Preserving a green space network for a regional Auckland

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1. Introduction
2. Rethinking of Auckland’s regional development
3. Methodology
4. Case studies
5. Conclusion
Introduction

About Auckland
What is the question?
Why is the question important?
How can we address the question?
Auckland

- The largest urban region in New Zealand
- 1.5 million people, 1/3 of national population
- One of the most livable cities in the world
- Commercial Centre, the city of sail
Study area
• Auckland
• Northland
• Waikato
• Bay of Plenty

Growth corridor
• State Highway 1 (SH1)
• 5-km and 10-km buffer zones
Distinctive features of Auckland

Integration of urban and nature
- Urban and green space are integrated
- Close to water
- Decentralized urban pattern

Unique lifestyle
- Single housing
- Easy access to nature
- Importance of Sports

With 34 regional parks and over 4000 local and sports parks, green space plays a key role for Auckland’s uniqueness from regional development to individual’s lifestyle.
Future challenges

Increasing population
Approximately 1 million population increase by 2040

Ongoing urban area growth
Auckland and surrounding cities will keep growing after 2040

As they expand, cities and towns from Whangarei to Hamilton and Tauranga are getting closer; green spaces between them are under pressure.
How can a green space network maintain the sustainable and resilient urban development of regional Auckland and preserve the unique lifestyle?
Rethinking of Auckland’s regional development

Macro regional scope of Auckland
Importance of Auckland’s green space
Elements of Auckland lifestyle
Definition of regional city
According to Peter Hall (2006), a regional city is a cluster of cities and towns surrounding one or more influential major cities; the former are spatially separated but functionally connected with the central city (or cities) and one another.

Framework of regional cities
As Edward Soja (2001) explains, the framework of a city-region is a network of different-sized settlements whereby a number of urban spaces surround a related bigger centre city, in addition, they are hierarchized by size, related location, and distribution of functions.

Development of regional cities
Development of a city-region is a process of decentralization. Peter Hall (2014) describes the process: population is decentralized from cities to their suburbs, and then moved outside to smaller towns.
Practices of regional cities’ forms

- City region
- Conurbation
- Linear City
- Polycentric Metropolis
- Megalopolis
- Postmetropolis
- Mega-city Region
- Global City Region
- Metropolitan Interlocking Regions
A regional structure for Auckland’s future

a “Linear Conurbation” along State Highway 1
(Bogunovich and Bradbury, 2012)
Regional city thinking for Auckland

Auckland is likely to become a **linear conurbation** from Whangarei to Hamilton and Tauranga.

Auckland future structure could be a **network of different-sized cities and towns**.

The development of Auckland region would benefit from **decentralization** and **polycentric structure**.

Within the city-region context, studies about individual city or town are not enough to understand or to plan regional urban forms. **Auckland’s development needs to be studied as a macro regional conurbation beyond the current Auckland metropolitan area.**

A regional cluster of cities and towns from Whangarei to Hamilton and Tauranga
2.2 Importance of Auckland’s green space

Definition of green space network
Generally, a green space network refers to the space both outside and inside human settlements, such as parks, reserves, conservation sites, forests, croplands, farmlands, grasslands, wetlands and water bodies.

The importance of green space networks
Green spaces are not only natural resources for an entire city region, but also essential elements to shape the urban spatial structure and social order. Bosselmann (2008) states the interaction between urban structure and a green network would be a foundation to achieve future liveability and vitality.
Practices of green space networks

- **Preserving natural environment**
  e.g. The East Coast Megaregion of Australia (2013)
  Ecological preserves, agriculture lands

- **Guiding the directions of regional development**
  e.g. England national plan (2006)
  Green space oriented development combines with transport oriented development (GOD + TOD)
• **Dividing sub-centres and communities**
  e.g. Salt Lake City regional plan (2001)
  Green belt, growth boundary

• **Retrofitting urbanized regions**
  e.g. Greenway network plan for Pearl River Delta (2010)
  Green belt, greenway
A green space network for Auckland

The green space network plays a very important role in maintaining a sustainable regional spatial form.

Greenbelts and greenways are the main strategies used in the master planning/land use planning process.

Geographic Information System (GIS) is an effective tool for planning or monitoring these processes.

Due to its long geological isolation, preserving the natural environment is much more important for New Zealand than for other countries in the world. Preserving green space of Auckland would not only benefit many native wildlife, but also provide more outdoor spaces for people’s recreational activities.
2.3 Elements of Auckland lifestyle

Characteristics of Auckland lifestyle
A quarter acre kiwi dream
Car oriented transport
Great accessibility to nature
Preference of beach-side living

Historical reasons behind the Auckland’s lifestyle
The initial land lot division was its fundamental reason
The desire of middle class value
The land trade tradition
The initial settlement was coastal
How lifestyle affects Auckland’s regional development

The uniqueness of Auckland’s lifestyle is not only because it accommodates the “kiwi dream” dwelling type, but also because it provides ready access to green space.

Auckland urban growth has been a lifestyle oriented development which has shaped Auckland’s urban form, and driven Auckland’s regional expansion along the motorway network and coastlines.

In planning any future urban development, preserving this high quality lifestyle at the regional level is essential to maintain high livability.
Environmental criteria

Social criteria
### Environmental criteria

**Identifying existing and potential green space**

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub- category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing green space</strong></td>
<td>Public conservation sites</td>
</tr>
<tr>
<td></td>
<td>Native forests</td>
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<tr>
<td></td>
<td>Water bodies</td>
</tr>
<tr>
<td><strong>Potential green space</strong></td>
<td>Exotic forests</td>
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<td></td>
<td>Steep lands (&gt;20°)</td>
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<td></td>
<td>Flood plains</td>
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<td></td>
<td>Green corridors</td>
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</table>
Environmental criteria

**Design of green space network**

**Reserve buffer zones**
According to Meurk and Hall, in a matrix of urban green space, 50 m buffer zones outside the reserve can increase population and sensitivities of wild species.

**Green space connection**
A patch pattern is suggested with a range of sizes from 5 ha, 1 ha to 0.02 ha. Connections are suggested at 5 km, 1–2 km, and 0.2 km away from similar sized patches.

**Green space corridors**
According to Kline and Cahoon, the width of river corridors should equal to approximately 6 times of their bank channel widths.
Social criteria

Developed from a Remuera case study

- Close to SH1 and coast
- Low-medium density
- Mix different types of housing
- Easy access to green space
## Social criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density in house blocks</td>
<td>20-40 people/ha</td>
</tr>
<tr>
<td>Population density in apartment blocks</td>
<td>40-60 people/ha</td>
</tr>
<tr>
<td>Single house/attached house and apartment</td>
<td>7/3</td>
</tr>
<tr>
<td>Distance to local parks and reserves</td>
<td>1km</td>
</tr>
<tr>
<td>Distance to regional parks</td>
<td>2km</td>
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Case studies

Regional Auckland

Warkworth – Silverdale Greenbelt

Puhoi
## Environmental data

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topography features</td>
<td>Hill slope</td>
</tr>
<tr>
<td></td>
<td>Hill aspects</td>
</tr>
<tr>
<td></td>
<td>Hill height</td>
</tr>
<tr>
<td>Special landscape areas</td>
<td>Public conservation</td>
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<td></td>
<td>Volcanic view shafts</td>
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<td></td>
<td>Significant ecological areas</td>
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<td></td>
<td>Outstanding natural landscape</td>
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<td>Outstanding natural features</td>
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<td>Islands</td>
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<td>Designations</td>
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<td>Heritage areas</td>
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<td>Wildlife features</td>
<td>Wildlife reserves</td>
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<td></td>
<td>Marine reserves</td>
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<td>Wildlife movement corridors</td>
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<tr>
<td></td>
<td>Key bird feeding areas</td>
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<tr>
<td>Water features</td>
<td>Surface</td>
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<tr>
<td></td>
<td>water(rivers/lakes)</td>
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<td></td>
<td>Floodplain (50-years)</td>
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<td>Aquifers</td>
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<td>Aquifer recharge areas</td>
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<td>Port and harbor facilities</td>
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<td>Marinas</td>
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<td>coastline</td>
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<tr>
<td>Land use features</td>
<td>Cropland</td>
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<td>Grassland</td>
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<td>Forest</td>
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<td>Settlement</td>
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<td></td>
<td>Wetland</td>
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<td>Open water</td>
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<td>Land cover features</td>
<td>Bushes</td>
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<td>Native vegetation</td>
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<td>Sand</td>
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<td></td>
<td>Soil classification</td>
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<tr>
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<td>urban</td>
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</tbody>
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Based on Bogunovich and Bradbury’s linear city idea, motorway buffer zones (5-Km and 10-km) were chosen as the most relevant feature.

Five environmental maps were identified for green space study, and then combined with motorway buffer zones:
- Public conservation
- Forest
- Land use
- Steep land
- Flood plain
Findings from case study 1

Green space network

- Combined result from the five maps
- Categorized by the environmental criteria
Greenbelts

From Whangarei to Hamilton, 6 major greenbelts were identified as buffers between urban developments.
Case study 2 – W/S Greenbelt

Among the 6 greenbelts, Greenbelt- C was chosen for next case study

Warkworth – Silverdale Greenbelt
FUTURE IMPROVEMENTS

1. Expanding native forest

- Preserve current public conservation
- Encourage land owners to preserve native forest
- Encourage land owners to plant native forest around existing native forests and public conservation sites (within 50m buffer zones)
2. Planting steep land

- Encourage land owners to plant exotic forest on steep land
3. Planting river corridors

• Encourage planting vegetation in the edges of river

• Encourage planting within 100m buffer zones along each side of the Puhoi River and the Waiwera River

• Encourage planting within 20m buffer zones along each side of streams
4. Planting road corridors

• Preserve 200m buffer zone along SH1
• Preserve 20m buffer zones along each side of local roads
5. Rezoning land use

• Purchase/gifting land from private owners
• Convert to public green spaces

- Current conservation sites (310.2ha)
- Public land conversion according to PUP (869.0ha)
- Land conversion according to my strategies (473.2ha)
Findings from case study 2

- Public green spaces
- Native forests
- Exotic forests
- Corridors
Case study 3 – Puhoi town
Puhoi River

Settlements are along the Puhoi bank
Puhoi River is 10-20 meters width, with activities like canoe, fishing, boating
Using of social criteria - **Urban population**

Total potential urban area is 331 ha, total population could be 8610-15240 people.

Density: 30 for single house settlements, 50 for flat areas.
Using of social criteria - **Urban structure**

- Community services
- Historical Town Centre
- New Town Centre
- Single house
- Single house
- Flat / Apartment
- Single house
Using of social criteria – **Subdivision**

- 3000m²
  - 3.3 Dwelling/ha
  - 8 people/ha

- 750m²
  - 13.3 Dwelling/ha
  - 33 people/ha

- 500m²
  - 20 Dwelling/ha
  - 50 people/ha
Findings from case study 3

Tentative Master Plan Concept for Future Puhoi

Environmental and social connections: people can walk to green spaces within 12 minutes from each home
Three case studies

Green space network in Regional Auckland

Greenbelt in W/S

Parks and greenways in Puhoi
Summary

Research question
How can a green space network maintain the sustainable and resilient urban development of regional Auckland and preserve the unique lifestyle?

Three key concepts
Regional city + Green space network + Lifestyle urbanism

The Methodology

Environmental criteria
• Combination of land use
• Rezoning
• Revegetation

Social criteria
• Dwelling density
• Mixed housing
• Green accessibility

Green network

Urban structure
An enhanced and enlarged green space network would not only offer the growing population of Auckland a new regional park system but could also provide more desirable urban land for a growing Auckland. The result of these two operations will enhance the quality of life for future citizens.

- A regional green network would dramatically increase the accessibility to public green space for people living in the projected new cities and towns along the SH1 spine.
- By preserving the continuity of native ecotones, native species will be helped to move and migrate.
- A green space network in the greater Auckland region would also prevent urban sprawl.

Conclusion