

# Dunstan Rohe and Upper Lakes Rohe Economic Snapshot



*Lake Dunstan – artificial lake created by Clyde Dam*

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## Summary

The Dunstan Rohe (area) is one of the five Rohe within the Clutha/Mata-Au Freshwater Management Unit (FMU)<sup>1</sup>. It runs from the outlets of Lakes Wanaka, Wakatipu and Hawea down to the Clyde Dam and includes the catchments of the Kawarau, Nevis, Shotover, Upper Clutha, Hawea, Cardrona, Arrow, and Lindis Rivers. The Rohe also includes Lake Dunstan, a hydro lake created by the Clyde Dam, as well as the catchments of many smaller Clutha tributaries, such as the Lowburn, Amisfeild Burn, Bannock Burn and Luggate Creek.

Due to its inland location, the Dunstan Rohe has four distinct seasons with a continental-style climate. This part of Otago typically records more days with a maximum air temperature above 25°C and a minimum temperature below 0°C than Coastal Otago. Queenstown receives around 750 mm rainfall per annum while Wānaka receives around 600 mm rainfall per annum. On average, Queenstown has one dry spell<sup>2</sup> every six months, compared to one every three months in Alexandra (further east) or one every 13 months in Dunedin (Coastal Otago).

While policies might be designed and applied specifically to the Dunstan Rohe, the impact of policies are not limited to the Rohe boundary and may be felt beyond the area where they apply. Hence the Dunstan Rohe and the neighbouring Upper Lakes Rohe are combined when presenting socio-economic information. This is because the communities in these two geographical areas have closer economic ties, that is, residents are more likely to live in one area while work or spend in the other.

The local communities and the economy in the Dunstan and Upper Lakes Rohe are especially reliant on water resources. The most populated towns in these Rohe are built around the lakes. Tourism, an important industry sector in both Rohe, relies on freshwater in some way or form (including snow, which is essential for the ski resorts operating in the Rohe). Agricultural activities in the Dunstan Rohe, mainly drystock (incl. little dairy) and horticulture/viticulture operations, are dependent on freshwater supplies.

In 2018, the Dunstan and Upper Lakes Rohe were home to around 47,400 residents (21% of Otago's population). In the previous 12 years, the population in these Rohe increased by 19,300 people (or 69%) from 28,000 residents in 2006. This rapid population growth is putting increasing pressure on water use (water takes and discharges of pollutants or contaminants) and its infrastructure. Overall, these Rohe have relatively low social deprivation<sup>3</sup>, when considering factors such as income, home ownership, employment, access to transport and communications, and access to internet.

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<sup>1</sup> The National Policy Statement for Freshwater Management 2020 (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.

<sup>2</sup> Periods of fifteen days or longer with less than 1 mm of rain on any day are referred to as 'dry spells'

<sup>3</sup> The scores are calculated based on 2018 Census information.

Compared to other parts of Otago, more people in these Rohe have higher formal qualifications (Bachelors' degree and above) and earn higher personal income (above \$70,000per annum).

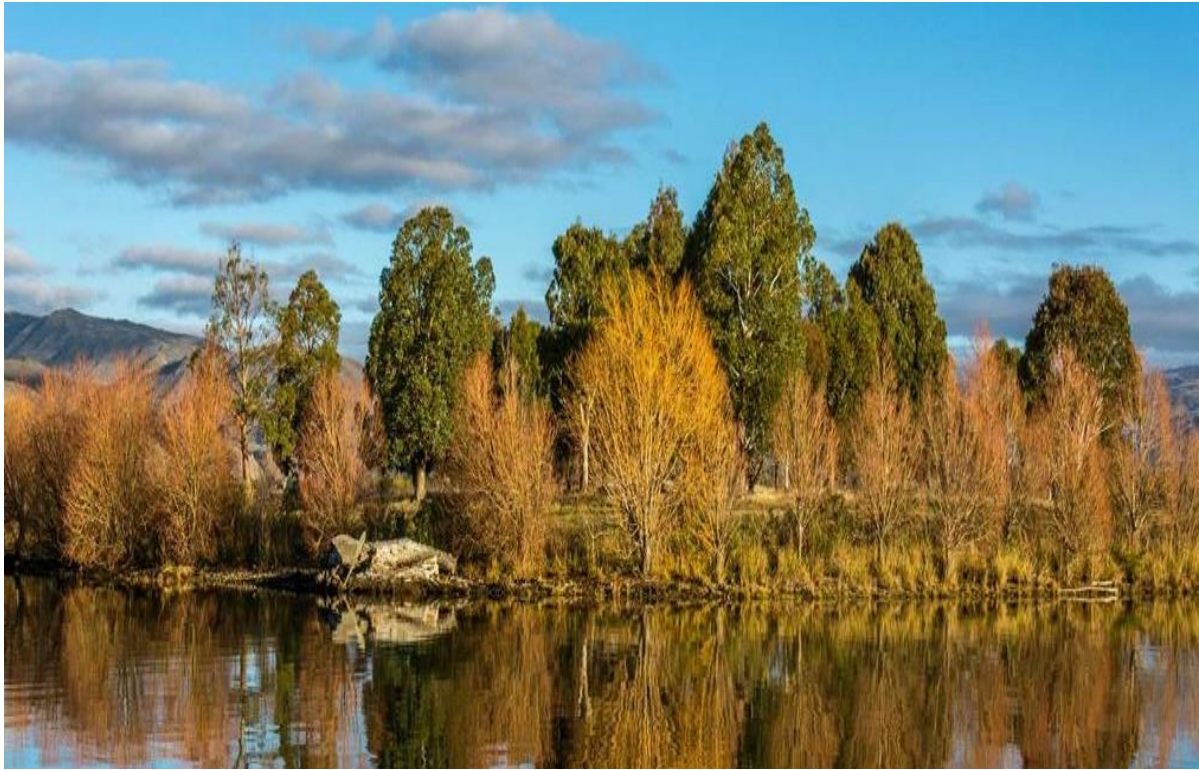


Image 1. Dunstan Lake area

Source: Department of Conservation

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>4</sup> and Te Ao Marama<sup>5</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 Dunstan Rohe is one of the five Rohe within the Clutha/Mata-Au Freshwater Management Unit (FMU). The Rohe's boundary starts from the outlets of Lakes Wanaka, Wakatipu and Hawea down to Clyde dam and includes the catchments of the Kawarau, Nevis, Shotover, Upper Clutha, Hawea, Cardrona, Arrow, and Lindis Rivers. The catchments of many smaller tributaries of the Clutha/Mata-Au, such as the Lowburn, Amisfeild Burn, Bannock Burn and Luggate Creek, are also included in this Rohe.

Figure 1 below shows the Dunstan Rohe with its major waterbodies and topography.

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<sup>4</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>5</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/>



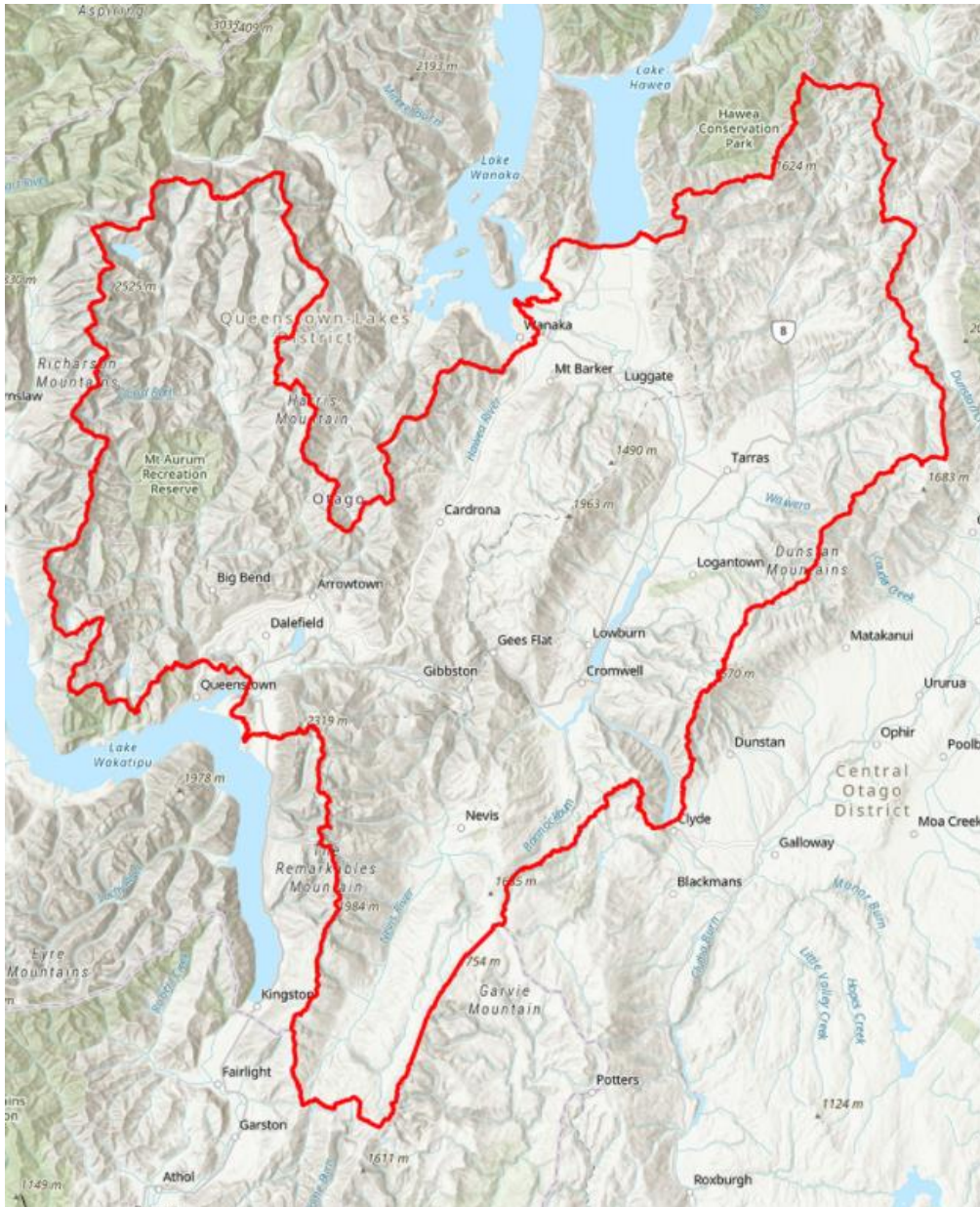


Figure 1. Map of the Lower Clutha Rohe

In total, the Dunstan Rohe has a land area of around 510,000 hectares (or roughly 16% of the Otago Region). It is the second largest Rohe in the Clutha/Mata-Au FMU by land area, after the Upper Lakes Rohe. It is also larger than the North Otago, Dunedin & Coast, and Catlins FMUs, but smaller than the Taieri FMU.

Due to its inland location, the Dunstan Rohe has four distinct seasons with a continental-style climate. During the summer the days are long and hot and during the winter the days are cool and short. This part of Otago typically records more days with a maximum air temperature above 25°C and a minimum temperature below 0°C than Coastal Otago.

The annual rainfall for the Dunstan Rohe tends to be more evenly distributed throughout the year than in other parts of the Otago region. Queenstown receives around 750 mm rainfall per annum

while Wānaka receives around 600 mm rainfall per annum<sup>6</sup>. On average, Queenstown has one dry spell every six months, compared to one every three months in Alexandra (further east) or one every 13 months in Dunedin (Coastal Otago)<sup>7</sup>.

## Socio-economic background

### Land use

The Dunstan Rohe has roughly 320,000 hectares (or nearly 63% of the Rohe's land area) of primary production land use, the second lowest proportion amongst the five Rohe in the Clutha/Mata-Au FMU, after the Upper Lakes Rohe. The proportion of primary production land use in this Rohe is also lower than that in the North Otago, Taieri, and Dunedin & Coast FMUs, but higher than that in the Catlins FMU. The agricultural land consists mostly of drystock properties. The land use map suggests that there is little dairy farming in the Dunstan Rohe. Nearly half (or 46%) of Otago's horticulture land use is in the Dunstan Rohe. There are roughly 160,000 hectares (more nearly one third of the Rohe's land area) of public conservation land. The urban areas cover around 27,000 hectares (5% of the Rohe). It is important to note that the extent of a land use does not reflect the value created from or the number of jobs provided by this land use. Table 1 gives estimates of the extent of the main land use activities. Figure 2 below shows the distribution of these land uses within the Rohe.

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<sup>6</sup> <https://www.queenstownnz.co.nz/plan/seasons-and-weather/>

<sup>7</sup> <https://docs.niwa.co.nz/library/public/NIWAsts67.pdf>



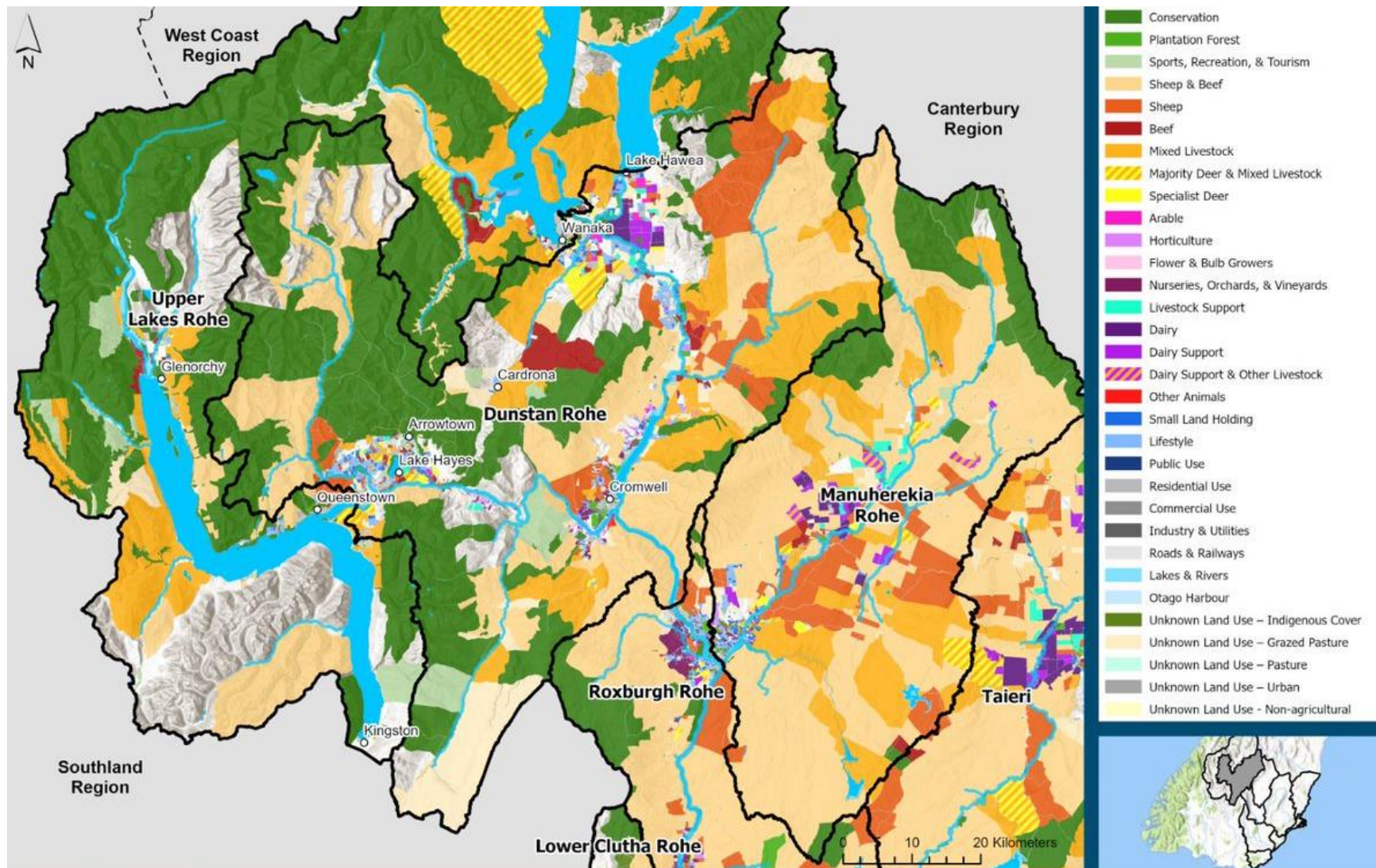


Figure 2. Land uses within the Dunstan Rohe  
 Source: Otago Land Use Map (Great south, 2021)

## The people and the economy<sup>8</sup>

The Dunstan Rohe lies partly in the Queenstown Lake District and partly in the Central Otago District. Some towns (e.g., Queenstown, Wānaka and Cardrona) are located on the border of the Dunstan Rohe and its neighbouring Upper Lakes Rohe. Other towns (e.g., Arrowtown and Cromwell) are geographically in the Dunstan Rohe but are within 30 minutes driving distance to the Upper Lakes.

Water resources are essential to local communities and the economy of the Dunstan and Upper Lakes Rohe. These Rohe contain four large lakes: Lake Wakatipu, Lake Wānaka, Lake Hāwea and Lake Dunstan. The four most populous towns in these Rohe are located on the foreshores of these four lakes: Queenstown by Lake Wakatipu, Wānaka by Lake Wānaka, Crownwell by Lake Dunstan and Lake Hāwea by Lake Hāwea. Also located in these Rohe are smaller towns of Cardrona, Glenorchy, and Kingston, and surrounding rural areas of outer Wakatipu, outer Wānaka, Lindis-Nevis Valleys and Upper Clutha Valley.

As of 2018, there were approximately 47,400 residents in these Rohe (or 21% of the region), which was an increase of 19,300 people (or 69%) from 28,000 residents in 2006. This rapid population growth rate exceeded that of the Otago region (+16%), and New Zealand as a whole (+17%). It is putting increasing pressure on water use (water takes and discharges of pollutants or contaminants).



*Image 2. Lake Dunstan – artificial lake created by Clyde Dam*

Both Queenstown and Wānaka are popular for their scenery and access to all-year round tourism activities. In the warmer months, tramping, mountain biking, fishing, jet boating, and wine-tasting are popular in the area; while during winter, the ski resorts in the areas (e.g., the Remarkable and Cardrona) attract both domestic and international visitors.

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<sup>8</sup> Most data in this section are based on the 2018 NZ Census.



Cromwell, in the mid-1800s to the early-1900s, was a gold mining and pioneering town. Today, it is also known for its scenery and horticulture/viticulture industries. The export of fruit and wine produced in the Cromwell area contributes to the national and local economy, while pick your own (PYO) fruit in the local orchards and fruit stalls is popular with visitors. Arrowtown (2018 population 2,823) also has its roots in gold mining while currently attracting large number of tourists for its scenery, historical buildings and mining sites.

Figure 3 below shows, that these Rohe experienced rapid population between 2006 and 2008, with its largest population growth occurring between 2013 and 2018. The populations of larger towns grew nearly 70% (or around 16,000 people) over that period, while over 80% population growth took place in the smaller towns (approximately 1,200 people) and rural areas (2,200 people).

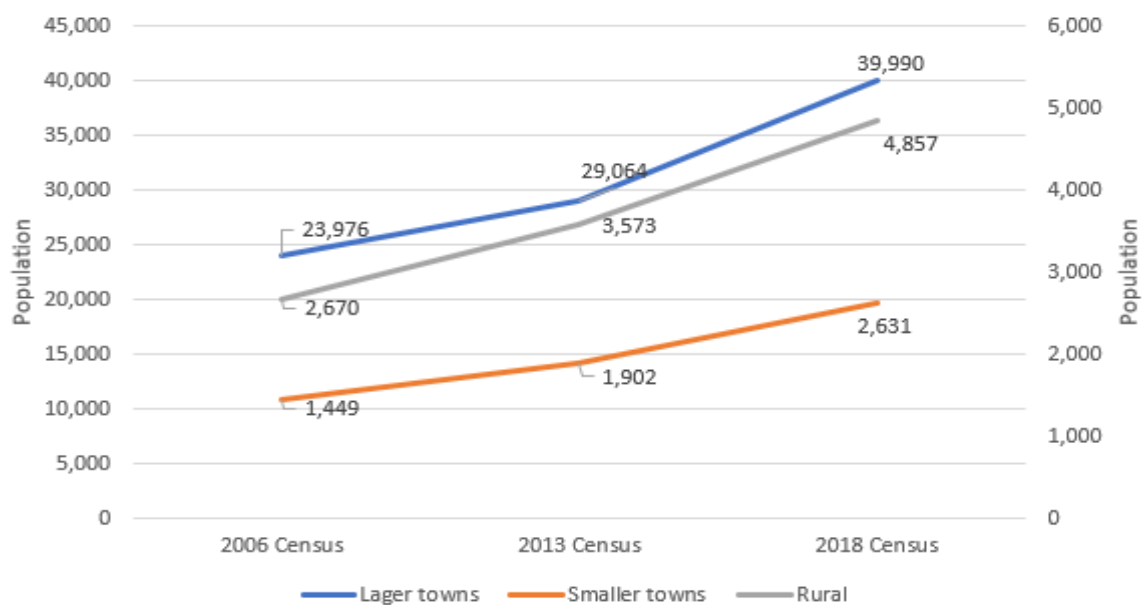


Figure 3. Dunstan Rohe and Upper Lakes Rohe population by selected group, 2006 – 2018  
Source: Stats NZ Census 2018

Figure 4 below shows that, amongst the larger towns, Wānaka experienced the largest proportion of population growth (90%, or around 4,500 people), while Queenstown population grew the most in numbers (nearly 9,000 people or 70%). Among smaller towns, Lake Hāwea experienced the most population growth by both percentage (more than double) and in numbers (around 650 people), while Arrowtown population grew the slowest proportionally (nearly 30% or 600 people). Among the rural areas, the population in the Lindis and Nevis Valleys more than doubled from 1,150 to 2,400 people, while the Outer Wānaka area population growth stabilised sitting at 290 people since 2013 after a 15% growth (from 250 to 290 people) between 2006 and 2013.



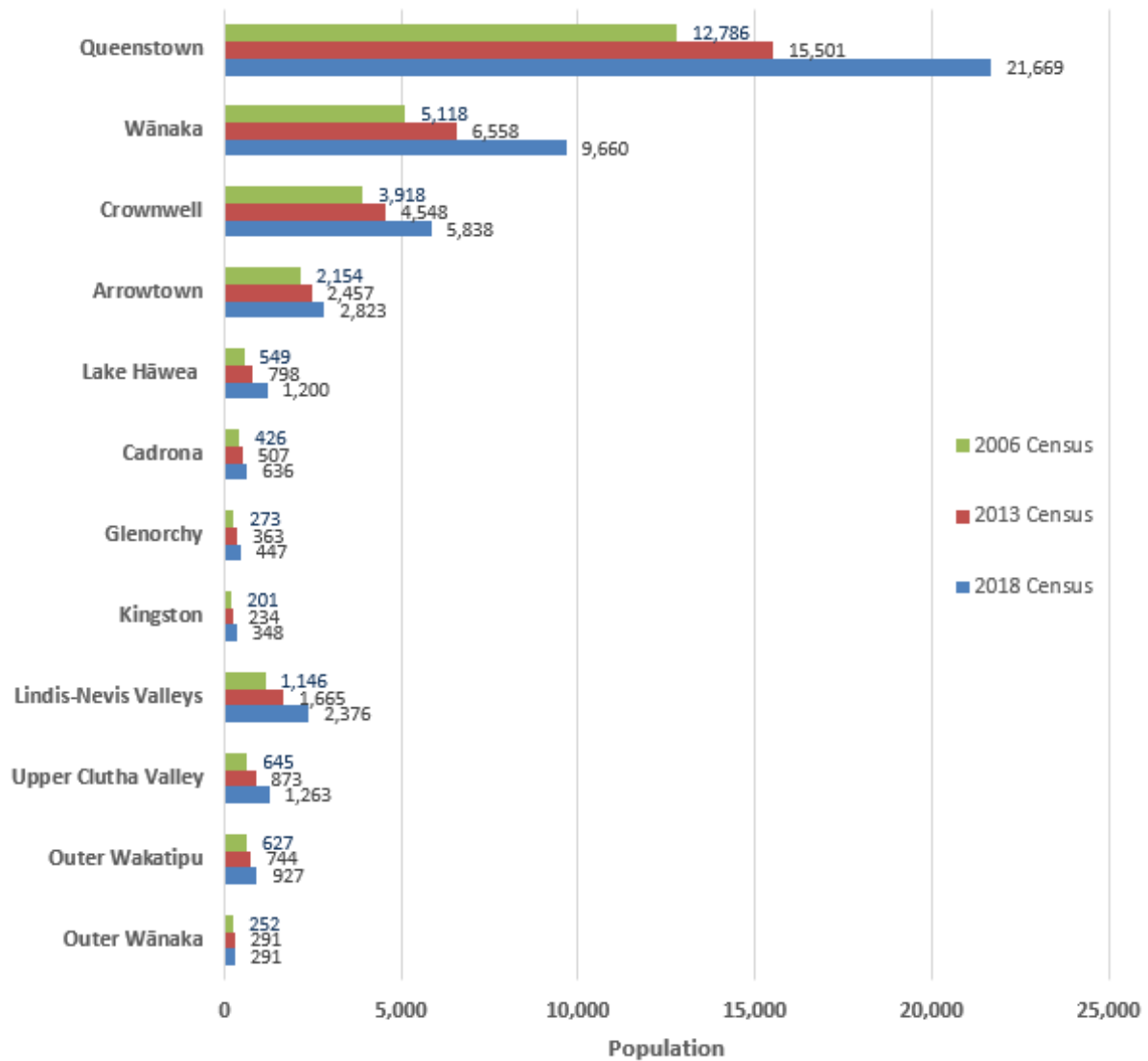


Figure 4. Dunstan Rohe and Upper Lakes Rohe population by towns and rural area, 2006 – 2018

Source: Stats NZ Census 2018

Overall, people who live in the larger towns are younger, while those who live in the rest of these Rohe are slightly older. Figure 5 below shows that 40% of the larger town residents (where) are under 30 years of age, compared to around 30% of people living in the smaller towns and rural area. Similarly, a slightly higher proportion of 65 years and over population lives outside of the larger towns (12%) compared to smaller towns (13%) and rural area (14%).

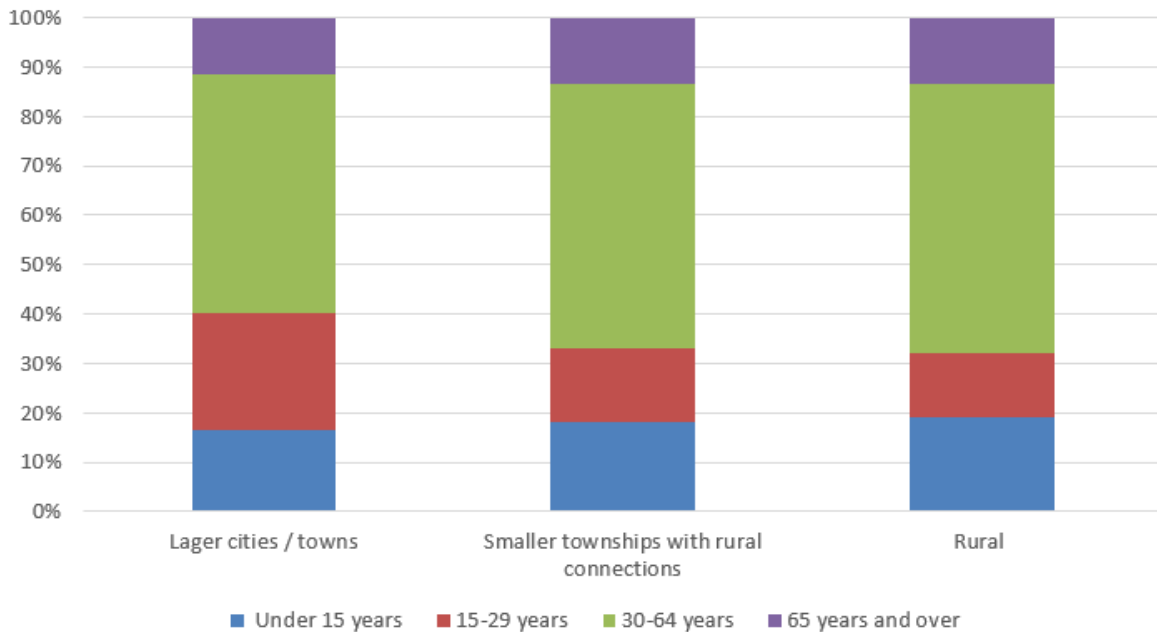


Figure 5. Dunstan Rohe and Upper Lakes Rohe population distribution by age group, 2018  
Source: Stats NZ Census 2018

As of 2018, 6% of the population in the Dunstan and Upper Lakes Rohe identified as Māori. This proportion, which has been relatively stable since at least 2006, is also lower than the overall Māori population proportion in Otago (9%) in 2018. However, the Māori population share has been increasing steadily in Otago since 2006 (6%) and 2013 (7%).

People living in the Dunstan and Upper Lakes Rohe tend to move more often (both into and out of these Rohe) compared to the Otago average. In 2018, 58% of the population in these Rohe were still living in the same residence as one year ago, which was lower than Otago average of 65% and the lowest amongst all Rohe/FMUs in Otago. Around 5% of the population had arrived from overseas, which is two-thirds higher than the Otago average (3% overseas arrival).

The total business activity accounts for around 34,000 “jobs” (measured by employment counts, which does not include working proprietors<sup>9</sup>). In New Zealand 20% of all jobs are working proprietors<sup>10</sup>. In 2020, the largest industries by employment (using ANZSIC 2006<sup>11</sup>) in the Dunstan and Upper Lakes Rohe were tourism related sectors such as Accommodation and Food Services (23%) and Retail (12%). In addition, part of the Administrative Services (7%) and Building Construction (12%) are driven by tourism demand. Agriculture is also important (7%), and more than half of the employment is provided for by the horticulture and viticulture sectors. Together, all these industries account for around two-thirds of employment in the Rohe.

<sup>9</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>10</sup> 2019 numbers according to Stats NZ Linked employer-employee data  
<http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7240#>

<sup>11</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.



*Image 3. Sunset sky at Queenstown port*

The working age (15 – 65 years) population in the Dunstan and Upper Lakes Rohe is likely to be earning a work-related income, or relatively more affluent. In 2018, 3% (990 people) of the population in the Rohe had no source of income, which was less than the Otago average of 5%, while 8% (2990 people) were receiving some type of government benefit<sup>12</sup>, which was lower than the Otago average of 15%.

Figure 6 below shows that, compared with the Otago average, the Dunstan and Upper Lakes Rohe have higher proportion of the population with higher level formal qualification (bachelor's degrees and above). In addition, more people are in a higher personal income bracket (\$70,001 or more per annum) than Otago average.

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<sup>12</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.



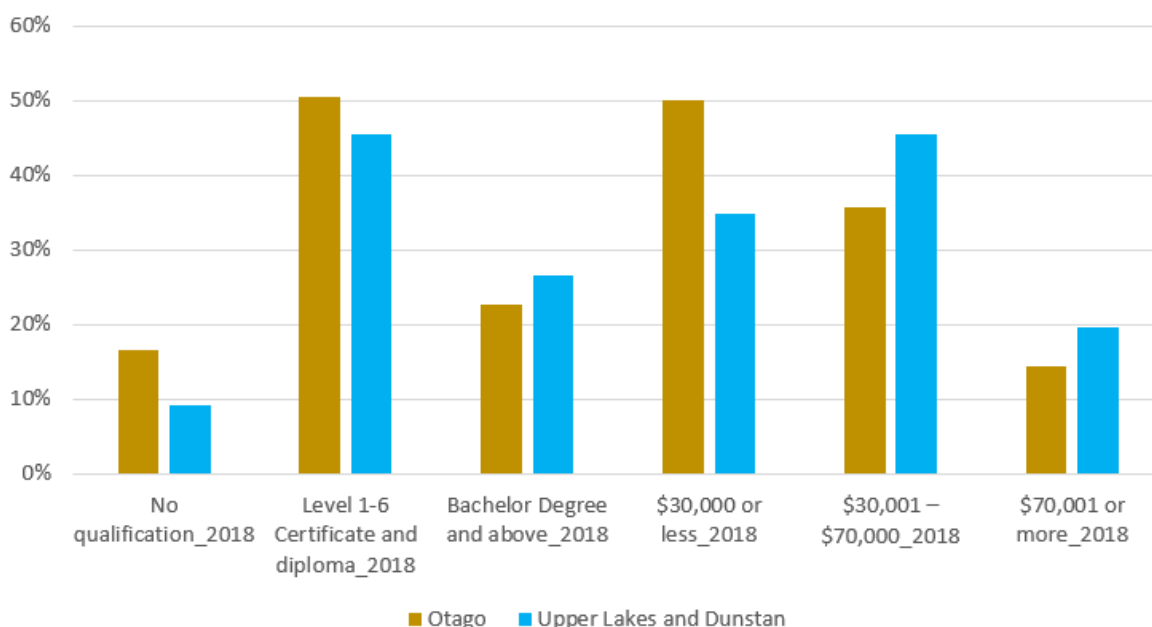


Figure 6. Academic qualification and personal annual income, Dunstan and Upper Lakes Rohe vs Otago average, 2018  
Source: Stats NZ Census 2018

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>13</sup>. In the Deprivation Index, decile 1 represents areas with the least deprived scores while decile 10 represents areas with the most deprived scores.

Figure 7 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>14</sup> in the Dunstan and Upper Lakes Rohe. The map only shows Census SA1 for agriculture and urban land developed land. Conservation land and plantation forestry are shaded green because no communities are living in these areas.

Figure 7 along with figure 7.1-7.4 show that while the rural areas of the Dunstan and Upper Lakes Rohe generally have a deprivation score of 3 and below, the larger towns have a more diverse outlook. For Queenstown (Figure 7.1), the central areas have deprivation scores between 6 and 8. Queenstown east areas have deprivation scores between 2 and 6, while most of the Warren park areas have deprivation scores of 6 or 7. For Wanaka (Figure 7.2), most areas have a deprivation score of 4 and under. For Cromwell (Figure 7.3), the deprivation scores vary between 1 and 6. The deprivation scores for most areas in Arrowtown (Figure 7.4) are 3 and below.

<sup>13</sup> <https://www.otago.ac.nz/wellington/departments/publichealth/otago830998.html>

<sup>14</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>

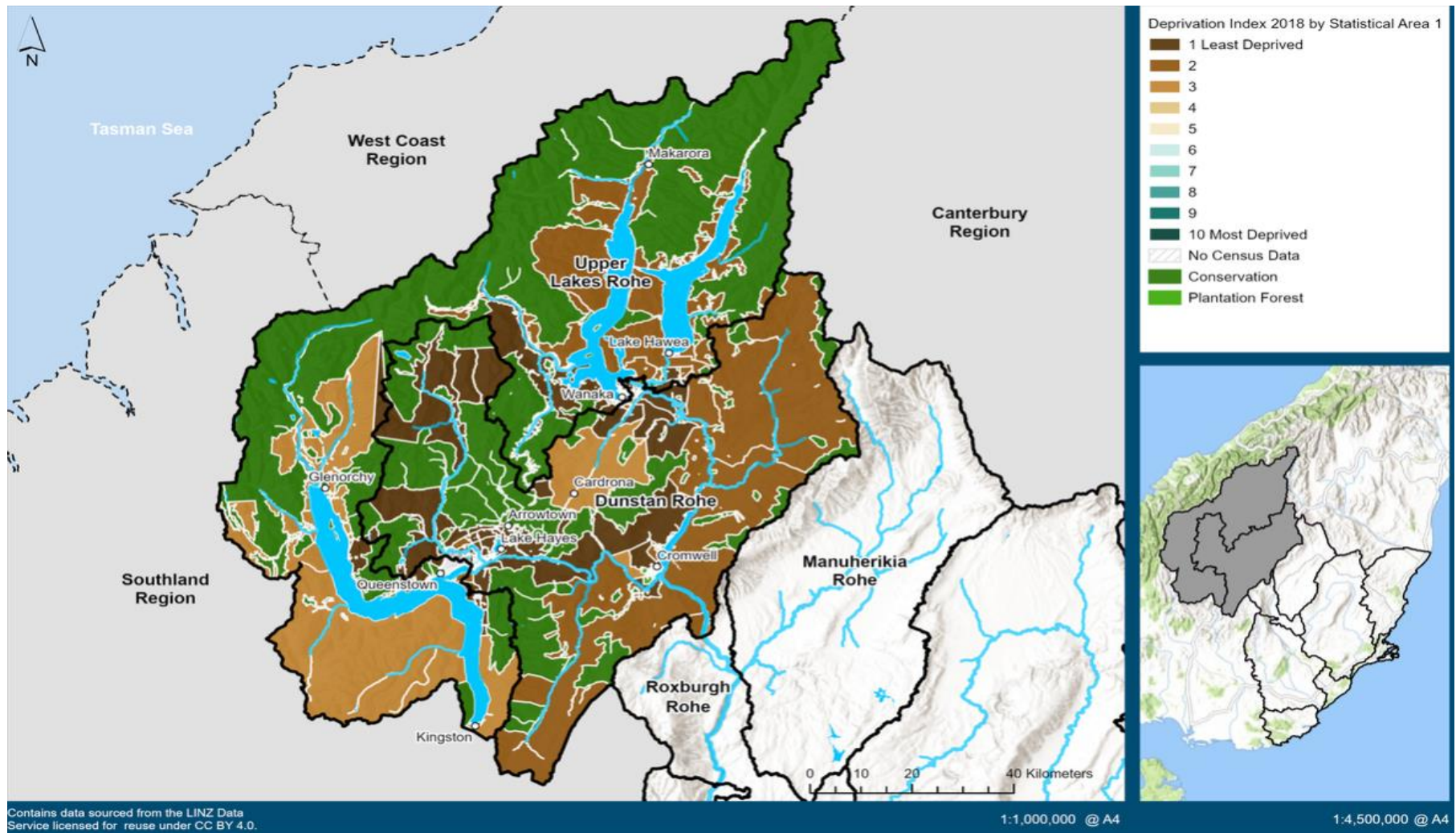


Figure 7. Deprivation Index (by SA1) for the Dunstan and Upper Lakes Rohe

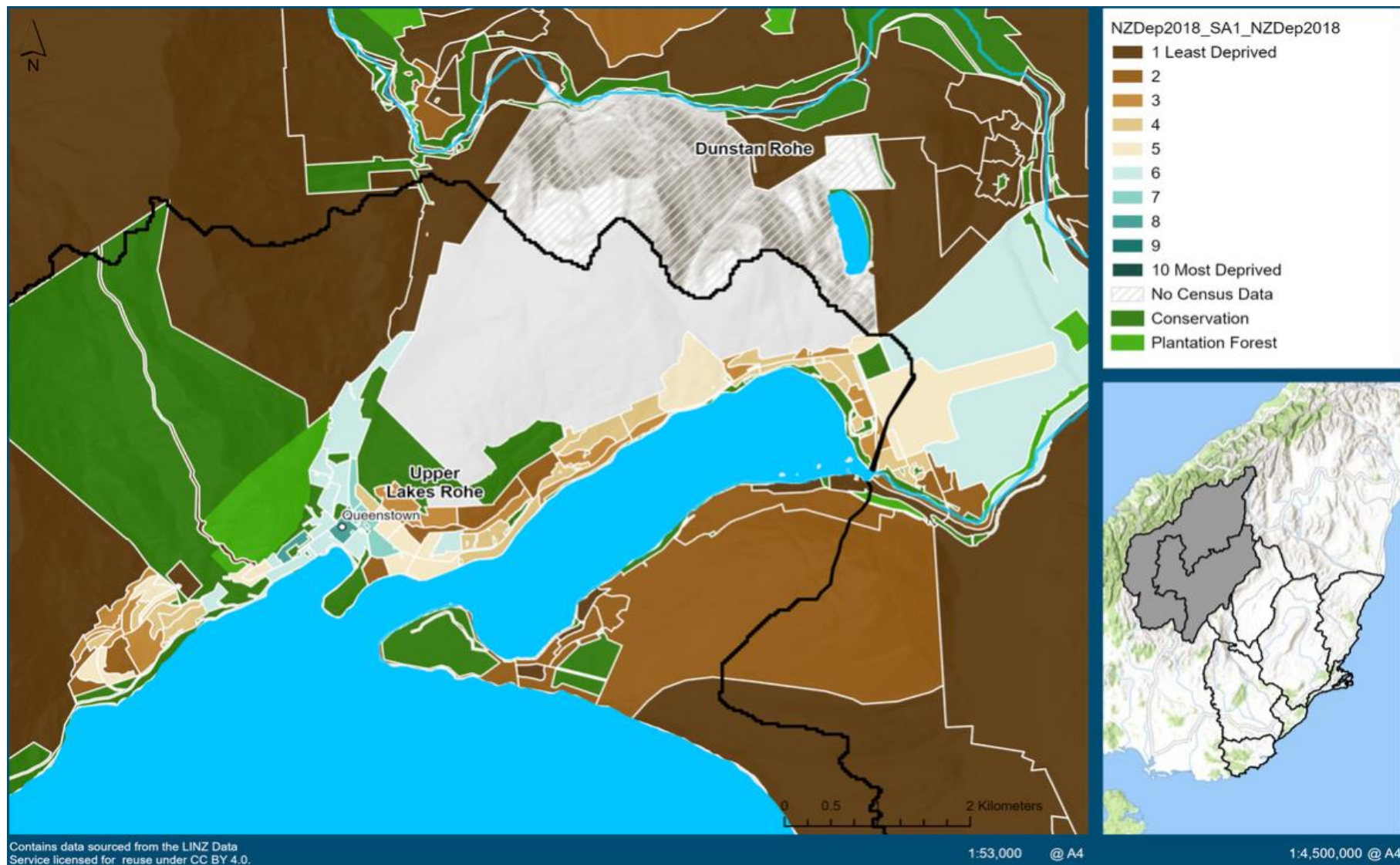


Figure 7.1. Deprivation Index (by SA1), Queenstown



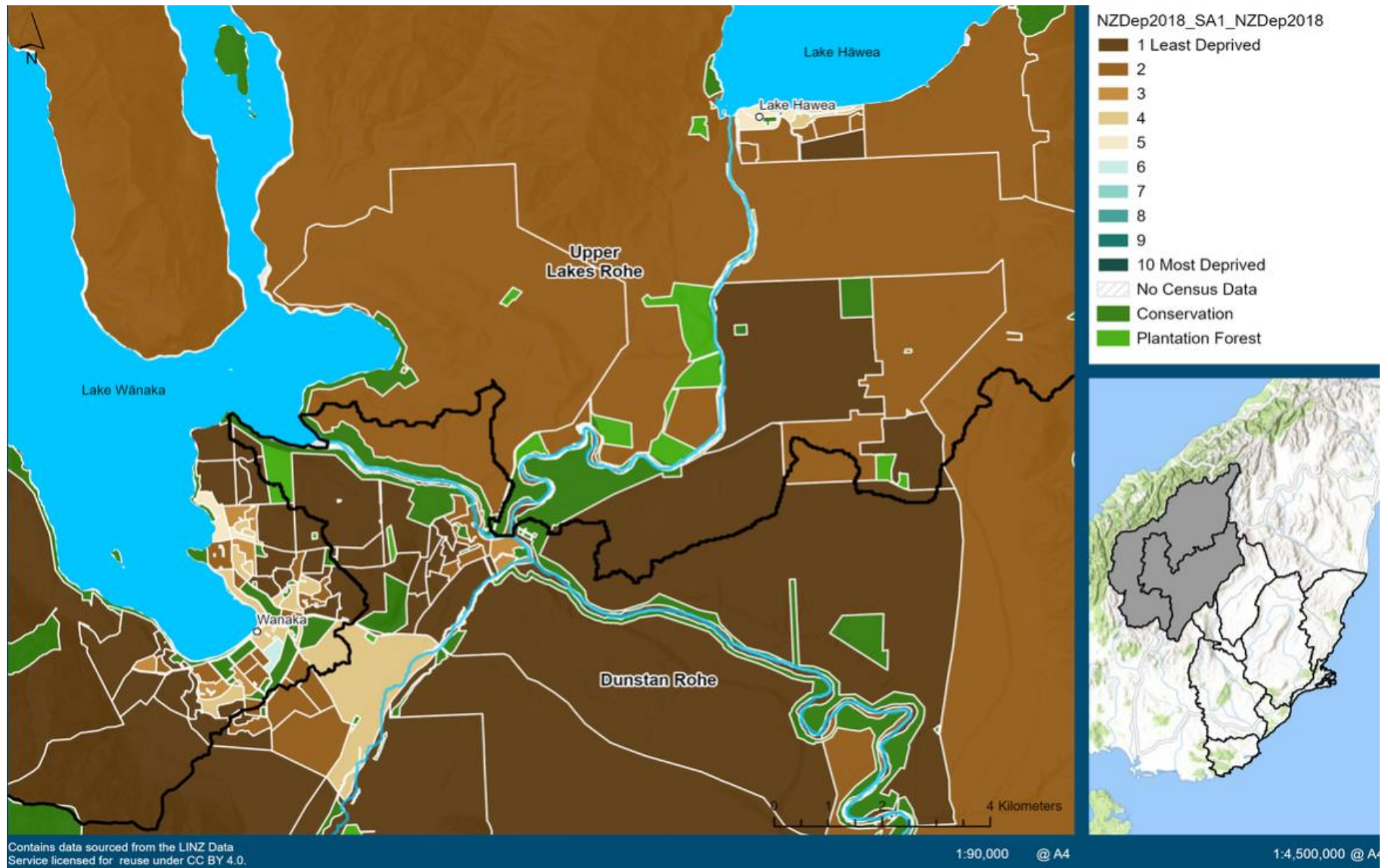


Figure 7.2.. Deprivation Index (by SA1), Wanaka

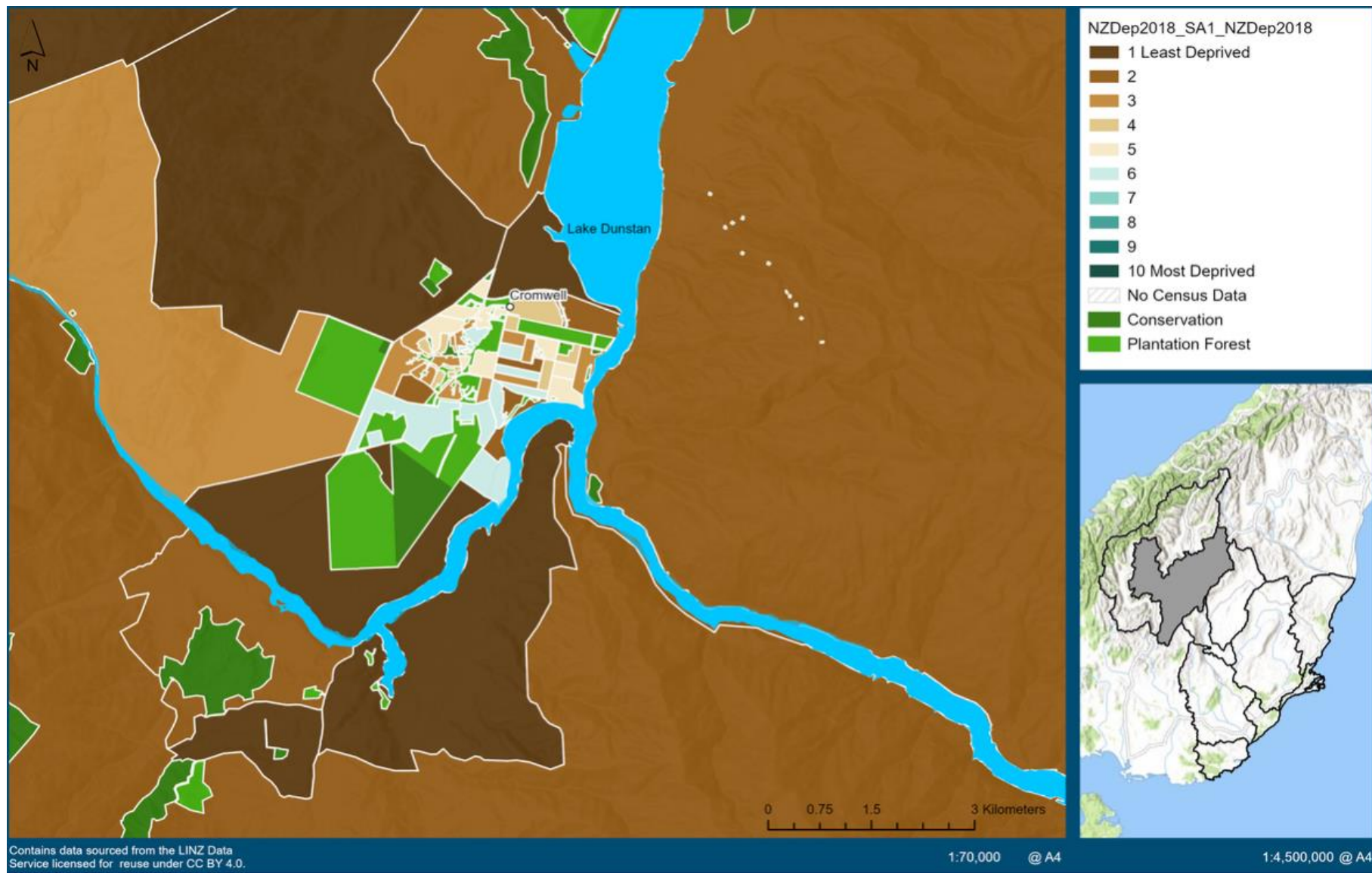


Figure 7.3.8 Deprivation Index by SA1), Cromwell

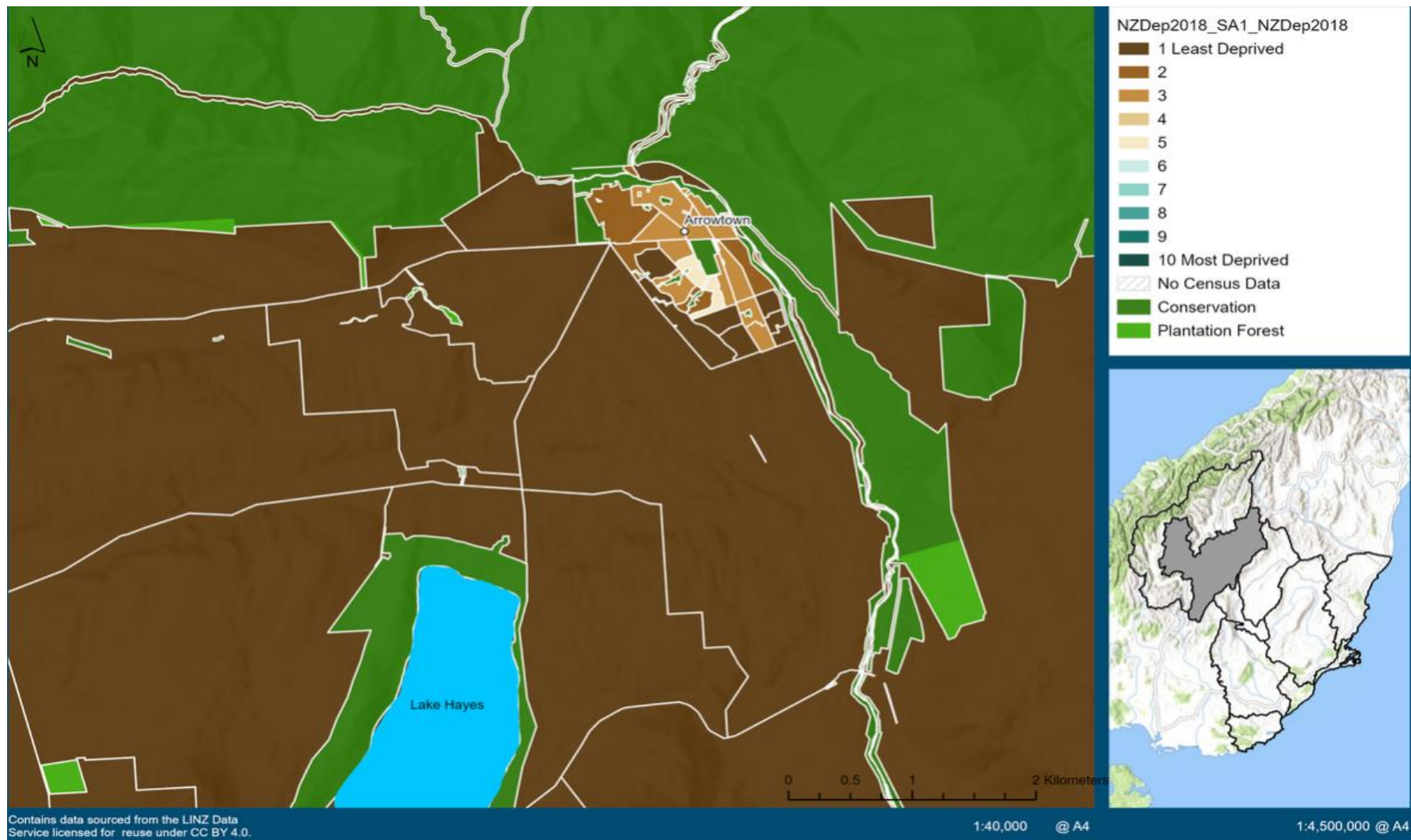


Figure 7.4. Deprivation Index (by SA1), Arrowtown