



Hurunui Waiau Healthy Rivers, Productive Land: Social Community Profile Assessment

**Report prepared for
Environment Canterbury Regional Council**

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1. Introduction

1.1. Purpose of this study

As part of a review of the Zone Implementation Programme and preparation of a water management solutions package, the Hurunui-Waiu Zone Committee wish to understand the current state of the environment and the economic, social and cultural drivers in the zone. The information in this study will be used to provide a social baseline against which potential policy and development options can be assessed in order to understand the impact of a plan review.

The scope of this study is to provide:

1. A succinct summary of the historic social changes over the last thirty years
2. A description of the current community profile
3. Identification of key indicators that can be used to measure or assess future policy scenarios compared to the existing profile.

This study has been progressed alongside the economic profile of the zone undertaken by Simon Harris of Landwaterpeople.

1.2. The assessment area

The Hurunui District is a predominantly rural area in North Canterbury. The Hurunui-Waiu Water Management Zone boundaries are generally contiguous with those of the Hurunui District Council (Environment Canterbury Regional Council, 2017). It includes the alpine Hurunui and Waiu rivers, the hill-fed Waipara River, Lake Sumner and the north Pegasus Bay coastal wetlands (Figure 1).

The Hurunui River is a braided river running 138 km. Its north branch flows through Lake Sumner, its middle reaches cross the Amuri District, and close to the river's mouth is a settlement of fishing huts and holiday homes. The Waiu River runs 169 km from the Spenser Mountains and across the Hanmer Plain, the Amuri Plain and the Cheviot Basin. The Waipara River runs from the Okuku Range through small, spectacular gorges. Fossils of marine reptiles have been found in the river since 1859, including a mosasaur skull thought to be 65 million years old (Wilson, n.d.-a). As well as these longer rivers, there are many shorter rivers and streams. For example, the Blythe River (13 km) flows south of and roughly parallel to the Hurunui River. The Jed River (16 km) flows close to Cheviot and Gore Bay.

Lake Sumner has an area of 14 km² and is the focus of the Lake Sumner Forest Park. It is on the route across Harper Pass and was an important source of food when Māori were bringing pounamu from the West Coast. Harper Pass was also used by the first gold miners and is now a route for trampers. Another feature of the region is Balmoral Forest, one of Canterbury's largest exotic forests, on the north bank of the Hurunui River.

The Department of Conservation administers a number of reserves, including a 12,000 hectare 'mainland island' for native animals in the Hurunui valley, and is working to protect endangered species of native birds around the Hurunui River (Orwin, n.d.; Wilson, n.d.-a). The Hurunui River is one of the most diverse river catchments in Canterbury, and is an outstanding habitat for native fish and birds. These include the nationally endangered black-fronted tern, black-billed gull and dotterel, and 25 native fish species, including six threatened species (Forest & Bird, n.d.).

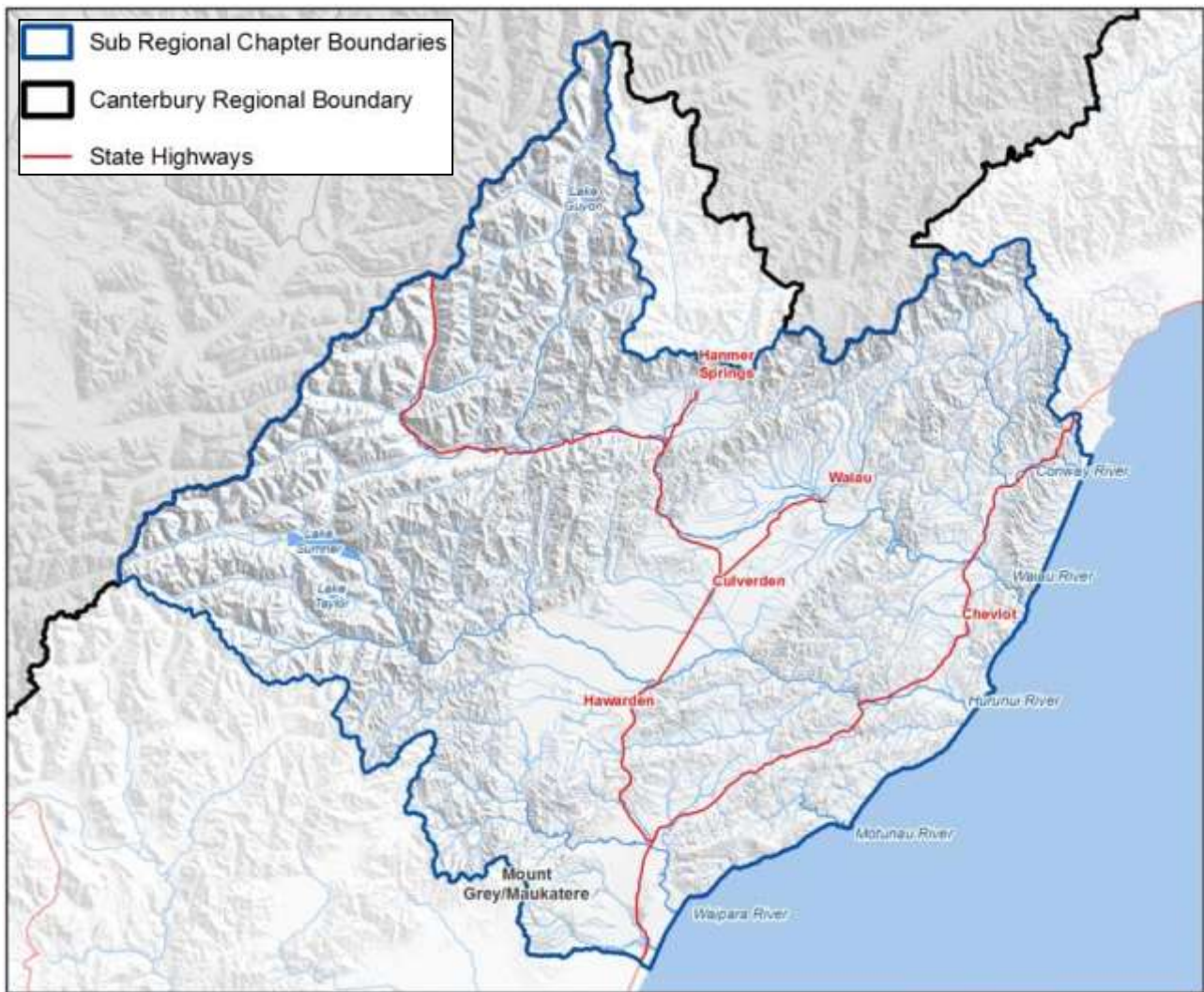


Figure 1: Hurunui-Waiu sub-region (Environment Canterbury Regional Council, 2017)

There are a number of small towns in the region including: Cheviot; Waiau, on the north bank of the Waiau River; Culverden, the chief service centre of the Amuri District; Hawarden; Waikari; and Waipara, location of the Weka Pass heritage railway. Amberley, on the northern bank of the Kowai River, is the base for the Hurunui District Council. Hanmer Springs is a resort town south-east of the Lewis Pass known for its hot springs. Bathing facilities were first opened in 1883 and the complex that opened in 1978 is a major tourist attraction, with thermal pools and other facilities (Wilson, n.d.-a).

There are six main river catchments in the Hurunui District, as seen in Figure 2. Within these are various rural and urban areas defined by Statistics NZ boundaries. For the purposes of this study, these statistical boundaries are used to present information about social and economic trends. At the Zone Committee's request, this study excludes the Conway River catchment.

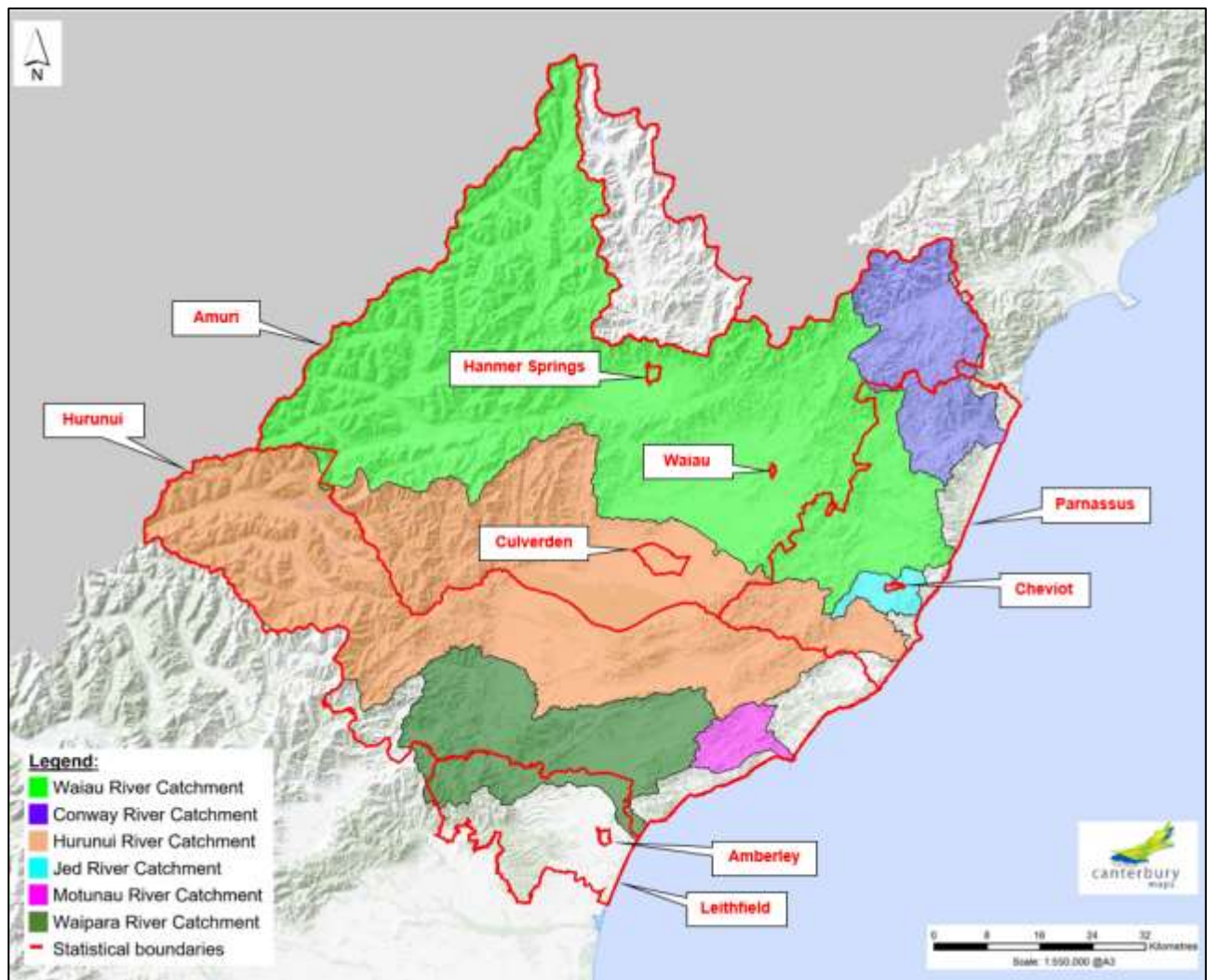


Figure 2: Hurunui District river catchments, rural areas and townships (Canterbury maps, Statistics NZ)

1.3 Methodology

Consultation with stakeholders to access relevant information has been an important part of the study process. This included a presentation to the Science Stakeholder Group in May 2017, providing an opportunity for key stakeholders to consider what they wanted from the study, share their knowledge of the area and provide references to further information.

Some of the issues raised through the consultation were:

- How to define and benchmark social health and community wellbeing
- Iconic and modified landscapes and visual character
- Recreational amenity and visitor attractions
- Braided riverbeds and their management
- Water quality impacts
- Social equitability and fairness.

There is a wealth of work already completed by the Zone Committee, particularly in the biophysical space including ecological and landscape impacts. The focus of this study is to identify key indicators relevant to assessing impacts of changes to the uses of water, and therefore land, based on the Zone Committee's priorities for a targeted plan change. While the '10% rule' (discussed in 1.4 Planning Context) is understood to have resulted in tension within the community between dryland and intensive farmers, this study aims to

provide a social profile baseline, and any future social impact assessment work will consider the social impact of plan changes on the community rather than study the impact of the '10% rule' itself.

The majority of information for this study comes from existing sources, drawing on a range of published material including local government reports, websites, newspapers, academic studies and books. Various quantitative indicators and statistics describe the social environment in Hurunui District and changes over time. These statistics are largely from the 2013 New Zealand Census, the most recent Census available at the time of writing. Information about business and employment comes from the New Zealand Business Frame, an annual survey of businesses carried out by Statistics NZ (complementing the separate economic report provided by Simon Harris of landwaterpeople). The study also draws on results from recent surveys on water-related recreational activities within the district.

While the preference was to present information based on the zone's catchments, much of the data (for example, census data) was not available at this level of detail. Data sourced from Statistics NZ is presented at either territorial authority level, encompassing the whole Hurunui District, and/or census area unit level. Census area units are Statistics NZ non-administrative area geographical boundaries that lie in size between the smallest areas (mesh blocks) and territorial authorities. Census area units do not directly correspond to sub-catchments (as shown in Figure 22), but do provide a useful means of comparing across the urban centres and rural areas of the district. In consideration of feedback from the Science Stakeholder Group, information is presented as north and south of the Hurunui River where possible. No particular pattern of difference is noted in the social data between areas north and south of the river.

1.4 Planning Context

The Canterbury Water Management Strategy, 2009, set a platform for collaborative engagement with local communities and stakeholders in the preparation of site specific sub-regional plans. The formation of zone committees provided a forum at which key land and water issues could be raised and discussed. The aim was to develop a set of solutions which would be carried forward through the non-statutory Zone Implementation Programme (ZIP), as well as provide recommendations to the Regional Council for outcomes sought in the respective sub-regional plans.

Following the notification of the proposed Land and Water Regional Plan (LWRP) in August 2012, the Regional Council progressed the preparation of the sub-regional plans. At the same time the Regional Plan was being prepared, the Hurunui-Waiu Zone Committee was preparing their ZIP, submitting their recommendations to Council in mid-2011. The Hurunui and Waiu River Regional Plan (HWRRP) was subsequently notified in October 2011, but as a variation to the then Natural Resources Regional Plan as it was much further ahead than the release of the proposed LWRP. The HWRRP became operative in December 2013 (Environment Canterbury Regional Council, 2013).

While the HWRRP allowed some intensification for irrigated land, it placed unintended constraints for the intensification of dryland farming through the consideration of a land use change, as defined by a greater than 10% increase in the release of nitrogen or phosphorus to land. As a result, the percentage rule unfairly penalised low emitting properties.

Over the next two years, the Hurunui-Waiu Zone Committee are reviewing their ZIP with the aim of developing a long-term water management solutions package to include both statutory and non-statutory measures. The solutions package, known as "Healthy rivers – productive land", will address the current inequity of the HWRRP, as well as identify and propose recommendations for changes to the HWRRP. It is expected that the HWRRP will be notified in mid-2019 to review specific matters within it. To support this process, the Zone Committee established a Science Stakeholder Group in November 2016 to facilitate the sharing of information, particularly in respect of local knowledge.

Through the first half of 2017, the Zone Committee, in consultation with the Science Stakeholder Group, identified their priority list of key land and water management issues to be addressed over the next 18 months. These issues may or may not require a plan change:

- Fixing the '10% rule' to address unintended constraints on dryland development
- Considering deferring a review of water take consents (with respect to HWRRP minimum flows) to lever more action to improve water quality
- Braided riverbed management to improve natural character and prevent further loss of braided riverbeds through land use encroachment
- All farms at Good Management Practice (GMP)
- Considering the Waipara River catchment with respect to water quality classification
- Addressing toxic cyanobacteria (phormidium) and options to reduce blooms
- Looking at strengthening water quality limits for the Waiau River
- Considering water storage for the Hurunui and Waiau catchments
- Management (for example, tributaries or land uses) of phosphorus load limits for the Hurunui River.

Consequently, the Zone Committee support a targeted approach to review specific aspects of the HWRRP rather than a full plan review which is due to take place in 2023.

2. Social profile of the area

This profile of the Hurunui District describes historical social changes and recent trends to build a picture of the interplay between water and the social environment. The current social situation of communities within the Hurunui District is similar in many ways to that of other rural communities across New Zealand, for example, the impacts of new technologies and demographic shifts. The profile presented here focuses on factors specific to Hurunui District and related to the role of water use, including implications for how people live, work, learn and play.

2.1. Maori Values

Maori interests and values in the region will be covered in depth in a separate report, but are acknowledged here. The takiwā of two hapū - Ngāti Kurī and Ngāi Tūāhuriri – are in the Hurunui-Waiau Zone, with the Hurunui River an area of shared interest. Ngāti Kurī (Te Rūnanga o Kaikoura) interests run from Te Parinui o Whiti (White Bluffs) in the north to the Hurunui River in the south, east from the Main Divide out to sea. The takiwā of Te Rūnanga o Kaikoura centres on Takahanga Marae. Ngāi Tūāhuriri interests run from the Hurunui River in the north to the Hakatere/Ashburton River in the south, east from the Main Divide and out to sea. The takiwā of Te Ngāi Tūāhuriri Rūnanga centres on Tuahiwi Marae (Land, Air, Water Aotearoa, n.d.; Mahaanui: Iwi management plan, 2013; Special Tribunal, 2009).

The Hurunui catchment was and remains a significant cultural, historic, economic and spiritual site for Māori, recognised by the Crown in the Ngāi Tahu Claims Settlement Act 1998. The Hurunui River was part of the traditional travel route transporting pounamu from Te Tai Poutini to settlements on the east coast of Te Waipounamu. Rivers were like highways and were sources of mahinga kai during the journey (Pompei, 2015; Special Tribunal, 2009). There were settlements along the Hurunui River, and the mouth is the site of wāhi tapu (Thomas, 2014). Near the Hurunui River mouth, Napenape was a place important to early Māori (Wilson, n.d.-a). There were villages in other places also, such as the south side of the Waipara River mouth (Taylor, 1952). Ngāi Tahu retains an interest in the protection of the area's spiritual, cultural and environmental values, including natural character, ara tawhito, mahinga kai and wāhi tapu (*Mahaanui: Iwi management plan*, 2013). Ngāi Tahu Property Limited has commercial interests in the region, such as its ownership of Balmoral Forest (Special Tribunal, 2009).

Mahaanui Iwi Management Plan 2013 (IMP) reflects the efforts of six Papatipu Rūnanga that represent the hapū who hold mana whenua rights over lands and waters within the takiwā from the Hurunui River to the Hakatere River and inland to Kā Tiritiri o Te Moana, including Ngāi Tūāhuriri Rūnanga. The document outlines Ngāi Tahu rights, interests and priorities associated with freshwater resources, as well as land and sea. It states that there is a need to change the way that water is valued, a need for appropriate management to deliver cultural outcomes, and for recognition of statutory acknowledgements. It outlines their concerns for water including:

- The decline in water quality in the takiwā
- Intensive rural land use having unacceptable effects on water quality, quantity and the relationship of Ngāi Tahu with freshwater
- Over-allocation and pressure from abstractive use
- Environmental issues for river beds, river margins and wetlands (for example, weed invasion, soil health)
- The need to protect the freshwater-saltwater interface at lagoon and river mouth environments.

The IMP specifies that the outstanding cultural characteristics and values of the Hurunui River catchment should be protected and restored. Land use in the catchment and water storage should reflect land capability and water limits. Groundwater and surface water quality in the catchment should be restored to a level suitable to provide a safe, reliable and untreated drinking water supply and enable cultural, customary and recreational use. Mahinga kai species and sites, and the traditions associated with them, should be

protected and enhanced. The Hurunui River mouth and Hoka Kura/Lake Sumner and associated wetlands are recognised as distinctive cultural landscapes within the catchment.

Significant cultural issues are associated with the unnatural mixing of water between and within catchments. Activities occurring within the beds of rivers and lakes and their riparian zones can adversely affect the values associated with these areas. Further, the “ability to transfer water permits and treat water as a tradeable commodity is inconsistent with tūngata whenua perspectives on how to achieve the sustainable management of water” (*Mahaanui: Iwi management plan*, 2013). The IMP calls for a framework to assess regional water infrastructure proposals based on sound cultural and environmental bottom lines.

2.2. Economy and employment

As a detailed economic assessment has been provided in a separate report, this section focuses on the aspects of economic and employment data that impact on social life and social outcomes. For instance, while farming is a core economic activity, it is also a way of life.

2.2.1 History

The recent history of the area is in many ways the history of farming (Lovell-Smith, 2000). Motunau was the site of the first sheep run in Canterbury, taken up in 1847. While farming began with large sheep stations, by 1914 the family farm was the norm on the plains, aided by government policy to break up large estates. Lamb was and remains an important regional product (Wilson, n.d.-b). For example, Charles Clifford landed sheep on the beach near the mouth of the Blythe River, founding one of Canterbury's earliest sheep stations, Stonyhurst. The farm today is smaller but remains in Clifford family hands, running sheep, beef and deer and winning farming environmental awards (Benny, 2017; The Press, 2008).

The rural water schemes of the 1960s and 1970s in the Hurunui District, along with fertiliser use and improvements in machinery, enabled the development of hill country farms using similar techniques as the low country (such as rotational grazing patterns) and increases in productivity (increase in stock units). Government farming incentives were removed in the 1980s. In the 1980s and 1990s financial pressure led to selling of farms, often divided and bought by neighbours. In some cases this meant fewer people managing more stock. Farmers also looked to supplementary incomes, such as farm stays and camping accommodation for tourists, market gardens and new crops (Lovell-Smith, 2000).

Fairweather and Gilmour (1993) surveyed changes in farming between 1986 and 1992. They found that, while the main farming remained sheep and beef, there were more types of farm and more smallholdings. Farm labour data showed that the proportion of owner-operators declined, while the proportion of paid farm workers increased. Dairying registered as a new land use. The first commercial olive oil was produced in Canterbury near Amberley in 1997 (Lovell-Smith, 2000). Grapes were first planted in the Waipara Valley in the 1980s. There are now over 1,200 hectares of plantings and around 28 wineries, making Waipara the main wine-making area in Canterbury (Wilson, n.d.-a).

Tourism has become a significant generator of employment. Most are domestic visitors, with a proportion of international visitors that has increased over recent times. Many are independent travellers attracted by the region's scenic qualities. The Hanmer Springs Thermal Reserve is a key destination (Shone, 2013). The traffic through the area also gives business to small shops, such as bakeries, and service suppliers. Areas such as Waiau, Cheviot and the Waipara Valley were busy in the tourist season (October-April) even before the post-earthquake close of the Kaikoura route brought more traffic their way. Residents from Christchurch and surrounding locations, as well as travelling through to Hanmer Springs, enjoy the area for recreation.

The impacts of such longer term changes can be observed in recent trends and current data on the kinds of work and business undertaken in the Hurunui District.

2.2.2 Work opportunities

Agriculture is a significant provider of work opportunities. Just under one-third of Hurunui District's labour force were employed in an agricultural vocation, according to Statistics NZ 2013 Census data. While numbers were small, there was an increase in employment in the construction sector since 2004 (3.1% to 7.5%).¹ In 2016 two employment sectors were notably higher than the national average: accommodation and food services accounts for 13.9% of employment in the district (compared with a national average of 7.3%), and employment in sport and recreation activities accounts for 3.2% (national average of 1.2%) (Statistics NZ, 2016).

When looking specifically at businesses operating within the Hurunui District, in 2016 there were 4,550 economically significant individual business units.² The numbers presented will not capture all economic activity in the district, for example, many individual Bed & Breakfast providers will not be included owing to small operation size and/or sales or income levels. Of the business units included, 975 (21.4%) were agricultural operations. While the agricultural sector employed the most people in the district, the average number of employees per business unit was relatively low compared to other sectors at just 1.2 (Table 1).

Table 1: Average number of employees per business unit by industry classification in Hurunui District, 2016 (Statistics NZ, 2016)

Industry	Business units	Employee count	Employees per unit
Agriculture	975	1200	1.2
Manufacturing	78	290	3.7
Construction	177	330	1.9
Retail trade	75	240	3.2
Accommodation and food services	126	610	4.8
Professional, scientific and technical services	84	120	1.4
Education and training	33	290	8.8
Sport and recreation activities	42	140	3.3

There has generally been growth in the number of people employed in the non-agricultural major employment sectors in the Hurunui District since 2000 (Figure 33).

¹ Census data will include residents whose work is located elsewhere, notably those who commute to Christchurch.

² Statistics NZ defines a geographic business unit as "a separate operating unit engaged in New Zealand in one, or predominantly one, kind of economic activity from a single physical location or base". "The coverage of business demography statistics is limited to economically significant enterprises that are engaged in the production of goods and services in New Zealand. They must meet at least one of the following criteria:

- annual expenses or sales subject to GST of more than \$30,000
- 12-month rolling mean employee count of greater than three
- part of a group of enterprises
- registered for GST and involved in agriculture or forestry
- over \$40,000 of income recorded in the IR10 annual tax return (this includes some units in residential property leasing and rental)."

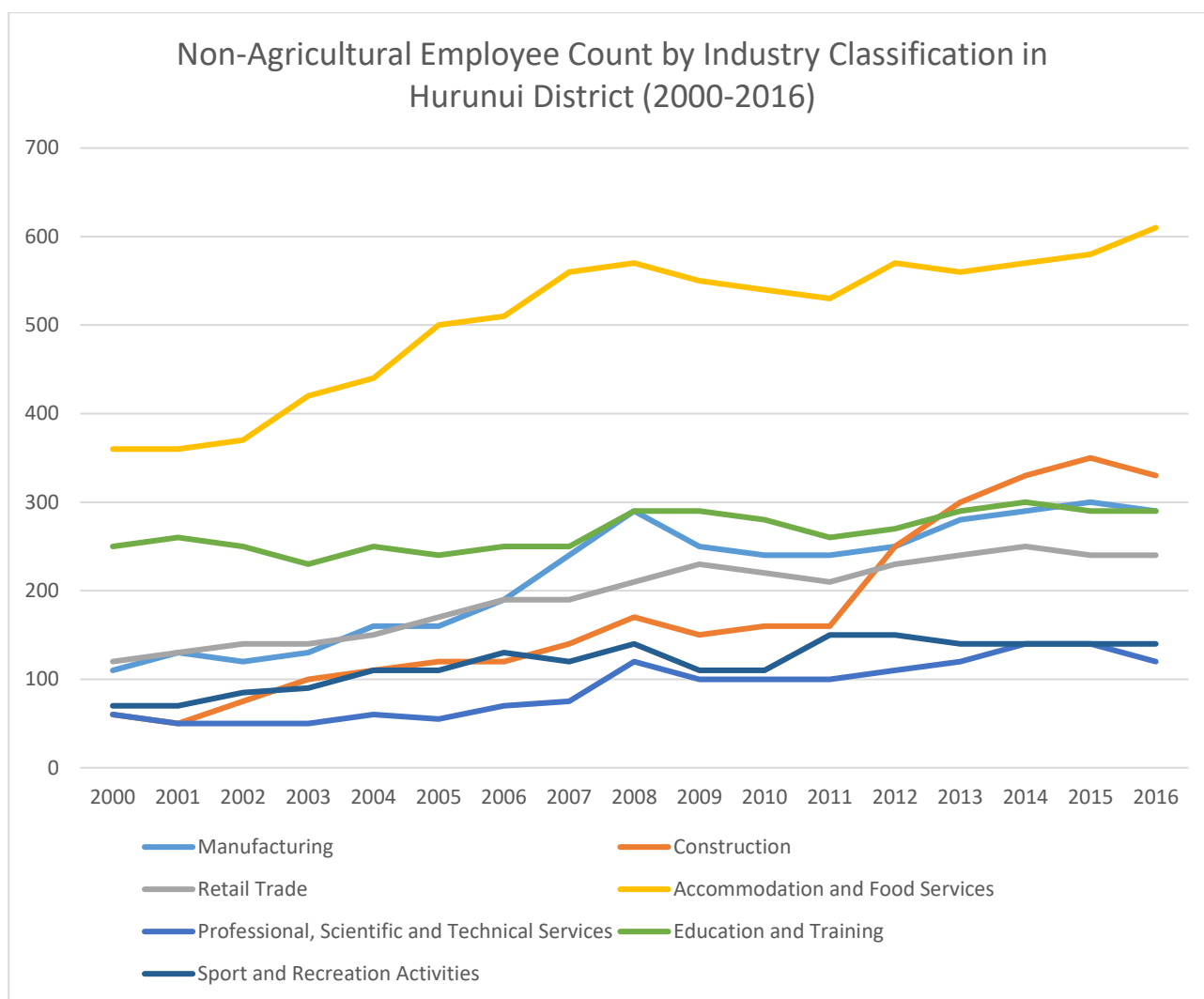


Figure 3: Non-agricultural employee count by industry classification in Hurunui District, 2000-2016 (Statistics NZ, 2016)

Non-agricultural business activities have experienced growth in business numbers since the early 2000s (Figure 44). This is most evident in the construction sector, where the number of operating units has grown by 78 for the period 2000-2016 (+79%), and the professional, scientific and technical services industry, where 54 new business units has amounted to 180% growth on 2000 levels.

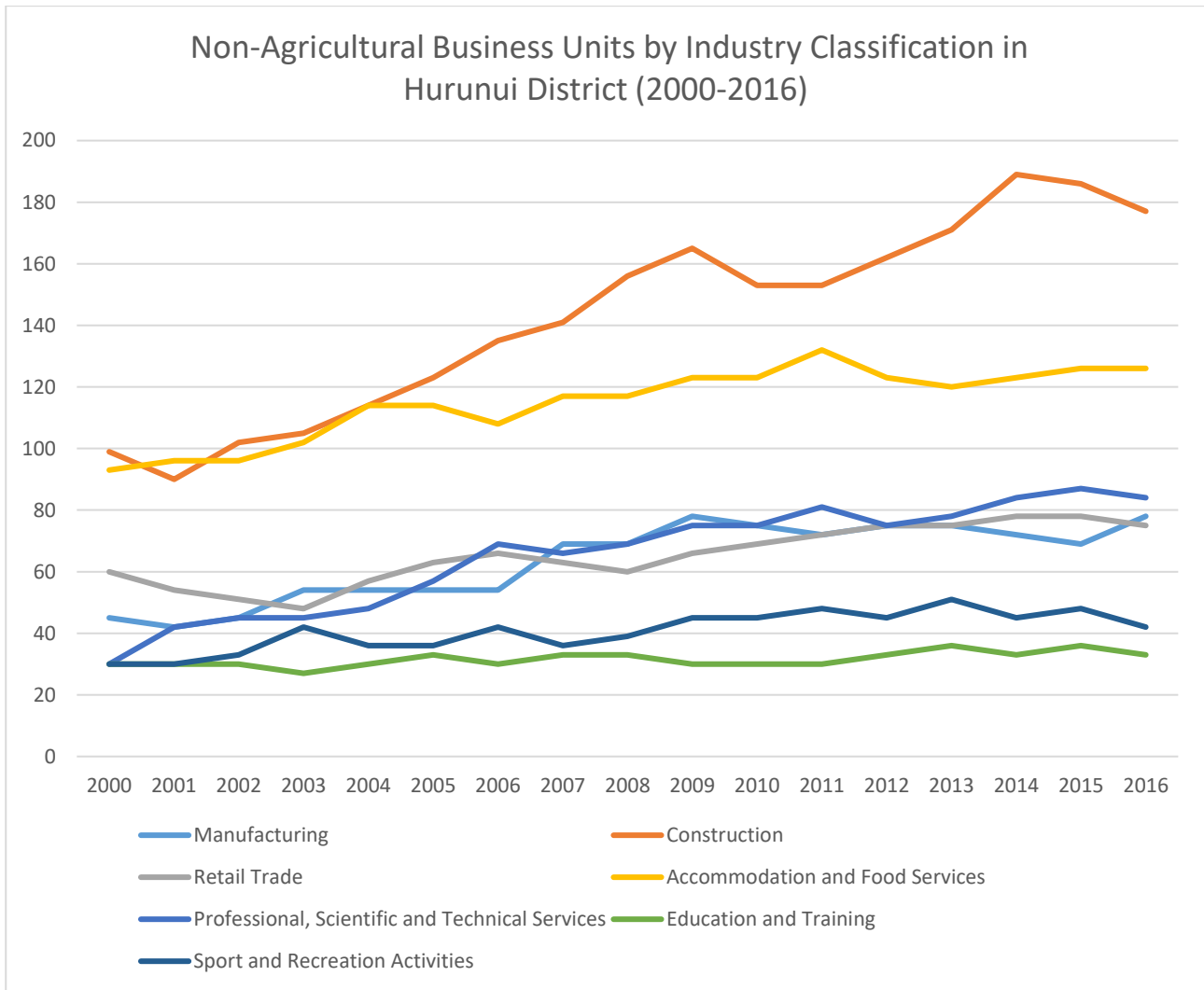


Figure 4: Non-agricultural business unit count by industry classification in Hurunui District, 2000-2016 (Statistics NZ, 2016)

Sheep, beef cattle and grain farming is the primary agricultural activity undertaken in Hurunui District when considering the number of individual farming units (

Figure 5). While the reported number of farming units engaged in these activities has declined from 777 to 633 since the year 2000, approximately 60% of agricultural and forestry activities are represented by these types of farms. During the same period, the number of dairy cattle farming units increased from 78 to 126.

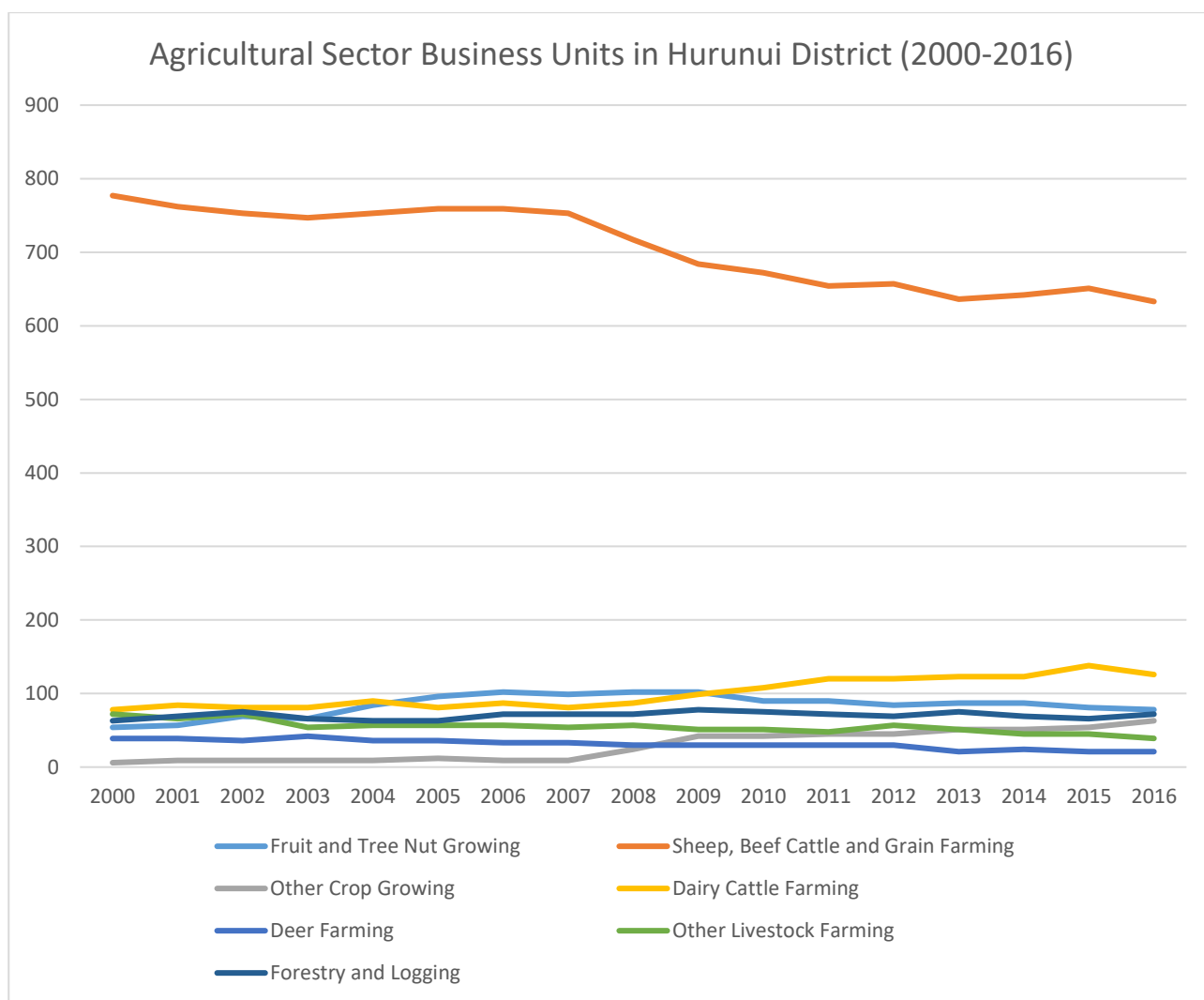


Figure 5: Count of agricultural business units in Hurunui District by activity type, 2000-2016 (Statistics NZ, 2016)

Trends in farming activities can be seen in changes in livestock numbers (Table 2). There have been rapid changes to livestock composition in Hurunui District between 2002 and 2012. Dairy cattle increased in numbers, particularly during the five-year period 2007-2012, where total numbers almost doubled. Meanwhile beef cattle, sheep and deer numbers declined, with total sheep numbers decreasing by close to 370,000 between 2002 and 2012.

Table 2: Livestock numbers in Hurunui District, 2002-2012 (Statistics NZ, 2012)

Livestock	2002	2007	2012	Change 2002-2012
Dairy cattle	45,271	53,099	103,121	+127.8%
Beef cattle	117,623	119,141	97,864	-16.8%
Sheep	1,643,785	1,612,116	1,276,364	-22.4%
Deer	42,988	34,042	26,015	-39.5%

2.2.3 Employment status

From 2001 to 2013, the number of people in employment rose in the Hurunui District. Both full-time and part-time employee numbers grew, by 23.2% and 25.1% respectively, while unemployed persons reduced from 201 to 159 (-20.9%).

Self-reported employment status from the 2013 Census indicated that the rate of employment among residents aged 15 and above was relatively high compared to national levels. The data showed:

- People in full-time employment made up 50.3% of the working age population in the district in 2013 (compared to 48.0% nationally).
- Part-time employees were 16.9% of the working age population (14.3% nationally).
- The number of people who identified as unemployed was low: 1.7% in Hurunui District in 2013 compared with 4.8% nationally.
- Just 13.8% of residents aged 15 plus were classified as not in the labour force (retired, personal/family responsibilities, attending educational institutions, physical or mental impairment to work, temporarily unavailable for work at the time of the Census, or not actively seeking work), compared to a national rate of 26.9%.

Most of the workforce were paid employees (62.3%), below the national rate of 77.6% in 2013. Hurunui District had a relatively high rate of residents who were employers (11.4%) and self-employed with no employees (18.1%) compared to the national workforce (6.5% and 11.8% respectively). This is likely to be driven by the farming sector where farmers are owner/operators of their businesses. Residents who are paid employees have been increasing in numbers at a relatively faster rate than other employment status types (

Figure 66).

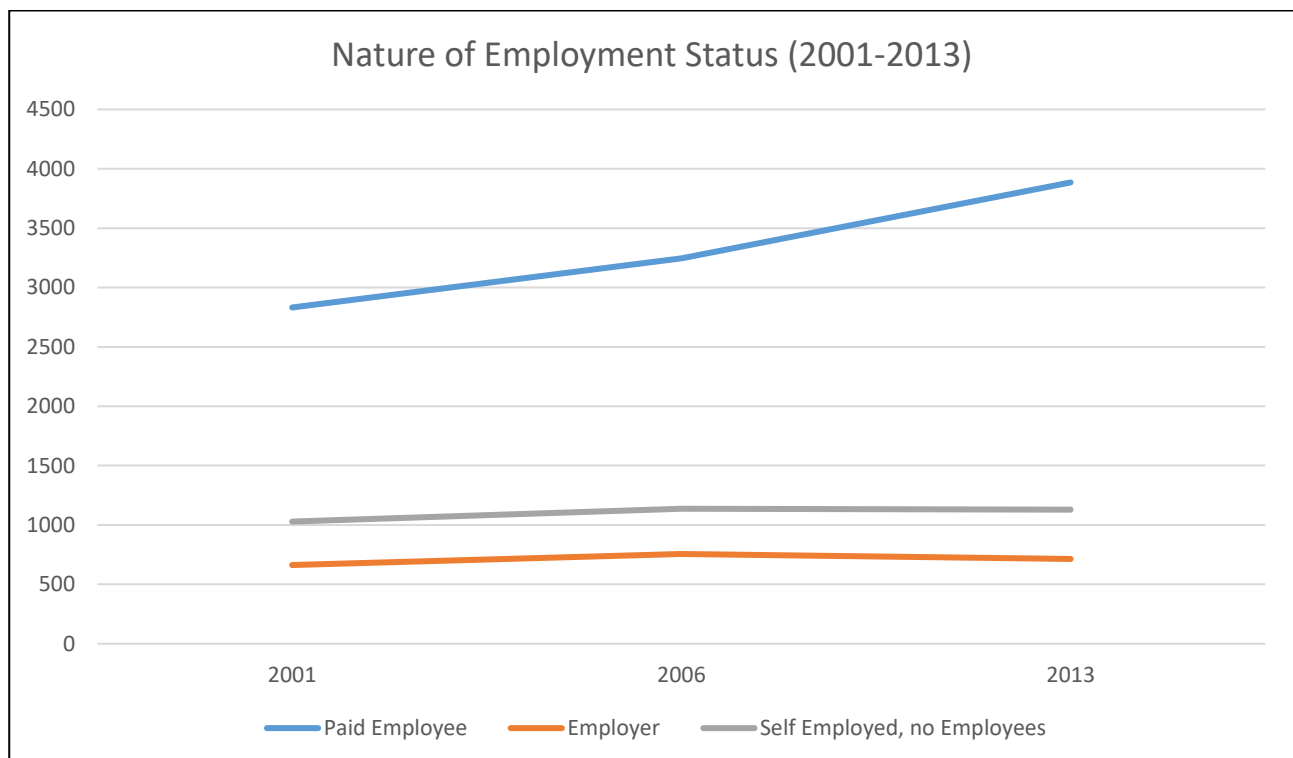


Figure 6: Trends in employment status type in Hurunui District, 2001-2013 (Statistics NZ, 2001, 2006, 2013)

2.2.4 Household income

In 2013 the self-reported median household income of Hurunui District was \$56,400, compared to \$63,800 nationally. There was a declining number of households with a reported income of less than \$50,000, while households with an income of greater than \$50,000 were increasing, in line with national trends but taking place more rapidly in Hurunui District (Table 3).

The impact of owner-operated farming businesses on self-reported incomes is an unknown in this dataset. It is likely that many households have greater financial standing than suggested by self-reported household incomes, as the business entity provides for many household related costs.

Table 3: Household income for Hurunui District compared to New Zealand, 2001-2013 (Statistics NZ, 2001, 2006, 2013)

Household income	2001		2006		2013	
	Hurunui District	New Zealand	Hurunui District	New Zealand	Hurunui District	New Zealand
\$50,000 or less	60.6%	49.6%	49.1%	40.9%	38.2%	33.8%
\$50,001 - \$100,000	17.5%	22.5%	26.5%	26.7%	31.0%	27.7%
\$100,001 or more	5.2%	9.4%	9.6%	16.2%	16.9%	23.4%
Median household income	\$31,800	\$39,600	\$43,300	\$51,400	\$56,400	\$63,800

2.3. Education

The total number of students enrolled at schools in Hurunui District increased during the period 2010 to 2016 (

Figure 77). Schools in the area cater primarily to younger primary school aged children, and just three schools (Amuri Area School, Cheviot Area School and Hurunui College) had students aged 16 years and older on their rolls. The age profile of students remained relatively stable between 2010 and 2016 (Ministry of Education, 2017). Around 61% of students were aged 10 and under, 31% 11-15 years, and 7% 16 years or older.

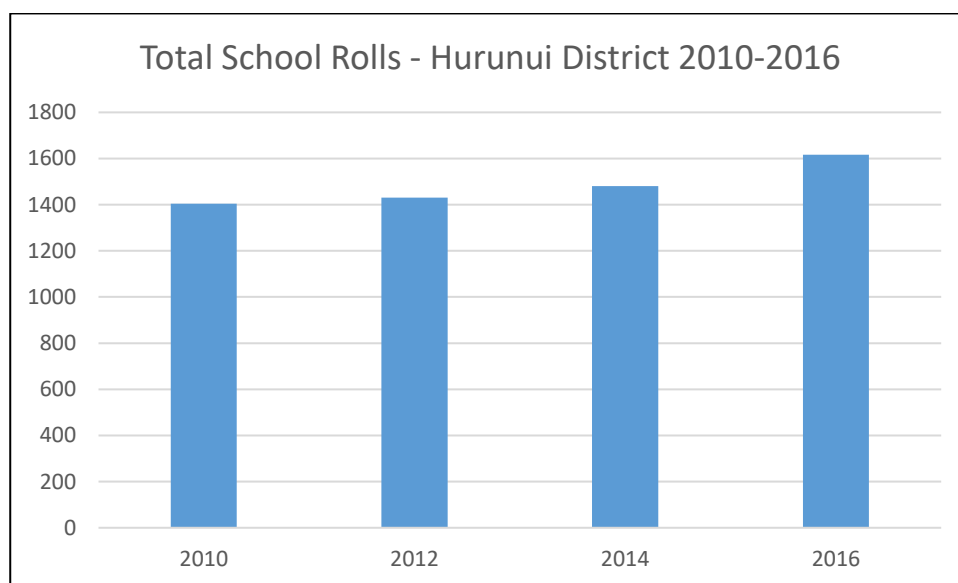


Figure 7: Total school rolls of Hurunui District, 2010-2016 (Ministry of Education, 2017)

Growth in school rolls was not even across all schools. Hanmer Springs School had the largest proportional increase in students between 2010 and 2016 (46 students or 54.8% growth in total students). Waipara School had the largest decrease (-23 students or -33.8% of total roll) (Table 4).

Table 4: Hurunui District school rolls by school 2010-2016 (Ministry of Education, 2017)

School	2010	2012	2014	2016	Change 2010 - 2016	% change 2010 - 2016
Amberley School	214	221	240	242	+28	+13.1%
Amuri Area School	271	250	282	324	+53	+19.6%
Broomfield School	92	113	111	117	+25	+27.2%
Cheviot Area School	171	166	183	198	+27	+15.8%
Greta Valley School	34	37	34	40	+6	+17.6%
Hanmer Springs School	84	87	102	130	+46	+54.8%
Hurunui College	229	234	226	241	+12	+5.2%
Leithfield School	96	93	98	128	+32	+33.3%
Omihi School	26	28	25	27	+1	+3.8%
Rotherham School	31	41	35	36	+5	+16.1%
Waiau School	52	69	60	50	-2	-3.8%
Waikari School	36	41	36	38	+2	+5.6%
Waipara School	68	50	49	45	-23	-33.8%
Hurunui District Total	1,404	1,430	1,481	1,616	+212	+15.1%

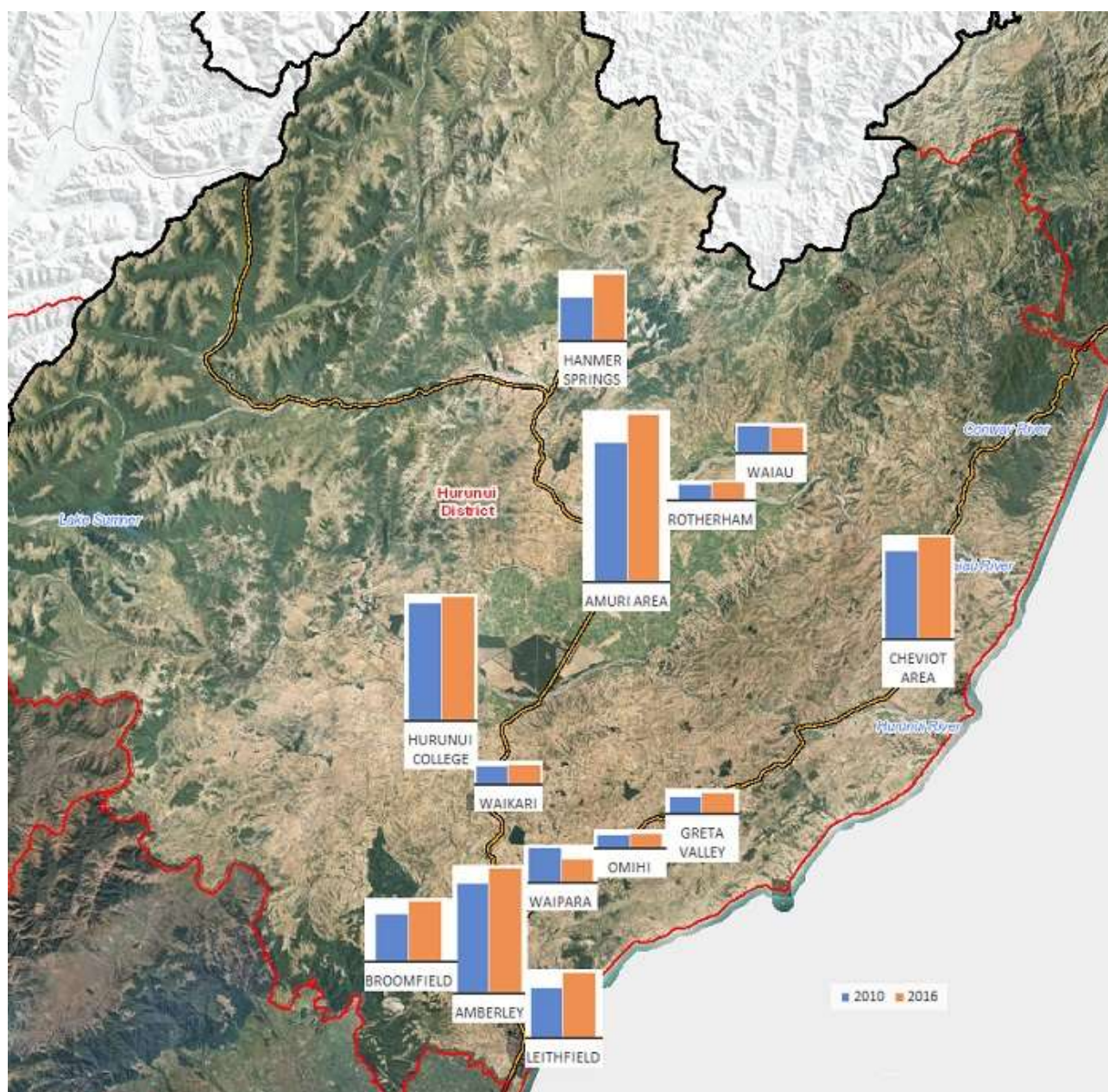


Figure 8: Hurunui District changes in school rolls, 2010-2016 (map: Canterbury Maps website)

The educational profile of residents aged 15 and above is indicated in Table 5. Hurunui District had a greater proportion of residents whose highest level of educational achievement was high school or a university bachelor/honours degree compared to the Canterbury Region, but a lower proportion compared to all New Zealand. In 2013, 34.3% of residents aged 15 and above had no education qualification, excluding students who were still in high school and had attained at least Level 1 NCEA. This was higher than the national rate of 27.4%, and the rate for the Canterbury Region of 21.5%. (The categories in Table 5 do not add to 100%; this gap is comprised of individuals who had not achieved at least a high school qualification, including adults in the workforce and young people aged 15 plus who were still studying at school.)

Table 5: Highest level of educational achievement in census area units of Hurunui District, 2013 (Statistics NZ, 2013)³

Area	High school qualification	University bachelor or honours degree	University masters or doctorate degree
Amberley (town)	123 (15.0%)	84 (10.3%)	9 (1.1%)
Amuri (rural area)	165 (20.5%)	165 (20.5%)	3 (0.4%)
Cheviot (town)	18 (9.0%)	21 (10.4%)	3 (1.5%)
Culverden (town)	24 (12.1%)	27 (13.6%)	3 (1.5%)
Hanmer Springs (town)	102 (21.9%)	90 (19.4%)	21 (4.5%)
Hurunui (rural area)	210 (16.1%)	195 (14.9%)	39 (3.0%)
Leithfield (rural area)	243 (17.0%)	225 (15.8%)	42 (2.9%)
Parnassus (rural area)	81 (17.6%)	87 (19.0%)	3 (0.7%)
Waiau (town)	12 (9.5%)	15 (11.9%)	0 (0.0%)
Hurunui District	978 (16.8%)	909 (15.6%)	123 (2.1%)
Canterbury Region	14.6%	14.9%	3.1%
New Zealand	27.4%	21.6%	4.6%

In line with the agricultural focus of the employment sector, the district has a relatively high proportion of residents with apprenticeships (15.2%), and trade qualifications and diplomas (15.9%) compared to the Canterbury Region and all New Zealand.

2.4. People and communities

2.4.1. Recent history

Lovell-Smith (2000) described development and growth in the Hurunui District in the 1950s and 1960s, followed by rural and town decline in the 1970s and 1980s. Railway lines and many services and businesses closed, and people moved away. However, Amberley continued to grow, as did Hanmer Springs due to its particular features (Queen Mary hospital, large forest service camp, and tourism following the rebuild of the thermal pools). There was also growth in beach settlements as holiday areas. The 1990s saw some demographic changes as youths moved away and retired people moved in, with more people living in urban areas in the district.

Writing in the 1980s, Gardner (1983) considered the Amuri area to be stable, with little population change except for young women moving out of the district, and with one-family farms having been the basic household unit for three generations. It was a homogeneous district, with social structure related to land ownership and land use. The greatest change to landscape came with irrigation.

From the 1990s, increasing use of irrigation and growing demand for dairy products led to expansion of dairying. North Island dairy farmers came south, attracted by cheaper land. Long-established families sold up, and there was high turnover of farm ownership. Share-milking increased the movement of families in and out. This brought social change to the area. Dairy and other new economic activities attracted new families and nationalities, and altered patterns of participation in community activities, with growing diversity of

³ The census area units in this table have been divided into towns and rural areas located to the north and south of the Hurunui River.

community organisations (Amuri Irrigation Company, n.d.; Wilson, n.d.-b). Workers from outside the district may be transient, and may or may not have a lasting stake in the area and its values. However, these population changes have also brought social diversity to a traditional farming locale.

The following section of the study looks at recent changes and the current makeup of the Hurunui District population.

2.4.2. Population growth

The total population of the Hurunui District grew from 9,885 residents in 2001 to 11,529 in 2013, a rate of 16.6% (Table 6). This rate of growth was relatively high compared to the Canterbury Region (12.0%) and New Zealand (13.5%) for the period. Population growth was experienced by all areas except for Cheviot, though the actual decline in residents in Cheviot for the period was relatively small.

Population growth in absolute numbers was concentrated to the south in Amberley and the surrounding Leithfield rural area. The increasing 2013 population was likely driven by post-earthquake housing developments in this area, though there was an increasing trend between 2001 and 2006 also. Population growth in Hanmer Springs has been linked to tourism, and population increase in the Amuri district between 1996 and 2006 has been linked in part to extended irrigation (Amuri Irrigation Company, n.d.; Wilson, n.d.-b).

Table 6: Change in usually resident population of census area unit areas of Hurunui District, 2001-2013 (Statistics NZ, 2001, 2006, 2013)⁴

Area	Population 2001	Population 2006	Population 2013	Percentage change 2001-2013
Amberley (town)	1,137	1,302	1,575	38.5
Amuri (rural area)	1,347	1,530	1,644	22.0
Cheviot (town)	390	390	372	-4.6
Culverden (town)	396	420	426	7.6
Hanmer Springs (town)	681	732	840	23.3
Hurunui (rural area)	2,562	2,583	2,640	3.0
Waiau (town)	255	252	261	2.4
Leithfield (rural area)	2,217	2,385	2,832	27.7
Parnassus (rural area)	900	882	939	4.3
Hurunui District	9,885	10,476	11,529	16.6
Canterbury Region	481,431	521,832	539,436	12.0
New Zealand	3,737,280	4,027,947	4,242,051	13.5

⁴ The census area units in this table have been divided into towns and rural areas located to the north and south of the Hurunui River.

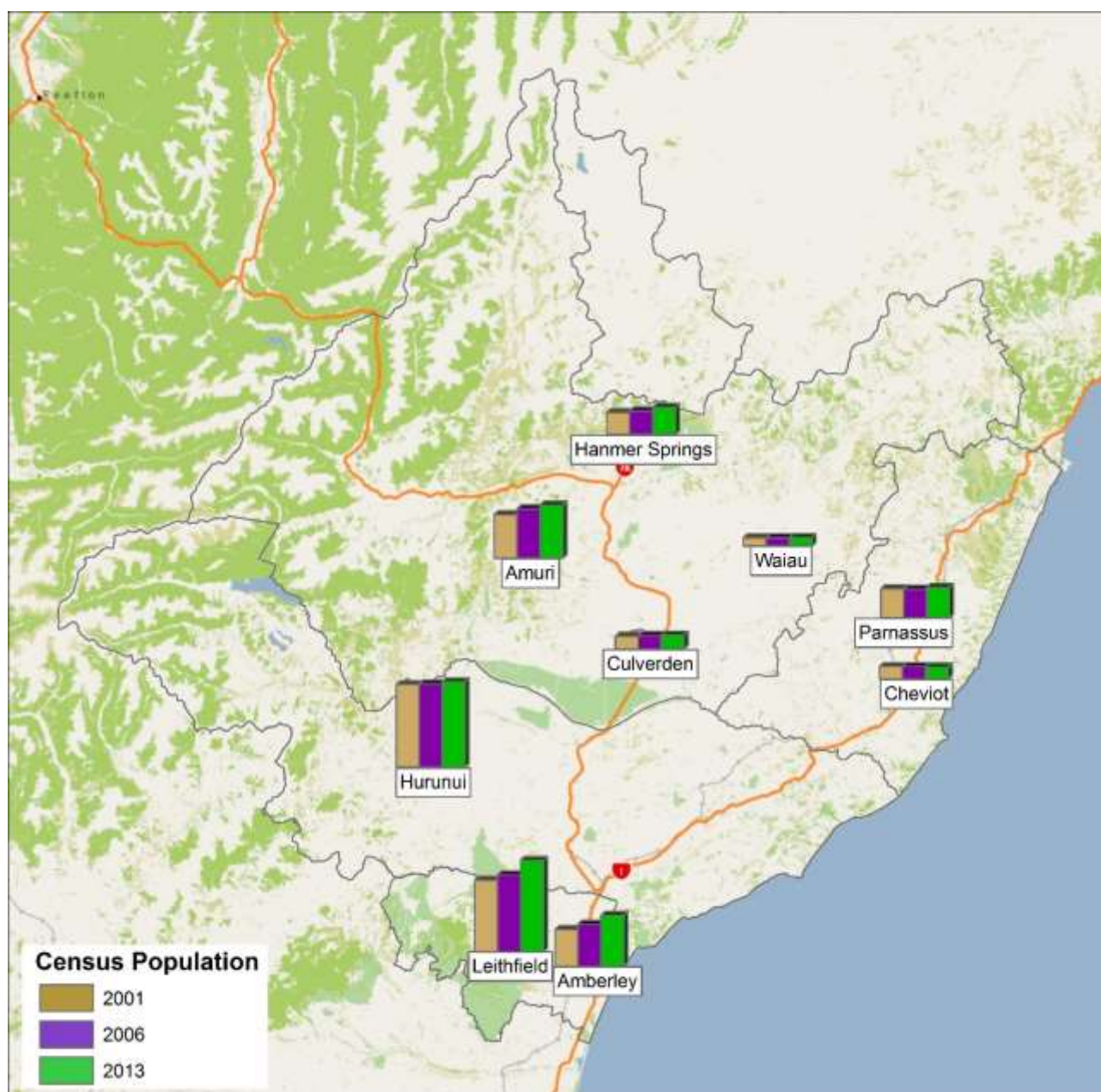


Figure 9: Change in usually resident population of census area unit areas of Hurunui District, 2001-2013 (Statistics NZ, 2001, 2006, 2013)

2.4.3. Population makeup

According to Statistics NZ Census data, the gender distribution of the Hurunui District is relatively even: 49.7% of the usual resident population was female and 50.3% male in 2013.

In recent years there has been rapid growth in non-European ethnic groups.⁵ Between 2001 and 2013 there was growth in residents who identify as Maori (+55.8%), Pacific Peoples (+133.3%), Asian (+394.1%) and Middle Eastern, Latin American and African (+144.4%). However, as a proportion of the total population, these ethnic groups together made up just over 10% of Hurunui District's residents. 'European or Other'

⁵ These figures are based on self-defined ethnicity data from the Census using Statistics NZ level one ethnicity classifications.

(which includes people who identify as 'New Zealander') was the most common ethnic group in the 2013 Census, comprising 89.7% of the total population.

Like many New Zealand regions, Hurunui District has an ageing population (Table 7). For the period 2001 to 2013, there was little growth in numbers of residents aged 19 years and aged 20 to 39 years (1.6% for each group). This rate was far below the overall rate of population growth for the district. In contrast, the number of residents aged 40 to 64 years and 65 plus grew at a much faster rate, 24.0% and 54.3% respectively (Figure 1010).

Table 7: Median age of residents in census area unit areas of Hurunui District, 2001-2013 (Statistics NZ, 2001, 2006, 2013)⁶

Area	2001 Median Age	2006 Median Age	2013 Median Age
Amberley (town)	45.7	46.5	49.4
Amuri (rural area)	34.2	36.4	34.8
Cheviot (town)	45.1	50.5	49.7
Culverden (town)	36.3	40.8	39.3
Hanmer Springs (town)	39.7	40.4	40.1
Hurunui (rural area)	38.8	40.7	44.4
Leithfield (rural area)	38.4	41.3	44.4
Parnassus (rural area)	41.1	42.1	46.8
Waiau (town)	39.8	39.5	43.1
Hurunui District	39.2	41.3	43.7
Canterbury Region	36.6	37.6	39.9
New Zealand	34.8	35.9	38.0

⁶ The census area units in this table have been divided into towns and rural areas located to the north and south of the Hurunui River.

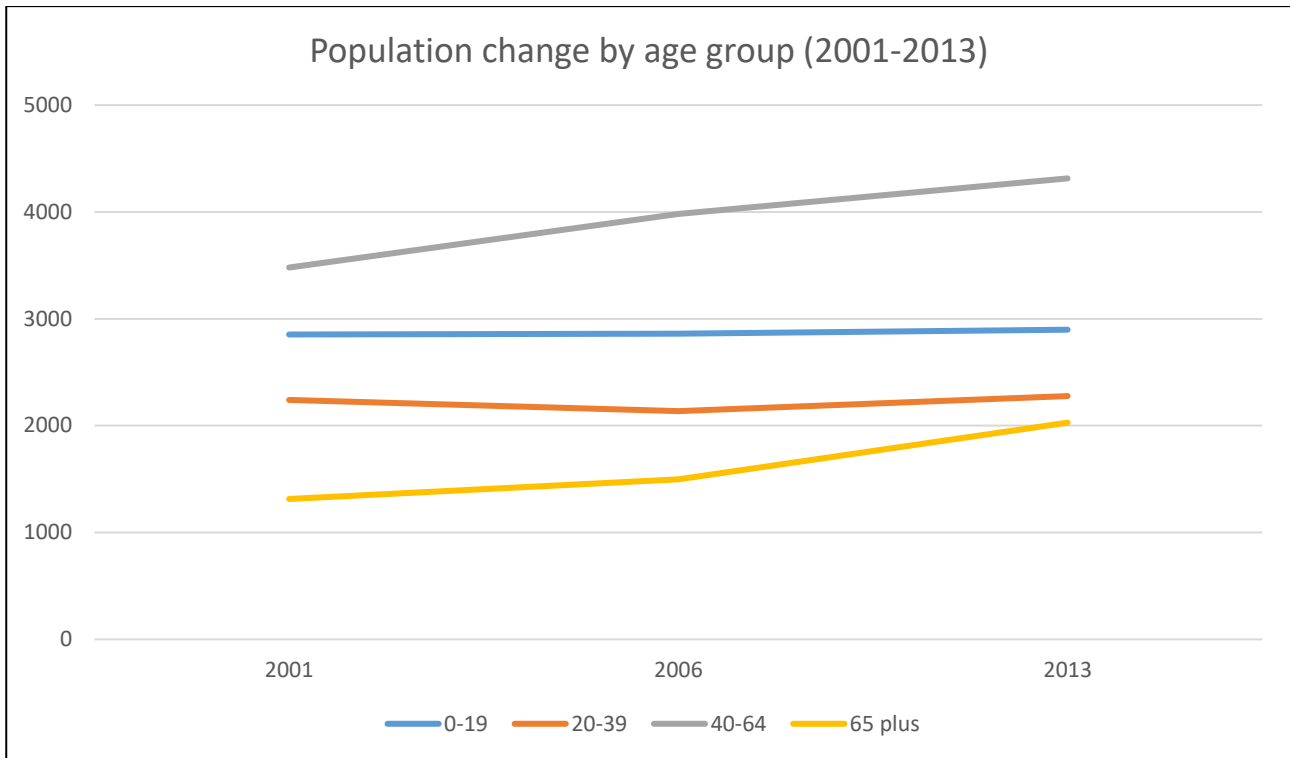


Figure 10: Population change by age group in Hurunui District, 2001-2013 (Statistics NZ, 2001, 2006, 2013)

2.4.4. Households

Householders predominantly owned the home they lived in or lived in a home owned by a family trust (68.9%) (Statistics NZ, 2013). However, there was a considerable rise in the number of households who did not own the home they lived in, increasing from 954 to 1,386 (43% rise) between 2001 and 2013.

In 2013 most households were one family (3,528), almost one quarter were one person (1,119), and the remainder were multi-family or multi-person (for example, flatting). The changing age demographics of the district's population has coincided with an increasing number of family types consisting of couples with no children (Figure 111).

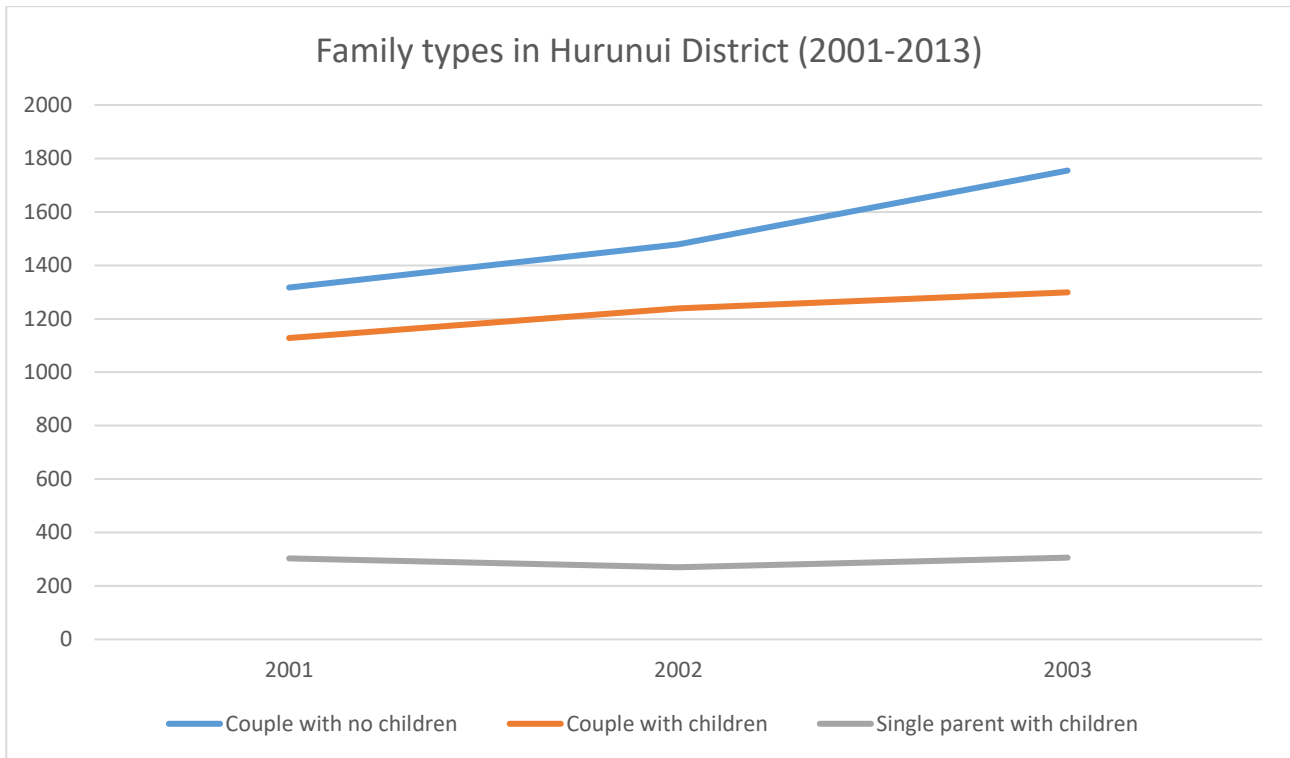


Figure 11: Change in family types in Hurunui District, 2001-2013 (Statistics NZ, 2001, 2006, 2013)

2.4.5. Residential mobility

Most Hurunui District residents reported being New Zealand born (85.0%) (Statistics NZ, 2013).

There was considerable residential mobility. In 2013 most residents had lived in the district for less than 10 years (7,656 or 70.2%). When asked where their usual residence was five years previously in 2008, 49.2% stated that they had lived in the Hurunui District, 38.5% in another area of New Zealand and 5.3% overseas. Approximately one fifth of residents were recent arrivals in 2013, having lived in the area for less than one year. From 2001 to 2013 the number of such recent arrivals grew from 1,746 to 2,178, nearly a 25% increase.

The towns of Hanmer Springs (63.9%) and Amberley (52.0%), along with the rural census area unit of Amuri (52.6%), had relatively high proportions of the population who had lived there for less than five years. Table 8 shows the change between 2001 and 2013 in numbers of people who had lived at their current residence less than five years.

Table 8: Numbers of people who had lived in the Hurunui District for less than five years, by census area units, 2001-2013 (Statistics NZ, 2001, 2006, 2013)⁷

Area	2001	2006	2013	Percentage change 2001-2013
Amberley (town)	600	663	819	36.5%
Amuri (rural area)	693	780	864	24.7%
Cheviot (town)	189	216	159	-15.9%
Culverden (town)	189	192	195	3.2%
Hanmer Springs (town)	402	468	537	33.6%
Hurunui (rural area)	1,119	1,056	1,011	-9.7%
Leithfield (rural area)	1,116	1,245	1,164	4.3%
Parnassus (rural area)	327	348	381	16.5%
Waiau (town)	111	126	117	5.4%
Hurunui District	4,746	5,091	5,247	10.6%

2.4.6. Socioeconomic status

The New Zealand Index of Deprivation (NZDep) is an area-based measure of relative socioeconomic status. The index incorporates eight dimensions of household deprivation, from Census data, to calculate a deprivation score for statistical areas (mesh blocks, aggregated to census area units) in New Zealand. The eight dimensions are:

- Communication (access to the internet)
- Individual income
- Household income
- Employment
- Qualifications
- Home ownership
- Family support (single parent families)
- Living space (household crowding threshold)
- Transport (access to a vehicle).

Index scores are categorised on a 1-10 ordinal scale nationally, where 1 is the 10% of relatively least deprived areas and 10 is the 10% of relatively most deprived areas. It is a measure of deprivation of areas, not individuals. Table 9 shows the relative national ranking of socioeconomic deprivation in census area units of Hurunui District.

There is large variation in how the areas are ranked by deprivation. Compared to townships, rural areas tended to be relatively less deprived. Given the greater diversity of people living in towns, this is unsurprising. Care should be taken when comparing areas, as the scores presented here indicate relative deprivation at a national and not a district level.

⁷ The census area units in this table have been divided into towns and rural areas located to the north and south of the Hurunui River.

Table 9: New Zealand Index of Deprivation for census area units of Hurunui District, 2006 and 2013 (Salmond, Crampton, & Atkinson, 2014)⁸

Census area unit	2006	2013
Amberley (town)	6	6
Amuri (rural area)	2	2
Cheviot (town)	7	8
Culverden (town)	5	5
Hanmer Springs (town)	6	4
Hurunui (rural area)	4	4
Letihfield (rural area)	2	3
Parnassus (rural area)	4	5
Waiau (town)	9	8

2.5. Outdoor recreation

In this section, outdoor recreational pursuits related to water are listed in turn. However, recreation in the area is a holistic experience. Water bodies provide a variety of related experiences, as part of a wider set of values. For example, Pompei (2015) described how the Hurunui River is valued recreationally, culturally and economically, and recognised as an outstanding natural landscape feature and an important habitat for native fish and threatened bird species. Recreation there includes camping, picnicking, walking and tramping, mountain biking, kayaking, fishing and whitebaiting.

Likewise, people in the regional and district communities enjoy the rivers for a range of active and passive recreations. A Canterbury resident giving evidence in 2009 (Special Tribunal, 2009) said she enjoyed rivers for their intrinsic values, and wanted them preserved for present and future generations. She tramped and camped with her family in the Hurunui, and visited there to observe a wide variety of birds. She also joined a hunting party which went by boat from Loch Katrine through the canal in “an area of overwhelming scenic beauty, outstanding natural landscape and where the water sparkles like crystal”. There is value in the environmental and social benefits gained from living in a pleasant rural environment, with the ability to enjoy a variety of outdoor activities.

2.5.1. Tramping, camping, picnicking, cycling and swimming

Two major conservation areas, Lake Sumner and Hanmer, have long been used for recreation, with hiking since the 1930s (Lovell-Smith, 2000). The Upper Hurunui area is used by trampers, and offers accessible back-country lakes and rivers in a very scenic setting. There is a notable tramp up the Taramakau, over Harpers Pass and down the North Branch of the Hurunui and alongside Lake Sumner (Special Tribunal, 2009), which now forms part of the Te Araroa – New Zealand’s Trail.

Mountain biking and horse trekking also take place (Lovell-Smith, 2000). There is a cycle trail in the Waipara Valley run by Hurunui Trails Trust, with long-term plans to extend a cycle network throughout the region.

Camping, picnicking and swimming are traditional activities associated with both the rivers and the sea (Lovell-Smith, 2000; Mosley, 2002). For example, Gore Bay, near Cheviot, offers camping grounds, surfing, swimming and beach-combing (Burgess, 2015). McRae described how, in the heat of summer, camps were spaced out along the sides of the Hurunui River (1993). There is a popular picnic and camping area by the

⁸ The census area units in this table have been divided into towns and rural areas located to the north and south of the Hurunui River.

Hurunui River on the south side of the Balmoral Forest (Wilson, n.d.-a). The Balmoral Camping Ground is a free camping spot, so offers entry level opportunity for people to have a rural holiday, with river access a key part. People also use the river as part of school trips (Special Tribunal, 2009).

The Hurunui and Waiau Rivers are moderately polluted compared to worse affected places in Canterbury. Where the water is polluted, this curtails recreation such as swimming and fishing. In personal conversations, instances were mentioned where the District Health Board put up warning signs near the Balmoral Camping Ground, and where toxic algal blooms affected swimming holes on the lower Hurunui River such as the swimming hole just before State Highway 1. A report on River and lake swimming in the Canterbury Region (Dynes et al., 2017) applied a River Values Assessment System to known swimming locations and also featured a 2016 online survey of 1371 respondents. While many of these were from Christchurch, giving more information on rivers close to the city, the Hurunui River featured as one of the Canterbury rivers most used for swimming. The survey also identified catchments where respondents reportedly no longer swim, and a small percentage named the Hurunui River, most giving pollution as the reason.

Pompei (2007) noted that the coastal marine area was also under pressure from small but expanding holiday settlements, recreational anglers, divers and walkers. Issues included erosion, sewage disposal, and impacts on dunes and wildlife estuaries.

2.5.2. Fishing

Hunting and fishing are traditional Hurunui District recreations (Lovell-Smith, 2000). The region offers fishing in rivers and lakes as part of an iconic backcountry experience, local recreational river fishing, and coastal fishing enjoyed at river mouths and beaches, plus whitebaiting (McRae, 1993). For example, Motunau offers surf-fishing. The settlement of Motunau Beach, at the northern tip of Pegasus Bay, is a top destination for Canterbury divers, attracted by crayfish and good bottom fishing, with a high turnout of anglers on most weekends (Burgess, 2015).

The Hurunui and Waiau salmon fisheries are of regional significance and are among the top ten salmon fisheries in the country (Millichamp, 2012). The Hurunui River is the most traditionally popular fishing destination, enjoyed by regulars and visitors. It is an outstanding salmon and trout fishery, especially in the lower river and river mouth for salmon, in an attractive location (Hawker, 2012; Pearson, 2013). The upper regions of the river are also fished, as are the lakes such as Sumner. The north branch offers a backcountry, remote fishing experience, with great scenery. Private anglers testified in 2009 that the Upper Hurunui was valuable for tourism (Special Tribunal, 2009). Fishing the north branch of the Hurunui River has been made more challenging by didymo, so the fishing is not as good as 15 years ago, though still good. The Pahau River, which flows to the Hurunui, is no longer used for trout fishing.

The Waiau River salmon fishery is of regional significance. It is popular, particularly with landowners and other rural residents who know people who can give easy access to the river (the lower Waiau is challenging to access due to lack of public roads) and with anglers who jet boat downstream (Millichamp, 2012). In the 2015-16 season, the mouth of the Waiau River ran dry, leaving local people to ask questions of the Amuri Irrigation Company. There is also fishing around Waiau township and Hanmer Springs. The tributary rivers, Boyle and Hope, are trophy trout fisheries. There is excellent fishing on the Lewis and Nina Rivers. (This upper area is also the site of the Boyle River Outdoor Education Centre for schools and community groups.)

Overall, there have been increasing angler days across lakes and rivers in the Hurunui and Waiau catchments (summarised in

Figure 122). In the North Canterbury region in October 2014-September 2015 the Hurunui catchment was the third most popular fishery ($16,370 \pm 2,810$ angler-days; 9% of the North Canterbury total), followed by the Waiau catchment ($6,780 \pm 1,370$ angler-days; 4%), divided between salmon and trout angling.⁹

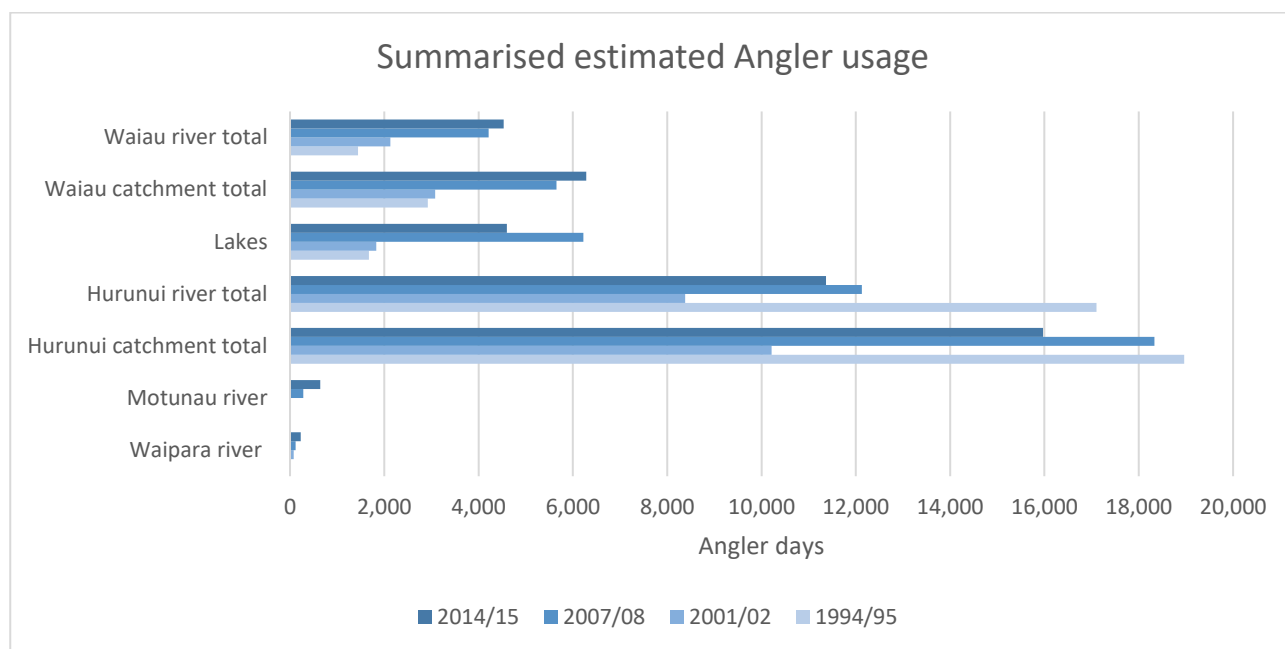


Figure 12: Trends in estimated usage (summarised) across waterways in the Hurunui & Waiau catchments (Unwin, 2016)

The majority of fishing in North Canterbury was done by North Canterbury license holders. The Waiau River was third most popular with anglers from other regions of New Zealand ($2,760 \pm 980$ angler-days). Overseas visitors accounted for a small number of angler-days (Hurunui catchment 400 ± 160 ; Waiau catchment 500 ± 170). There is evidence of a sustained increase in numbers for the Waiau catchment between 1994/95 and 2014/15 (Table 10). Annual effort in the Hurunui catchment has been variable with no clear trend (Unwin, 2016).

⁹ The Hurunui catchment includes Hurunui River, Lake Sumner, Mandamus River, Lake Mason, Lake Sheppard, Lake Taylor and Loch Katrine. The Waiau catchment includes Waiau River, Hanmer River, Hope River, Boyle River, Doubtful River, Nina River, Lewis River, Henry River and Lake Guyon.

Table 10: Estimated usage for lake and river fisheries recorded in the 1994/95 - 2014/15 National Angling Surveys (Unwin, 2016)

Catchment	Angling water	2014/15	2007/08	2001/02	1994/95
Waiau River	Waiau River (salmon)	2,280 ± 1,010			
	Waiau R (trout)	2,250 ± 760			
	Waiau R (species undefined)		4,210 ± 1,010	2,130 ± 420	1,440 ± 490
	Waiau River total	4,530 ± 1,260	4,210 ± 1,010	2,130 ± 420	1,440 ± 490
	Mason River			30 ± 30	
	Hanmer River		30 ± 30	30 ± 30	20 ± 20
	Hope River	750 ± 360	670 ± 310	340 ± 110	510 ± 300
	Boyle River	550 ± 220	320 ± 160	200 ± 80	390 ± 270
	Doubtful River		110 ± 110	50 ± 40	
	Doubtless River		110 ± 110		
	Nina River	20 ± 20	180 ± 120	40 ± 20	260 ± 260
	Lewis River	110 ± 60	20 ± 20	110 ± 50	270 ± 260
	Henry River				
	Ada River				20 ± 20
	Lake Guyon	320 ± 230		160 ± 80	
Total, Waiau catchment		6,280 ± 1,360	5,650 ± 1,080	3,080 ± 450	2,920 ± 730
Hurunui River	Hurunui R (above Mandamus)	4,580 ± 1,420	4,240 ± 800	2,910 ± 350	
	Hurunui R (below Mandamus)	6,790 ± 1,750	5,660 ± 950	4,370 ± 850	
	Hurunui River (undefined)		2,230 ± 720	1,100 ± 370	17,100 ± 3,330
	Hurunui R total	11,370 ± 2,250	12,130 ± 1,430	8,380 ± 990	17,100 ± 3,330
	Lake Sumner	2,430 ± 1,620	1,880 ± 520	520 ± 210	390 ± 170
	Waitohi River		220 ± 190		
	Mandamus River	150 ± 70	30 ± 30		
	Lake Mason	190 ± 180	380 ± 150	20 ± 20	300 ± 300
	Lake Sheppard	290 ± 140	180 ± 90	120 ± 50	230 ± 120
	Lake Taylor	1,230 ± 330	3,270 ± 1,280	970 ± 220	750 ± 250
	Loch Katrine	310 ± 160	260 ± 140	200 ± 70	190 ± 130
Total, Hurunui catchment		15,970 ± 2,810	18,330 ± 2,010	10,210 ± 1,040	18,960 ± 3,360
Motunau River	Motunau River	640 ± 630	280 ± 280		20 ± 20
Waipara River	Waipara River	230 ± 130	120 ± 80	80 ± 50	

2.5.3. Boating

Jet boats, rafts, canoes and kayaks have been in use on the district's rivers for many decades (Mosley, 2002). Lovell-Smith (2000) outlined the arrival of jet boating with adventure tourism in the 1960s. Describing the Hurunui River in the 1990s, McRae (1993) estimated that, on summer Sundays, rafts, canoes and kayaks might number a hundred craft on the length of the river. River users today include canoers, kayakers, rafters, tubing, plus newer craft such as riverbugs (single person raft sitting low in the water), and catarafting (twin hulled raft). Commercial rafting companies run trips on the Hurunui and Waiau Rivers.

The recreational value of rivers depends on the level of flow (not too low to be useable or so high as to become dangerous) and the quality of the water. People also enjoy scenic and wilderness features as seen from the river, a view which may be quite different to that from land. For instance, the waters of the Upper Hurunui River have a high degree of natural character, and kayakers in Māori Gully and the Hawarden Gap experience a nearly pristine, wild river (Special Tribunal, 2009).

The Hurunui River features class II and III kayaking runs for the skill level of basic to experienced paddlers, with a great variety of features in the river over a wide range of flows. The bulk of paddlers come from the Canterbury Region. It is also used by schools for their outdoor courses. It is a 'nursery' river where the clubs in Christchurch, such as the leading University of Canterbury Canoeing Club, can develop their sporting talent. The upper Waiau River is a class III-IV+ run, with wild water, outstanding scenery and some dangers, so a challenge for advanced paddlers (Rankin, Earnshaw, Fox, & Botterill, 2014). The only white water trip of its kind in Canterbury, it is featured in guidebooks and attracts expert paddlers from throughout New Zealand and a few from around the world.



Figure 13: Ian Fox paddling in Māori Gully on the Hurunui River. Photo: Graeme Wilson (Rankin et al., 2014)

While the focus of this study is social activities of zone residents, only some of the people who use the rivers for recreation live within the zone, while some come from elsewhere in the Canterbury Region and New Zealand. The value for zone residents from these activities may be direct (ability to go swimming, ability for a child to go on a river-related school trip) or they may be indirect (income from recreational tourism, enjoyment of New Zealand sporting achievement on the water).

2.6. Water supply

Water can be needed for homes, industries, agriculture and irrigation, conservation programmes, recreational activities, fishing and power generation. Many social and economic activities of the zone are underpinned by the quality and quantity of freshwater available. While measurement of the biophysical qualities of freshwater is outside the scope of this study, the social (and economic) values that residents attach to water are considered. Two particularly significant uses are for drinking water and in farming. Three quarters of consents for use of groundwater in the area are for irrigation (75.6%), with 5.3% for town supply (Land, Air, Water Aotearoa, n.d.).

2.6.1. Drinking water

The Waiau River floodplain has been the site of many historical flooding events, and one likely effect of climate change will be to increase the intensity of extreme rainfall events (Griffiths & Wild, 2015). In contrast, the region has also experienced drought, making security of water supply for drinking and for farming very important. Lovell-Smith (2000) described the history of local towns developing water and sewage schemes, including a variety of water schemes run by local committees. These aimed for security of supply. For instance, in the late 1990s drought, the source for the Hawarden-Waikari water supply dried up, leading to water restrictions in February 1998. Tankers shipped in water, following which a new pipe from the Hurunui River was installed.

The Hurunui District Council website lists thirteen Council-owned water schemes, extracting water from over twenty sources, overseen by water committees. The website also itemises current water quality issues, including boilwater notices (for example, Amberley Beach with *E. coli*) and algal blooms (for example, Waipara River). The Council has until 2025 to meet national drinking water standards. As much infrastructure is old, it may need to spend up to \$14 million on upgrades (Broughton, 2016; Mitchell, 2016a).

Residents' concerns over the quality of drinking water have been reported in The Press. Amberley water was described as rusty brown, "crunchy" in texture, corrosive to bathroom surfaces and appliances, and causing dyed hair to fall out. This was attributed to fluctuating iron levels following the earthquakes and to water 'hardness' (excess levels of calcium carbonate). A Facebook group to discuss water issues in the district attracted nearly 300 members, sharing stories about health effects from drinking the water, including stomach upsets. Medical and Council officials were quoted as saying it was unlikely that the sickness reported was related to hardness and iron in drinking water (Broughton, 2016; Mitchell, 2016a).

The Hurunui District Council announced in 2017 that it will permanently chlorinate its drinking water supplies.

A Council statement was quoted in The Press: "Over the past year there have been a number of *E. coli* transgressions in Hurunui which have had the potential to adversely impact residents' health" (Mitchell, 2017). Council data showed 88 transgressions in the district's drinking water supplies since 2012. In 2014, supplies for Cheviot, Waiau, Amberley and Waipara had excessive *E. coli* levels and failed protozoa tests (protozoa, for example cryptosporidium and giardia, can stem from contamination by human or animal faeces). Seven rural water schemes were on a permanent notice to boil water in 2016. The Hanmer Springs water supply was contaminated with *E. coli* at the peak of the tourism season, bringing some businesses to a halt. Two months prior, in 2016, Hanmer Springs ran out of water. The Amuri Plains scheme was compromised both by the 2016 earthquake and the construction of the Amuri Irrigation Scheme, according to the Council. There were also transgressions in the Hawarden/Waikari scheme (Broughton, 2016; Mitchell, 2016a, 2016b, 2016c, 2017). Hurunui Mayor Winton Dalley was cited as acknowledging there had been a huge increase in dairy farming over the past ten years, but that this was not responsible for increased risks to drinking water safety. "There's a whole raft of potential sources of contamination in our rivers, and that's wild fowl, wild animals... humans. There is contamination from all sources and dairy is only one of them" (Broughton, 2016).

2.6.2. Irrigation

The farm productivity of the region is affected by dry Canterbury summers and droughts. For over a century, water was taken from rivers for farming purposes using water races. In the 1970s there was enthusiasm for large scale public works. A scheme to take water from the Waiau River was approved in 1975 and a poll of 85 local farmers voted to proceed. The first of the Amuri schemes to open was Waiareka Downs in 1976, irrigating eight farms. The Waiau scheme began in 1977 and the intake gates of the main water race were opened in 1980. Other projects followed, including taking of water from the Hurunui River (Amuri Irrigation Company, n.d.).

In the early 1980s there were successive droughts. Many farms were partly developed with borderdyked land, but only a few could receive water. Water charges became higher and development slowed, though farms that did receive irrigation showed productivity gains, with an increased stock rate. Escalating construction costs, inflation and low meat and wool prices meant that farmers could not afford high water charges. In 1986 a government review of community irrigation schemes suggested that the sale of these schemes might solve the ongoing problems. The Amuri Irrigation Company Limited, a company wholly owned by farmers, acquired the three Amuri schemes in 1990 (Amuri Irrigation Company, n.d.).

Irrigation was first intended for more intensive sheep and beef farming. However, it was suited for dairy and the first dairy farm was established in the Amuri in 1982. Conversions to dairy gained momentum in the 1990s. The Amuri Irrigation Company irrigated area now has around 70 dairy farms, and is 60% dairy, 25% dairy support including cropping, and 15% sheep, deer, beef and cropping. Irrigation has become not just insurance against extreme weather, but also a tool to get maximum efficiency from land (Amuri Irrigation Company, n.d.).

Drought in the late 1990s placed stress on environments, farms and communities in the Hurunui District. In 2002 a group of farmers formed a trust, aiming to create greater reliability of water access and improve resilience to future droughts. They later became the Hurunui Water Project Limited (Thomas, 2014). It is a farmer-shareholder based irrigation company with the support of landowners across 42,000ha, most of whom have no access to water for irrigation (Hurunui Water Project, n.d.).

This was a time when water was becoming a critical issue in Canterbury. Conservationists and recreationists were concerned further intensive land use and water extraction would cause environmental damage and undermine water values. The quality and use of freshwater became the subject of much community and political debate (Knight, 2017; Thomas, 2014).

Initial Hurunui Water Project plans focused on placing a dam over the south branch of the Hurunui River and a weir on the outlet of Lake Sumner on the north branch. Kayaking organisations and Fish and Game led opposition to the scheme, though legal processes were superseded in 2010. The Hurunui District became the site of the first devolved, catchment-based committee established under the Canterbury Water Management Strategy, and a plan for the Hurunui and Waiau rivers became operative in 2013 (discussed in 1.4 **Error! Reference source not found.**). Over the past decade, there have been several applications by irrigators and power companies to dam the Hurunui River to generate electricity and extract and store irrigation water. Due to the high level of public opposition, attention shifted to the Waitohi, in the mid-reaches of the Hurunui catchment (Forest & Bird, n.d.; Pompei, 2015). The Hurunui Water Project was granted resource consents in 2013, the Amuri Irrigation Company and Ngāi Tahu Property appealed, concerned about the effects on their own irrigation schemes, and in 2015 the High Court gave it the go ahead (Knight, 2017).

Farmers who gave evidence to the Special Tribunal (2009) on the Hurunui River spoke of the social and economic benefits of irrigation. They explained how production and profit on dryland farms was limited by a shortage of water, with low summer rainfall, concerns over climate change, and little groundwater to be tapped. They considered the economic benefits resulting from irrigation would strengthen the community, for

instance decline in community activities would be reversed by increased economic activity resulting in an increase in the population.

McRae (1993) wrote that the Amuri irrigation scheme had brought farmers together. However, the apportioning of water also has the potential to create divisions within the farming community. For example, when the Hurunui Waiau River Regional Plan proposed to restrict activities where increased nutrient losses of more than 10% might result (discussed in 1.4 Planning Context), dryland farmers were concerned the rules meant they could not undertake even moderate intensification of their farms, unlike those farmers who had already intensified (Robinson, 2014).

In recent years there has been high awareness of the need for sustainable land use practices (Macfie, 2010). However, there are issues in the Canterbury Region with declining water quality and a loss of cultural and recreational use (Environment Canterbury Regional Council, n.d.). For example, conversation with stakeholders suggested that the Waikari River experienced intermittent flows and the Waipara River, where farmers and wine-growers obtained early access to large permits, sometimes experienced minimum flows. Balancing all the social, economic and environmental needs for and values of water remains challenging.

3. Potential social indicators

The social profile has been prepared as a baseline for potential changes in the Hurunui District and to inform a set of indicators to measure the consequences of change. The following section discusses the pros and cons to measurement and sets out a range of indicators.

3.1. What needs to be measured?

The primary purpose of the indicators will be to assess the social consequences of changes resulting from the “Healthy rivers – productive land” solutions package, including a review of the HWRRP. A set of indicators can aid decision-makers to evaluate the package and HWRRP by measuring the degree of change against the baseline. An effective and useful set of indicators needs to be able to:

- Observe meaningful change (or lack of change)
- Correspond with plausible mechanisms between potential package changes and the social environment
- Recognise and/or incorporate significant secondary factors that could otherwise explain changes.

Practical issues of measurement are important to consider. The social profile reported above calls heavily on high quality routinely collected data sources, such as the Census, because they are readily available at no or limited cost. In contrast, bespoke survey data can provide more detailed and pertinent information but is less regularly collected as it can be onerous and expensive. However, not all aspects of social environments can be well captured using either routine or bespoke survey data. For example, capturing the quality and extent of social networks within an area, or the level of community ‘belonging’, is difficult to achieve in a robust way. To a large extent, indicators will therefore be dependent on proxies for the underlying concept of interest. For instance, high levels of residential stability are associated with increased sense of belonging and social cohesion, so could be considered a useful proxy alongside other factors.

Indicators need to reflect the ways in which changes from the “Healthy rivers – productive land” solutions package could plausibly affect the social environment, while taking into account the broader social, cultural and natural environmental changes taking place in New Zealand. For example, changes in the provision of high speed internet services (like the Rural Broadband Initiative) have the potential to change the locations where business takes place, increasing the attractiveness of rural locations such as the Hurunui District to new business sectors and residents.

On the other hand, a social change can result from multiple factors. For example, changes in crime levels may be a response to changes in policing practices, local authority amenity provision and/or housing. So while there are likely to be many social changes that can be correlated with a plan change, thought needs to be given as to whether there is a plausible causal relationship that can be observed with the data that is available, and that is not better explained by other factors.

3.2. Indicators

Based on the social profile presented above, we have identified three areas where indicators could be useful for decision-makers to consider implications of the “Healthy rivers – productive land” solutions package, and what that means for planning for the management of freshwater and the social environment in the Hurunui District.

3.2.1. Diversification of community and livelihoods

A feature of changes described over the long and short-term has been a diversification in who lives in the Hurunui District, as well as diversification in the work and recreational activities undertaken there. Increased diversification (or a reversal) could be seen through changes in:

- *Residential mobility:* The proportion of new residents compared with longer term residents could reflect planning changes if employment and lifestyle attractors continue to grow.
- *Household tenure:* The proportion of home owners compared with renters could reflect planning changes if the type of agricultural changed the likelihood of owning a home. For example, rental housing may be tied to certain types of farming employment, or relatively low wages, and/or shorter term or fixed term employment contracts making buying a house difficult or impractical.
- *Sociodemographic composition:* The social makeup (age, ethnicity, education and income levels) of the district will continue to reflect the type of employment, housing and lifestyle opportunities available in the Hurunui District.
- *Business composition:* There has been an increase in the diversity of business sectors in the region in response to economic, environmental and technical factors such as irrigation. The relative strength of some sectors, such as tourism or dairying, are likely to be sensitive to changes.
- *The range of water-based recreational activities:* Hurunui District's waterways have been used for increasingly diverse activities over time, supporting both commercial and private recreation in places across the district. The range of location and type of activities could be affected by changes.

3.2.2. Changes in water-related activities and places

Who lives, learns, works and plays in the district could change as a consequence of the solutions package. This could be seen through changes in:

- *Total number of businesses:* Changes could affect the capacity of the district to support the same level of business activity.
- *Employment levels:* Changes may occur in work opportunities related to the level of business reliant on water quality or quantity (notably for irrigation-supported agriculture and tourism).
- *Total number of households:* More employment and/or improved natural environments could attract new households to the district for lifestyle benefits. Conversely, loss of employment overall or in particular sectors, and/or decline in water quality could lead to a decline in the total number of households or in particular types of households, for example, families with children.
- *School roles:* Plan-related changes affecting employment opportunities and/or lifestyle could affect school roles in terms of overall numbers, student turnover, and the ability to recruit and retain teachers.
- *Hardship and poverty:* Unmitigated changes in livelihood and housing opportunities could lead to unmet needs within communities, resulting in higher levels of unemployment, numbers of households on benefits and so on. Substantial changes could lead to a shift in the relative deprivation ranking of areas.
- *Health:* Residents' and visitors' perceptions and/or experiences of the quality of drinking water and quality of water bodies used in contact recreation may affect their perceptions and/or experiences of positive or negative health outcomes. In turn, this may affect the quality of residential or tourist enjoyment.
- *Accessibility to water-related places and activities:* Changes in the plan could affect levels of access to the places where people engage with water, through land use change, through changing water quality and flows (for example for kayaking), and through formal and informal rights of way.

3.2.3. Social drivers and consequences of changes in water-related activities and places

Broader societal and regional factors are also likely to play a part in determining the demand for water use and engagement with water-based places and activities in the district, reflecting a two-way interaction between potential changes identified in the "Healthy rivers – productive land" solutions package and how the community responds. Relevant factors could be seen through:

- *Population change:* Substantial increase or decrease in the population of Hurunui District could change the demand for the supply of water for household and business consumption.
- *Economic or technological change:* Changes in agricultural markets, technologies or practices might affect the demand for the supply of water for business consumption.

- *Number of water-dependent businesses:* A number of factors could change district levels of commercial activities with a high dependence on water use. For example, levels of adventure tourism could change in response to changing water flows and quality.
- *Leisure preferences:* Changing populations within the district, as well as broader societal changes, affect expectations and social norms around water use and engagement with the natural environment. Such preferences could affect the 'social licence' for plan changes, as well as water and non-water recreational behaviours.
- *Expectations and tolerance for water quality:* Broader societal factors could change local and neighbouring expectations for water quality, as well as national level regulatory changes.

4. Summary

The need for this work arises from the review of the ZIP, the “Healthy rivers – productive land” solutions package, including a targeted review of the HWRRP. The Hurunui-Waiau Zone Committee need to understand the current state of the environment, including the profile of the community with respect to economic, social and cultural drivers of change to sit alongside the biophysical work to date. The work presented here focuses on the social profile as a baseline for making decisions about changes to the HWRRP.

The report describes the historical and current social environment using a range of data sources. Published reports have been sourced from local government, websites, media, academic studies and books, and have included reporting from earlier Tribunal hearings. Current social data has included census and business demography datasets as well as recent survey data on water-related recreational activities in the area. Information has also been supplemented with key informant interviews with stakeholders and meetings with the Science Stakeholder Group.

The Hurunui and Waiau districts remain a largely agricultural community, albeit with increasing diversification in the types of farming as well as increasing non-agricultural livelihoods. Irrigation schemes in the 1970s and 80s saw more stability for sheep and beef farming (as intended), but also saw an increase in dairying in irrigated areas.

In recent years livelihoods in the Hurunui and Waiau districts continue to be predominantly in small, agricultural businesses. The number of sheep and beef farms have declined, while there has been a steady increase in most non-agricultural businesses, notably in the construction sector. The accommodation and food services sector is the second largest employer in the district after farming. Not surprisingly, there has been a steeper increase in the number of employees than seen for employers or self-employed.

Where people live has also been changing. Greater population growth has been seen in the south of the district as well as in Amuri and Hanmer Springs, with similar growth patterns in school rolls. With the increases in population has come greater residential mobility, with more residents coming from outside of the district in these areas.

While household income and qualification levels are generally lower than the New Zealand average (as often seen in rural areas), there has been an increase in the number of higher income households in the region. Overall, deprivation levels appear stable relative to the rest of New Zealand, with the exception of Hanmer Springs where there has been a decline in relative deprivation.

As well as business activities, a wide range of recreational activities take place on and around water across the district. The area is used by locals and non-locals; casually and formally; socially and for commercial purposes. The range of activities include tramping, cycling and horse riding, camping, picnicking, swimming, rafting, jet boating, kayaking, and fishing. The waterways are valued for their provision of a wide range of skill levels, allowing learners as well as challenges to experts. These water-activities and places are recognised as being vulnerable to changes in water levels and quality.

Building on the history and baseline, a set of indicators have been described that can help decision-makers consider the implications of the solutions package. They include indicators of diversification in the livelihood and community make-up; the changes in where water-related activities take place; and social factors that could interact with the solutions package in a significant way.

The social profile reported here sits alongside the economic profile and other ecological and landscape reports. It can therefore be taken as one part of a larger picture about the Hurunui Waiau district and its people.

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