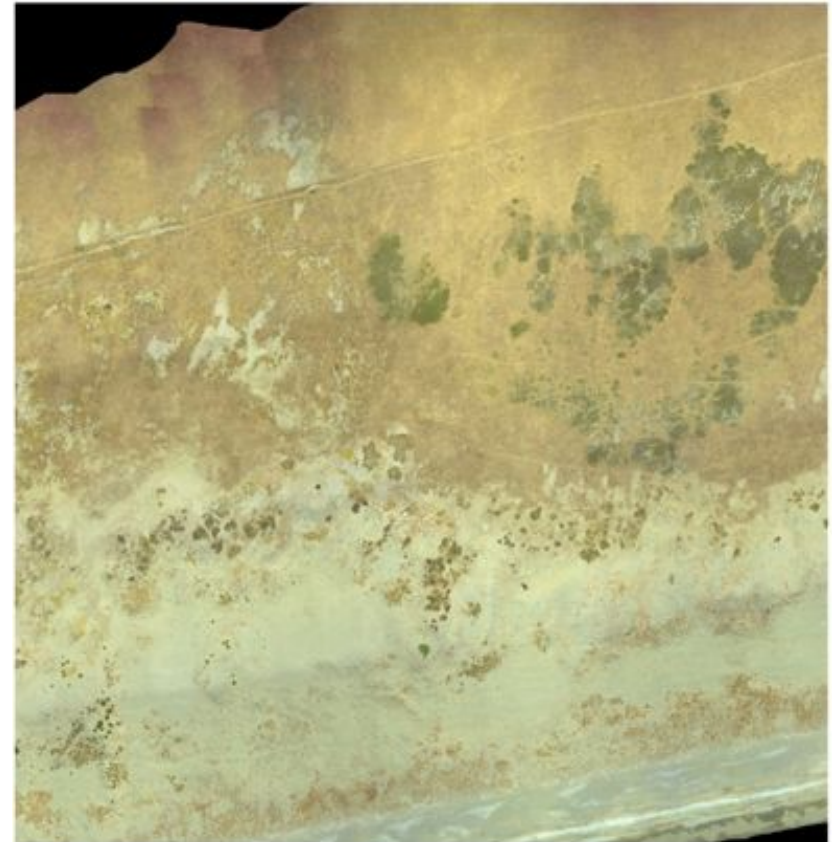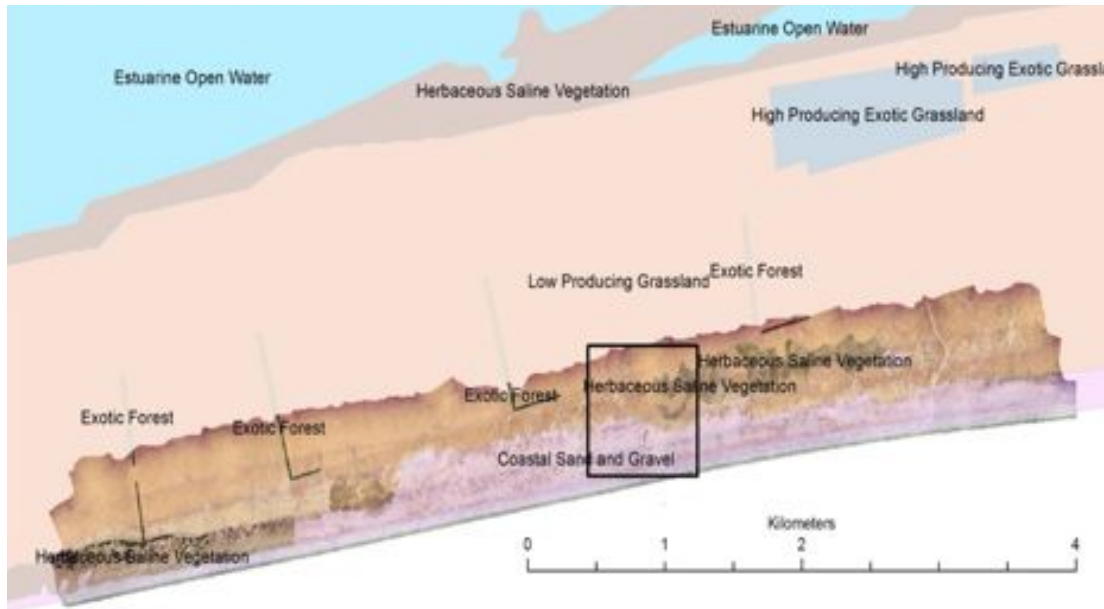

Hawkeye UAV

Drone captured data from dunes

- Two sites, two times

- Fine resolution (nominally 10-30cm)

- Captures colour (RGB) and near-infrared (NIR) wavelengths

- Elevation values derived via photogrammetry

- Potentially more cost effective and informative than field work

Ocean Beach

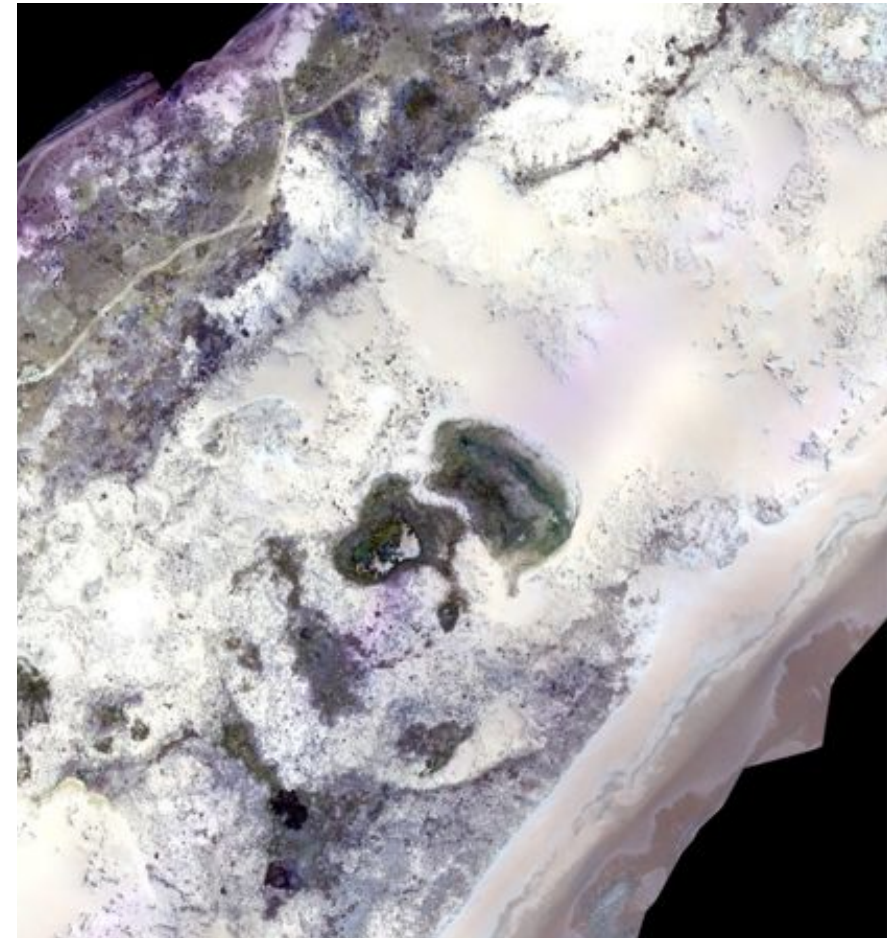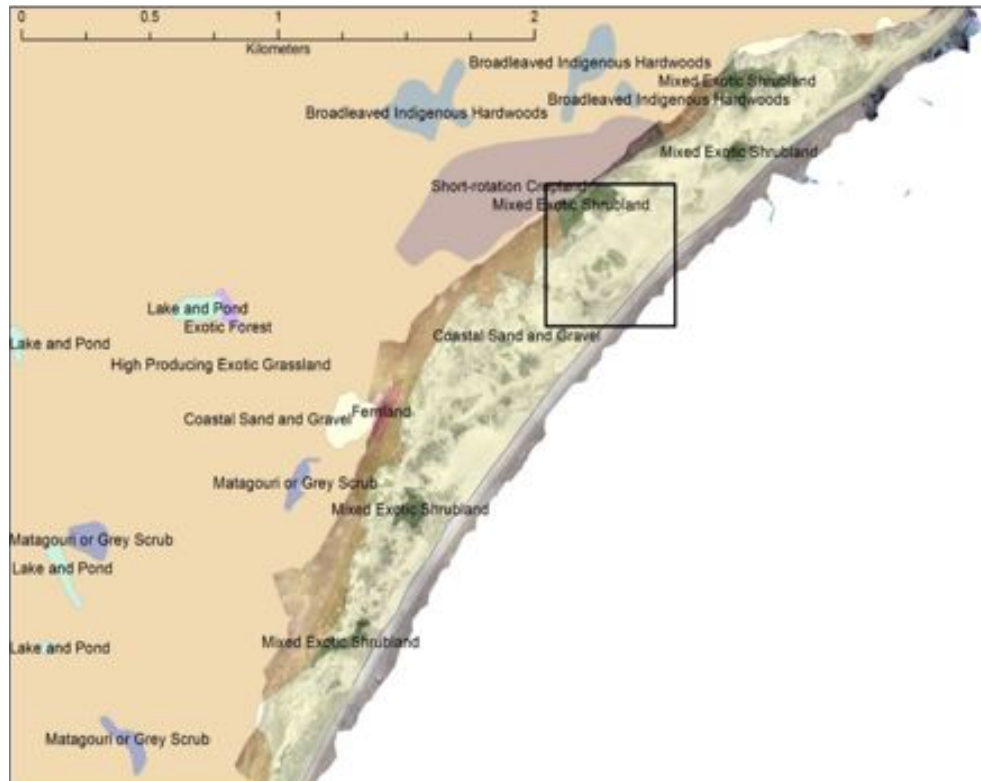Kaitorete Spit

Kaitorete Spit

Approximate area of image: 7 km²

Approximate cost per flight (excl. travel): $3,900

Ocean Beach

Near-infrared image

Approximate area of image: 2 km²
Approximate cost per flight (excl. travel): $3,700

Research objectives

- Can we characterise plant community structure using this imagery?
  - Applications:
    - Predicting spatial variation in plant species composition and diversity
    - Characterising animal habitats, e.g., spiders, lizards
- Can we differentiate plant species using this imagery?
  - Application: monitoring weed spread over time, e.g. lupin, marram
- Can we differentiate living and dead plant individuals?
  - Applications:
    - Monitoring weed management impacts such as target and non-target effects of weed spraying
    - Monitoring population dynamics of native species, e.g., pīngao
- Can we use this imagery to obtain accurate topographic data?
  - Application: Monitoring dune geomorphology and relating this to vegetation/habitat dynamics

Imagery classification
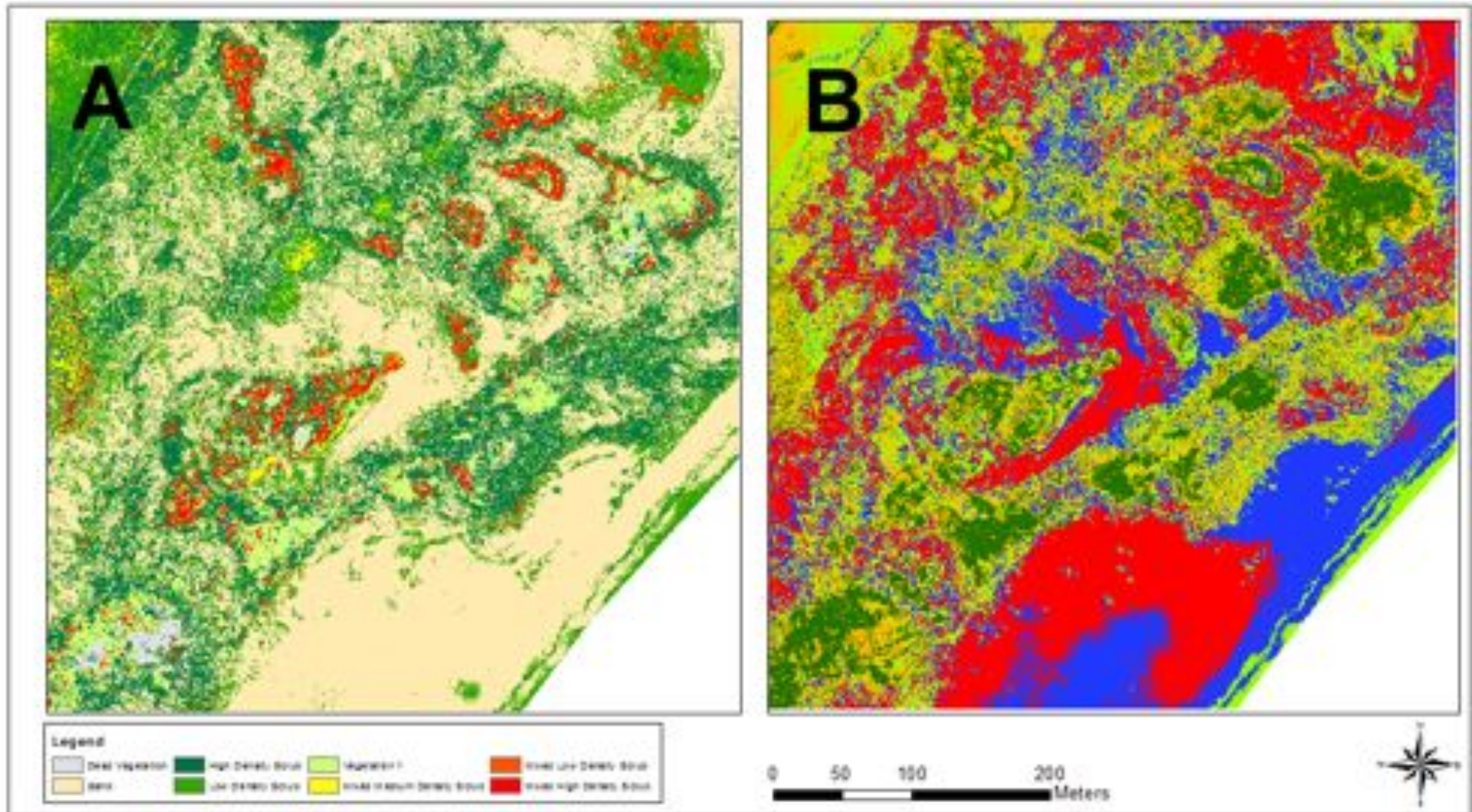
Comparison of a supervised classification (A) compared to a five-class unsupervised classification (B) on the high-resolution imagery.

Ground-truthing

- Plot-based sampling

- Measured:
  - Plant species composition
  - Alive vs. dead vegetation
  - Vegetation heights

Predicting animal distributions

Acknowledgements