
Sustainable Pathways II

Integrating state-of-the-art research with policy to
enable better decisions in Spatial Planning

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Sustainable Pathways II project

- Builds on 'FRST Sustainable Pathways' (2003 – 2009) which developed following integrated tools to assist local authorities in assessing environment-economy trade-offs
 - Ecological Footprints (All regions and territories)
 - Genuine Progress Indicator (NZ, ARC, EW)
 - Environment-Economy Futures (ARC, EW, ACC, CCC, ENS, CDC)
 - System Dynamics (WRDEEM, CANDEEM, ARDEEM)
 - Computable General Equilibrium (ARCGE)
- Proposes to use Mediated Modelling; a tool previously used for Energy Planning, Land Use Planning, Ecosystem services restoration etc overseas.



Sustainable Pathways II

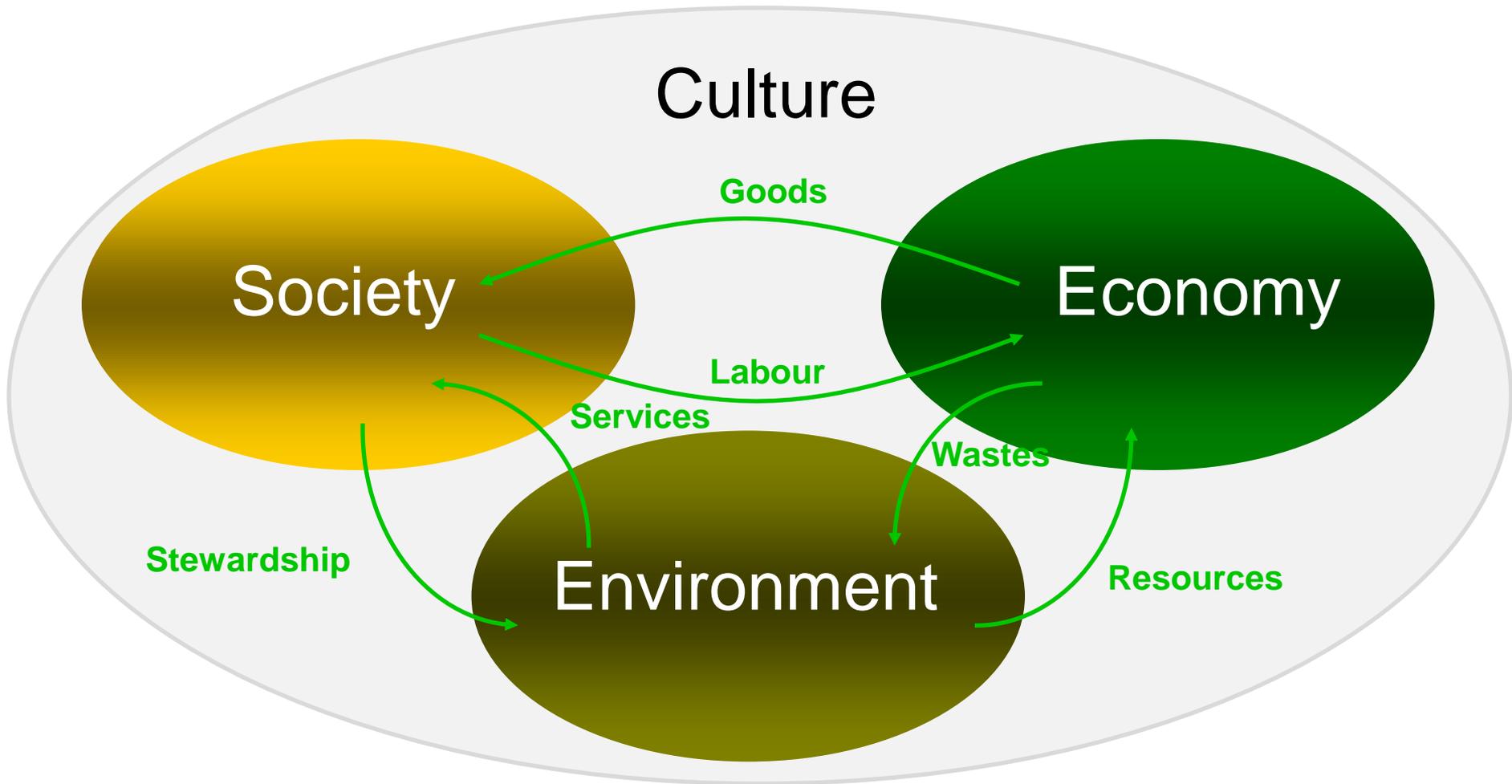
- \$4 million research programme
- From Oct 2009 to Sep 2015
- Three parallel research streams
 1. Mediated Modelling
 2. Spatial Dynamic Modelling
 3. Developing and Integrating Dynamic and Spatial Modelling tools into Urban Planning Practice



Integrated Decision Support – What is IDS?

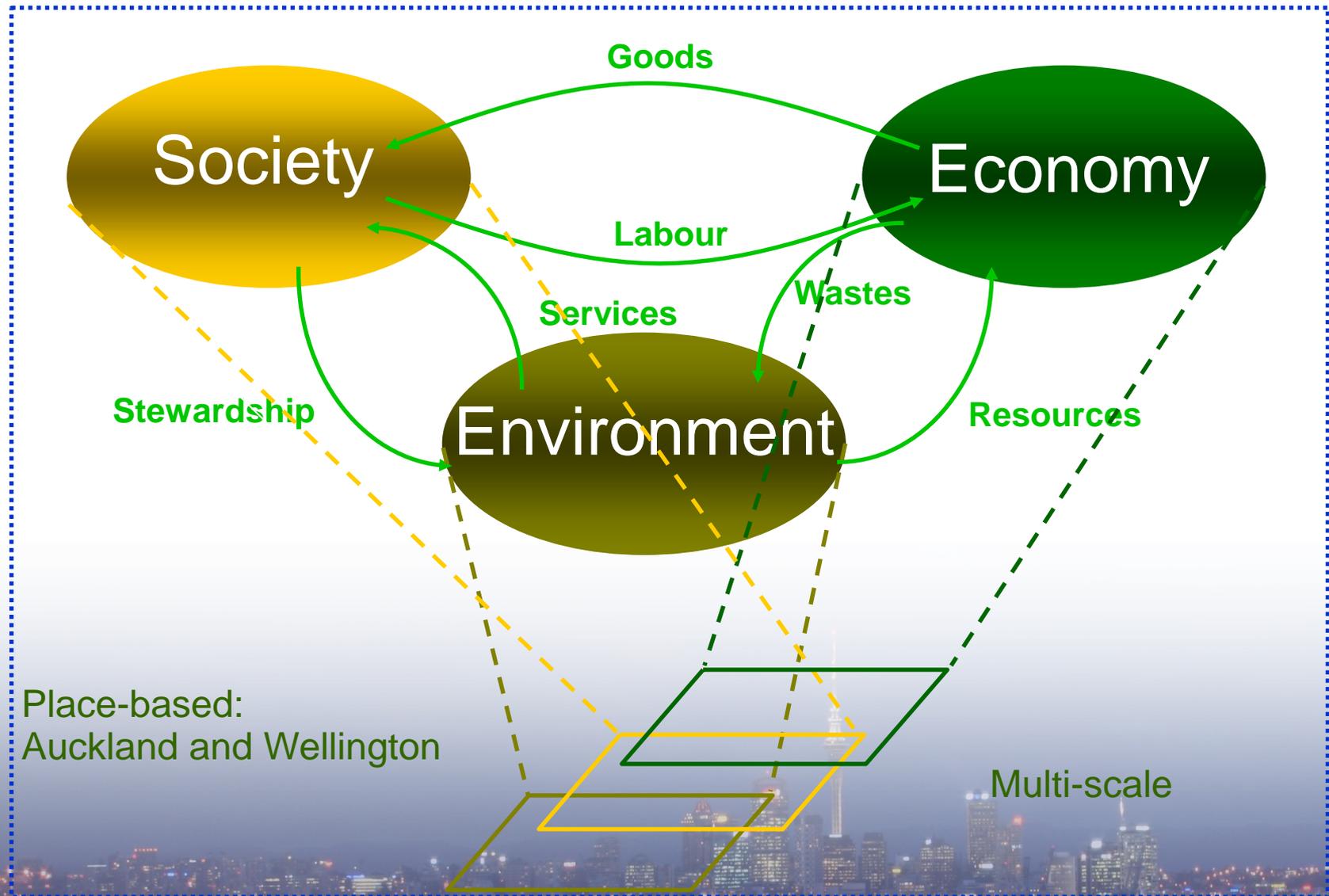
- **Addresses** long-term integrated planning and resource management issues characterised by:
 - Multi-scale
 - Spatially explicit
 - Multiple actors, values, views and possible outcomes
 - High uncertainty
 - Need for adaptive management: continuous response to change and improvement
 - Integration of four aspects of well-beings
- **Applies**
 - Systems thinking: Identifies linkages, feedbacks and (unintended) consequences
 - Action research



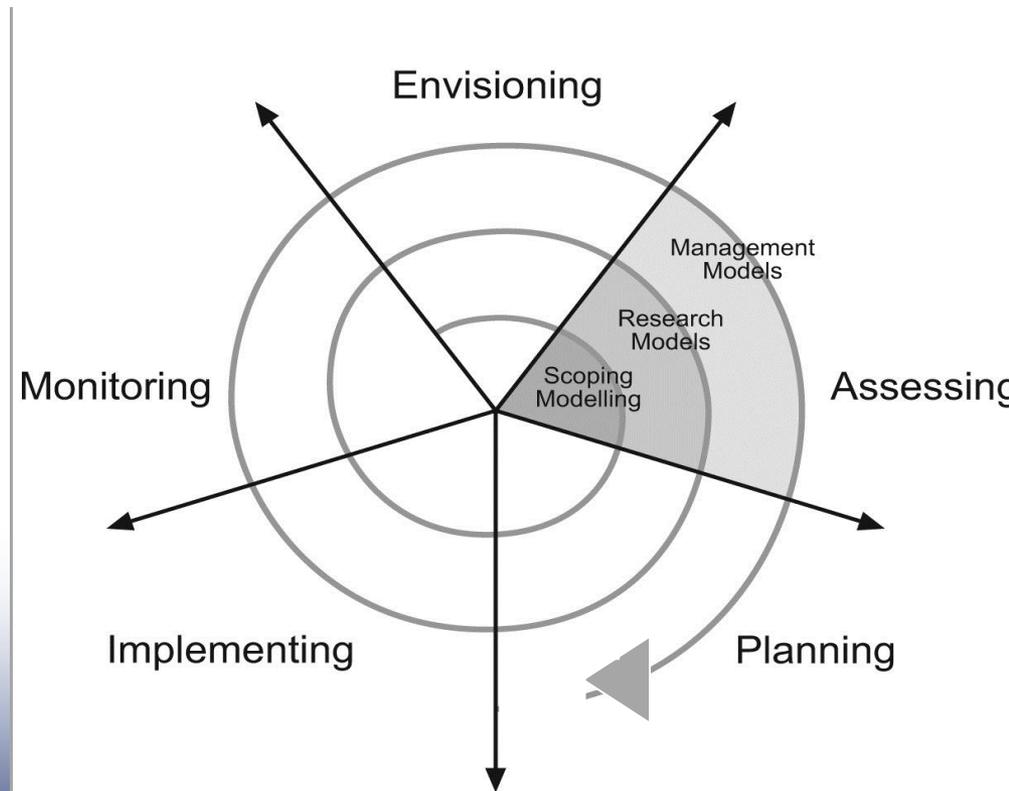


Uses an integrated and dynamics systems thinking approach

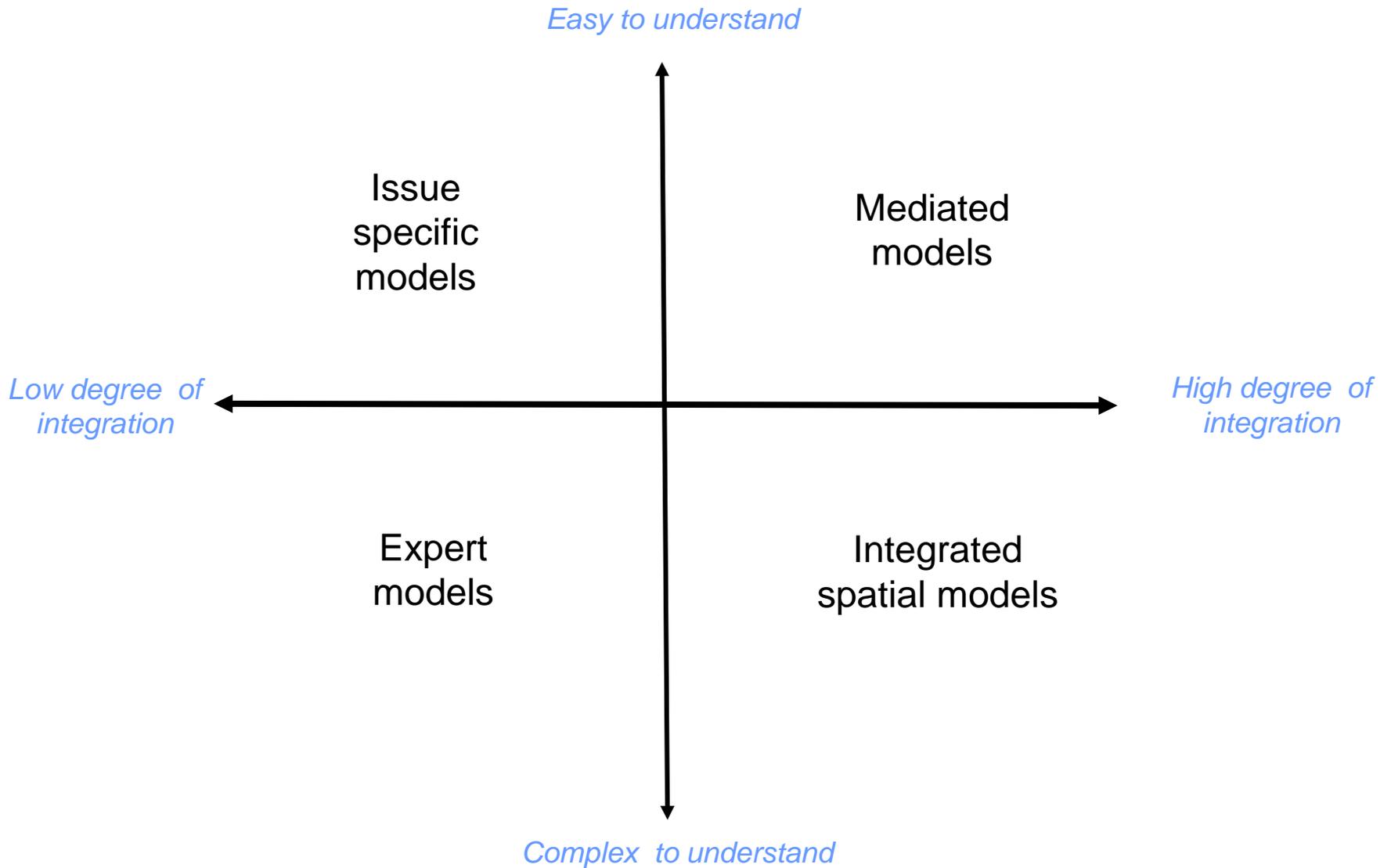
Uses a Spatially-Explicit, Multi-scale Approach



Where does IDS add value? How does the model toolkit relate to planning?



How different modelling tools relate



Sustainable Pathways II

- Three parallel streams
 - **Mediated Modelling (Dr Marjan van den Belt)**
 - Spatial Dynamic Modelling (Dr G McDonald)
 - Embedding Scenario Modelling into Urban Planning Practice (Dr Beat Huser (EW), Dr Catherine Murray (ARC), Ms Melanie Thornton (GW))

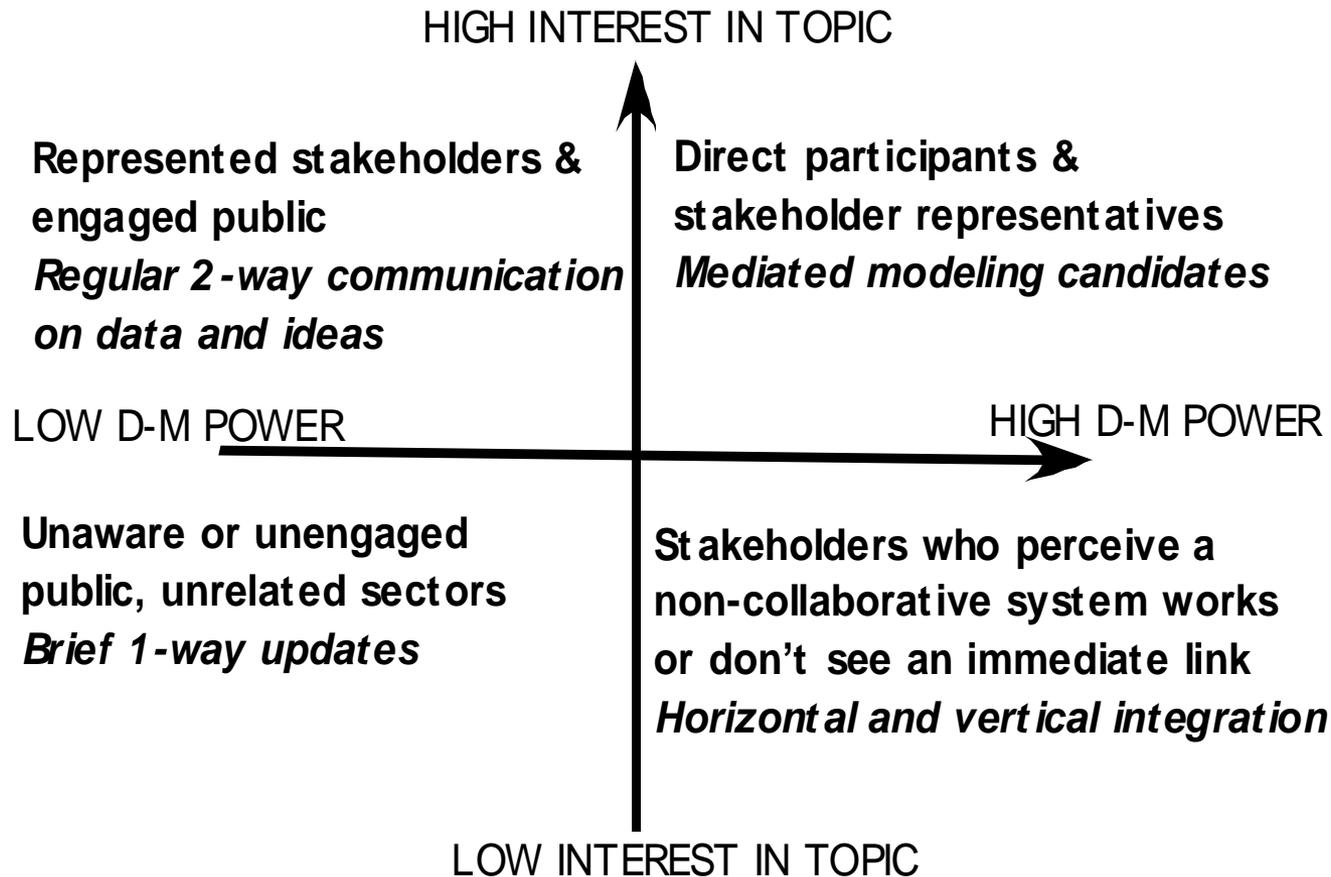


Mediated Modelling – scoping with stakeholders, dynamic, but not spatially explicit

- Works with key players to build a framework for spatial planning
- Focuses on inter-linkages, changes over time and unintended consequences.
- Uses stakeholder's perceptions on past trends and future vision
- Enhanced by available data, but not limited by data availability
- Develops a scoping model that can be used for 'what-if' scenarios
- Ensures that key drivers are incorporated in Spatial Model
- Model revisited as circumstances change to ensure are still on track and enhances adaptive capacity.
- Capacity to maintain model developed within councils (and other stakeholders).



Stakeholder analysis and management



Sustainable Pathways II

- Three parallel Objectives
 - Mediated Modelling (Dr Marjan van den Belt)
 - **Spatial Dynamic Modelling (Dr G McDonald)**
 - Embedding Scenario Modelling into Urban Planning Practice (Dr Beat Huser (EW), Dr Catherine Murray (ARC), Ms Melanie Thornton (GW))



Spatial Dynamic Modelling

- A Spatial Decision Support system for Auckland and Wellington urban areas that:
 - Captures dynamic feedbacks between existing population demographics, economics, labour, transport, land use, energy and environmental (energy, water etc) models
 - Presents dynamic changes in a two-dimensional spatial manner



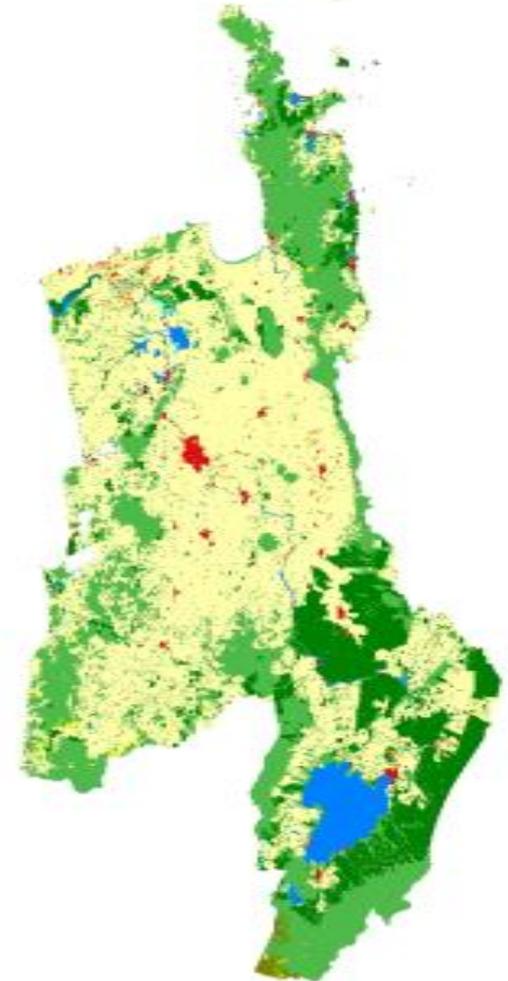
Spatial Resolution – Waikato Example



Region

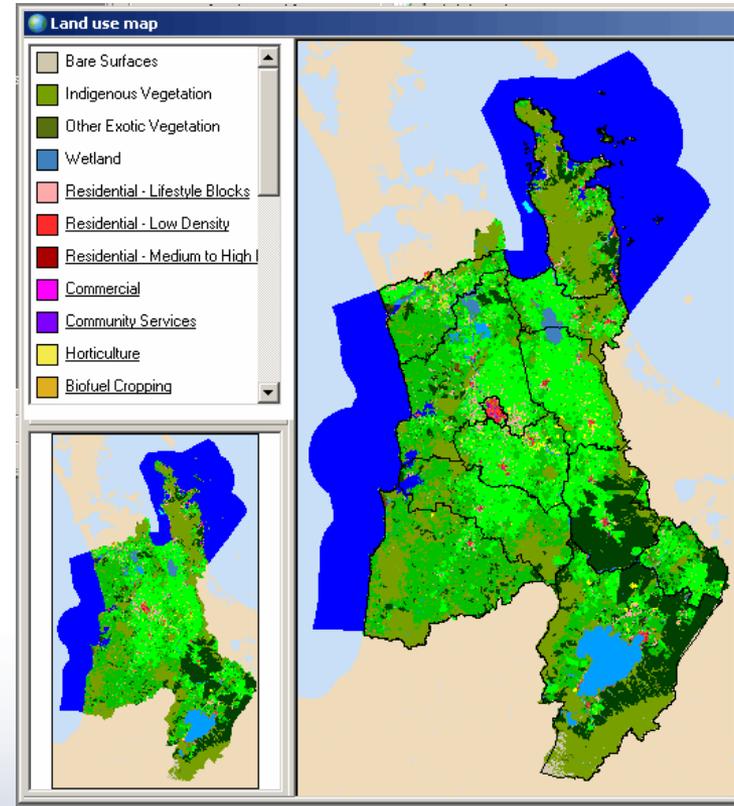
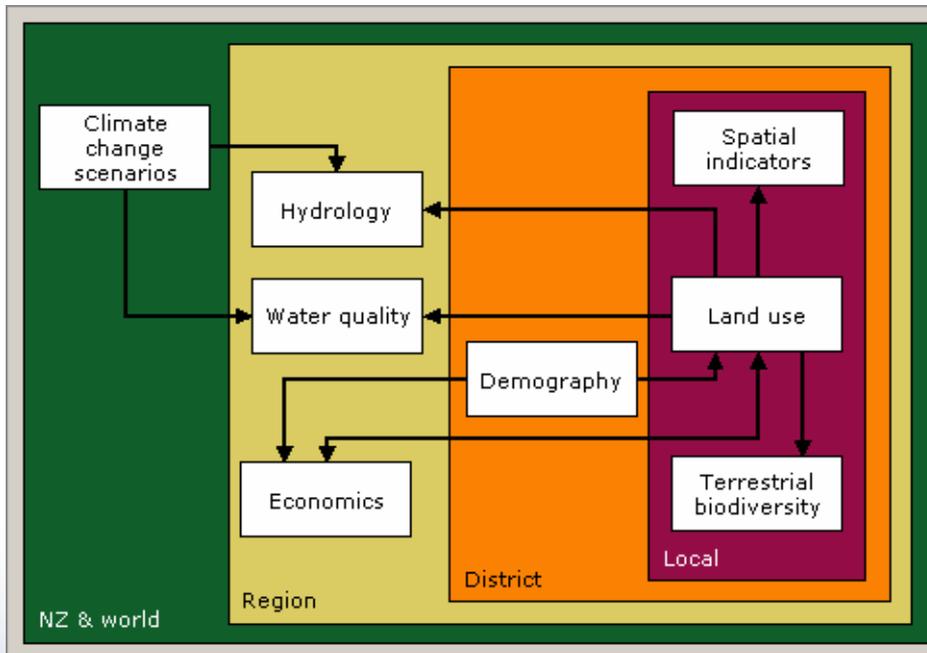


District



Local
(50 x 50 m cells)

Prototype IDS Example



Integration

Basic Framework



Models

Demography

Economy

Land Use Change

Zoning

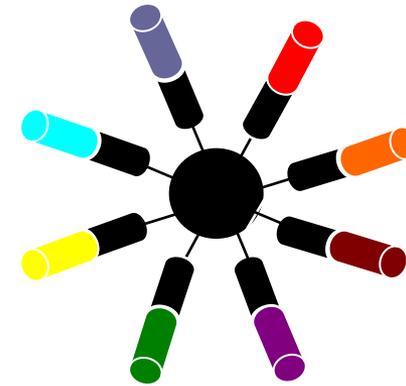
Transport

Energy

Water

Others

Geonamica



IDS



Land Use Change Module

- **GIS land use layers, land use classification, and land use to economic activity relationships**
 - GIS base year **land use layers** 20-30 (2004-2007)
 - Physical: Land use (LCDB), NZTM Topographical Maps
 - Socio-Economic: Meshblock boundaries (census data, business activity, other), road and rail networks, agriculture (Agribase)
 - Zoning (time intensive)
- **Land use to economic activity relationships**
- **Land use classification**



Sustainable Pathways II

- Three parallel streams
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 - **Embedding Scenario Modelling into Urban Planning Practice (Dr Beat Huser (EW), Dr Catherine Murray (ARC), Ms Melanie Thornton (GW))**



Embedding scenario modelling

- Council led
 - What models are needed by Councils?
 - How can the Sustainable Pathways II research team best meet these needs?
 - How can we best build on the work done in Sustainable Pathways I and Creating Futures (spatial examples as follows)

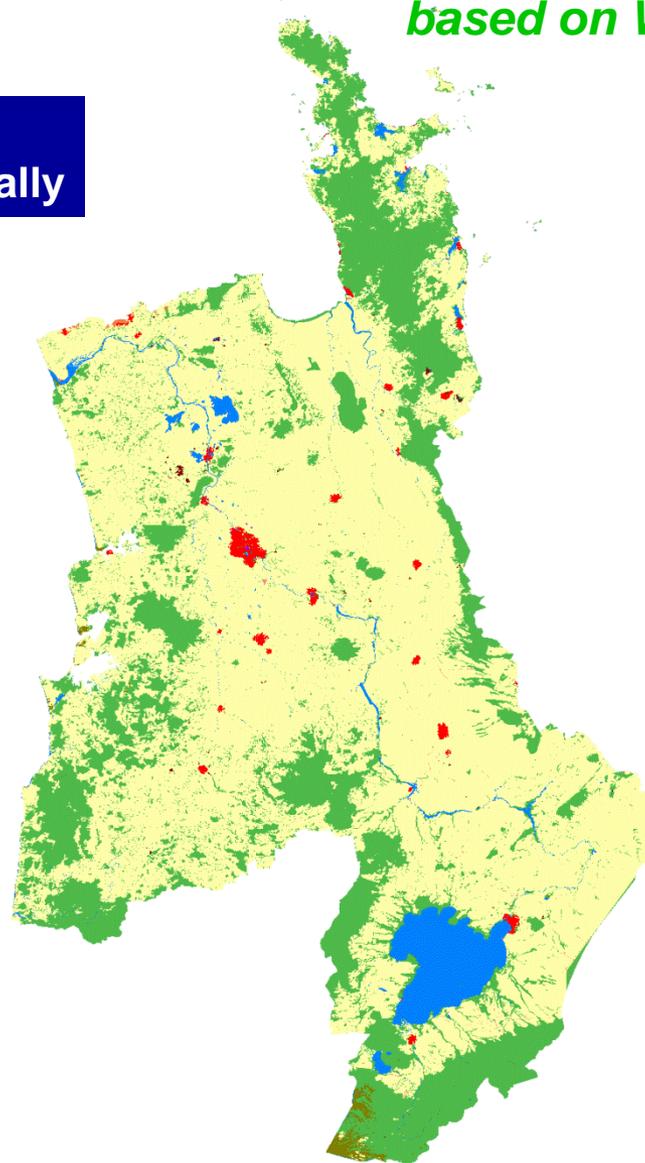


Mock Scenarios for Waikato's Future 2001-2050

based on WISE prototype

**Land for dairying
increases ~4% annually**

Land Use



3 Mock Scenarios for Waikato's Future 2001-2050

based on WISE Prototype

Dairy Expansion

Land for dairying increases ~4% annually

Diversification

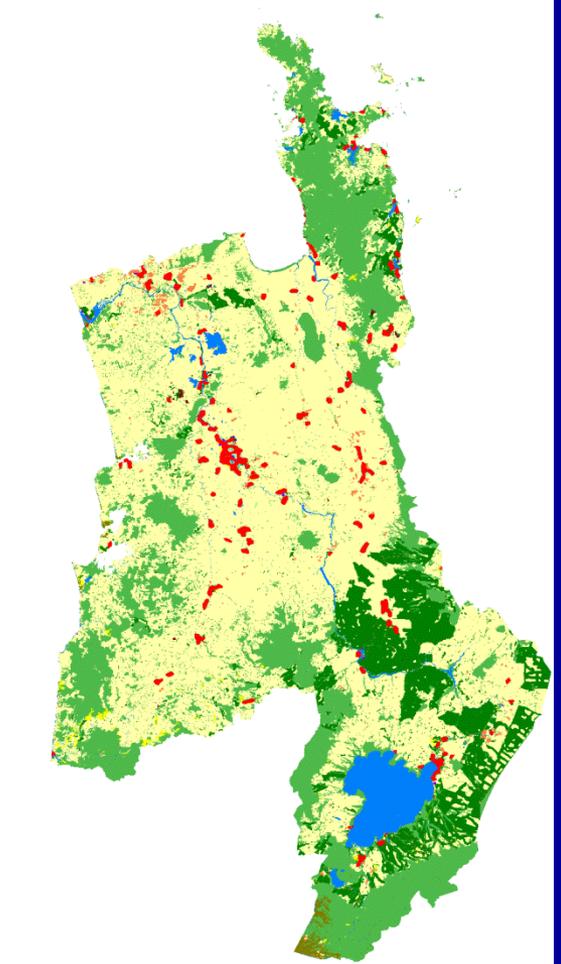
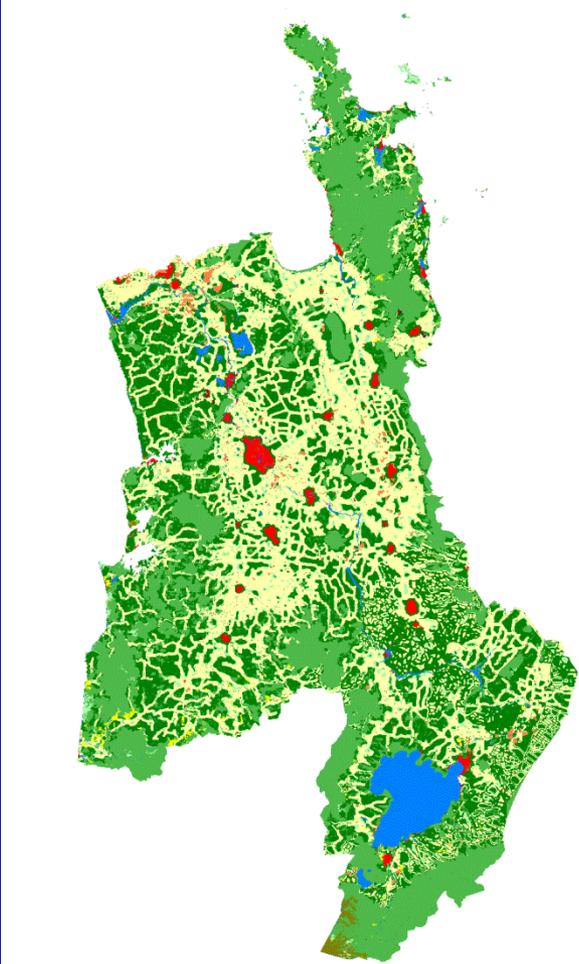
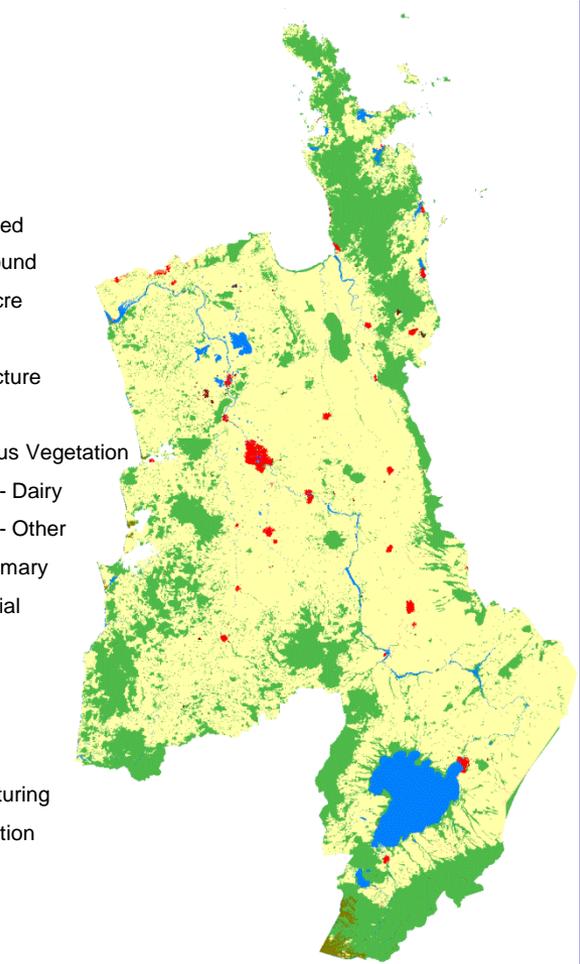
Demand for non-dairy primary production land increases

Village Life

Residential land increases 7-fold

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



The functions of the spatial plans outlined in the Local Government (Auckland Council Amendment) Act that SP2 can assist with (Part 6, 79):

2. Contribute to Auckland's social, economic, environmental, and cultural well-being through a comprehensive and effective long-term (20- to 30-year) strategy for Auckland's growth and development.
- 3a. Set a strategic direction for Auckland and its communities that integrates social, economic, environmental and cultural objectives.
- 3b. Outline a high level development strategy that will achieve that direction and those objectives.
- 3c. Enable coherent and co-ordinated decision making by the Auckland Council (as the spatial planning agency) and other parties to determine the future location and timing of critical infrastructure, services and investment within Auckland in accordance with the strategy.
- 3d. Provide a basis for aligning the implementation plans, regulatory plans and funding programmes of the Auckland Council.
- 4a) Recognise and describe Auckland's role in New Zealand
- 4b) Visually illustrate how Auckland may develop in the future, including how growth may be sequenced and how infrastructure may be provided
- 4c) Provide an evidential base to support decision-making for Auckland, including evidence of trends, opportunities, and constraints in Auckland
- 4d) Identify the existing, and future location and mix of:
 - i) residential, business, rural production and industrial activities within specific geographic areas in Auckland
 - ii) Critical infrastructure, services and investment within Auckland
- 4e) Identify nationally and regionally sig.:
 - i) Recreational areas and open space areas within Auckland;
 - ii) ecological areas in Auckland that should be protected from development
 - iii) Environmental constraints on development within Auckland (for eg flood prone or unstable land)
 - iv) Landscapes, areas of historic heritage value, and natural features
- 4f) Identify policies, priorities, land allocations and programmes and investments to implement the strategic direction and specify how resources will be provided to implement the strategic direction

80) Development, adoption, and implementation of spatial plan (Part 6, 80):

“(1) The Auckland Council must involve central government, infrastructure, providers (including network utility operators), the communities of Auckland, the private sector, the rural sector, and other parties (as appropriate) throughout the preparation and development of the spatial plan.

“(2) The Auckland Council must adopt the spatial plan in accordance with the special consultative procedure.

“(3) The Auckland Council may amend the spatial plan, at any time, in accordance with subsections (1) and (2).

“(4) The Auckland Council must—

“(a) make the spatial plan (including any amendments) available for inspection during working hours, free of charge, at.....

“(5) The Auckland Council must endeavour to secure and maintain the support and co-operation of central government, infrastructure providers (including network utility operators), the communities of Auckland, the private sector, the rural sector, and other parties (as appropriate) in the implementation of the spatial plan.

What value can SP2 add to Auckland Spatial Plan?

- Long term project until 2015
- FRST funded research programme aligns with Auckland's spatial planning process
- Research team (MU, MEL, RIKS, GW, ARC, EW) capabilities available to assist in current policy processes
- Improving understanding on how to integrate the 4 well-beings
- SP2 can help develop consensus on HOW to develop a spatial plan, especially long term direction and exploring tradeoffs.
- Scenario development and transition pathways (30-50 years)



Next Steps

- Continue working with ARC
- Align time frame of SP2 with ARC's Spatial Planning process
- Short term time frame for Mediated Modelling to foster consensus on scope of spatial plan.
- Prototype Spatial Model for Auckland region available June 2011
- Ensure integration of research into Auckland Council
- Catherine Murray is ARC point of contact.

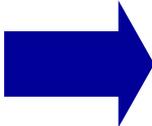


Both high quality soils and sensitive natural environments protected

Original Zoning



Both Protected Zoning

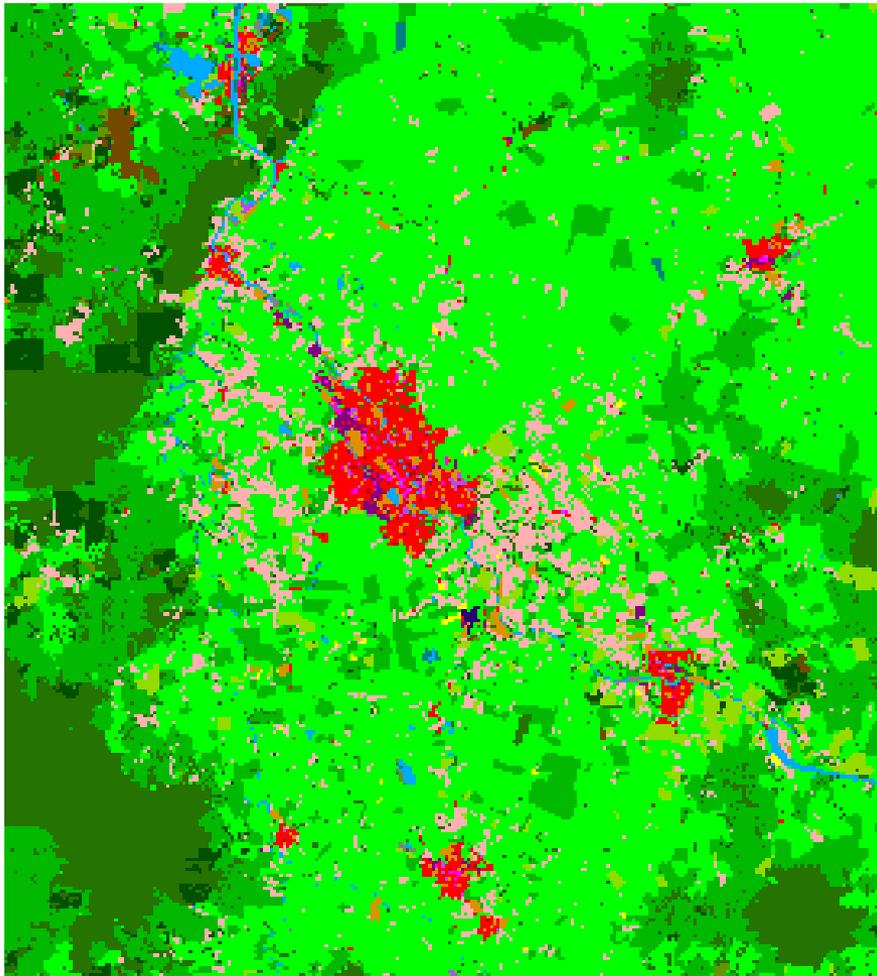


- Zoning Status
- Allowed
 - Allowed from time step 1
 - Allowed from time step 2
 - Not allowed

Policy: Protecting High Class Soils

Land use change 2006-2050

Business as Usual



Quality Soils Protected

