Lecture – University of Waikato School

Tools for Futures Thinking

1. **Horizon Scanning**

2. **Scenario planning**

3. **Computer simulation models**

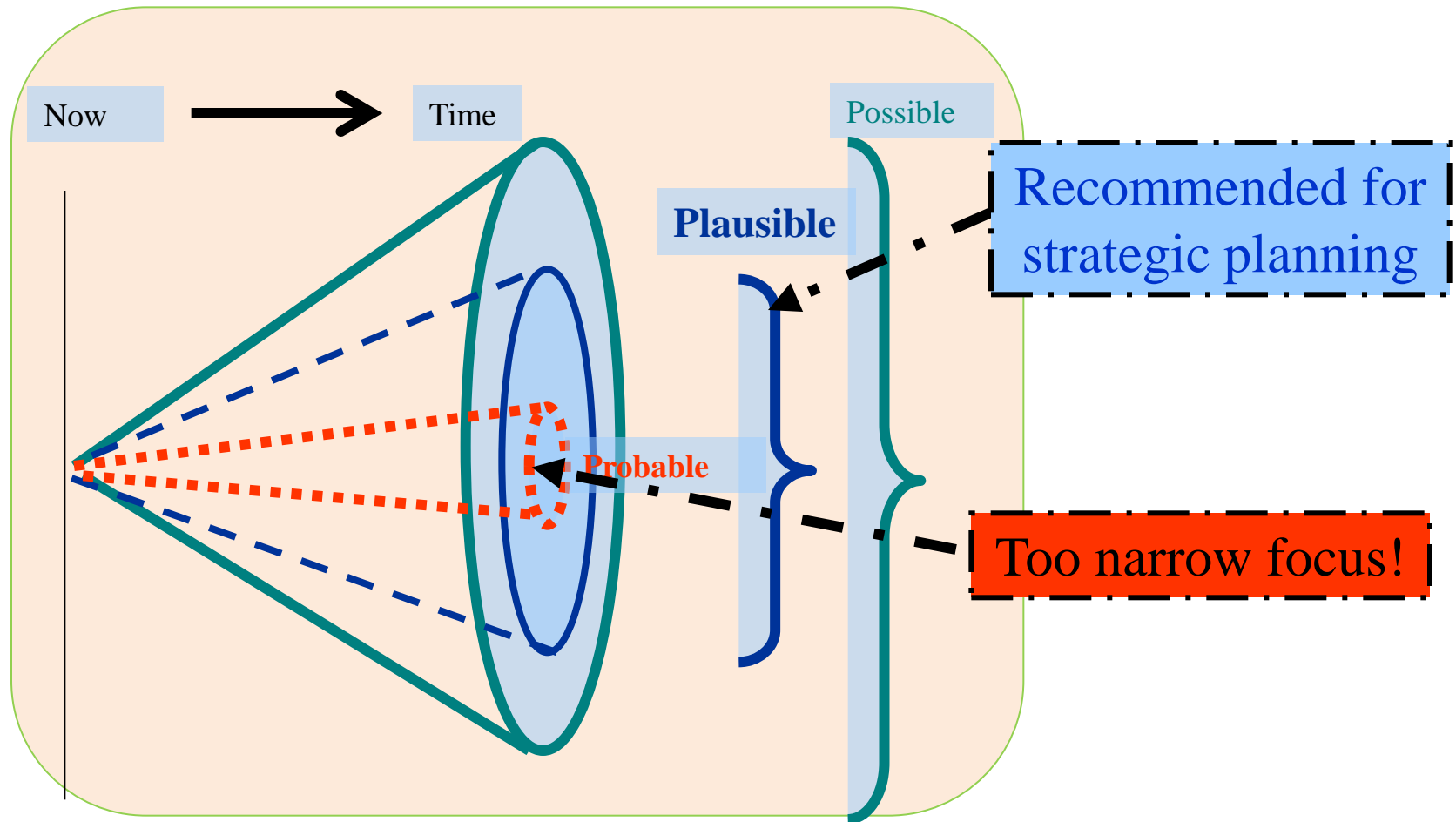November 2011   Beat Huser, Waikato Regional Council

Creating Futures

Futures Tool 1 – Horizon Scanning

... spotting change early

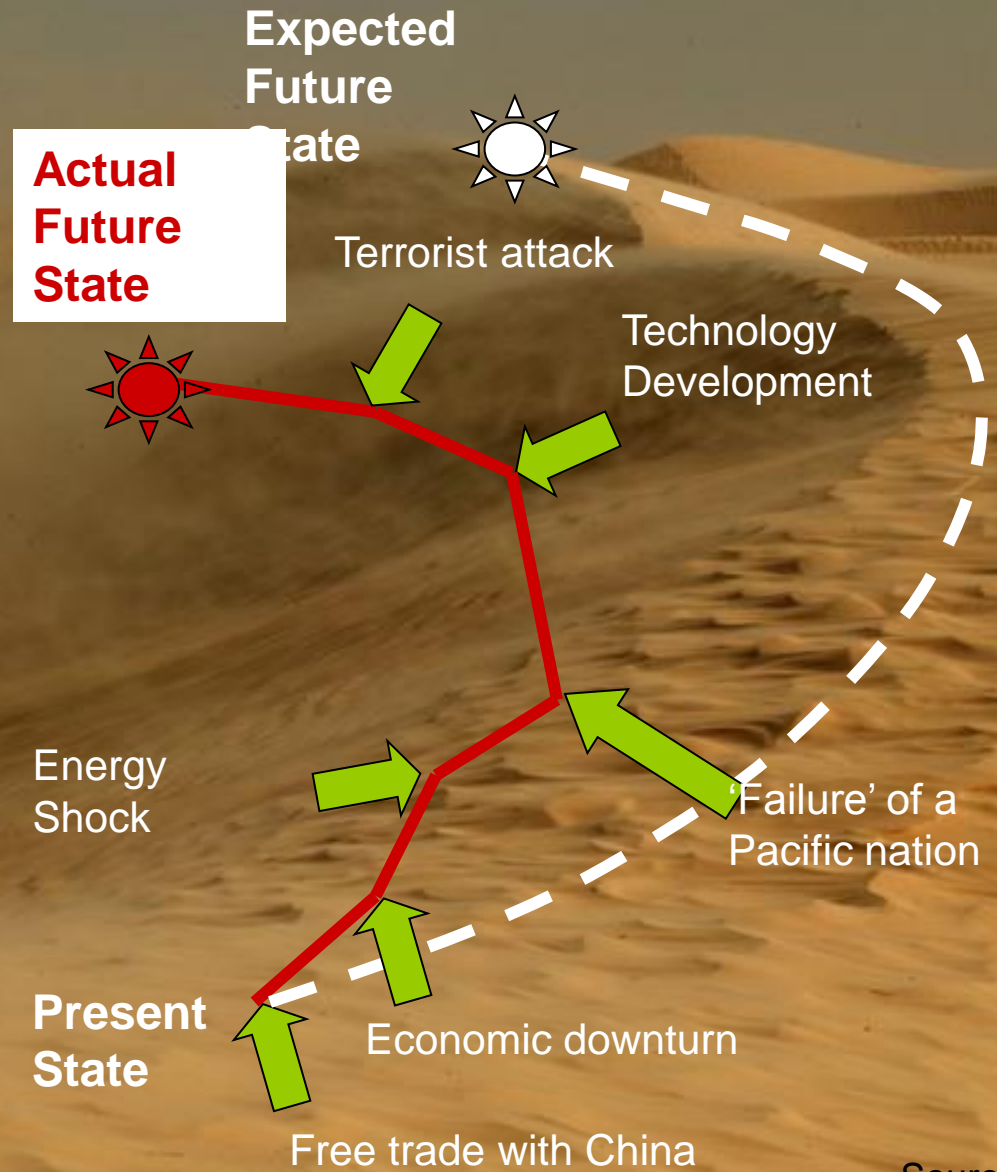# ...different types of futures

Creating Futures
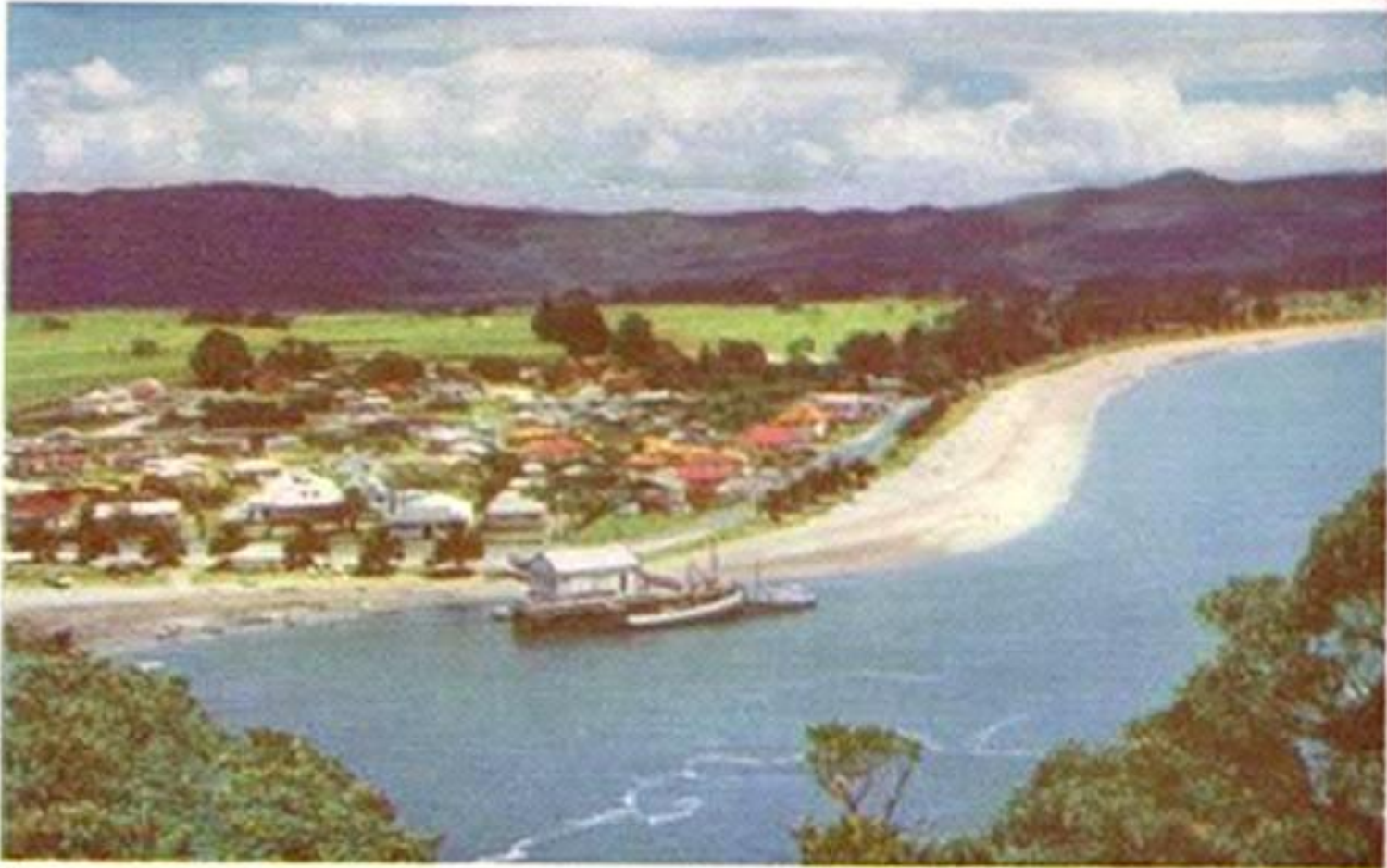
We can't predict the future ….

The 'futures landscape' is one of shifting sands

The path between the present and the future is not clear and direct…

Expected Future State

Actual Future State

Terrorist attack

Technology Development

Energy Shock

'Failure' of a Pacific nation

Present State

Economic downturn

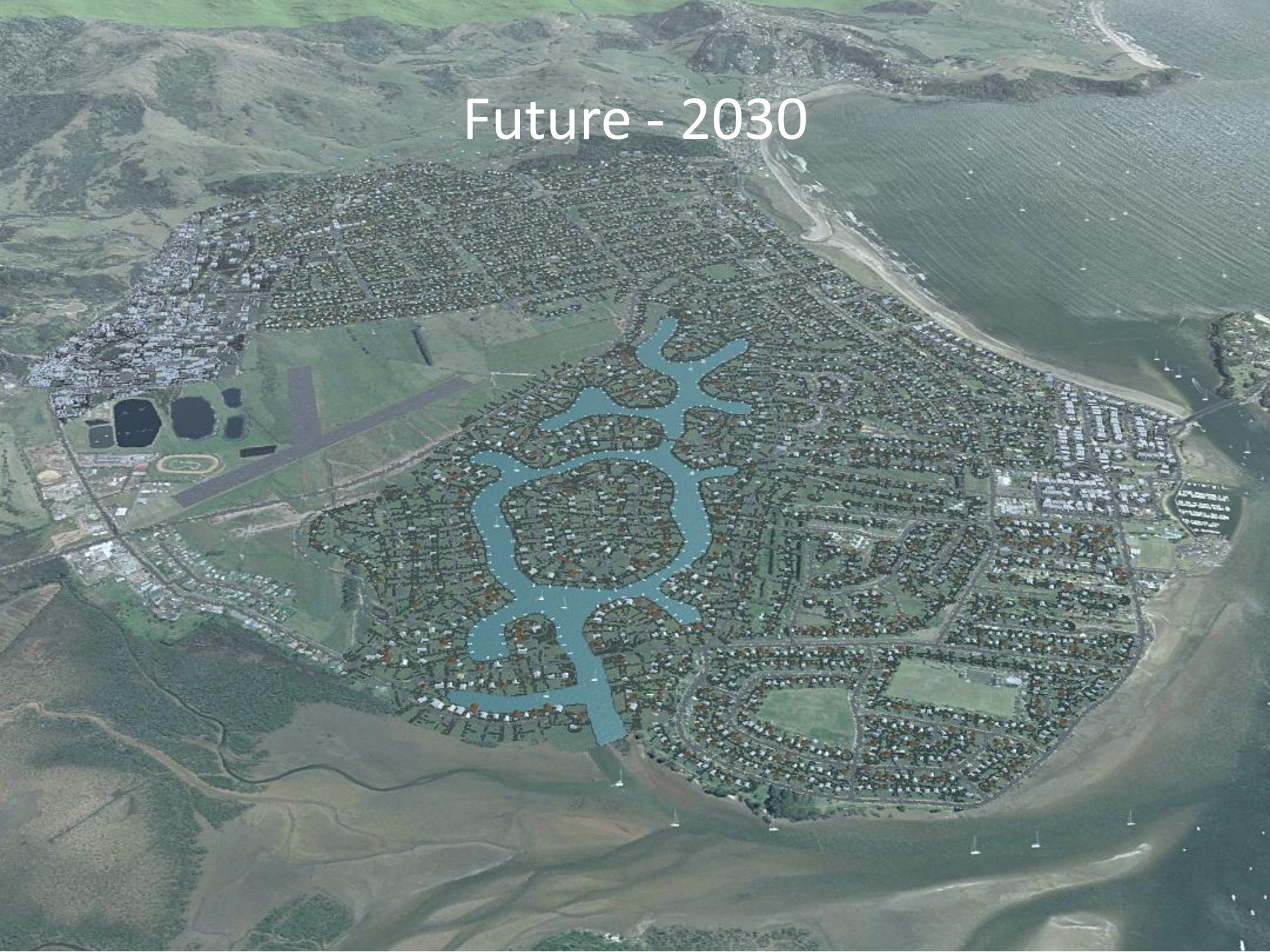Free trade with China

Source: MSD

Whitianga in 1950s

Whitianga, Mercury Bay.   Buffalo Beach, right, named after H.M.S. Buffalo, wrecked there, 27th July, 1840

Now - 2007

Future - 2030

Future - in 500 years …

What people value:

> **Whitianga 2500?**

"The natural environment and lifestyle the Coromandel offers"

Futures Tool 2 – Scenario planning

… thinking strategically

- Stories of what the future might look like

- Built by assessing how trends and drivers might influence the present to create the future.
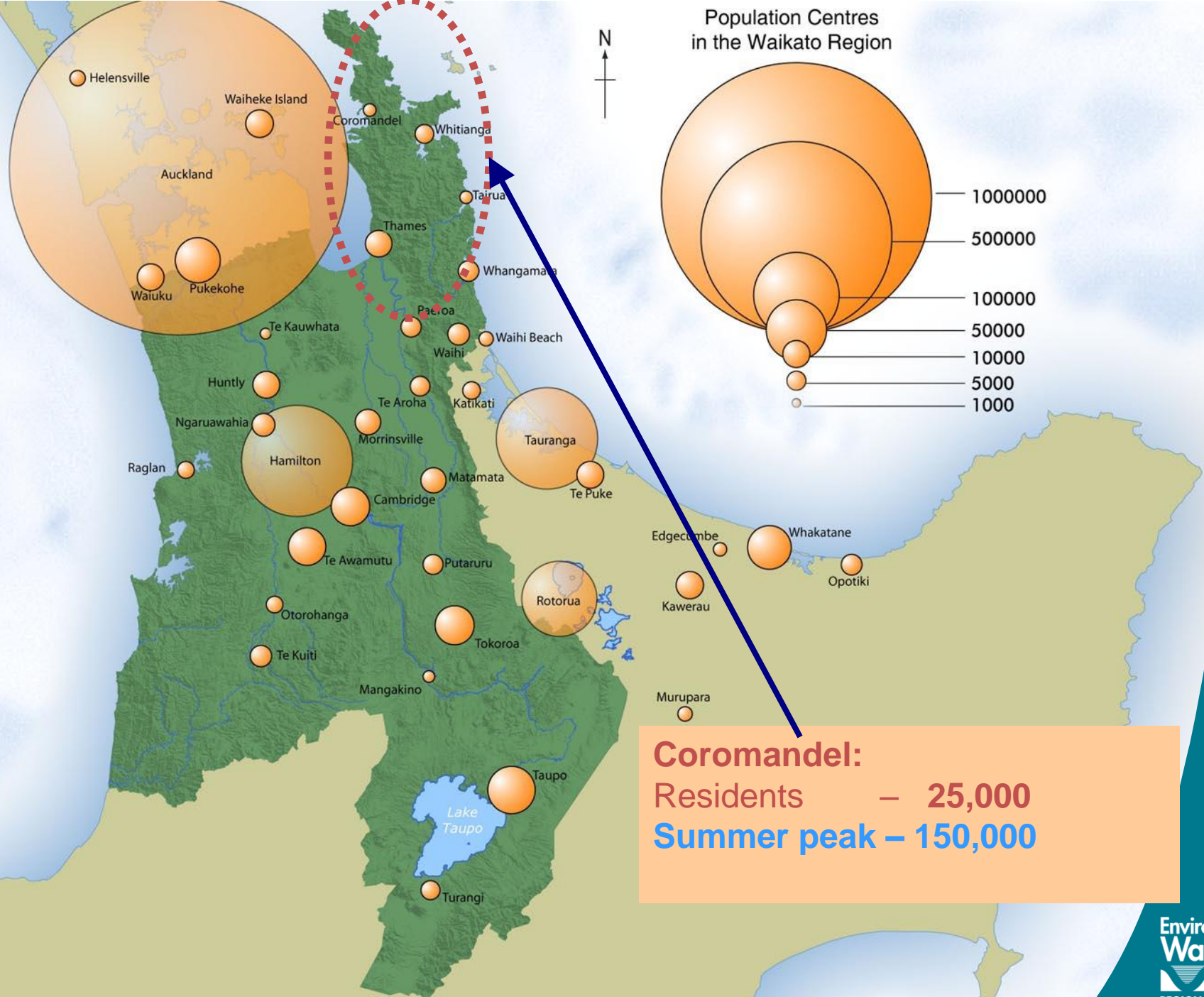
Scenarios – Stories About the Future

Now · Time · Possible · Plausible · Probable

Scenarios = plausible stories about the future

Creating **Futures**
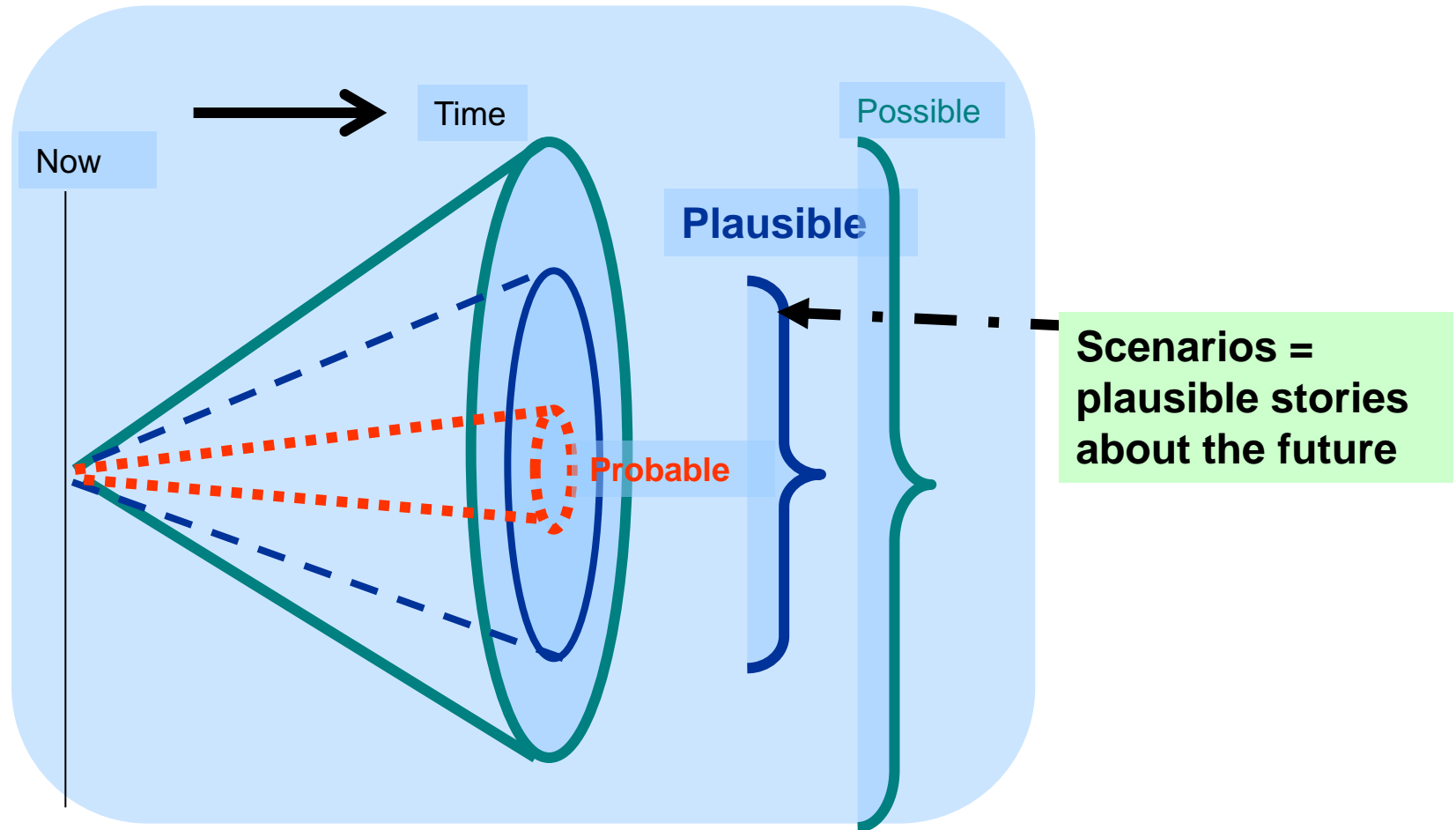
30% Population Increase North of Taupo by 2026

679,100

Source: Statistics NZ 2006

Environment
Waikato
REGIONAL COUNCIL

Population Centres in the Waikato Region

Coromandel:
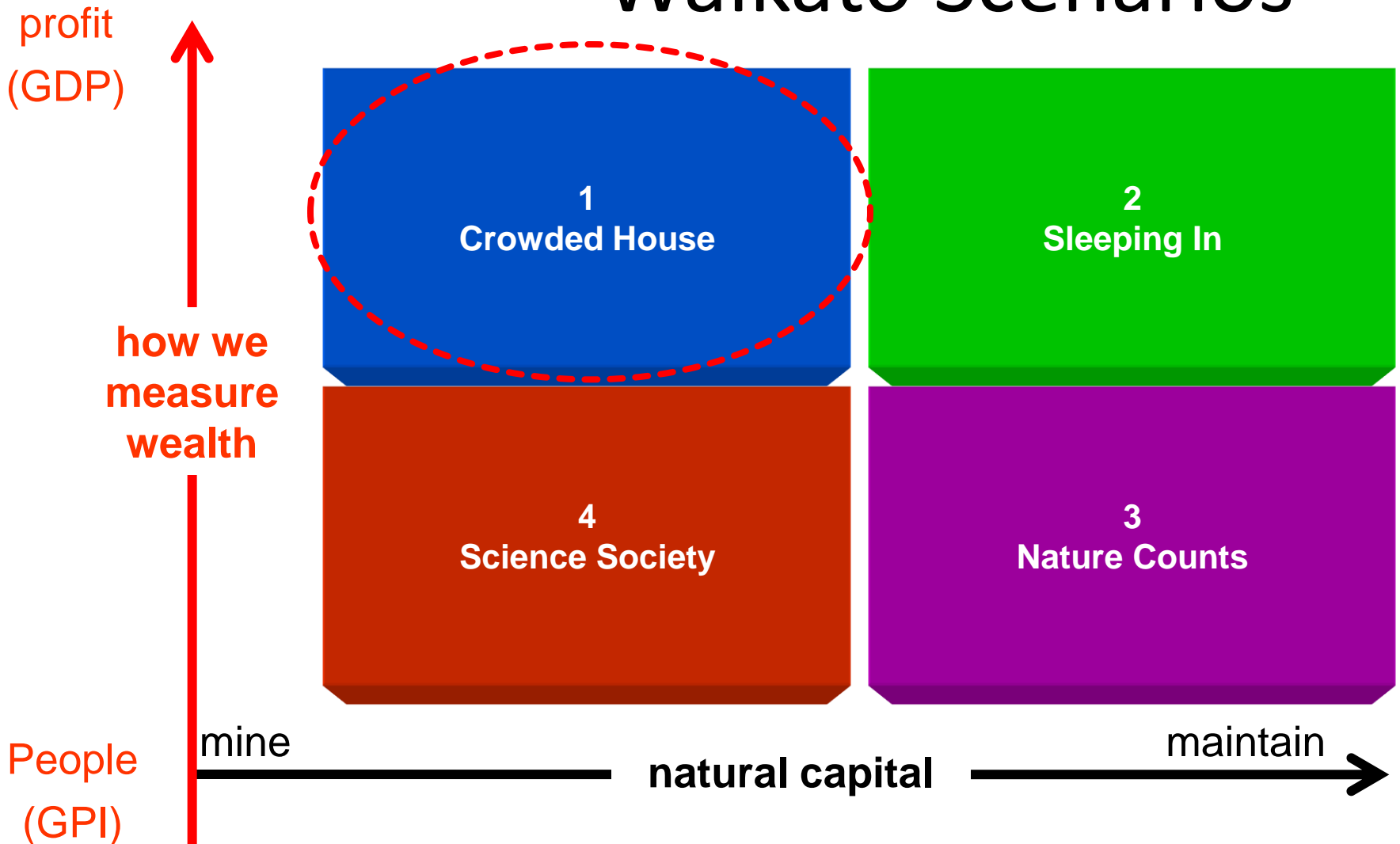Residents   – **25,000**
Summer peak – 150,000

Pressures we face…

- **Sustainability of agriculture**
- **Water quality and availability**
- **Loss of biodiversity and natural areas**
- **Urban expansion and sprawl**
- **Coastal and marine issues**
- **Climate change and adaptation**

Waikato Scenarios

profit (GDP)

how we measure wealth

People (GPI)

mine — **natural capital** — maintain

1 **Crowded House**

2 **Sleeping In**

4 **Science Society**

3 **Nature Counts**

- **Nature Counts / Science Society**
  - **Sleeping In / Crowded House**
    - A bioeconomy where science tells off and is controlled differently using resource productivity and technology in society
    - Keep on talking about how we change people and change our agriculture and energy production

Scenario 1 - **Crowded House**

more on the scenarios:

www.creatingfutures.org.nz

Futures Tool 3 – Computer Models

... spatial planning and integrated decision-making

Government Research Grant $1.6M for *Creating Futures* project

Project Aim

Develop and apply

planning and communication tools
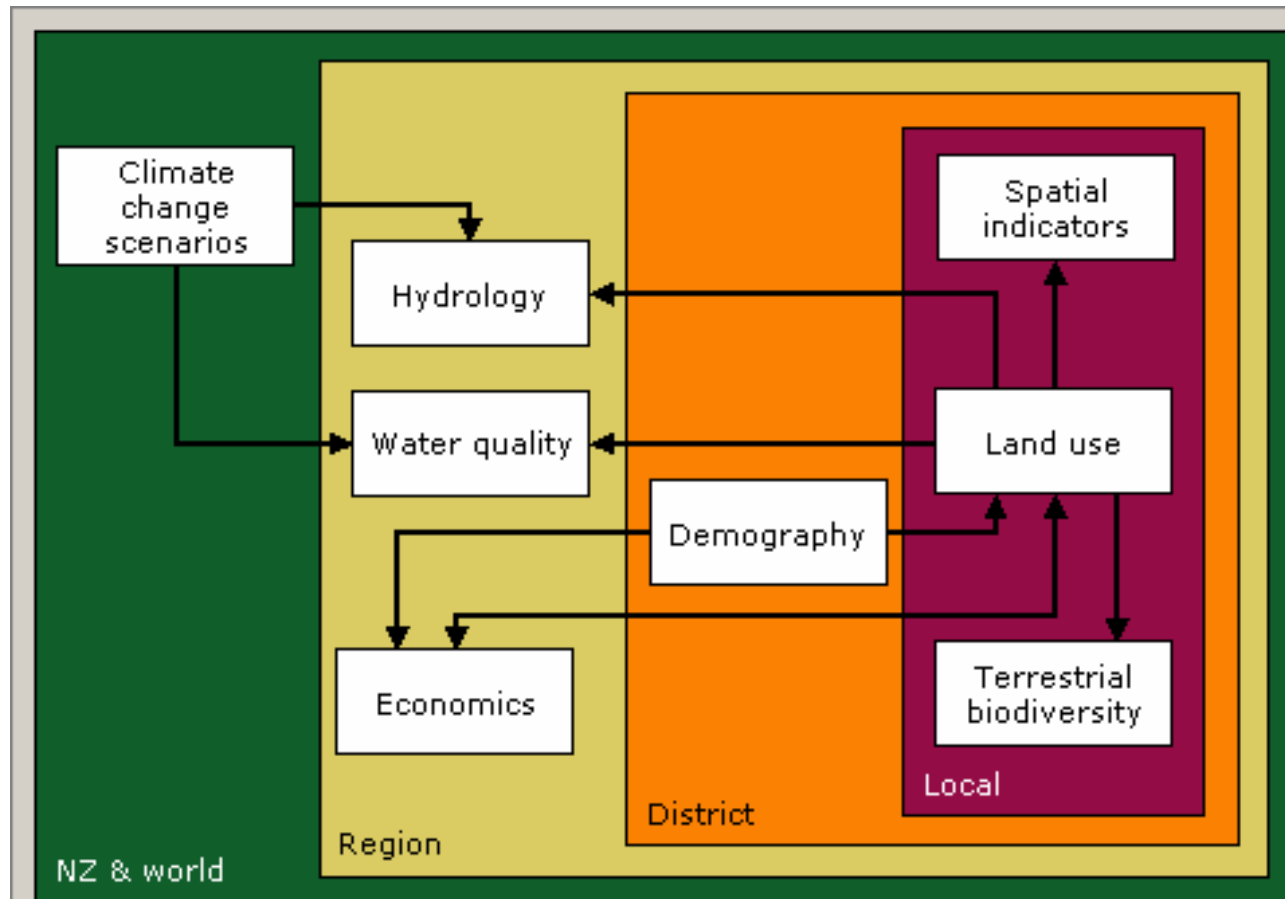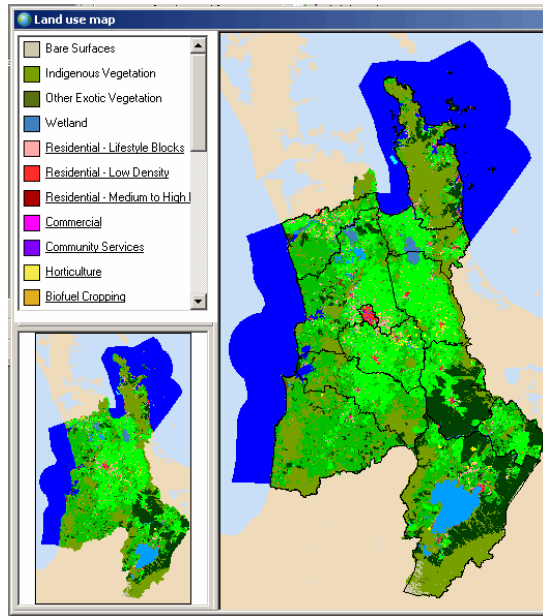
to make informed choices for the future
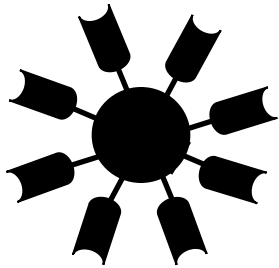
Key Tool

Spatial Model

(WISE)

What is WISE?

WISE = Waikato Integrated Scenario Explorer – YouTube video

- **Stand-alone software application**
- **System of interacting models**

Dynamic and Spatial Modelling

Basic Framework

Geonamica

research institute for knowledge systems
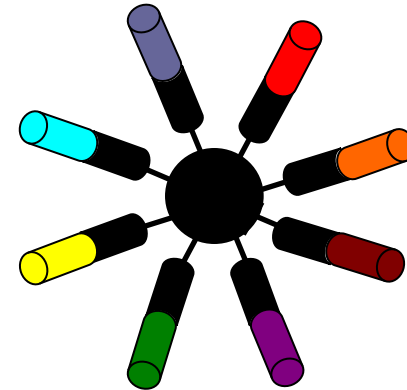
Model library:

 Land use local level

 Regional interaction

 Transport

 Population (Age cohort)

 Plant growth

 Climate

 Hydrology

 Input – Output (Economy-Environment)

Product

WISE

now
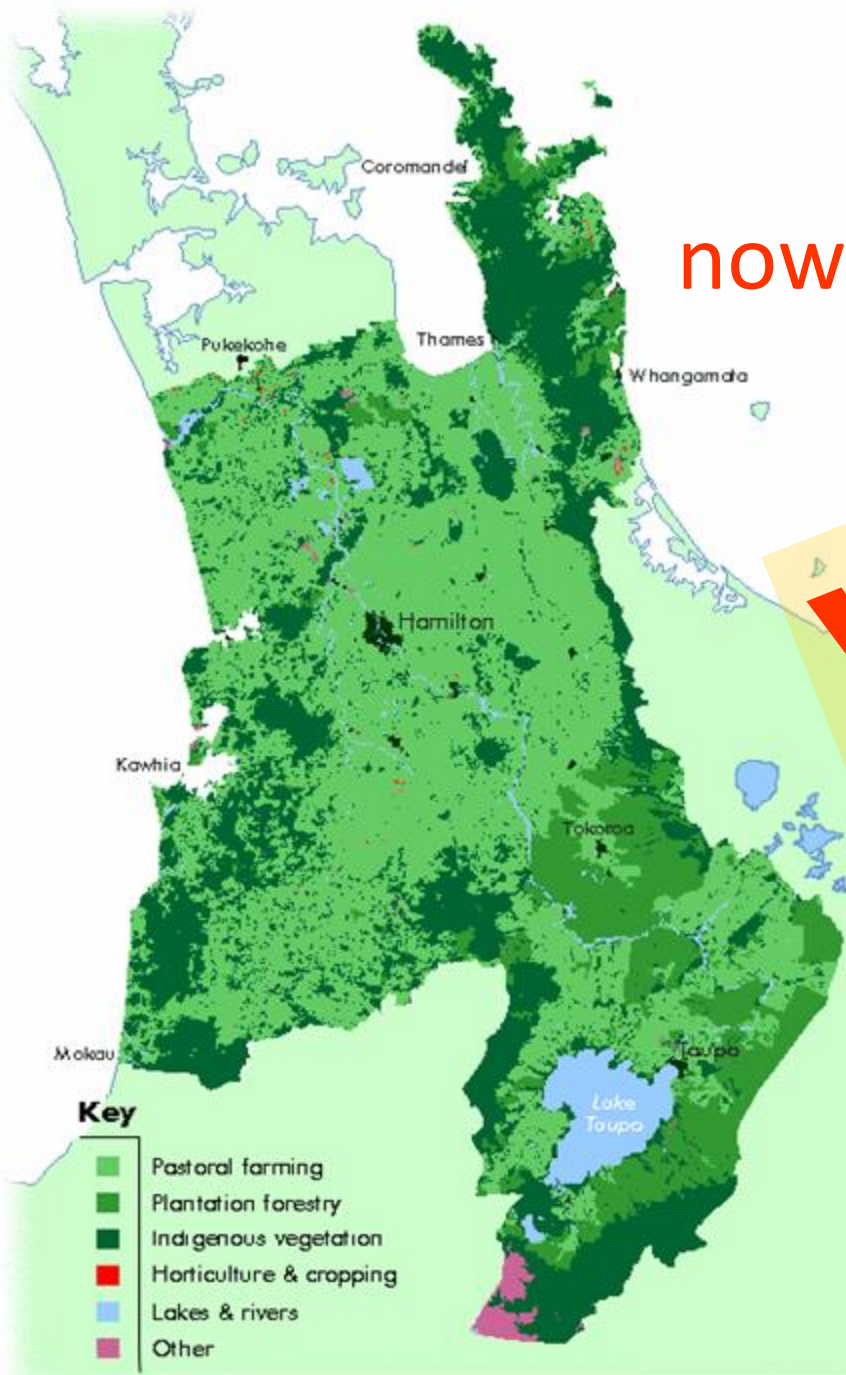
What, if . . .

Waikato in 2050?

Land cover data supplied by Terralink NZ Limited (from 1996 Waikato Land Cover Database); COPYRIGHT RESERVED.

Key
- Pastoral farming
- Plantation forestry
- Indigenous vegetation
- Horticulture & cropping
- Lakes & rivers
- Other

How Environment Waikato Uses WISE

- **Linking science to policy** (evidence-based decision-making)

- Explore alternative policy options for regional planning, assess **trade-offs** and prioritise issues

- **Regional** development and **sub-regional** strategies (non-statutory – e.g. Future Proof case study)

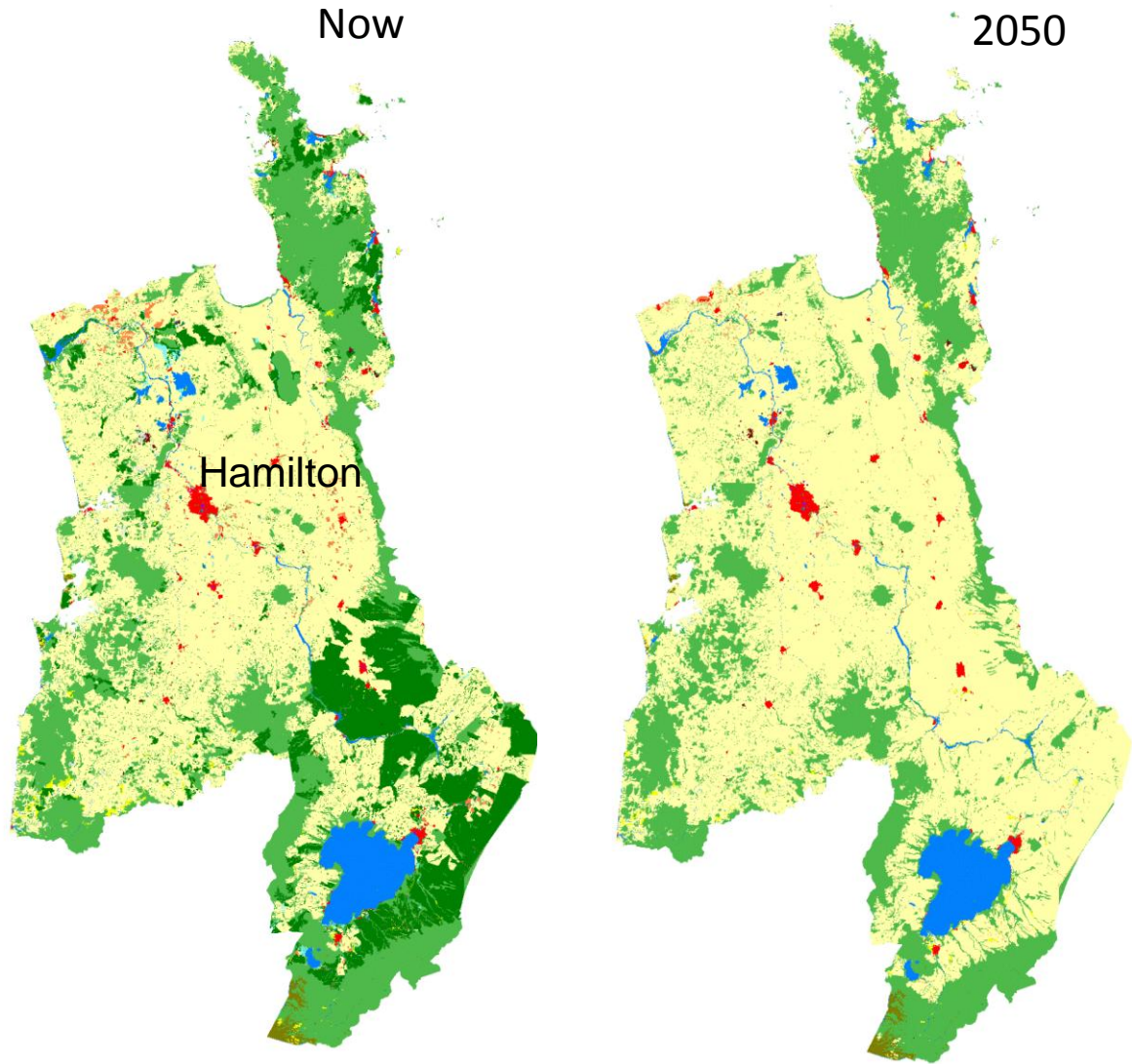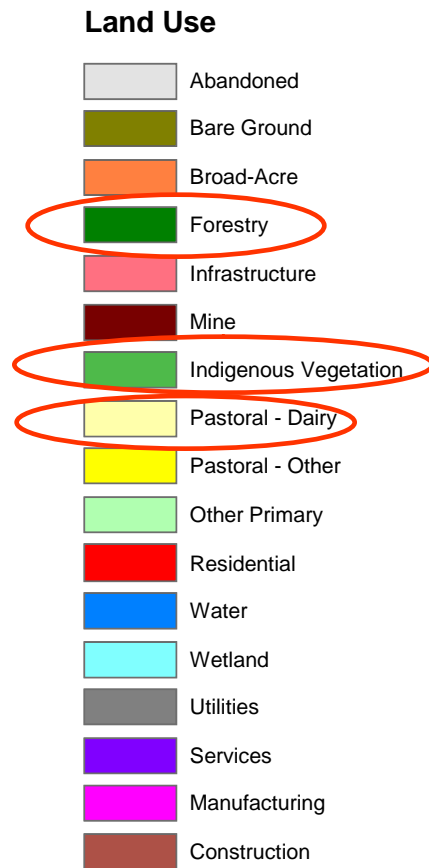- **Cumulative** effects of policy and permits (over space/time)

WISE also provides:

- Up-to-date data and information

- Access to expert knowledge from all disciplines

Creating
Futures

Waikato in 2050?

what/if ?

Land for dairy farming increases ~4% annually

Land Use

- Abandoned
- Bare Ground
- Broad-Acre
- Forestry
- Infrastructure
- Mine
- Indigenous Vegetation
- Pastoral - Dairy
- Pastoral - Other
- Other Primary
- Residential
- Water
- Wetland
- Utilities
- Services
- Manufacturing
- Construction

Now

2050

Hamilton

based on WISE Prototype

Waikato in 2050 – Three Different Futures *(what/ifs?)*
(based on WISE Prototype) Baseline 2001

1-Dairy Expansion
Land for dairying
increases ~4% annually

2-Diversification
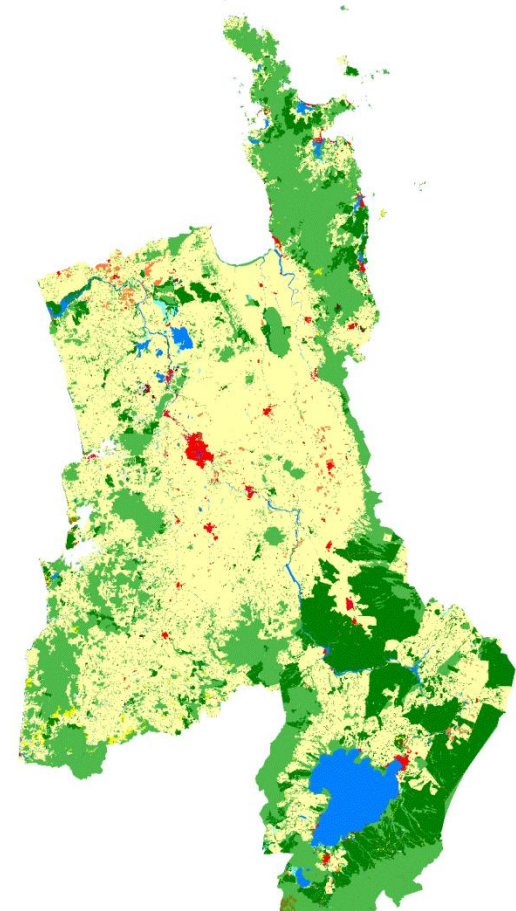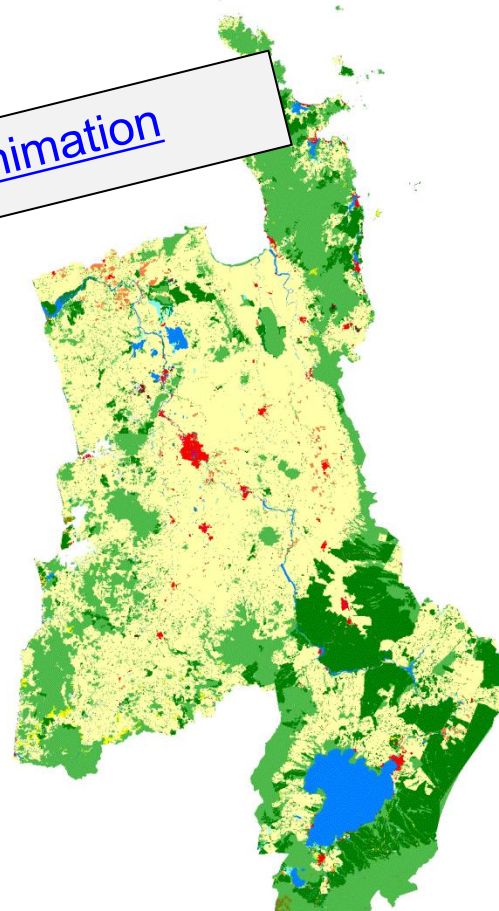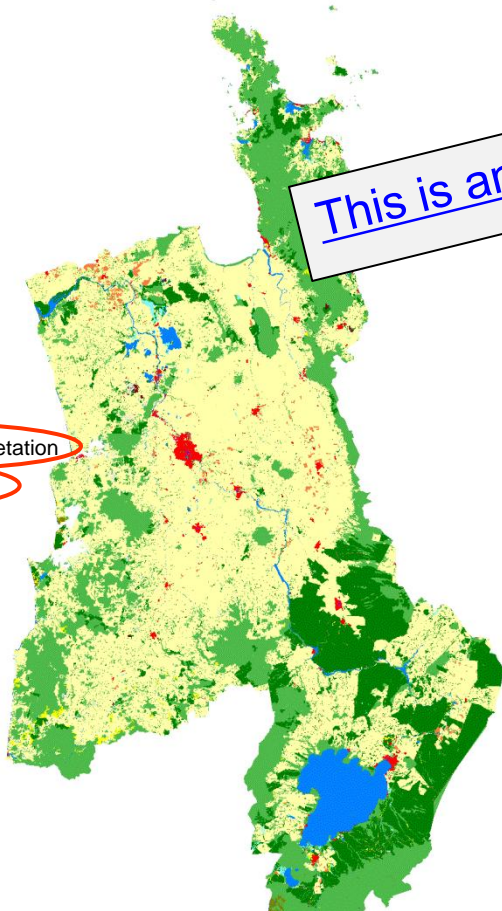Demand for non-dairy primary
production land increases

3-Village Life
Residential land
increases 7-fold

This is an animation

Land Use

- Abandoned
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- Broad-Acre
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- Residential
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- Wetland
- Utilities
- Services
- Manufacturing
- Construction

Source: Landcare Research & RIKS

Waikato in 2050 – Three Different Futures *(what/ifs?)*
(based on WISE Prototype)

1-Dairy Expansion
Land for dairying increases ~4% annually

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Demand for non-dairy primary production land increases

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Land Use
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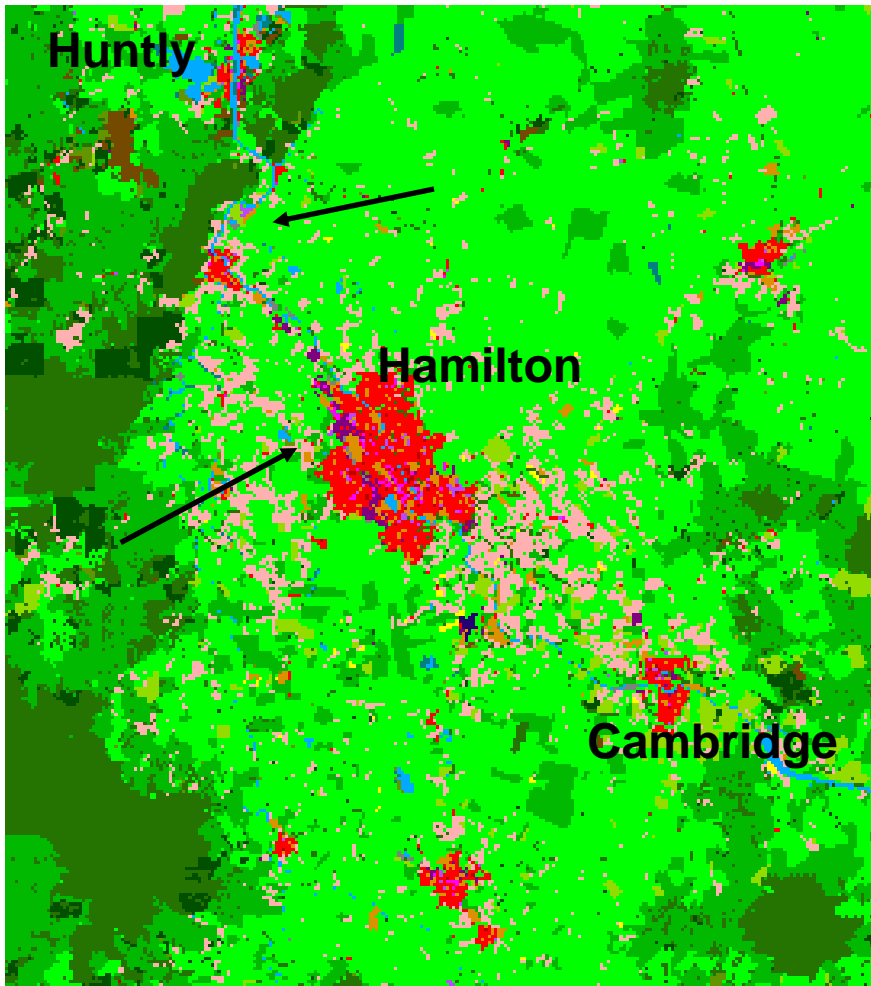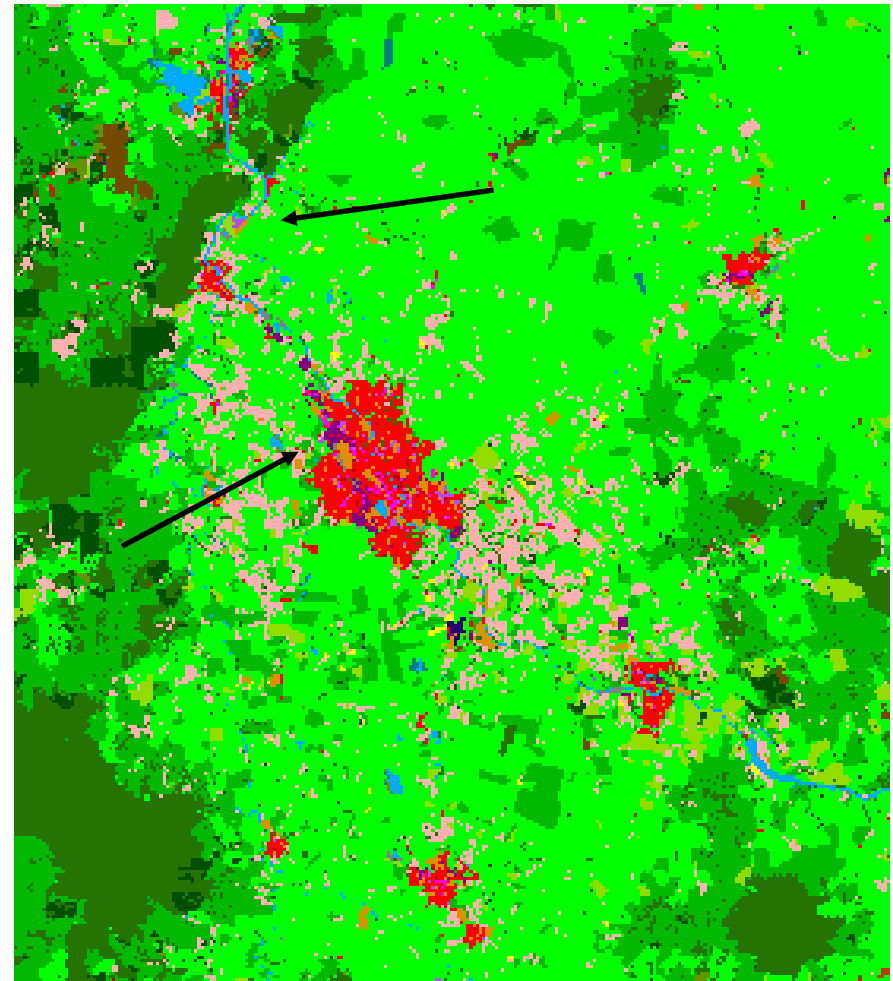- Services
- Manufacturing
- Construction
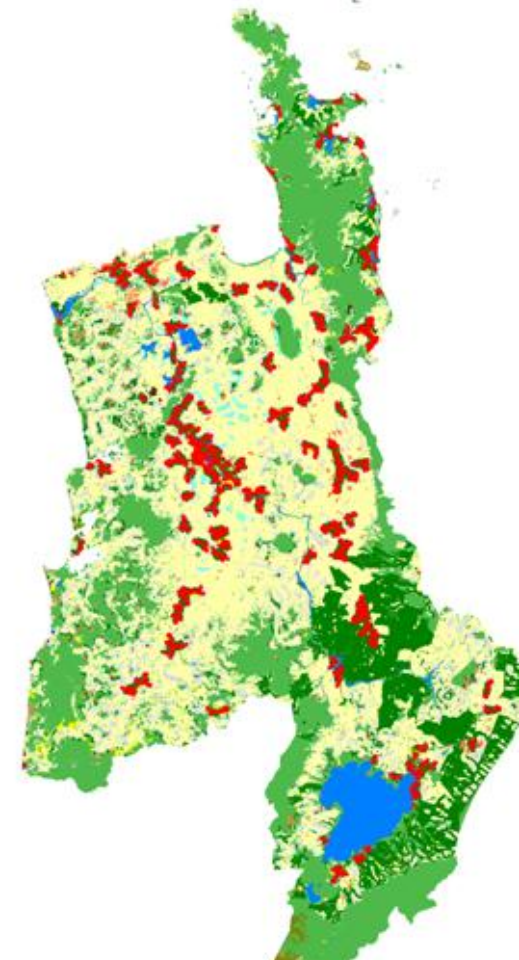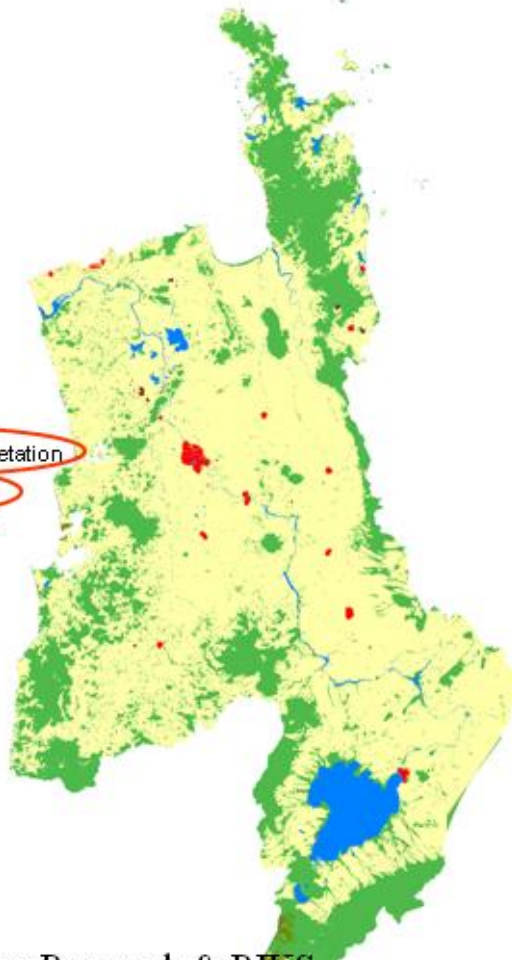
Policy:
Protecting High Class Soils around Hamilton

Land Use Change – 2006 to 2050
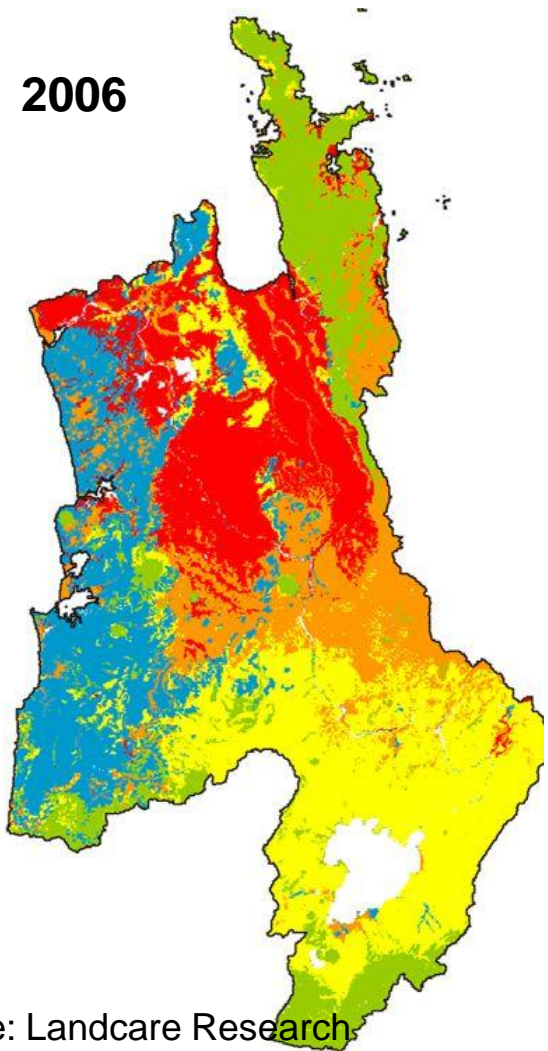

Business as Usual

High Quality Soils Protected

Case Study 4: Biodiversity – Loss of Threatened Ecosystems (BAU scenario)
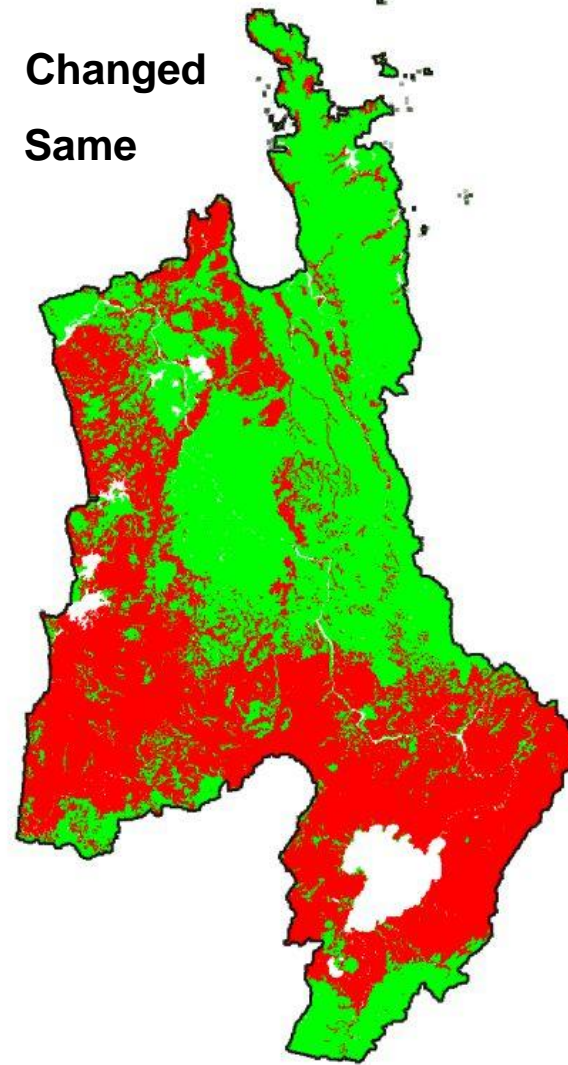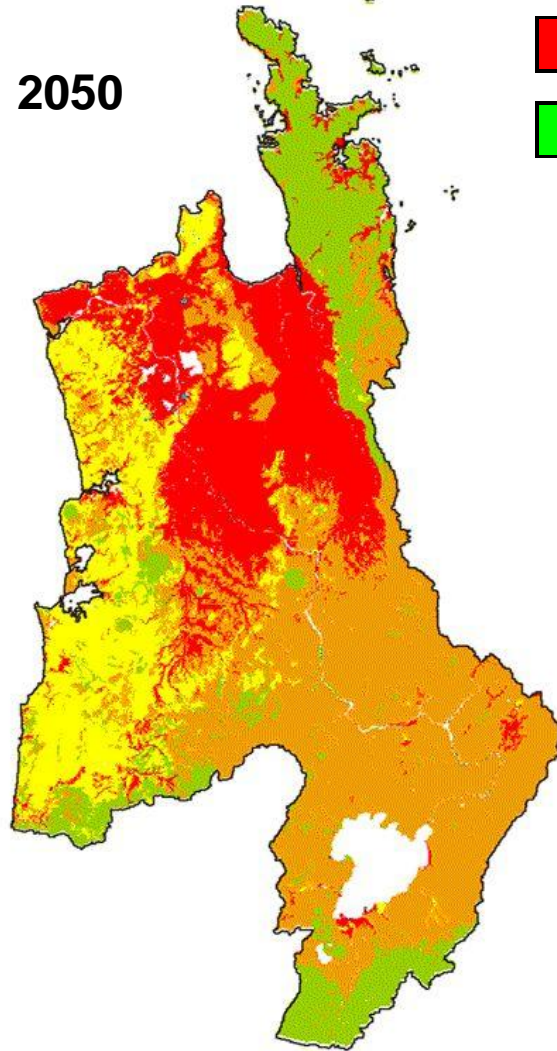
Colours represent different risk categories

Comparison

2006

2050

Changed

Same

Source: Landcare Research

– by Risk Categories

Legend:
- Acutely threatened
- Chronically threatened
- At risk
- Critically underprotected
- Underprotected
- No threat category

Blue = New 'Acutely Threatened'

2006

2050

Source: Landcare Research
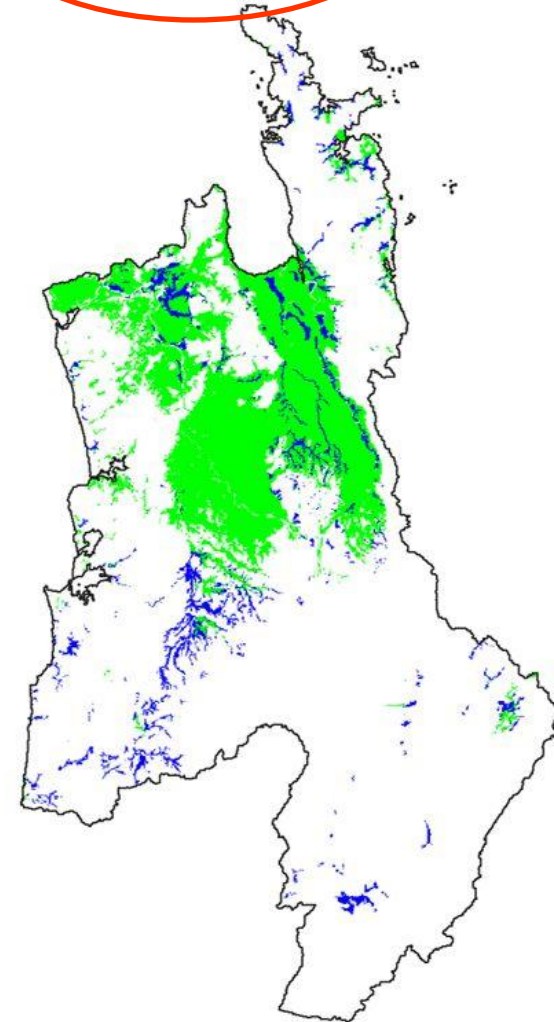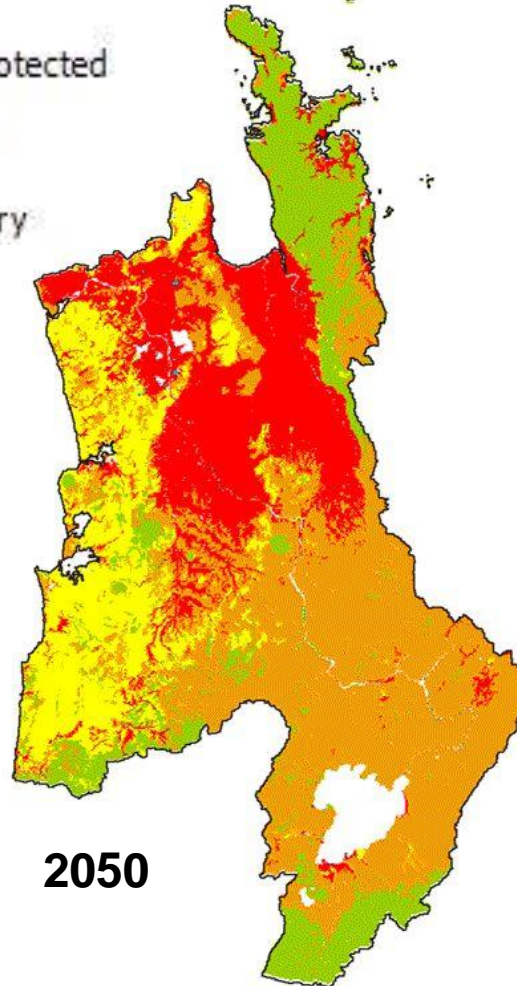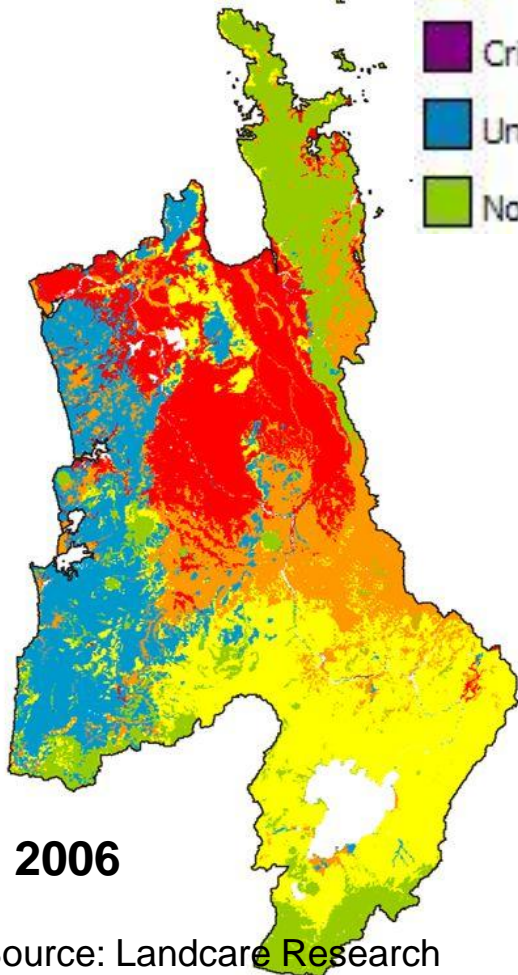
Case Study 3: Regional Carbon Strategy

The Issue

- Soil erosion

- Water quality
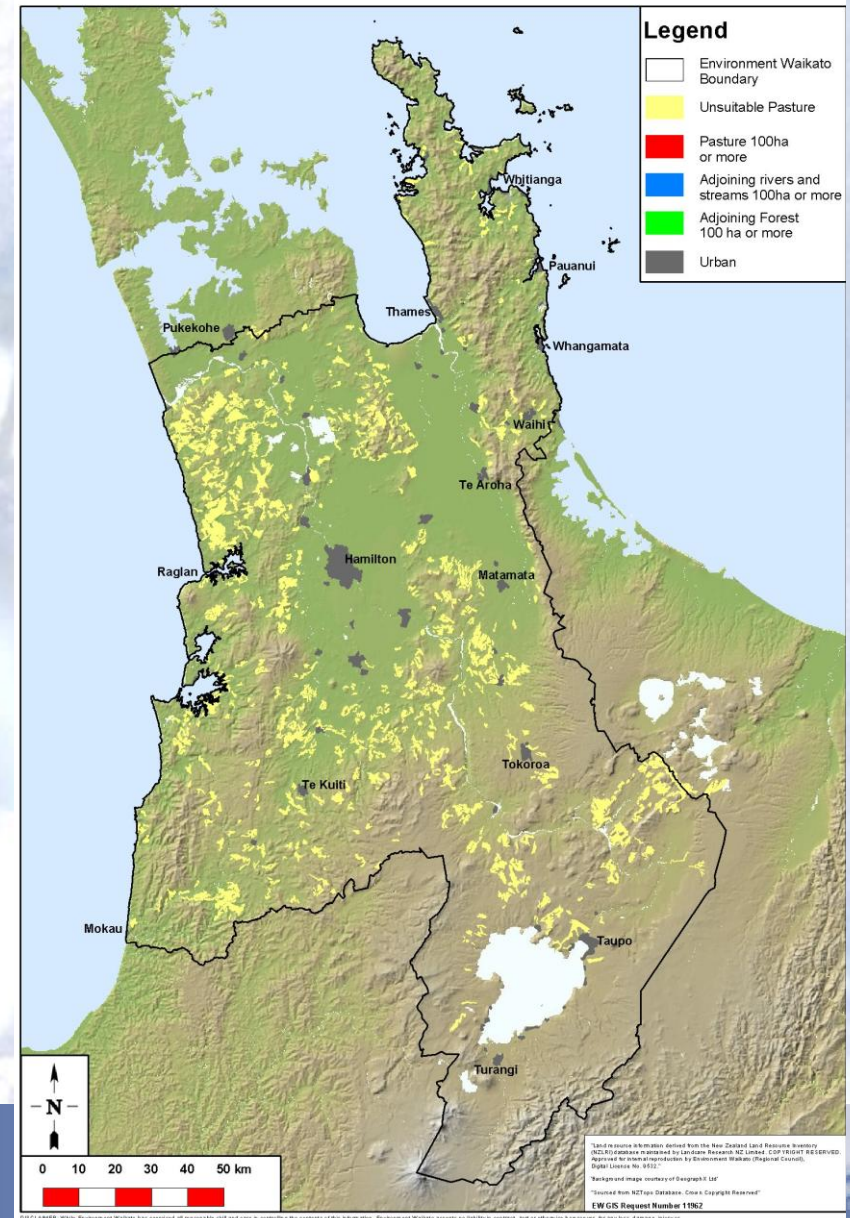
- Sustainable land use

✓ Convert steep, erosion prone farming land to forestry

✓ ETS a commercial opportunity

✓ Water quality, land management and biodiversity co-benefits

Creating Futures

Applying WISE Model:

Regional scenario of land use change to carbon farming 2012 - 2050

Modelling impacts of land use change on:

- **Current sheep and beef farming land**

- **Phosphate and nitrogen loads into rivers & streams**

- **Impacts on runoff and stream flows**

- **Impacts on regional GDP** (requires modification to WISE economic model)
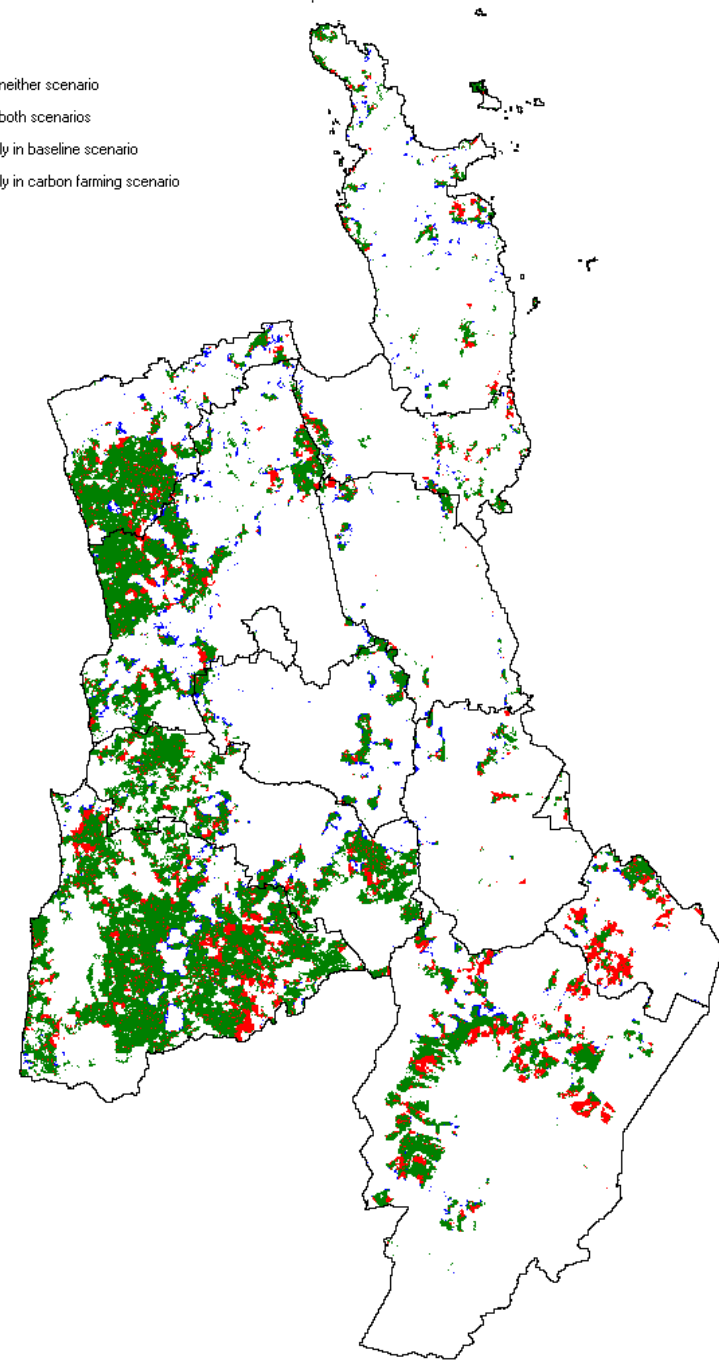
Model Inputs

Sheep, Beef and Deer (<u>SBD</u>) land use change to C-farming

Assumptions:

- **<u>~65,000ha</u> less <u>SBD</u> by 2050 when compared to the baseline:**

  ➢ **Green** = <u>SBD</u> in both scenarios **(no change)**

 ➢ **Red** = <u>SBD</u> only under baseline **(change from SBD to C-farming)**

□ in neither scenario
■ in both scenarios
■ only in baseline scenario
■ only in carbon farming scenario

Regional Carbon Strategy

So where is the new "C-forestry" likely to go?

➢ Assume a carbon forestry **area of ~65,000ha by 2050** within the total potential carbon forestry area

✓ **Impacts on phosphate and nitrogen** discharges also positive
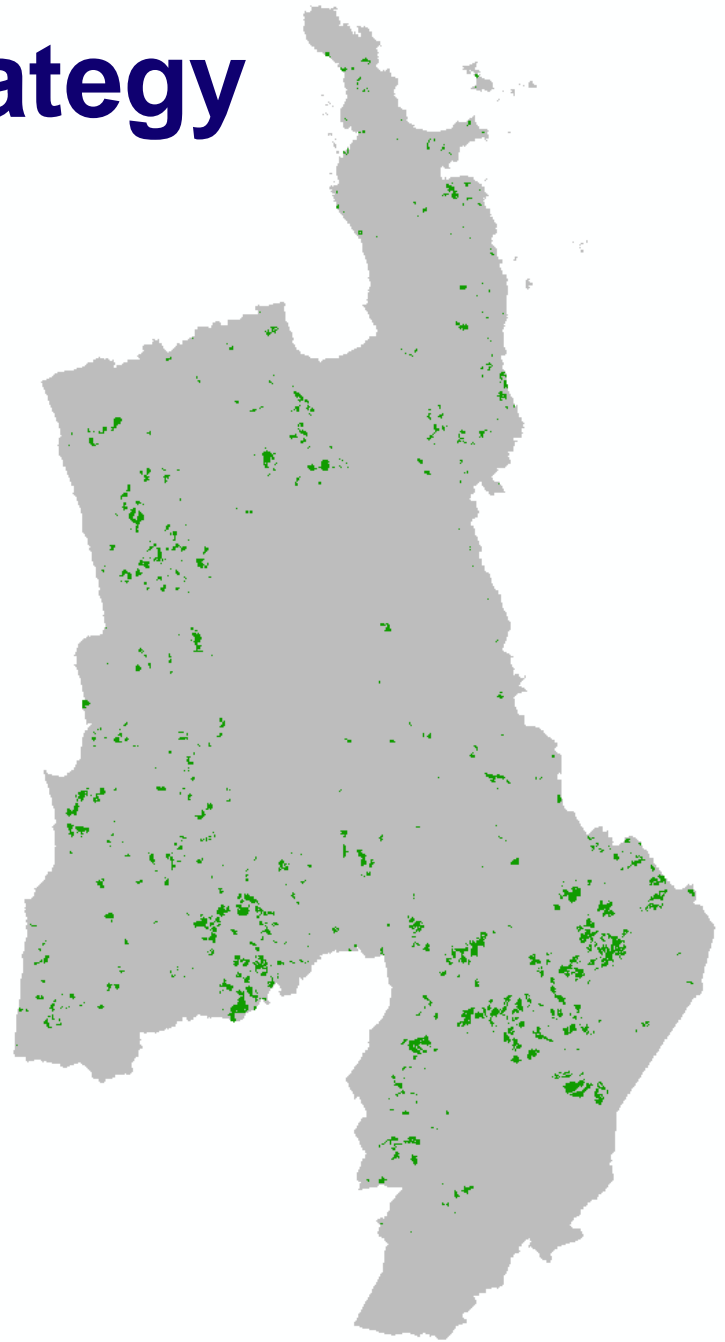
Thanks

- ✓ **Waikato Regional Council**
- ✓ **Ministry of Science & Innovation**
- ✓ **Creating Futures project partners**
  - Daniel Rutledge, Liz Wedderburn, Derek Phyn and many others

Waikato Regional Council
www.waikatoregion.govt.nz

Environmental Indicators
www.ew.govt.nz/Environmental-information/Environmental-indicators/

Community Outcomes (MARCO) Indicators
www.choosingfutures.co.nz/MARCO-indicators/

Creating Futures Project
www.creatingfutures.org.nz