

# Mapping NZ 2025

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OUR VISION

The power of 'where' drives NZ's success

the power of  
**where**  
drives NZ's success



OUR  
OUTCOME

Geographic and property information are both used effectively to address key challenges for NZ: resilience and climate change, water, urban areas



CRITICAL FEW  
PROGRAMMES

Mapping NZ 2025  
Improving Resilience to Natural Events  
Improving Property Information

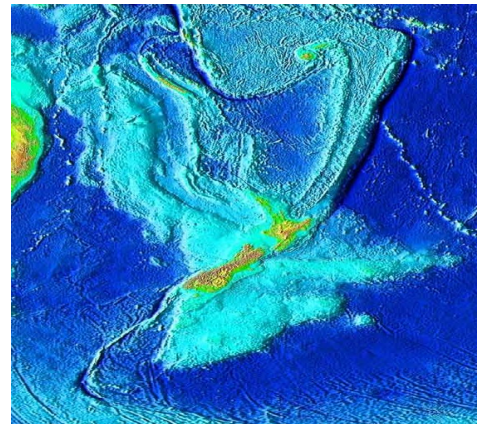
OUR PURPOSE

We drive the delivery of accessible, useable geographic and property information to provoke better decisions and inspire innovation

# Mapping NZ 2025

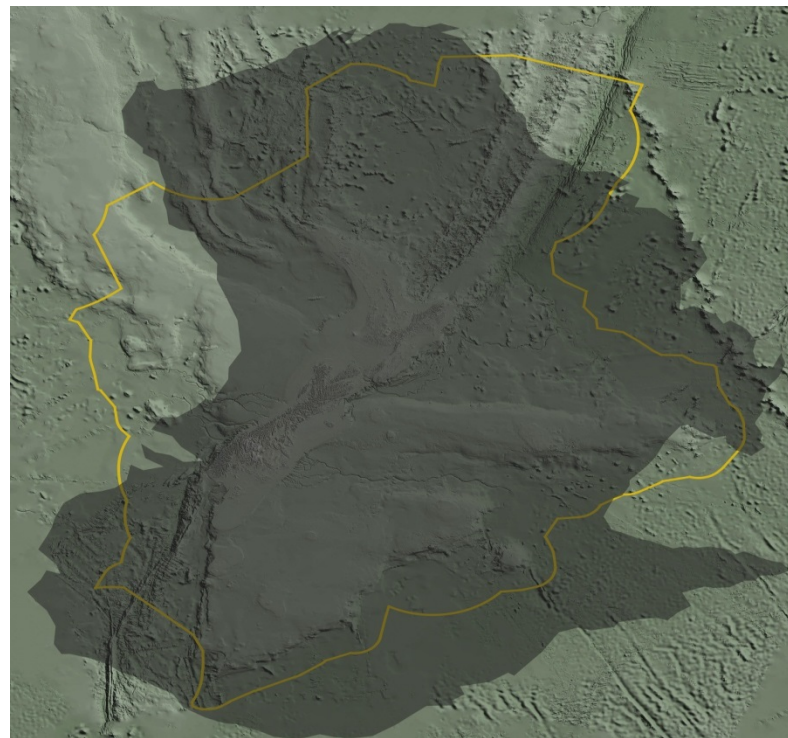
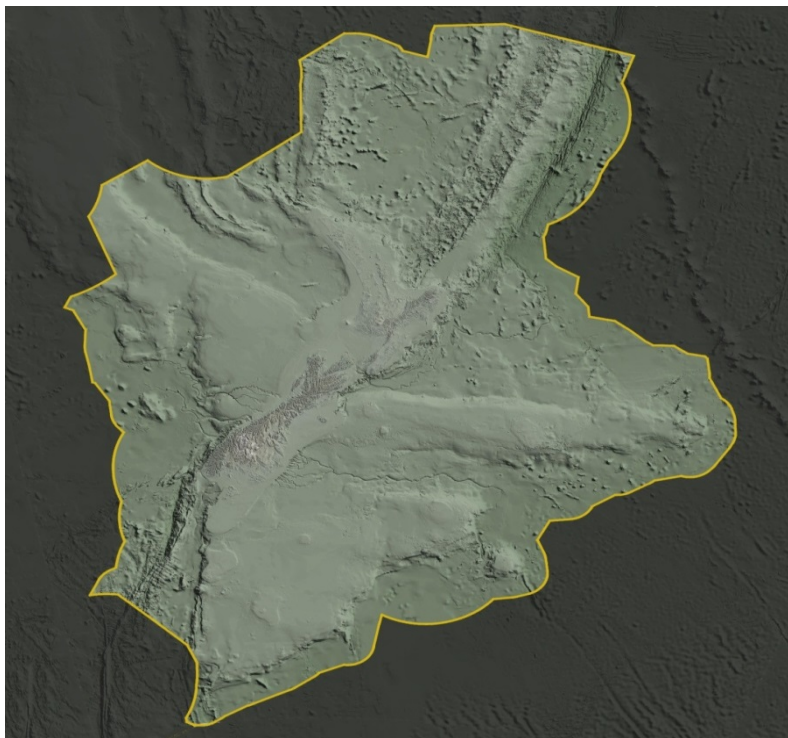
Mapping NZ 2025 is a 10-year programme of leadership and coordination by LINZ.

It aims to ensure seamless, integrated mapping and provision of national datasets that help answer the most critical 'Where' questions.



# Mapping NZ 2025

A land and marine domain similar to the size of Australia.



# Some predictions for our land and sea domain

**By 2068, NZ's population will be 7.5 million**

**Within the next 30 years, Auckland's population will grow by 1 million**

**Half of the infrastructure required by 2050 has not been built yet**

**In the next 10 years, the Government will invest \$50 billion in infrastructure**

**By 2050, sea levels will rise by 30cm, impacting our coastal communities**

**Within 50 years, climate change will significantly increase droughts in some areas, flooding within others**

**By 2030 NZ will need to significantly reduce carbon emissions to meet international obligations**

**In the next 25 years, dairy cows numbers will double increasing stress on the environment**

**Since 1990, fertilizer use has increased by 600% increasing nitrogen runoff into waterways**

**90% of NZ wetlands have been drained by farming, continuing to put stress on our environment**

**While the continental shelf is 21 times larger than NZ's land area, it's poorly mapped, resulting in unrealised opportunities**

**By 2050 NZ aims to make the nation predator free**

# Mapping NZ 2025 - will help us answer some of these and other questions

**Where** to plant 1M ha of trees that can improve our carbon emissions?

**Where** are waterways affected by intense agriculture?

**Where** to build 500k buildings needed in Auckland?

**Where** to minimise the impacts of flooding?

**Where** to invest \$50B in infrastructure over the next 3 decades?

**Where** is the greatest potential for productivity gains in Māori land?

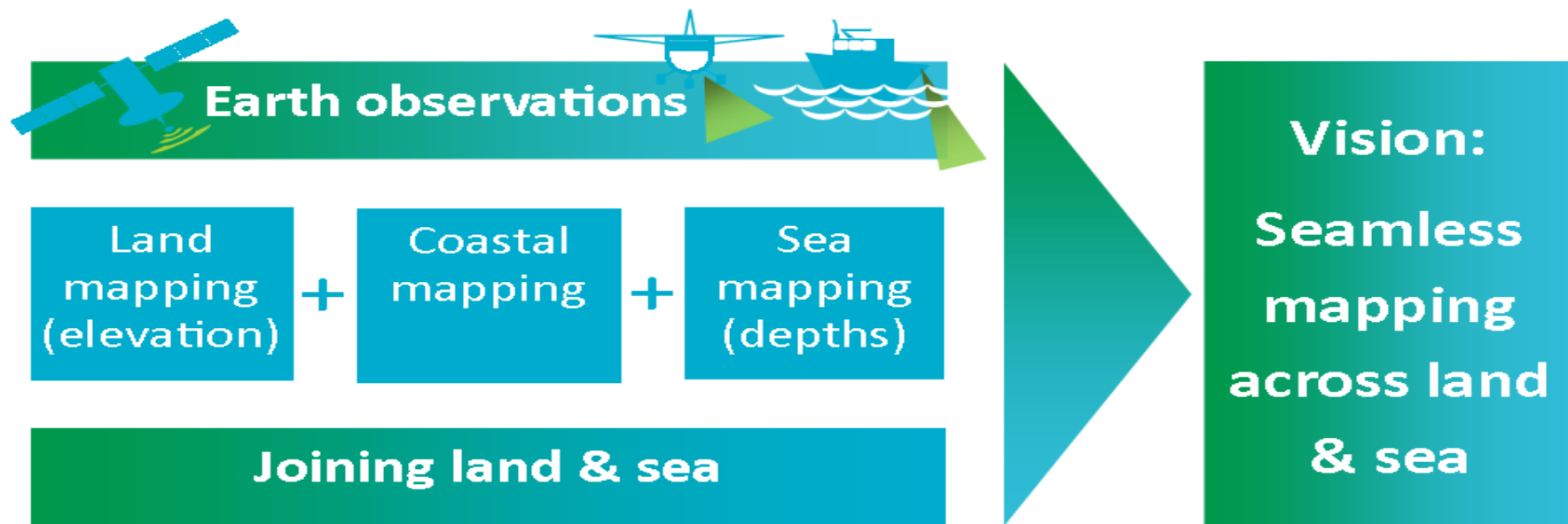
‘The  
power  
of  
where’  
DRIVES NEW ZEALAND’S SUCCESS



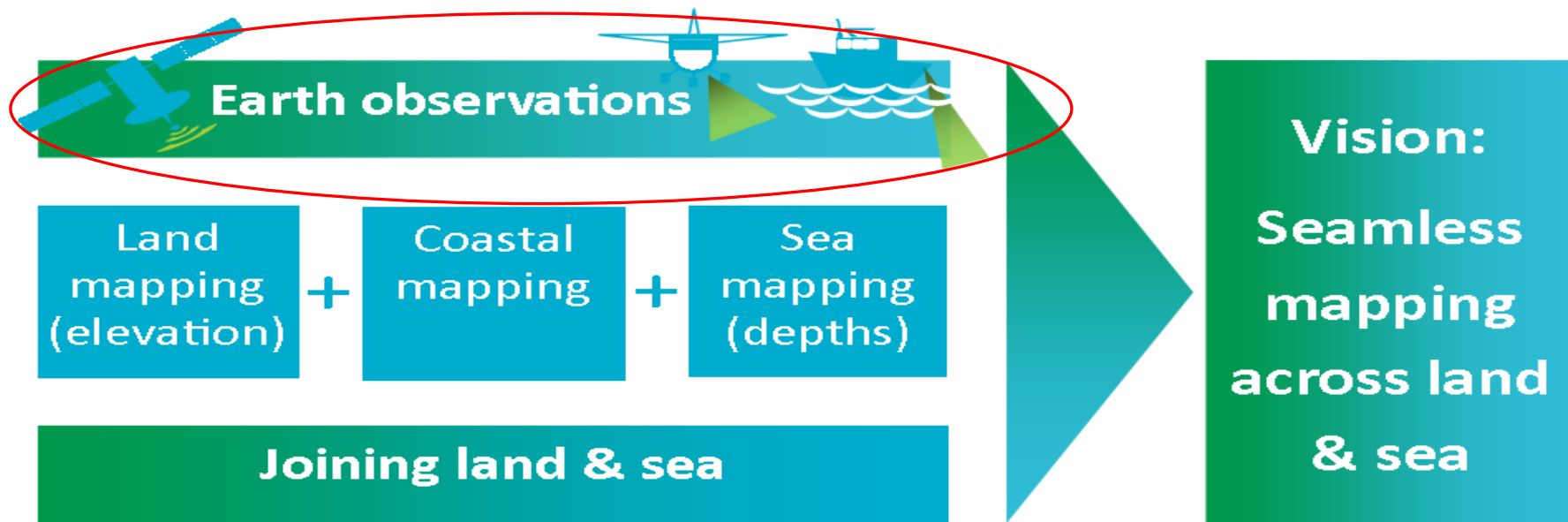
**Where** is productive land most at risk from climate change and how do we mitigate that?

**Where** are pests impacting our native vegetation?

# Mapping NZ 2025



# Mapping NZ 2025



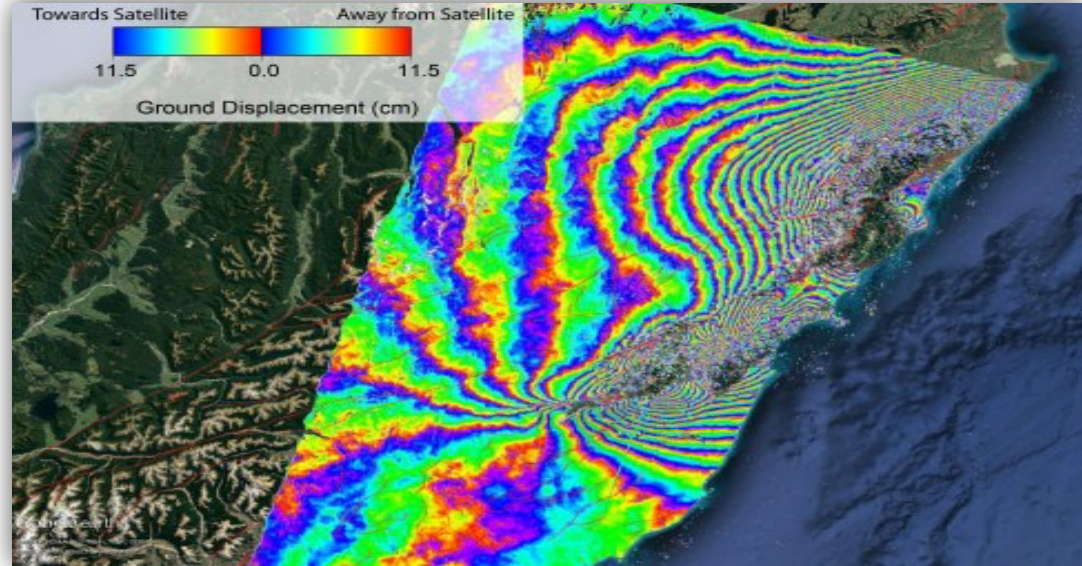


# Access to Earth Observations

- Visit the LINZ Earth Observation Innovation Hub to access Sentinel-2 satellite image archive.
- Three Access Points to EO Imagery:
  - LINZ Data Service (yearly Sentinel-2 mosaic)
  - Sentinel Playground (full Sentinel-2 archive)
  - Sentinel EO Browser (full Sentinel-2 archive).

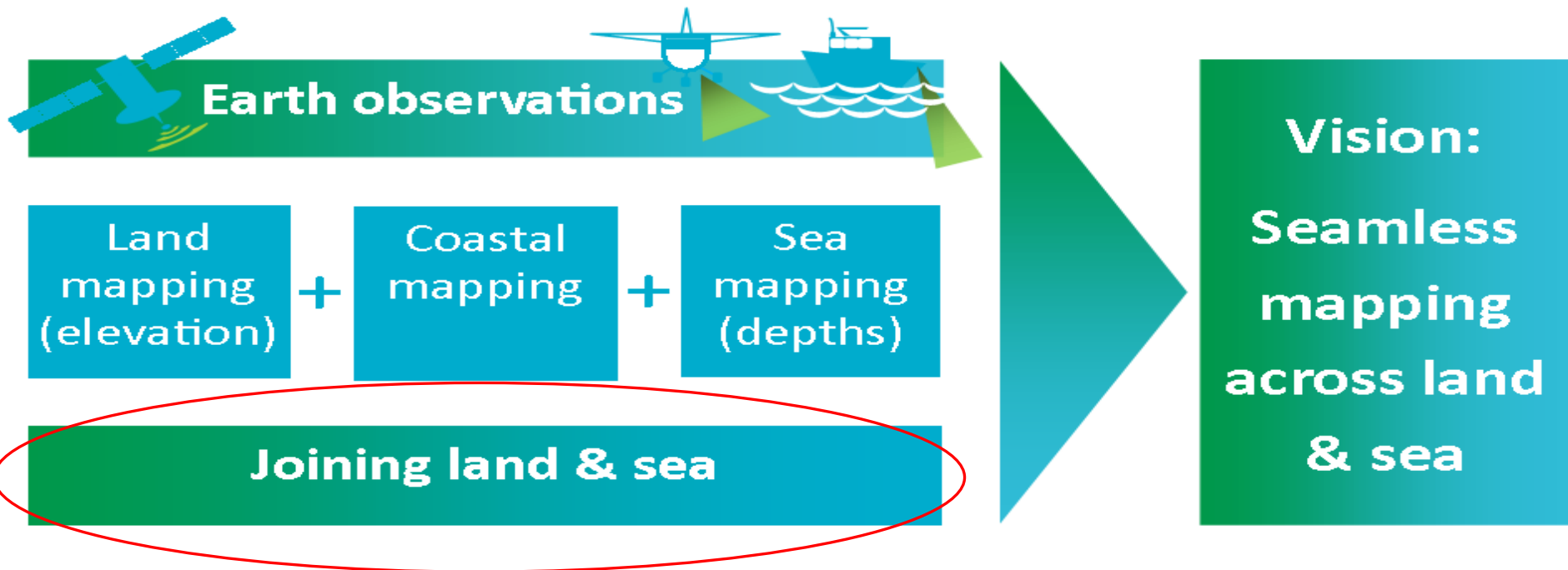


- Interferometric Synthetic Aperture Radar (INSAR) is a geodetic technique that can identify movements of the Earth's surface.
- InSAR can identify surface movements of millimetre to centimetre scale.



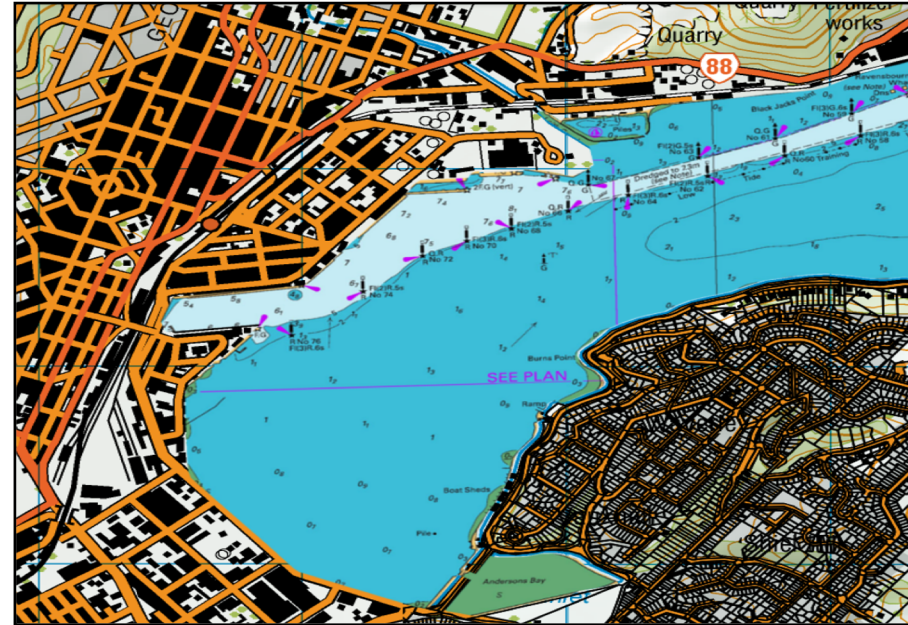
Interferogram of Kaikoura using radar satellite data. Each set of rainbow-coloured contours represent 11.5 cm of ground movement. The largest changes in land motion have occurred where the coloured contours are closest together.

# Mapping NZ 2025



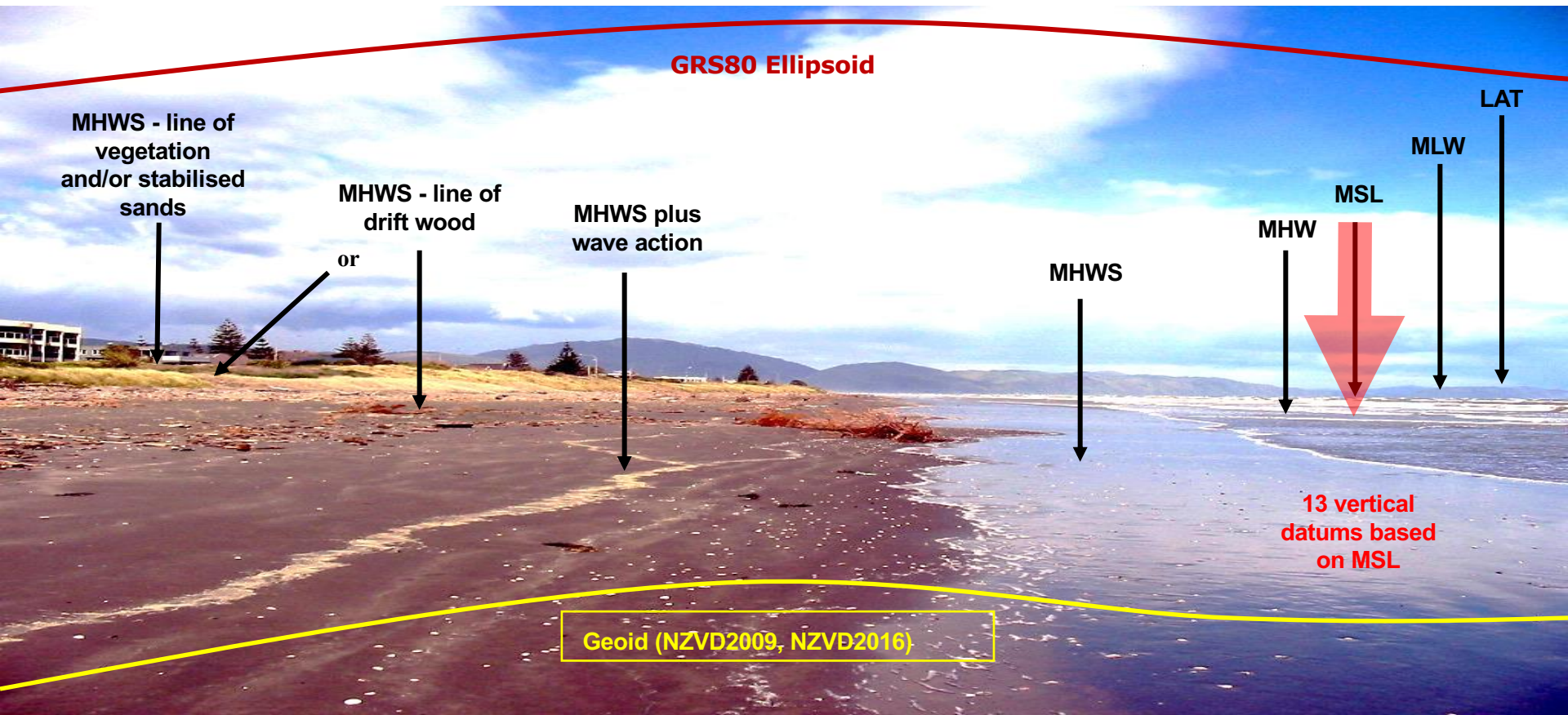
# Joining land and sea datasets

- Datasets defined in terms of different vertical datums and reference surfaces
  - Topography – MSL
  - Hydro – LAT/CD
  - Cadastral – MHWS
  - Geodesy – MSL & ellipsoid.
- The challenge is to combine different datasets.

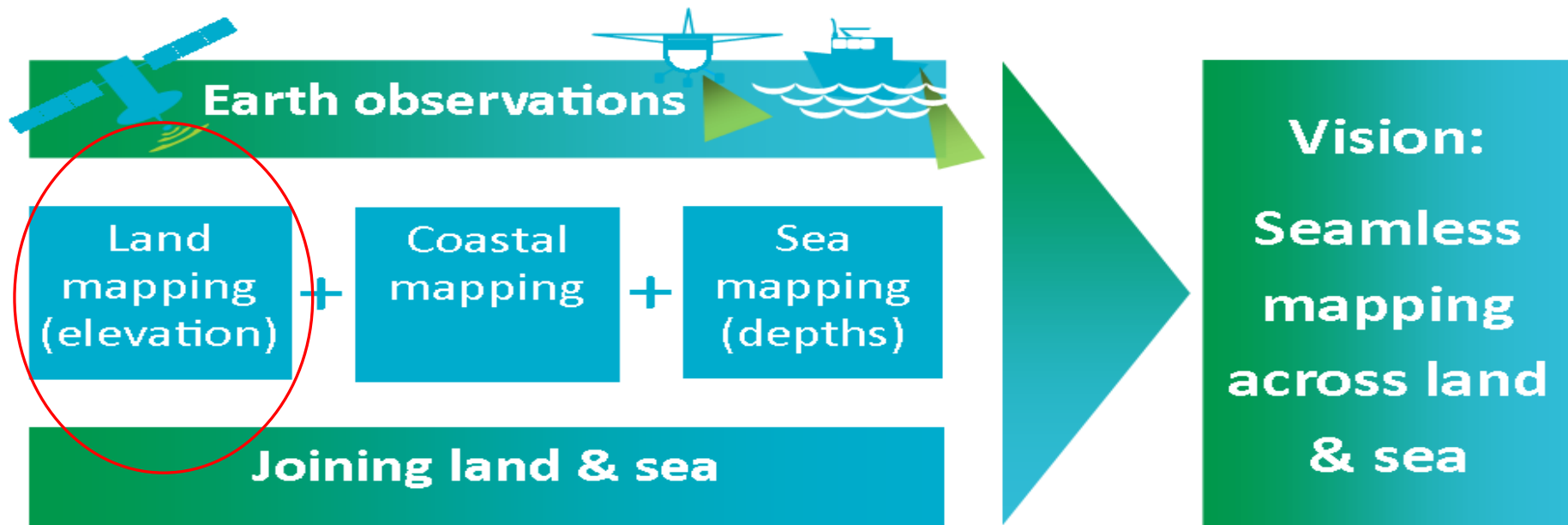


- Working with NIWA to enable linking boundaries in the littoral zone and seamless data:

- tool for transforming data between datums
- improved NZ tidal model



# Mapping NZ 2025

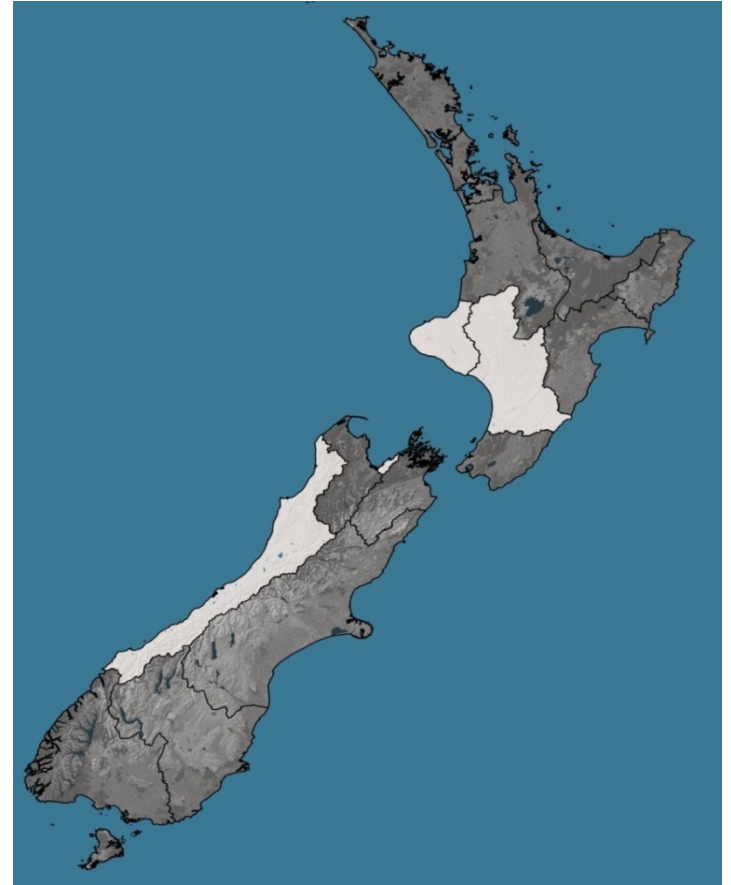


# Learning from the past to inform the future



# Historic Imagery

Scanning Partners: Northland, Auckland,  
Waikato, Bay of Plenty, Gisborne,  
Hawke's Bay, Wellington. Tasman,  
Canterbury, Marlborough, Otago,  
Southland





BETA

RETROLENS  
Historical Image Resource

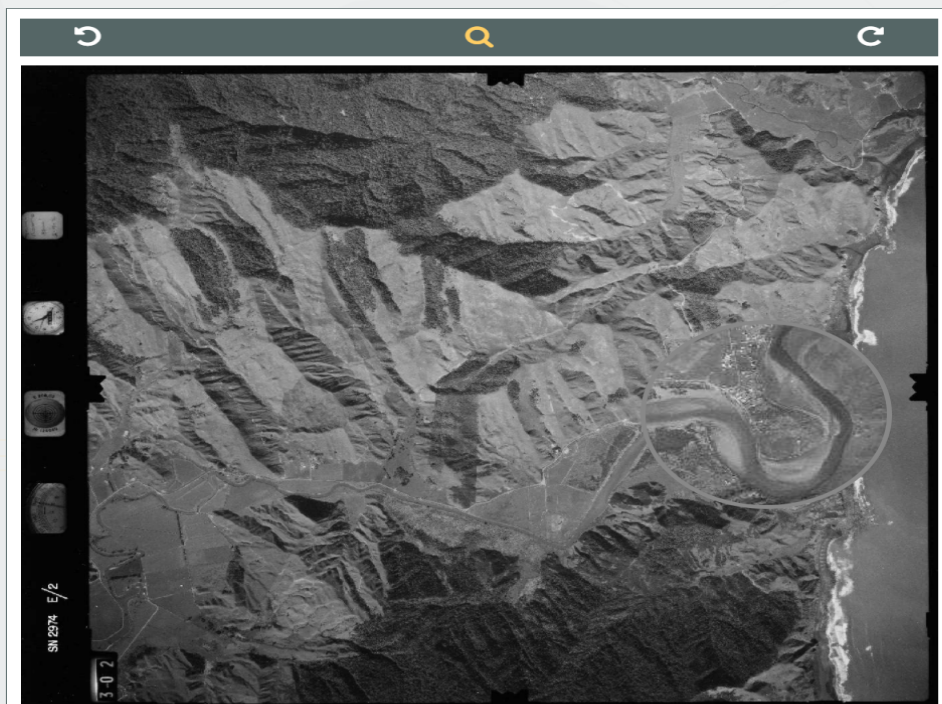
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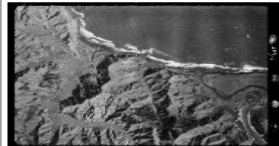
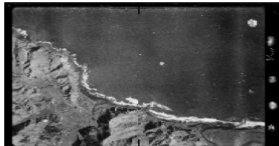
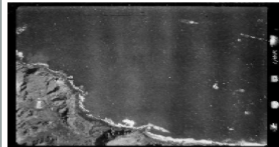

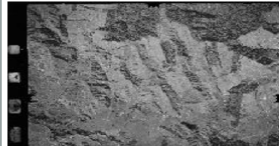
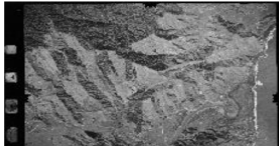
1926  2017

Auto refresh photos from map.

Place point on the map.



9 images found [add all](#) | [remove all](#) | [download\(0\)](#)

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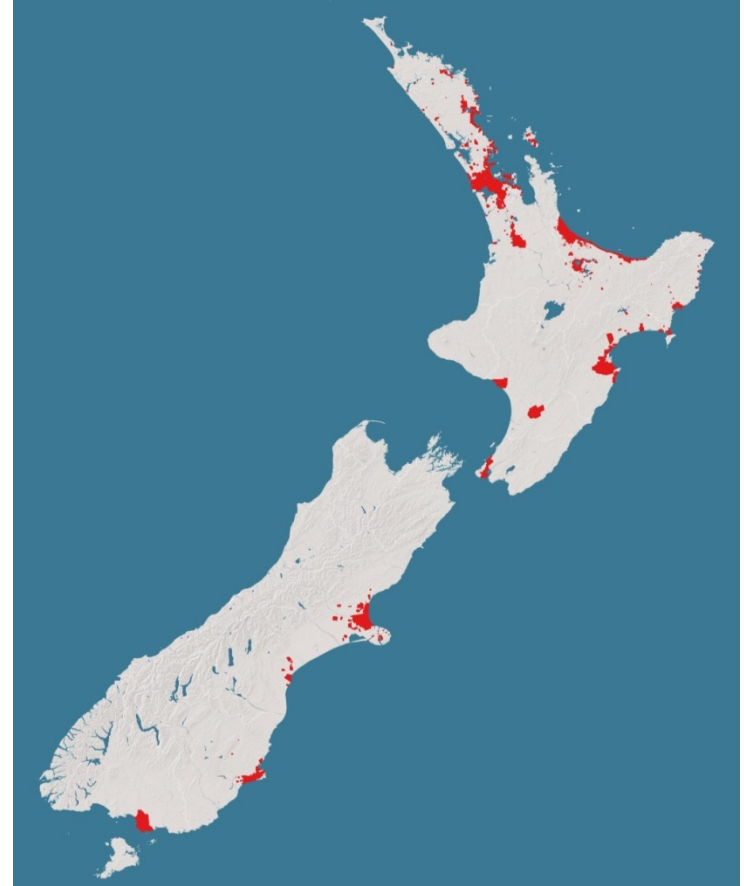
# Regional Aerial Imagery

- Work in regional consortiums
  - regional councils
  - territorial authorities
- Central government
  - MPI
  - DOC
  - LINZ
- Creative Commons License
- Resolution ~ 30 – 40 cm
- Accuracy ~1m accuracy
- Available on the LINZ Data Service.



# Urban Aerial Imagery

- Territorial authorities
- Central government
  - MPI
  - DOC
  - LINZ
- Creative Commons License
- Resolution ~ 10 cm
- Accuracy ~ 30 cm accuracy
- Available on the LINZ Data Service.



# Additional capture following significant events



**Pre Kaikoura earthquake**



**Post Kaikoura earthquake**

# Access via the LINZ Data Service

Search



Help

Andrew Ferrel



- DATA TYPE
  - All 166
  - Layers 166
- CATEGORY
  - All 2153
  - Aerial Photos 166
  - Basemaps 15
  - Crown Property 8
  - Elevation 45
  - Full Landonline Dataset 103
  - Gazetteer 3
  - Geodetic 50
  - Hydrographic & Maritime 865
  - Property Ownership & Boundaries 38
  - Roads and Addresses 64
  - Topographic 717
- GROUP
- REGION

## Aerial Photos Data



### Waikato 0.5m Rural Aerial Photos (2012-2013)

LINZ / National Imagery



Licence



107962



12855



Updated

10 Mar 2014



### Wellington 0.3m Rural Aerial Photos (2012-2013)

LINZ / National Imagery



Licence



98792



11401



Updated

10 Mar 2014



### Auckland 0.5m Rural Aerial Photos (2010-2012)

LINZ / National Imagery



Licence



95876



8104



Added

12 Dec 2013



### Wellington 0.1m Urban Aerial Photos (2012-2013)

LINZ / National Imagery



Licence



90908



6096



Added

23 Dec 2013



### Manawatu Whanganui 0.4m Rural Aerial Photos (2010 - 2011)

LINZ / National Imagery



Licence



86457



5756



Added

09 Dec 2013

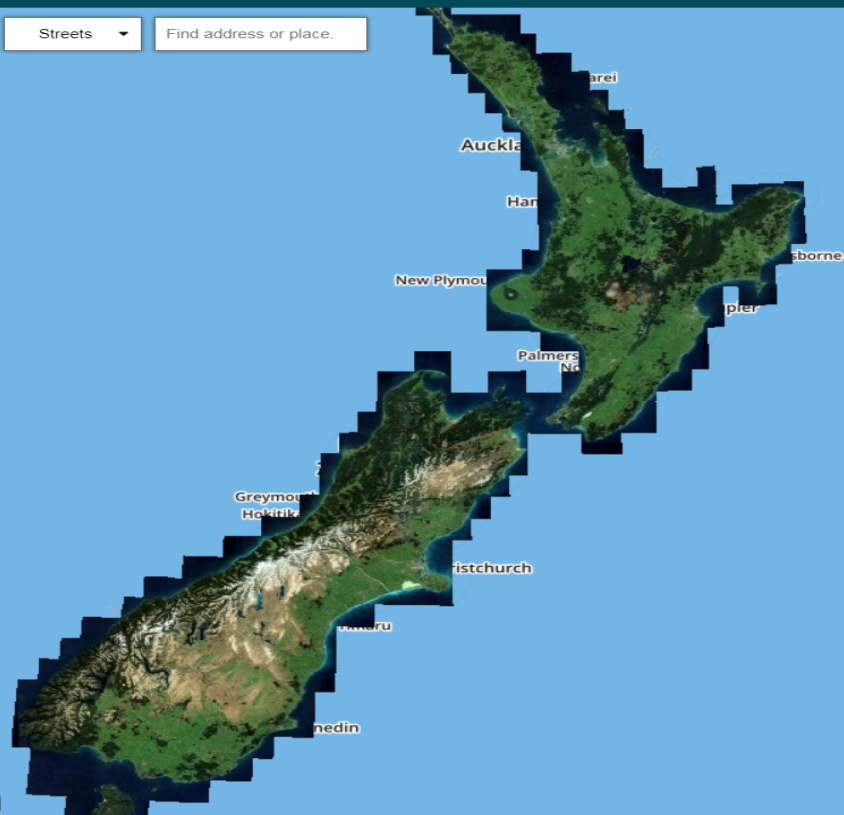
### Bay of Plenty 0.25m Rural Aerial Photos

1 2 3 4 5 6 7 8 9 10 Results 1 to 10 of 166

Streets Find address or place.

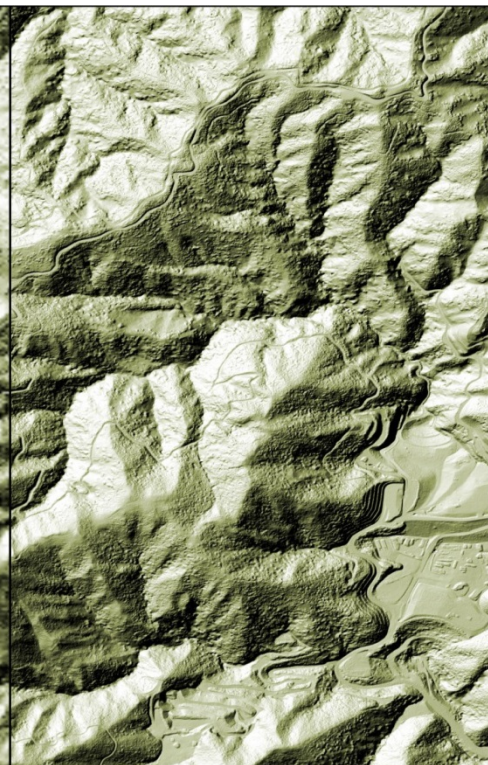
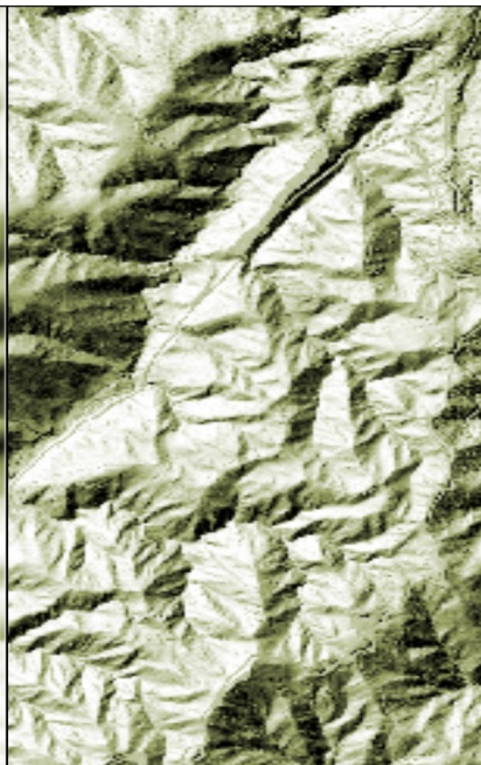
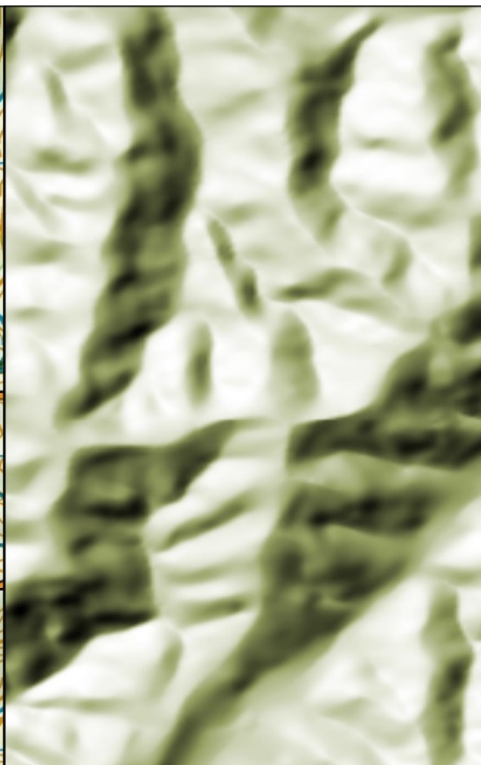
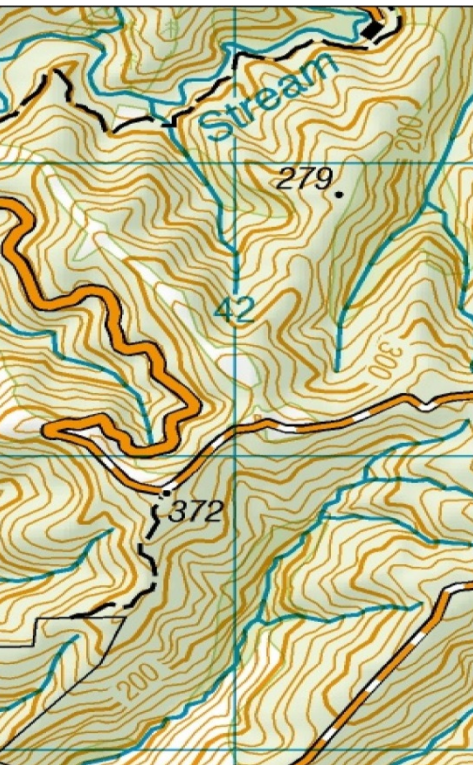


100 km  
100 mi



# National Elevation Improvement

“Changing the source elevation data from mapping contours to LiDAR provides the DEMs required for better interpretation of remote sensing data.”

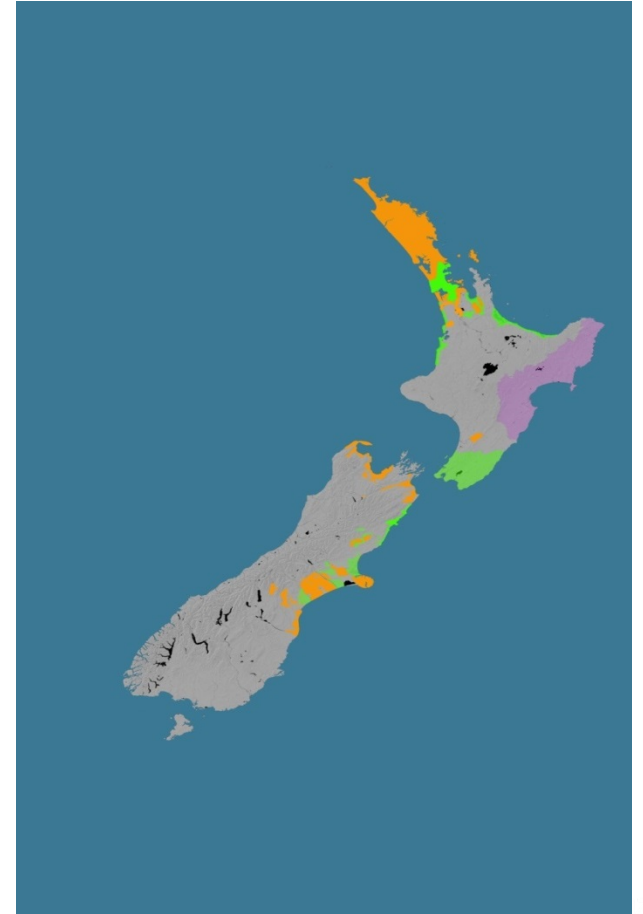


# LiDAR Coverage

LDS now - 16,000 km<sup>2</sup>

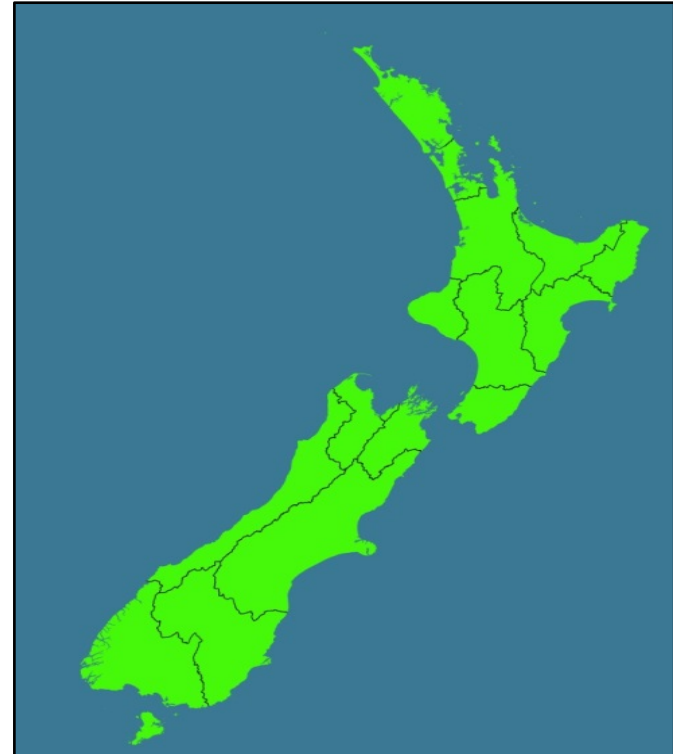
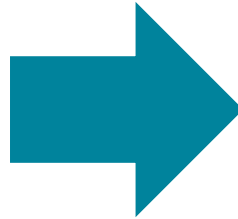
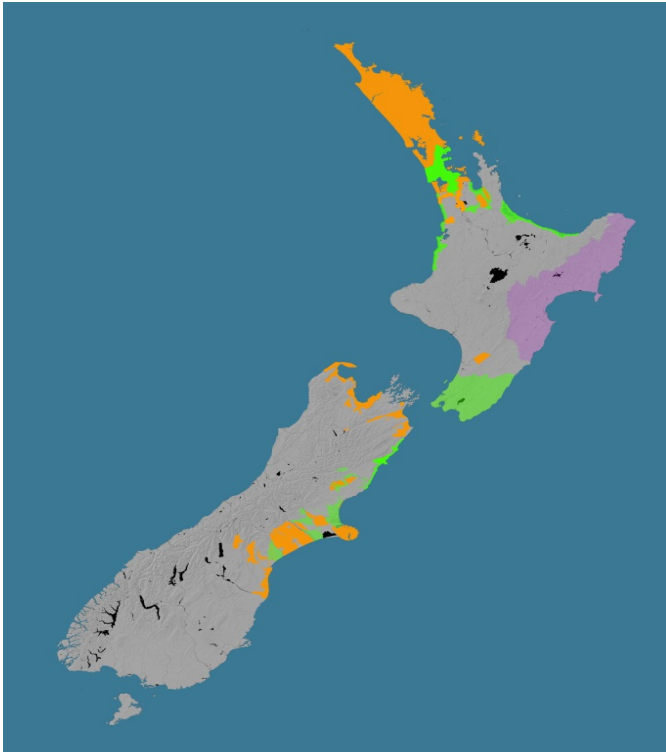
In progress - 25,000 km<sup>2</sup>

In discussion - 20,000 km<sup>2</sup>



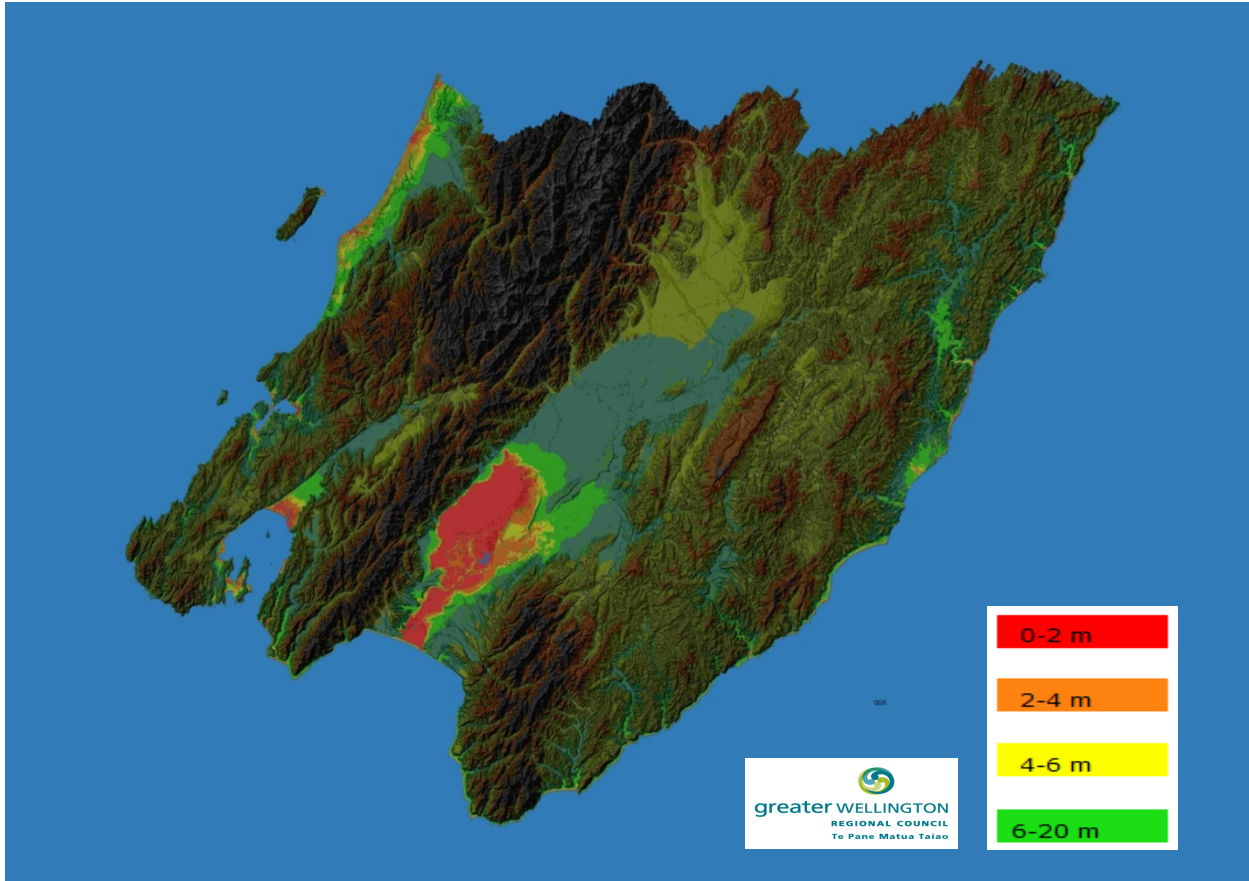
# Mapping NZ 2025

Build the national DEM New Zealand needs





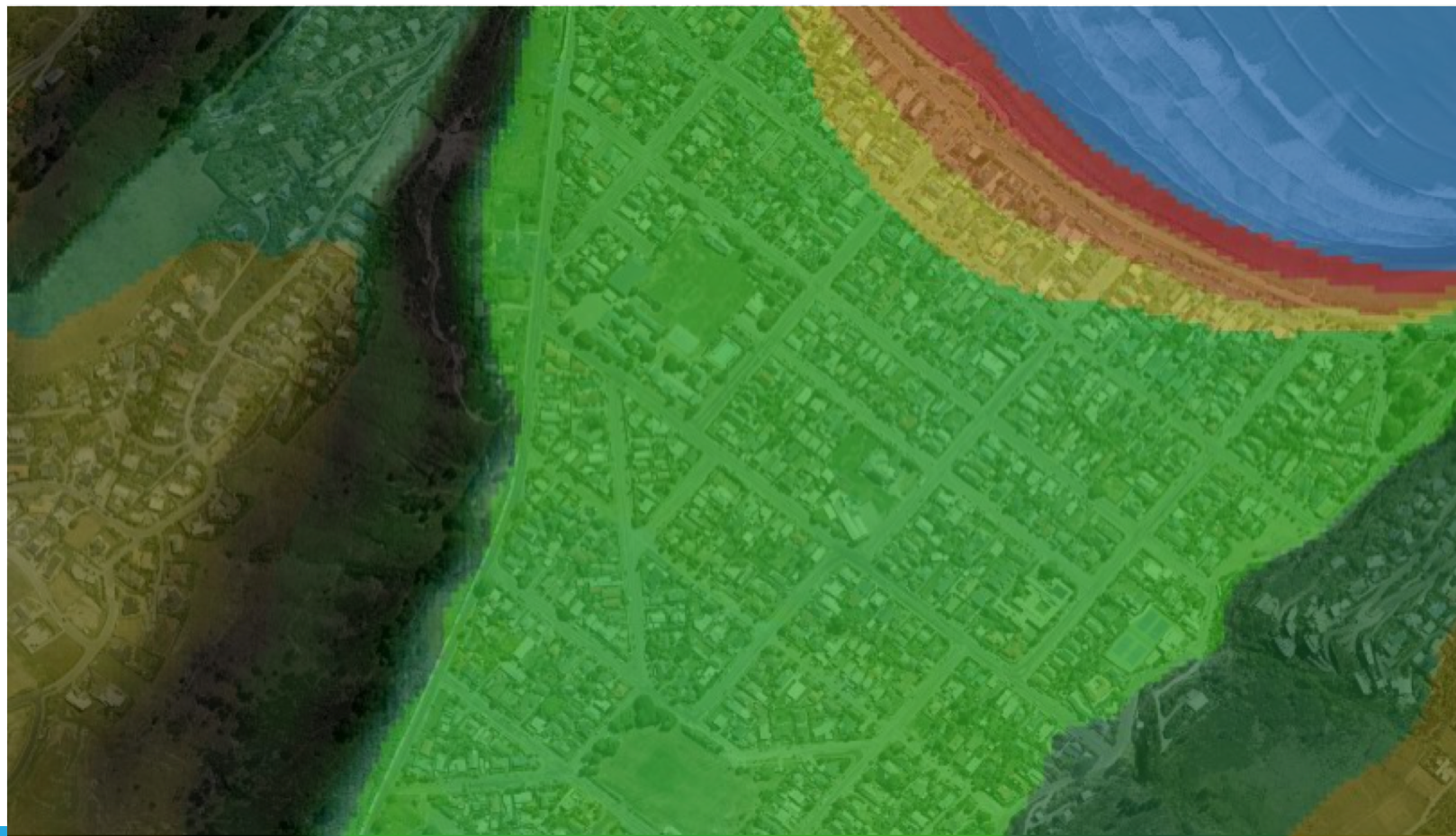
# Wellington region-wide LiDAR



# Sumner flood risk example



# National DEM – 10m accuracy



0-2 m

2-4 m

4-6 m

6-20 m

# LiDAR provides sub-m accuracy

DSM

DEM

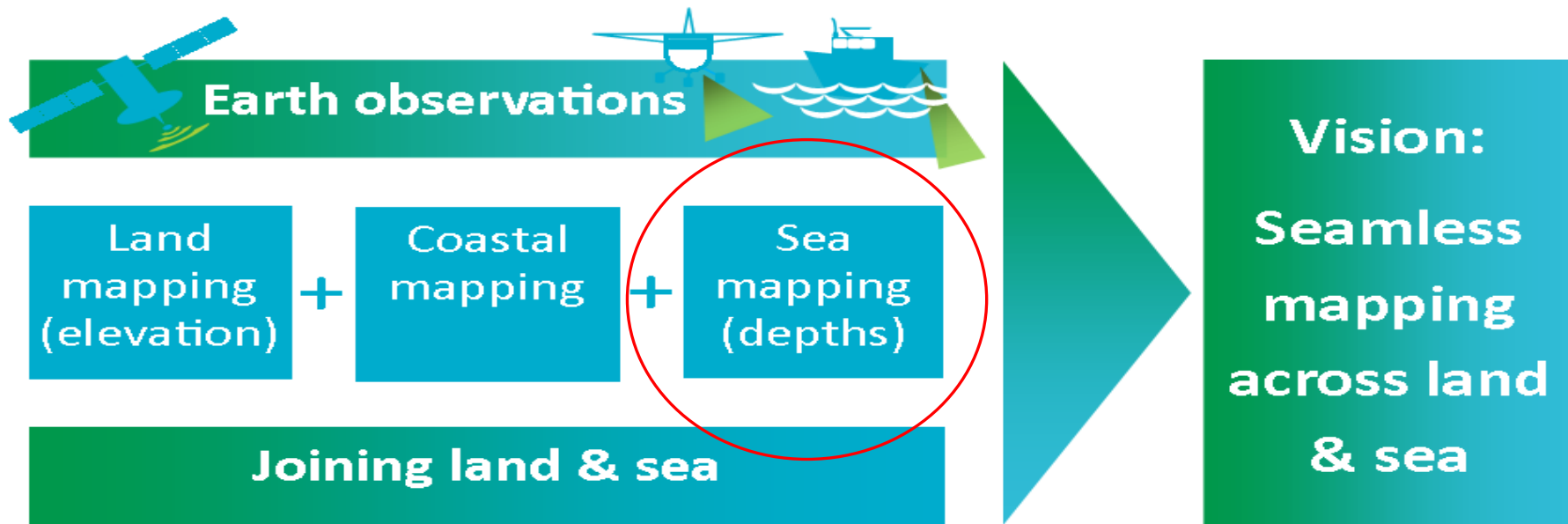
0-2 m

2-4 m

4-6 m

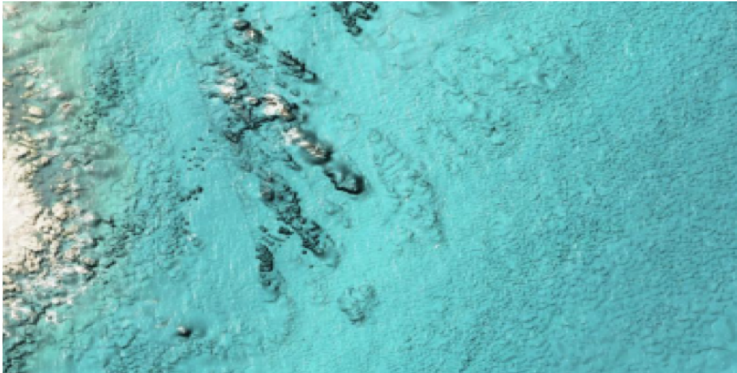
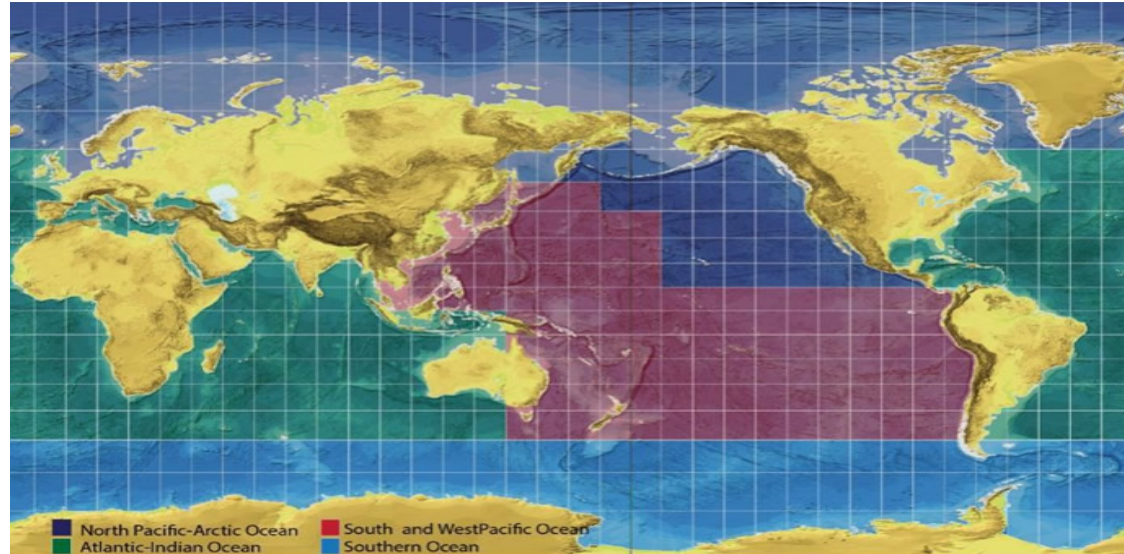
6-20 m

# Mapping NZ 2025



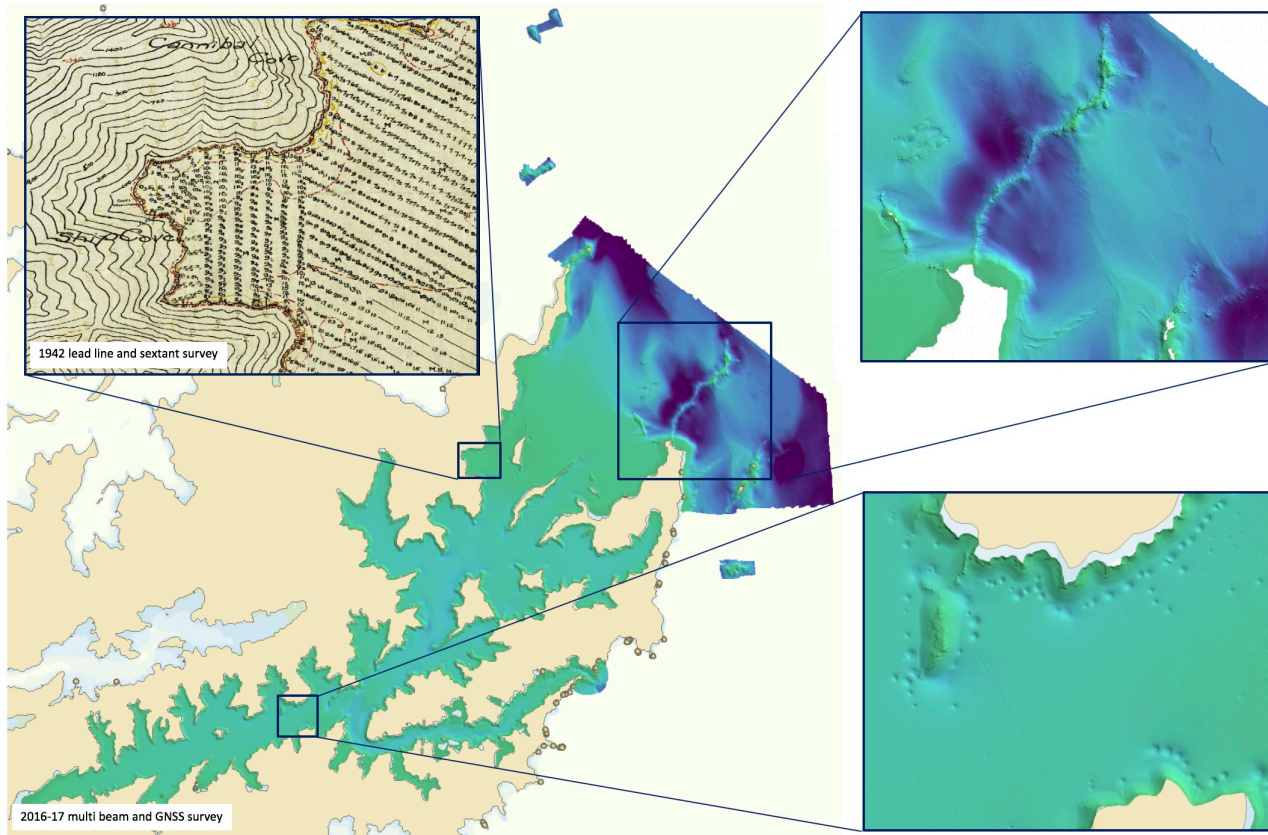
# Improving national bathymetry

- Operating survey programme and partnerships
- Joint agency work on international initiatives (Seabed 2030)
- Gathering bathymetric data from research vessels
- Focus on near shore mapping.

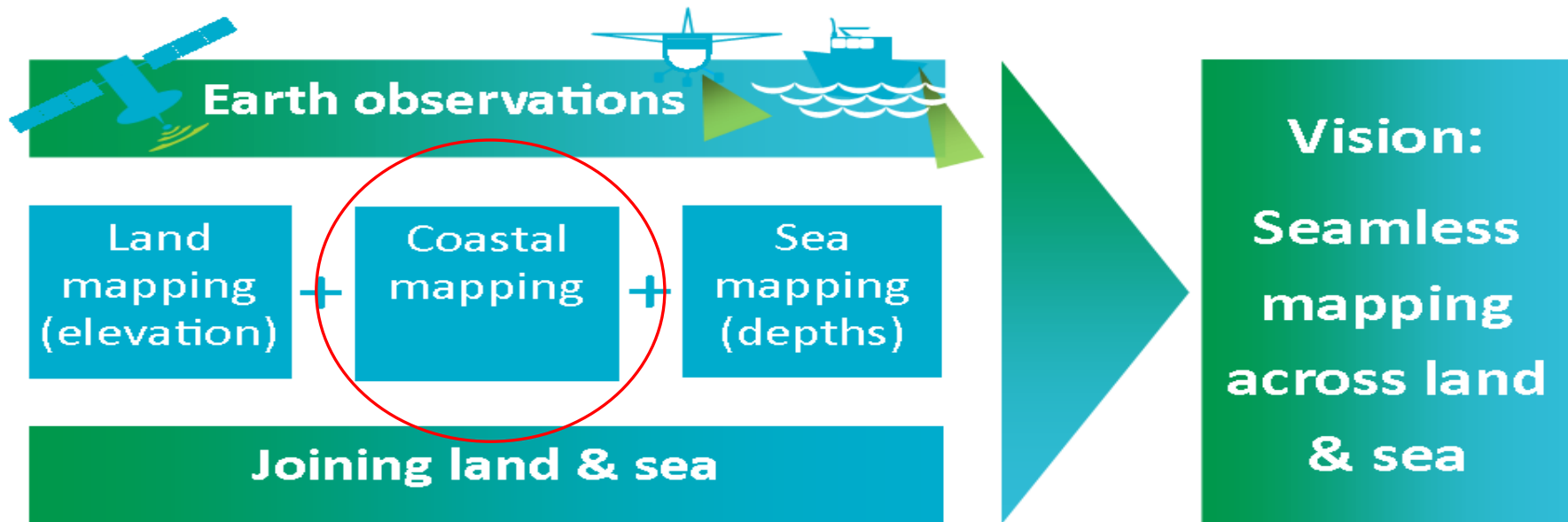


# Improved bathymetry

## HS51 Queen Charlotte Sound and Tory Channel



# Mapping NZ 2025





# Mapping the coastal zone



# Bathymetry adds further context



# Coastal mapping benefits and applications

- Improved modelling
  - Sea level rise
  - Flooding
  - Tsunami
- Integrated ocean and coastal mapping
  - Shoreline studies
  - Hydrographic surveying
  - Integrating bathymetric datasets
- Collecting and Processing survey data
- Surveying on the ellipsoid.



# Questions

