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WAY OUT WEST

Dune Restoration of NZ Annual Conference 2014

11 – 13th March 2014

Fitzroy Surf and Lifesaving Club, New Plymouth



Presentation: Using drone technology in sand dune research

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Conference sponsors



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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

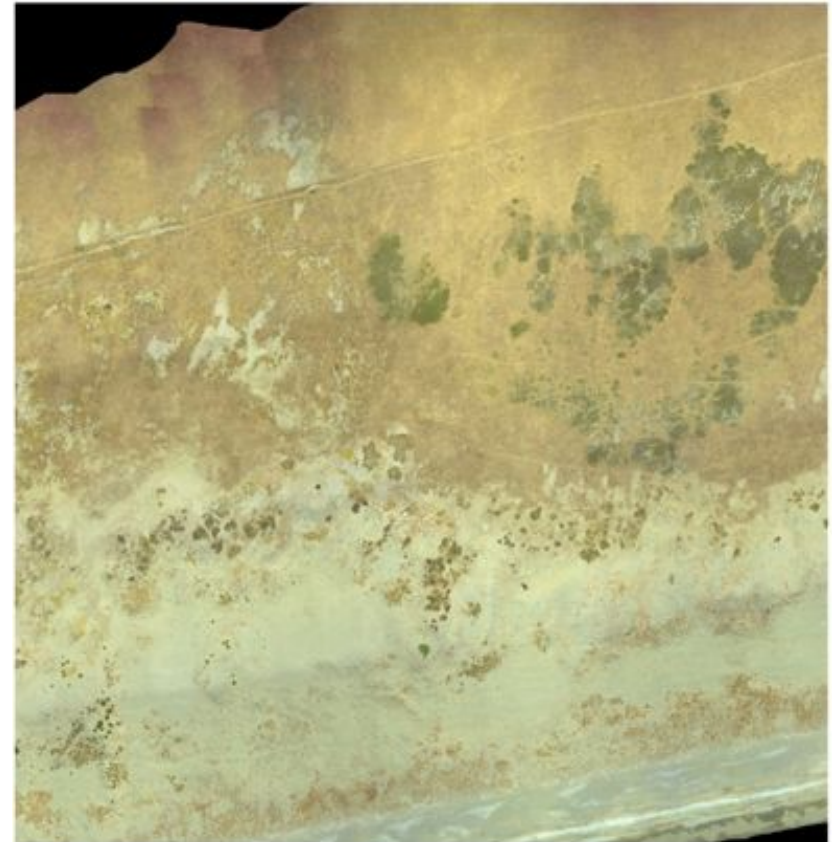
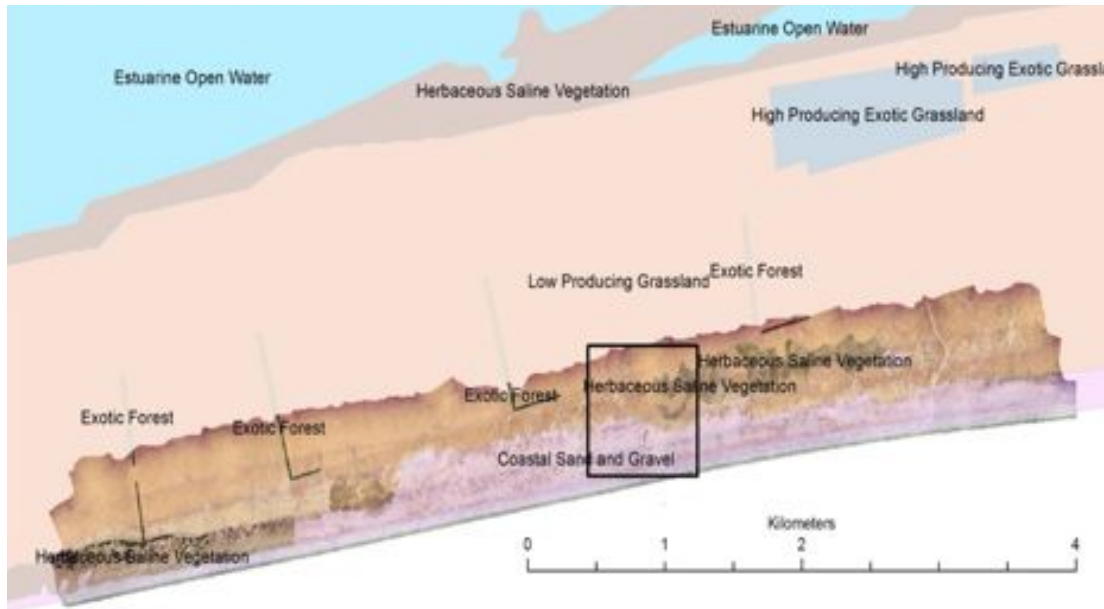
Drone captured data from dunes

- 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



Kaitorete Spit

RGB colour image

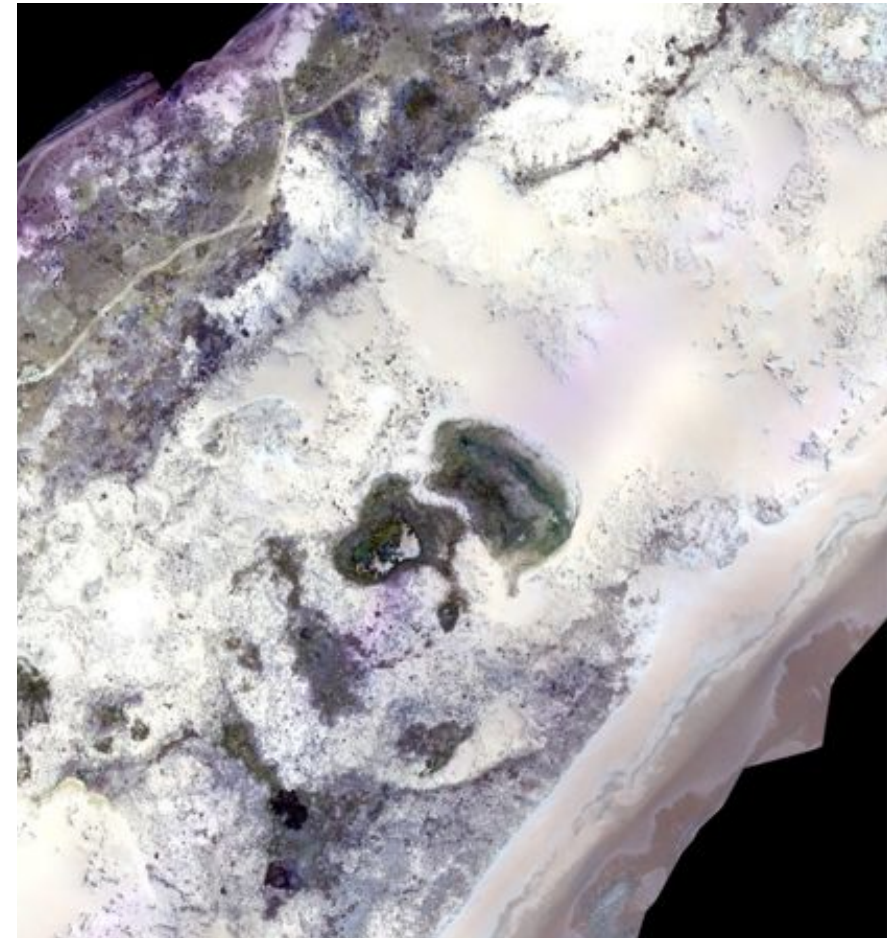
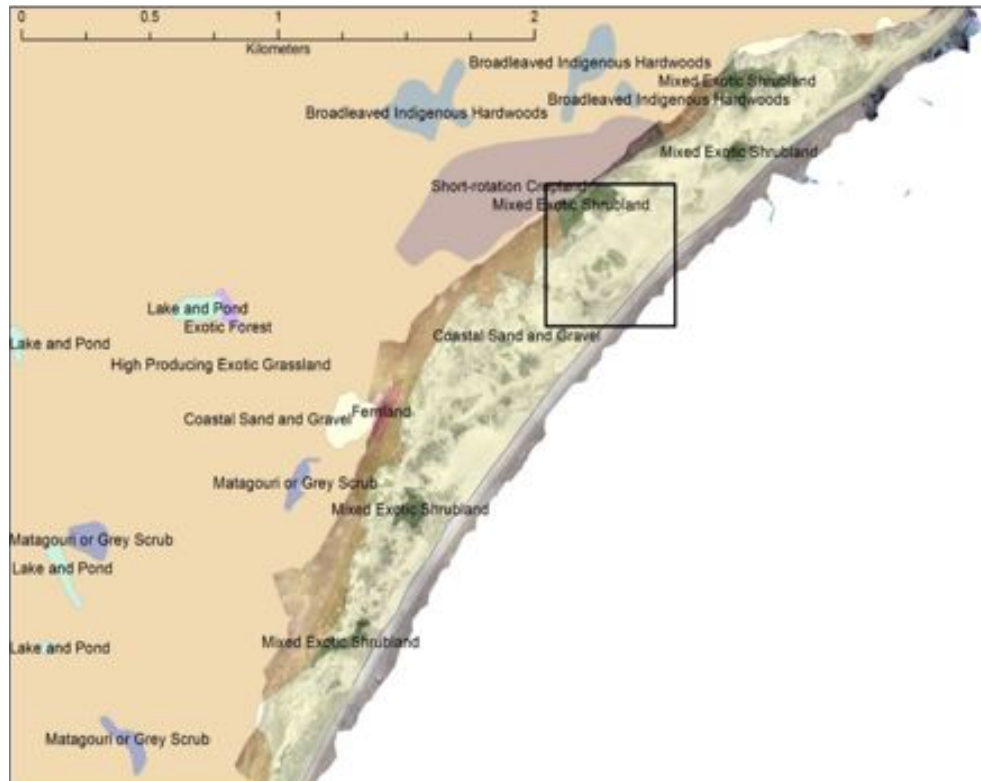


Approximate area of image: 7 km²

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

Ocean Beach

Near-infrared image



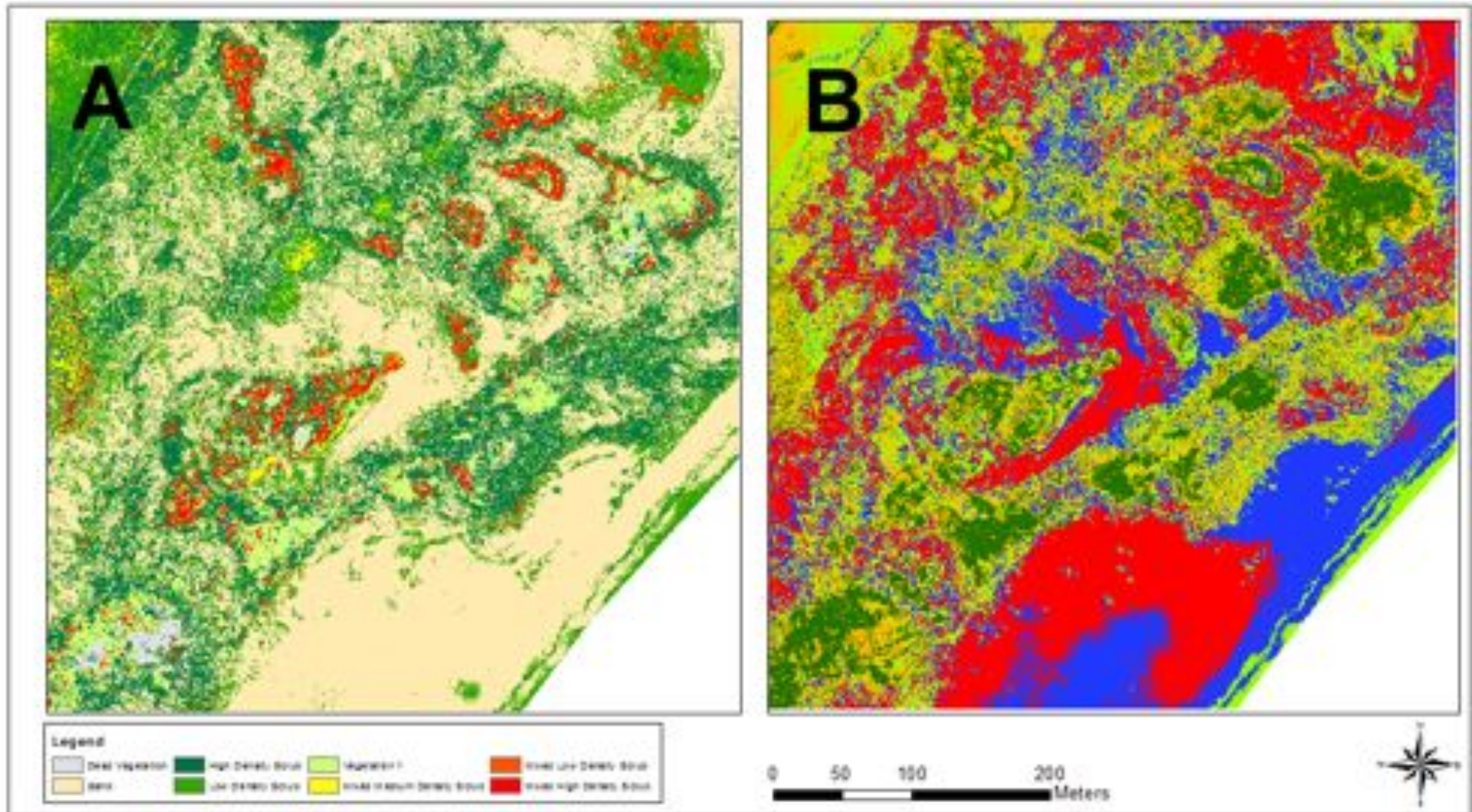
Approximate area of image: 2 km²

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

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