



**Landcare Research**  
**Manaaki Whenua**

# A nationally consistent approach for monitoring land fragmentation

Georgina Hart, Daniel Rutledge, Robbie Price,  
Fiona Curran-Cournane, Haydon Jones, Reece Hill, Andrew Burton

Landcare Research, Auckland Council,  
Waikato Regional Council, Tasman District Council

NZPI Conference, Mountains to the Sea, 2-5 April 2014, Queenstown



# Today's presentation

- Project outline
- Background – Land fragmentation
- Review of land fragmentation outline
- Methods
- Results
- Conclusions

# Nationally consistent guidelines for land fragmentation monitoring

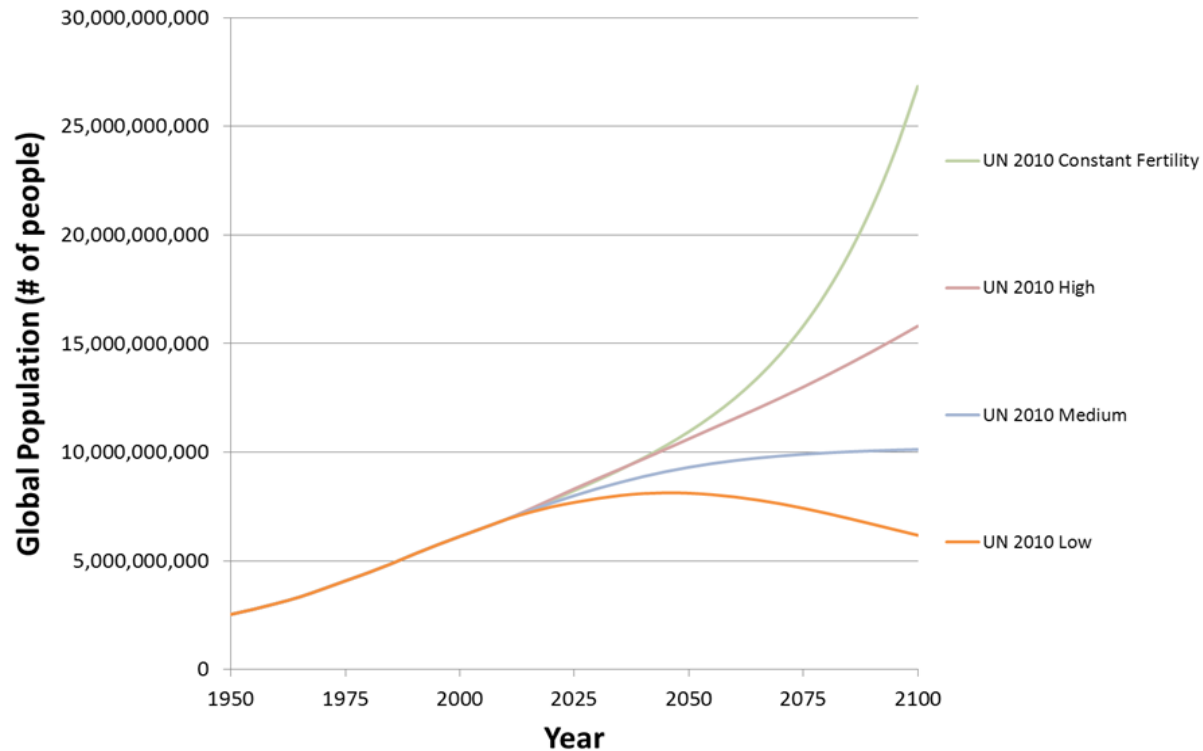
## Project outline

- Landcare Research and the Land Monitoring Forum
- 2-year Envirolink tools project

## Objectives

- National guidelines and methodologies for measuring land fragmentation trends
- Tool to assist regional councils with processing and analysing data
- Train regional councils in tool use

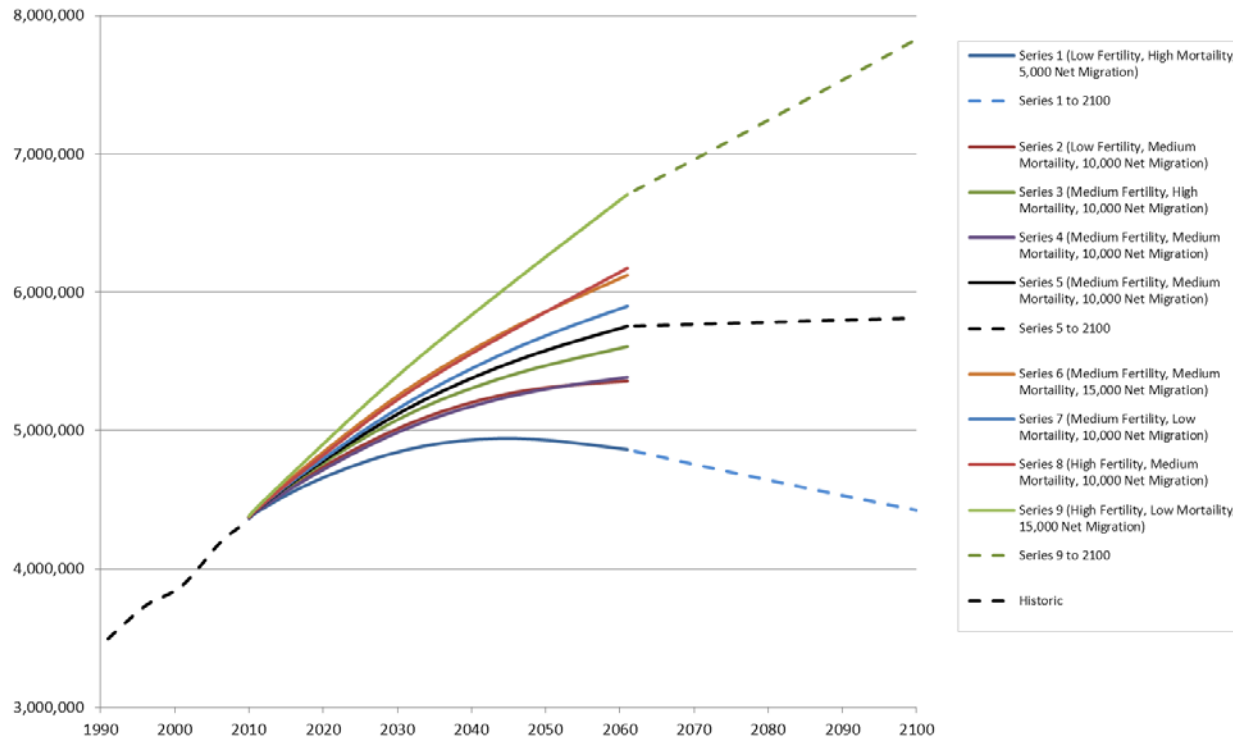
# Background: Land fragmentation



## UN Global Population Projections to 2100

Source: United Nations Population Division, World Population Prospects 2010 Revision









# Background: Land fragmentation



New Zealand population projections to 2061 and extrapolations to 2100

Source: Statistics New Zealand Population Projections to 2061, 2009 Base

# Background: Land fragmentation

<b>LRI Class</b>	<b>Area (1,000 ha)</b>	<b>Total Area (%)</b>	<b>Cumulative Area (%)</b>
 LUC Class 1	186.91	0.7	0.7
 LUC Class 2	1,199.77	4.5	5.2
 LUC Class 3	2,438.94	9.2	14.4
 LUC Class 4	2,771.92	10.5	24.9
 LUC Class 5	209.07	0.8	25.7
 LUC Class 6	7,452.62	28.1	53.8
 LUC Class 7	5,673.07	21.4	75.2
 LUC Class 8	5,781.63	21.8	77.0
<b>Other*</b>	774.74	2.9	99.9

Rutledge et al. 2010. Thought for food: Impacts of Urbanisation Trends on Soil Resource Availability in New Zealand. Proceedings of the New Zealand Grasslands Association 72: 241-246.

# Background: Land Fragmentation

FROM (LRI 1985)	TO (% Converted from Original Area)			
	LCDB1 Urban 1996/1997	LCDB2 Urban 2001/2002	Agribase Lifestyle Blocks 2008	Total Agribase + LCDB2
LUC 1	<b>1.6</b>	<b>2.3</b>	<b>3.3</b>	<b>5.6</b>
LUC 2	<b>0.9</b>	<b>1.7</b>	<b>2.2</b>	<b>4.0</b>
LUC 3	0.5	1.0	1.4	2.4
LUC 4	0.3	0.7	1.0	1.7
LUC 5	0.2	0.4	0.9	1.3
LUC 6	0.1	0.2	0.5	0.7
LUC 7	0.1	0.1	0.2	0.3
LUC 8	<0.1	<0.1	<0.1	<0.1

# Stage one: review of land fragmentation

- Review of the state of knowledge, policies and monitoring of land fragmentation in New Zealand
- Objectives
  - State of knowledge and issues
  - Policy and planning review
  - Monitoring



# Methods: Land fragmentation review

- Literature review
- Review of RPSs and plans
- Survey with all reg/unitary authorities
  
- Surveying territorial authorities fell outside project scope

# Results: State of knowledge

---

- No single common term or definition
  - Key concern – loss of productive capacity of land (essentially permanent)
  - Relative importance as a regional issue varies widely
  - Most regions have local “hotspots”
  - Key driver - demand for lifestyle block living, and financial gains
-

# Results: Definition

---

## Formal Definitions of Land Fragmentation

<b>Auckland Council</b>	the on-going subdivision of rural land that leads to increasingly smaller land parcels
<b>Bay of Plenty Regional Council</b>	development on land that is categorised as Land Use Capability (LUC) class I, II, or III
<b>Horizons Regional Council</b>	subdivision on land categorised as LUC class I and II
<b>Tasman District Council</b>	...any increase over time in the number of separately developed properties in any area, through successive land subdivision to form new land parcels and associated land development activities such as buildings and roads

---

# Results: Key Issues

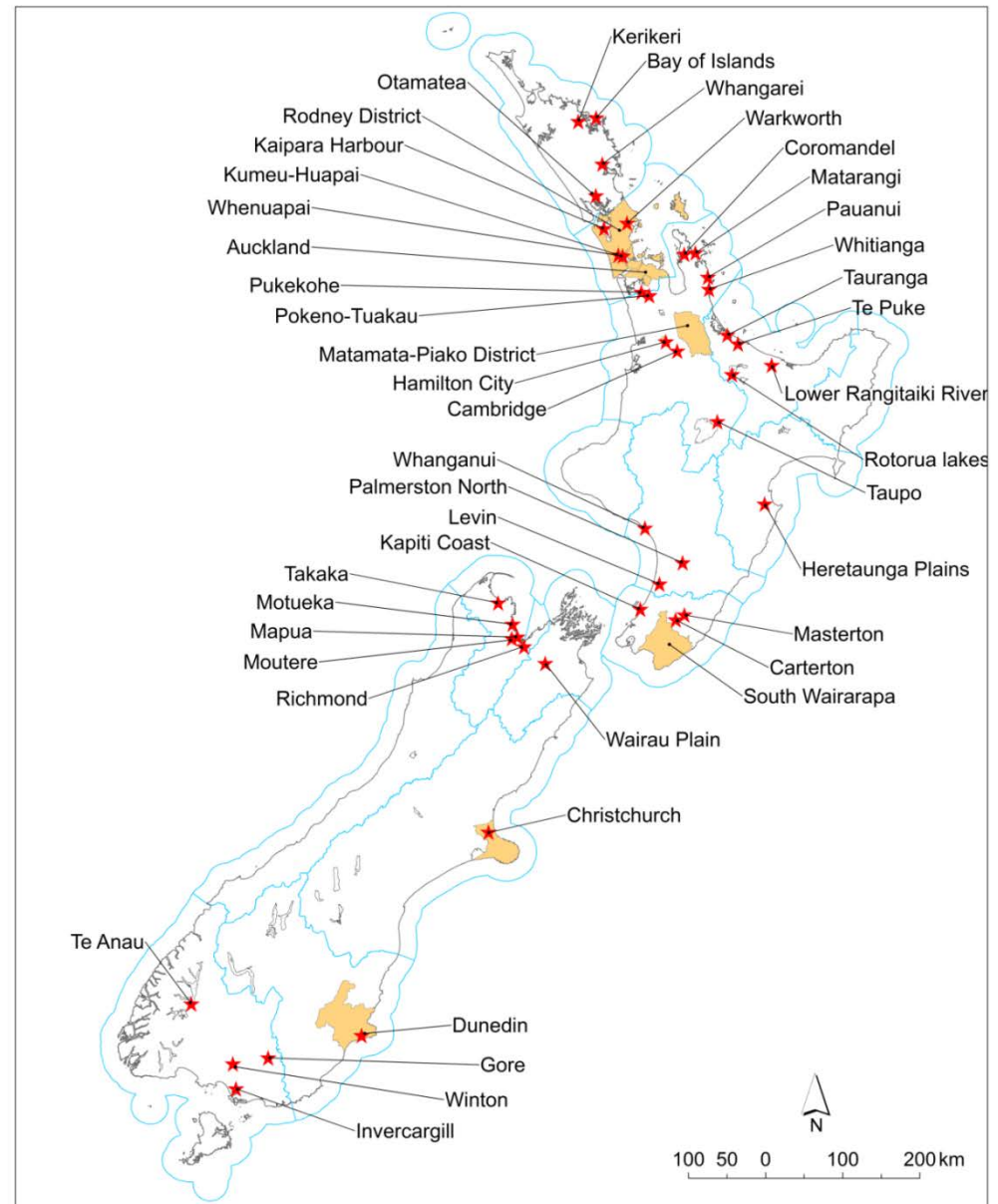
---

## Councils most frequently identified these issues

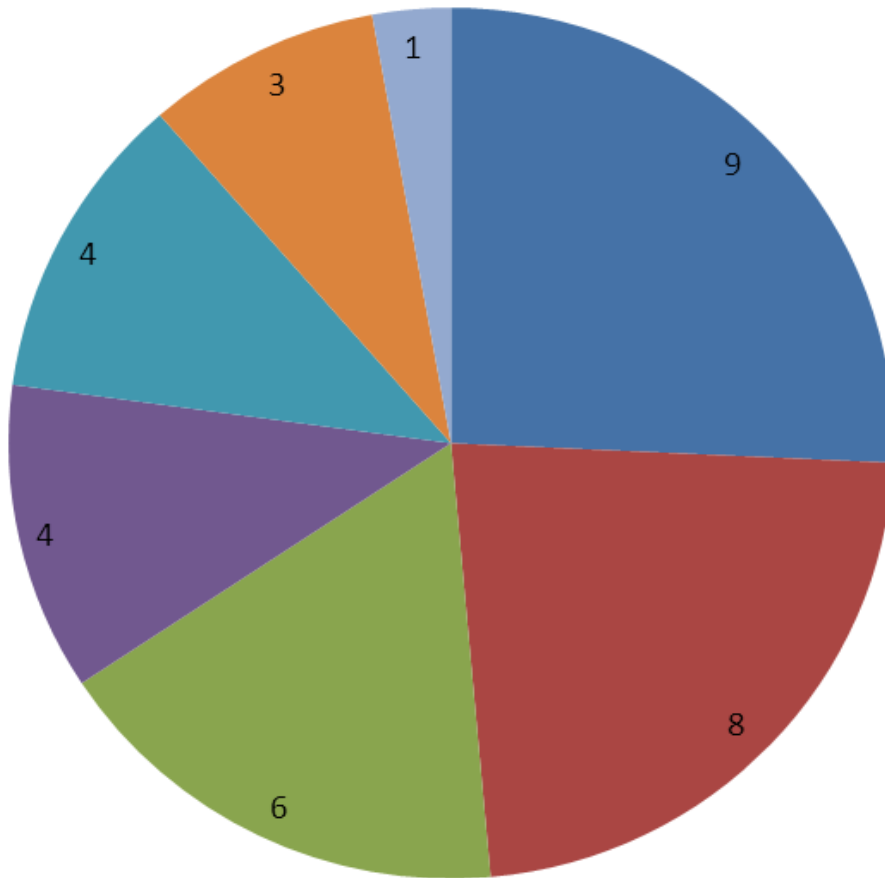
---

- Loss of land for production
  - Reverse sensitivity
  - Social and economic impacts of a changing rural landscape
  - Infrastructure provision
  - Decreasing options for productive land use
  - Increased water supply/allocation pressure
  - Regional sustainability
  - Risk to local and global food production
  - Increased environmental pressure on land that remains in productive use
  - Increased pressure on water quality
  - Land contamination problems
  - Increasing natural hazard risk
-

# Results: Hot-spots



# Results: Drivers



- Demand for lifestyle blocks (lifestyle choices)
- Economic reward for farmers
- Permissive district plan provisions
- Land /property speculation (e.g.land banking)
- Demand for housing (urban growth)
- Population increase and aging population
- Implementation of district plan provisions

# Results: Policy and planning

---

- 12 councils have provisions in their operative or proposed RPS
  - RPS issues and objectives are broadly consistent around the country; policies and methods vary
  - Considerable progression from first to second generation RPSs
  - District Plans and their implementation are key
  - Unitary authorities reported easier and better internal relationships
-

# Results: Land Fragmentation Monitoring

## Key Findings

### Regular Monitoring & Reporting

Auckland  
Waikato  
Marlborough

### Ad hoc Reporting

Horizons  
Wellington

### Future Commitment

Hawke's Bay Regional Council  
Tasman District Council

### Monitoring Methods

- Methods not consistent
- Tends to track some aspect of subdivision

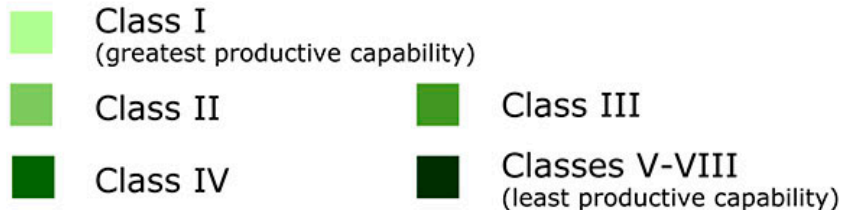
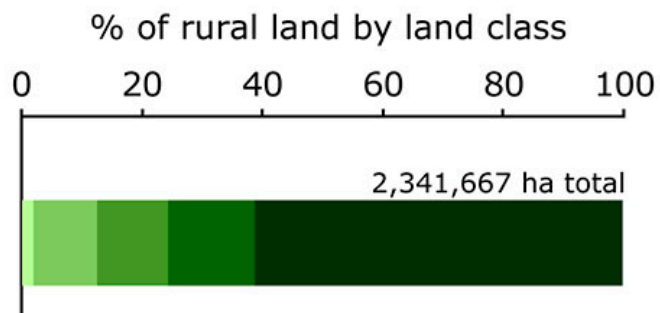
### Monitoring Data Needed

- Aerial photography
- Up-to-date land cover & use
- Consistent definitions
- Information sharing

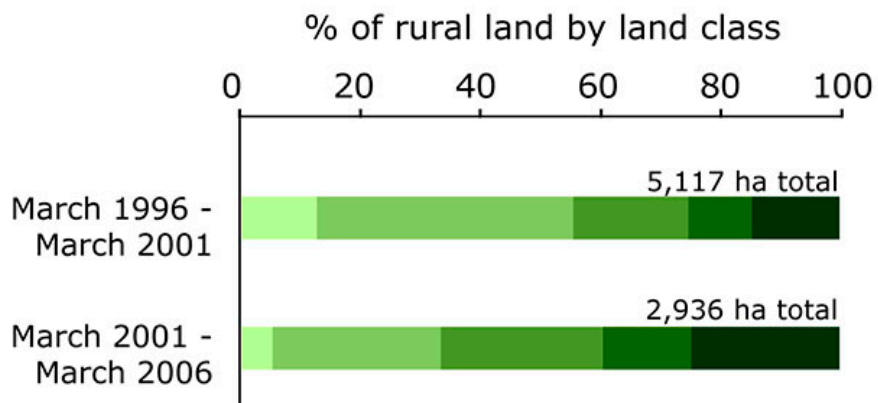


# Monitoring example: Waikato Regional Council

**Available rural land in the  
Waikato Region (1996)**



**Rural land subdivided in the Waikato Region  
(1996 - 2006)**



Region	Regional Importance	Existing Policies		Plan Rules	Monitoring
		1st Gen RPS	2nd Gen RPS		
Northland	High	✓	✓	-	-
Auckland	High	✓	✓	1999 RPS 1999: No Proposed Unitary Plan 2013: ✓	✓
Waikato	High	-	✓	-	✓
Bay of Plenty	High	✓	✓	-	-
Gisborne	High	✓	n.a.	-	-
Hawke's Bay	Low (local)	-	✓	-	-
Taranaki	Low	-	-	-	-
Manawatu-Whanganui (Horizons)	Low	✓	✓	-	Ad hoc
Wellington	Low	✓	✓	-	Ad hoc
Nelson	Low	-	n.a.	-	-
Marlborough	Low (local)	✓	n.a.	✓	✓
West Coast	Low	-	n.a.	-	-
Tasman	High	✓	n.a.	✓	-
Canterbury	Low	✓	✓	-	-
Otago	Medium	-	n.a.	-	-
Southland	Low	-	✓	-	-

# Take away points

- Lack of common language around land fragmentation
- Identified as an issue by councils and incorporated into RPS
- Very few councils monitoring land fragmentation
- Broad call for consistent guidance on land fragmentation, and data/information needs for management

# Contact

Georgina Hart

Landcare Research

[hartg@landcareresearch.co.nz](mailto:hartg@landcareresearch.co.nz)

09-5744211

<https://www.landcareresearch.co.nz/science/living/sustainable-futures/monitoring-land-fragmentation>