

Using WISE to explore *Urban Sprawl* Scenarios

Steps

1. Planner defines an issue
2. Planner defines a strategy to manage that issue
3. Modeller proposes options to simulate that strategy
4. Modeller proposes options for indicators to explore
5. Planner picks simulation and indicator options
6. Modeller carries out preprocessing of data
7. Modeller integrates new data and adjusts parameters to match strategy
8. Modeller runs simulation and captures results
9. Modeller analyzes results and reports on them to Planner...



Using WISE to explore *Urban Sprawl* Scenarios

1. Planner defines an issue
 - Urban Sprawl and associated negative effects
2. Planner defines a strategy to manage that issue
 - Various types of control of residential land use growth: “Status Quo Vs No Control Vs Tight Control”
3. Modeller proposes options to simulate that strategy
 - Use variations to zoning
4. Modeller proposes options for indicators to explore
 - Social, Economic, Environmental, Economic Environmental, Biodiversity, Land Use



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5. Planner picks simulation and indicator options

- Status Quo = Leave zoning as is for all land use functions
- No Control = All 3 residential land use classes (RLB, RLW, RMH) allowed anywhere in sub-region except where land use is a feature (such as water or airport) or land is currently legally protected
- Tight Control:
 - RLB = Not allowed to grow any further than 2006 extent.
 - RLW
 - From 2006 allowed to grow in existing residential zones only.
 - From 2012 allowed to grow in Hamilton Future Urban zone and other district's already operational future residential zones only.
 - From 2030 allowed to grow in urban expansion policy area and out to 'urban limits' of other settlements.
 - RMH = Similar to RLW except from 2006 also allowed to grow in business/commercial and some industrial zones also.



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5. Planner picks simulation and indicator options

■ Social Indicators

- Population change over time
- Population density change over time

■ Economic Indicators (for 11 selected sectors)

- Change in final demand (mln\$ (2004))
- Final demand (mln\$ (2004))
- Output (mln\$ (2004))
- Employment (FTE)
- Household consumption (mln\$ (2004))



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5. Planner picks simulation and indicator options

■ Environmental Indicators

- Annual runoff (mm/year)
- Summer flow yield (l/s/km²)
- Phosphorous load (tonnes/year)
- Nitrogen load (tonnes/year)

■ Economic Environmental Indicators

- Energy Use (GJ, oi equivalents)
- Energy related CO₂ Emissions (tonnes)
- Solid waste generation (tonnes)



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5. Planner picks simulation and indicator options

- Other Environmental Indicators
 - Threatened Environments Classification
- Land Use Change
 - Per land use type
 - For all land use types



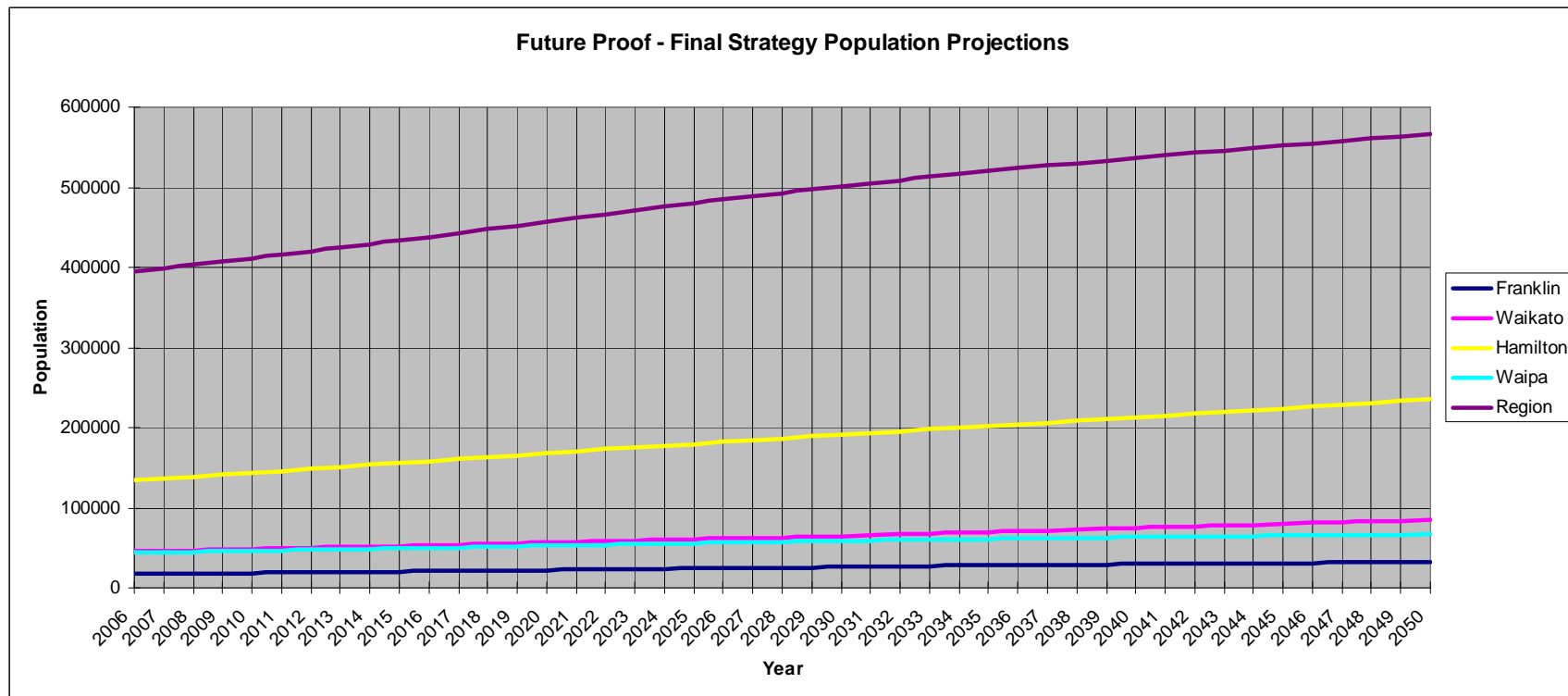
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6. Modeller carries out preprocessing of data
 - Modify zoning grids using GIS
 - Calculate population parameters to match Future Proof Final Strategy
7. Modeller integrates new data and adjusts parameters to match strategy (go to Scenario manager in WISE)
 - External factors – Climate scenario: Medium emission trend without variability
 - External factors – Population scenario: Changes to WOW Future Proof net in-migration figures (see next page)



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Population projections (see population parameters and social indicators as at 2050)



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7. Modeller integrates new data and adjusts parameters to match strategy
 - Adjust residential population proportions (see policy population parameter)
 - Zoning time steps 1 and 2 = 2012 and 2030 respectively (see policy zoning parameter)
 - New infrastructure added up to 2015 (see policy infrastructure network map)
 - “No control” and “tight control” zoning data integrated (see next page)

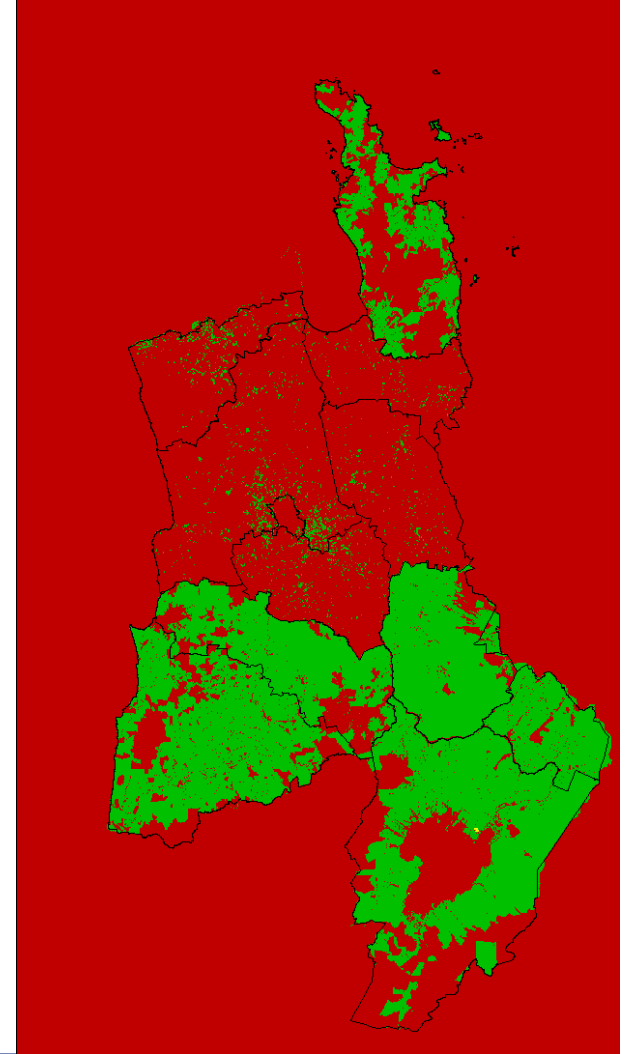
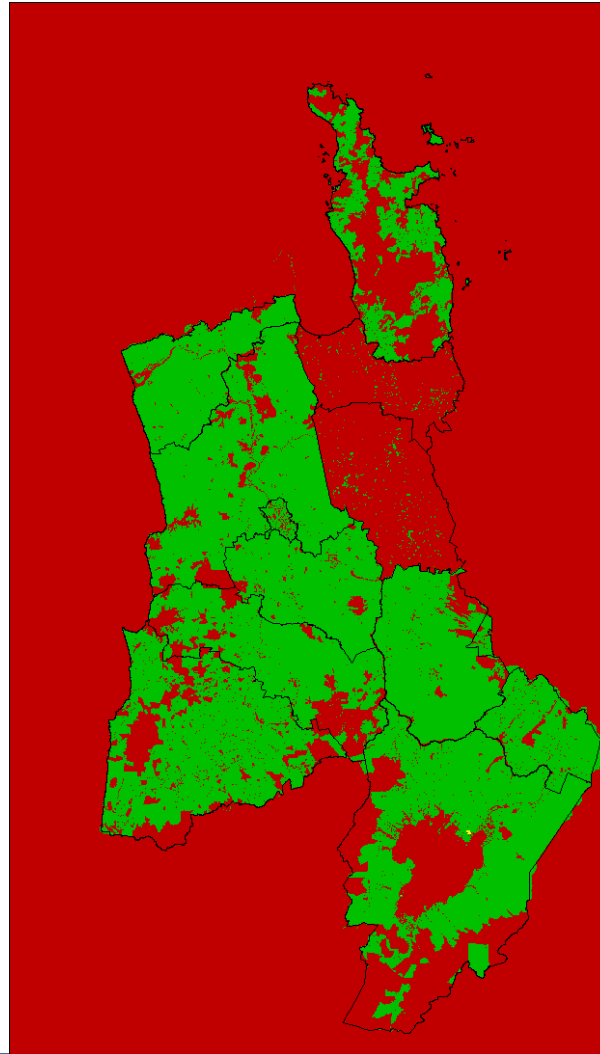
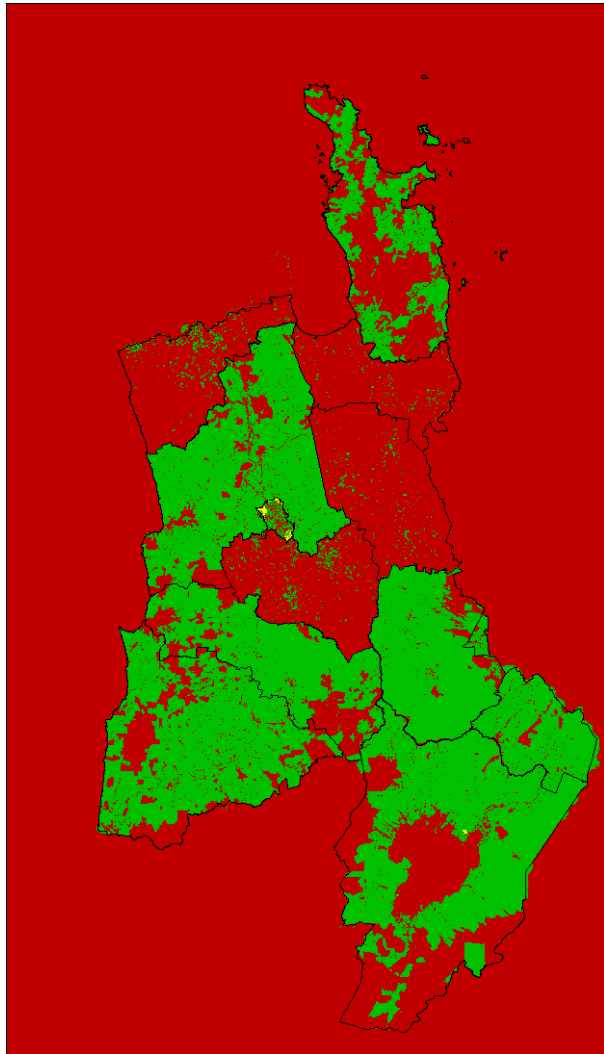


Residential – Lifestyle Block Zoning

Status Quo

No Control

Tight Control



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- Allowed at any time
- Allowed from 2012
- Allowed from 2030
- Not allowed at any time

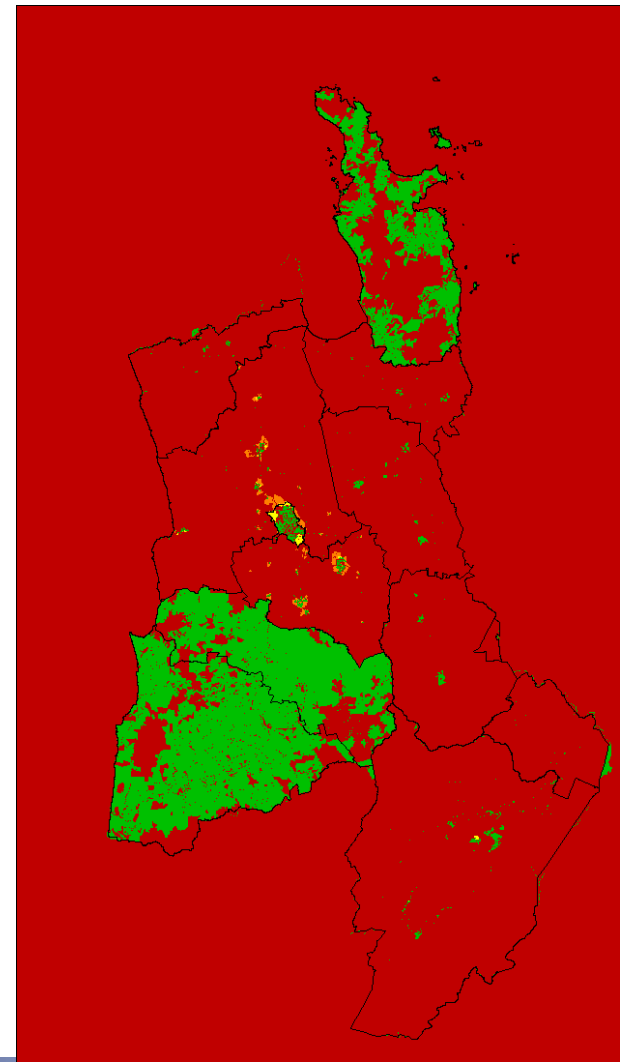
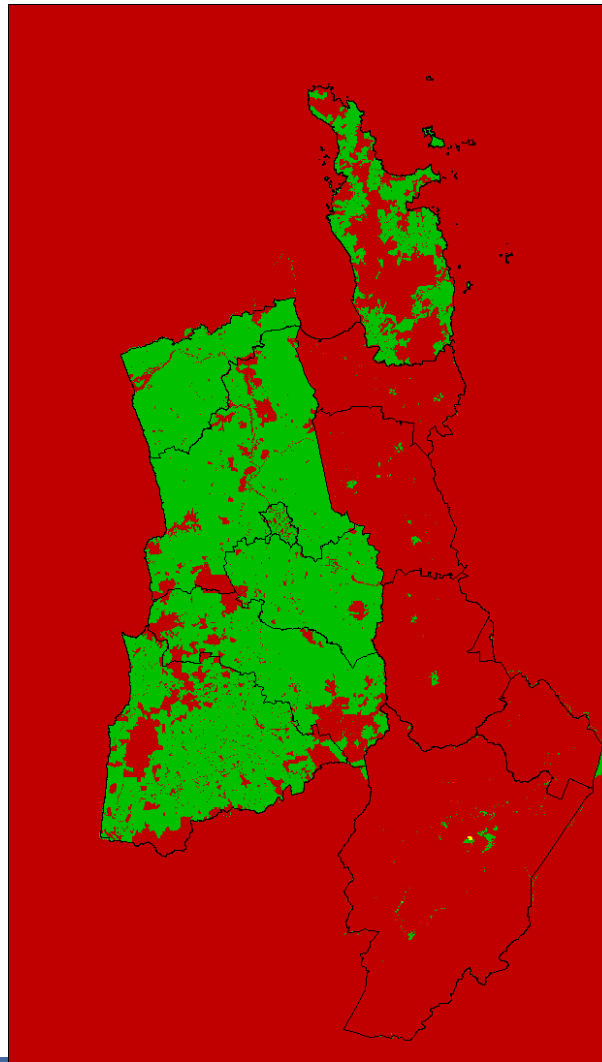
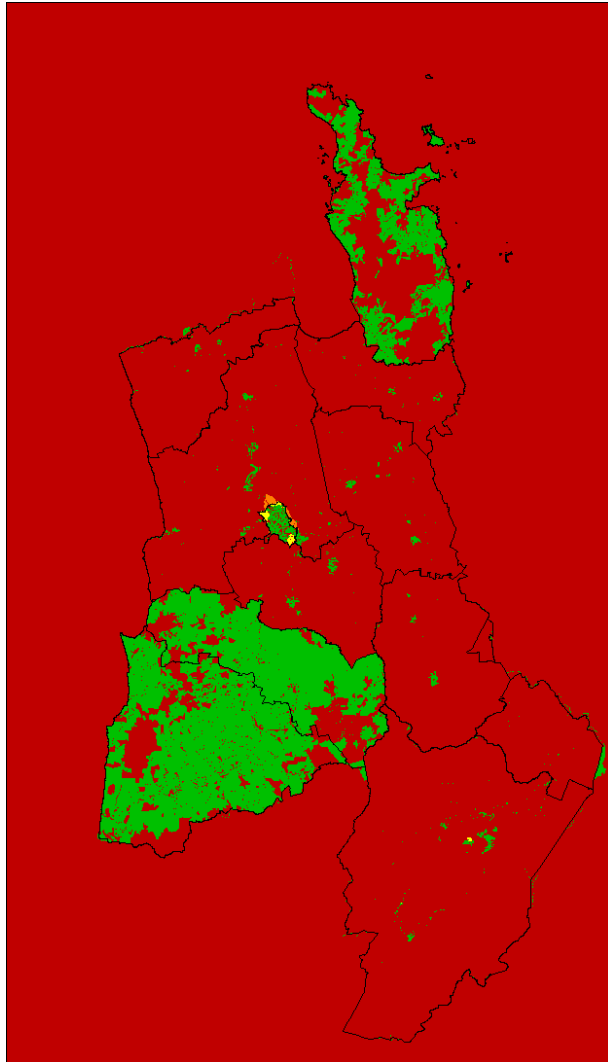


Residential – Low Density Zoning

Status Quo

No Control

Tight Control



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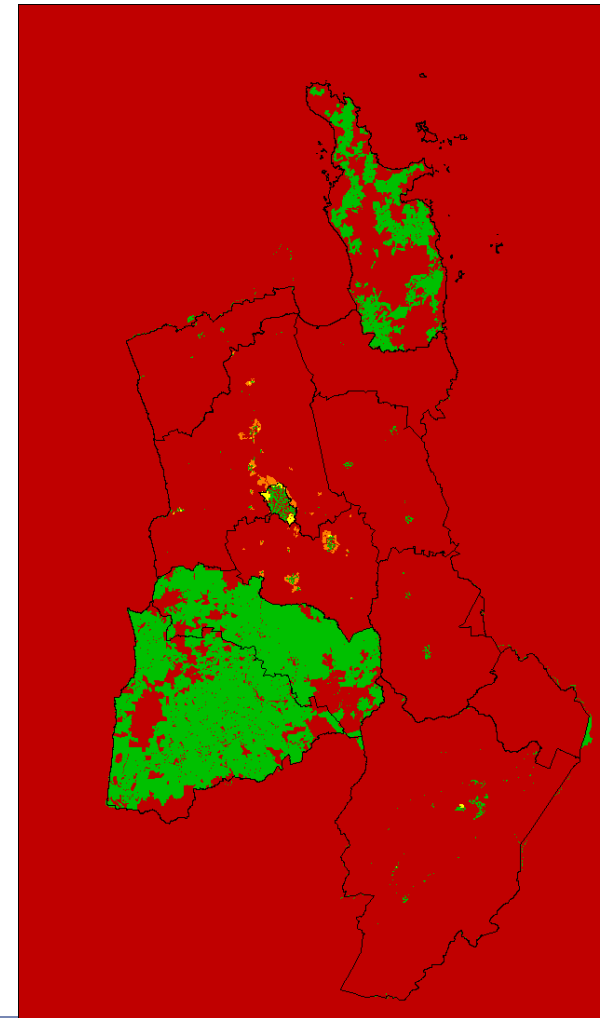
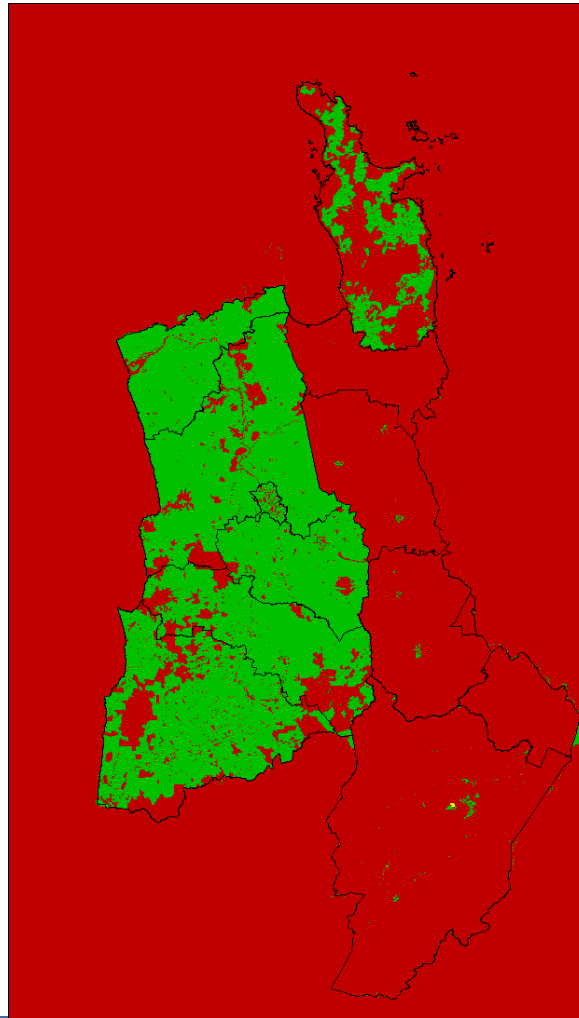
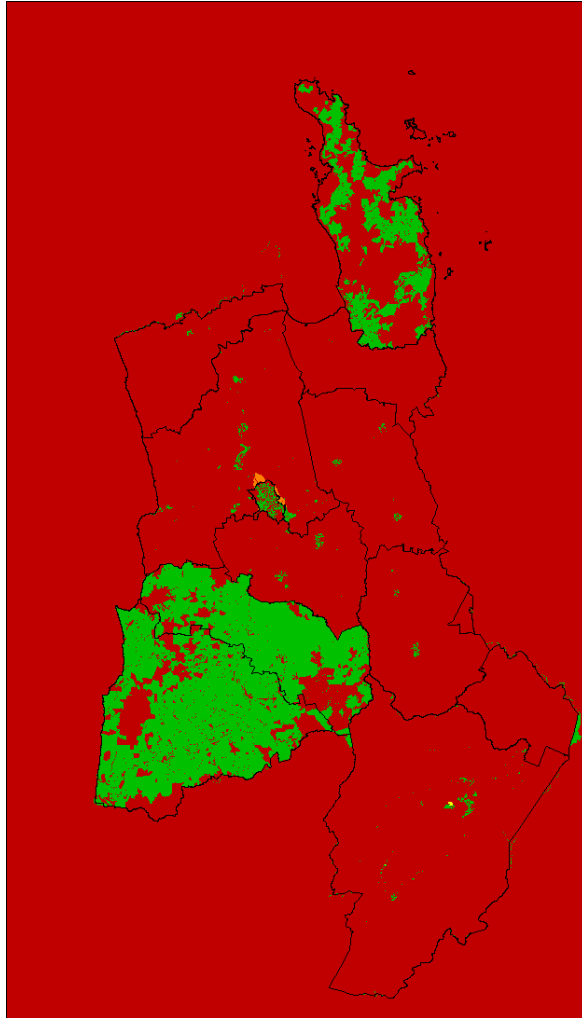
- Allowed at any time
- Allowed from 2012
- Allowed from 2030
- Not allowed at any time

Residential – Medium to High Density Zoning

Status Quo

No Control

Tight Control



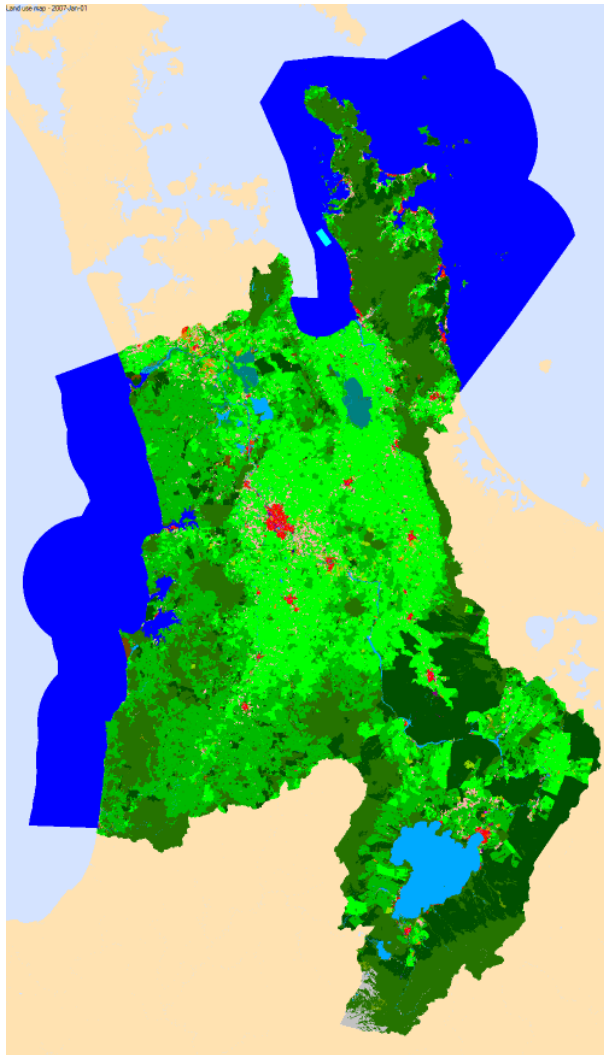
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- Allowed at any time
- Allowed from 2012
- Allowed from 2030
- Not allowed at any time

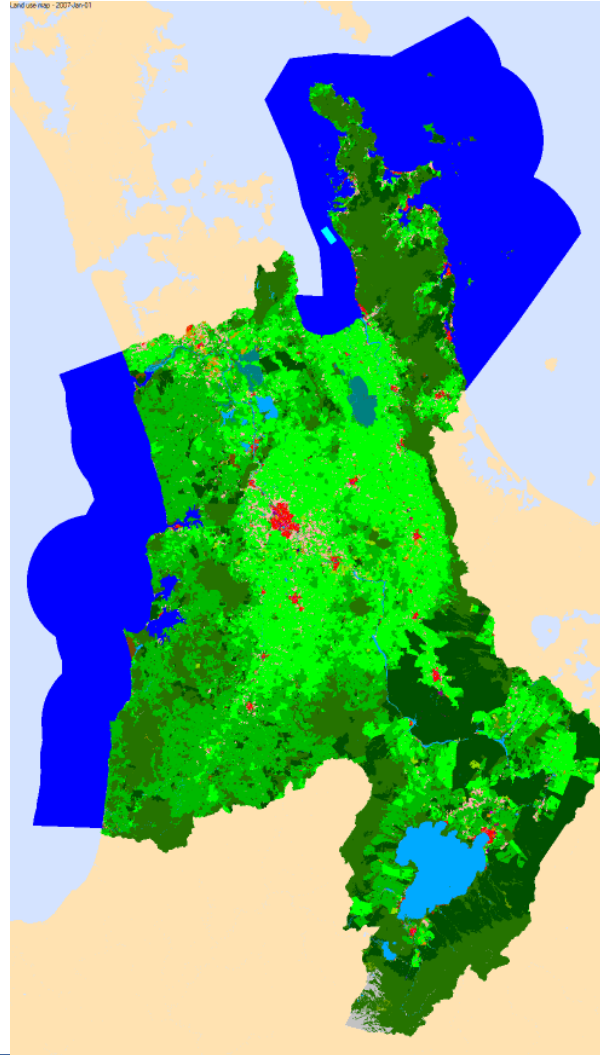


8. Modeller runs simulation and captures results

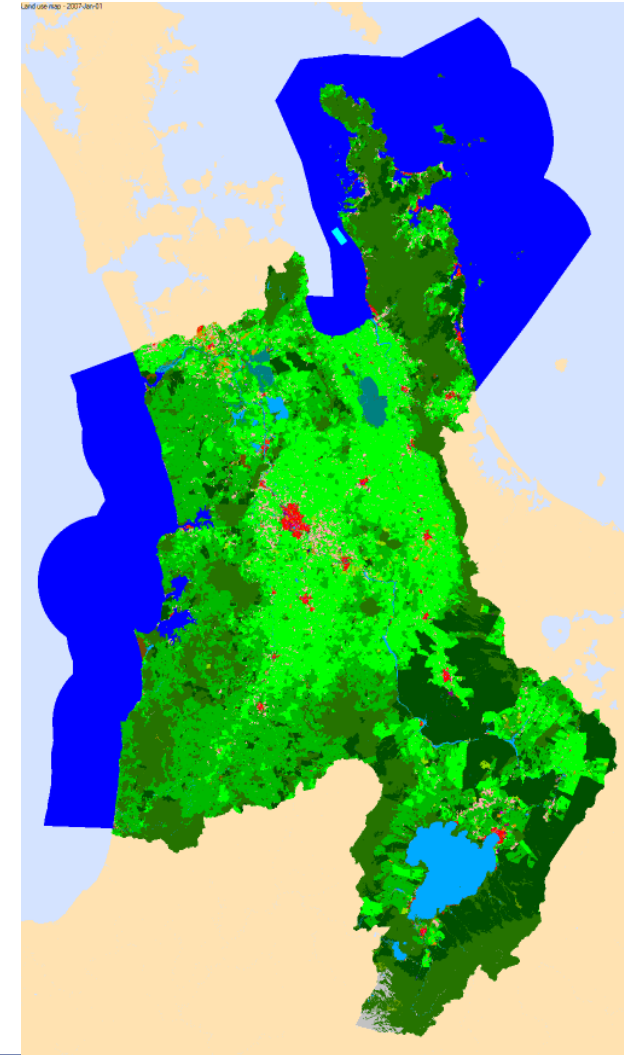
Land Use Status Quo



Land Use No Control



Land Use Tight Control



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9. Modeller analyzes results and reports on them to Planner...

■ In Map Comparison Kit:

1. Land Use RLB, RLW and RMH Status Quo 2006 to Status Quo 2050
2. Land Use RLB, RLW and RMH Status Quo 2050 to No Control 2050
3. Land Use RLB, RLW and RMH Status Quo 2050 to Tight Control 2050
4. Threatened Environments (visual only)

■ Or in WISE (visually) or Excel for comparisons



Using WISE to explore *Urban Sprawl* Scenarios

To conclude: Plausible impacts of no control over urban sprawl as at 2050 when compared to status quo control...

■ Social

“Has little impact on population totals, trends or pyramid patterns but densities are significantly less for Franklin, Hamilton and Waipa – especially for RMH. There is a significant bias towards males in the Waikato District.”

■ Economy

“There is little economic impact other a relatively small increase (2.5mIn\$2004) in value added from the dairy cattle farming sector and 15 additional FTE jobs in the horticulture and fruit growing sector.”



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To conclude: Plausible impacts of no control over urban sprawl as at 2050 when compared to status quo control...

- Environment

“Visually there appears to be little impact on annual runoff, summer flow yield, nitrogen loads or phosphorous loads although the data still needs full investigation.”

- Energy

“A trend towards most economic sectors using less energy, emitting less CO2 emissions or generating less solid waste but no more than around 1% less than for the status quo scenario, and usually much less than this.”



Using WISE to explore *Urban Sprawl* Scenarios

To conclude: Plausible impacts of no control over urban sprawl as at 2050 when compared to status quo control...

■ Land Use

“An additional 3,900 hectares of RLB (across the entire region). Greater cluster growth from existing RLB, or forming moderate sized clusters near the Waikato River or as rural villages, especially in the Hamilton basin and Franklin District.

“An additional 1,100 hectares of RLW (across the entire region). Significant growth around Temple View, Rototuna and on the margins of Te Awamutu, Pirongia, Ngaruawahia, Huntly, Tuakau and Kaiaua.

“An additional 150 hectares of RMH (across the entire region) . Significant near Cambridge, Hopuhopu, Rotokauri/Te Rapa and Hamilton CBD.



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To conclude: Plausible impacts of no control over urban sprawl as at 2050 when compared to status quo control...

- Biodiversity

“Visually there appears to be only minor impacts on threatened environments in the north of the sub-region although there are some changes on the neighbouring Hauraki Plains.”



Using WISE to explore *Urban Sprawl* Scenarios

To conclude: Plausible impacts of tight control over urban sprawl as at 2050 when compared to status quo control...

■ Social

“Has little impact on population totals, trends or pyramid patterns but densities are significantly less for RMH in Franklin, Hamilton and Waipa, but higher for RLB in Waikato, Hamilton and Waipa. RLW population density is only significantly lower in Waipa. Other values are similar. There is a significant bias towards males in the Waikato District.”

■ Economy

“There is little economic impact other a slight increase (1.45mIn\$2004) in value added from, and 26 additional FTE jobs in, the horticulture and fruit growing sector.”



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To conclude: Plausible impacts of tight control over urban sprawl as at 2050 when compared to status quo control...

- Environment

“Visually there appears to be little impact on annual runoff, summer flow yield, nitrogen loads or phosphorous loads although the data still needs full investigation.”

- Energy

“A trend towards some economic sectors using slightly more energy, emitting more CO2 emissions or generating slightly more solid waste but no more than around 1% more than for the status quo scenario, and usually much less than this. For many sectors there is no change.”



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To conclude: Plausible impacts of tight control over urban sprawl as at 2050 when compared to status quo control...

■ Land Use

“2,000 hectares less of RLB (across the entire region). RLB more likely to maintain its current location.

“An additional 400 hectares of RLW (across the entire region). More evenly distributed around, and in, Hamilton. Significant new subdivisions close to the margins of most towns and villages.

“An additional 160 hectares of RMH (across the entire region). Significant near Cambridge, Horotiu, Nawton and Hamilton CBD.



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To conclude: Plausible impacts of tight control over urban sprawl as at 2050 when compared to status quo control...

- Biodiversity

“Visually there appears to be only minor impacts on threatened environments in the north of the sub-region although there are some changes on the neighbouring Hauraki Plains.”



Thank You

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