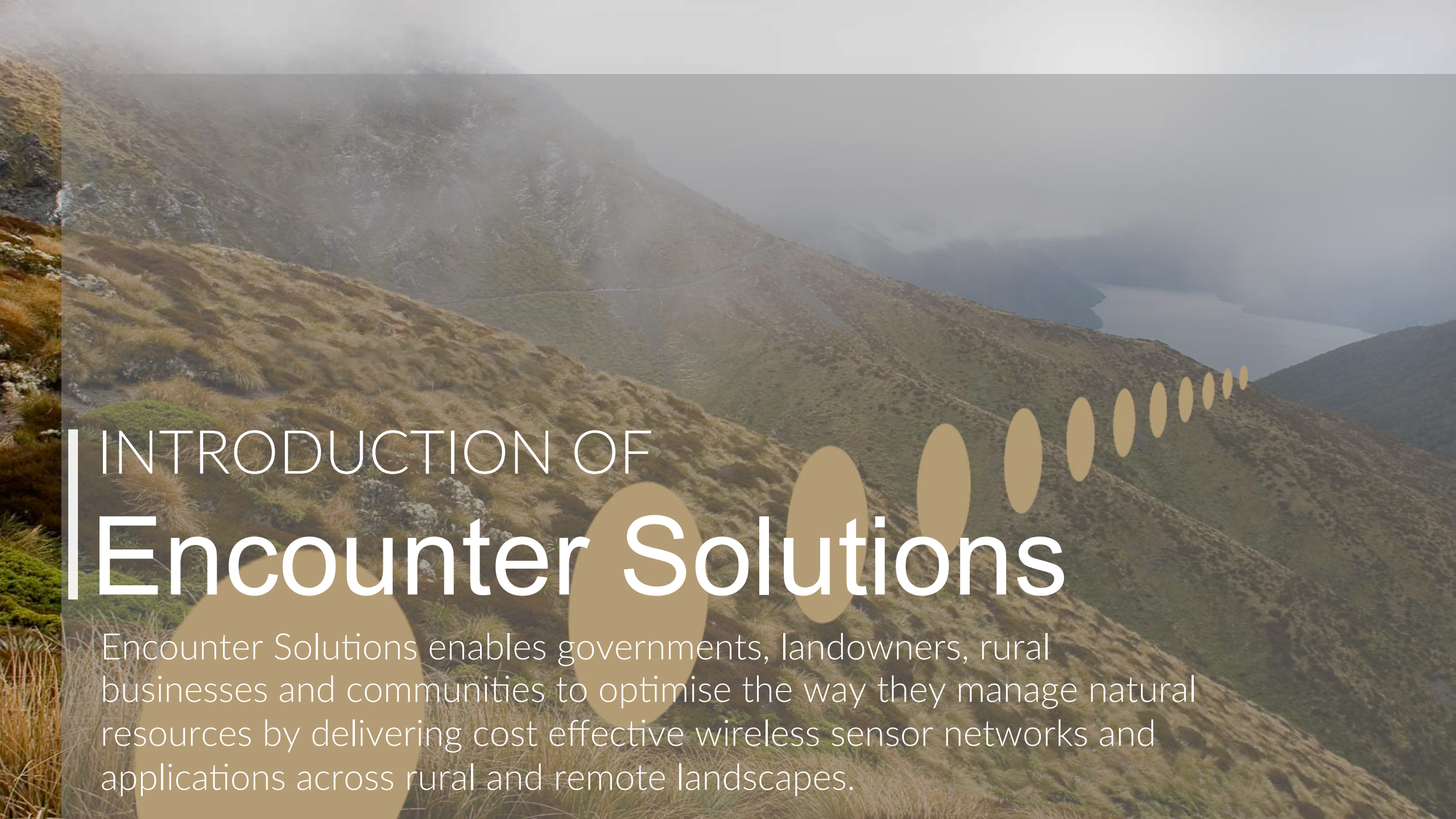

ENCOUNTER SOLUTIONS


BRING BACK THE BIRD SONG
Now wide scale pest control is easier
and more affordable



INTRODUCTION OF
Encounter Solutions

Encounter Solutions enables governments, landowners, rural businesses and communities to optimise the way they manage natural resources by delivering cost effective wireless sensor networks and applications across rural and remote landscapes.

Encounter Solutions

Our Vision- One network, a thousand opportunities

The cost of enhancing biodiversity has traditionally been prohibitive.

Until now.

Celium Wireless Sensor Network is transforming wide scale predator pest management by allowing you to **'connect' to your landscape** and get the insight you need to manage it better.

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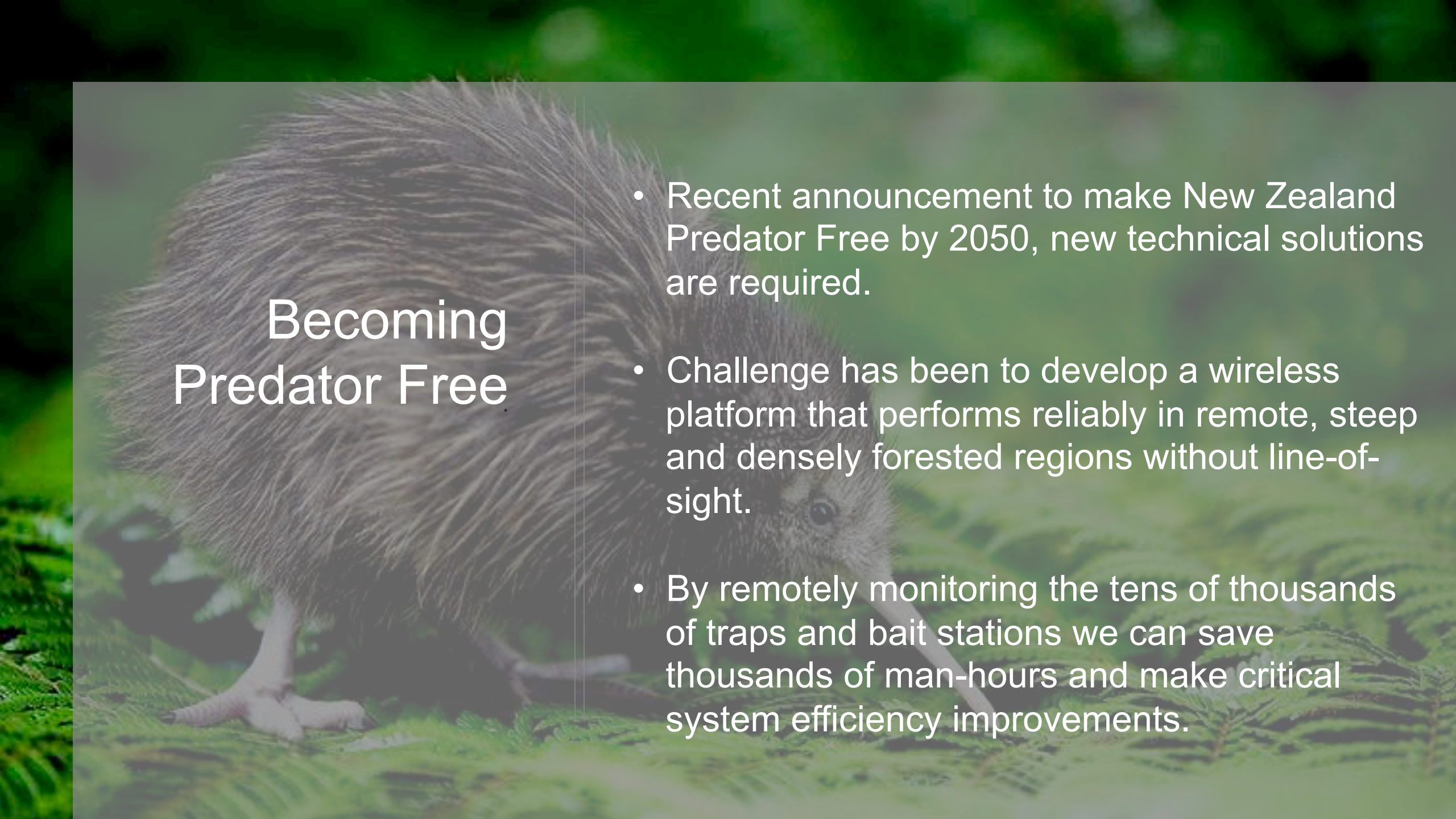
BIODIVERSITY MONITORING

PEST CONTROL

CLIMATE STATIONS

BEEHIVES



Becoming Predator Free

- Recent announcement to make New Zealand Predator Free by 2050, new technical solutions are required.
- Challenge has been to develop a wireless platform that performs reliably in remote, steep and densely forested regions without line-of-sight.
- By remotely monitoring the tens of thousands of traps and bait stations we can save thousands of man-hours and make critical system efficiency improvements.

New Zealand

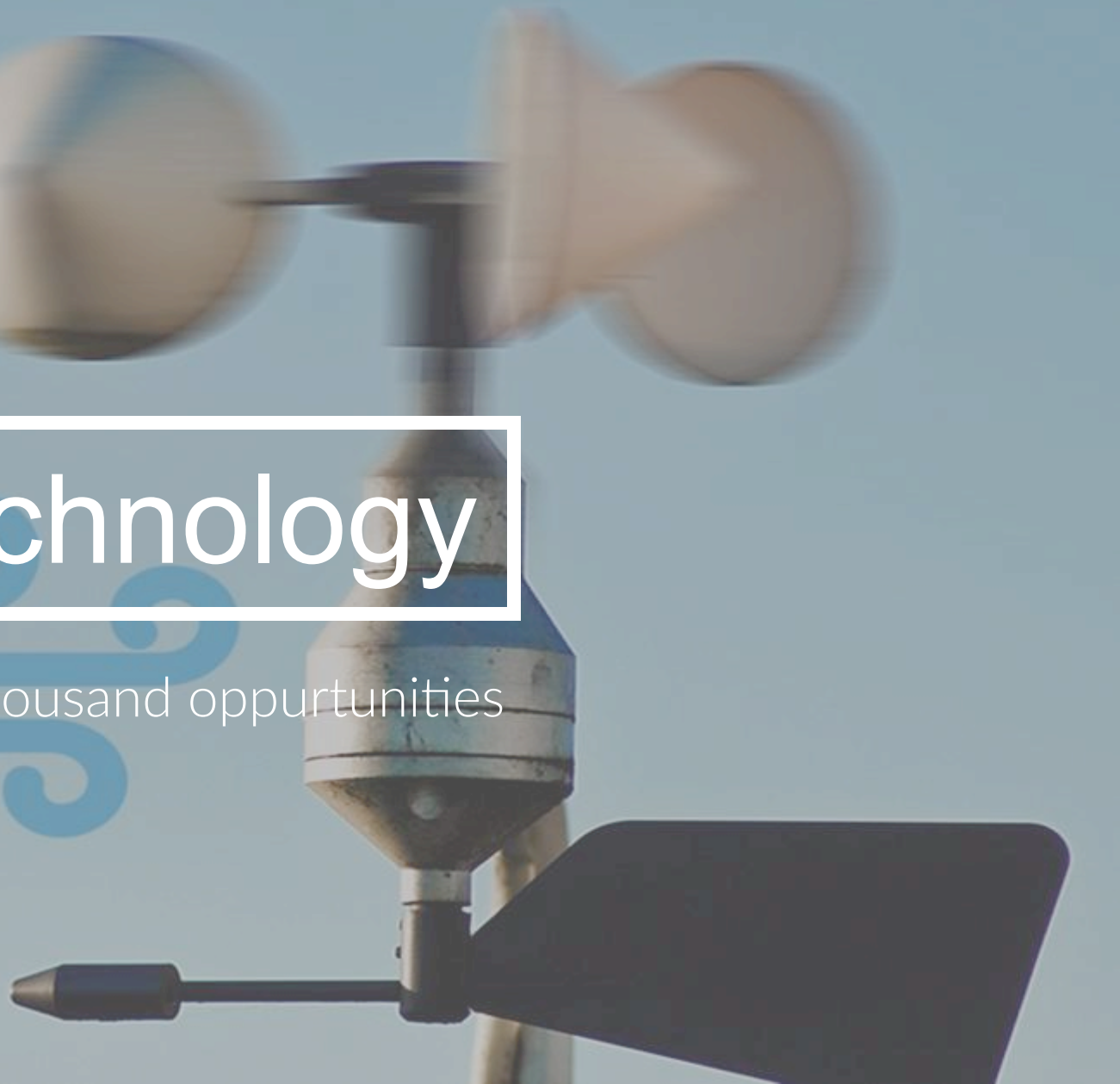
Celium was developed in New Zealand by New Zealanders to tackle a large scale biodiversity issue.

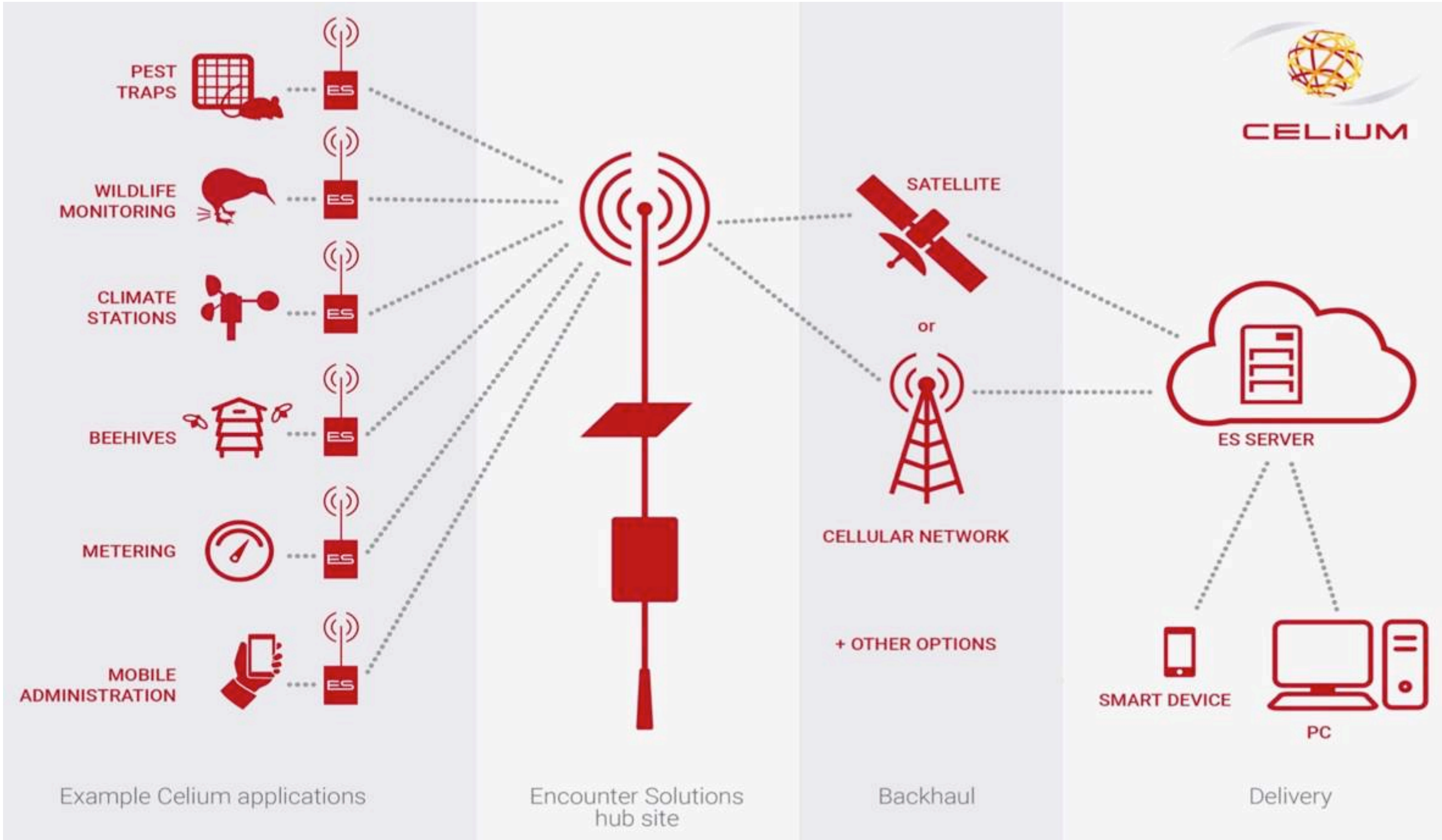
Diverse conditions made it possible to test and develop a truly robust system.

- Diverse and complex ecosystems
- Rugged terrain from mountains, to wetlands, to dense forested landscapes
- Remote locations with no connectivity
- Topographical constraints
- Harsh weather conditions

The Technology

One network, a thousand oppurtunities




PEST TRAPS
WILDLIFE MONITORING
CLIMATE STATIONS
BEEHIVES
METERING
MOBILE ADMINISTRATION
ES
SATELLITE
or
CELLULAR NETWORK
+ OTHER OPTIONS
CELiUM
ES SERVER
SMART DEVICE
PC
Example Celium applications
Encounter Solutions hub site
Backhaul
Delivery

Celium Products

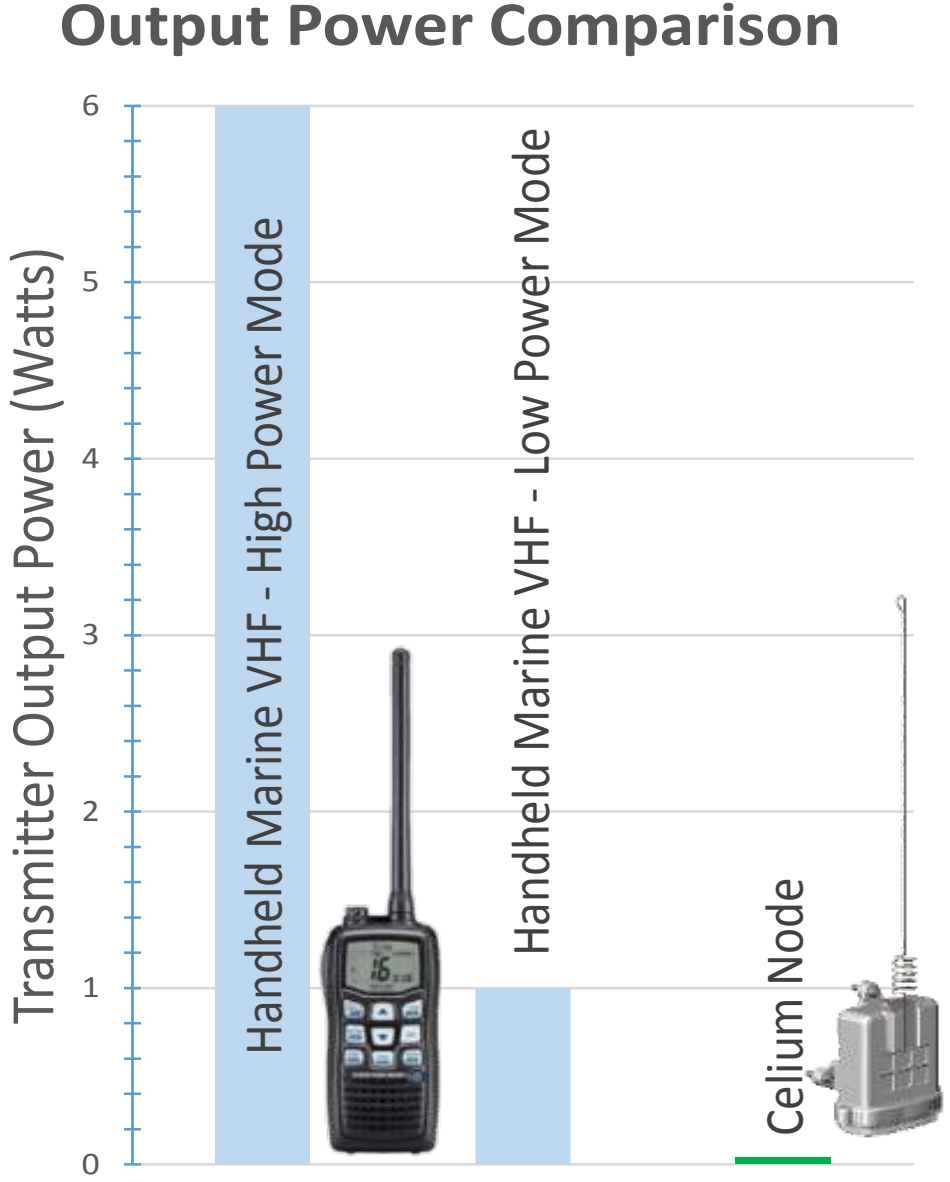
Celium Hub

- Hubs are responsible for monitoring and administering nodes within their jurisdiction.
- One hub can administer hundreds of nodes.
- Celium hubs on-forward data to Encounter Solutions' cloud servers via satellite.
- Hubs are lightweight and designed so they can be carried and installed by one person.
- Charged using solar energy.

Celium Products

Celium Node

- Nodes are wireless communication devices that are equipped with, or connected to, sensors.
- Nodes are able to perform a wide variety of functions and monitor a range of different parameters and assets.
- High performance devices, capable of withstanding demanding conditions.
- Built-in low power user interface, mobile devices can wirelessly connect to them as well.



Celium Products

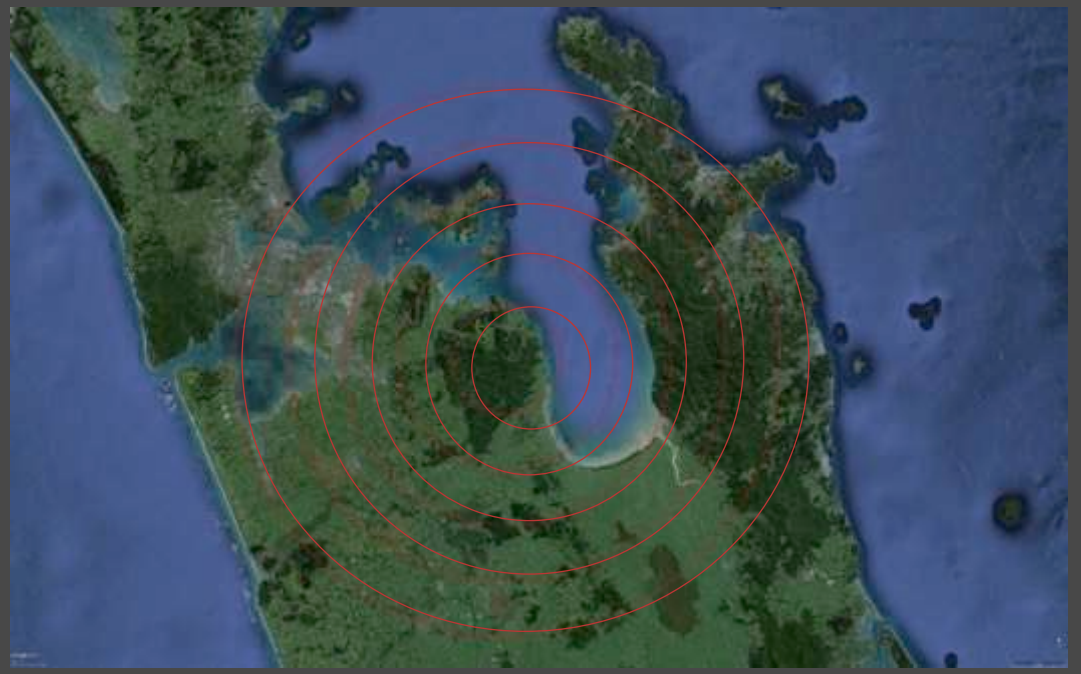
Celium Node- Low Power Long Life

- Battery lifetime is influenced by a range of factors including the frequency and duration of the transmissions.
- Celium's simple power efficient network configurations can be used to extract long operational lifetimes from batteries.
- Four AA batteries can last up to 2-4 years.

The Celium Platform

LOW POWER

Celium required very little power to run, operates on inexpensive AA batteries for several years.



LONG RANGE

Designed for deployment over large areas of rural and remote land. ESL has validated communications over 50 km.

The Celium Platform

REDUCED COST

Celium is capable of delivering significant benefit-to-cost ratios to pest trapping programmes carried out over large areas.

FLEXIBLE

Designed to be flexible, Celium hubs have been installed on buildings, on fence posts and even in trees.

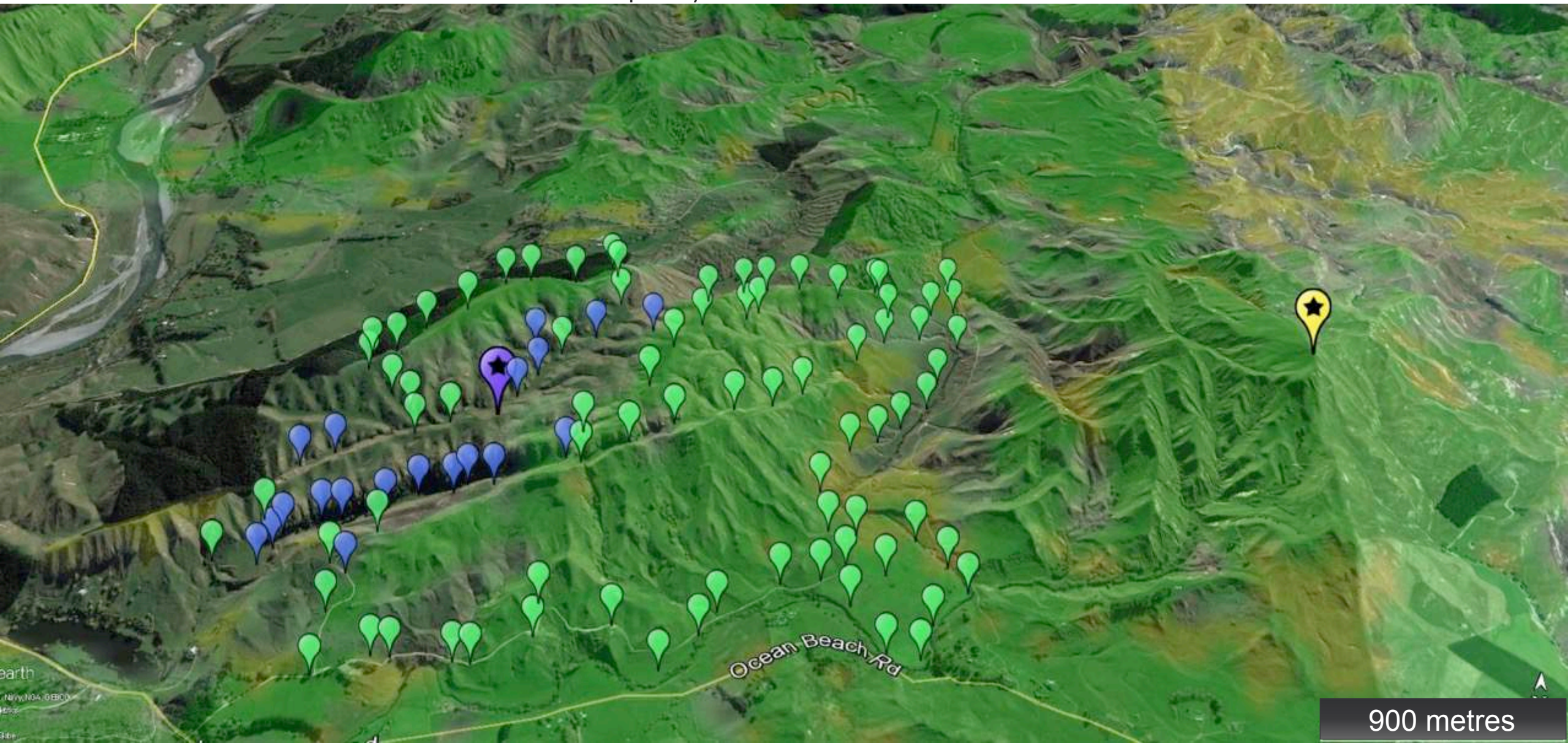
The Celium Platform

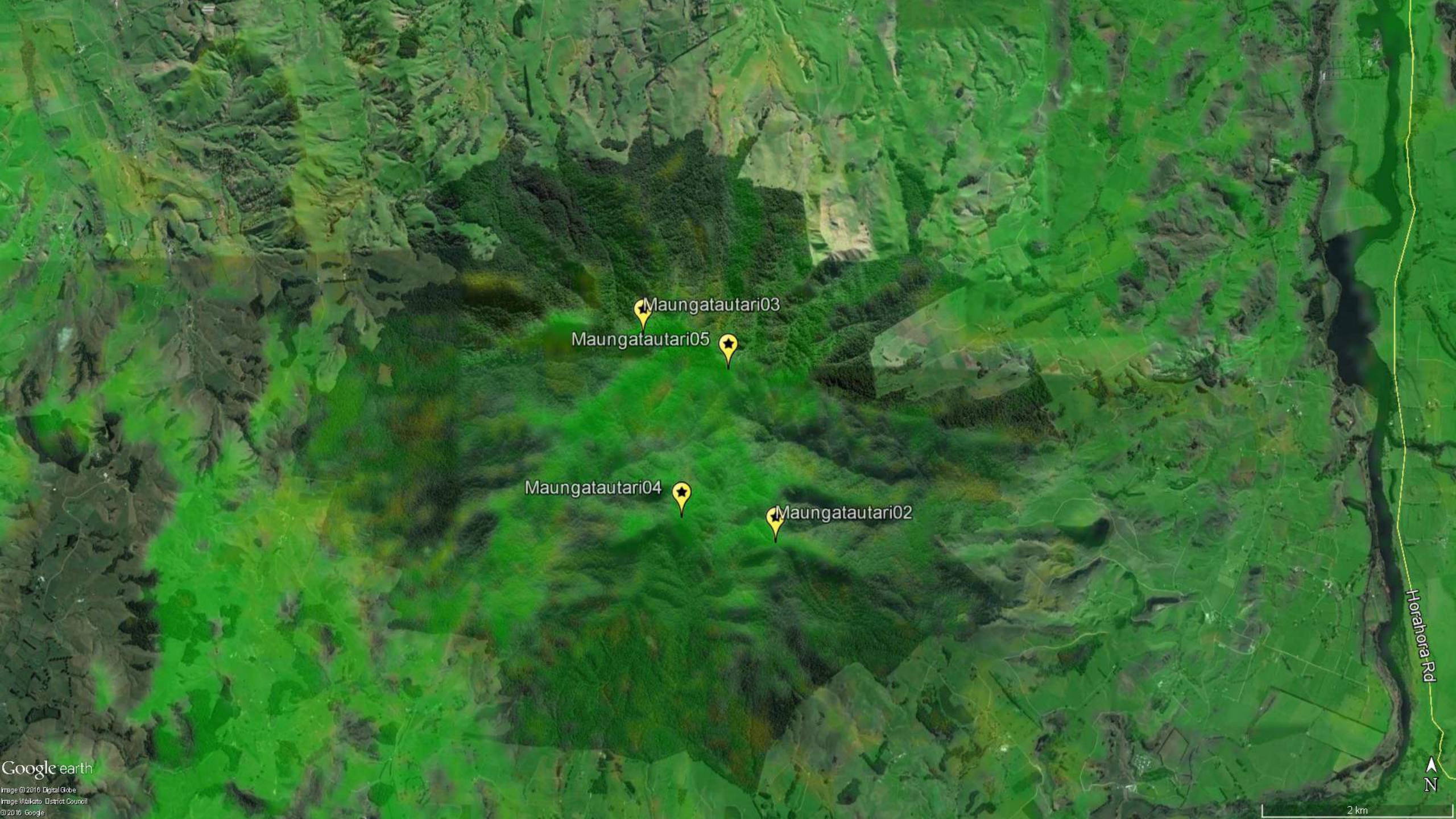
PROVEN

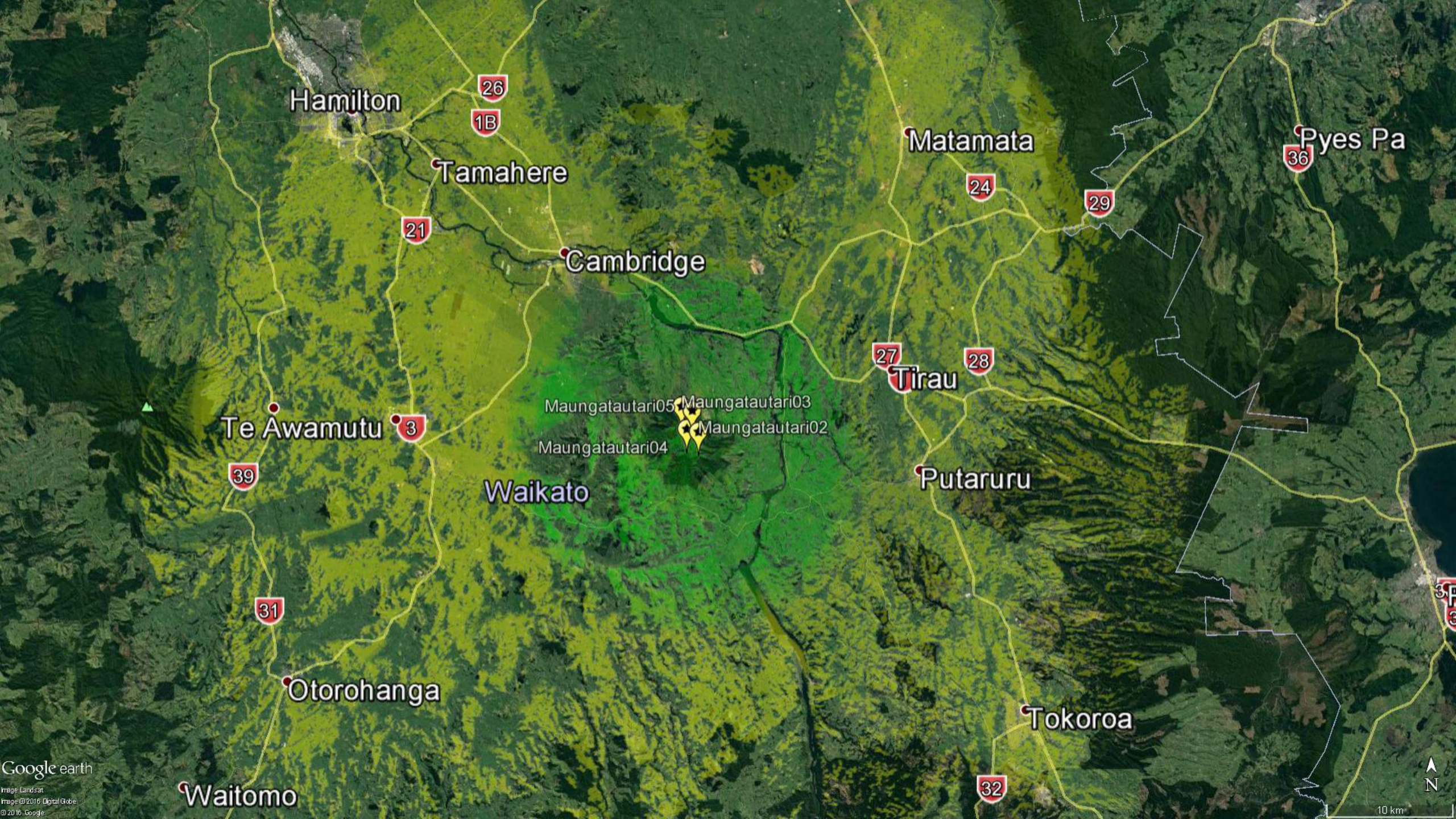
Celium has already been installed on islands, in forests, around lakes, coastal areas, over steep topography, amongst stock on productive farmland and in urban areas.

The Celium Platform

Deployment Scenario




Maungatautari03
Maungatautari05
Maungatautari04
Maungatautari02
Horahora Rd
Google earth
Image © 2016 DigitalGlobe
Image Waikato District Council
© 2016 Google
N
2 km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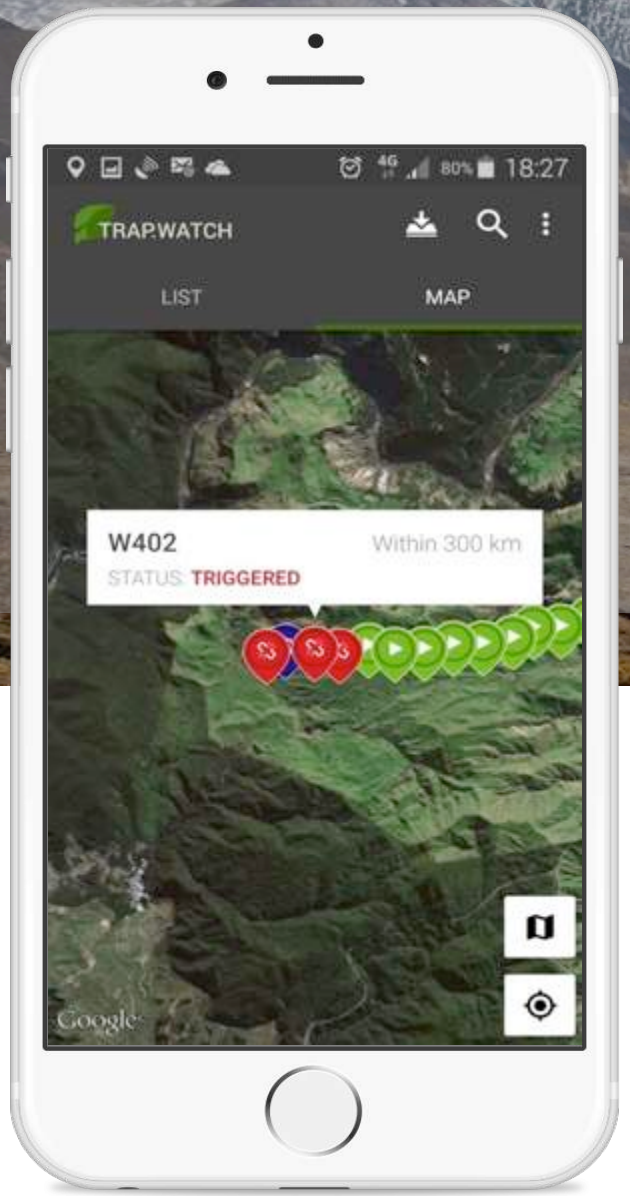
10 km


Data Mangement



TRAP.WATCH

SMARTPHONE APP

Trap.Watch is Encounter Solutions proprietary mobile application (app). It enables users to easily view and manage the real-time status of their trap networks.

Display real-time trap status

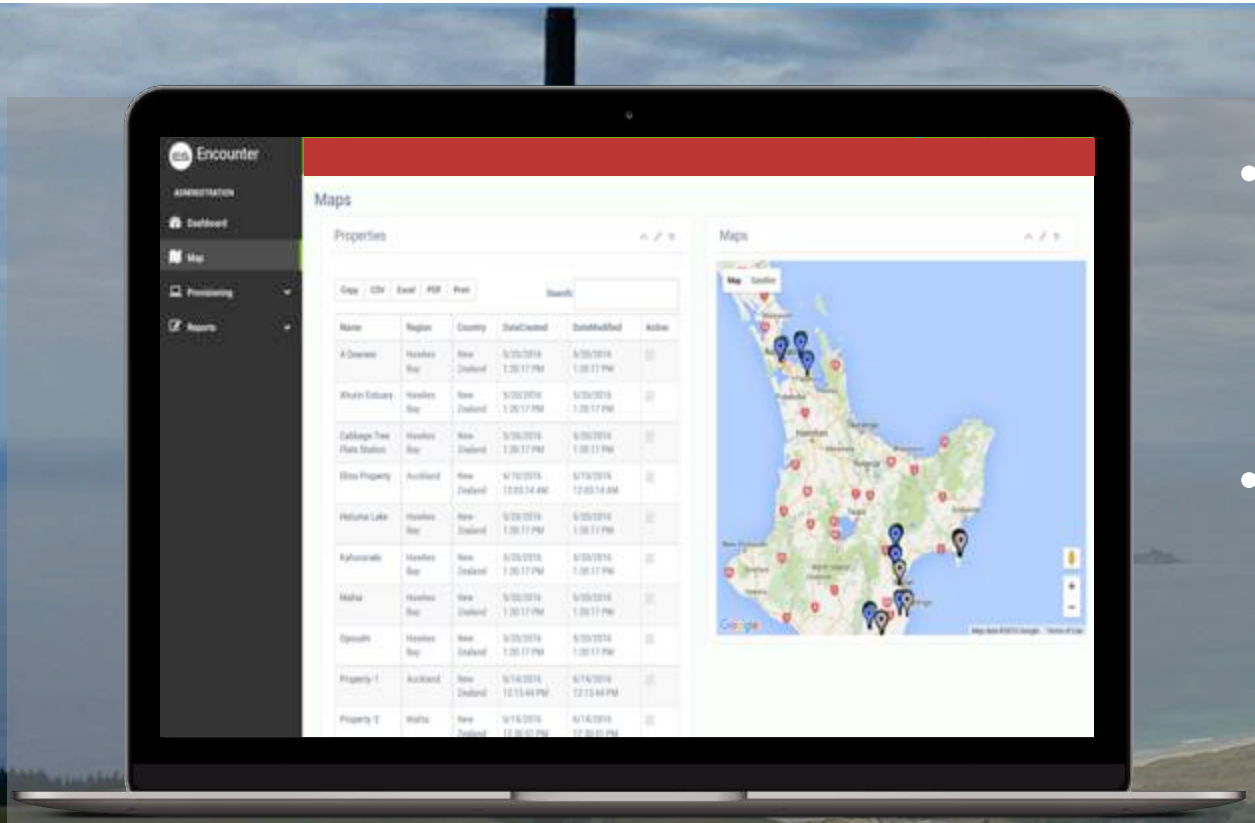
Deploy and Maintain your trap network

Works in Remote Areas

View Maps Online and offline

Cloud Data Centre

Allowing users to interact with their trapping network remotely



- The Encounter Solutions web portal enables Celium owners and users to view and manage their networks online.
- The portal provides real-time status information of Celium trap networks in interactive map formats as well as summary statistical information.

Case Studies

Wireless Sensor Networks

Landcare and Seradigm independent research for 300 live-trapping network

Jones, C. et. al., Applications of Wireless Sensor Networks for Wildlife Trapping and Monitoring Programs. Wildlife Society Bulletin 39(2):341–348; 2015.

01

Daily check- **$29,907**
WSN 5-day rebaiting- **$13,165**
WSN no rebaiting- **$8,985**

02

50% of operational costs could be saved when traps were visited only when sprung and rebaited every 5-days. Up to **70%** with long-life bait.

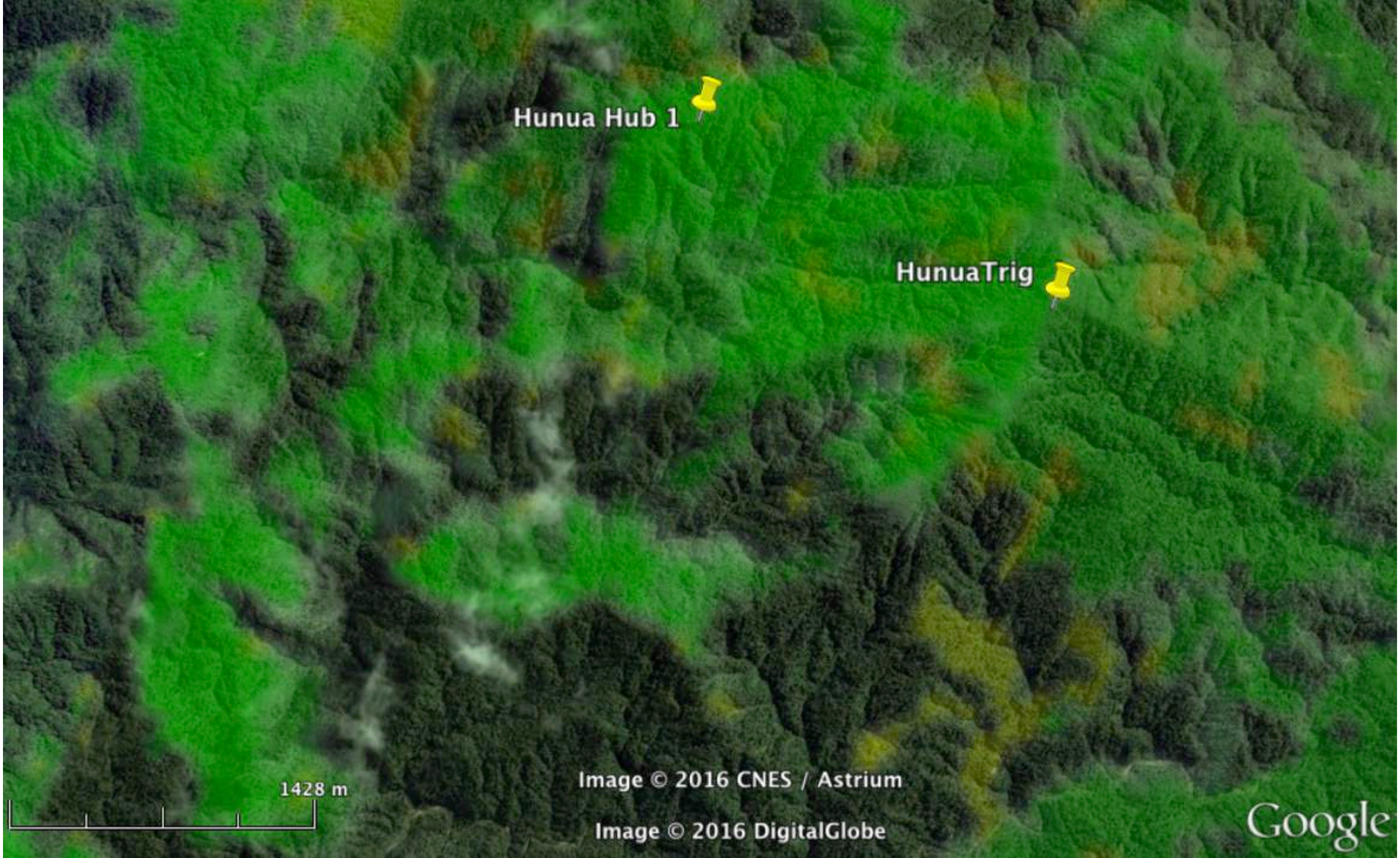
03

Cost savings - **58% at a rate of 2.40 sprung traps/100 trap-nights** to **79% with a trap-spring rate of 0.76/100 trapnights**

Hunua Kokako Recovery Projects

- An early indication of high rat or mustelid numbers if lots of traps go off in a short time frame.
- Early alert for predators close to kokako nests, faster response time and ensure that trap is emptied.
- Ability to place traps outside the bait grid system in remote locations 24/7.
- Tracking- alert when transmittered animals pass by a node.

Auckland Council
Te Kaunihera o Tāmaki Makaurau

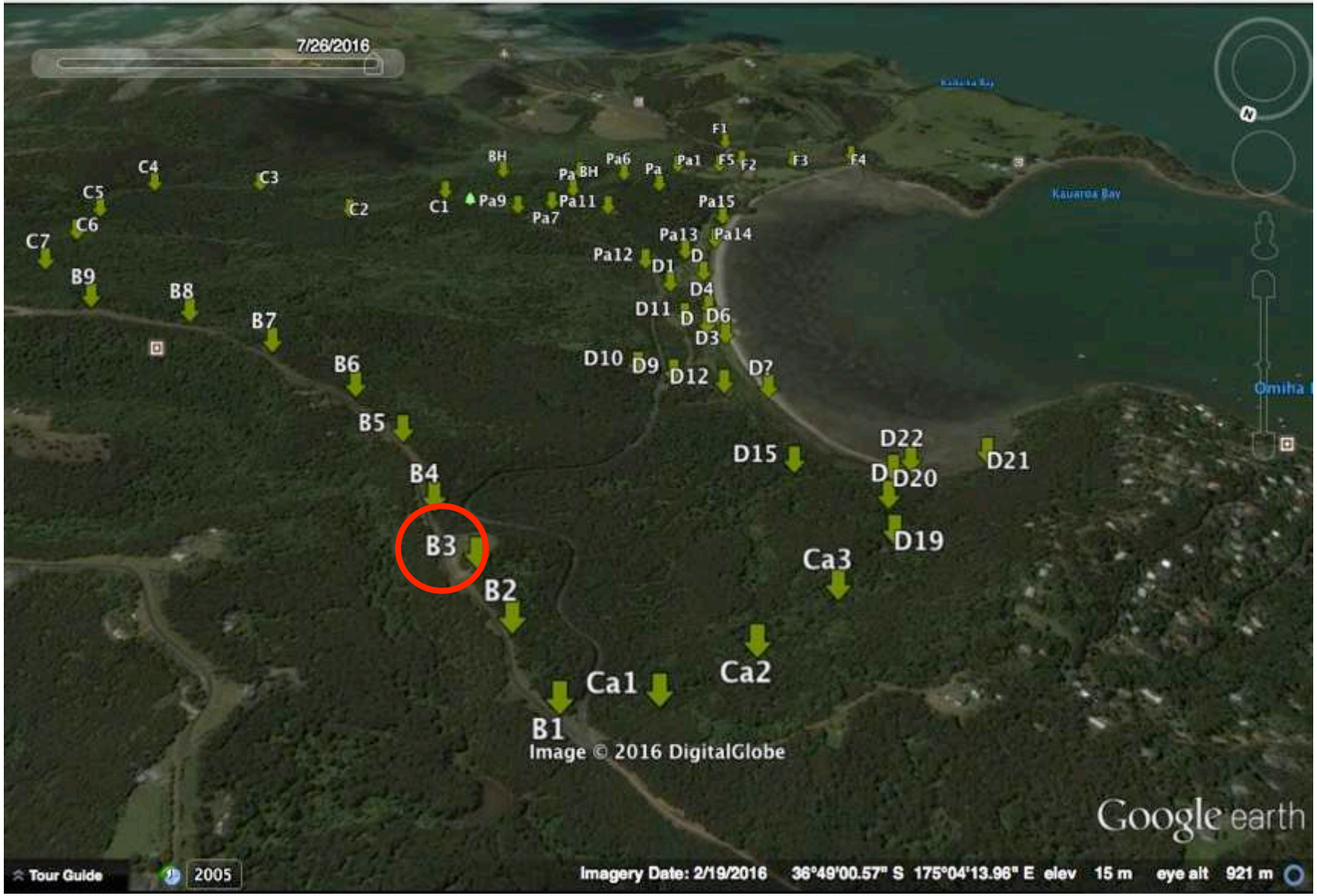

Hunua Hub 1
HunuaTrig
1428 m
Image © 2016 CNES / Astrium
Image © 2016 DigitalGlobe
Google

Whakanewha Regional Park

Key Factors

- Vulnerable threatened species (NZ Dotterel, Bittern, Pāteke, Geckos)
- High ambient pest numbers
- Topography, steep and forested
- Range of trap types
- Limited resources for trap checking

Auckland Council
Te Kaunihera o Tāmaki Makaurau



Results

- Efficient targeting of resources
- Increased trap catch rates
- Adaptable node function based on trap type
- Improved response time to live traps

Auckland Council
Te Kaunihera o Tāmaki Makaurau

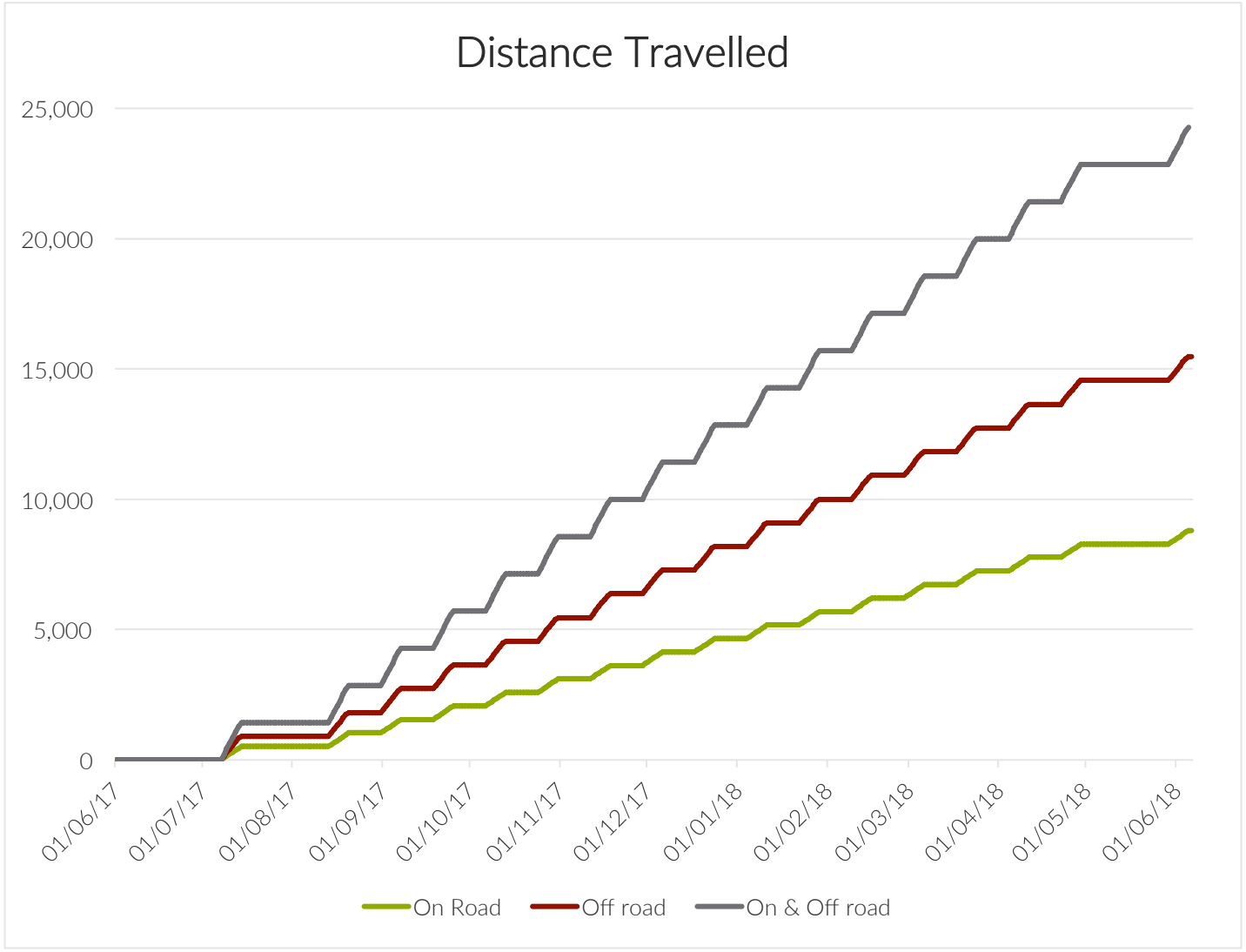
Cape to City

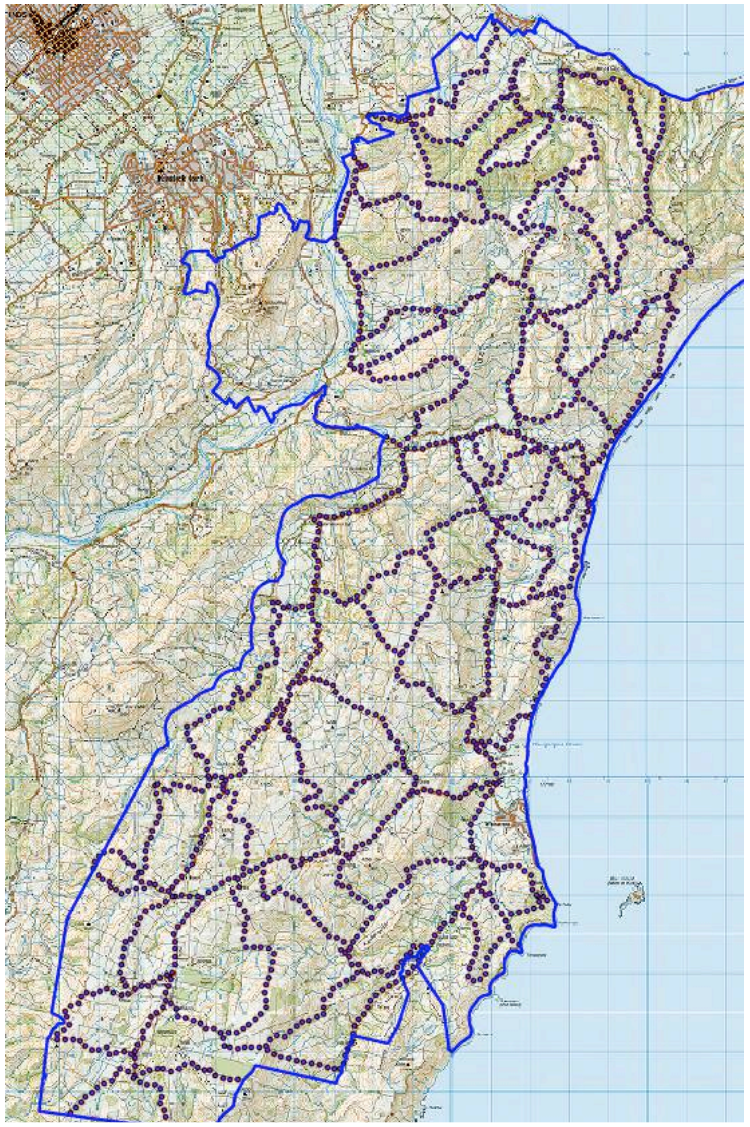
A partnership between: Cape Sanctuary land owners, Hawke's Bay Regional Council, Department of Conservation,, Landcare Research, Tangata Whenua, 168 Landowners, Aotearoa Foundation, and citizens of the Hawke's Bay region and beyond.

- To deliver low-cost integrated predator control over a large-scale.
- Implementing biodiversity enhancement learning programmes into Hawke's Bay schools.
- Using camera trap to monitor pest numbers before and after trapping.

- The use of wireless technology to revolutionise pest control operations.
- Toxoplasmosis disease based research
- The intention is to deliver a template for wide scale predator control that can be incrementally rolled out across the region and New Zealand.

Distance travelled

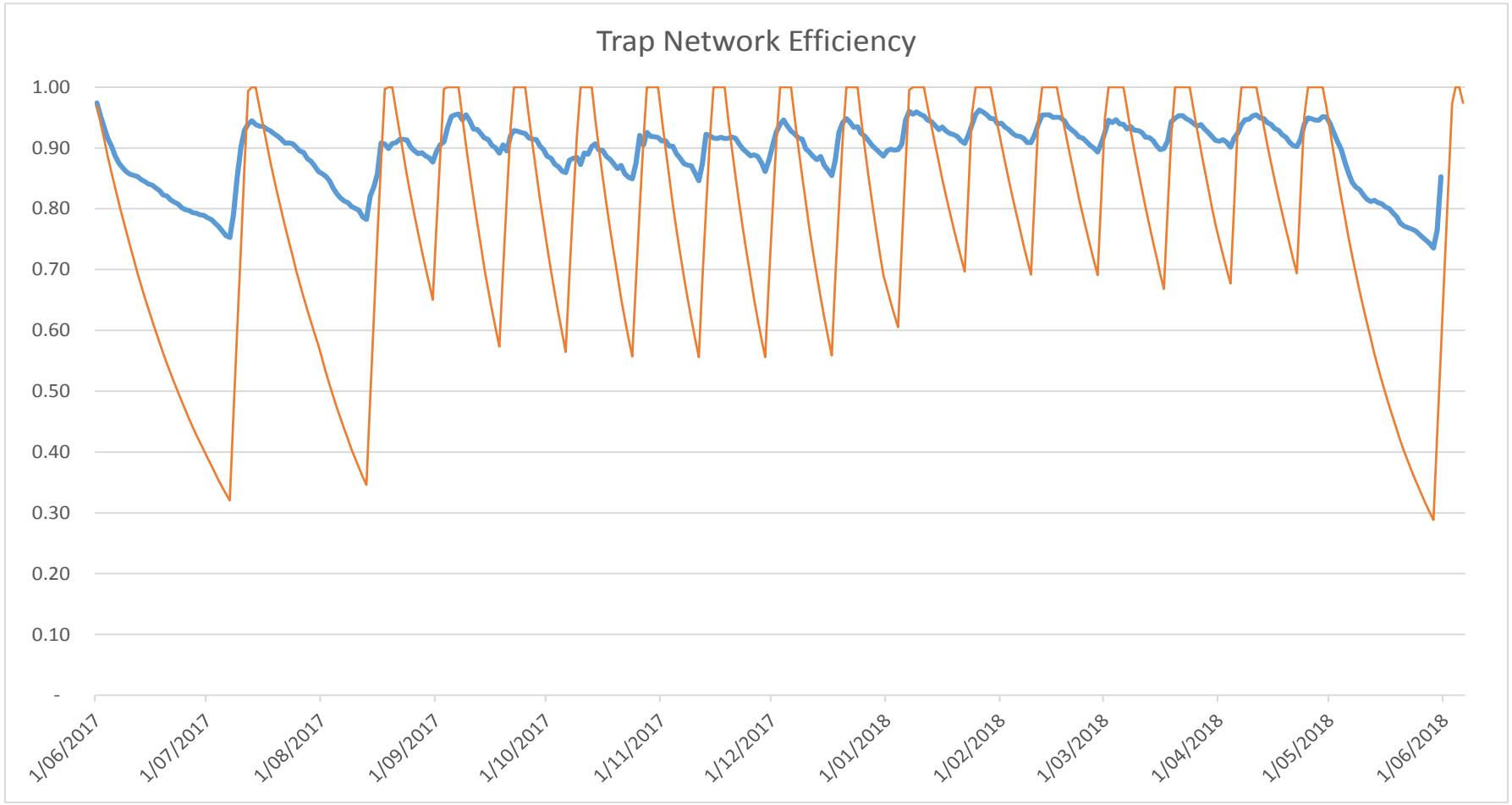


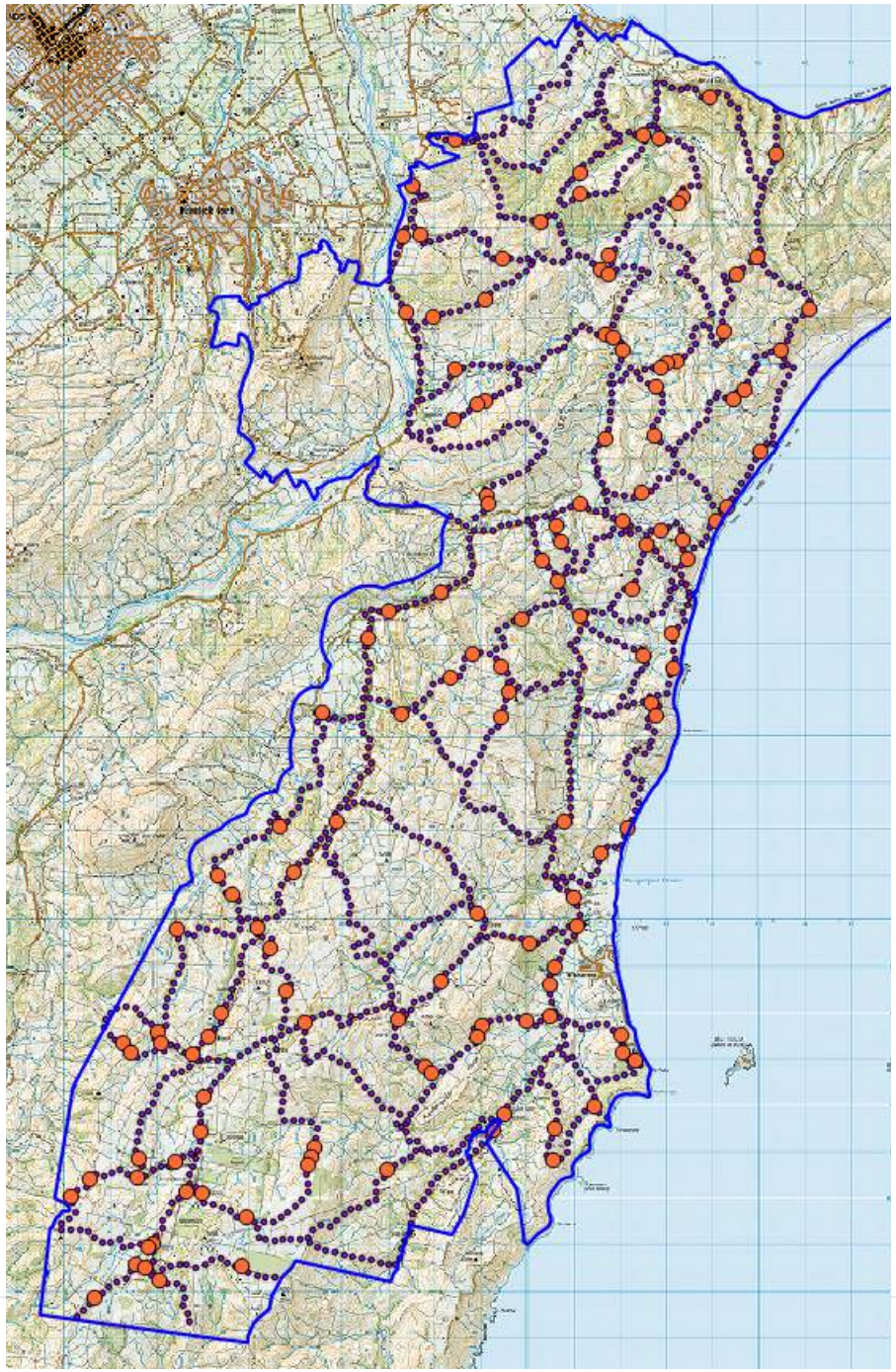


Trap Network Efficiency

Assumption: 80% of traps are checked and cleared within 25% of the standard trap check intervals

%





Client Testimonials

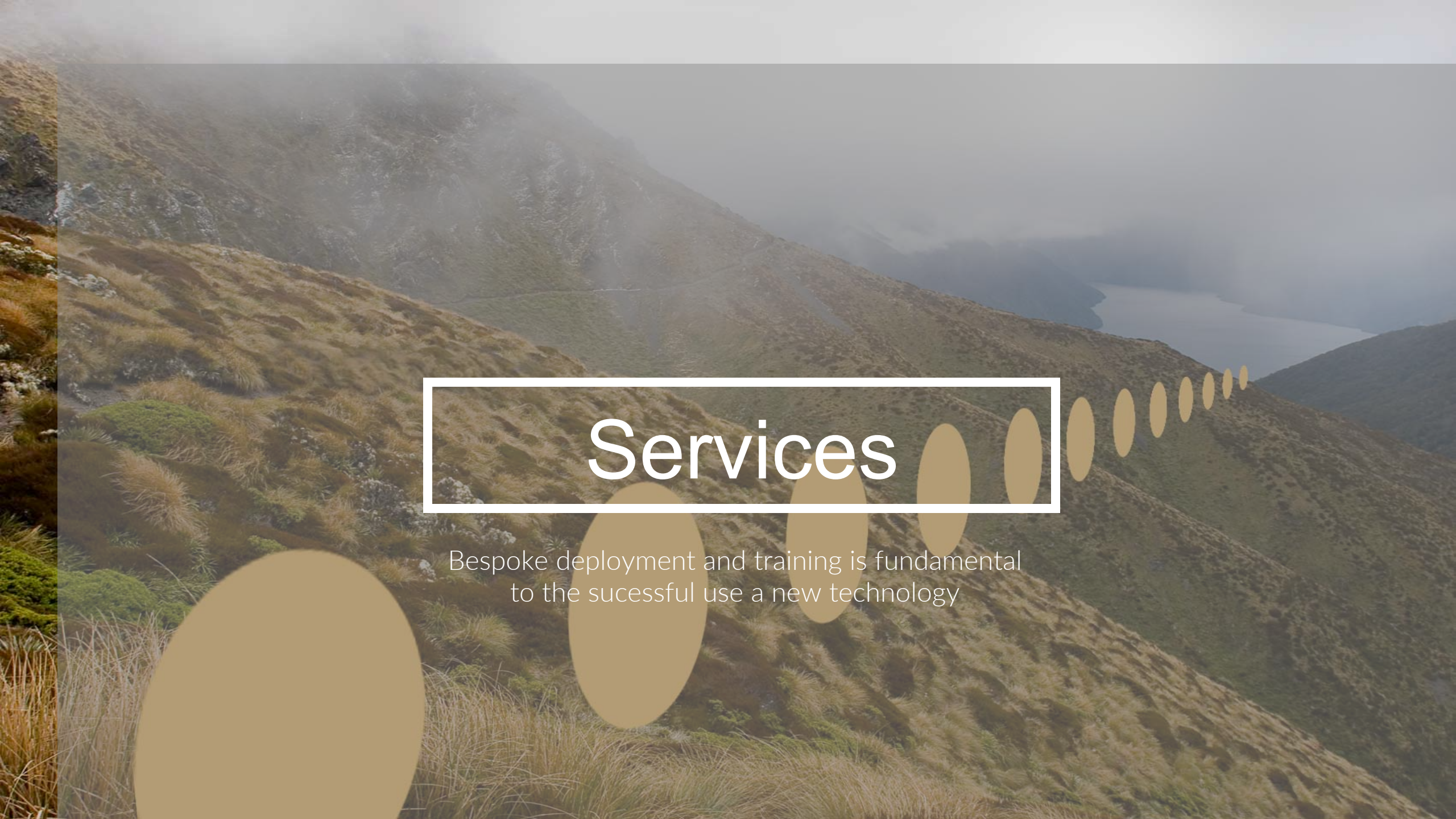
From project partners

"In most cases, the cost of labour for pest trapping is 40-70%of the total cost of an operation. Wireless technology will reduce this labour cost by up to 50-80-% depending on the scenario."

CAMPBELL LECKIE *Land Service Manager, Hawkes Bay Regional Council*

"Farmers don't have a lot of time to continually check bait stations and traps using this technology is going to make a big difference. We are going to see a bird paradise.'

Bruce Wills *Drirector, Queen Elizabeth II National Trust, former Federated Farmers President*



Services

Bespoke deployment and training is fundamental to the sucessful use a new technology

Our Services

Encounter Solutions will provide a range of services to ensure effective management of your assets

Delivery of Robust Technology

Deploymet Training

Data Management Services

Operational Support

Satellite Data

Consultancy

What is required?

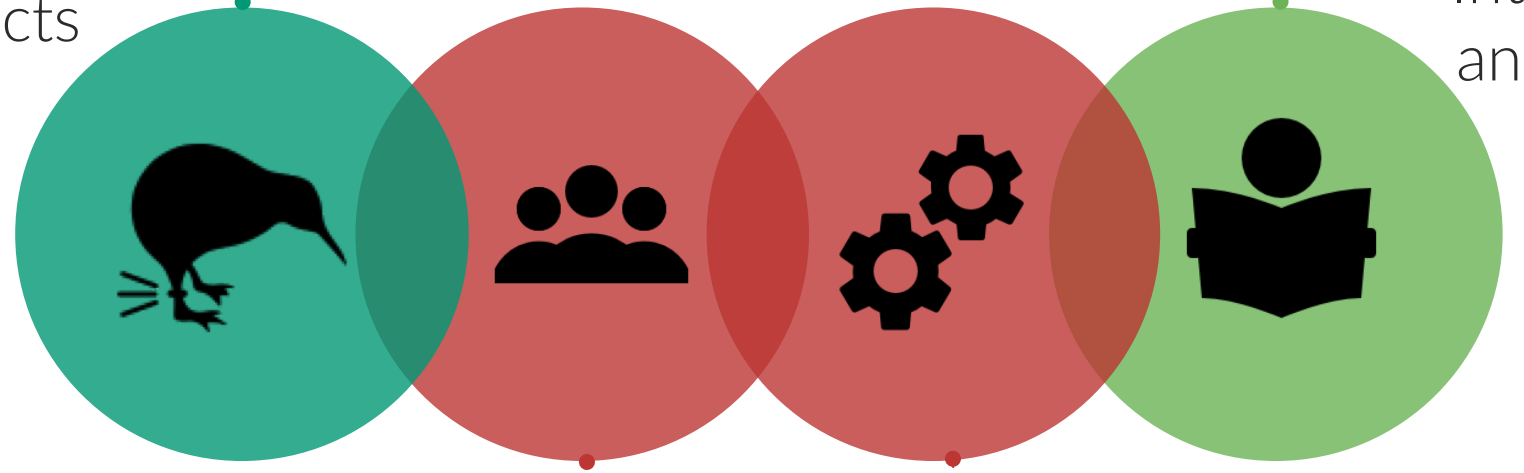
A new model that that integrates:

Large scale

Biodiversity Restoration Projects

Wide-scale Education

Integrating Schools and Environmental Education Programmes



People

Uraban and Rural Communities

Primary Production

Business as Usual

KEEP IN TOUCH WITH US

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