

# Dunedin & Coast Freshwater Management Unit

## Economic Snapshot

### Summary

The Dunedin & Coast Freshwater Management Unit ('FMU')<sup>1</sup> is located on the east coast of the Otago Region. The FMU generally has a more temperate climate than inland Otago. It contains the largest proportion of urban land use amongst all Otago's FMUs and includes the most populated part of the Dunedin City (but excludes Mosgiel and smaller settlements such as Outram, Middlemarch, Hyde and Hindon, which are part of the Taieri FMU).

This economic snapshot covers an area larger than the Dunedin & Coast FMU. This is because while policies might be designed and applied specifically to the FMU, their impacts may be felt beyond the FMU boundary. Hence the rest of the Dunedin City area (including Mosgiel and surrounding area up to Middlemarch, which are part of the Taieri FMU but are all within one hour driving from Dunedin City centre) are combined with the Dunedin & Coast FMU when presenting socio-economic information. This combined area is referred to as *Dunedin and surrounds* in this report.



Image 1. Spring in the Octagon, Dunedin City centre

Source: DunedinNZ

---

<sup>1</sup> The National Policy Statement for Freshwater Management (NPSFM) requires regional councils to identify Freshwater Management Units in the region. A freshwater management unit (FMU) is defined in the NPSFM as "all or any part of a water body or water bodies and their related catchments, that a regional council determines (under clause 3.8 in the NPSFM) is an appropriate unit for freshwater management purposes.

In 2018, the area encompassing Dunedin and surrounds was home to around 130,000 residents (or nearly 60% of the population of Otago). In the 12 years between 2006 and 2018, there was a 7% (or 8,100 people) increase in population, which is lower than the Otago Region (+16%) and New Zealand (+17%). Most residents (nearly 80%) live in Dunedin City centre area, while the remainder is split fairly evenly between Mosgiel and surrounding area (10%), and smaller towns and rural areas (10%). Nearly two in three Otago residents' livelihoods are directly reliant on the water resources in this FMU, from domestic water consumption and discharge to commercial and industrial water use and discharge.

Compared to the averages for Otago as a whole, a higher share of the population in Dunedin and surrounds holds higher formal qualifications, but a lower share earns higher income (\$70k and above per annum). The large number (approximately 30,000) of tertiary students at University of Otago and Otago Polytechnic is the likely reason for the high proportion of the population that has higher formal qualifications but has lower earnings.

The economy in Dunedin and surrounds is more diverse than other parts of the Otago Region. Residents are likely to be working in Tourism Related industries<sup>2</sup>, Health Care and Social Assistance, Education and Training, Construction, or Public Administration and Safety<sup>3</sup>. Employment in the primary sector is relatively small, providing around 2% of jobs. The large residential population and approximate two million visitors annually (pre-COVID 19)<sup>4</sup> has been putting increasing pressure on water use (water takes and discharges of pollutants or contaminants to water) and its infrastructure.

An understanding of Māori history and Māori economy is essential for policy development and policy impact assessment. Not only does pre-European Māori history help shape modern day New Zealand, but the Māori economy is also integral to the New Zealand economic system. ORC is partnering with Aukaha<sup>5</sup> and Te Ao Marama<sup>6</sup> to develop an overview of Kāi Tahu history and economy. This work will be included in the economic impact assessment.

## Geography and climate

The proposed boundary of the Dunedin & Coast FMU, as shown in the Proposed Regional Policy Statement for Otago 2021, begins south of Karitane and ends at the Clutha/Mata-Au mouth near Balclutha. It encompasses the coastal margins of the north and east of Waitati, Otago Harbour and Otago Peninsula, Dunedin City, the narrow coastal strip from Dunedin to the north of the Clutha/Mata-Au River, and the Tokomairiro River catchment near Milton. Aside from Tokomairiro River, many of the catchments are mostly short rivers or streams, with some having estuaries and/or wetlands.<sup>7</sup>

---

<sup>2</sup> Tourism is represented by a range of industries including (but not limited to) accommodation, cafes and restaurants, and scenic and sightseeing transport.

<sup>3</sup> Except for Tourism Related industries, the rest of the industries described here follow StatsNZ's ANZSIC06 classifications. <https://www.stats.govt.nz/topics/industries>

<sup>4</sup> Pre-COVID-19 level, <https://www.dunedinnz.com/business/business-support/help-for-business-growth/tourism>

<sup>5</sup> Aukaha is 'a Rūnaka based consultancy service with Governance from five Rūnaka owners: Te Rūnanga o Waihao, Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, Hokonui Rūnanga' <https://aukaha.co.nz/about/>

<sup>6</sup> Te Ao Mārama Inc represents Ngai Tahu ki Murihiku tangata whenua for resource management and local government purposes. <https://www.facebook.com/Te-Ao-Marama-INC-1669235646693199/>

<sup>7</sup> The Otago Regional Council has identified and mapped the FMUs for the Otago Region in its Proposed Regional Policy Statement for Otago 2021 (PRPS). The PRPS was notified in June 2021 and is currently going through the plan development

Figure 1 below provides a map of the current Dunedin & Coast FMU with its topography. This is the area where policy specific to the FMU may be applied but the economic snapshot looks beyond this to include parts of the neighbouring Taieri FMU (roughly includes up to Momona and Matararae in the figure below).



Figure 1. Map of the Dunedin & Coast FMU

In total, the Dunedin & Coast FMU has a land area of around 112,000 hectares (or roughly 3% of the Otago Region), making it the smallest of the five FMUs in Otago by land area. The largest FMU is the Clutha/Mata-Au FMU (or 65% of the region), which is divided into five rohe (Upper Lakes, Dunstan, Manuherekia, Roxburgh and Lower Clutha).

Generally-speaking, the Dunedin & Coast FMU has a mild climate with oceanic influences. This part of Otago typically records fewer days with a maximum air temperature above 25°C and a minimum temperature below 0°C than inland Otago<sup>8</sup>. During summer, temperatures usually range from 12 to 19°C but can sometimes reach up to around 30 °C. Winter temperatures typically range from 4 to 11°C with some frosts and occasional snowfall.

---

process. Kāi Tahu ki Otago have made a submission on the PRPS asking for the boundary of the Dunedin & Coast FMU to be extended to include the Waikouaiti River catchment. “The coastal streams in the Dunedin & Coast FMU north of Dunedin, together with the Waikouaiti River, flow into coastal and estuarine waters that are managed under the East Otago Taiāpure. This is a local fishery reserve managed to support a sustainable, healthy, abundant and accessible fishery to meet the community’s customary, recreational and commercial needs.” (Aukaha pers. comm., Dec, 2021) As a result of submissions and hearings process on the PRPS the boundary of the Dunedin & Coast FMU as shown in the PRPS can be amended in accordance with the relief sought by Kāi Tahu.

<sup>8</sup> <https://docs.niwa.co.nz/library/public/NIWAsts67.pdf>

Between 1981 and 2010, annual rainfall averaged around 800mm at various Dunedin locations and many places observed more rainfall in the summer months. For example, Dunedin receives on average 30% of its annual rainfall in the summer months and Middlemarch (approx. one hour driving from Dunedin) receives 36% of their annual rainfall during summer<sup>2</sup>. On average, the Dunedin area has one dry spell every 13 months, compared to one every three months in Alexandra in Central Otago<sup>2</sup>.

## Socio-economic background

### Land use

Within the Dunedin & Coast FMU, there is roughly 16,000 hectares (14% of the FMU's land area) of urban-use land, the largest proportion amongst Otago's five FMUs. Just over three quarters of the land is used for primary production, which consists mostly of plantation forestry (just over a quarter of this land use) and dry stock farming. Dairy farming (including dairy support) takes up less than 10% of the agricultural land use and is mainly concentrated on the south-west (Clutha District) side of the FMU. Other land uses (including conservation land, rivers and lakes, Otago harbour, indigenous cover, and unknown pasture) covers around 10,000 hectares (9%). Table 1 gives estimates of the extent of the main land use activities, while Figure 2 shows the distribution of these land uses within the FMU.

*Table 1. The extent of Land use in the Dunedin & Coast FMU  
Source: Otago Land Use Map (Great South, 2021)*

Land use in the Dunedin & Coast FMU	Total land in this FMU (ha)	Share of land use in this FMU	Share of land use in Otago that is present in this FMU
<b>Total land use</b>	<b>111,662</b>	<b>100%</b>	<b>3%</b>
<b>Primary Production-use</b>	<b>86,080</b>	<b>77%</b>	<b>4%</b>
Plantation Forest	29,455	26%	23%
Sheep and beef	21,019	19%	2%
Sheep	10,490	9%	6%
Dairy (incl. support and Other livestock)	9,070	8%	6%
Mixed Livestock (incl. support)	6,609	6%	2%
Beef	4,507	4%	11%
Other Agriculture use (incl. other animals and grazing pasture)	4,113	4%	4%
Deer (incl. specialised and majority deer and mixed stock)	537	0%	1%
Arable	227	0%	3%
Horticulture (incl. flower and bulb growers and nurseries, orchards, and vineyards)	54	0%	1%
<b>Urban use</b>	<b>15,813</b>	<b>14%</b>	<b>14%</b>
<b>Other (incl. conservation land, rivers, and lakes etc.)</b>	<b>9,769</b>	<b>9%</b>	<b>1%</b>

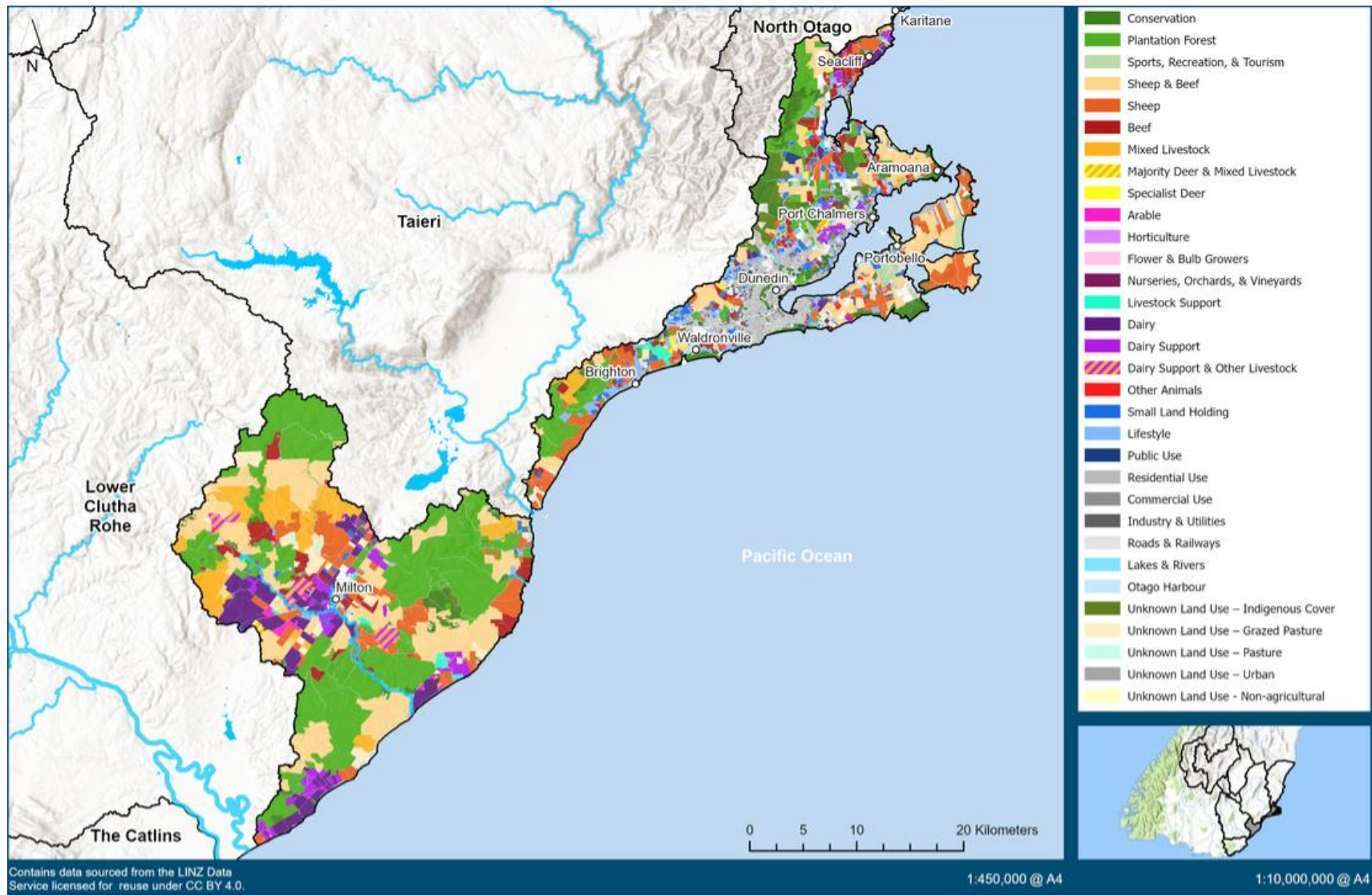


Figure 2. Land uses within the Dunedin & Coast FMU  
 Source: Otago Land Use Map (Great south, 2021)

## The people and the economy<sup>9</sup>

The Dunedin & Coast FMU lies partly in the Dunedin City and partly in the Clutha District. Some Dunedin suburbs and the close-by towns and settlements (e.g., Mosgiel and Middlemarch) are geographically in the Taieri FMU but within one hour driving distance to the Dunedin & Coast FMU. As the economic impacts of policy for the Dunedin & Coast FMU may well be felt beyond the area where they apply, the Dunedin & Coast FMU and the Dunedin City are combined and referred to as *Dunedin and surrounds* for the purposes of this analysis.

As of 2018, there were approximately 130,000 residents in Dunedin and surrounds (or nearly 60% of the region), which was an increase of around 8,100 people (or 7%) from 122,000 residents in 2006. Although this is a slower population growth rate than that of the Otago Region (+16%), and New Zealand (+17%), it is still significant. Most people (close to four in five) live in the Dunedin City central area, while around 10% of the population live in the Mosgiel and surrounding area (including Allanton, Brighton, Outram and Wingatui). The remaining 10% lives in smaller towns and rural areas. Albeit slower population growth, nearly two in three Otago residents' livelihoods are directly reliant on the water resources in this FMU, including domestic water consumption and discharge and commercial and industrial water use and discharge.

Dunedin is the second-largest city in the South Island of New Zealand after Christchurch and has a strong Scottish influence. The name 'Dunedin' is the Scottish Gaelic name for Edinburgh, and was established in the mid-1800s around a Scottish settlement funded by the Lay Association of the Free Church of Scotland<sup>10</sup>. A mass emigration of Scottish and Chinese people from the mid-1800s to the early 1900s resulted in Dunedin developing into one of New Zealand's major centres.

Mosgiel is an urban satellite town of Dunedin and is about 15 minutes travel time via the Dunedin Southern Motorway. Sometimes referred to as "The pearl of the (Taieri) plain", Mosgiel is a low-lying flat area separated from the Dunedin City by Three Mile Hill and Scroggs Hill to the south-east and Saddle Hill to the south. These hills help create an in-land microclimate, which makes the climate in Mosgiel more stable than the coastal areas of Dunedin.

---

<sup>9</sup> Most data in this section are based on the 2018 NZ Census.

<sup>10</sup> <https://en.wikipedia.org/wiki/Dunedin>



Image 2. The end of Dunedin Southern Motorway at Mosgiel  
 Source: DunedinNZ

Figure 3 below shows that the population and growth rate in Dunedin and surrounds varied over the period 2006 to 2018. Most people (close to four in five) live in the Dunedin City central area. However, the population growth in the central area was low (5%). The lack of residential land for housing has been one of the contributing factors of the slower growth in this area.

The Mosgiel area (incl. Allanton, Brighton, Outram and Wingatui) is connected to the Dunedin City central area within 30 minutes of driving. This area accommodates over 10% of the FMU’s population and has also experienced around 14% of population growth between 2006 and 2018. New subdivisions have been established in this area and the locals have observed more of the ‘hustle and bustle’ of the ‘big smoke’ in recent years.

Just over 10% of the population live in other parts of Dunedin and surrounds. Notably Otago Peninsula (around 30 minutes of driving to the centre of Dunedin) and semi-rural area<sup>11</sup>, home to 7% of the population, have experienced the highest growth (20%). In contrast, the more distant towns<sup>12</sup> (3% of the area’s population, around 1 hour of driving to Dunedin City central area) and rural area<sup>13</sup> (1% of the area’s population) grew slower at 7% and 4% respectively between 2006 and 2018.

<sup>11</sup> Surrounding areas of Dunedin City suburbs and main towns; the SA1 included in this category is normally smaller than 50km<sup>2</sup>.

<sup>12</sup> Karitane, Waikouaiti, Waiholo, Milton, and Middlemarch.

<sup>13</sup> Generally, more than 1 hour driving away from Dunedin City central area; the SA1 included in this category is normally bigger than 200km<sup>2</sup>.

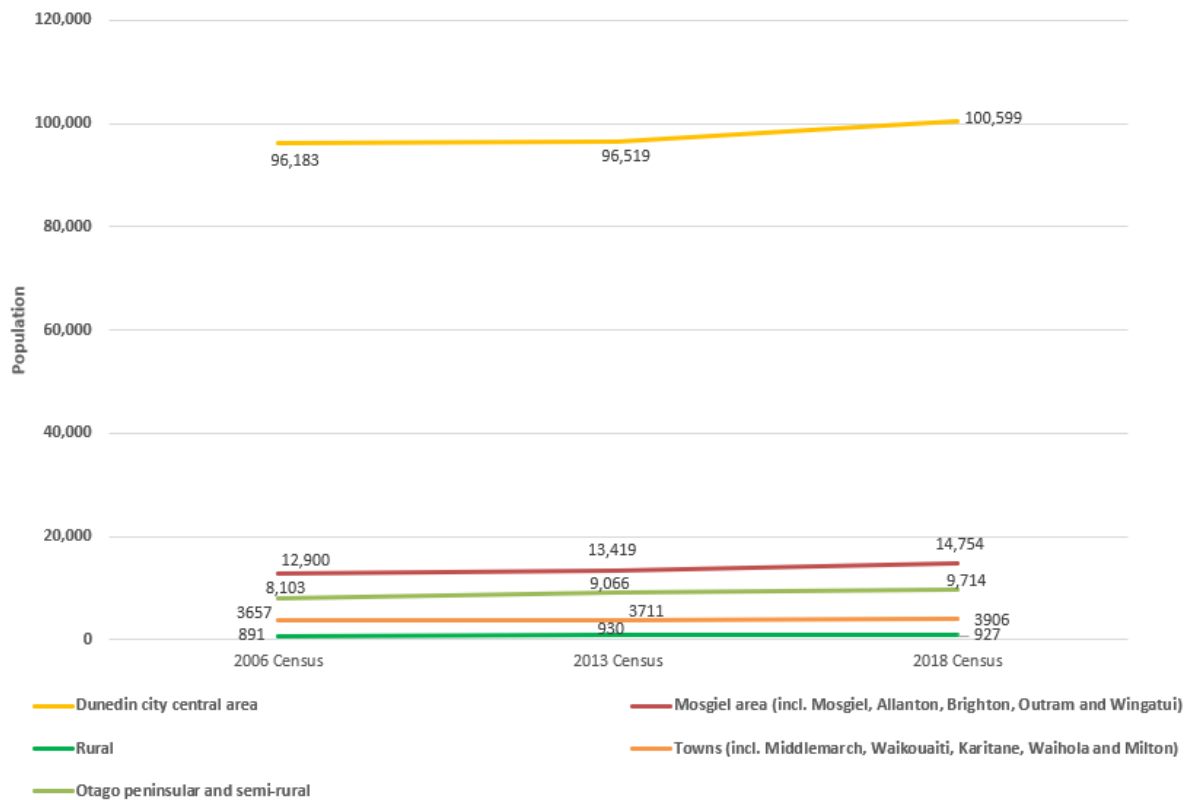


Figure 3. Dunedin and surrounds population by selected group, 2006 – 2018  
 Source: Stats NZ Census 2018

Figure 4 below shows the population in the towns and rural area by selected age categories. Overall, Dunedin City central area’s residents tend to be younger. Just under a half of people living in the Dunedin City central area were under 30 years of age, compared to less than one-third of people living elsewhere. On the other hand, around 25% residents in the Mosgiel area and in the more distant towns were aged 65+, compared to 14% in Dunedin City central area, 16% in Otago Peninsula and semi-rural area, and 12% in rural area. The large number of tertiary students is likely to be one of the contributing factors of younger population in the Dunedin City central area.



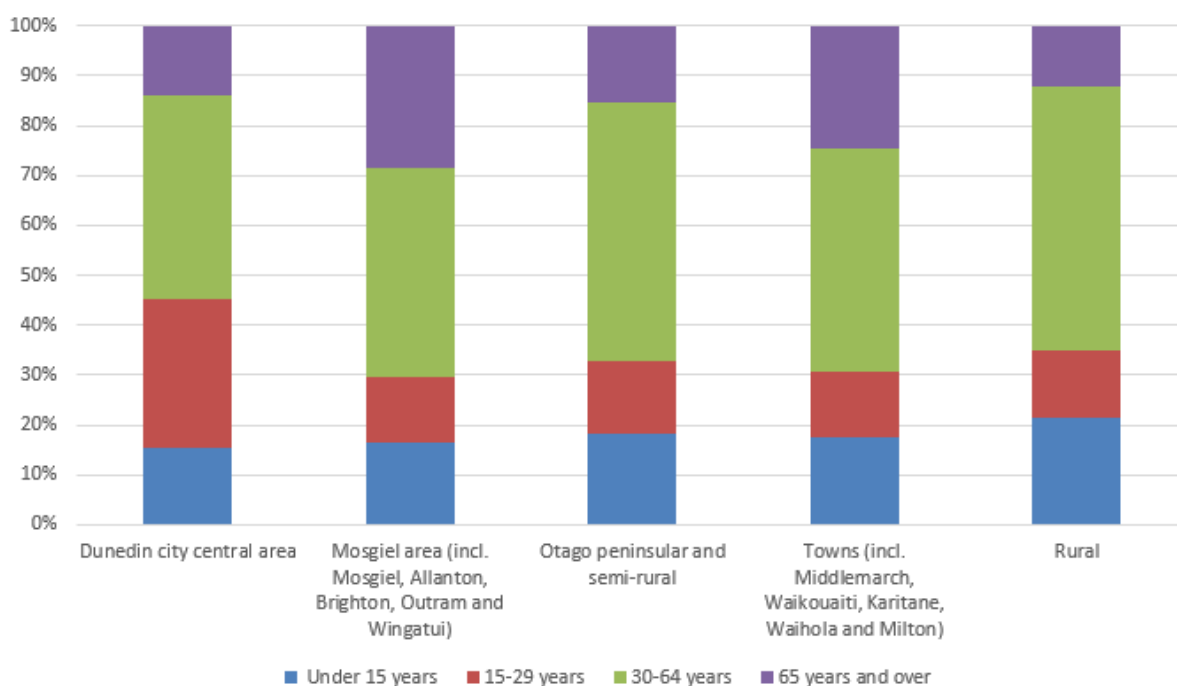


Figure 4. Dunedin and surrounds Population distribution by age group, 2018

Source: Stats NZ Census 2018

Since nearly two in three Otago residents live in the Dunedin and surrounds, the demographic statistics of this area are mostly representative of the Otago Region.

As of 2018, 10% of the population in the Dunedin and surrounds identified themselves as Māori. This proportion is gradually increasing over time (it was 7% in 2006 and 8% in 2013) and this trend is reflected in Otago as a whole. Similarly, 66% of the population in Dunedin and surrounds lived in the same residence as one year ago and roughly 2.5% of the population were from overseas, which is on par with the region.

The total business activities in Dunedin and surrounds accounted for around 62,000 ‘jobs’ (measured by employment counts, which does not include working proprietors<sup>14</sup>). In New Zealand, approximately 20% of all jobs are working proprietors<sup>15</sup>. In 2020, the largest industries by employment (using ANZSIC 2006<sup>16</sup>) in the Dunedin and surrounds were Tourism Related industries<sup>17</sup> (Retail trade (11%), Accommodation and Food Services (8%), Arts and Recreation Services (2%)). In addition, Health Care and Social Assistance (16%), Education and Training (14%), Construction (8%) and Public Administration and Safety (6%) were also large employers in the area. Together, these industries

<sup>14</sup> Employee Counts data are used by Stats NZ’s Business Frame. Employment Counts is a head count of salary and wage earners for a reference period. It includes most employees but does not capture all working proprietors –people who pay themselves a salary or wage (or ‘drawings’).

<sup>15</sup> 2019 numbers according to Stats NZ Linked employer-employee data <http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7240#>.

<sup>16</sup> Australian and New Zealand Standard Industrial Classification (ANZSIC) was jointly developed by Statistics New Zealand and the Australian Bureau of Statistics. ANZSIC system classifies entities based on their main business activity and is used to collect and analyse data across industries. The 2006 edition is arranged into 19 broad industry divisions and 96 industry subdivisions.

<sup>17</sup> Tourism is represented by a range of industries including (but not limited to) accommodation, cafes and restaurants, and scenic and sightseeing transport.

provide two in three jobs in the area. The Agriculture, Forestry and Fishing industry accounted for 2% (approx. 1,200 jobs) of jobs in Dunedin and surrounds. Approximately two million annual visitors (pre COVID-19) and the large residential population and have been putting increasing pressure on water use (water takes and discharges of pollutants or contaminants) and its infrastructure.

Some of the jobs listed above are amongst the higher paying occupations while others are amongst the lower paying occupations. For example, in 2019, the average median earnings for jobs in Public Administration and Safety and Construction were around \$64,000 and \$53,000 respectively, which were higher than the \$48,000 average median earnings across all industries. The average median earnings for jobs in the Health Care and Social Assistance and Education and Training sectors were both around \$49,000, which is on par with the average median earnings across all industries. By contrast, the average median earnings of the Tourism Related industries and Administrative and Support Services sector are amongst the lowest paid jobs. In 2019, the average median earnings of jobs in the Tourism Related industries were \$29,000 and \$27,500 per annum respectively<sup>18</sup>.



*Image 3. St Clair Beach summer*  
*Source: DunedinNZ*

When considering different incomes sources in Dunedin and surrounds, the proportion (74%) of the working age population (15 – 65 years) that earned a work-related income was smaller than the Otago average (79%); while the proportion of the population (19%) that received some type of government benefit<sup>19</sup> was larger than the Otago average (15%). The proportion of residents that received

---

<sup>18</sup> <http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7108#>

<sup>19</sup> The type of benefits includes ACC or private work accident insurer, job seeker, sole parent support, supported living payment, other govt benefits, govt income support payments, war pensions or paid parental leave, other sources of income including support payments from people who do not live in my household.

superannuation or veteran’s pension (21%) and no source of income (5%) was similar to the Otago average. A higher proportion of the population received student allowance (6%) than the Otago average (4%). Otago University, the main campus located in the Dunedin & Coast FMU, housed around 21,000 students in 2018.

Figure 5 below shows that, compared to the Otago average, Dunedin and surrounds have lower proportion of the population without a formal qualification. In addition, fewer people in Dunedin and surrounds are in a higher personal income bracket (\$70,001 or more per annum) compared to the Otago average.

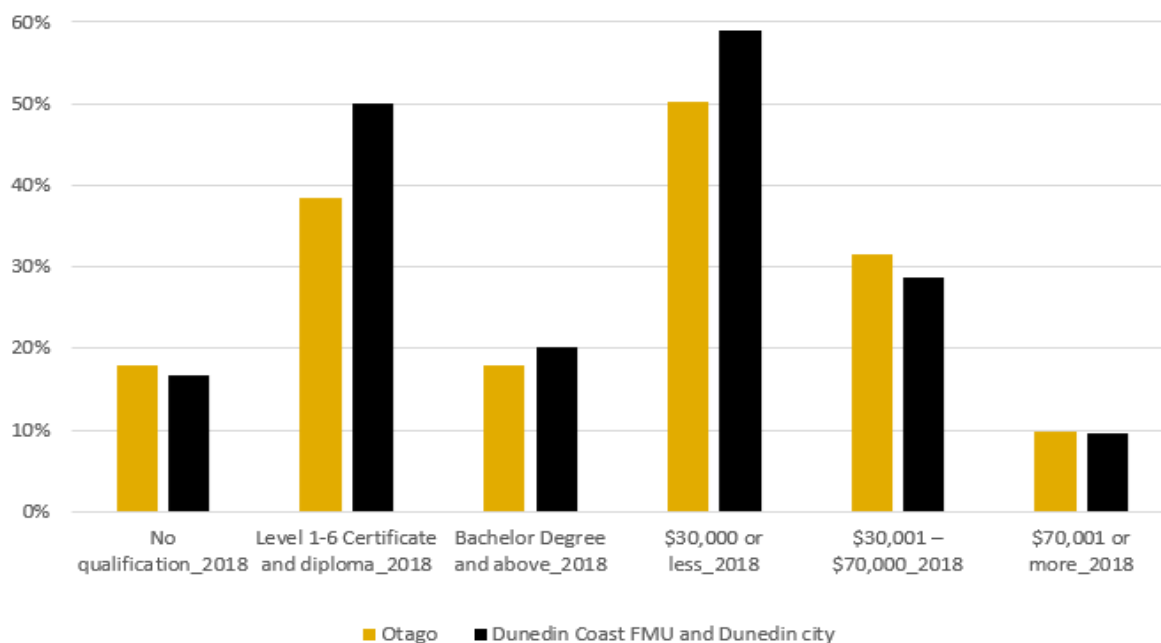


Figure 5. Academic qualification and personal annual income, Dunedin and surrounds vs Otago average, 2018  
 Source: Stats NZ Census 2018

University of Otago’s New Zealand Deprivation Index estimates the relative socio-economic deprivation of an area. The current version of the index is derived from 2018 census and combines census data relating to income, home ownership, employment, qualifications, family structure, housing, access to transport and communications, and access to internet<sup>20</sup>. In the Deprivation Index, decile 1 represents areas with the least deprivation while decile 10 represents areas with the most deprivation when measured using these factors.

Figure 6 shows the relative deprivation in 2018 by Census Statistic Area 1 (SA1, which ideally ranges between 100 and 200 residents and a maximum of about 500)<sup>21</sup> in Dunedin and surrounds. The map only shows Census SA1 for agriculture and urban land developed land; conservation land and plantation forestry are shaded green because they are generally unpopulated.

<sup>20</sup> <https://www.otago.ac.nz/wellington/departments/publichealth/otago830998.html>

<sup>21</sup> SA1s were introduced as part of the Statistical Standard for Geographic Areas 2018 (SSGA18); <https://www.stats.govt.nz/assets/Uploads/Retirement-of-archive-website-project-files/Methods/Statistical-standard-for-geographic-areas-2018/statistical-standard-for-geographic-areas-2018.pdf>

Figure 6 along with Figure 6.1 – 6.6 show that, in general, rural and semi-rural areas tend to have lower deprivation scores of below 5, while the Dunedin City central area and its suburbs, the Mosgiel central area, and smaller towns typically have a deprivation score of 5 and above.

For Dunedin City central area (Fig. 6.1), the following trend generally applies: the closer an area to the Octagon (i.e., the central city) the higher the deprivation score. Similarly, the data for Mosgiel area (including Allanton, Brighton, Outram and Wingatui, Fig.6.2) shows that neighbourhoods closer to the centre of Mosgiel generally have higher deprivation scores. Most areas on the Otago Peninsula (Fig. 6.3) have deprivation scores under 5 with pockets of areas scoring above 7. The towns, including Middlemarch, Waikouaiti, Karitane, Waihola and Milton (Fig. 6.4-6.6) generally received high deprivation scores, of 7 and above, except for Karitane, which scored 2.

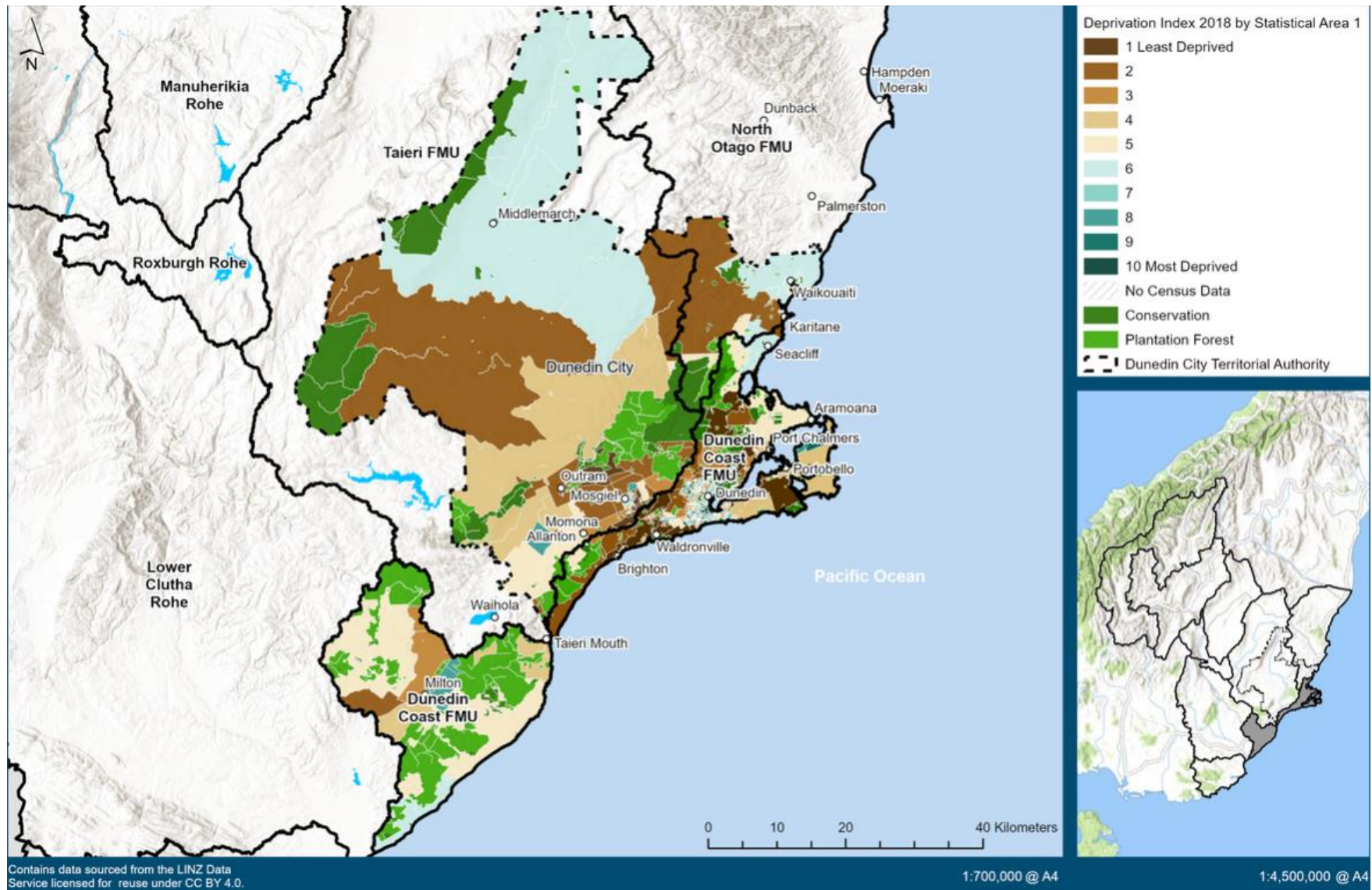


Figure 6. Deprivation Index (by SA1) for the Dunedin and surrounds

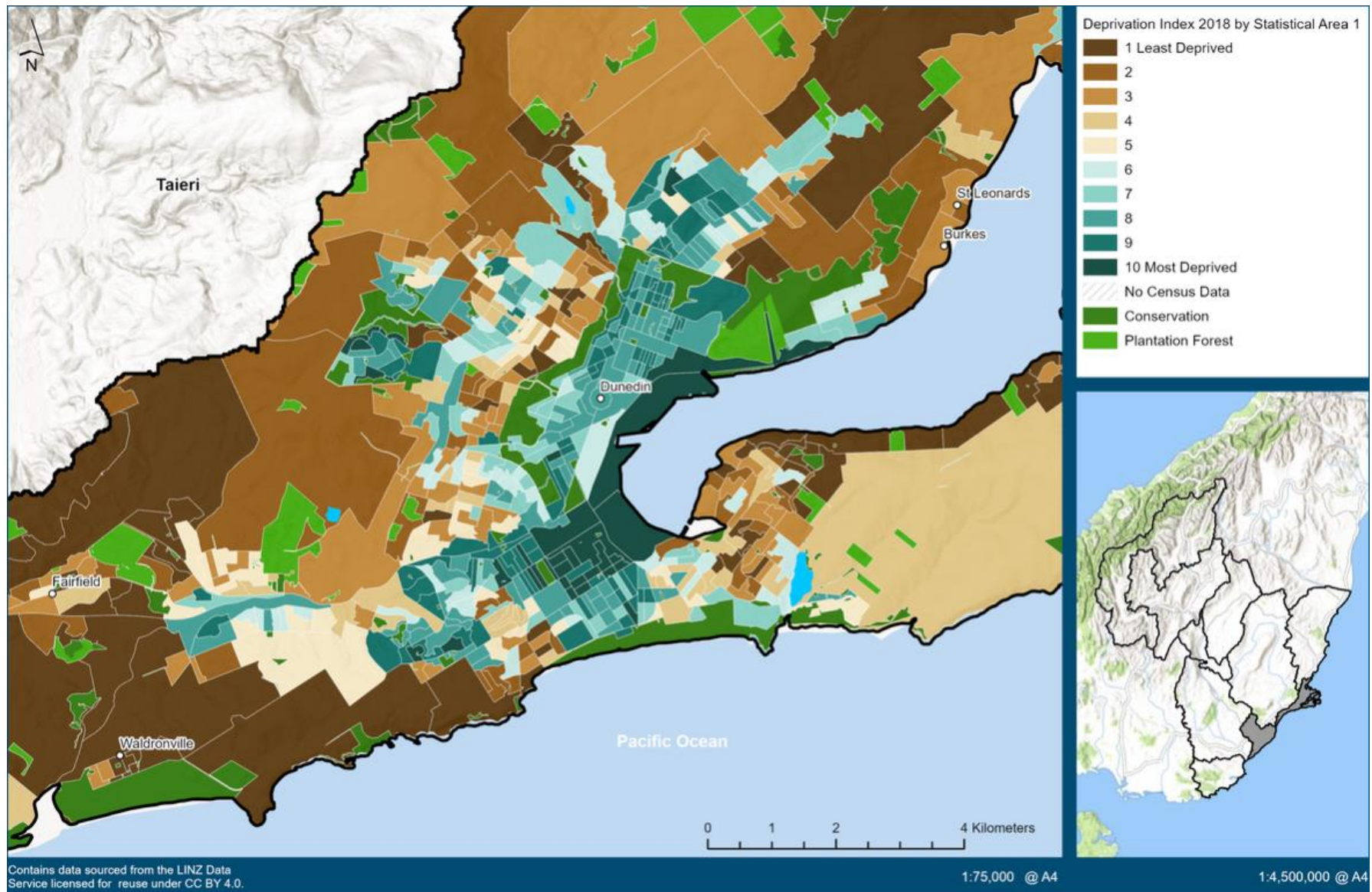


Figure 6.1. Deprivation Index (by SA1), Dunedin City central area

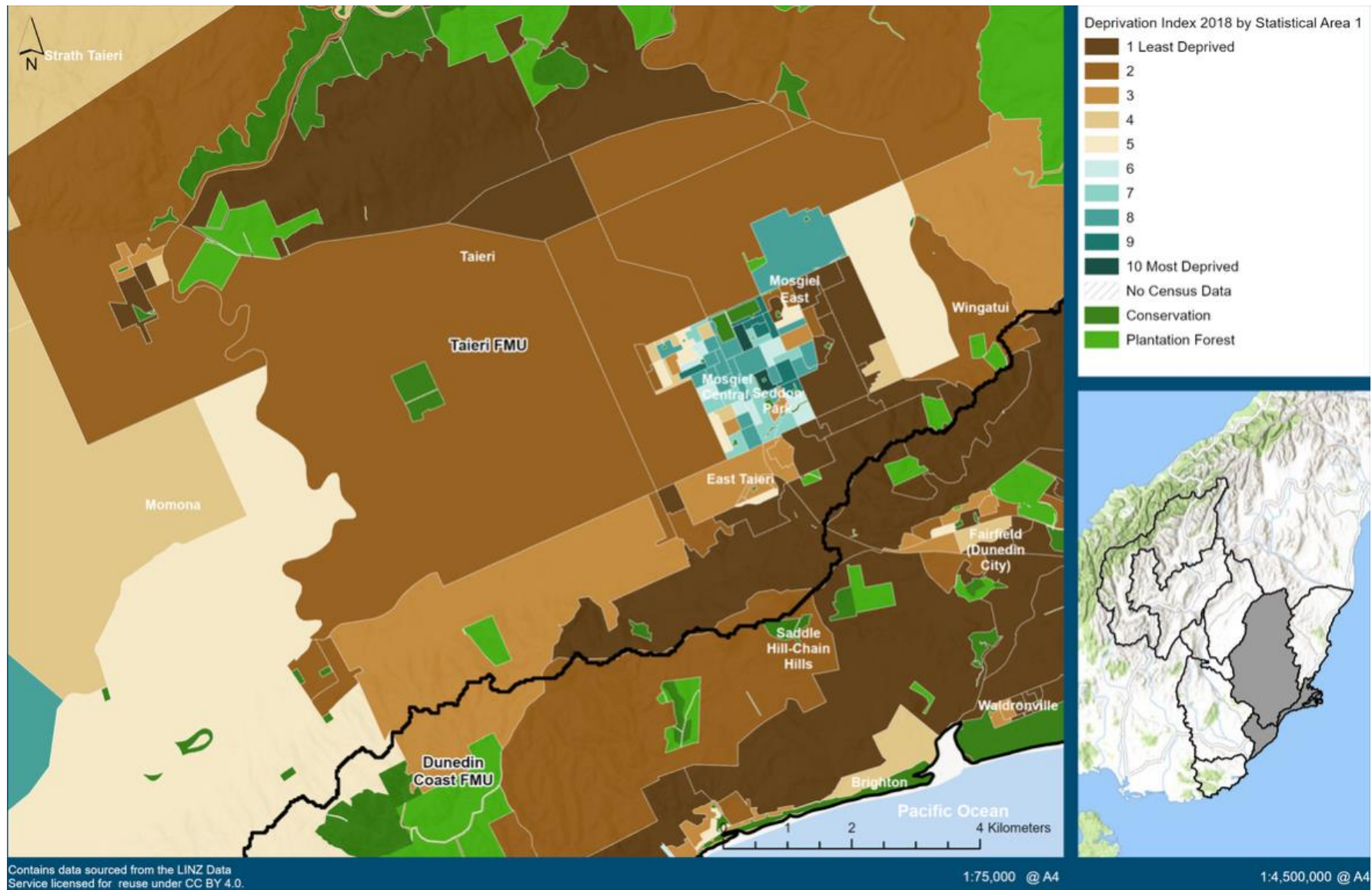


Figure 6.2. Deprivation Index (by SA1), Mosgiel Surrounding area (incl. Allanton, Brighton, Outram and Wingatui)

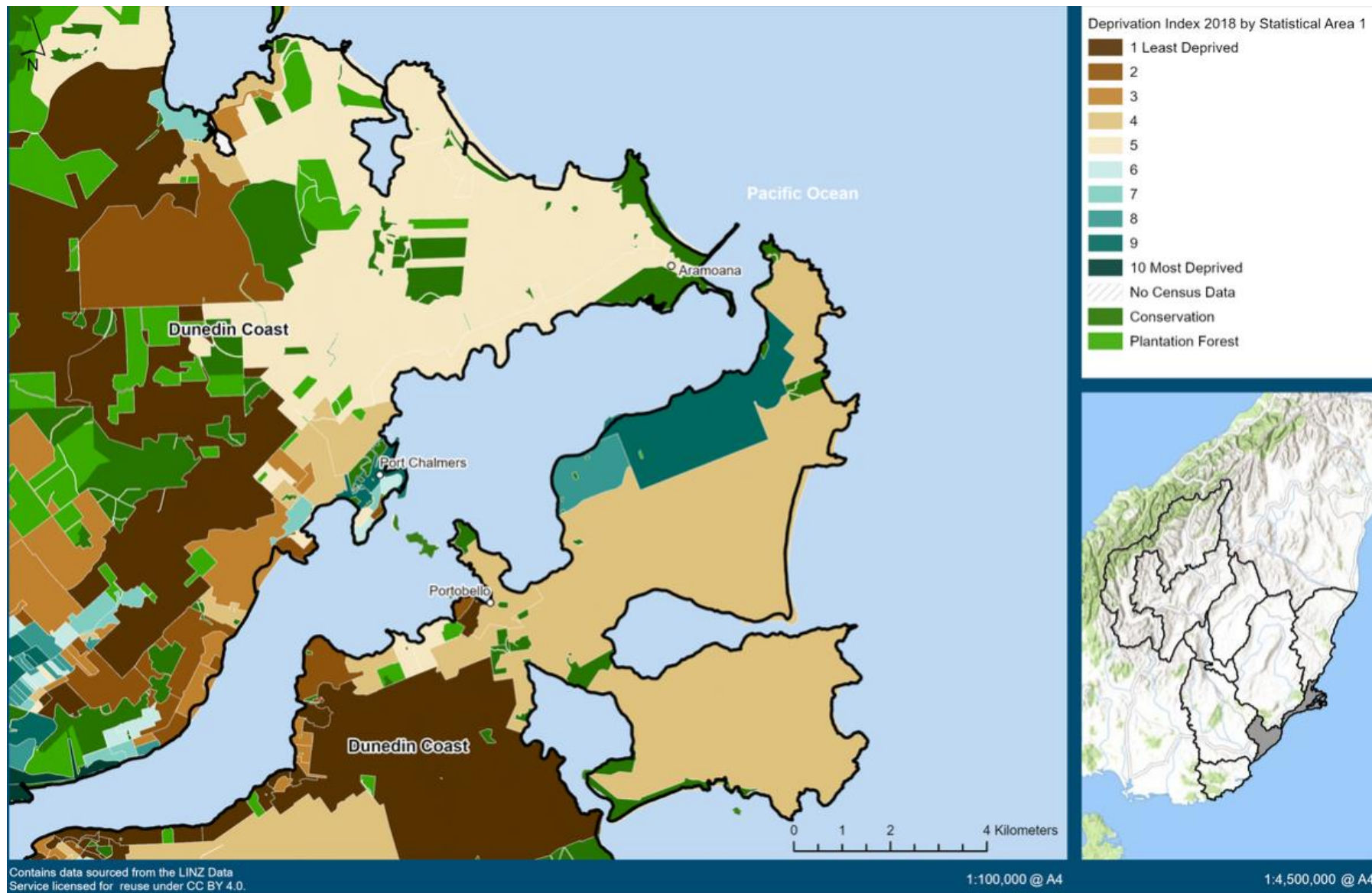


Figure 6.3. Deprivation Index (by SA1), Otago Peninsular (incl. Aramoana, Port Chalmers and Portobello)



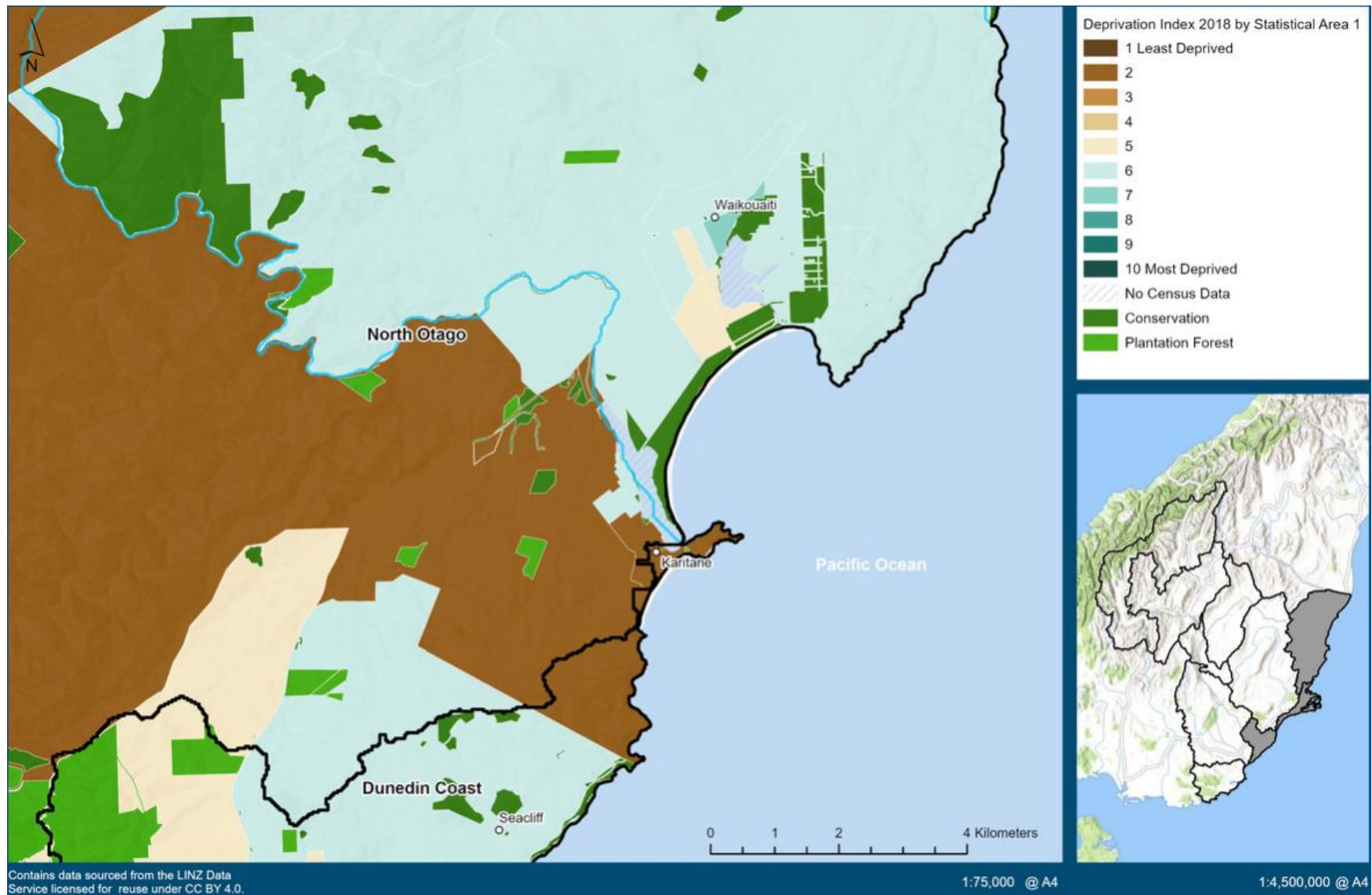


Figure 6.4. Deprivation Index (by SA1), Smaller Towns, Karitane and Waikouaiti

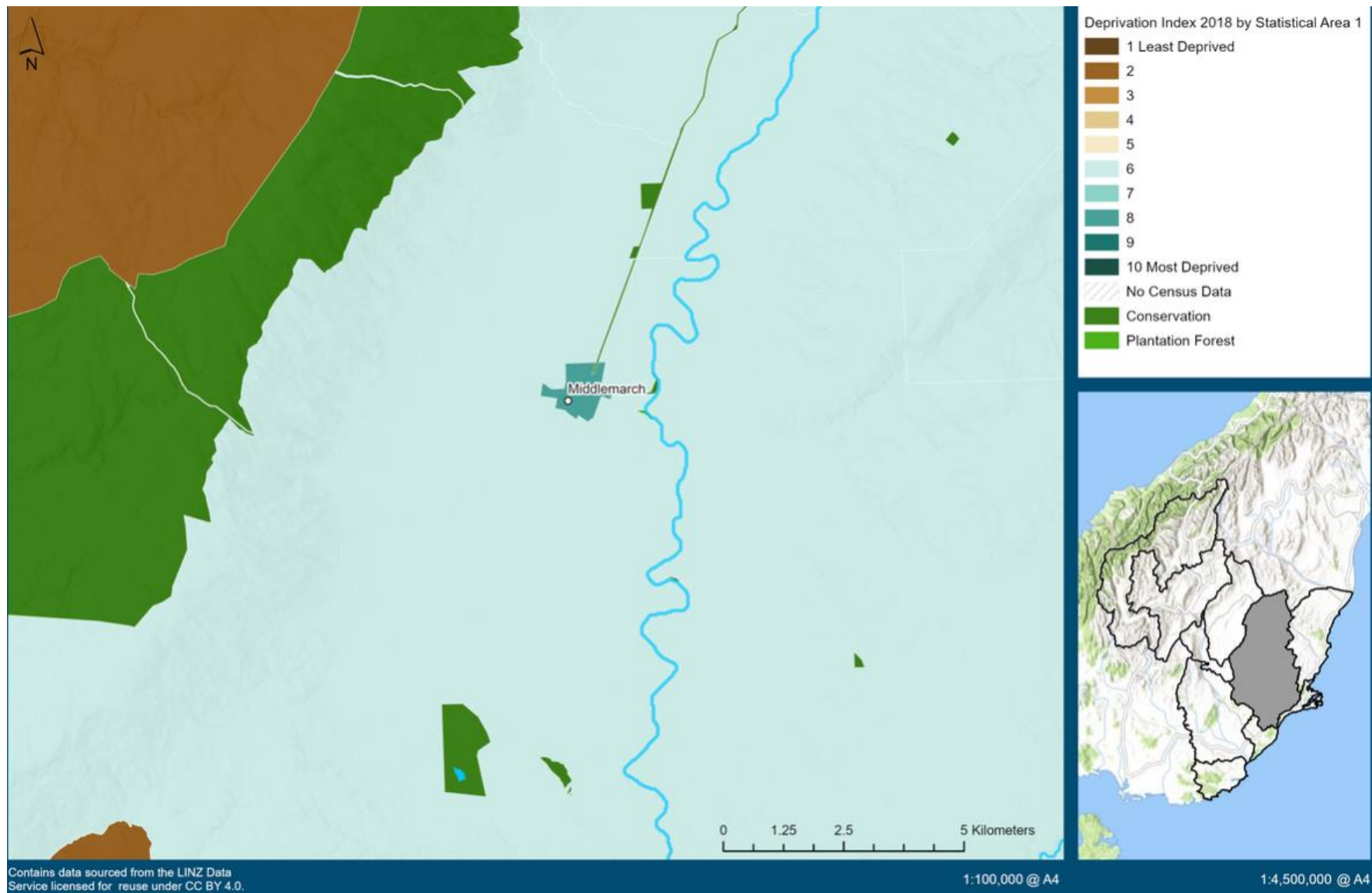


Figure 6.5. Deprivation Index (by SA1), Smaller Towns, Middlemarch

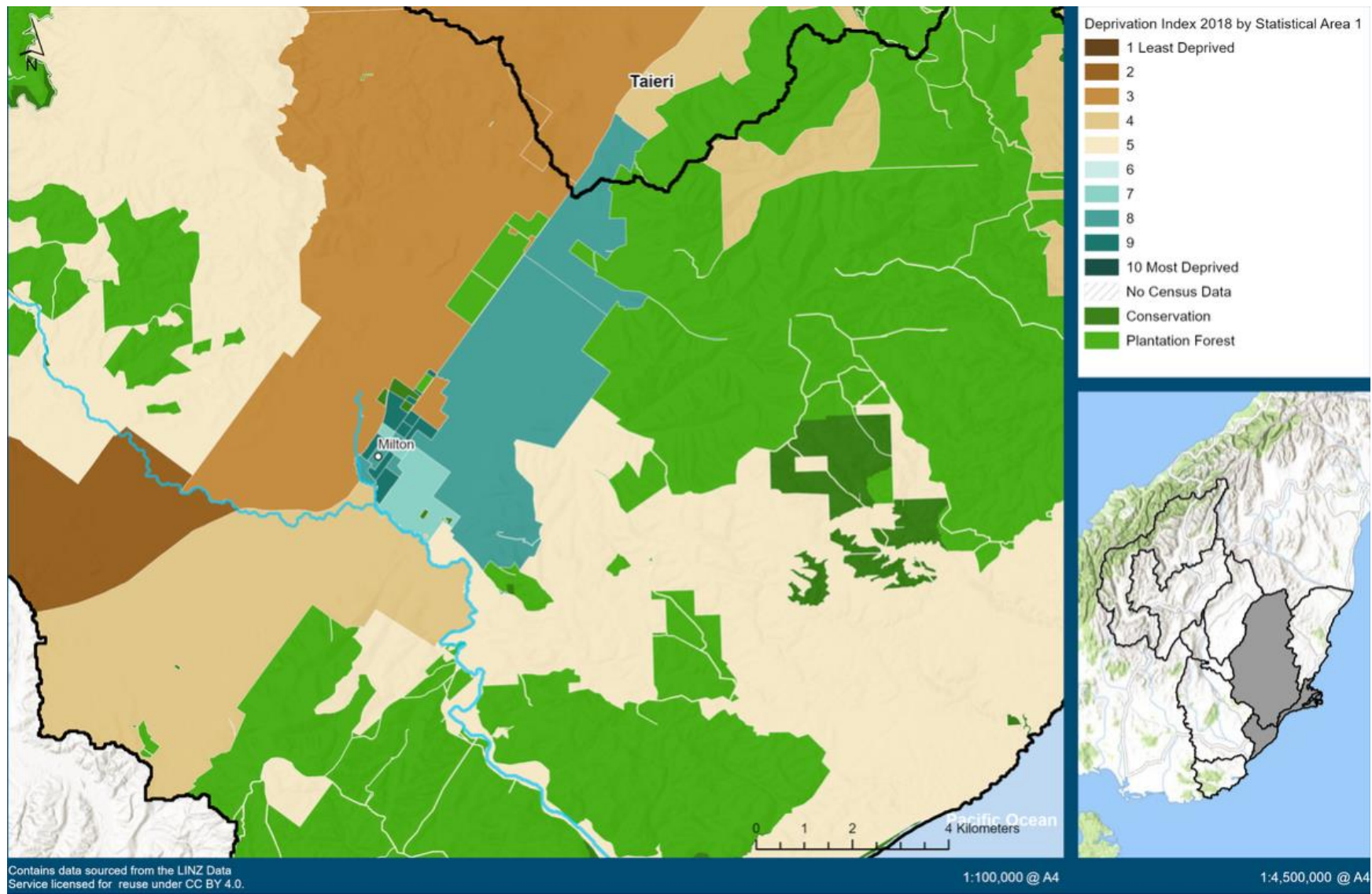


Figure 6.6. Deprivation Index (by SA1), Smaller Towns, Milton