



Whangarei District Land Use Report

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1. INTRODUCTION

1.1 Purpose and Objectives

This report describes the geographic make up of the district and how land has been allocated for different uses. Land use can have impacts on various factors such as landscape, wildlife, urban amenity, open space, water quality (freshwater, coastal and ground water), as well as economic output and infrastructure provision.

For example, the use of the land influences gross economic output for the district. According to economic theory, the market is the best determinant of the efficient use of the land resource. However, the market does not necessarily result in a sustainable use of a resource over the long term, nor does it adequately deal with externalities, i.e. spill-over effects and effects on the environment (biophysical, social and cultural). Nor does it ensure a spatial distribution of land uses that best promotes the efficient and effective provision of infrastructure both short term and long term. For these reasons, intervention in the land market is sometimes required to correct such deficiencies.

The first part of the report provides an overview of Whangarei District's land resources. It describes the existing land use pattern, quantifies the area of each land use and maps the distribution. The second part of the report examines the land use capability of the district using the Land Use Capability Classification. The third part of the report will compare the existing land uses with land use capability to determine what potential there is for a change in use of the land. The last part of the report looks at the land use pattern composition under the three alternative futures proposed by the WDC Sub-Regional Growth Strategy (Sustainable Futures 30/50) and illustrates their potential impacts on different land uses and land use capability.

1.2 Methodologies and Limitations

The information used in this report was drawn from the Land Resource Information System Spatial Data Layers, Whangarei District Council's Rating Assessment Land Use Category 2009, and New Zealand Land Cover Database Version 1 and Version 2 from the New Zealand Land Resource Inventory (NZLR1) database maintained by Landcare Research NZ Ltd. The data sources present the spatial arrangement of land uses (e.g. land use capability mapping) at a regional and district scale and local detail may not be accurate in all cases. The intent is not to provide accuracy in local detail in all instances, but rather to provide a broad overview of the district's land use and land use capability. In this way future development paths can be assessed for impacts on existing land uses and land use capability. Planning at a local level, for example through local structure plans, may well require more detailed analysis of both existing land use and land use capability.

In addition, this report deals primarily with the spatial distribution of land uses and the gross areas of the various land uses in the district. More detailed economic analysis of the various land use activities will be examined in the Economic Report commissioned for the Growth Strategy. Mineral resources will be examined separately in a Minerals Report. Environmental effects of different land uses will be examined in more detail in separate reports on biodiversity, water and soil quality, landscapes and natural character.

The intent of this report is to provide useful background information on present land use and land use capability which will assist in developing the broad approach to managing future growth in the district. This information, together with information provided in other reports, will assist in formulating the WDC long term Sub-Regional Growth Strategy – Sustainable Futures 30/50.

2. PRESENT LAND USE

2.1 Topography and Land Cover

The Whangarei District covers the lower eastern section of Northland (approximately 284,814.85ha), extending from Bland Bay in the north to Langs Beach in the south and westwards towards Dargaville. Whangarei City is the largest centre providing commercial and community services in Northland. The district contains the major port for the Northland Region at Marsden Point which has recently undergone significant expansion. There are also a number of smaller townships and settlements around the district, many of which are expanding as coastal and rural land is developed.

Table 1: Types of Land Use in the Whangarei District (2009)

Category	Area (ha)	Percentage of Land Cover
Commercial	177.13	0.1%
Dairying ¹	59,360.31	20.8%
Production Forestry ²	59,647.68	20.9%
Horticulture ³	1,868.58	0.7%
Industrial	1,630.75	0.6%
Lifestyle ⁴	28,107.67	9.7%
Mining	497.31	0.2%
Other ⁵	14,199.30	5%
Other Pastoral ⁶	104,766.69	36.8%
Residential	13,601.81	4.8%
Specialist Farming ⁷	957.61	0.3%
Total	284,814.85	100%

Source: Whangarei District Council, 2009.

Industrial developments are mainly concentrated in Whangarei City and Marsden Point/Ruakaka area. In the northern, southern and western portions of the district, mountains and hilly areas are predominant, and land uses are primarily forest and pasture. Considering the district as whole,

¹ Dairying land suitable for all types of supply and stud, but does not include land used as dairy run-off and that is not suitable for milking.

² Production forestry includes native and exotic forests.

³ Horticultural land suitable for orchards, market gardening, glass houses etc.

⁴ Lifestyle land of variable size, but larger than an ordinary residential allotment (i.e. typically from 1ha upwards to 20ha), where the principle use of the land is for lifestyle purpose, non-economic in the traditional farming sense, and where the value exceeds the value of comparable farmland.

⁵ Other includes assembly (e.g. halls), educational, religious, health/medical, sports, all passive reserves, Maori sites (Urupa, Marae), utilities (power, gas) and cemeteries.

⁶ Pastoral farming land where the main farming use is the grazing, fattening etc of livestock including beef cattle and sheep.

⁷ Specialist farming includes aquaculture (fish), deer, horse studs, poultry, pigs and sale yards.

pastoral (36.8%), dairying (20.8%), production forestry (20.9%), constructed land⁸ (10.4%) and lifestyle (9.7%) are the major land uses. Horticulture is a minor land use activity covering only 1,869ha or 0.7% of the district (Figure 2).

2.2 Pastoral

Pastoralism is the most widespread land use in the district, with approximately 36.8% (or 104,767ha) of the land area used for grazing stock (Figure 3). Pastoral land use is spread through most suitable areas of the district. The district supports around 100,000 sheep, 115,000 beef cattle, 2,500 deer, 3,000 goats, 900 horses, plus pigs and poultry (Statistics New Zealand, 2007). Beef cattle and sheep are usually run on steeper sedimentary and volcanic country (Harmsworth, G, 1996, p. 28).

2.3 Dairying

Approximately 20.8% (or 59,360.31ha) of the land in the district is used for dairying. The district supports around 130,000 dairy cattle (Statistics New Zealand, 2007). Dairying remains one of the dominant agricultural land uses, generally on flat to gently rolling country on a range of rock types (Figure 3).

2.4 Production Forestry

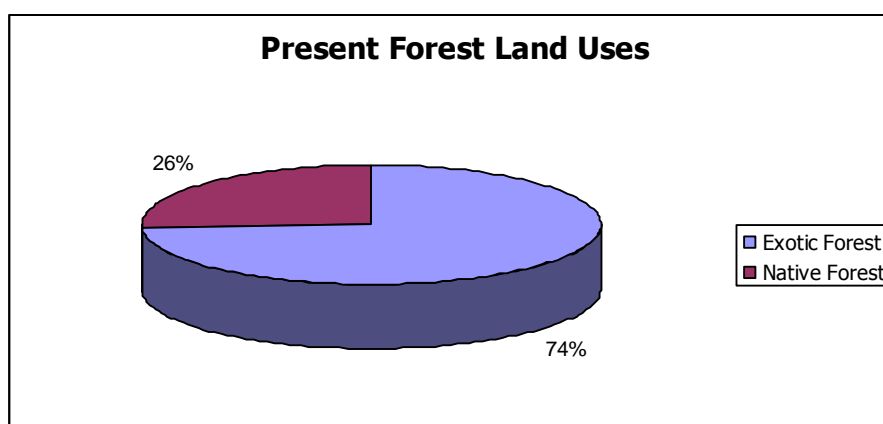
The total production forest area for all purposes (both native and exotic) covers 59,648ha or 20.9% of the district area (Figure 4). The exotic forest is approximately 44,009ha, this is equivalent to 15.5% of the total district land area. Native forests cover 15,639ha, equivalent to 5% of the total district area. Over 80% of plantations are in Pinus Radiata with the remainder in eucalypts, arcacia hardwoods and other species. Most of the areas attributed to native production forestry are historical rather than being actively harvested at present. These areas of native forest used now predominantly for conservation or catchment protection will be further examined in the Biodiversity Report.

Most forestry blocks are found around the boundary of the district (e.g. the western part of the district towards Dargaville, northern part in Puhipuhi and the southern end of the Brynderwyn Range). There is a large forest at Glenbervie and small areas of forest blocks scattered across the district, particularly in Maungatapere, Ngunguru and Pataua. Some Crown Land reserves (managed by Department of Conservation) are located within the district which have been left under native vegetation.

Most of the plantation forests within the district are owned by major corporate forestry companies which comply with the New Zealand Forest Code of Practice. This provides a general assurance that major forestry company operations are reasonably well planned and implemented. Forestry on steep slope soils requires careful planning and management to minimise soil and water problems.

⁸ Constructed land includes residential, commercial, industrial and other land uses such as assembly (e.g. halls), educational institutions, religious, health/medical, sports, passive reserves, Maori sites (Urupa, Marae), utilities (power, gas) and cemeteries.

Figure 1: Different Types of Forest Land Uses in the Whangarei District



Source: Whangarei District Council, 2009.

2.5 Horticulture

Horticulture covers approximately 1,869ha or 0.7% of the district land area (Figure 5). This land is suitable for orchards, market gardening, glass houses and so on. Most horticultural activities occur along State Highway 14 in Maunu and between Kara Road and Whatitiri Road in the Maungatapere area. There are small areas of horticulture scattered around Three Mile Bush, Glenbervie, Maungakaramea and areas along State Highway 1 between Pipiwai and Apotu Roads. These areas are predominately located on volcanic soils, as evidenced by the presence of volcanic stone walls.

Table 2: Horticultural Uses by Crop Type

Farm Type	Number of Farms	Area (ha)	Farm Type	Number of Farms	Area (ha)
Nursery and Floriculture Production (under cover)	45	9.6	Vegetable Growing (under cover)	15	0.9
Nursery and Floriculture Production (outdoors)	42	62	Vegetable Growing (outdoors)	8	8
Turf Growing	-	-	Apple and Pear Growing	-	-
Mushroom Growing	-	-	Stone Fruit Growing	-	-
Grape Growing	3	12	Citrus Fruit Growing	9	31
Kiwifruit Growing	39	159	Olive Growing	15	36
Berry Fruit Growing	-	-	Other Fruit and Tree Nut Growing (including Tamarillos, Passionfruit and Persimmons)	N/A	68
Avocados	N/A	840			

Source: Statistics New Zealand, 2007.

Note: These figures are based on current and actual land use which differs from the use the land is rated as.

2.6 Lifestyle

There is not a clear definition as to what 'lifestyle blocks' mean. The term was introduced by real estate agents in the early 1980s promoting urban residents to live within the rural zone. Quotable Value New Zealand defines a 'lifestyle block' as a piece of land of more than one hectare zoned rural or semi-rural and which has a rural residential or semi-productive use, but is still too small to run stock on productively (Paterson, 2005). In 2004, a total of 7,000 properties within the Whangarei district were identified as lifestyle blocks covering 25,519.52ha, with a mean area of 3.65ha per allotment (Ministry of Agriculture and Forestry, 2009). Based on Council's Property Database and Rating Assessment 2009, lifestyle blocks cover 28,107.67ha of the district. This represents an increase of 10 percent from the recorded land areas in 2004.

As shown in Figure 6, lifestyle blocks are scattering throughout the district, particularly in areas around the urban fringes (e.g. Glenberrie, Three Mile Bush, Maunu and Maungatapere/Maungakaramea), along the coast (e.g. Matapouri and Parua Bay) and along transit corridors.

2.7 Land Use Trends

A summary of Whangarei District land use statistics is presented in Table 2. Important factors associated with these statistics are summarised as:

- The number of farm holdings and total area being farmed peaked in 1993, and then declined to the lowest level in 1995/96.
- Despite the fact that the total number of farm holdings and the area of farms in use have decreased during the period of 1990-1996, the average area per holding has increased from 89.6ha to 109.6ha. This could be the result of amalgamating of land parcels/ownership.
- During the period of 1996-2002, the number of farm holdings and total area of farms have an increase of 12% and 2% respectively. This increase is reflected in the average area per holding within the district dropping from 109.6ha in 1996 to 99.6ha in 2002.

Table 3: Land Use Trends for Farming Activities in the Whangarei District (1990 – 2002)

Year Ended 30 June	1990	1991	1992	1993	1994	1995	1996	2002
Number of Farm Holdings	2,406	2,360	2,380	2,416	1,880	1,905	1,872	2,100
Total Area of Farms (ha)	215,696	212,690	217,475	228,105	207,520	203,330	205,095	209,193
Average Holding Area (ha)	89.6	90.1	91.4	94.4	110.4	106.7	109.6	99.6

Source: Statistics New Zealand.

Figure 2. Present Land Uses in the Whangarei District

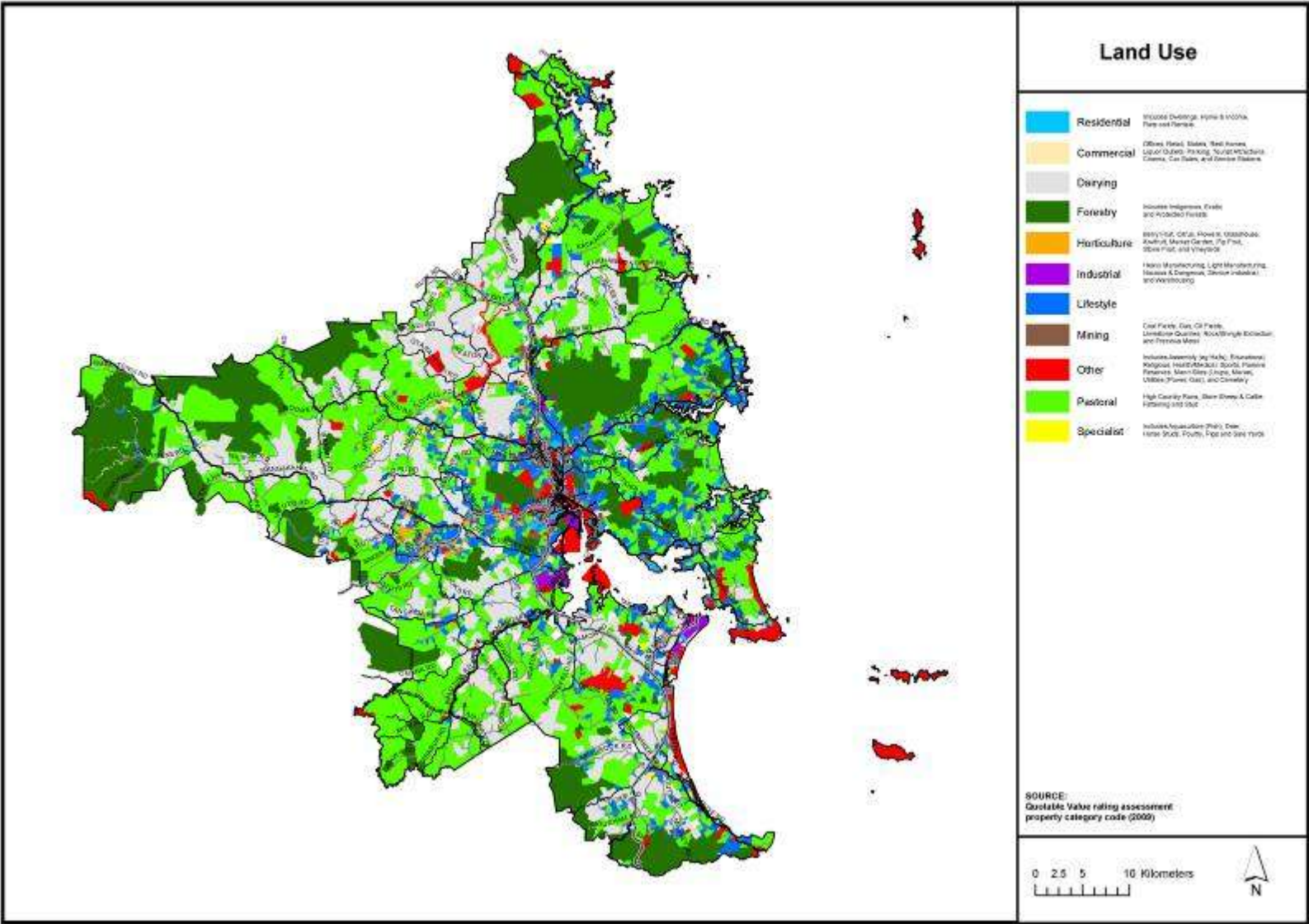


Figure 3. Distribution of Pastoral Use and Dairying in the Whangarei District

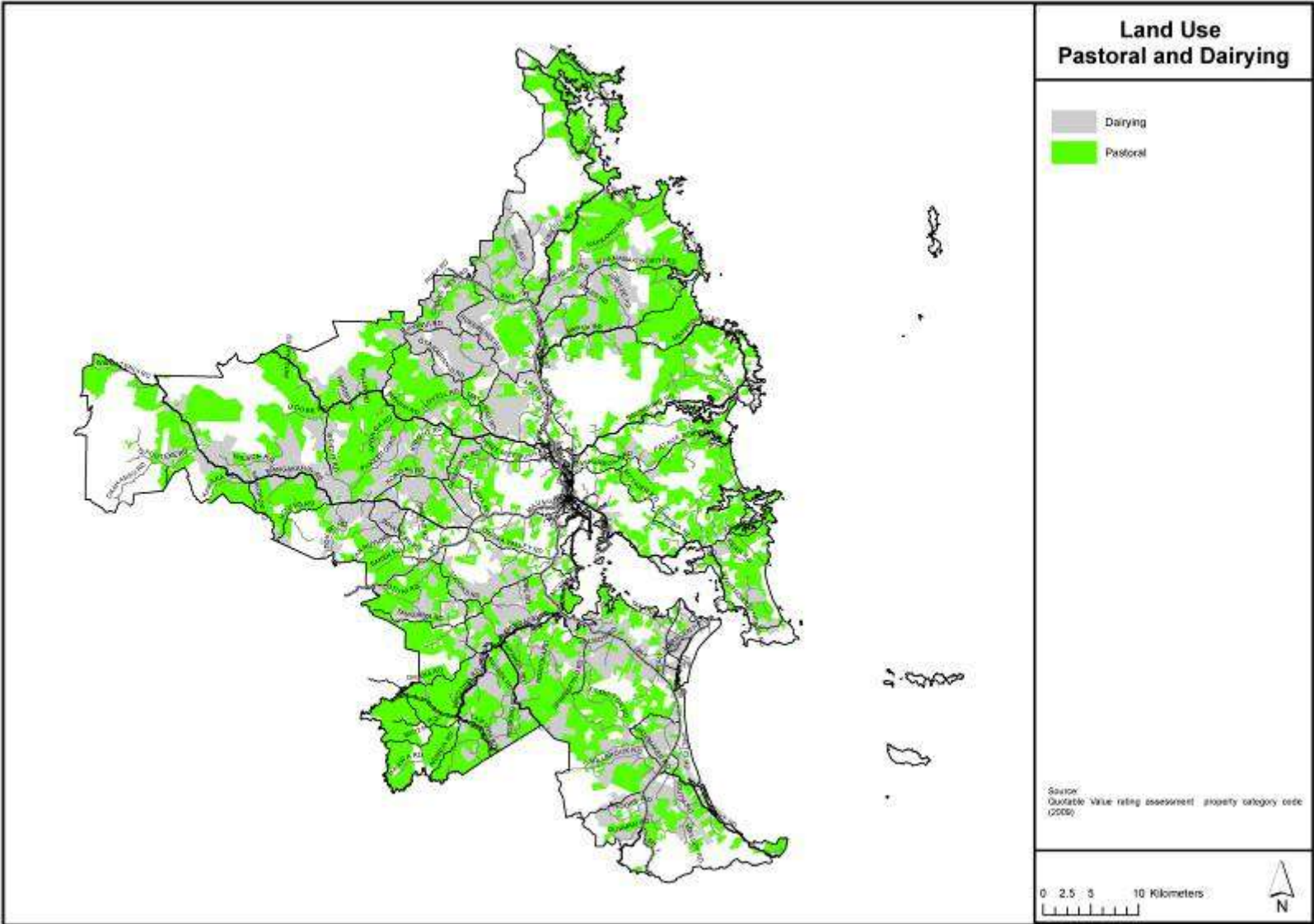


Figure 4. Exotic and Native Forest Land Uses in the Whangarei District

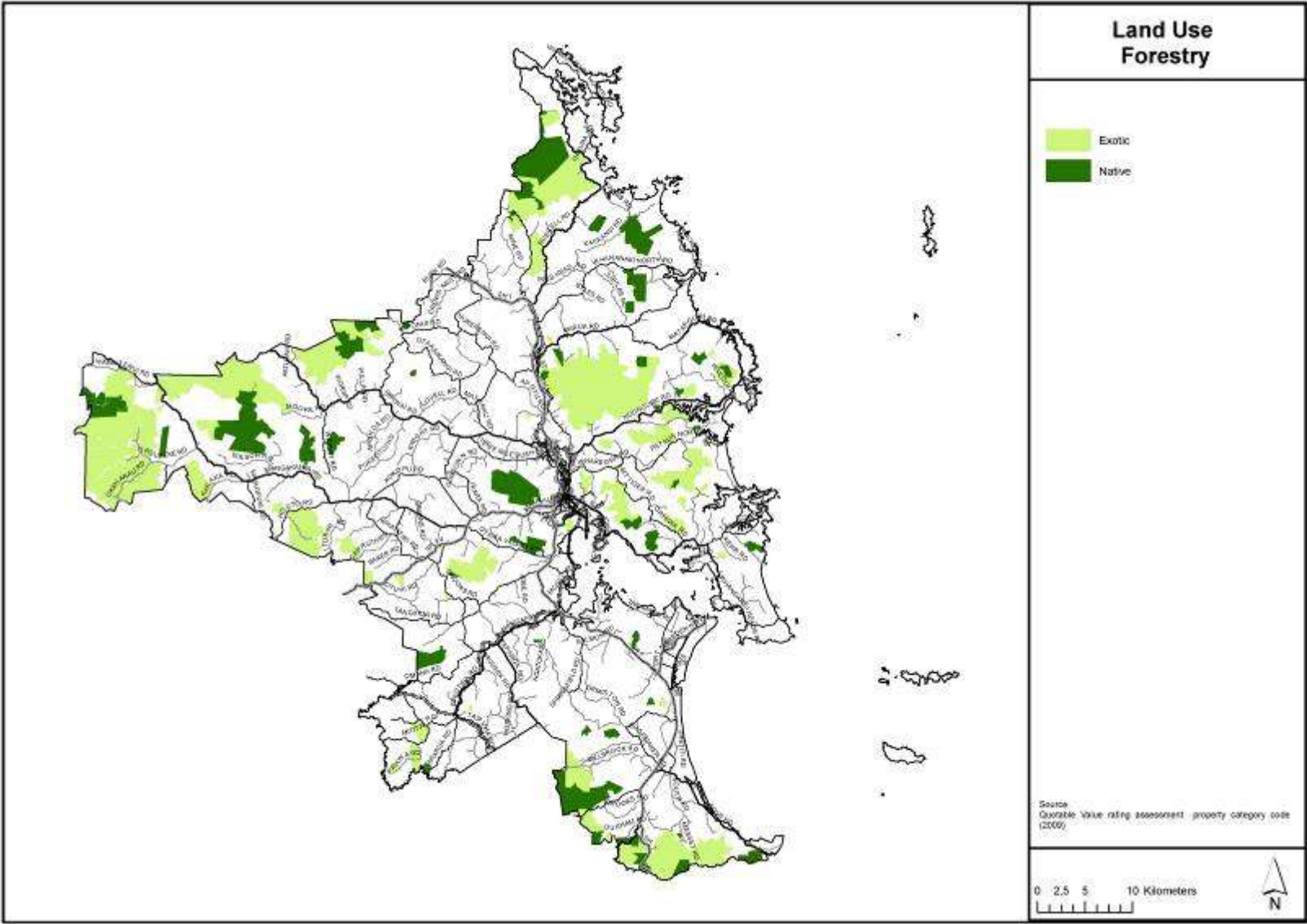


Figure 5. Horticultural Land Use in the Whangarei District

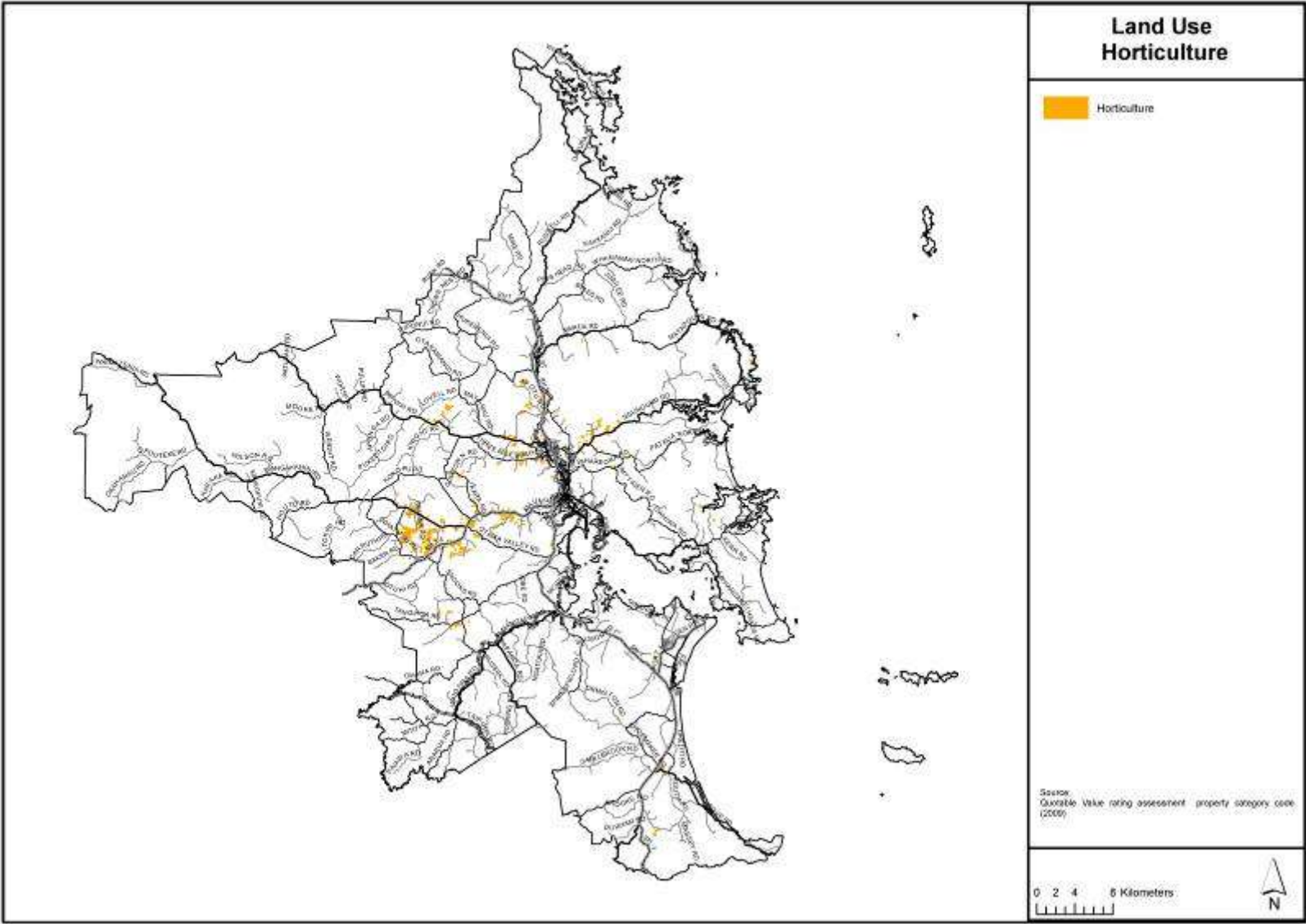
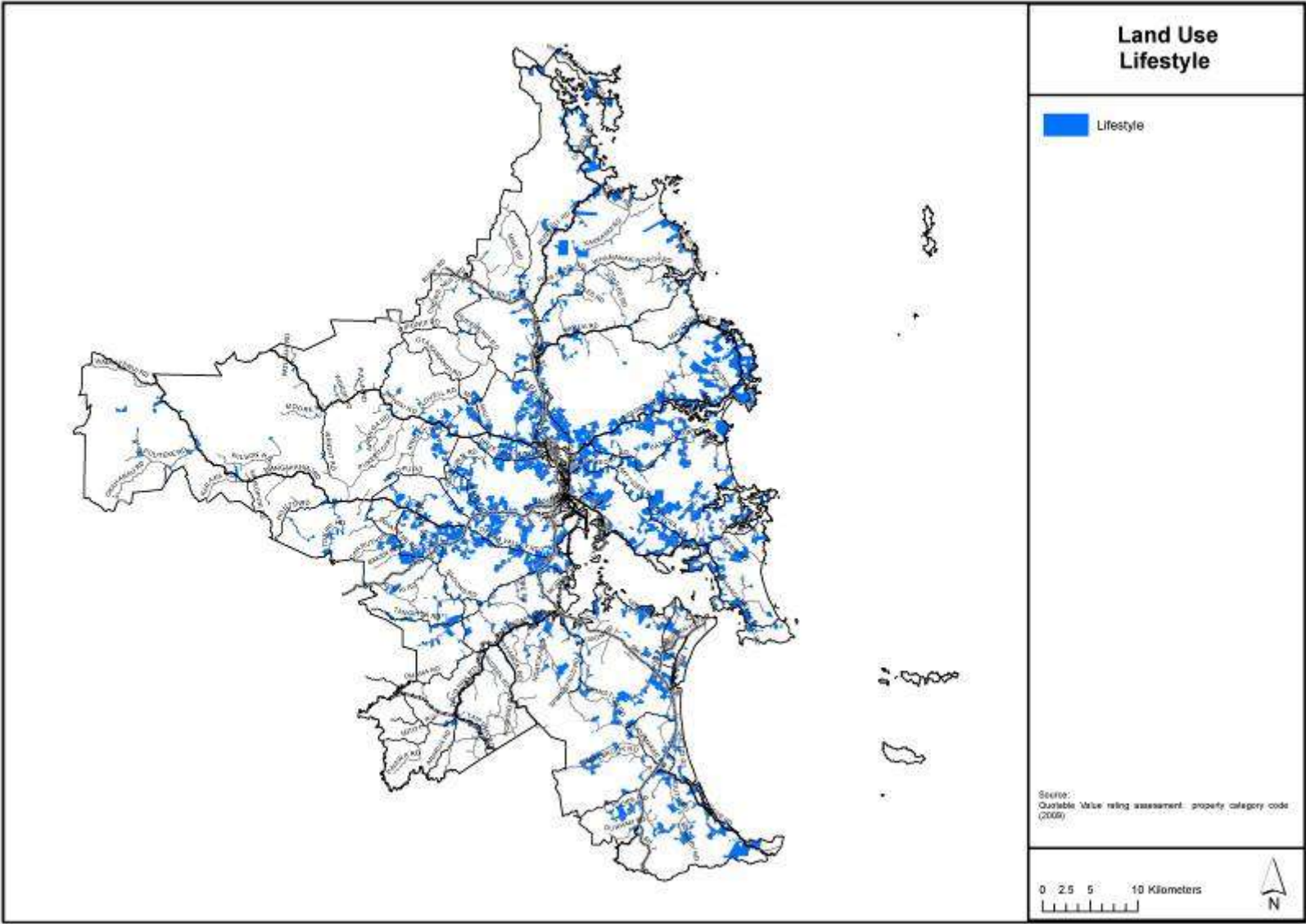


Figure 6. Distribution of Lifestyle Blocks in the Whangarei District



3. LAND USE CAPABILITY

The Land Use Capability (LUC) framework is a tool that is used to assess capability of the land resource for sustained production over the long term, together with the physical limitations of the land. It is the basis for land evaluation and planning throughout most of New Zealand and has been used in various forms since the 1950s. Land information is derived from the New Zealand Land Resource Inventory (NZLR1) database maintained by Landcare Research NZ Ltd.

Land is classified according to its physical characteristics, i.e. soil and topographical features, including steepness and drainage. The classification reflects the capacity of the land to support a particular land use in a long-term sustainable manner.

In New Zealand, there are eight land use capability classes. Land classes 1 to 3 are suitable for arable use and may also be suitable for pastoral or forestry use, while Classes 4 to 6 are not well suited to arable use, but are suitable for pastoral use and forestry. Class 7 land is suitable for forestry use, while Class 8 land is suitable for protection purposes only.

Class 1 and Class 2 land can be considered the versatile and/or high class soils which form part of New Zealand's limited resource of highly productive/versatile land. According to Te Ara: the Encyclopaedia of New Zealand (2009), over the whole country only 5.4% of the total land area is classified as Class 1 or Class 2. Of this 2.1% occurs in the South Island with the remaining 3.3% in the North Island.

Whangarei's land capability was mapped by Landcare Research in 2000, using the Land Resource Information System Spatial Data Layers. Figure 7 shows the distribution of land classes and Table 3 provides the statistical information regarding areas of each class within the Whangarei District.

These data sets show that land classified as Class 1 and 2 (red and green areas) occupies 324ha and 4,734ha respectively of the district. This type of highly productive arable/versatile land makes up just 1.8% of the district, and represents some 0.4% of New Zealand's total area of highly productive/versatile land (Figure 8). There are also 23,585ha of Class 3 land (yellow areas), most of which has potential for a wide range of land uses and should be considered as part of the potentially arable areas in the district (Figure 8).

About 61% of the district (171,758ha) has medium to low class soils (Figure 9), substantially suited to grazing and forestry (i.e. Classes 4, 5 and 6). Class 7 land in steep hill country is best suited for forestry use (Figure 10). Class 8 land mainly comprises high, mountainous country (e.g. Russell Forest)

although it may include very steep slopes on hill country. These areas will generally not be suitable for productive purposes, due to topographical constraints (Figure 10).

3.1 Descriptions of Land Capability Classes

3.1.1 Class 1 – The land is very fertile and suitable for most agricultural purposes including horticulture. Nearly level, has deep easily worked soils which are well drained but not seriously affected by drought and usually well supplied with plant nutrients and responsive to applied fertilisers. Climate is favourable for growth of wide range of cultivated crops/pasture/forestry. Practically no risk of erosion.

Comments - The land class is not widespread and occurs on small areas (324ha or 0.1% of the district) in the Maungakaramea catchment and Maunu (i.e. particularly along Austin Road and State Highway 14). Figure 8 shows the distribution of Class 1, 2 and 3 land.

3.1.2 Class 2 – Good land with slight limitations. Management/conservation practices to overcome these limitations are easy to apply. Land used for cultivated crops/pasture/forestry.

Limitations occur singly or combined:

- (a) slight to moderate susceptibility to erosion
- (b) gentle slopes
- (c) soils of only moderate depth
- (d) wetness, existing permanently as a slight limitation after drainage
- (e) occasional damaging overflow
- (f) unfavourable structure and difficulty in working
- (g) slight to moderate salinity
- (h) slight climatic limitations.

Comments - Approximately 4,734ha or 1.7% of the district is Class 2 land; about half of the area is found in Maungatapere, Maungakaramea and Maunu catchment. This land can be used for a wide range of agricultural uses. It is potentially as productive as Class 1 land. The rest of Class 2 land is found in Waipu catchment (e.g South Road, St. Marys Road and along the State Highway 1).

3.1.3 Class 3 – Moderate limitations restricting choice of plants grown and/or make special conservation practices necessary. May be used for cultivated crops/pasture/forestry.

Limitation result from one or more of the following:

- (a) moderate to high susceptibility to erosion or severe effects of past erosion
- (b) rolling slopes

Table 4: Land Use Capability in the Whangarei District

Land Capability Class	Land Area		Productivity Limitations	Soil Types	Land Use Activities	Locations
	Ha	%				
1	323.52	0.1	Nil	Volcanic or loam	All types	Maunu/Maungakaramea
2	4,733.68	1.7	Soil moisture	Recent volcanic/peat/alluvial	Horticulture/cropping	Maunu/Mangatapere/ Bream Bay/ Maungakaramea
3	23,585.09	8.3	Soil moisture/rocks drainage/flooding	Alluvial/volcanic	Pastoral farming/horticulture/cropping	Marsden Point/Ruakaka, Matarau/Ruatangata, Kamo and Glenbervie
4	75,389.66	26	Drainage/erosion	Sedimentary/alluvial/volcanic	Dairying/sheep, beef/forestry	Hikurangi/Hukerenui, Matarau/Ruatangata, Mangatapere/ Maungakaramea and scattered around the district
5	395.53	0.1	Steep/dry	Limestone/volcanic	Sheep/beef	Maungakahia
6	147,204.34	52	Erosion/steep/flooding	Sedimentary/old volcanic/greywacke	Sheep/beef/forestry	Throughout Whangarei District
7	24158.58	8.5	Erosion/Steep	Greywacke/sedimentary	Sheep/forestry/land/retirement	Brynderwyn/Helena Bay/Whangaruru
8	1,923.94	0.7	Erosion/Steep	Greywacke/old volcanic/sand dunes	Total retirement from productive use	Cliffs, mudflats and sand dunes throughout the district
Other (Lakes, waterways and impervious area)	7,100.53	2.5				
Total	284,814.85	100				

Source: Whangarei District Council, 2009

- (c) shallow soils
- (d) wetness or continued waterlogging after drainage
- (e) frequent damaging overflow
- (f) low moisture holding capacity
- (g) moderate salinity
- (h) moderate climatic limitations
- (i) low fertility, not easily corrected.

Comments - About 23,585ha or 8.3% of the district is Class 3 land. It is found in the Marsden Point/Ruakaka, Matarau, Ruatangata, Kamo, Glenbervie catchments and scattered around Maungakamea and Maungatapere catchments. It is generally fair to good agricultural land suitable for cropping and pastures. Productivity is dependent on soil fertility.

- 3.1.3 Class 4 – Severe limitations to arable use restricting choice of crops grown and/or necessitate intensive conservation treatment and/or very careful management. Land kept in pasture for long periods with cash for cropping should be restricted to, say, once in five years or less frequently.

Limiting features occurring alone or in combination:

- (a) high susceptibility to erosion or very severe effects of past erosion
- (b) strongly rolling slopes
- (c) very shallow soils
- (d) excessive wetness with continuing hazard of waterlogging after drainage
- (e) frequent overflow with severe damage
- (f) very low moisture holding capacity
- (g) high salinity
- (h) severe climatic limitations
- (i) low fertility very difficult to correct

Comments - There is 75,390ha (or 26% of the land area) of Class 4 land within the district, of which the majority of land occurs in the Hikurangi/Hukerenui, western part of the district such as Matarau, Ruatangata, Maungatapere, Maungakamea, and Taiharuru catchments. This land may not be suitable for regular cultivation due to slope gradient and site characteristics (e.g soil erosion hazard, shallowness or rockiness or a combination of these factors). Soil conservation practices such as pasture improvements, application of fertiliser, stock control to maintain high levels of ground cover, and minimal cultivation for the establishment of permanent pasture or occasional cropping are necessary to prevent land degradation and maintain soil structure. Figure 9 shows the distribution of Class 4 and 6 land.

3.1.5 Class 5 – High producing land with physical limitations that make it unsuitable for arable cropping. Also includes non-arable sloping land with a slight sheet, soil slip, rill, tunnel gully erosion limitation, or hazard under permanent vegetation cover.

Limitations are (usually in combination):

- (a) Moderate steep slopes
- (b) Erosion risk
- (c) Stoniness and/or the presence of boulders or rock outcrops
- (d) Excessive wetness after drainage
- (e) Frequent flooding

Comments - About 396ha (or 0.1%) of Class 5 land is found in the district with most located within the Mangakahia catchment, on the northern side of Mangakahia Road.

3.1.6 Class 6 – Fairly good stable hill country where soil erosion can be minimised by good pasture establishment/management. Also includes flat rolling land with an erosion risk or other limitation too great to allow safe cropping use but which has moderate limitations/hazards under perennial vegetation. Usually well suited to grazing/forestry. Soils responsive to fertiliser.

Limitations are (usually in combination):

- (a) slight to moderate erosion hazard under perennial vegetation
- (b) steep/very steep slopes
- (c) very stony/very shallow soils
- (d) excessive wetness or overflow
- (e) frequent flooding with severe damage to pastures
- (f) low moisture holding capacity
- (g) severe salinity
- (h) moderate climatic limitations.

Comments - Over 52% (147,204ha) of the district is Class 6 land, and it is extensively found across the district. The majority is stable productive hill country, a large proportion of which has a moderate erosion potential. The land generally has a slope of between 7% and 20%. The class tends to be the less productive grazing lands although productivity varies due to soil depth and soil fertility. Soil conservation practices recommended for this class include space-planted trees, conservation fencing (e.g. dividing strongly contrasting aspects), limited stock numbers, prevention of fire, destruction of vermin and strategic grazing management.

3.1.7 Class 7 – Unsuitable for arable use and has severe limitations/hazards under perennial vegetation. Usually not suited for grazing, as it requires special soil conservation practices, moderately well suited to forestry. Limitations are similar to Class 6 but are intensified.

Limitations are usually in combination:

- (a) severe erosion hazards or severe effects of past erosion
- (b) very steep slopes
- (c) very stony/very shallow soils
- (d) extreme wetness of soils
- (e) very frequent damaging flooding
- (f) very erodible rock type
- (g) very high salinity
- (h) severe climatic limitations
- (i) very low moisture holding capacity
- (j) low fertility, very difficult to correct.

Comments - There is 24,159ha (or 8.5%) of Class 7 land within the district, mainly concentrated in the southern end (Brynderwyn) and northern part (i.e Helena Bay, Whangaruru) of the district. The majority of this classification is associated with steep hill, mountain country and shallow soils. Infertility, erosion hazard, steep slopes and stony shallow soils limit land use. Most of this land is in forestry.

- 3.1.8 Class 8 – Predominantly steep mountainous and hill country land. Most common limitation is extreme erosion or erosion hazard which may be combined with severe limitations of climate or low fertility. Management for pastoral/forestry production not very commercial as it will be increasingly necessary to give protection for plant growth for on- and, particularly, off-site benefits. Therefore, unsuitable for pasture or commercial forestry. Use is restricted to catchment protection and recreation (Lynn et al, 2009).

Comments - Parcels of Class 8 land, totalling 1,924ha (or 0.7%), are found in Puhipuhi (Russell Forest), Taheke Scenic Reserve, Bream Head and Manaia Ridge Scenic Reserves, generally associated with the rock outcrops and steep land which is unsuitable for agricultural uses, including grazing. It should be left for the preservation of natural vegetation and used for regional parks, reserves and scenic areas. Figure 10 presents the distribution of Land Class 7 and Class 8 in the district.

- 3.1.9 Urban and water Areas

Comments – This classification includes built up areas, typically urban with high impervious surface areas, wetlands, rivers, streams, lakes, creeks and reservoirs. This takes up approximately 7,100.53ha (or 2%) of the district's area. For the Whangarei District, subsoil is typically clay, clay loam, friable clay, sandy loam or silt loam.

Figure 7. Distribution of Land Use Classification Classes in the Whangarei District

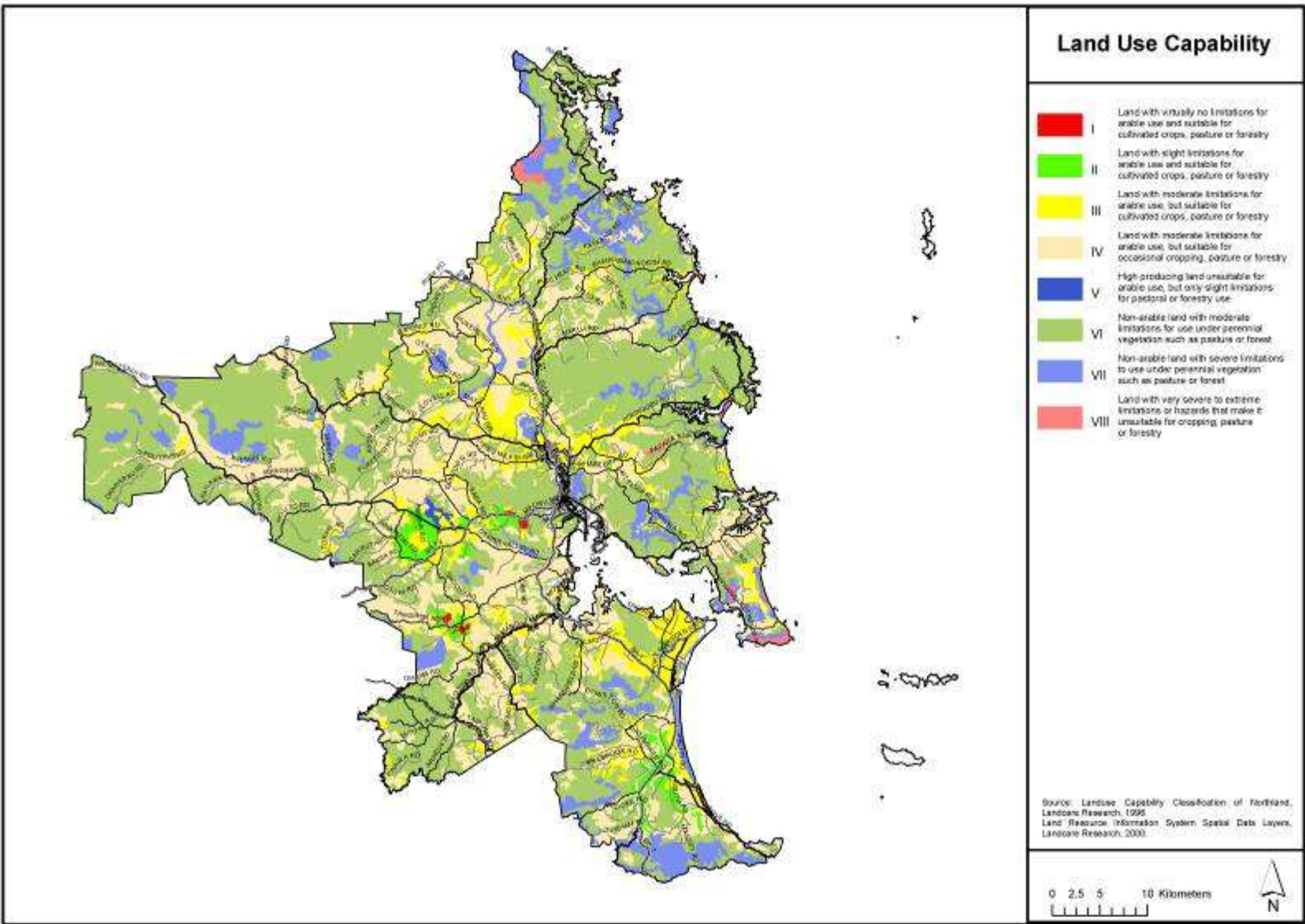


Figure 8. Location of Class 1, 2 and 3 Land

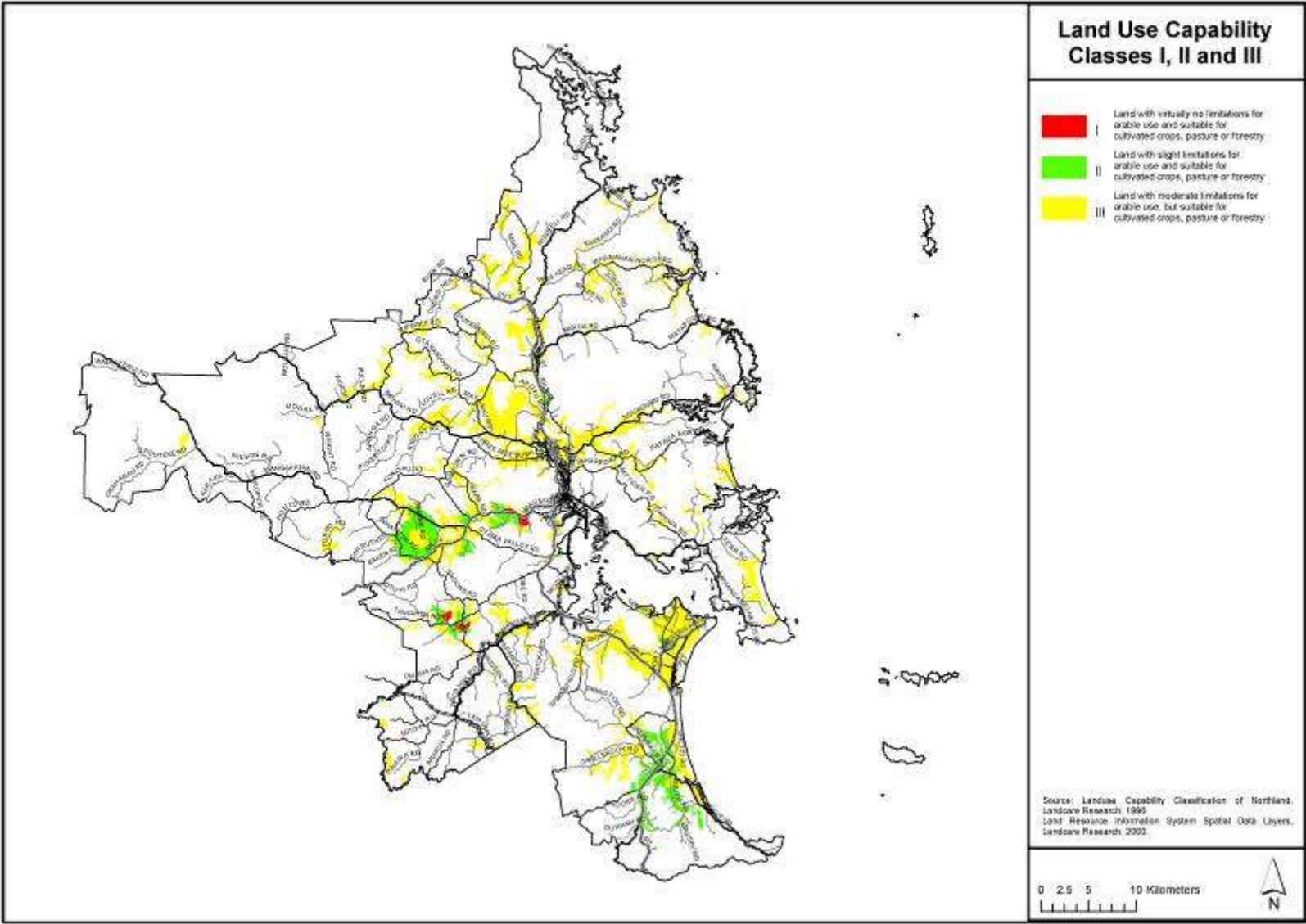


Figure 9. Location of Class 4 and 6 Land

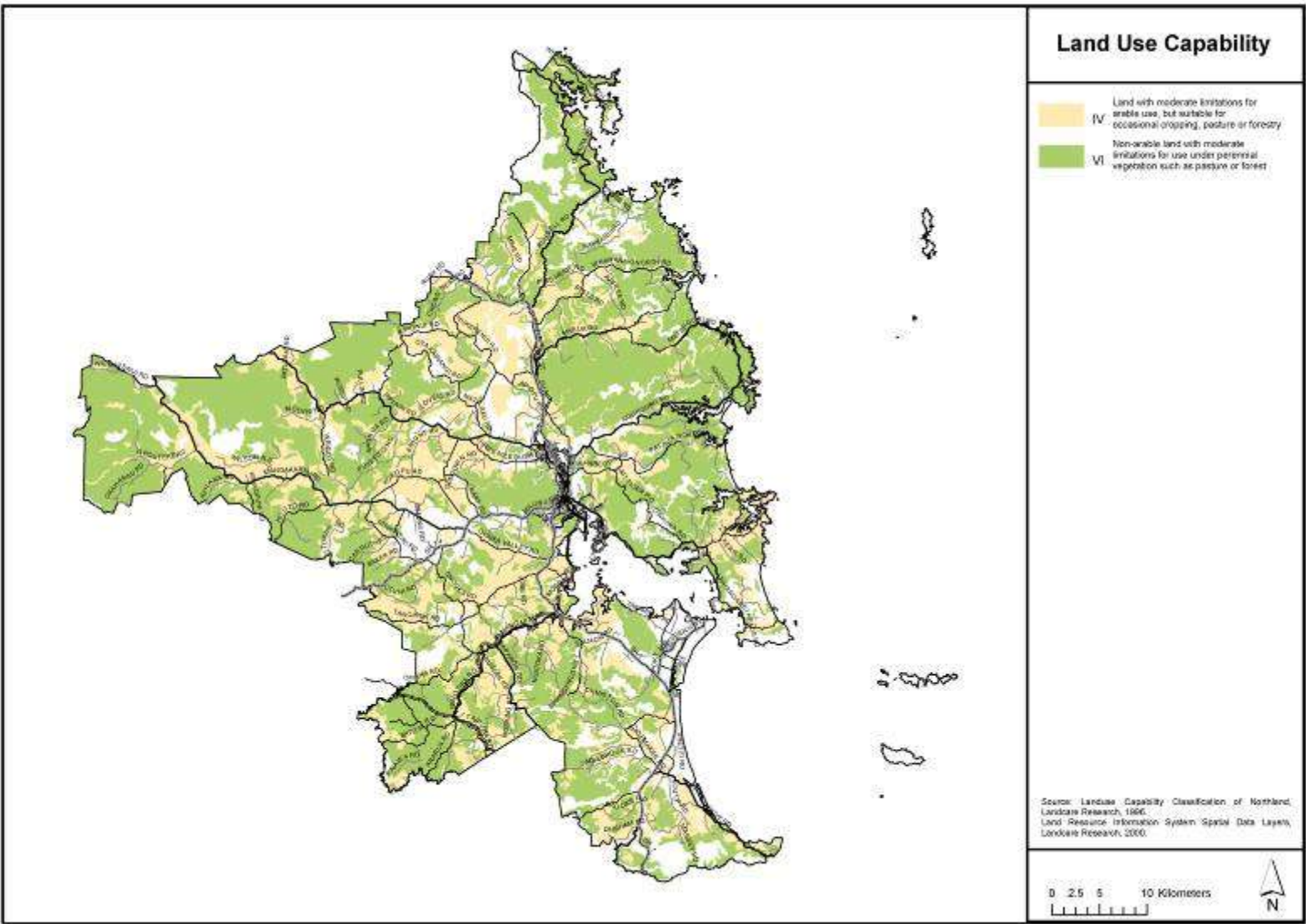
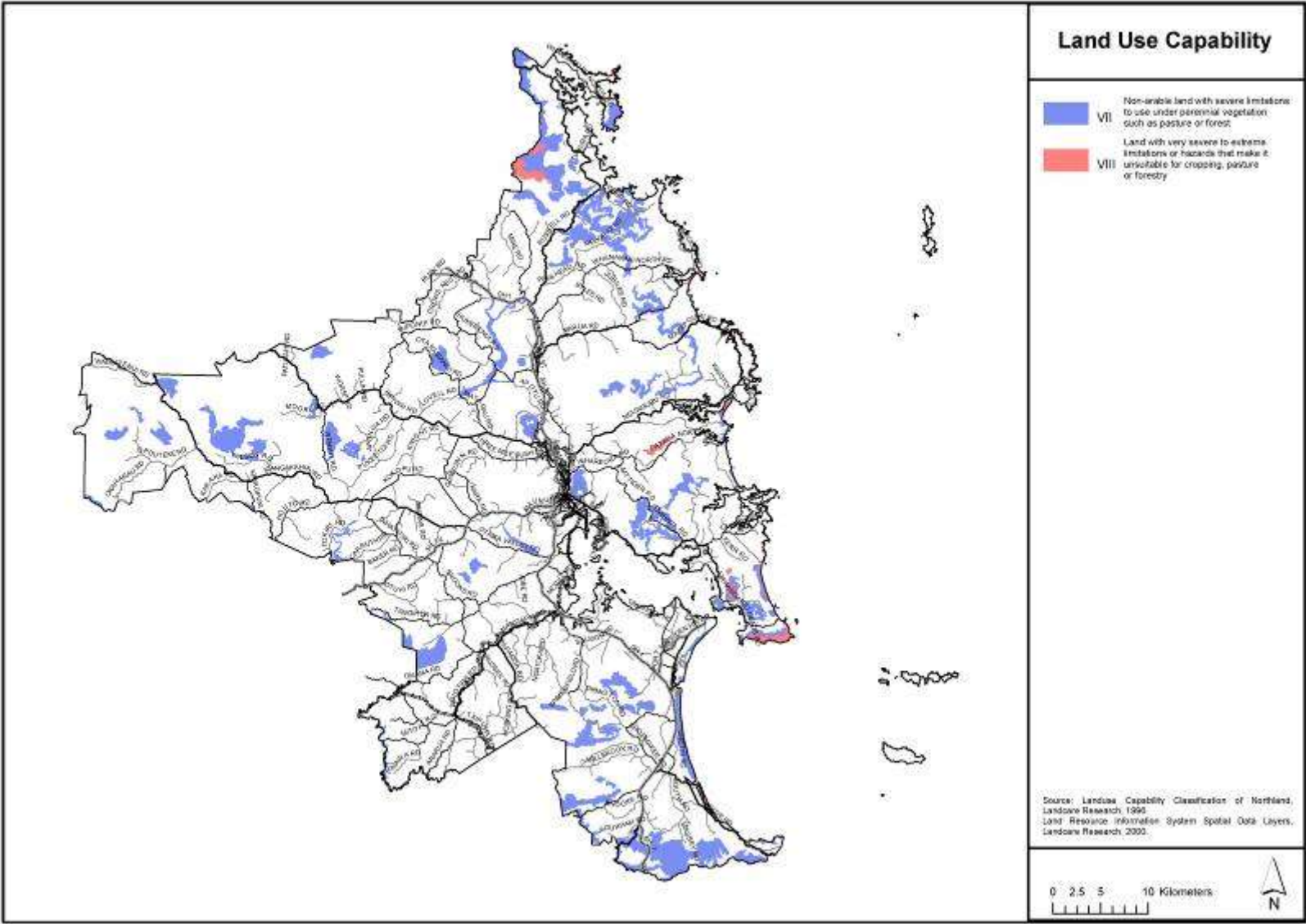


Figure 10. Location of Class 7 and 8 Land



4. LAND USE CAPABILITY AND PRESENT LAND USE

The sustainability of land use depends on a number of factors including soil type, vegetation cover, geology, climate, slope characteristics, and the type and extent of the land use. Unsustainable land management practices may result in sediment and nutrients being discharged into the natural water, affecting land production and water quality.

Land use also affects landscapes and amenity values. Land use may also affect soil quality over the longer term. Many of the most versatile soils in the district are being increasingly lost to urban and rural residential development due to urban sprawl, sporadic, and ribbon development. The aim of this section of the report is to compare present land use patterns with the land use capability of the district using the Land Use Capability Classification System to identify the land use potential of the district. These findings will then inform opportunities for increasing productive land use while maintaining and enhancing the special character of the district.

4.1 Dairying

According to Council's Properties Database and Rating Assessment 2009 and Land Use Class Datasets, 52% (or 31,103ha) of dairy farming activities are located on Class 4 land, whereas 27% (or 16,191ha) are located on Class 6 land and 13% (9,156ha) on Class 3 land. Dairy farming on these land classes are scattered across the district (see Figure 14). For example, there are areas of dairying north around Hekerenui, south in Bream Bay and in the western part of the district out to Parakao. In addition, approximately 2.6% (or 1,642ha) of dairying activities are located on Class 2 land. These are mainly located along State Highway 1 in the Waipu catchment.

Given that Class 3 and 4 land makes up approximately 34% of the land area and dairying at present occupies approximately 21% of the land area, there may be some potential in the district for the expansion of dairying. Any expansion in either area or intensity may have effects on the environment, including soil and water quality. These issues, along with economic factors and physical limitations of the land, may well limit any significant expansion in dairying.

4.2 Forestry

Production forestry generally occurs on Class 6 and 7 land. 74% (or 44,050ha) of forestry land is located on Class 6 land, whereas 19% (or 11,239ha) is located on Class 7 land (see Figure 15). Generally speaking, production forest on these land classes poses fewer adverse effects than result from arable and/or pastoral farming. These areas are often too steep and/or infertile due to the previous extensive clear felling, burning, gum digging and attempts at farming in the early part of the 20th century. However, it is important that forestry operations are carefully planned and carried out, particularly on Class 7 land, where the forest fulfils a catchment protection role as well as being a

production forest. There are over 610ha (or 0.1%) of forest located on Class 8 land. The majority of these are indigenous forests located within reserves. There is also a small area of forest measuring 364ha (or 0.6%) on Class 3 land in Puhipuhi.

There is considerable potential for an increase in production forestry within the district. Expansion in forestry is not limited by suitable land but rather by competing more profitable land uses. In some areas an expansion of production forestry may be desirable for soil conservation purposes. There is also potential for the diversification of tree species used in production forestry including the commercial production of native species. Research is presently taking place in Northland on the production of totora, for example. Farm wood lots utilising native species is a future possibility.

4.3 Horticulture

Land with versatile soils suitable for a wide range of uses is a scarce resource in New Zealand. As discussed in the earlier chapter, this type of "elite soil" (Class 1 and 2) makes up just 1.8% of the district's total land area. These elite soils have exceptional primary production potential and are capable of producing a wide range of crops, including intensive horticulture and orcharding. Much of the district's elite soil is of a volcanic or alluvial nature and is located in Maunu adjacent to the urban area, around Maungakaramea, the Maungatapere catchment, and areas along Three Mile Bush Road and around Glenbervie.

At present, 37% (or 698ha) and 40% (or 744ha) of horticultural activity are located on Class 2 and Class 3 land respectively, with only 3% (or 65ha) on Class 1 soils (see Figure 12). Currently, over one third of land use activities carried out on Class 1 land is pastoral and only 20% of Class 1 land is being used for horticulture. Many of the elite soils in Maunu have experienced subdivision activity as larger blocks are turned into small titles for urban land use and rural lifestyle blocks, with sizes ranging from just under 1,000m² to 6ha.

Given that Class 1 and 2 land comprises approximately 5,000ha in the district, and at present horticulture occupies around 2,000ha, there would appear to be significant potential for an expansion of horticultural land use in the district. Moreover, some Class 3 land is suitable for horticulture in addition to other forms of cropping.

However, due to the desirability of this land for lifestyle and rural residential development much of this highly productive land has been taken out of productive use and been converted to lifestyle and rural residential development. This trend is likely to continue if left to market forces (see Figure 13).

Given the extremely limited area of these high class soils (i.e. 5,000ha or 1.8% of the district's land area) and the potential these soils have for increased primary production, continuing economic return and on-going employment for the district, the loss of this highly productive land is a significant

resource management issue for the district. The retention of this scarce land resource for primary production for the foreseeable needs of future generation is a land use issue that needs serious consideration by Council and the community. If this land is not protected from rural residential and lifestyle development this valuable resource will be lost forever within a very short space of time. Future generations will consequently be denied the use of this scarce, valuable resource.

Guidelines for economic units suggested for viable productive land uses are as follows:

- Market gardens and orchards 8ha
- Vineyards 10ha
- Process cropping 30ha (Wilton, 2008)

For this reason, future use in Maunu, given the existing lot sizes, is likely to be for lifestyle block, or very intensive orcharding/horticulture. Alternatively, to become a viable economic size, some consolidation of land parcels/ownership may be required.

It is important to note that the future productive potential of intensive horticulture and orcharding will rely on the continued availability of highly versatile soils. Sporadic buildings and lifestyle blocks need to be limited by strong planning provisions in areas such as Maunu, Maungatapere, Maungakaramea, Bream Bay, Three Mile Bush and Glenbervie if this resource is to be retained for productive use. Highly productive lands currently used for dairying and grazing in these catchments may be converted to horticultural uses in the future. However, once subdivided for rural residential or life style development, the potential for horticulture, orcharding and intensive cropping is largely precluded.

4.4 Pastoral

Around 59% of the district’s pastoral land use is located on Class 4 land, whereas 27% is located on Class 6 land (see Figure 14). There is approximately 6% of pastoral land use located on Class 7 land. As a general rule, pastoral land use on Class 7 land is considered unsustainable in the long term. Other classes of land each make up between 0.1% and 6.2% (Class 3) of the remaining 8% of pastoral use. Based on this land use pattern, it is considered most of the area in pasture is suited to that land use. There appears limited potential to increase the area of pastoral land use. Any increase in production is more likely to come from more intensive grazing or a change in pastoral use i.e. sheep to beef or vice versa. Pastoral land use has some potential for growth according to Enterprise Northland (2009). It is predicted that even a 1% increase in productivity would return an additional \$10million to the regional economy. Note that this refers to the whole of Northland and is not directly applicable to the Whangarei District.

4.5 Undeveloped Land

Undeveloped or vacant land, occupies about 5.1% of the district, or 14,702ha. The amount of vacant land in the district that is not used for its specified purpose is a signal of land use trends. There

maybe a number of reasons why land is vacant. It may be a reflection of the current economic climate or more site specific limitations. An area of 12,874ha is vacant for future residential development in both urban and rural areas. Approximately 288ha of land zoned industrial is currently vacant, with a large portion of this located in the Marsden Point/Ruakaka area. The remaining 1,525ha is predominately forest land not improved for any activity or has been left to regenerate. It must be kept in mind that although this land is classified as undeveloped or vacant because it is not presently being used for its designated purpose, much of it is used for some purpose, either farming or forestry.

Table 5: Undeveloped Land in the Whangarei District

Land Use – Undeveloped (i.e. vacant)	Area (ha)	Percentage of Vacant Land over the Total District Area
Commercial	15.15	0.005%
Dairying	-	-
Forestry	1,525	0.5%
Horticulture	-	-
Industrial	288.20	0.1%
Lifestyle	11,151.63	3.9%
Mining	-	-
Other	-	-
Pastoral	-	-
Residential	1,722.08	0.6%
Specialist	-	-
Total Vacant	14,702.06	5.1%
Total District land	284,814.85	

Source: Whangarei District Council, 2009.

Note: Vacant land is based on the Council's land parcel and residential/commercial building consent information.

4.6 Opportunities and Constraints

This section outlines the key opportunities and constraints for growth management in relation to land use in the district.

Opportunities:

- Whangarei's geography and sub-tropical climate provides the district with a wide range of potential land uses. These include pastoral, dairying, forestry, cropping, horticulture, and viticulture.

- The district has a limited amount of good arable soils, with around 10% of the land considered to be suitable for arable use - horticulture and/or cropping.
- The area of high class soils/productive horticulture land is extremely limited, comprising only 1.8% of the total land area. However, only around 50% of this is being used for horticultural purposes. There is therefore potential to horticultural production in the district.
- The central part of the district contains flat to rolling land which is more suited to primary production than the hilly or steep areas to the north, south and west of the district. There is limited potential to expand the area of Class 4 and 6 land used for dairying.
- The district's relative advantage of warm winters has a competitive advantage to grow stock during the winter and spring months. This sector has more potential for growth and even a 1% increase in productivity would return an additional \$10 million to the regional economy (Enterprise Northland, 2009).
- There is potential to raise the contribution of forestry to the district's economic development.

Constraints:

- Some areas of highly productive land with fertile soils are currently under increasing pressure from urban and rural residential development, i.e. Austin Road and Cemetery Road in Maunu. This trend leads to a conflict between urban expansion and the need to preserve versatile soils. It will be important, therefore, to plan these areas effectively so that a balance between agricultural, urban and recreational demand can be maintained.
- The proliferation of lifestyle blocks and rural residential development can also fragment productive farmland and constrain land use options. This leads to 'reverse sensitivity' issues and limits the productive potential of farmland.
- Aside from effects on the soil resource, changes of land can also have wider environmental impacts. These impacts can be on natural resources, such as contamination of waterways and aquifers, or discharges to air from intensive farming operations, but can also have social and economic impacts, for example the increasing number of lifestyle blocks in the rural-urban interface and the consequences for transport patterns and infrastructure provision.

Future trends in the Whangarei District could see a greater diversification of different land uses. In particular, land assessed as Classes 1, 2 and 3 could be used for an expansion and diversification of cropping and horticulture. There is some potential for increasing viticulture and orcharding. Pastoral production could be intensified on both arable and hill country pastoral land with further diversification to mixed farming of livestock such as deer, cattle and sheep, or multi-tier farming with farm woodlots. Some of the more unstable Class 7 land is unlikely to prove economic for pastoral farming and could be planted in forestry. Forestry on Class 6 and 7 land, particularly in the steeper inland hills and mountainous country, should be carefully planned and monitored to cope with environmental problems.

Figure 11. Present Land Uses Showing Relationship with Land Use Capability Classes in the Whangarei District

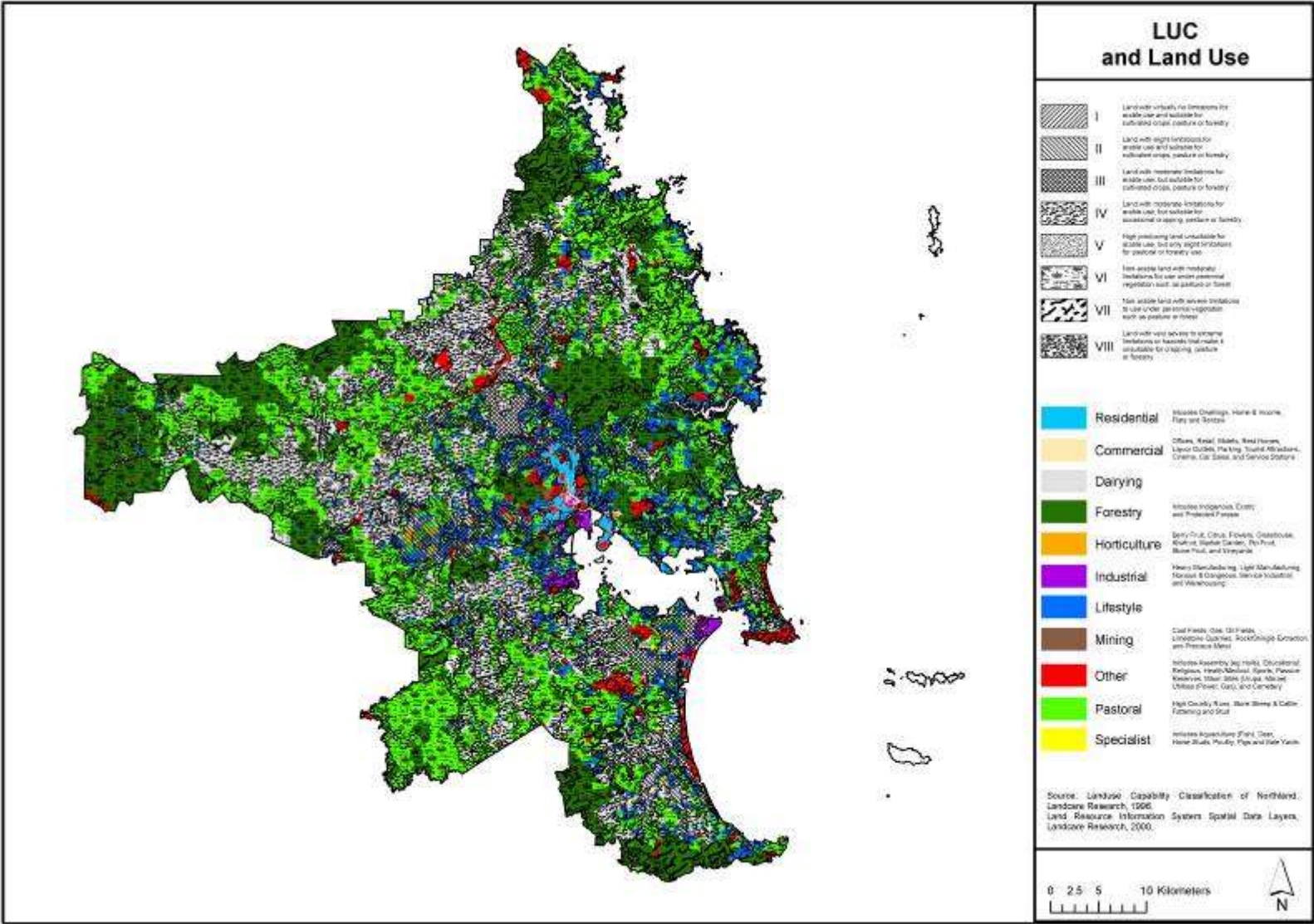


Figure 12. Present Horticulture Land Use Showing Relationship with Land Use Capability Classes in the Whangarei District

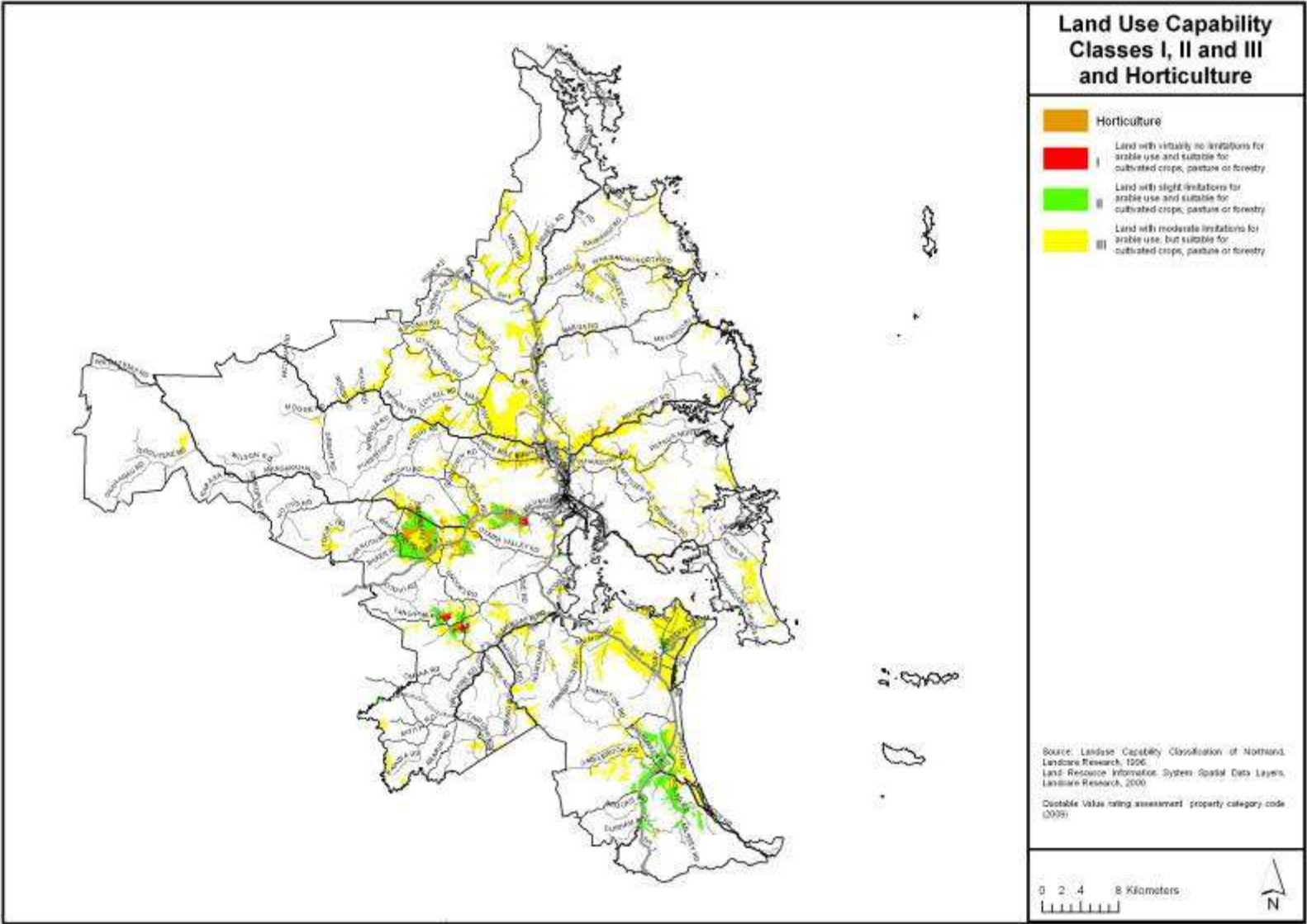


Figure 13. Present Lifestyle Blocks Showing Relationship with Land Use Capability Classes in the Whangarei District

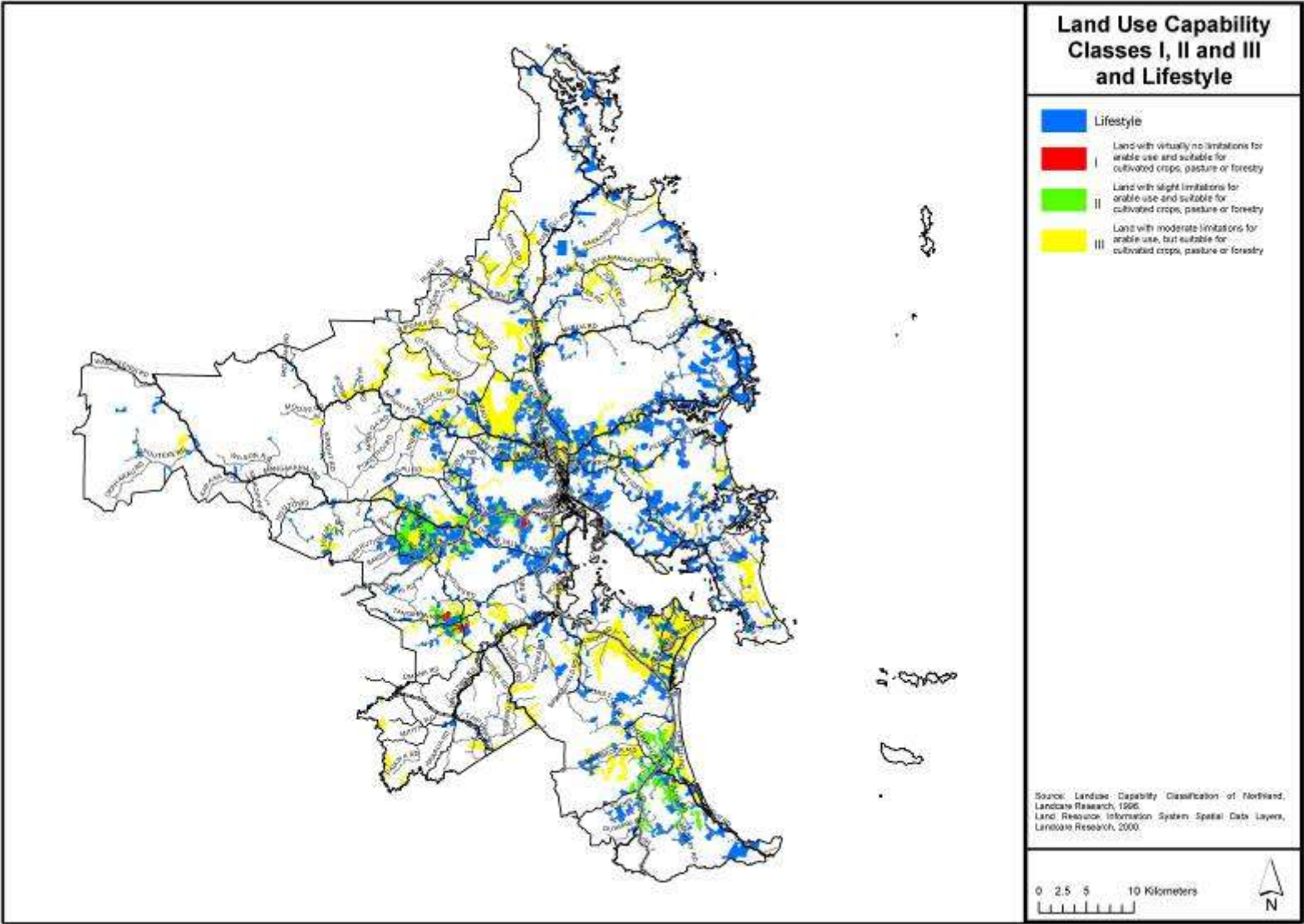


Figure 14. Present Dairying and Pastoral Land Uses Showing Relationship with Land Use Capability Classes in the Whangarei District

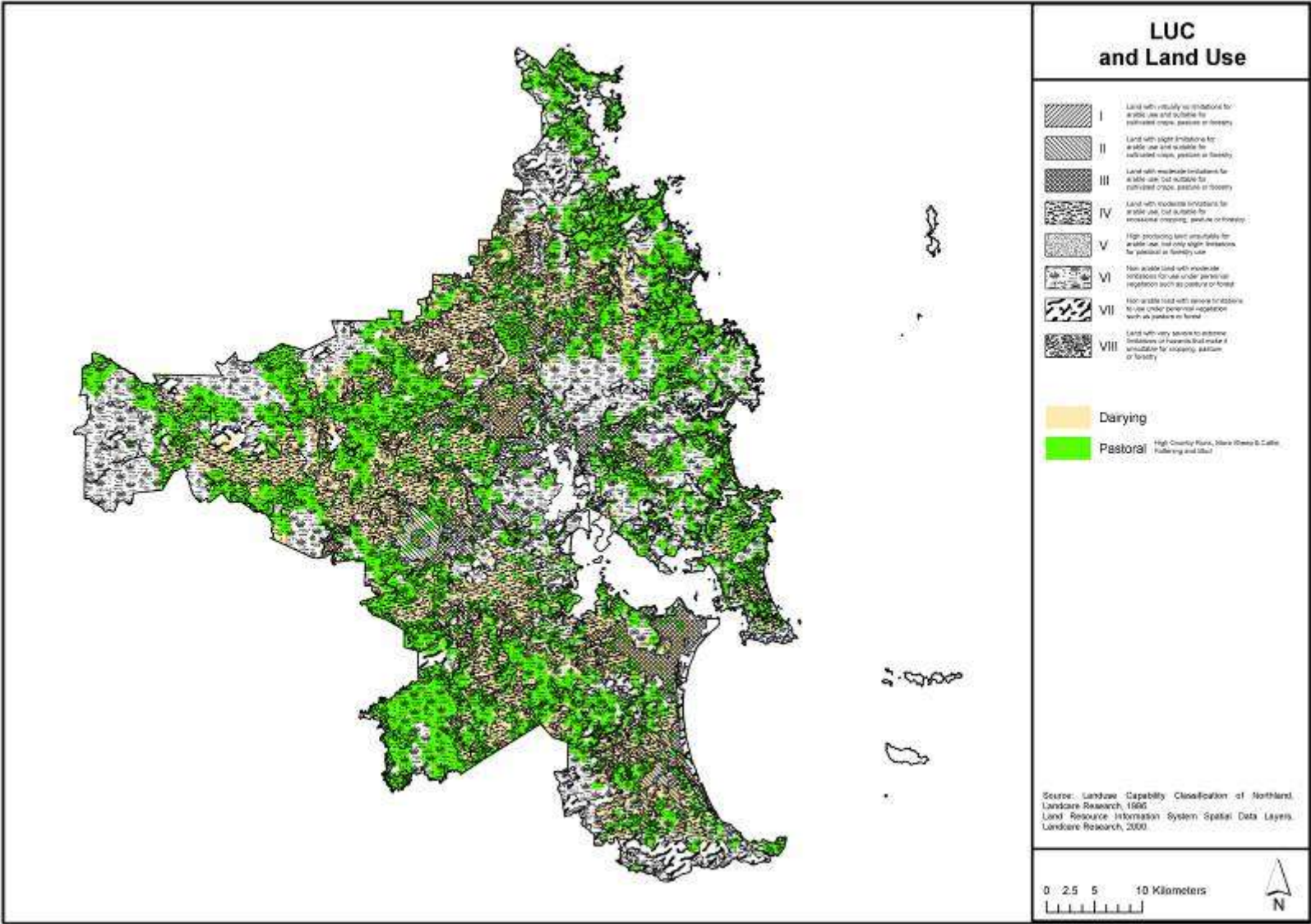
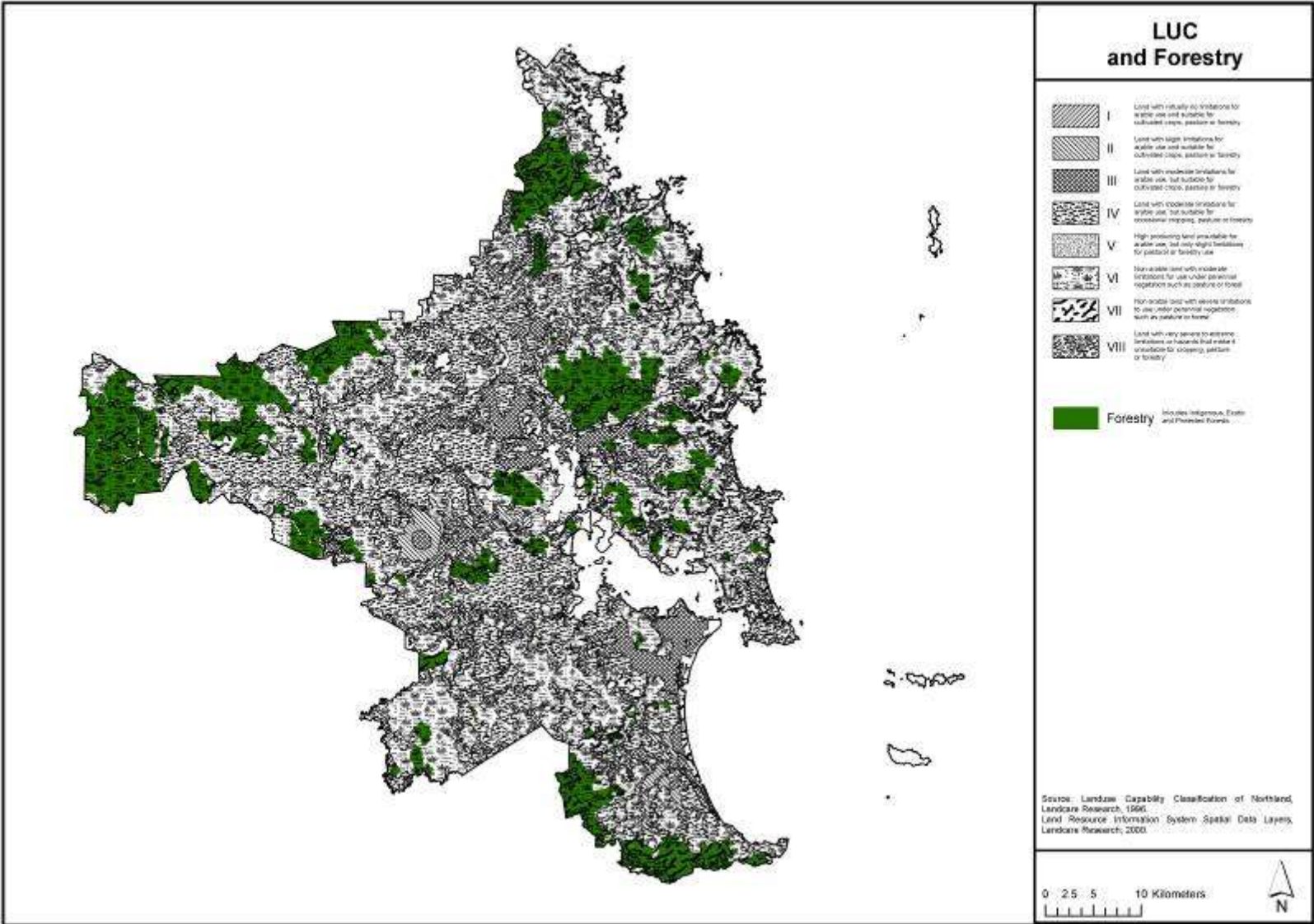


Figure 15. Present Forestry Showing Relationship with Land Use Capability Classes in the Whangarei District



5. DISTRICT PLAN ENVIRONMENTS

Table 5 and Figure 16 below provide a snapshot of the change in District Plan zonings between 1998 and 2008. The areas zoned Open Space decreased from 18,641ha to 18,167ha over the 10 year period. However, 459 hectares were rezoned to Countryside in 2005 due to a mistake in zoning.

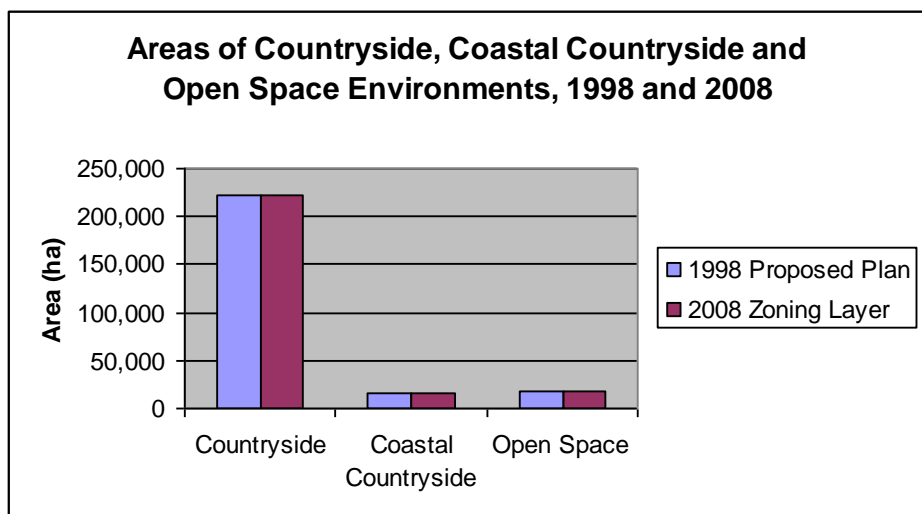
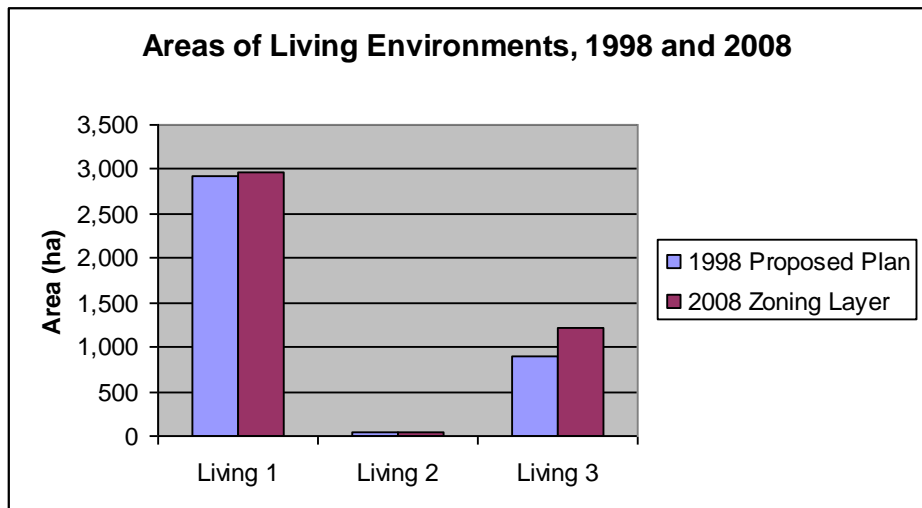
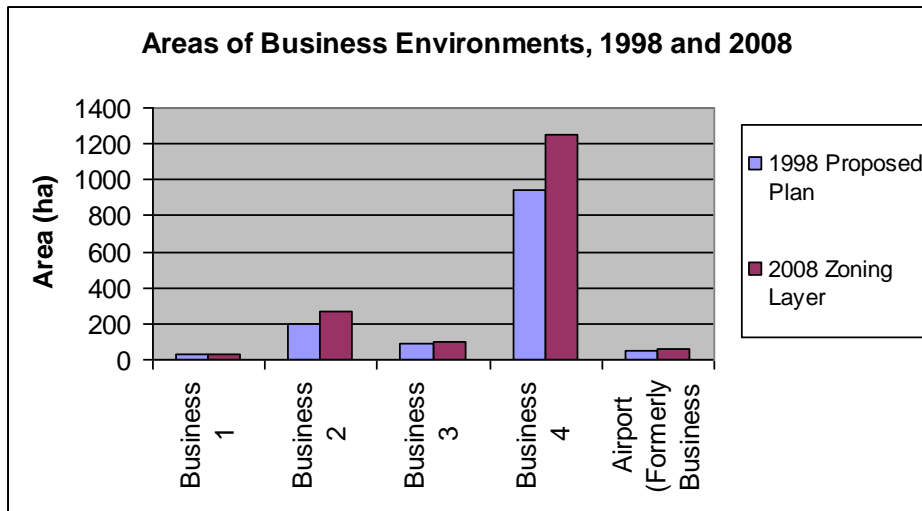
As the district's population grows, land zoned Countryside Environment is rezoned to urban Living Environments and Business Environments. The Living 3 Environment had the greatest increase from 886ha to 1,214ha in the 10 year period, representing a 37.1% increase in land area. Both Business 2 and 4 Environments have also had a significant expansion with a 32.2% and 32.6% increase respectively.

Table 6: Change in District Plan Environments, 1998 and 2008

District Plan Environment	1998 Proposed Plan Area (ha)	Percentage	2008 Zoning Layer	Percentage	Change in Area (ha)	Change (Percentage)
Business 1	26		26		0	0
Business 2	201		265		64	32.2
Business 3	85		100		15	17.1
Business 4	942		1,249		307	32.6
Airport (Formerly Business 5)	54		55		1	0.17
Total	1,308	0.5	1,695	0.6	387	29.5
Living 1	2,933		2,972		39	1.3
Living 2	44		43		-1	-2.1
Living 3	886		1,214		328	37.1
Total	3,863	1.5	4,229	1.6	366	9.5
Countryside	222,851		222,513		-338	-0.2
Coastal Countryside	15,434		15,491		57	0.37
Total	238,285	90.9	238,004	90.8	-281	-1.18
Open Space	18,641	7.1	18,167	6.9	-472	-2.5
Total	18,641	7.1	18,167	6.9	-472	2.5
Grand Total	262,097	100	262,097	100	0	

Source: Whangarei District Council, 2009.

Figure 16. Area of Whangarei District by District Plan Environments, 1998 and 2008



Source: Whangarei District Council, 2009.

6. COMPARISON OF THE THREE FUTURES

The Growth Strategy outlines three alternative futures for the district over the next 30/50 years. The three futures are presented to stimulate debate as to the preferred future settlement pattern for the district over the next 50 years.

Future One represents a lightly regulated, market led approach to development and, in general, reflects land development in the district over the past 10-20 years. It is presented as a continuation of this lightly regulated, largely market driven approach to land development and can be seen as a baseline against which to evaluate the other two options, in addition to an alternative development path in its own right.

Future Three represents a managed, consolidated development path based upon a structured five tier settlement pattern. This hierarchical arrangement is as follows: Whangarei City as the primary district and regional urban centre with a strong, protected and enduring CBD; a satellite town at Marsden Point/Ruakaka which complements (but does not compete with) Whangarei City; five urban villages within greater Whangarei; one rural (Hikurangi) and two coastal growth nodes at Parua Bay and Waipu; and two rural villages along with eight coastal villages located along the coastline from Waipu Cove in the south to Oakura in the north.

Future Two is an intermediate position between Futures One and Three. It represents a moderately controlled, less consolidated development path based upon a three tier settlement pattern. These tiers consist of: twin cities at Whangarei and Marsden Point/Ruakaka competing with each other for higher level service provision; urban and coastal settlements with some associated urban sprawl and ribbon development; and rural urban development largely at village level with some sporadic development throughout the rural area.

The above futures will be examined with regard to the effects of each settlement pattern on existing land use together with land use capability to try to determine which settlement pattern has the least adverse effects on land use and land capability. When put together with a range of other sustainability criteria this will assist in determining the most sustainable future development path for the district.

Figures 17 - 22 show the general development pattern under the three growth scenarios and illustrate the potential impacts on different land uses, and land use capability classes.

The effects of each development path on existing land use and land use capability can be summarised as follows:

6.1 Future One: Lightly Regulated/Market Led Development

Under Future One - Business as Usual - urban development will be dispersed throughout the district, with concentrations in Whangarei, Marsden Point/Ruakaka, other urban, rural and coastal locations and along transport corridors. There will be a continuation of urban sprawl and sporadic development on the urban fringes; residential and commercial ribbon development along the coast; residential, commercial and industrial development along transport corridors; and scattered residential, commercial, and industrial development in the Bream Bay area.

There will also be a continuation of widely dispersed sporadic rural residential development throughout the district including both Countryside and Coastal Countryside Environments. In particular, there will be widespread rural residential development scattered throughout all rural areas; widespread rural residential sprawl and ribbon development along the coast and transport corridors; and continuing rural residential development on high quality soils and productive farm land.

Regarding existing land uses, this development pattern will result in increasing conflict between primary production and residential and industrial/commercial development (see Figure 17). These effects will include:

- Encroachment of urban sprawl around the urban fringes onto productive farmland with increased reverse sensitivity problems and inflated land values.
- Ribbon development along the coast affecting pastoral land uses and some dairying with associated reverse sensitivity issues and inflated land values.
- Residential, commercial and industrial development along transport corridors affecting productive farmland, in some instances highly productive land, with associated reverse sensitivity issues.
- Scattered commercial, industrial and residential development in the Marsden Point/ Bream Bay area fragmenting pastoral and dairy farming with associated reverse sensitivity issues.
- Widespread rural residential development throughout the district fragmenting productive farmland with associated reverse sensitivity issues.
- Rural residential development on high class soils, particularly in Maunu, Maungatapere, Maungakaramea, Three Mile Bush Road and Glenbervie, resulting in a change of land use from horticultural to residential.

In the case of land use capability, this development pattern will result in the loss and continued fragmentation of productive farmland by scattered residential, commercial and industrial development (see Figure 18). These effects will include:

- Encroachment of urban sprawl around the urban fringes onto Class 3, 4 and 6 land with a consequent loss of this land for productive use.
- Ribbon development along the coast affecting Class 4 and 6 land with a consequent loss of this land for productive use.

- Residential, commercial and industrial development along transport corridors affecting Class 3, 4 and 6 land with a consequent loss of this land to productive use.
- Scattered commercial, industrial and residential development in the Marsden Point/ Bream Bay area fragmenting Class 2, 3 and 4 land with a consequent loss of this land for productive use.
- Widespread rural residential development throughout the district fragmenting Class 3, 4 and 6 land with a consequent loss of this land for productive use.
- Rural residential development on Class 1, 2 and 3 land particularly in Maunu, Maungatapere, Maungakaramea, Three Mile Bush Road and Glenbervie, resulting in a loss of this land to productive use.

Overall, the development path represented by Future One will result in the continued loss and fragmentation of productive farmland throughout the district from scattered residential, commercial, industrial and, in particular, rural residential and lifestyle development. It will also result in increasing reverse sensitivity problems between existing farming operations and new rural residential/lifestyle development. Of particular concern are the continuing adverse effects on the highly productive and versatile Class 1 and 2 land. Existing horticultural uses on these high class soils are already being compromised by rural residential development, for example in the Maunu, Maungatapere, Maungakaramea, Three Mile Bush and Glenbervie areas. A continuation of the lightly regulated, market led approach under Future One will see these highly productive and versatile soils effectively lost to productive use through increasing residential development.

6.2 Future Two: Twin City/Urban and Coastal Spread

Under Future Two, the settlement pattern represents a moderately controlled and partly consolidated development path. It includes twin cities at Whangarei and Marsden Point/Ruakaka based upon significant residential, commercial and industrial development at Marsden Point/Ruakaka; urban and coastal settlements with some associated urban sprawl and ribbon development along the coast and transport corridors; and rural urban development largely at village level with some sporadic rural residential development throughout the rural area.

Regarding existing land uses, this development pattern will result in major land use changes in the Marsden Point/Ruakaka area but less conflict with existing land uses in other parts of the district (Figure 19). These effects will include:

- Expansion of urban land use in Marsden Point/Ruakaka to accommodate around 25,000 people along with significant industrial and commercial development, resulting in major encroachment onto existing farmland including pastoral, dairying and some cropping.

- The five urban centres (i.e. Kamo, Tikipunga, Onerahi, Maunu and Otaika) will grow to around 10,000 people each, resulting in residential development on the urban fringes with some urban sprawl and sporadic development. There will be some loss of existing farmland on the urban fringes - generally pastoral with the potential for loss of horticultural use and orcharding in the Maunu, Three Mile Bush Road and Glenbervie areas.
- Coastal development will be more constrained but some ribbon development remains likely between coastal settlements and along coastal roads. This will impact on existing farm land, mostly pastoral use.
- Ribbon development along transport corridors will be more restricted resulting in less conflict with existing land uses. There will however remain some loss of productive land along transport corridors, mostly pastoral, some dairying and the potential loss of horticulture and orcharding in Maunu, Maungatapere, Glenbervie and Three Mile Bush Road.
- Rural residential and lifestyle development will be more controlled with widespread sporadic development in rural areas lessened. This will result in less conflict with existing land use, less reverse sensitivity problems, and some protection for highly productive versatile land. Some orchards or horticultural land near the urban fringes of Kamo, Tikipunga or Maunu could potentially be lost to lifestyle blocks. However, high class soils and productive farmland can be protected to some degree in rural areas of Maungatapere, Whatitiri, Maungakaramea, Ruatangata and Bream Bay.

In relation to land use capability, this development pattern will result in significant loss of agricultural land in the Marsden Point/Ruakaka area, together with some loss and fragmentation of productive land in other parts of the district (Figure 20). These effects will include:

- Expansion of urban land use in Marsden Point/Ruakaka to accommodate around 25,000 people along with significant industrial and commercial development, resulting in major encroachment onto Class 3 and 4 land with a consequent loss of this land for productive use.
- The five urban centres (i.e. Kamo, Tikipunga, Onerahi, Maunu and Otaika) will grow to around 10,000 people each, resulting in residential development on the urban fringes with some urban sprawl and sporadic development. There will be some encroachment onto Class 3 and 4 land and potential encroachment onto Class 1 and 2 land in the Maunu, Three Mile Bush Road and Glenbervie areas.
- Coastal development will be more constrained but some ribbon development remains likely between coastal settlements and along coastal roads. This will result in some encroachment onto Class 4 and 6 land with minor loss to agricultural use.
- Ribbon development along transport corridors will be more restricted resulting in less conflict with existing land uses. There will however remain some loss of productive land along transport corridors, mostly Class 4 and 6 land and the potential loss of Class 2 and 3 land in Maunu, Glenbervie and Three Mile Bush Road.

- Rural residential and lifestyle development will be more controlled with widespread sporadic development in rural areas lessened. This will result in some fragmentation of Class 4 and 6 land and some loss of Class 1, 2 and 3 land to rural residential development near the urban fringes and in rural areas of Maungatapere, Maungakaramea, Whatitiri and Waipu.

Overall, the development path represented by Future Two will result in major land use changes in the One Tree Point/Marsden Point/Ruakaka area as residential, commercial and industrial development increases to accommodate a population of 25,000 people. There will be less fragmentation and loss of productive land in other parts of the district due to the moderately controlled and partly consolidated development path outlined under Future Two. There will be some encroachment onto productive farmland around the urban fringes, along the coast and along transport corridors but this will be significantly less than what is likely under Future One. This will also lessen reverse sensitivity problems between existing farm operations and new rural residential development. Of concern is the potential for continuing loss of highly productive and versatile land on the City fringes at Maunu, Three Mile Bush Road, and Glenbervie. Threats to the highly productive land in the Maungatapere, Maungakaramea, and Ruatangata areas will be lessened with more control over rural residential and lifestyle development.

6.3 Future Three: Satellite Town/Rural and Coastal Villages

Future Three represents a controlled, consolidated development path. It posits Whangarei City as the primary district and regional centre with a strong, enduring CBD and five urban villages within the greater Whangarei area. Strong urban containment provisions will prevent urban sprawl around the City fringes. Marsden Point/Ruakaka grows to a town of around 15,000 people which complements Whangarei City. Prescriptive land use planning prevents sprawling development and ensures a consolidated pattern of residential, industrial and commercial development. One rural growth node at Hikurangi and two coastal growth nodes at Parua Bay and Waipu allow for consolidated residential, industrial and commercial development in the coastal and rural areas. Two rural villages and eight coastal villages allow for consolidated residential (and limited commercial) development along the coast and in the countryside. As a consequence of this tiered settlement pattern, rural residential and lifestyle development will be tightly controlled. Designated areas of less productive or already compromised land will be identified for rural residential and lifestyle development.

In relation to existing land uses, this development path will result in much reduced fragmentation and loss of existing farmland and reduced reverse sensitivity issues due to strong urban containment provisions, directed development to rural and coastal growth nodes, and tightly controlled rural residential and lifestyle development (Figure 21). These effects will include:

- Strong urban containment and urban infill provisions will limit urban sprawl and lessen encroachment of urban development onto productive farmland. There will be some expansion of urban areas but new urban land will be released in a controlled way prescribed by local structure planning.
- Prescriptive land use planning to ensure a consolidated, integrated urban centre at Marsden Point/Ruakaka will limit the fragmentation and loss of productive land. There will remain a significant change in land use over the longer term and inevitable loss of existing farmland but this will be kept to the minimum required by gradual release of new urban land according to prescriptive structure planning.
- The five urban centres (i.e. Kamo, Tikipunga, Onerahi, Maunu and Otaika) will grow to around 10,000 people each, resulting in residential development on the urban fringes. Urban sprawl and sporadic development will be kept to a minimum by use of infill and urban containment provisions. There will be some loss of existing farmland on the urban fringes but land will be released in a controlled manner prescribed by local structure plans which will seek to avoid urban expansion onto highly productive land.
- Rural and coastal growth nodes at Hikurangi, Parua Bay and Waipu will result in some expansion of urban land use onto existing farmland. This expansion will be controlled by infill and tight urban containment policies and the release of new urban land will be prescribed by local structure plans. These will seek to limit urbanisation of the more productive farmland.
- Coastal development will be directed to existing coastal villages and sporadic and ribbon development between the coastal villages reduced. This will result in some loss of land on the fringes of the coastal villages but less fragmentation of farmland between the centres.
- Ribbon development along transport corridors will be restricted resulting in reduced fragmentation of existing farmland and reduced residential development on highly productive land particularly in the Maunu, Maungatapere, Three Mile Bush Road and Glenbervie areas.
- Rural development will be directed to existing rural villages and widespread sporadic rural residential development will be directed to designated areas of less productive and/or already compromised farmland. This will result in less fragmentation of productive land and reduced reverse sensitivity issues between existing farm uses and new rural residential and life style development. The most highly productive land will be protected from further conversion to residential use wherever possible.

In relation to land use capability, this development path will result in continuing change in land use in the Marsden Point/Ruakaka area, controlled urban expansion around existing urban areas, limited development in rural and coastal villages, and tightly controlled rural residential development throughout the district (Figure 22). These effects will include:

- Expansion of urban land use in Marsden/Point to accommodate a population of around 15,000 people along with associated industrial and commercial development resulting in significant

encroachment onto Class 3 and 4 land with a consequent loss of this land for primary production over the longer term. Prescriptive land use planning to ensure a consolidated, integrated urban development at Marsden Point/Ruakaka will control the fragmentation and loss of productive land.

- The five urban centres (i.e. Kamo, Tikipunga, Onerahi, Maunu and Otaika) will grow to around 10,000 people each, resulting in residential development on the urban fringes. Urban sprawl and sporadic development will be kept to a minimum by use of infill and urban containment provisions. There will be some expansion of urban land use onto Class 3 and 4 but this will be controlled by local structure plans which will seek to avoid urban expansion onto highly productive land.
- Rural and coastal growth nodes at Hikurangi, Parua Bay and Waipu will result in some expansion of urban land use onto Class 3, 4 and 6 land (and around Waipu, some Class 2 land). This expansion will be controlled by local structure plans which will seek to limited urbanisation of the more productive Class 2 and 3 land.
- Coastal development will be directed to existing coastal villages and sporadic and ribbon development between the coastal villages reduced. This will result in some loss of Class 4 and 6 land on the fringes of the coastal villages but less fragmentation of farmland between the centres.
- Ribbon development along transport corridors will be restricted resulting in reduced urbanisation of Class 4 and 6 land together with greater protection of Class 2 and 3 land around Glenbervie, Three Mile Bush Road, and Maunu/ Maungatapere.
- Rural development will be directed to existing rural villages and widespread sporadic rural residential development will be directed to designated areas of less productive and/or already compromised farmland. This will result in less fragmentation of Class 3, 4 and 6 land and greater protection of Class 1 and 2 land, particularly around Maungakaremea, Maungatapere, Maunu, Three Mile Bush and Glenbervie.

Overall, the development pattern represented by Future Three will result in a continuing change of land use in the Marsden Point/Ruakaka area as residential, commercial and industrial development increases to accommodate a population of 15,000 people. There will be reduced fragmentation and loss of productive land in other parts of the district due to the controlled consolidated development path outlined under Future Three. This will also be some reduction in reverse sensitivity. There will be some expansion of existing urban areas around Whangarei City and around the identified rural and coastal growth nodes but this will be limited by urban infill and containment provisions. There will be reduced sporadic and ribbon development along the coast and transport corridors with a consequent reduction of fragmentation and urbanisation of productive land. Finally, there will be less fragmentation of productive farmland from widespread sporadic rural residential and life style development throughout the rural area and greater protection of the high class versatile Class 1, 2 and 3 land from residential, rural residential and lifestyle development.

Figure 17. Future 1 and Present Land Use

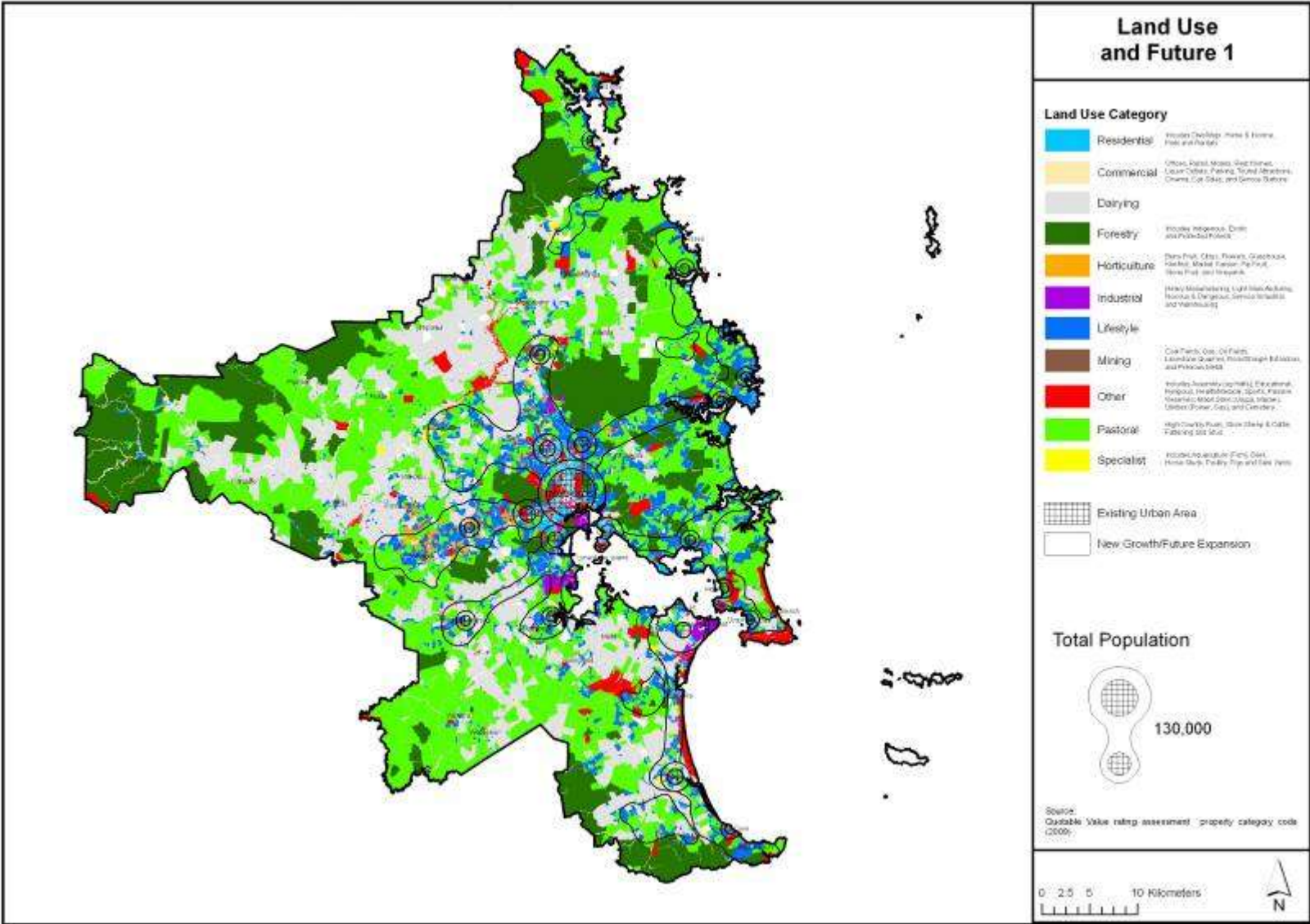


Figure 18. Future 1 and Land Use Capability

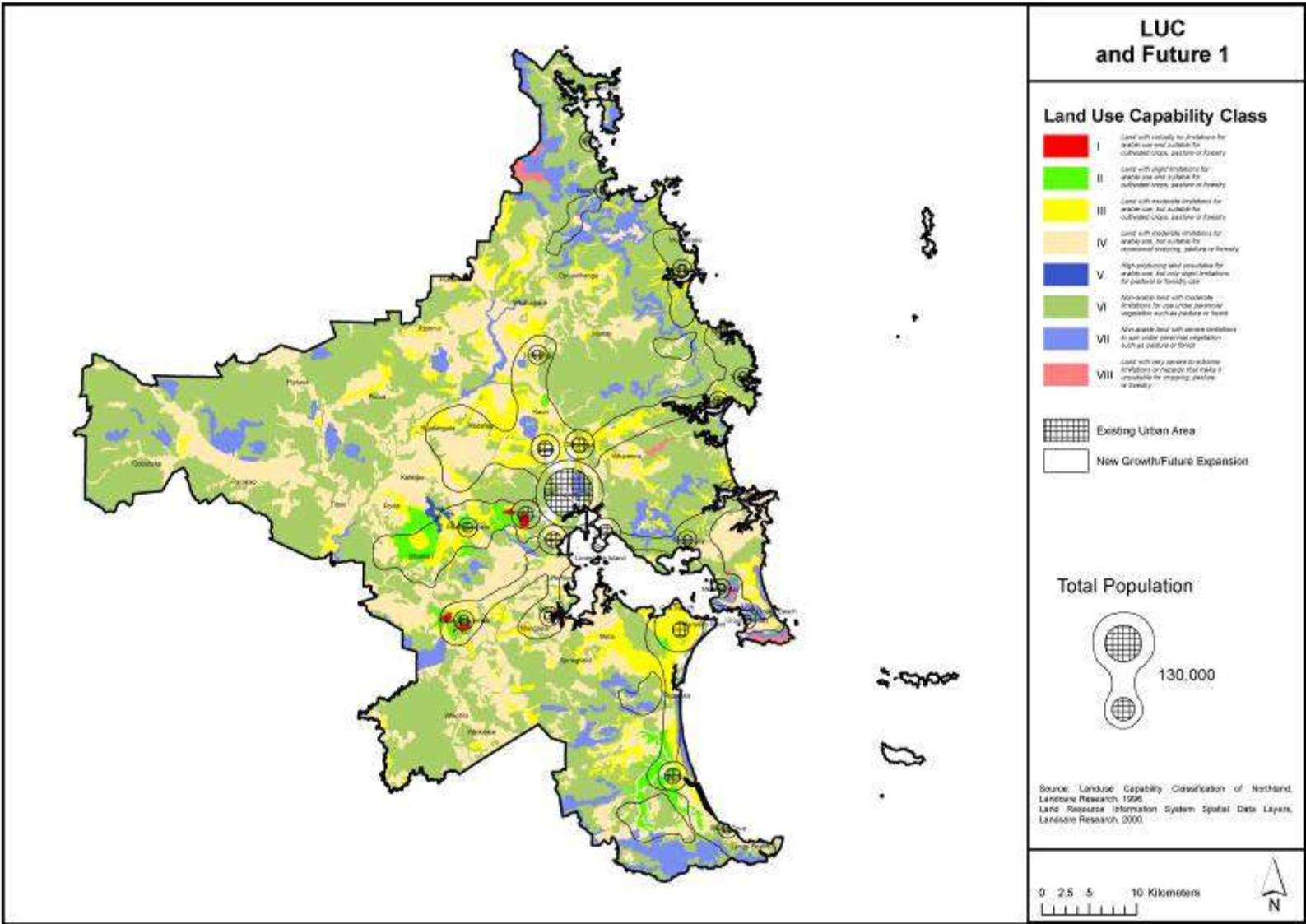


Figure 19. Future 2 and Present Land Use

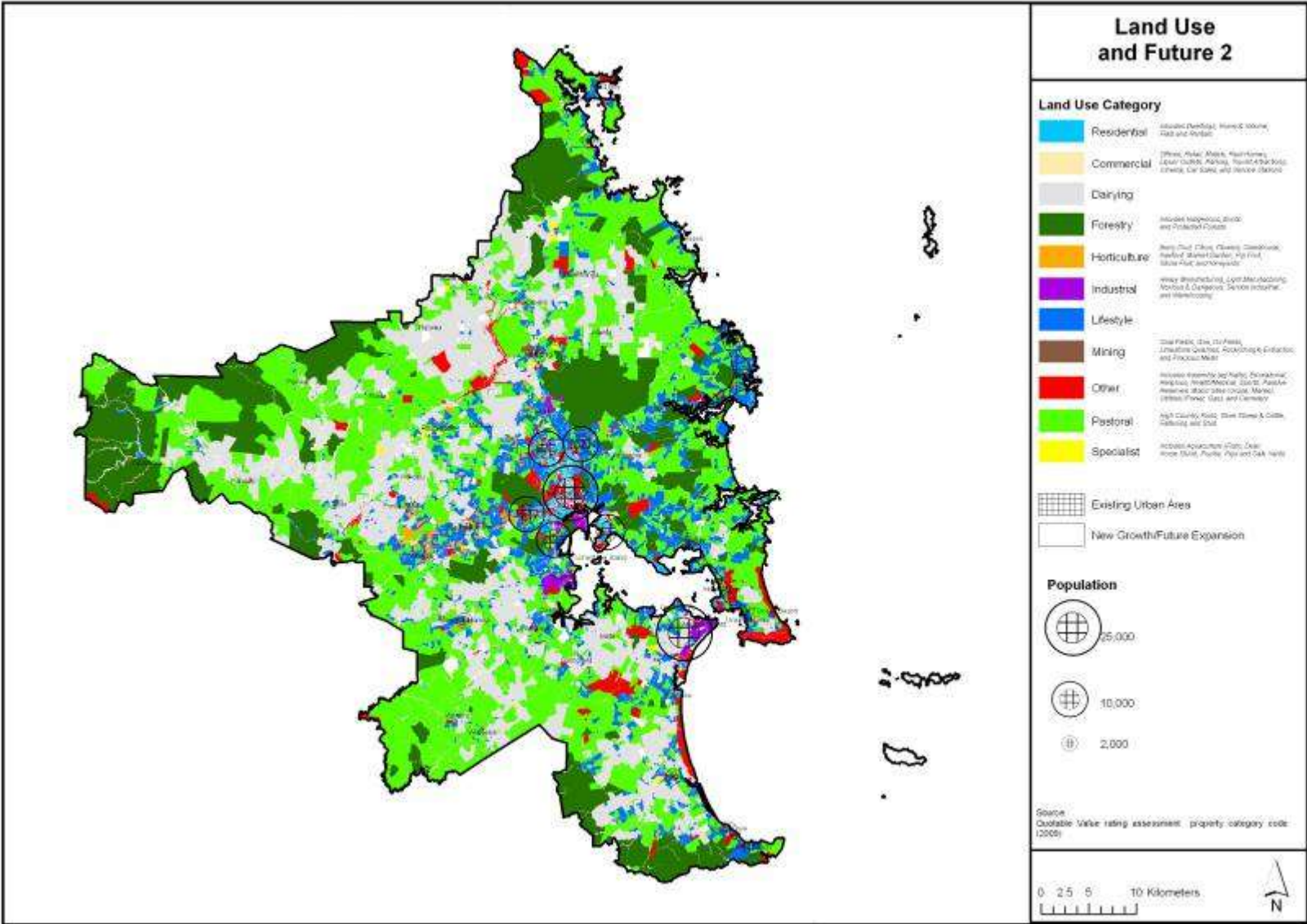


Figure 20. Future 2 and Land Use Capability

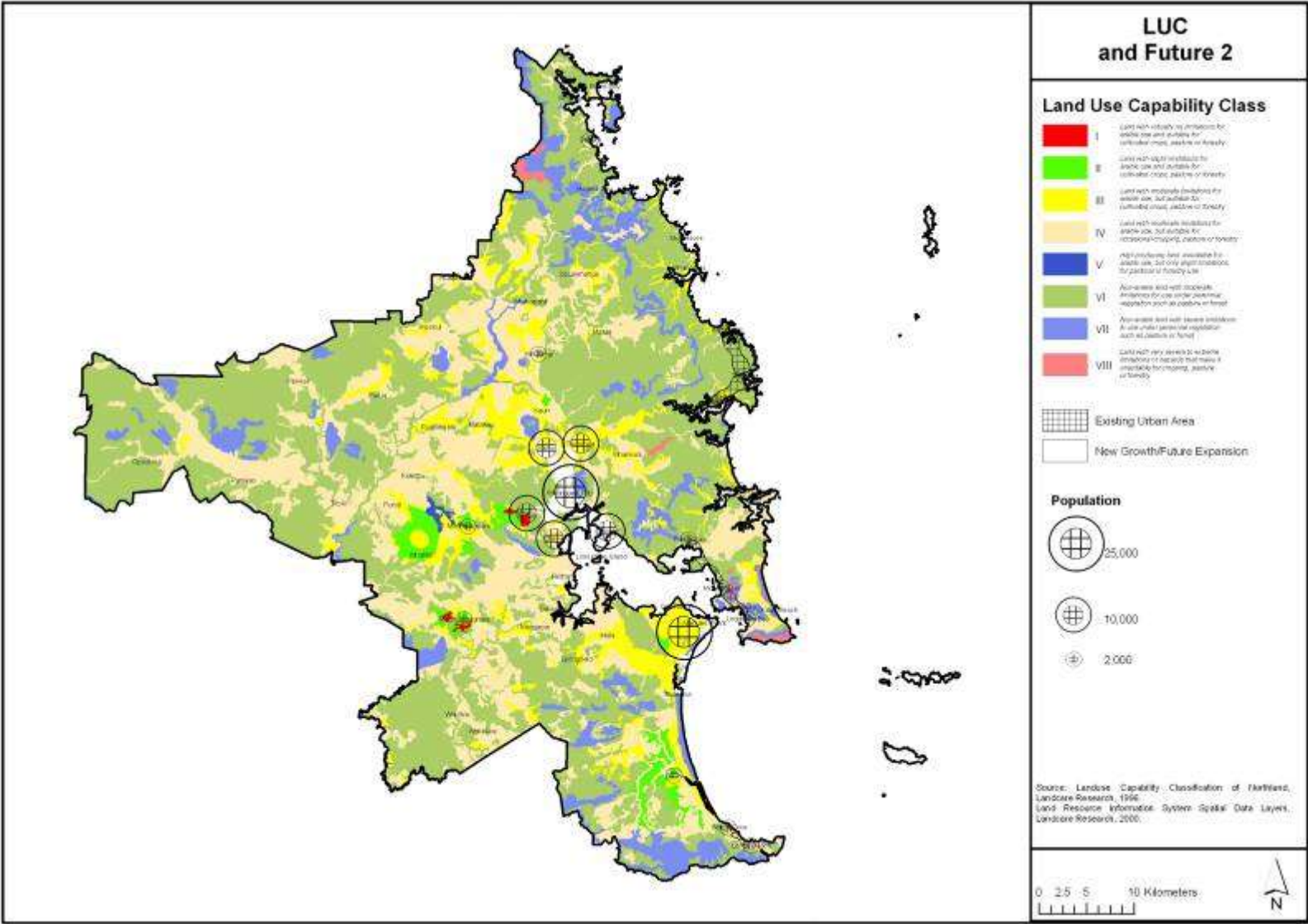


Figure 21. Future 3 and Present Land Use

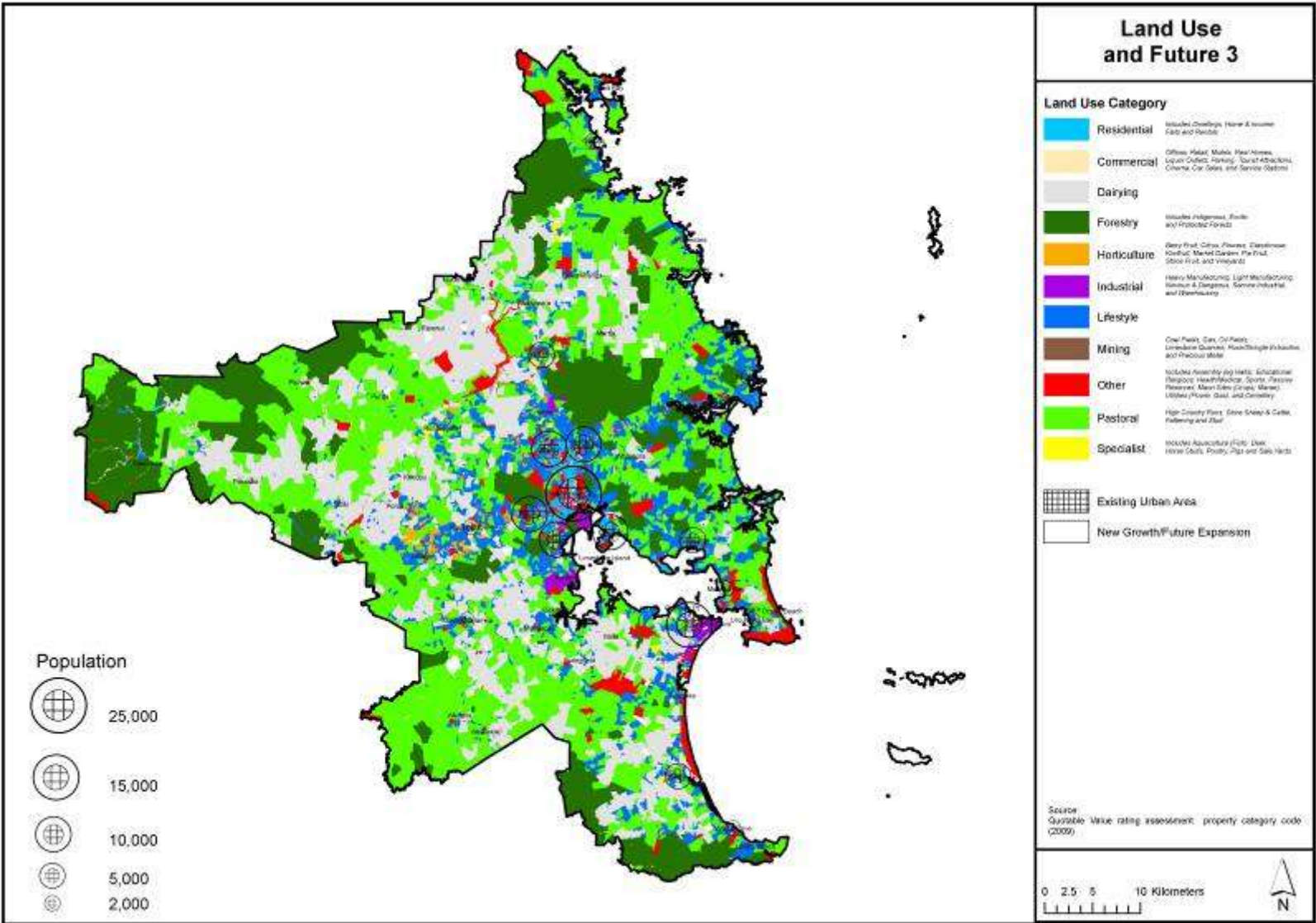
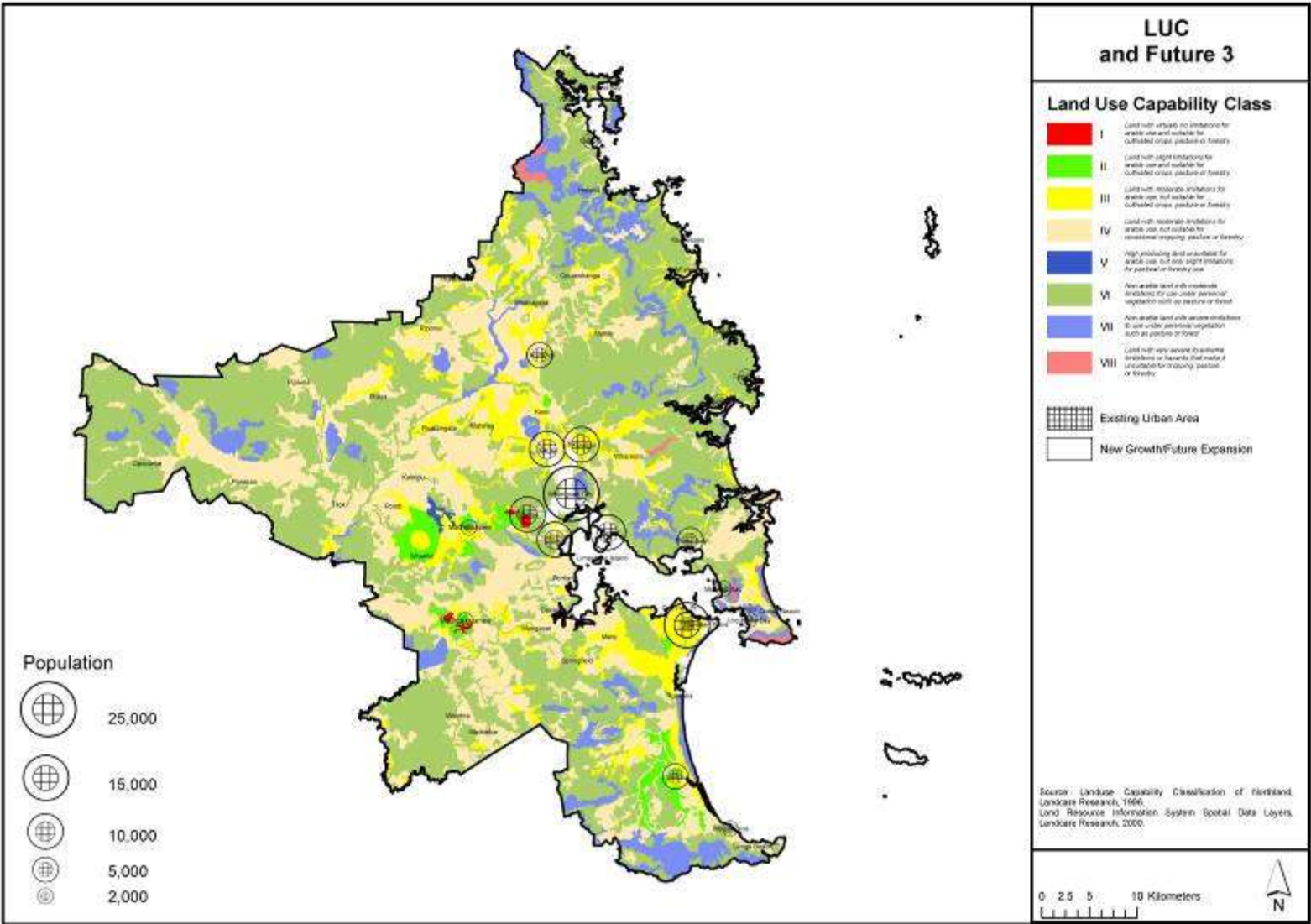


Figure 22. Future 3 and Land Use Capability



7. CONCLUSIONS

The Whangarei District has a wide range of primary land uses. These include pastoral farming, dairying, forestry, cropping, horticulture and viticulture. Pastoral farming occupying around 37% of the district's land area, dairying 21%, forestry 21%, urban areas and reserves 10% and lifestyle blocks 10% are the major land uses. The district is well endowed with Class 4 and 6 land suitable to dairying and pastoral use. However, good arable land suitable for intensive cropping and/or horticulture/orcharding is limited. Around 10% of the district is Class 1, 2 or 3 land. The area of highly versatile land or high class soils is extremely limited with around 2% of the district land area comprised of Class 1 and 2 land. These are generally the volcanic soils in the Maunu, Maungatapere, Maungakaramea, Three Mile Bush Road and Glenbervie areas, together with some Class 2 alluvial soils in the Waipu area.

Generally, present land use within the district aligns broadly with land use capability. However, providing environmental and cultural effects are adequately dealt with, there is some potential for increased production and increased economic outcomes for the district either through a change in land use and/or an intensification of existing land use.

In relation to pastoral use there appears to be limited potential for an expansion in land area except at the expense of other, at present more productive uses (such as dairying). There appears to be some potential for intensification of use but this is probably limited. There is more potential for diversification or change of livestock produced, e.g. deer, sheep to beef, beef to sheep. However, this is largely determined by the profitability of different commodities on the global market at particular times.

There appears to be some potential for the expansion of dairying in the district but this is most likely limited. There may be some potential for increased stocking rates but this too is probably limited. Once again, the profitability of dairying is strongly influenced by world commodity prices and the output from dairying will remain related to returns gained on the world market.

There is considerable potential for expansion in forestry production in the district. An increase in land area planted under forestry is not limited by suitable land but instead by competing, more profitable land uses. In some areas, i.e. steep hill country, it may be desirable to convert land to forests for soil conservation and catchment protection purposes. There is also potential for diversification of tree species harvested, including the commercial production of native species.

Horticulture and orcharding (and possibly viticulture) appear to hold the most promise for increased primary production in the district over the long term. At present only around half of Class 1 and 2 land

is used for horticulture or orcharding. There is considerable potential for increasing economic returns to the district over the long term together with increased employment opportunities for the community. Because of its versatility, there is considerable potential for diversification of crops grown on these soils. Future uses will depend on market demand for particular products but because of the nature of these soils there are few limitations as to what crops can be grown. In affluent markets, which are becoming increasingly discernable in regard to food safety and quality, there is significant potential for high quality, high return products. Demand for organic food is predicted to grow and these soils are well suited to the organic production of a wide range of products.

At the same time, because of their location on the urban fringes or within easy travelling distance to the City centre, these highly versatile and productive soils are most at risk from residential, rural residential and lifestyle development. Many areas are already compromised and future potential for productive use has been reduced or lost altogether. This process of urbanisation of highly productive agricultural land is likely continue with the consequent loss of the potential for increased economic output and employment opportunities in the future. This is not considered a sustainable use of this limited and valuable land resource. Once these high class soils are converted to residential or rural residential development they are effectively removed from agricultural use. Given, the very limited distribution of Class 1 and 2 land, the loss of these soils for productive use does not accord with the concept of sustainable management, particularly the requirement to meet the reasonably foreseeable needs of future generations. If this highly versatile and productive land resource is to be retained for primary production, strong planning provisions are required to ensure this.

Finally, analysis of the different development paths outlined under the three alternative futures in the WDC Growth Strategy, shows that Future Three offers the most sustainable option in regard to future land use, whilst Future One is the least sustainable. Future Two represents an intermediate position.

Overall, the development path represented by Future One will result in the continued loss and fragmentation of productive farmland throughout the district from scattered residential, commercial, industrial and, in particular, rural residential and lifestyle development. It will also result in increasing reverse sensitivity problems between existing farming operations and new rural residential/lifestyle development. Of particular concern are the continuing adverse effects on the highly productive and versatile Class 1 and 2 land. Existing horticultural uses on these high class soils are already being compromised by rural residential development, for example in the Maunu, Maungatapere, Maungakaramea, Three Mile Bush and Glenbervie areas. A continuation of the lightly regulated, market led approach under Future One will see these highly productive and versatile soils effectively lost to productive use through increasing residential development.

The development path represented by Future Two will result in major land use changes in the One Tree Point/Marsden Point/Ruakaka area as residential, commercial and industrial development

increases to accommodate a population of 25,000 people. There will be less fragmentation and loss of productive land in other parts of the district due to the moderately controlled and partly consolidated development path outlined under Future Two. There will be some encroachment onto productive farmland around the urban fringes, along the coast and along transport corridors but this will be significantly less than what is likely under Future One. This will also lessen reverse sensitivity problems between existing farm operations and new rural residential development. Of concern is the potential for continuing loss of highly productive and versatile land on the City fringes at Maunu, Three Mile Bush Road, and Glenbervie. Threats to the highly productive land in the Maungatapere, Maungakaramea, and Ruatangata areas will be lessened with more control over rural residential and lifestyle development.

Lastly, the development pattern represented by Future Three will result in a continuing change of land use in the Marsden Point/Ruakaka area as residential, commercial and industrial development increases to accommodate a population of 15,000 people over the next 50 years. There will be reduced fragmentation and loss of productive land in other parts of the district due to the controlled consolidated development path outlined under Future Three. There will be some expansion of existing urban areas around Whangarei City and around the identified rural and coastal growth nodes but this will be limited by urban infill and containment provisions. There will be reduced sporadic and ribbon development along the coast and transport corridors with a consequent reduction of fragmentation and urbanisation of productive land. Finally, there will be less fragmentation of productive farmland from widespread sporadic rural residential and life style development throughout the rural area and greater protection of the high quality versatile Class 1, 2 and 3 land from residential, rural residential and lifestyle development.

8. REFERENCES

Harmsworth, G.M. (1996). *Land Use Capability Classification of the Northland Region*. Landcare Research Science Series No.9. Palmerston North, New Zealand, Manaaki Whenua Press.

Lynn, I., Manderson, A., Page, M., Harmsworth, G., Eyles, G., Douglas, G., *et al.* (2009). *Land Use Capability Survey Handbook: A New Zealand handbook for the classification of land* (3rd ed.). New Zealand: AgResearch Ltd, Landcare Research New Zealand Ltd and Institute of Geological and Nuclear Sciences Ltd.

Ministry of Agriculture and Forestry. (2009) *Small Holdings*. Retrieved March 30, 2009, from <http://www.maf.govt.nz/mafnet/publications/statistics/forestry/smallholdings/part-one.htm>

Paterson, J. (2005). *What is a "lifestyle block" and is it a form of "rural gentrification"?* Paper presented at the Focus on rural research. Retrieved April 2, 2009, from www.waikato.ac.nz/wfass/subjects/geography/research/rtp/trtwebpage1.doc

Statistics New Zealand. (2002). *Hectares Used and Farms by land Use by Territorial Authority*. Retrieved March 10, 2009, from <http://www.stats.govt.nz/NR/rdonlyres/722DC803-86F6-4C2D-862A-E2487AF6EBCA/0/Part2.xls>

Statistics New Zealand. (2007). *Livestock Numbers by Type and Territorial Authority at 30 June 2007*. Retrieved March 10, 2009, from <http://www.stats.govt.nz/tables/2007-ag-prod/Livestock+numbers.htm>

Te Ara. (2009). *The Encyclopaedia of New Zealand: What makes a good soil?* Retrieved March 10, 2009, from <http://www.teara.govt.nz/TheBush/Landscapes/Soils/9/en>

Whangarei District Council. (2009). *Property Database and Rating Assessment*. Whangarei District Council, Whangarei.

Wilton, J. (2008). *Agricultural and Horticultural Potential of Sections 8 and 9, Block XVI, Heretaunga Survey District*. Retrieved March 27, 2009 from <http://www.hastingsdc.govt.nz/resourceconsents/bunnings/11-Appendix-J-Soils.pdf>