

# **South Canterbury Coastal Streams (SCCS) Limit Setting Process: Social Profile and Assessment**

**Technical Report Prepared for Environment Canterbury**

**by Nick Taylor, Wayne McClintock, Mike Mackay<sup>1</sup>**

**Taylor Baines and Associates**

**January 2015**

---

<sup>1</sup> Lincoln University

## Table of Contents

1	Introduction .....	3
1.1	Objectives of the assessment.....	3
1.2	The assessment area .....	3
1.3	Data sources.....	3
1.4	ZC Outcomes and technical indicators.....	4
1.5	Scenario assessment method .....	5
2	Social profile of the Southern Streams area .....	6
2.1	Introduction to the profile .....	6
2.2	Economy and employment .....	6
2.3	People and communities.....	9
2.4	School rolls in Waimate District .....	12
2.5	Social issues.....	13
2.6	Stock, drinking, and waste water .....	13
2.7	Outdoor recreation .....	14
2.8	Stakeholder groups .....	19
3	Assessment of scenarios.....	21
3.2	Land use change.....	22
3.3	Vibrant economy and sustainable growth .....	22
3.4	Population in the SCCS area .....	24
3.5	Services including health and education.....	24
3.6	Drinking water meets quality standards .....	26
3.7	Wainono Lagoon is a healthy ecosystem .....	27
3.8	Coastal streams have high water quality .....	29
4	Discussion of the Zone Committee Solutions Package (ZCSP) .....	31
4.1	Development of the ZCSP .....	31
4.1	Proposed pathways of the ZCSP.....	31
4.2	Summary of social effects .....	32
4.3	Management of change .....	33
5	Conclusions .....	35
	Glossary .....	36
	References .....	37
Attachment 1	Maps of the SCCS area .....	40
Attachment 2	Further tables and commentary on the social profile of the area in 2013 .....	43
Attachment 3	Description of scenarios.....	51

# 1 Introduction

## 1.1 Objectives of the assessment

The social analysis reported here was part of the process for setting nutrient limits, and minimum flows and water allocation for the South Canterbury Coastal Streams (SCCS) through a sub-regional plan of the Canterbury Region's Land and Water Regional Plan (LWRP).<sup>2</sup> The limit-setting process was undertaken by the Lower Waitaki – South Canterbury Coastal Zone Committee (ZC)<sup>3</sup> under the auspices of the Canterbury Regional Council (ECAN) as part of the Canterbury Water Management Strategy (CWMS). The goal of the zone committee is to work with the community to develop a programme of water management recommendations which give effect to the vision and goals of the Canterbury Water Management Strategy (CWMS). The ZC see there is an opportunity to improve the health and mana (cultural power and values) of Wainono Lagoon, while realising the potential gains in production possible through the proposed Waihao Downs Irrigation Scheme (WDIS) and the Hunter Downs Irrigation Scheme (HDIS).<sup>4</sup>

## 1.2 The assessment area

The SCCS assessment area is within Waimate District in South Canterbury and lies between the Otaio River in the north and the Morven drain in the South. The Zip Addendum splits the area into three parts as shown in the map in Attachment 1:

1. Waihao Wainono - Wainono Lagoon and the rivers and streams that flow into it
2. Northern Streams - Otaio River, Makikihi River, Kohika Stream and Horseshoe Bend Creek
3. Morven Drain and Sinclairs Creek.

To the south of this area, while not a direct part of the assessment area, the Waitaki River has a significant influence on the three parts because it is the primary source of water for surface-sourced irrigation water in the SCCS area, and in particular the future WDIS and HDIS schemes.

The town of Waimate is the main settlement in the assessment area, however, there are a number of smaller settlements that are important to the social environment, including St Andrews, Makikihi and Studholme. Outside the catchment, to the north, is Pareora and to the south is Glenavy. There are a number of smaller localities as well. A detailed description (baseline profile) of the social-economic characteristics of the assessment area is provided in Section 2.

## 1.3 Data sources

The baseline profile (Section 2) and the assessment of scenarios and the proposed solutions package utilised a wide range of data sources including:

- published information from a number of sources
- official statistics, including the 2013 census
- other documentary sources including local histories and manuscripts
- comparison case data from throughout Canterbury
- visitor brochures, websites and other visitor information

---

<sup>2</sup> The authors acknowledge the leadership and helpful comments of Team Leader, Ned Norton and the collaborative input of other technical team members cited in this report, as well as helpful peer review comments from Dr Mark Fenton.

<sup>3</sup> <http://ecan.govt.nz/get-involved/canterburywater/committees/Pages/about-zone-committees.aspx>

<sup>4</sup> Draft ZIP Addendum: South Coastal Canterbury.

- interviews and discussions conducted in the assessment area
- discussions at three Community Workshops.

Data sources are identified throughout in footnotes.

The social profile summarises the “current state” of the South Canterbury Coastal area including the main town of Waimate. Historical data are also discussed and, where available, trends (over the last twelve years in particular) are described, to provide a picture of recent changes in the area and to consider what it might look like if there are no further major land use changes from this point, such as might be the case if proposed water schemes do not proceed. Updating of the social profile continued throughout the planning process, recording wherever possible the views of local people and those aspects of the catchments that they value, alongside the different technical analyses.

#### **1.4 ZC Outcomes and technical indicators**

The ZC established a number of outcomes and sub outcomes that they expect a sub-regional plan to achieve. These outcomes include social-economic outcomes alongside, ecological and cultural outcomes. In the assessment in sections 3 and 4, below, technical indicators are used to help to establish the likelihood of achieving these outcome. The outcomes are:

##### ***“Wainono Lagoon is a healthy ecosystem***

- *Abundant mahinga kai*
- *Fish passage is provided throughout the catchment where appropriate*
- *Enhanced wetlands and protection of springs*
- *No further reduction in water quality of the lagoon (acknowledging and allowing for its transitional state)*
- *Catchment flows and water quality support a healthy lagoon*
- *Maintenance and Enhancement of the Mataitai Reserve*
- *Enhanced riparian management*

##### ***Vibrant economy, and sustainable growth***

- *A growing local economy*
- *Highly reliable and secure irrigation*
- *Protection of Wahi Tapu and Wahi Taonga*
- *Diversity of farming systems*
- *Good rural and urban land management practice is common practice*
- *Safe water for contact recreation throughout the Zone*
- *Safe drinking and stock water supplies exist in the Zone*
- *Safe water for cultural use*
- *Catchment drainage and flood risk is managed*

##### ***Coastal streams have high water quality***

- *That supports aquatic life and biodiversity*
- *flows supports aquatic life and biodiversity suitable for waterway*
- *connected groundwater has healthy flows and high water quality.*<sup>5</sup>

---

<sup>5</sup> Draft ZIP Addendum: South Coastal Canterbury.

## 1.5 Scenario assessment method

This social assessment drew on scenarios of change that were the focus for engagement by ECAN and the technical team with the SCCS communities and key stakeholders in the early stages of the work programme. The scenarios are summarised in the introduction to section 3. The scenarios and assumptions are described in detail in an Overview Report<sup>6</sup> and a summary description is provided in Attachment 3. The scenario assumptions have been applied consistently by the authors of all the multidisciplinary reports.<sup>7</sup>

For each scenario, the social assessment used comparative cases to understand likely social change with different levels of irrigation and farm intensification, drawing on New Zealand research and case studies of social change that is typically driven by land-use and associated changes in farm systems, farm ownership and community demographics with new irrigation. The scenario assessments used baseline information in conjunction with comparative case data from the Amuri/Hurunui, Central Plains/Selwyn, Hinds/Ashburton, Waitaki Valley and Opuha irrigation areas.

The assessments also utilised maps of current and potential land-use activity supplied by ECAN, as well as information from economic and farm management analysis. Likewise very relevant was the analysis of drinking water quality and the cultural assessment work. The recreation assessment also drew on the analysis and narratives developed to assess the effects<sup>8</sup> of scenarios and policy proposals on stream ecology, and surface and groundwater quality.

It should be emphasised that comparison cases are only indicators of social change and local conditions need to be considered alongside these cases. Discussions at community workshops were therefore very helpful when investigating the potential social effects of each scenario and later the solutions package. Discussions of the scenarios at workshop focus groups provided important information for refining the social assessment.

---

<sup>6</sup> Norton and Robson 2015.

<sup>7</sup> Including water quality (Kelly, 2015), cultural values (Tipa, 2014), groundwater quality (Scott and Etheridge, 2015) and economic values (Harris, 2015)

<sup>8</sup> In this report the term effect (as defined in the RMA, s2) is synonymous with impact, the term more commonly used internationally.

## 2 Social profile of the Southern Streams area

### 2.1 Introduction to the profile

This social profile summarises the current state of the South Canterbury Coastal Streams (SCCS) Catchments. The profile provides a baseline from which future water management options can be assessed. Where available, trends (over the last twelve years) are described, in order to provide a picture of recent changes in the catchment. Historical data are also referred to for a sense of longer-term trends.

Where possible, information is provided about the catchments, the town of Waimate and small settlements and the people who live there. However, it is not possible to always separate the catchments from the wider Waimate District in which the catchments are located. Much of the available data is available at the District level, and important services such as health, education, retail and other services are delivered in the main town. Hence this profile includes some District data, while its main focus is on the catchments as defined by Environment Canterbury (see attached map).

The baseline profile was developed from a wide range of data sources comprising published information, official statistics including the census, other documentary sources including local histories and manuscripts.

The social profile reflects a wide range of social and cultural values present in the catchment. These values are also the subject of complementary technical areas such as economics, ecology, water quality and cultural assessment. It is also important to note that values vary between people and groups, and change over time as a result of current conditions. Major value areas covered in this profile include those associated with:

- the productive and consumptive uses of water that provide reliable irrigation, drinking and stock water supplies, enabling people to meet social needs and gain economic livelihoods from a mix of farming systems;
- the people and communities of the catchment, their identities, ways of life and historical linkages to water; and
- the recreational, ecological and intrinsic values of rivers, streams, groundwater and drains, lakes, lagoons and wetlands, and the cultural and aesthetic values associated with them.

Updating the social profile continued throughout the planning process, capturing wherever possible the views of local people and their valued aspects of the catchment. Information was added from interviews and discussions in the assessment area, and discussions at public meetings and community workshops as the assessment process proceeded.

### 2.2 Economy and employment

In a rural area, such as the SCCS Catchments, the economy drives employment, which in turn influences the size and composition of the population, its growth, and the services and community life that sustain a high level of social and economic wellbeing for residents.

Waimate District experienced very strong economic growth in 2012. A report by BERL notes that the District, with the fastest GDP growth of 17 per cent, moved up 21 positions to fifth place in the regional rankings of New Zealand that year. This growth was mainly driven by a 33 per cent increase in primary sector GDP. The District had 2,600 FTEs, and generated \$200 million in GDP from 1,200 businesses. The primary sector in Waimate District provided 55 per cent of both on and off farm

employment and 53 per cent of GDP.<sup>9</sup> Further details on the employment status and industrial classification of the working-age population are available in Attachment 2 (Tables A7 & A9).

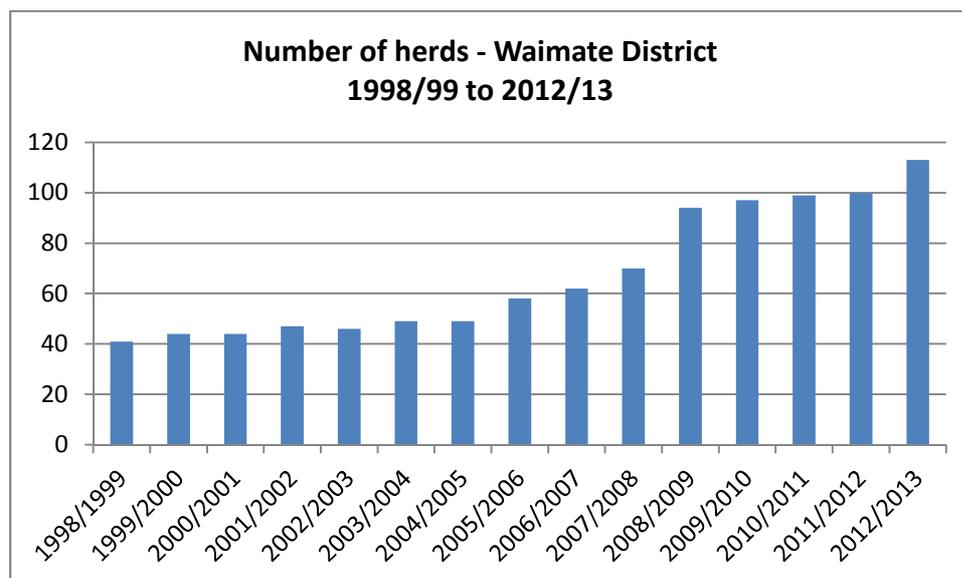
Almost all the farmland on the coastal strip is used for horticulture, dairy and sheep production. Dairy production predominates in the northern part of the Waitaki Valley from Ikawai to the coast following irrigation of the lower Waitaki during the 1970s, and more recently has spread upstream from Ikawai.

The dairy industry is a major contributor to the economy of the Waimate District. A study by the New Zealand Institute of Economic Research found that in 2009 dairying directly contributed more than \$143 million of GDP and 21 per cent of employment (470 jobs) to the District's economy (410 jobs on farm and 60 in processing).<sup>10</sup>

Dairying was an integral part of mixed farming in the Waimate District before the 1970s and then developed on a large scale after the opening of the Morven-Glenavy irrigation scheme in 1974.<sup>11</sup>

In 1998/99 the Waimate District had 41 dairy herds, (average herd size of 546) and by 2012/13 there were 113 herds (average herd size of 842) with 56 owner/operators and 51 sharemilkers.<sup>12</sup> The number of herds and livestock increased rapidly between 2004/05 and 2008/09, but since then the rate of growth has moderated (see Figure 1). The growth in dairy herds and their size has been accompanied by the increased production of fodder crops in areas supporting the dairy industry. Further growth in the District is restricted by the availability of suitable water for irrigation.

Figure 1: Number of dairy herds - Waimate District 1998/99 to 2012/13



Source: NZ Dairy Statistics as cited.

<sup>9</sup> Leung-Wai, J. (2013): 11.

<sup>10</sup> Schilling *et al* (2010): 35, 38.

<sup>11</sup> Wilson (1999): 228, 235.

<sup>12</sup> Livestock Improvement Corporation Ltd (2002). New Zealand Dairy Statistics 2001/2002. Livestock Improvement Corporation Ltd, Hamilton. Downloaded from <http://www.lic.co.nz> 21 January 2008. Livestock Improvement Corporation and DairyNZ (2013). New Zealand Dairy Statistics 2012-13. DairyNZ, Hamilton. Downloaded from <http://www.lic.co.nz> 26 March 2014.

Milk from these herds is processed at Fonterra's factories at Studholme (Waimate District) and Clandeboye (Timaru District). The factory at Studholme, which Fonterra purchased from New Zealand Dairies Ltd in 2012, has a production capacity of 30,000 metric tons per season and employs 45 people,<sup>13</sup> and a further factory under construction near Glenavy is likely to add another 100 jobs.<sup>14</sup>

While dairying (12% all farm types) is a major contributor to the District's economy, the Agriculture Survey of 2007 indicates that other types of farms, such as sheep (26%), beef cattle (18%) and sheep and beef cattle (17%) also provide significant income and employment for residents.<sup>15</sup> There is also arable farming and some horticulture and a food processing (potato chips) factory at Makikihi.<sup>16</sup>

Farming interests in Waimate District view irrigation as a technique for intensifying current production methods and developing new productive activities. The proposed Hunter Downs scheme has been granted consents to take water from the Waitaki River to irrigate 40,000 hectares of land in Waimate and Timaru Districts. Likewise, the proposed Waihao Downs Irrigation Scheme has consent to supply water from the Waitaki River to 43 properties over an area of 6,800 hectares within Waimate District.<sup>17</sup>

Though farming is the main economic activity throughout Waimate District, forestry production also provides significant employment (Waimate District Council, 2006: 1-1, 2).<sup>18</sup> There was an estimated total forest area of 11,629 hectares in the District at 1 April 2012.<sup>19</sup> The District Council had a mix of forestry assets with a stocked area of 237 hectares at 1 July 2011.<sup>20</sup>

State Highway 1 passes through the District, and State Highway 82 allows visitors to access the Waitaki Lakes and Central Otago, with a new bridge recently constructed at Kurow. The Waitaki River is an important recreational resource that forms the southern boundary of the District. The hydro lakes (Waitaki, Aviemore and Benmore) are a popular holiday area, with a large influx of campers during summer. Ninety kilometres from Waimate Town is the Waitaki Lakes Reserve which is open to campers from September until the beginning of May (Waimate District Council, 2010).<sup>21</sup> The District also offers a range of short walks and bike trails.<sup>22</sup>

However, the hospitality and accommodation sector in the District is limited. Accommodation monitoring data from the Ministry of Economic Development indicates that the District had 11

---

<sup>13</sup> <http://www.fonterra.com/global/en/hub/sites/news-and-media/media+releases/fonterra+studholme+breaks+production+record/fonterra+studholme+breaks+production+record> 26 March 2013  
[http://www.fonterra.com/wps/wcm/connect/Fonterra\\_NewZealand\\_en/Fonterra/Hub%20Sites/News%20and%20Media/Media%20Releases/Fonterra%20welcomes%20approval%20to%20acquire%20Canterbury%20factory%20/](http://www.fonterra.com/wps/wcm/connect/Fonterra_NewZealand_en/Fonterra/Hub%20Sites/News%20and%20Media/Media%20Releases/Fonterra%20welcomes%20approval%20to%20acquire%20Canterbury%20factory%20/) 26 March 2013

<sup>14</sup> The Overseas Investment Commission recently gave the go ahead for a Chinese company to invest in this plant (Timaru Herald, 4-4-13 <http://www.stuff.co.nz/timaru-herald/news/8506149/Glenavy-factory-may-create-100-jobs>, accessed 23-4-13).

<sup>15</sup> Statistics New Zealand, farms-by-farm-type-TLA-2007.xls, downloaded 4 November 2011.

<sup>16</sup> Makikihi Fries, manufacturing potato chips from South Canterbury potatoes - since 1987. Note there are also major meat works at Pareora (to the north) and Pukeuri (to the south).

<sup>17</sup> <http://www.mpi.govt.nz/agriculture/funding-programmes/community-irrigation-fund/community-irrigation-fund-funded-projects/cif-projects-waihao-downs-irrigation-scheme> 14 March 2013

<sup>18</sup> Waimate District Council (2006): 1-1, 2.

<sup>19</sup> Ministry for Primary Industries (2012): 27.

<sup>20</sup> WDC (2012): 1-50.

<sup>21</sup> Waimate District Council (2010). <http://www.waimatedc.govt.nz/council/sportandrecreation> 1 June 2010.

<sup>22</sup> Waimate Official Visitor Guide, [www.waimate.org.nz](http://www.waimate.org.nz)

establishments which provided 7,359 guest nights in January 2013 (cf. 8 establishments and 4,265 guest nights in January 2008) with an occupancy rate of 34 per cent.<sup>23</sup>

The return to a moderate rate of growth in dairying from 2008 onwards, and other effects associated with the global economic downturn on primary production have suppressed activity in the construction sector of Waimate District (Table 1). The value of building consents issued by the District Council, for instance, declined from \$26.5 million in 2007/08 to \$11.0 million in 2009/10.

Table 1: Building Consents issued by Waimate District Council - 2007/8 to 2009/10

Area	2007-2008		2008-2009		2009-2010	
	Number of Consents	Value \$million	Number of Consents	Value \$million	Number of Consents	Value \$million
Waimate District	252	26.5	197	22.2	150	11.0
New Zealand	-	11,282.0	86,000	9,115.0	90,901	8,904.0

Source: Department of Building and Housing (2011). Building Consent Statistics: A summary of selected NZ data. May 2011. pp. 4, 7, 15, 22.

### 2.3 People and communities

Waimate District is one of the larger territorial local authorities in New Zealand in terms of land area. Most of its population is located on the coastal strip that runs the length of the district between the foot of the Hunter Hills to the west and the Pacific Ocean to the east. The town of Waimate is the main service centre for the Catchments, with smaller settlements at St Andrews, Makikihi, Studholme, Morven and Glenavy.<sup>24</sup>

Waimate Town provides services for the surrounding farming communities and is the base of the District Council. Facilities in the town include a high school, three primary schools, a residential home for aged people, two medical centres, a library, swimming pool and other sports and recreation facilities.<sup>25</sup>

St Andrews, a village located 15 kilometres south of Timaru on State Highway 1, had a population of 180 in 2013. Its facilities include a primary school, a police station, a Masonic Hotel and a golf course.<sup>26</sup> To the north of St Andrews, just outside the District and SCCS Catchments, is the village of Pareora, which is notable as the site of one of two meat (sheep and beef) processing plants in South Canterbury. This village had a population of 429 usual residents in 2013, yet it supplied 720 jobs (paid employees), mostly in manufacturing. Its facilities include a campus of Timaru South School.

There are two other villages, Makikihi and Studholme, on State Highway 1 in the District between St Andrews and Glenavy. Makikihi's amenities include a primary school, hotel, service station and a factory producing French fries. The second village, Studholme, is seven kilometres east of Waimate. Studholme<sup>27</sup> also has a hotel and a small number of houses. Located nearby is a major dairy processing plant<sup>28</sup> owned by Fonterra, which was purchased from Russian owners in 2012.

<sup>23</sup> <http://www.med.govt.nz/sectors-industries/tourism/tourism-research-data/commercial-accommodation-monitor-data/cam-regional-pivot-tables> 22 March 2013

<sup>24</sup> Waimate District Council (2006): 1-1. Although Glenavy is part of the District it is just outside the Catchments.

<sup>25</sup> Waimate District Council (2006): 1-1, 2-23-26.

<sup>26</sup> downloaded from <http://www.themasonichotel.co.nz/what-to-do/> 17 April 2013

<sup>27</sup> downloaded from <http://en.wikipedia.org/wiki/Studholme> 16 September 2014

<sup>28</sup> Built on a site previously occupied by a vegetable processing plant.

Figure 2: Map of settlements and localities



Morven, about 10 kilometres north of Glenavy, was created by the subdivision of the Waikakahi Estate in the 19<sup>th</sup> century. It was a local service centre until experiencing a sharp decline during the 1960s and 1970s when a couple of stores, post office, and railway station were closed. Nowadays, Morven continues to function as a social centre for farming families in the surrounding countryside through its hall, domain, and school.<sup>29</sup>

Glenavy is a small settlement on the north bank of the Waitaki River. Located 20 kilometres north of Oamaru on State Highway 1, Glenavy had 267 residents in 2013. It has a fishing reserve near the mouth of the Waitaki River which has a number of huts and is regularly visited by anglers chasing salmon. Glenavy has a domain, hall and hotel that provide venues for sporting and social events, which contributes to a sense of community for residents.<sup>30</sup>

The population of the SCCS Catchments<sup>31</sup> was 5,970 in 2013. It grew at half the rate (3%) of the District's population between 2001 and 2013 (Table 2). Over the same period the number of residents of Waimate Town and St Andrews Village remained static, with the population of the former settlement increasing by 18, and the latter declining by 3.<sup>32</sup>

<sup>29</sup> Wilson (1999): 253, 259-260.

<sup>30</sup> Wilson (1999): 268, 270.

<sup>31</sup> Meshblocks representing the Catchments were selected for their best fit to the Catchments' boundaries.

<sup>32</sup> Much of the growth in the District was outside the towns and the Catchments and therefore took place in the Southern plains and terraces of the Waitaki River where dairy farming predominates.

Table 2: Changes in usually resident population of selected areas of Waimate District - 2001-2013

Area	2001	2006	2013	Per cent change 2001-2013
SCCS Catchments	5,799	5,868	5,970	2.9
St Andrews Village	183	177	180	-1.6
Waimate Town	2,757	2,835	2,775	0.7
Waimate District	7,101	7,209	7,536	6.1
New Zealand	3,737,277	4,027,947	4,242,048	13.5

Source: Statistics New Zealand

Statistics NZ forecast the population of Waimate District in 2031 will range from 6,550 (low) through 7,660 (medium) to 8,800 (high), while the number of households that year will range from 2,900 (low), 3,400 (medium) to 3,900 (high).<sup>33</sup>

Key features of the population of SCCS Catchments, St Andrews Village and Waimate Town in 2013 were (See Attachment 2 for further details from the tables indicated):

- *The age structure of the Catchments' population was older than the District's population.* Females predominated in the population of Waimate Town and males predominated in the population of St Andrews Village, while males and females were more evenly balanced in the SCCS Catchments and District populations (Table A2) .
- *The populations of all three areas and the District were relatively homogeneous* in their ethnic composition compared with the national population, with 79 to 87 per cent of responses by residents identifying themselves as European (Table A3).
- Residents of the SCCS Catchments and Waimate Town were relatively less mobile than the national population. People living in St Andrews Village were more likely to have been domiciled there for a shorter period than the other two areas (Table A4).
- The populations of St Andrews Village and the Catchments were relatively higher educated than the population of Waimate Town, but still had relatively fewer residents with tertiary qualifications than the national average (Table A5).
- *People living in the Catchments and St Andrews Village had higher levels of participation in the labour force when compared to residents of Waimate Town.* In particular residents of these two areas were more likely to be employed fulltime than people living in Waimate Town (Table A6).
- About four-fifths of residents of St Andrews Village and Waimate Town who had jobs were paid employees. The SCCS Catchments and District had higher proportions of employers and self-employed persons among their workforces reflecting the pattern of employment status which is usually associated with primary production and its support services (Table A7).
- *There was a high incidence of farmers and less skilled workers employed on-farm and in agricultural support services in the SCCS Catchments.* The workforces of Waimate Town and St Andrews Village had relatively fewer people with higher status positions and more with blue-collar occupations (Table A8).
- *The major source of employment for residents of the SCCS Catchments was the agriculture/forestry/fishing sector* which provided a livelihood for 47 per cent of them. By contrast the sources of jobs for the people of Waimate Town and St Andrews Village were more diverse (Table A9).

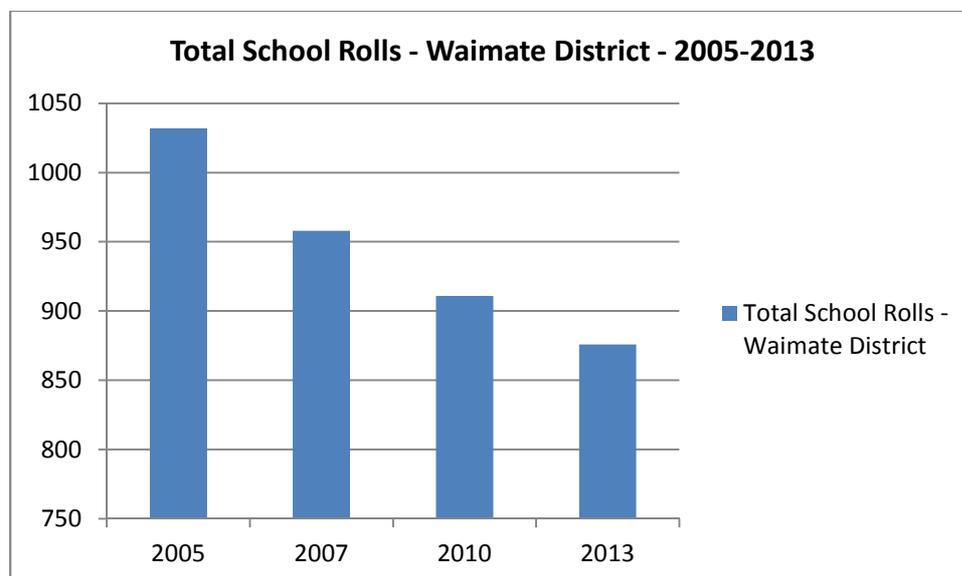
<sup>33</sup> Statistics New Zealand, Subnational population projections, 2006 (base) - 2031, update October 2012, Tables 1 & 2. Statistics New Zealand, Subnational family and household projections, 2006 (base) - 2031, Tables 1 & 2.

- *Couple only families were predominant* in the SCCS Catchments and Waimate Town, while St Andrews Village had the highest proportion of two parent families. Waimate Town also had significantly more one parent families than the District (Table A10).
- One family households were higher proportions of total households in St Andrews Village and the SCCS Catchments than for Waimate Town. Thirty-eight per cent of Waimate Town households were occupied by one person (Table A11).
- Both Waimate Town and the Catchments had relatively more households with incomes of \$50,000 and under, and fewer households with incomes between \$50,001 and \$100,000 than did Waimate District and St Andrews Village (Table A12).
- *The degree of dependence residents of all the areas had on government sources was higher than the national average* of 32 per cent. The total number of government payments received by residents of the Catchments, for instance, represented 39 per cent of its residents (Table A13).
- All three areas had higher levels of home ownership (owned & family trust) than was typical for New Zealand as a whole (Table A14).

## 2.4 School rolls in Waimate District

School rolls indicate population trends and social vitality at the community level, with an uneven pattern of growth. Rural schools have large catchments that are defined by their enrolment zones and bus runs. Only the rolls of three (Glenavy, St Andrews and Waihao Downs) of the ten schools in Waimate District increased between 2005 and 2013, while those of another two schools (St Patrick's and Waituna Creek) were halved. Despite an overall increase in population, total school rolls in the District declined 15 per cent from 1,032 in July 2005 to 876 in July 2013 (see Figure 3), reflecting a generally older population profile.

Figure 3: Total School Rolls of Waimate District 2005-2013<sup>34</sup>



<sup>34</sup> Roll-by-Age-and-Ethnicity.xls from

[http://www.educationcounts.govt.nz/statistics/schooling/july\\_school\\_roll\\_returns/6028](http://www.educationcounts.govt.nz/statistics/schooling/july_school_roll_returns/6028) downloaded 23 April 2014.

## 2.5 Social issues

Participants at a 2009 community workshop at Waimate acknowledged a number of issues and gaps in services faced by residents of the District. The issues included an aging population; the arrival of new families associated with large dairying ventures and innovative industries; the need to travel to larger settlements for services; and the shortage of volunteers for community organisations and clubs. Gaps were noted for community care for older people; primary health and specialist facilities; drug and alcohol services; and parenting and budgeting advice.<sup>35</sup>

An earlier social needs analysis undertaken for the Waimate District Council's Social Services Committee identified a wider range of issues confronting the community. General issues included the restricted opportunities for social interaction, the isolation of some individuals and families, a shortage of employment for younger people, the need for a visible police presence in the town, and a lack of coordination between social services. The main health issues described were the absence of consistent general practice, the cost of care, and a need to expand counselling services. A major issue for families was the need for parental support. The social isolation of elderly people, together with associated problems such as elder abuse, budgeting difficulties, and mental health, were also of concern. Significant issues for young people focused on their use of alcohol, the lack of activities and facilities available to them, and the absence of positive role modeling for their behaviour. Furthermore, a decline in the number of volunteers for social services, sporting and other organisations, and the reduced time people have available for voluntary activities were considered a major challenge for the community.<sup>36</sup>

## 2.6 Stock, drinking, and waste water

The Waimate District Council provides drinking water to the designated urban area and the fringe rural areas (a population of approximately 3000 people) for drinking, commercial and fire protection uses. Two secure groundwater bores at Timaru Road and Manchester Road supply the Waimate urban network via a reservoir at Mill Road. The Council notes that it needs to locate additional source water in the near future to cope with increasing demand. Many of the pipes in the system need replacement (under investigation in 2013/14).

Water quality is a significant issue regarding the level of Council water services to consumers. The Council owns nine water treatment plants and has begun upgrading them to improve water quality and comply with NZ Drinking Water Standards.<sup>37</sup>

The District Council also operates six rural water schemes<sup>38</sup>. Five of the rural water schemes operated by the Council obtain their water from river intakes.<sup>39</sup> Incorporated societies run Hakataramea and Cattle Creek supplies, and the Timaru District Council supplies the Downlands scheme. These rural schemes do not comply with NZ Drinking Water Standards – they need to achieve compliance by 2016, requiring investment in new systems and equipment (funding has been set aside to upgrade supplies). Increasing demands for water (due to changing land use and new applicants across the water schemes) mean that some of the schemes need new water sources. Like the urban schemes, many of the rural water pipes need replacement.

There are many individual systems based on shallow wells serving one or a few farms or dwellings which have not been monitored by the Waimate District Council.

<sup>35</sup> Local Services Mapping (2009): 82.

<sup>36</sup> McKay, S. (2006).

<sup>37</sup> Waimate District Council Water Asset Management Plan February 2012 pp. 42,44

<sup>38</sup> Cannington-Motukaika, Lower Waihao, Otaio-Makikihi, Waihaorunga, Waikakahi and Hook-Waituna

<sup>39</sup> Waimate District Council Water Asset Management Plan February 2012 p.33

Waimate District Council operates a wastewater collection and treatment system for the majority of the Waimate township, which has a design capacity for 4500 people (currently serving about 3000). Treated effluent goes to a land disposal area before entering the general environment.<sup>40</sup>

## 2.7 Outdoor recreation

Outdoor recreation is part of a healthy lifestyle for New Zealanders, providing opportunities for physical exercise and associated health benefits, rest, enjoyment of nature and escape from daily routine.<sup>41</sup> It also creates opportunities for socialisation and contributes to community cohesion through social interaction.<sup>42</sup> Recreation activity in freshwater environs is very common and of great cultural significance.<sup>43</sup> Seventy nine per cent of New Zealanders consider themselves recreational users of freshwater bodies<sup>44</sup> and “up to 50,000 people swim in New Zealand lakes and rivers on a typical fine weekend summer day”.<sup>45</sup>

The Wainono-Waihao River catchment is used moderately<sup>46</sup> for recreation; its waterways<sup>47</sup>, lagoon, wetland and lake, conservation areas, coastline, resident flora and fauna, forest remnants, foot hills and grasslands providing residents of the district and visitors with the resource-base for a variety of outdoor recreation activities, both active and passive. A broad description of the sporting and recreation opportunities is provided by the Council:<sup>48</sup>

“Waimate District has unrivalled sporting and recreational opportunities. Sporting activities requiring built infrastructure such as rugby, netball, tennis, basketball, cricket, squash, bowls are all catered for ... Waimate is served by a wonderful outdoor heated 33.3m pool in a garden setting. Waimate boasts a beautiful 18 hole golf course with beautiful landscaping and a public gym. In addition to these man made sporting structures Waimate District has amazing opportunities for fishing, tramping, hunting, kayaking, mountain biking, river swimming.”

In an assessment<sup>49</sup> of the in-stream values of the catchment, the following recreation pursuits were described for the area: wallaby and waterfowl hunting, bird watching, walking and various forms of fishing, including trout fishing, whitebaiting, eeling and floundering. The Waimate District Council includes swimming, river- and lake-side camping and mountain biking among the most popular activities for residents.<sup>50</sup> A study of public access points to waterways in the catchment<sup>51</sup> reports use of local river environs for recreational four-wheel driving and picnicking. Visitor surveys administered by the District Council found that walking is the most popular activity for people visiting the district.<sup>52</sup>

---

<sup>40</sup> Draft Waimate District Council Annual Plan 2013

<sup>41</sup> See: <http://ecan.govt.nz/publications/Plans/cw-regional-context-part7.pdf> (see page 99).

<sup>42</sup> See: Oncescu, J., 2014. Also see <http://ecan.govt.nz/publications/Plans/cw-regional-context-part7.pdf> (see page 99).

<sup>43</sup> See: <http://ecan.govt.nz/publications/Plans/cw-regional-context-part7.pdf> (see page 99).

<sup>44</sup> See: Fink-Jenson et al., 2004.

<sup>45</sup> See: Ward, J. and Pyle, E., 1997.

<sup>46</sup> See: Benn, 2011.

<sup>47</sup> It should be noted that none of the catchment’s waterways feature in the Ministry for the Environment’s (MFE, 2004) list of 105 water bodies of potential national importance for recreation (which, nationwide, includes 54 rivers, 30 lakes, and 21 wetlands, lagoons or inlets).

<sup>48</sup> WDC (2006c).

<sup>49</sup> See: Benn, 2011, pp.58-59.

<sup>50</sup> See: WDC, 2006a, p.22.

<sup>51</sup> See: Pompei, 2011, p.14.

<sup>52</sup> See: WDC, 2006b.

### **Walking and Mountain Biking (tracks and trails)**

Walking and mountain biking opportunities are available in the catchment, supported by a network of biking and walking tracks. Walking tracks are documented in the Waimate District Council's inventory of sport and recreation facilities<sup>53</sup> where the following trails are listed: Maori Cemetery/Totora Reserve Walk; Centrewood-Waimate Walkway/White Horse Walkway; Hunter Hills-Walking tracks; Kelcey's Bush; Gunns Bush; Hook bush; Mt Nimrod Scenic Reserve and the Otaio Gorge Scenic Reserve. The Waimate District Council "Trackways Group"<sup>54</sup> promotes nine main walkways on its website.<sup>55</sup> Descriptions for these walkways<sup>56</sup> emphasise the link between the catchment's high ecological value and local recreation opportunities, with all but one describing chances for viewing native and introduced flora and fauna and distinctive waterways (creeks, streams, rivers, channels, wetland and the Wainono Lagoon). Kelcey's Bush has been described as a good example of "enjoyability-and-easy-access-meets-native-bush".<sup>57</sup> Kelcey's Bush walkway featured in the 2008 publication: *Excellent Short Walks in the South Island*<sup>58</sup> where it is described as a "short easy walk through beautiful old tree fuchsias to the modest but pretty Saunders Falls". Local schools occasionally take fieldtrips to Kelcey's Bush for the purpose of nature education.<sup>59</sup>

Mountain biking trails also feature in *the Waimate District Sport and Recreation Plan*.<sup>60</sup> These include: Pentland Traverse (Waihaorunga); Kinbrace Trail (Waihaorunga); Meyers Pass (Waihaorunga); Clarkesfield Road (Elephant Hill); Hakataramea Pass Trail (Haka MacKenzie Pass) and The Whitehorse Trail (Hunter Hills). The South Canterbury Mountain Bike Club provides a detailed description of the Whitehorse (Hill) Trail on their website<sup>61</sup>, while the website of Christchurch and Canterbury Tourism notes that "Mountain bikers of all abilities are fast discovering the trails in these parts [Waimate], with picturesque landscapes to check out along the way".<sup>62</sup>

### **Bird watching**

The Wainono Lagoon<sup>63</sup> and its associated wetlands attract and provide breeding and feeding habitat for a variety of bird species (57 recorded<sup>64</sup>). This offers ornithological (bird watching) opportunities.

<sup>53</sup> This is one component of the Waimate District Sport and Recreation Plan. See: WDC, 2006a, p.37. For mountain bike trails see

[http://www.waimatedc.govt.nz/\\_data/assets/pdf\\_file/0016/23830/MountainBikeBrochure.pdf](http://www.waimatedc.govt.nz/_data/assets/pdf_file/0016/23830/MountainBikeBrochure.pdf)

For walkways see

[http://www.waimatedc.govt.nz/\\_data/assets/pdf\\_file/0005/23999/DistrictTracklocationsandurbanwalkwaybacktoback.pdf](http://www.waimatedc.govt.nz/_data/assets/pdf_file/0005/23999/DistrictTracklocationsandurbanwalkwaybacktoback.pdf)

<sup>54</sup> The Trackways group is made up of a mix of community people.

<sup>55</sup> See: <http://www.waimatedc.govt.nz/Waimate/default/walks.htm> and also

<http://www.waimatedc.govt.nz/Waimate/Community/waimatetrackwaysgroup.htm>.

<sup>56</sup> These include Garlands Track; Gunns Bush Track; Kelceys Bush Track; Mt Nimrod Track; Studholmes Bush Track; Waihao River Walkway; Waimate Historic Walk; Waimate Walkway and the Wainono Lagoon Track.

<sup>57</sup> See: ECAN, 2008a.

<sup>58</sup> See Janssen, 2008.

<sup>59</sup> Interview data – local resident

<sup>60</sup> See: WDC, 2006a, p.37.

<sup>61</sup> [http://www.southcanterburymountainbikeclub.co.nz/?page\\_id=692](http://www.southcanterburymountainbikeclub.co.nz/?page_id=692).

<sup>62</sup> <http://www.christchurchnz.com/destinations/south-canterbury/>.

<sup>63</sup> With respect to Wainono Lagoon (specifically), Benn, 2011, describes an area of varied and distinctive wildlife habitat supporting diverse native, endemic and introduced flora and fauna. It is this ecological heterogeneity which has earned the water body the legal status of a *Conservation Area*, with the surrounding wetland formally classified as a *Wildlife Refuge* (Benn, 2011; ECS, 1995; also see Golder Associates, 2012). ECAN (2008) has characterised the lagoon as a water body of national importance. Benn (2011, p.3) notes that while the lagoon and its wetlands are also widely "recognised as meeting the criteria of internationally significant wetlands under the Ramsar Wetland Convention ... they are not formally listed as a Wetland of International Importance".

One report<sup>65</sup> states that “the bird habitat that Wainono Lagoon provides is internationally significant because of seasonally high populations of migratory wading bird species”. “Rare or threatened bird species recorded from Wainono Lagoon include crested grebe, black stilt, wrybill, banded dotterel and black-fronted tern, while marsh crake and bittern are likely to be present.”<sup>66</sup> The Waimate District Council<sup>67</sup> describes the lagoon area as “a bird watchers paradise”. In 2011, one online ornithological website<sup>68</sup> stated that:

“Wainono Lagoon is a top birding location in South Canterbury and well worth a look when travelling through with two access points off State Highway One. The lagoon has good walking access on the spit that separates it from the sea. There are often some good edges for waders on the northern arm. Mudflats on the southern shoreline are certainly worth a look. Also a wide range of coastal seabirds have been sighted just offshore and often larger numbers of skuas and terns are in the region over the summer.”

### **Game bird and Small Game Hunting**

The catchment’s waterways and forests provide various hunting opportunities.

Wainono Lagoon is recognised as a popular game bird hunting area, providing beneficial habitat for waterfowl<sup>69</sup> including Canada geese<sup>70</sup>, black swans, mallard and grey ducks, and paradise ducks. Each year, during the duck shooting season, the lagoon area is populated by several hundred hunters, often reported to exceed 300 in number.<sup>71</sup> Central South Island Fish and Game (CSIFG) have noted<sup>72</sup> that:

“In late summer waterfowl counts on Lake Wainono and Wainono Wetlands typically show 12,000 – 18,000 game birds present of which 75% are Mallard ducks. Within the Wainono Wetlands area, nine hunting stands are balloted each year. There is no ballot system for the lake and many of the existing stands are reserved to traditional hunters. Other than possibly during opening weekend there is still plenty of opportunity for visiting hunters. “

“Hunting is allowed on some public conservation lands in the Hunter Hills area”.<sup>73</sup> The North Waihao hunting block (Figure 1) – 460 ha in size – is situated beside the north branch of the Waihao River, 20km south-west of Waimate where reasonable numbers of wallaby, low numbers of wild goats, and the occasional red and fallow deer or wild pig can be found.<sup>74</sup> Other hunting blocks in the

---

<sup>64</sup> See: Deans, 2007.

<sup>65</sup> See: Golder Associates, 2012, p.36, citing O’Donnell, 2000. Also see: Shadbolt, 2009.

<sup>66</sup> See: Golder Associates, 2012, p.41.

<sup>67</sup> See: WDC, n.d.

<sup>68</sup> <http://canterburybirding.blogspot.co.nz/2011/01/wainono-lagoon-overlooked-birding.html>.

<sup>69</sup> See: Benn, 2011.

<sup>70</sup> In 2012, 1500 Canada Geese were destroyed at Wainono Lagoon as part of a moult cull across the central South Island. “Before June, when the birds lost their protected status, Fish and Game had managed population numbers. The birds are considered a pest because they eat pasture and crops and foul paddocks and waterways.” <http://www.stuff.co.nz/timaru-herald/news/6224164/Moult-culls-destroy-18-000-canada-geese>.

<sup>71</sup> See: Deans, 2007; ECAN, 2008b, 2012; Golder Associates, 2012; Wilson, 2012.

<sup>72</sup> Cited in Greenaway, 2007, p.24.

<sup>73</sup> <http://www.doc.govt.nz/parks-and-recreation/places-to-visit/canterbury/mid-and-south-canterbury/hunter-hills/>. The Hunter Hills are a foothill range at the base of the Southern Alps, southwest of Timaru, Mid-Canterbury.

<sup>74</sup> <http://www.doc.govt.nz/parks-and-recreation/places-to-visit/canterbury/mid-and-south-canterbury/hunter-hills/>.

wider Hunter Hills area include: Kelceys Bush<sup>75</sup>, Hook Bush<sup>76</sup> (1100 ha), Mt Studholme<sup>77</sup>; Gunns Bush<sup>78</sup> (120 ha); and Kaumira hunting block.<sup>79</sup>

The North Branch of the Upper Waihao River is well known as wallaby hunting terrain, with guided wallaby hunts and backcountry accommodation available at Kaiwarua Station<sup>80</sup> and Caberfeidh Farms.<sup>81</sup> The town of Waimate is known as New Zealand's wallaby capital. Since 1991, the South Canterbury Recreational Sportsman's Club (SCRSC) has run an annual wallaby hunt in the Hunter Hills<sup>82</sup>. One commentator, reflecting on the event, noted that local wallaby: "unfortunately cause a lot of damage on public and private land, so they are in the sights of landowners, the regional council and Department of Conservation (DOC). So it is great to see recreational hunters actively targeting wallabies through this event".<sup>83</sup>

### Fishing

The catchments (see Fishing Waters map in Attachment 1) provide numerous fishing opportunities, with "introduced brown trout providing a regionally important recreational fishery".<sup>84</sup> The *Lower Waitaki South Coastal Canterbury Zone Implementation Plan* states that the "Waihao River is an important sports fishery"<sup>85</sup> with the "Waihao Box" being an important angler access point.<sup>86</sup> The Waimate District Council notes that Hook Beach is a popular place for sea fishermen.<sup>87</sup> One summary<sup>88</sup> links fishing activities and locations in the catchment, making note of: eeling<sup>89</sup> and trout fishing in the Waihao River and whitebaiting in the Waihao River and Waihao Box<sup>90</sup> (although the author points out that DOC do not regard Waihao as a *notable* whitebaiting destination).

NZ Fishing<sup>91</sup> describe the Waihao River as a "wee gem: a small stream offering good blind fishing for sea-run brown trout near the mouth and sight fishing for brown trout in the crystal clear waters further upstream". Elaborating, they mention: good blind fishing for sea-run brown trout from the mouth upstream to Bradshaw's Bridge<sup>92</sup> and, in the lower gorge, deep stable pools with willow-lined banks and further upstream where there are opportunities for sight fishing for brown trout in crystal clear water. Specific angling access points identified include: "The Mouth" (road access to "the

<sup>75</sup> <http://www.doc.govt.nz/documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunting/kelceys-bush-hunting.pdf>

<sup>76</sup> <http://www.doc.govt.nz/documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunting/hook-bush-hunting.pdf>

<sup>77</sup> <http://www.doc.govt.nz/documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunting/mount-studholme-hunting.pdf>

<sup>78</sup> <http://www.doc.govt.nz/documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunting/gunns-bush.pdf>

<sup>79</sup> <http://www.doc.govt.nz/documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunting/kaumira-hunting.pdf>

<sup>80</sup> See: Broad, 2010.

<sup>81</sup> <http://www.doc.govt.nz/parks-and-recreation/places-to-visit/canterbury/mid-and-south-canterbury/hunter-hills/guides-and-commercial-tourism-providers/>.

<sup>82</sup> <http://blog.doc.govt.nz/tag/hunting-2/>

<sup>83</sup> <http://blog.doc.govt.nz/tag/hunting-2/>

<sup>84</sup> See: Benn, 2011, p.63.

<sup>85</sup> See: ECAN, 2012a, p.9

<sup>86</sup> See: Pompei, 2011.

<sup>87</sup> See: WDC, n.d.

<sup>88</sup> See Greenaway, 2007, p.24.

<sup>89</sup> Supported by local observations and experience (interview data)

<sup>90</sup> This was supported by interview data. One resident noted that there were "always people whitebaiting at "the Box" during the whitebait season".

<sup>91</sup> See: NZ Fishing, online.

<sup>92</sup> Also see Kent, 2006, p.202.

Box”); the lower reaches (where SH1 crosses the river); above Bradshaw’s Bridge (from Gum Tree Flat Road where it meets the river); and at McCullough’s Bridge. In reference to the upper reaches, NZ fishing note a stretch of river on private land within Kaiwarua Station with access available to guests over well-formed tracks.

ECAN rates public access to the Waihao River as “good”, with access points regularly spaced and frequent.<sup>93</sup> ECAN have observed that facilities are sparse and basic, reflecting the river’s remoteness. In 1988, the Waihao River – specifically the section of the river between the river mouth and Bradshaws Road Bridge – was characterised as a whitebaiting resource of ‘major recreational significance’, with 50-60 whitebaiters fishing the lower river on an average day.<sup>94</sup> A recent (2012) online opinion piece<sup>95</sup> provided the following narrative:

“Old timers who fished the Waihao River this past summer tell me it returned the largest catches of whitebait seen in a lifetime. The box was closed for three weeks at one stage but an elderly gentleman caught 36 kilograms of bait on one day and a further 39kg a few days later. It was not uncommon for some baiters to get 27kg for the season. But it wasn’t just whitebait that were co-operative. On Anzac Day, and the previous weekend, a visiting angler landed two salmon. Another rowboat angler using 6kg line also caught a salmon. “It’s the biggest run of salmon in this river since 1985,” said one angler, attributing it to the influence of Waitaki water in the Waihao River.”

The 2007/2008 National Angler Survey reports the number of angler days for the Waihao River, Waihao River N. Branch and Waihao River S. Branch. Seasonal totals are recorded in Table 3.<sup>96</sup> It is not possible to detect any particular trends from available survey data.

Table 3: Seasonal total of angler days by water body, 1994/95, 2001/02, 2007/08

	<b>1994/95 Angler Days</b>	<b>2001/02 Angler Days</b>	<b>2007/08 Angler Days</b>
<i>Waihao River</i>	650	1100	640
<i>Waihao River N. Branch</i>	X	X	290
<i>Waihao River S. Branch</i>	X	10	310

### ***Camping, picnicking and swimming***

Several (riverside) parks and reserves provide picnicking, camping and swimming opportunities. Department of Conservation camping areas with basic facilities (classified as “standard campsites”) are located at the Otaio Gorge Scenic Reserve and Mount Nimrod (see maps), the latter on the eastern flank of the Hunter Hills.<sup>97</sup> Camping is also available at Kelcey’s Bush Farmyard Holiday Park, located 7km from Waimate. Kelcey’s Bush and the Otaio Gorge Scenic Reserve have designated picnic areas.<sup>98</sup>

<sup>93</sup> See: Pompei, 2011.

<sup>94</sup> Kelly, 1988, p.28 (cited in Greenaway, 2007, p.23).

<sup>95</sup> <http://www.stuff.co.nz/timaru-herald/opinion/peter-shutt/7078439/Bumper-whitebait-season-on-Waihao>.

<sup>96</sup> Consistent with Greenaway’s (2007, p.22), high margins of error suggest a high level of repeat visits by a relatively small number of respondents.

<sup>97</sup> <http://www.doc.govt.nz/parks-and-recreation/places-to-visit/canterbury/mid-and-south-canterbury/hunter-hills/>.

<sup>98</sup> See: WDC, 2006a.

In the mid-1980s the Otaio Reserve was recognised “as an important regional recreation opportunity. It is one public reserve that allows for multiple recreational usage within this type of setting. Mount Nimrod Scenic Reserve to the north and Hook Forest to the south-east are the only other comparable nearby areas”.<sup>99</sup> It was also defined as “a popular camping/day use area with the river providing good swimming holes. The river bed is used as access to higher reaches of the Otaio River Gorge while the open space area at the entrance to the reserve is often used for informal social outings. Visitor numbers are highest during the warmer summer months. Toilet facilities are provided and there is a track to a large swimming hole”.<sup>100</sup>

The Waihao River also provides opportunities for swimming at sites known as “Black Hole”<sup>101</sup> and “Bradshaws” (or “the Rocks”).<sup>102</sup> These popular swimming areas, including Otaio Reserve, are considered waterways “commonly used for freshwater bathing”<sup>103</sup> and are monitored for swimming-water quality. (Interview data indicated that “the Box” had become a preferred local swimming site, with one resident noting a growing concern that all other potential swimming locations were not suitable for contact recreation due to water quality issues). In 2013, public health warnings were issued for Black hole after relatively high levels of algae, also known as phormidium, were found; this algae poses a risk to people and animals, particularly dogs.<sup>104</sup>

### **Boating**

Above “the Box”, where the lower Waihao River’s channel is wide, power boating and water skiing can be observed.<sup>105</sup> This is supported by the *Inventory of instream values for rivers and lakes of Canterbury*<sup>106</sup>, New Zealand which reports a “high” frequency of use for power boating in this reach of the river. Notwithstanding these recent observations of site specific watercraft activity in the catchment, an earlier assessment of the importance of lakes and waterways in New Zealand for watercraft recreation,<sup>107</sup> noted that the Waihao River held little value for boating, canoeing and kayaking<sup>108</sup>.

## **2.8 Stakeholder groups**

The community and stakeholder list for the South Canterbury Coastal Streams Catchment includes a variety of community and stakeholder groups. A summary is provided below.

### **Local and National Government**

The Waimate District Council, Department of Conservation, Ministry for Primary Industries and Canterbury District Health Board.

### **Iwi**

Te Rūnanga o Waihao, Te Rūnanga o Arowhenua and Te Rūnanga o Ngāi Tahu.

---

<sup>99</sup> See: Department of Lands and Survey, 1984.

<sup>100</sup> See: Department of Lands and Survey, 1984 (p.6). Also see: WDC, 2006a.

<sup>101</sup> See: Pompei, 2011.

<sup>102</sup> See: ECAN, 2012b.

<sup>103</sup> See: ECAN, 2012b.

<sup>104</sup> <http://www.pressdisplay.com/pressdisplay/viewer.aspx>.

<sup>105</sup> Interview data – local resident

<sup>106</sup> See: Daly, 2004.

<sup>107</sup> See: Egarr and Egarr, 1984 (cited in Benn, 2011).

<sup>108</sup> One interviewee, a local resident, had however observed kayaking in “the Arm”.

***Community Groups and Organisations***

There are a wide range of community groups and organisations in or associated with the South Canterbury coastal streams catchment including schools, drainage boards, Horticultural society, clubs including rod and gun club, Lions, garden clubs and 'friends of specific parks' clubs, rural scholars and rural women, women's institute, resource trust, Waitaki Riparian Enhancement Society and Waihao Wainono Water Users Society.

***Agricultural and Irrigation Groups***

Beef and Lamb NZ, Dairy NZ, Deer NZ Association, Horticulture NZ, Irrigation NZ , Federated Farmers, Fonterra, Foundation for Arable Research, irrigation schemes, fertiliser companies, corporate farming and dairy companies, and meat companies and packers.

***Environmental and recreation groups***

Jet boating, kayaking and white water rafting clubs, Fish and Game, and Forest and Bird. The Waimate rod and gun club and Wainono lagoon interests.

***Energy***

Genesis and Meridian Energy.

### 3 Assessment of scenarios

#### 3.1 The scenarios

Following preparation of the social profile (current state) the social assessment investigated a number of scenarios as part of the overall planning process. The aim of the technical assessments was to support and inform community discussions on the limit setting process. The scenarios were used by the community, stakeholders and technical team supporting ECAN planners, to develop an initial solutions package – which was then further refined through collaborative input by the ZC and the community and key stakeholders. The scenarios considered were:

Scenario 1: What does the future look like until HDI and WD irrigation schemes are built, i.e. two schemes that will bring new (Waitaki) water into the SCCS area.

Three sub-scenarios are considered:

Scenario 1a: Assumes the proposed Land and Water regional Plan minimum flow and allocation limits for streams, rivers and groundwater within the SCCS area<sup>109</sup>. These allocation limits are approximately the current total allocation.

Scenario 1b: Assumes alternative minimum flows that are generally higher and with smaller total allocations<sup>110</sup> to better meet the preferences of Mana whenua and to benefit environmental values.

Scenario 1c: Assumes alternative minimum flows that are generally 25% lower than Scenario 1a, but with the same allocation limits as Scenario 1a (i.e. current allocation), to provide some increase in supply reliability to existing users but no new users.

Key assumptions for all Scenarios 1a, 1b and 1c are:

- Negligible new irrigated area is possible due to in-catchment water constraint
- All land users operating at Good Management Practice (GMP<sup>111</sup>)

Scenario 2a: examines the future if HDIS and WDI are developed as consented e.g. increased irrigation development, with good management practices (GMP) on all HDIS farms, an HDIS-levied environment enhancement fund, an increased nutrient load on the environment, some increase in groundwater levels and therefore stream flows, but with no direct flow augmentation to streams or Wainono Lagoon because this was not part of the HDIS consents. In scenario 2b the pros and cons of providing a direct flow augmentation of Waitaki water (~1m<sup>3</sup>/s average) to augment flow in the Hook River and through Wainono Lagoon are also assessed.

Scenario 3 examines more advanced farm mitigation measures. It contains two sub scenarios:

<sup>109</sup> See Section 15 of the pLWRP - [Proposed Canterbury Land & Water Regional Plan](#)

<sup>110</sup> The flow and allocation preferences of Manawhenua are expressed in a report (Tipa 2012) available on the website ( <http://ecan.govt.nz/publications/Reports/cultural-associations-flows-water-implications-wainono-catchment.pdf> ). These are partly (but not entirely) based on recommendations in the proposed NES (i.e. minimum flow 90%MALF; allocation 30% MALF).

<sup>111</sup> GMP refers to good nutrient and irrigation management as assumed in the ‘Canterbury look up tables’. Specifically this covers: use of nutrient budgets, application of fertiliser according to code of practice, stock exclusion, efficient irrigation application (80 % application efficiency), and compliant effluent systems.

**Scenario 3a:** is as for scenario 2a but explores the costs and benefits of employing Maximum Feasible Mitigations (MFM) on-farm, which equate to approximately an average 30% reduction in N losses compared to GMP (but varies between 0 and 40% reduction depending on land use type).

**Scenario 3b:** is as for scenario 2a but includes on-farm mitigations at the “mid-point” between GMP and MFM (i.e. approximately an average 15% reduction in N losses compared to GMP, but varying between 0 and 20% depending on land use type).

Further details and discussion of the assumptions behind these scenarios are available in Attachment 3 and the draft Overview Report.<sup>112</sup>

### ***Organisation of the assessment***

The social assessment of the scenarios is organised under three major Zone Committee outcomes, each of which is represented by a number of sub outcomes. The analysis is based on the selection of technical indicators that are most relevant for the social analysis and these indicators form the basis for the sub headings used below. Where possible, distinctions are drawn between the sub scenarios. The section ends with a summary table for the scenario assessment.

## **3.2 Land use change**

Land use change is the primary driver for social changes discussed in the scenario assessment below. At present only around half of the total irrigable land in the assessment area is irrigated - approximately 28,000 ha. Under scenarios 2 and 3 this area would almost double with the two irrigation schemes assumed to develop. The main land use change under the HDI and WD schemes is expected to be towards dairying as explained in the economic analysis<sup>113</sup>, with some increase in beef and dairy support, and for arable farming. This change would be offset by a decrease in land use for sheep farming. These changes are illustrated in the maps of land uses under the scenarios as provided in the Overview report.<sup>114</sup>

Experience with new irrigation shows there is a latent propensity to change amongst sheep and beef farmers who have experienced a long period of difficult economic conditions and are getting older overall, especially if few of them have an option to subdivide their property into lifestyle blocks to facilitate retirement and succession. Farmers in these circumstances could change their land use and/or ownership relatively quickly.<sup>115</sup> In addition, as discussed in the social profile, Waimate District has experienced very strong economic growth in recent years with dairying a major contributor. This provides considerable momentum towards dairy conversion under additional irrigation. Counteracting this trend in the short term will be uncertainties associated with international milk commodities cycles, although the longer-term trend is a rise in prices for milk and milk products.

## **3.3 Vibrant economy and sustainable growth**

### ***On farm and regional employment***

In the 2006 Census there were 2,600 people employed full time, 890 employed part time, and 100 unemployed in the Waimate District. Employment changed in only a very minor way between 1999 and 2006, although unemployment fell to below 150. The very limited increase in irrigated area in

<sup>112</sup> Norton and Robson (2015).

<sup>113</sup> Table 6 of Technical Report on the Economic impacts in South Canterbury Coastal Streams limit setting process (Harris, 2015).

<sup>114</sup> Norton and Robson (2015).

<sup>115</sup> The Opuha study, for instance, showed that in just five years there was a change from no dairying in the area to 27% of respondents reporting they were dairy farming (Harris, et al., 2005).

scenario 1 is likely to be associated with weaker growth in the dairy sector and little further intensification of farming, with sheep and beef remaining the dominant land use. Any development in the dairy sector will be constrained by water allocation being limited to in-catchment water as at present, so it is likely that growth in the dairy sector will be constrained in the longer term except for possible improvements in productivity that flow into employment levels in the District. Employment is unlikely to increase much over time and will be weaker under scenario 1. A major increase in irrigated area as in Scenarios 2 and 3, however, is likely to drive further intensification of farming and substantial growth in the dairy sector in particular, with dairy becoming a major contributor to the area economy and employment.

### ***Number of farmers and farm workers***

The number of farmers and farm workers employed in dairy, dairy support and arable farming is likely to increase to a minor extent for the next 5-10 years under the current state or Scenario 1. While it has considerably less area than sheep and beef, irrigated dairy farming already provides a significant component of district and regional employment. In comparison, the economic analysis indicates the number of farmers and farm workers employed in dairy, dairy support and arable farming is likely to increase by 500 to 600 FTEs under scenario 2. However, under scenario 3a (Maximum Feasible Mitigation) the analysis shows the increase in employment will be a little less – in the order of 100 FTEs less regionally (on and off farm).

Looking longer term for all scenarios, improvements in management efficiency and mechanisation could lead to a gradual decline in the numbers of people employed on farms (all sectors); however, this small decrease could be offset by a small increase in employment generated by the need to achieve GMP or achieve advanced mitigation.

Over time either the current level of employment under Scenario 1, or increased level of employment in Scenarios 2 and 3, should be relatively sustainable, with employment in dairy likely to be maintained even if declines in commodity prices are experienced by the dairy sector over the short term. A protracted period of economic stress for the dairy sector, however, could result in a reduction in cow numbers and a shift back to arable or pastoral farming that would reduce the level of employment and change the mixture of occupational skills away from dairy and dairy support.

The trend towards corporate farming in the Catchments is expected to continue, especially in the dairy sector,<sup>116</sup> with associated changes in employment status – especially more employees per hectare and fewer employers in the agriculture sector. Migrant workers are also likely to be a feature as in other dairy farming areas of the South Island.

Employment in food processing will continue to be located both inside and outside the Catchments, with two current plants (one dairy, one vegetable) in the Catchments area and a new one (dairy) proposed for Glenavy. Meat processing will remain outside the catchments with two major plants currently operating in commuting distance for workers, subject to any future rationalisation in this sector. An increase in milk production under scenarios 2 and 3 will assist the two factories and associated activities such as the transport sector.

Under all scenarios it is expected that employment in food processing will continue to be located both inside and outside the SCCS area, with two milk processing plants in the area and a third at Clandeboye in Timaru District. Meat processing will remain outside the SCCS area, with two major plants currently operating within commuting distance and therefore providing some jobs to the

---

<sup>116</sup> For example, Dairy is All About Scale, by Professor Keith Woodward, Sunday Star Times, D17, 30 November, 2014, who notes the increase in average farm size in Canterbury in particular and an increase in multiple-farm ownership.

Waimate District, subject to the high probability of future rationalisation in this sector. Future vegetable and milk processing are likely to take place both inside and outside the Catchments.

Unemployment is likely to remain low under all scenarios. If there is an economic downturn the rural workforce is relatively mobile and would move to work elsewhere if necessary. A significant retrenchment or closure of a processing plant in or close to the district would impact directly on unemployment, at least in the short to medium term.

### **3.4 Population in the SCCS area**

#### ***Population change***

The population of the Catchments is likely to remain about the 2012 level of 6,000 over both the short and long terms under Scenario 1. In the absence of any major land-use change (Scenario 1) small changes in the population base will occur slowly, driven by employment opportunities and will ultimately be influenced by the balance of inward or outward migration i.e., people shifting to the town (Waimate) for retirement, work (in the dairy sector especially) or lifestyle reasons, versus those moving away for further education and training or due to lack of work.

In comparison, the two irrigation schemes (Scenarios 2 and 3) are likely to increase population growth for both Waimate District and the main town of Waimate. Growth in the town's population is likely to occur in the construction stage of the schemes and then with changes in land use (particularly dairying) and associated services. With the regional labour market being bolstered by the range of new jobs on farm, a long term effect will be to support the viability of services available in Waimate Town. District incomes are also likely to be increased by the new irrigation.<sup>117</sup>

For scenarios 2 and 3 the population of the SCCS area is likely to increase from the 2012 level of 6,080 over both the short and long terms, with a total increase in the order of 1,000 – 1,200 people.<sup>118</sup>

### **3.5 Services including health and education**

Scenario 1 is unlikely to bring any significant gains in the form of improvements to health services, schools and community facilities from increased funding on a per capita basis. At best in a tight fiscal climate, access to social services and community facilities within the District is likely to be maintained at current levels; thereby continuing the challenge of meeting the needs of the aging population of the Catchments (22% of the District's population were aged 65 years and over in 2013).

The increasing numbers of elderly residents is likely to increase demand for medical services, home based care, transportation and recreation – including passive recreation opportunities provided by rivers (e.g., riverside walks and picnicking), parks and nature reserves.

A shortage of volunteers may also continue as younger newcomers will be employed in the dairy sector, with little available time to participate in traditional community activities. The need to expand the number of volunteers was identified as a significant issue by a Waimate Workshop.

There may be a reduction in social cohesion with increasing differences between productive and non-productive sectors, and also from competition between irrigators for the water available in the Catchments. There will be differing views of stakeholders about how this water should be used. Periodic stress from droughts and other climatic events will raise levels of farm family stress.

---

<sup>117</sup> Evidence of C N Taylor on social effects of the proposed HDI Scheme, paras 70-74.

<sup>118</sup> A multiplier of around 2 can be applied to new FTEs in agriculture in Canterbury, allowing for the addition of workers in part-time work and dependents for those that have them.

In comparison, as the two irrigation schemes in Scenarios 2 and 3 are likely to add population growth for both Waimate District and the main town of Waimate, a long term effect will be to support the viability of services available. District incomes are also likely to be increased by the new irrigation with improvement in wellbeing.<sup>119</sup>

### **School rolls**

At best, under Scenario 1 school rolls will remain steady with a slow decline in numbers most probable as the population ages overall. Dairy production will continue to bring a churn of younger families engaged in the dairy sector. There may be pressure on schools to merge or close over time should the Ministry of Education continue that policy.

With increased irrigation under scenarios 2 and 3, otherwise declining school rolls will strengthen, although further amalgamations of small schools are still possible.

### **Individual and household income**

In Scenario 1 individual and household income will remain relatively steady in real terms in the economies of the Catchments and District. Some potential growth in incomes associated with a small increase in dairying and increases in productivity is likely to be offset by a higher proportion of the population (mainly elderly) receiving fixed incomes, with increasing income inequality evident over time.

Continued growth in irrigation and land-use intensification with Scenarios 2 and 3 will benefit on-farm employment and household incomes,<sup>120</sup> as well as off-farm employment in the agricultural processing and services in the Catchments, and in the plants nearby the Catchments.

### **Community participation**

Waimate, like many other rural districts, finds it difficult to maintain high levels of volunteers who provide social capital. This situation is unlikely to change much in Scenario 1, and with an ageing population. However, it is not inevitable that the arrival of newcomers employed by dairy farmers will necessarily improve this situation in Scenarios 2 and 3, as the ethos and work practices of the dairy industry and the mobility of many of its workers means they may not have the same commitment to community activity as dry-land farmers and workers.<sup>121</sup> Increased ethnic diversity of the dairy farm workforce may also become a significant social issue as employers look overseas to obtain workers.<sup>122</sup> The community participation of newcomers will require active encouragement from settlement support services and a collaborative approach as promoted by the Settling In Aoraki, Migrant Community Social Services Report.

### **Workforce education**

With Scenarios 2 and 3 conversions to dairying, and a more skilled workforce with higher levels of formal qualifications, there is likely to be a narrowing of the education gap between the area average and that of the national population. This shift to dairy farming is also likely to increase the proportions of employers and paid employees due to larger farm units and more labour intensive

---

<sup>119</sup> Evidence of C N Taylor on social effects of the proposed HDI Scheme, paras 70-74.

<sup>120</sup> McClintock, et al. (2002).

<sup>121</sup> McClintock, et al. (2002).

<sup>122</sup> Nona Verwoerd, Lincoln University, identifies three main groups of foreign workers on dairy farms: young people on short-term permits, immigrants looking for a long-term home and refugees, noting each group brings potential benefits as workers but also needs careful personnel management. Both Southland and Ashburton Districts have experienced inflows of migrant workers from the Philippines and other countries during recent years and established settlement support processes, as has Network Waitaki.

methods of dairy production. Full-time employment should remain relatively strong with the introduction of the new irrigation because of more labour intensive farms.<sup>123</sup>

### ***Social cohesion***

There may be a reduction in the level of social cohesion with all three scenarios. In scenario 1, with increasing differences between productive and non-productive sectors, and also from competition between irrigators for the water available in the area, there will be differing views of stakeholders and increased tensions about how water should be used. In scenarios 2 and 3 there will be different types of tensions, especially from the need to integrate newcomers into the communities, including workers from overseas. The growth in dairy farming in these two scenarios will increase the number of corporate farms and the number of paid employees with different needs and attitudes regarding community participation. Some stakeholders will remain concerned about water quality, aquatic habitat and high trophic levels in Wainono Lagoon despite efforts to manage this effect, with least concern evident under scenario 3a.

### ***Engagement in Good Management Practices***

In Scenarios 2 and 3 the educational qualifications of farmers and farm workers are likely to become higher;<sup>124</sup> with the dairy sector hiring increased numbers of managers and skilled workers over time. This trend and the emphasis on Good Farm Management Practices will incentivise the farm workforce to learn practices from agricultural extension activities such as field days, on-farm trials and access to websites, which can facilitate more sustainable and productive uses of land and water.

Increased farm and herd sizes and more emphasis on corporate farming, with its ability to raise capital and service debt could also increase the adoption of new technologies and good farm management practices.

## **3.6 Drinking water meets quality standards**

The availability of an adequate supply of clean drinking water is regarded as a fundamental requirement for human health and is a determinant of social wellbeing. For this reason, any decline in drinking water quality is of concern to people and communities in the catchment, and to health services in the district and region. Any decline in drinking water standards could result in a range of responses by health agencies, councils and individuals. Effects on two sources of drinking water are discussed here: ground water from shallow household wells and reticulated supplies.

### ***Groundwater - Individual wells***

Analysis of groundwater quality across the SCCS area shows there is vulnerability of household supplies drawn from shallow wells to contamination from bacteria and other pathogens that come from wastewater disposal and grazing animals. Shallow wells are most at risk of contamination from pathogens carried into groundwater after heavy rainfall events or with excessive irrigation.

A decline in drinking water quality in shallow private wells could result from increased nitrates in ground water over time with Scenarios 2 and 3, and also from faecal contamination by livestock, leading to increased rates of waterborne disease (enteric or gastro-intestinal disease). In comparison, groundwater modelling has shown a small increase in the number of shallow wells exceeding MAV for Scenario 1. An increase in the number of animals as shown for land uses under scenarios 2 and 3, especially in areas of light soils, is likely to increase pathogens in groundwater. The type of irrigation is important as border dyke irrigation is most likely to flush pathogens into

<sup>123</sup> Evidence of C N Taylor on social effects of the proposed HDI Scheme paras 58, 65 and 67.

<sup>124</sup> A trend identified in McClintock et al. (2002).

groundwater so conversion to spray irrigation and improved farming practices (scenario 3) should reduce pathogens in groundwater.

In respect to nitrogen, land-use intensification and an increase in irrigated area will cause an increase in nitrate concentrations in shallow groundwater.<sup>125</sup> Modelling<sup>126</sup> suggests that the area where shallow groundwater concentrations will exceed the drinking water standards (MAV) is about 19% of the SCCS area currently and this would increase to 34% under Sub-scenarios 2a and 2b, and to 28% under Scenario 3b, while it would reduce to 16% under Scenario 3a. If these same relative changes are applied to the estimated 5% of domestic wells that currently exceed the MAV, it is predicted that 10% will exceed MAV in Scenario 2, 8% in Scenario 3b and remain at 5% under Scenario 3a.<sup>127</sup>

On-farm mitigations assumed under Scenario 3a (MFM) are likely to be more effective than the 'Mid-point mitigations' (Scenario 3b) and GMP (Scenario 2) for bacterial contamination as well as nitrate-N losses.

### ***Reticulated supplies***

Current Waimate District Council (WDC) drinking water supplies for Waimate town are sourced from deep groundwater bores, and will most likely be unaffected and continue to meet drinking water standards under all scenarios.

WDC rural scheme supplies sourced from rivers (i.e. Cannington Motukaika, Hook Waituna, Otaio Makikihi, Waihaorunga and Waikakahi schemes) may, depending on the location of intakes, be affected by an increase in contaminants (nitrate and microorganisms) under scenarios 2 and 3 and sub scenario 3b. For the Lower Waihao domestic supply scheme (which includes supply to the Waihao Marae) there would be a general increase in the risk of pathogenic microorganisms (e.g. *Campylobacter*) in shallow groundwater associated with increased animal numbers under all scenarios. This will make disinfection treatment even more important.

### **3.7 Wainono Lagoon is a healthy ecosystem**

The Wainono Restoration Project<sup>128</sup> is well underway and is expected to produce benefits for the Lagoon over the next few decades under all scenarios.

#### ***Recreational use of the Lagoon***

To manawhenua, Wainono is a taonga (treasure) equivalent to Te Waihora (Lake Ellesmere) and Wairewa (Lake Forsyth).<sup>129</sup> It provides important habitat for waterfowl, migrating birds, coastal birds and native fish, many of which are taonga species, in particular tuna (eels). For manawhenua, the value of the Waihao-Wainono system as home to taonga species, and as a source of mahinga kai cannot be overstated; the health of mahinga kai will be the ultimate indicator of the health of the system. The treasured status is reflected in the designation of the Lagoon and the lower reaches of its tributaries (Hook, Waituna and Waihao) as the "Waihao Mataitai Reserve" which prohibits commercial fishing and promotes customary sustainable management. The Lagoon and surrounding

<sup>125</sup> The New Zealand drinking-water standards set a Maximum Acceptable Value (MAV) for nitrate nitrogen at 11.3 mg/L (equivalent to 50 mg/L of nitrate), based on a risk to bottle-fed babies. Community & Public Health also recommend applying this MAV to pregnant women. More frequent monitoring is required when nitrate concentrations exceed ½ MAV (5.6 mg/L.)

<sup>126</sup> Scott and Etheridge (2015).

<sup>127</sup> See more detail in the groundwater quality report.

<sup>128</sup> See website <http://ecan.govt.nz/advice/biodiversity/area/lower-waitaki/Pages/wainono.aspx>

<sup>129</sup> See Tipa (2012).

area also have sites of considerable historical significance to both Maori and Europeans, with numerous sites identified as wahi taonga (treasured places) and wahi tapu (sacred places). The Lagoon and surrounds are also important to both local and regional communities for amenity and recreation including bird watching, walking, picnicking, whitebaiting, eeling, floundering, water fowl hunting and trout fishing.

Under all scenarios an increase in riparian planting and enhancement activities around the Lagoon could increase active and passive recreational uses including bird watching and walking, including by the older component of the population. Obvious physical improvements in the area could enhance perceptions of the recreation opportunities overall. There are unlikely to be any discernible changes in contact water activities such as swimming and water skiing.

Wainono Lagoon is recognised as a popular gamebird hunting area, providing beneficial habitat for waterfowl including Canada geese, black swans, mallard and grey ducks, and paradise ducks. There could be a small enhancement in bird shooting opportunities with increased riparian planting under all scenarios providing additional cover for birds and hunters.

An increase in the irrigated area and intensification under Scenario 2 (both Sub-scenarios 2a and 2b) will increase the load of Nitrogen (N) and Phosphorous (P) to the Lagoon by around 50% (Total N) and 13% (Total P) respectively. Wainono Lagoon is already very nutrient enriched (current TLI 6.5) and these load increases will further degrade water quality under Scenario 2a to an estimated Trophic Level Index (TLI) score of around 7.0.<sup>130</sup> This means an increased risk of algal blooms and associated risk of negative effects on lagoon visual aesthetics, and also a small increase in the risk of toxic blooms that would affect recreation opportunities.

Increased nutrient enrichment under Scenario 2a (TLI 7.0) will also increase the (already present) risk of adverse effects on aquatic life including invertebrates and fish (e.g. eels, whitebait, flounder and mullet) in the Lagoon and in the lower Waihao River and Box area. It is likely (but not certain) that these species will still persist with the further degraded water quality. However the Lagoon habitat may be exposed to more frequent periods of stress due to low dissolved oxygen that could limit population size. Adverse impacts on birds are difficult to predict; the main adverse effect is probably the risk to their food items (i.e. the effects described above on invertebrates and fish). There is unlikely to be a measurable adverse effect on game bird numbers, but poorer water quality and the increased risk of algal blooms (including risks to dogs) will also impact negatively on the game-bird hunting experience for hunters.

Under Scenario 2b the use of Waitaki water to augment flow through Wainono Lagoon via the Hook River could mitigate the effects of the increased nutrient load and the related water quality deterioration. Flow augmentation could potentially improve water quality and related aesthetic and ecological values to better than the current situation, potentially sufficient to achieve the proposed LWRP outcome of a TLI less than 6.0 and also reduce dissolved oxygen fluctuations. Achieving a TLI of less than 6.0 (Scenario 2b) is still a very nutrient-enriched state for a lake; however it is a significant improvement on the current situation. Flow augmentation may also offer opportunities to help reduce sediment accumulated on the Lagoon bed and could enhance the chances of re-establishing macrophyte beds, both of which would be positive for aesthetic and ecological values. The lower the TLI that can be achieved (i.e. further below 6.0) the better the water quality and the lower the risk to related aesthetic and ecological values,<sup>131</sup> and consequently for recreation activity.

Scenario 3a (maximum feasible mitigations – MFM) would also be a significant improvement on Scenario 2a and would probably maintain around the current Nitrogen load to the Lagoon and the

---

<sup>130</sup> Sutherland and Norton (2011), Norton (2014).

<sup>131</sup> Sutherland and Norton (2011), Norton (2014).

current average TLI score of 6.5. Thus Scenario 3a would maintain the current level of (degraded) water quality and related aesthetic and ecological values. Scenario 3b is halfway between Scenario 2a and 3a in terms of Nitrogen load to the lagoon and a TLI score in the order of 6.75.<sup>132</sup>

For recreation, an improvement in TLI score and Lagoon aesthetics and ecological values under Scenario 2b, should see improved public perceptions of the Lagoon and increased recreation activity in its environs, including fishing, game bird hunting and pursuits such as walking in the Lagoon margins, bird watching and passive recreation.

### ***Fishing activity in and around the lagoon***

For scenario 1, a considerable amount of local fishing activity will remain concentrated in the area of the Waihao box where there is good access to the Waihao River. All other fishing activity in the Catchments, including floundering, white-baiting and eeling is unlikely to change much in this scenario and sub scenarios, in terms of both frequency and location as identified in the baseline report.

Under scenarios 2 and 3 fishing activity will remain concentrated in the area of the Waihao box where there is good access to the Waihao River flows. In scenarios 2a and 3b, fishing activity in the Lagoon area, including floundering, white-baiting and eeling is likely to decrease in terms of both frequency and location compared to the social baseline. Scenarios 2b and 3a show some prospect for enhanced ecological values and improvement in the fishery.

## **3.8 Coastal streams have high water quality**

### ***Fishing activity in streams***

The streams of the catchments provide numerous fishing opportunities and brown trout provide a regionally important recreational fishery in some locations. Scenario 1a is unlikely to see any significant changes in activity. Sub scenario 1c is likely to result in less available habitat for native fish and trout, while sub scenario 1b is likely to provide improvement in native fish and trout habitat compared to the current situation and the other sub scenarios.

Irrigation development (Scenarios 2a and b and 3a and b) will generally increase flows in the lower reaches of rivers which is positive for fish habitat and for the fishing experience due to the current constraints of low flows and dry streams. However, the associated land use change will also increase nitrate concentrations and thus the risk of nuisance algae blooms that degrade fish habitat and the fishing experience. Scenarios 3a and 3b would provide more on-farm nutrient mitigation (better than GMP) and thus alleviate some of the negative water quality effects, but the rivers and streams will remain, as they are currently, prone to nuisance algae that will diminish fishing values at times.

### ***Other recreational use of streams***

Recreation sites in the upper parts of river catchments above where most water is taken and used for agriculture (e.g. Otaio Reserve) would see little difference between all scenarios and should remain at a good standard for recreation that meets current planning (LWRP) outcomes.

However current opportunities for contact recreation including swimming in the Waihao River at sites such as “Black Hole” and “Bradshaws” (or “the Rocks”), currently do not meet contact recreation outcomes (LWRP) at all times due to concentrations of microorganisms and periodic algae and cyanobacteria blooms. These sites would be at increased risk of breaching these outcomes under irrigation development as in Scenarios 2a and 2b. Scenarios 3a and 3b would provide more

---

<sup>132</sup> Norton and Robson (2015).

on-farm mitigation (better than GMP) and thus alleviate some of the negative water quality effects, but these sites would likely remain prone to nuisance algae blooms and breaches of recreation outcomes.<sup>133</sup>

Table 4: Scenario assessment summary table

Sub Outcome	Indicator	Scenario Assessments vs current state		
		S1	S2	S3
Vibrant economy and sustainable growth	On farm and regional employment	=	++	+
	Number of farmers and farm workers	=	++	+
Population in the SCCS area	Population change	=	++	++
Services Including Health and Education	School rolls	-	+	+
	Incomes	=	++	+
	Community participation	=	+	+
	Workforce education	=	+	++
	Social cohesion	-	--	-
	Engagement in GMP	+	++	++
Drinking water meets quality standards	Groundwater wells	=	--	-
	Reticulated supplies	=	-	-
Wainono Lagoon is a healthy ecosystem	Fishing activity around Lagoon	+	+	+
	Other recreational use of lagoon	+	+	++
Coastal streams have high water quality	Fishing activity in streams	=	+	++
	Other recreational use of streams	=	+	++

Note: The summary assessments indicate little change (=), positive (+) or negative (-). The scenario assessments are general and do not allow for particular nuances of some sub scenarios discussed in the text, or the management of change discussed in section 4.

<sup>133</sup> Kelly (2015).

## 4 Discussion of the Zone Committee Solutions Package (ZCSP)

### 4.1 Development of the ZCSP

The analysis underlying the social assessment of the scenarios forms the basis for discussion of the ZCSP. The effects of scenarios described above helped inform discussion and debate amongst the technical team and at numerous community meetings and ZC meetings held between May 2013 and August 2014 (see Overview Report, Norton and Robson 2015). An earlier draft version of this social assessment report contained predictions for all these scenarios and was available on the SCCS project website during all discussions through 2013-14.

Arising from the discussion and debate on the relative merits of the scenarios, the ZC developed its preferred approach for land and water management in the SCCS area and documented that approach in an addendum to the Lower Waitaki South Coastal Canterbury Zone Implementation Programme (the “ZIP Addendum”). The ZIP Addendum contains a “Solutions Package” of recommendations. The ZIP Addendum was formally accepted by Environment Canterbury Commissioners and the Waitaki and Waimate District Councils in September 2014, and has formed the basis for ECAN planners to subsequently prepare the draft SCCS sub-chapter of the proposed Land and Water Regional Plan for public notification.

The Zone Committee Solutions Package (ZCSP) has now been assessed by the technical contributors to the SCCS project and is assessed below against social outcomes and indicators.

### 4.1 Proposed pathways of the ZCSP

Major pathways to achieve the ZC outcomes are listed below and form the basis of the ZC recommendations. They are designed as an integrated package and in addition to full development of the HDI and WDI they include a focus on non-statutory actions, good environmental stream flows, good management practice, augmentation of Wainono Lagoon, and a fully functional and funded Waihao Box. Proposed pathways are:

1. Support for **Catchment Groups**: for collective action and practices to reduce losses of sediment, and reduce phosphorus and nitrogen inflows to waterways.
2. Use of **Farm Environment Plans** using available templates: to facilitate and demonstrate Good Management Practices and actions
3. Realising the gains from the **Wainono Project**<sup>134</sup> and any successor to the project: for catchment and on-farm actions to improve Wainono Lagoon; including identification of critical source areas, sediment traps, stream battering, wetland rehabilitation and biodiversity enhancement, optimal lagoon level management and the development of a de-nitrifying wetland
4. **Good Management Practice** (GMP) requirements for agricultural, and for urban and industrial discharges
5. A **Simple Framework** to support limits implementation
6. **Augmentation** of Wainono Lagoon: to improve lagoon health

---

<sup>134</sup> Wainono Lagoon Restoration Project, see <http://ecan.govt.nz/advice/biodiversity/restoration-trail/pages/wainono.aspx>

7. Capping current **Water Allocation** and reducing over-allocation over time as new water sources are available and irrigation efficiency improves, enabling alternative sources of water, and signalling a future date for higher flows to be implemented
8. Securing the future functioning of the **Waihao Box**, through a more sustainable and equitable funding arrangement

The key elements and assumptions of the Solutions Package are listed in the table in Attachment 3.

#### 4.2 Summary of social effects

The social effects of the ZC Solutions Package will encompass the social effects identified above for Scenario 2b, which includes the impacts of HDI and WDI plus flow augmentation in the Lower Hook through Wainono Lagoon, plus the benefits associated with additional flow left in rivers of the project area under Scenario 1b, which is enabled by the availability of new (Waitaki) water. Essentially the ZCSP is a blend of Scenario 2b and 1b plus a package of other added actions.

The scenario analysis found that the land-use changes from HDI and WDI combined are likely to be substantial as the total area of irrigated land will almost double. This land use change will involve a strong level of additional employment as the economic analysis indicates the number of farmers and farm workers employed in dairy, dairy support and arable farming is likely to increase by 500 to 600 FTE employees. There will be a particular boost to employment during the construction stage of the irrigation projects. This additional employment, in turn, will drive growth in employment and population throughout the District, with current population declines slowed or arrested. The growth in population should flow into benefits for population-based services such as health and education, with the growth in school rolls indicating increased vitality in those locations.

As the growth in population will largely involve working-age people and some younger families there will be benefits to community life such as an increase in participation in recreation, sport, community groups and voluntary activity, which is particularly important in the face of an increasingly aged population, with the older elderly often wanting to step back from their community obligations.

The Solutions package, as with Scenario 2, could reduce social cohesion as a result of new workers (from New Zealand and overseas) with different cultural values and expectations about community participation. The community will need to make a concerted effort to involve such newcomers and encourage their participation, thereby maximising positive social effects. Any tensions in this regard should be offset, however, by a reduction in tensions between farm production values and recreation and amenity values in the rivers and lagoon because of improvements in their ecological status. Although a new set of community concerns is likely to arise, with any evidence of declining status of drinking water in domestic wells as a result of land-use intensification. Such a trend could see an increased incidence of wells exceeding MAV for nitrogen and also *E. Coli*, with families taking measures to protect their health. These measures could include buying water to mix baby formula, seeking information about water quality and having wells tested more regularly, and for some, an effort to improve wellhead protection or even sink deeper wells.

Under the ZCSP, a range of mitigation actions (e.g. flow augmentation, increased minimum flows and reduced flow allocations in catchment, riparian buffer planting, soil erosion initiatives and targeted sediment removal) collectively could improve the quantity and quality of fish habitat and the fishing experience compared to the baseline, but it is still not certain if these values would be fully supported at all times.<sup>135</sup>

---

<sup>135</sup> Kelly (2015).

As the measures to adopt good farm management practices and augment river and lagoon water take shape, there is likely to be an increase in recreation activity, including fishing in the lower rivers and fishing, swimming and boating in the areas of the lagoon around a well-functioning box. An improvement in TLI score and Lagoon aesthetics and ecological values should see improved public perceptions of the Lagoon and increased recreation activity in its environs. Recreation in the upper Waihao and other rivers such the Otaio may decline if there are impacts from intensification of land uses in the vicinity. As there are potential improvements and negative effects for water-based recreation, a recreation strategy should be developed in conjunction with efforts at river care, stream augmentation and lagoon improvements.

#### 4.3 Management of change

In order to maximise the potential social benefits of the ZC Solutions Package, while minimising the potential negative social effects, it is proposed that a programme of social change management should be incorporated into the implementation of the package.<sup>136</sup> This programme should include:

- Community development to maximise the benefits from newcomers in the community with intensive land uses, and resolve any issues that emerge – this sort of collaborative approach is already underway in South Canterbury, providing a good basis to develop further.<sup>137</sup>
- A strategy for enhancing local business and employment opportunities from constructing and operating the HDI and WDI through training and business development.<sup>138</sup>
- A recreation development strategy building on the Waimate District Council's current initiatives.<sup>139</sup>

#### 4.4 Overall effects on social wellbeing

The Resource Management Act (s5) guides this assessment in respect to considering effects on social and economic wellbeing and the long-term implications for people and communities. The ZCSP will have an effect on a number of elements<sup>140</sup> that contribute to social and economic wellbeing as listed here. These elements are interdependent and influence social wellbeing as an interrelated set:

***Economy, business activity, income and employment*** – The overall effect is expected to be positive due to the longer term positive effect of the new irrigation areas allowed. Increased work opportunities and incomes are key determinates of health.

***Lifelong learning and education*** – The shift to good management practices and in time to advanced mitigation, will require a constant process of updating skills amongst farmers and rural services such as fertiliser firms, irrigation specialists and veterinarians.

***Physical and mental health*** – There will be increased pressure on farmers and farm families from new policies and planning rules and possibly from downward pressure on farm profitability, especially in the low points of farm commodity cycles. There are some risks to health from declining quality of shallow water tapped for drinking. Health status will benefit from higher incomes and employment.

<sup>136</sup> See also the evidence of C N Taylor on the HDI water consent.

<sup>137</sup> [http://www.southcanterbury.org.nz/PicsHotel/SouthCanterbury/Brochure/Settling\\_In\\_Aoraki.pdf](http://www.southcanterbury.org.nz/PicsHotel/SouthCanterbury/Brochure/Settling_In_Aoraki.pdf)

<sup>138</sup> The facility to run such a strategy is available through the Waimate Resource Centre.

<sup>139</sup> As has already happened with the Waimate Trackways Incorporated group formed following analysis of the Waimate District Council Sport & Recreation Plan.

<sup>140</sup> Elements of social wellbeing have been developed by Taylor Baines from international and national sources including the OECD and New Zealand Royal Commission on Social Policy.

**Outdoor areas, natural environment and open space** – Improvements to the water quality in streams and Wainono Lagoon will be a positive outcome, as the Lagoon is an important local and cultural resource because of its amenity values.

**Lifestyles, leisure and recreation**- Improvements to the ecological status of streams and Lagoon will flow into the amount and quality of recreational activity locally and for visitors.

**Family, social attachment and support** – An ongoing trend towards larger farms and increasingly mechanised farm systems, especially with irrigated farming, will see more farm workers and fewer owners, reducing the number of farm families. New social networks will continue to form, as is already happening with migrant workers.

**Participation in community and society** – Collaborative approaches and community based activities, such as enhancement programmes, will have a positive outcome for community processes and cohesion. Some social tension will continue around major value conflicts over water uses, especially for increased agricultural intensification.

## 5 Conclusions

The people of the SCCS Catchments hold a wide range of values for their water, including irrigation of agriculture, water supplies and recreational uses (active and passive). They have a significant advantage in their current ability to draw some water for rural water supplies and irrigation from the nearby large Waitaki River and to potentially increase this in future with proposed new schemes. Furthermore, the Waitaki River and lakes represent a significant nearby recreation resource in their own right for Waimate communities. In the long-term, there is evidence that the supply and quality of water in the coastal streams and Wainono Lagoon are stressed, and if nothing is done a range of values will continue to be compromised by declining water quality, particularly in the Wainono Lagoon.

Employment in the area drives the level of population and there is evidence of some strong growth in recent years, including agricultural production in the rich coastal strip that is the focus of this assessment. Dairy production has driven some of this growth but is now limited by available water. The recent economic growth has driven a small amount of population growth, but over the SCCS catchments this growth is very small and that of the town of Waimate is barely stable and becoming increasingly elderly. School rolls are declining.

The HDI and WDI schemes provide an opportunity to improve some values but this opportunity also comes with risks and effects that need to be managed. In essence the proposed ZCSP attempts to juggle the interconnected issues of water quality and quantity while maintaining economic growth and recreational opportunities in line with the established sub outcomes for the Zone.

Water quantity is stressed now, but in the long-term under the ZCSP this stress would be relieved and sufficient water made available for long term needs - indeed resilience to climate change in this regard would undoubtedly increase under the ZCSP.

Quality is also under stress now, and would be under even more stress if the proposed irrigation developments were to occur without active and significant management and mitigation. However the proposed actions under the ZCSP go a long way to managing those stresses and even improving current quality in some areas (e.g. Wainono Lagoon). Not all water quality stresses are eliminated, however, most notably shallow groundwater feeding private household wells, and periphyton growth risks and associated effects on river recreation at some sites. In the context of the new LWRP and CWMS these schemes can only be limited by ensuring that discharges of nutrients and takes of surface and ground water are carefully managed.

Through a process of community involvement and scenario assessment this social assessment has contributed a technical perspective that has helped the ZC to weigh up the full sets of advantages and disadvantages of various approaches to water management and ultimately to express their preferred approach (the "Solutions Package") in a ZIP Addendum. The assessment has found there are difficulties balancing the social advantages of increased agricultural production and employment through out-of-catchment irrigation water, with the values of recreational use and water-based amenity, and the health and social effects of quality drinking water. The proposed Solutions Package reflects a concerted effort by the community and key stakeholders to resolve these conflicts and achieve a set of outcomes that should enhance social wellbeing. A strategy for social change management to accompany implementation of the strategy would assist in achieving these outcomes.

## Glossary

BERL	A group of independent economic consultants
CWMS	Canterbury Water Management Strategy
DOC	Department of Conservation
ECAN	Environment Canterbury
FTE	Full time equivalent worker – an economic measure
GDP	Gross Domestic Product
GMP	Good management practice
HDIS	Hunter Downs Irrigation Scheme
HW	Highway
LWRP	Land and Water Regional Plan
MAV	Mean Annual Value
MFM	Maximum feasible mitigation
N	Nitrogen
P	Phosphorous
RMA	Resource Management Act (1991)
SCCS	South Canterbury Coastal Streams
SH	State Highway
TLI	Trophic Level Index
Waihao Box	A permanent physical structure for the Lagoon outlet to the ocean
WDIS	Waihao Downs Irrigation Scheme
Whitebait	Several species of native fish ( <i>Inanga</i> ) in their juvenile form, caught as a delicacy
ZC	Zone Committee
ZCSP	Zone Committee Solutions package
ZIP	Zone Implementation Plan

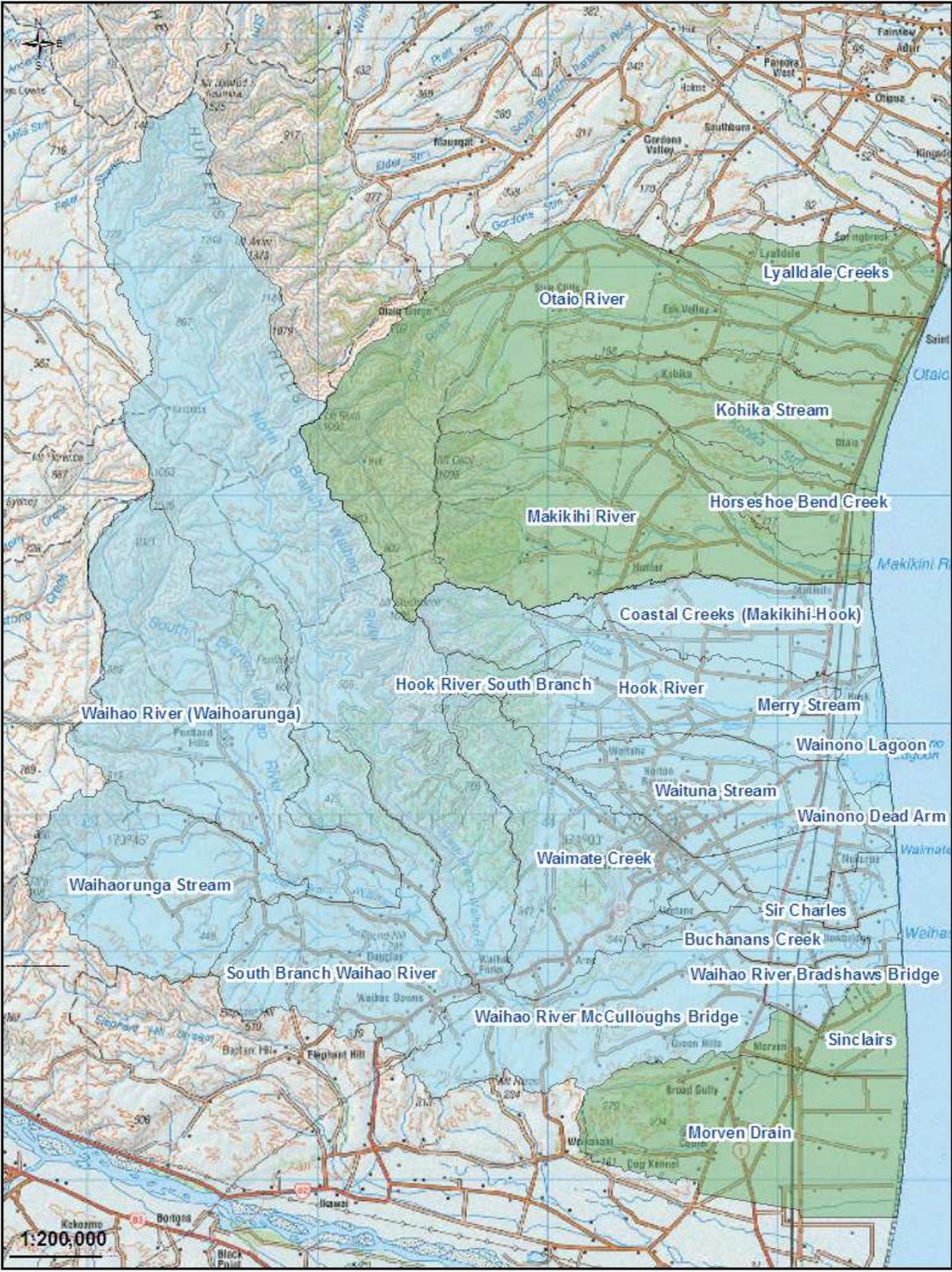
## References

- Benn, J. (2011). Instream intrinsic values of the Wainono Lagoon-Waihao River catchment. Draft/Living Document. Department of Conservation, Canterbury Conservancy, Christchurch, New Zealand.
- Broad, T. (2010). Wallaby Trip. New Zealand Hunting and Wildlife, Issue 167, January-March.
- Daly, A. (2004). Inventory of instream values for rivers and lakes of Canterbury, New Zealand – a desk top review. Environment Canterbury Report U0413.
- Deans, N. A. (2007). Evidence of Neil Alistair Deans on behalf of Central South Island Fish and Game Council 17 December 2007. In the matter of an application for resource consent CRC071029 by the South Canterbury Irrigation Trust and Meridian Energy Limited to take and use water from the Waitaki River.
- Department of Lands and Survey (1984). Otaio Gorge Scenic Reserve Management Plan. Management Plan No. 30. Christchurch: Department of Lands and Survey.
- ECAN (2008a). Friends help bush flourish at Waimate. Living Here: The Environmental Newsletter for Canterbury. April – May 2008.
- ECAN (2008b). Waihao River – Wainono Lagoon Management Strategy. Prepared by the Waihao-Wainono Waters Users Society Management Committee. Accessed 09/04/2013 from <http://ecan.govt.nz/publications/General/WaihaoWainonoManagementPlan.pdf>.
- ECAN (2012a). Lower Waitaki South Coastal Canterbury Zone Implementation Programme. Prepared by the Lower Waitaki South Coastal Canterbury Zone Committee. Accessed 09/04/2013 from <http://ecan.govt.nz/publications/Plans/cw-lower-waitaki-south-coastal-zone-implementation-plan.pdf>.
- ECAN (2012b). Proposed Canterbury Land and Water Regional Plan – Volume 1 (Schedule 6). Canterbury Regional Council (ECAN).
- ECS (1995). A summary of groundwater related issues within the Waihao River – Lake Wainono Catchment. Report Number CRC U95/30. Prepared by Environmental Consultancy Services (ECS) for the Canterbury Regional Council.
- Egarr, G. D. and Egarr, J. H. (1981). New Zealand Recreational River Survey: An Investigation into the Recreation Potential of New Zealand's Inland Waterways.
- Fink-Jenson, K; M. Johnson & M. Simpson-Edwards (2004). Freshwater recreational users: internet survey of freshwater use in New Zealand. Prepared for the Ministry for the Environment by, BRC Marketing and Social Research.
- Golder Associates (2012). Ecological Flow Review. Waihao River and Wainono Lagoon Catchment. Report Number 0978110112\_001\_R\_Rev1. Submitted to Canterbury Regional Council, Christchurch.
- Greenaway, R. J. (2007). Brief of Evidence of Robert James Greenaway. Report accessed 16/04/2013 from <http://files.ecan.govt.nz/public/south-canterbury-streams/research/greenaway-hdi-evidence-recreation.pdf>.
- Harris, S. (2015). South Canterbury Coastal Streams (SCCS) limit setting process: Economic assessment. Environment Canterbury Technical Report. Prepared by Harris Consulting Limited.

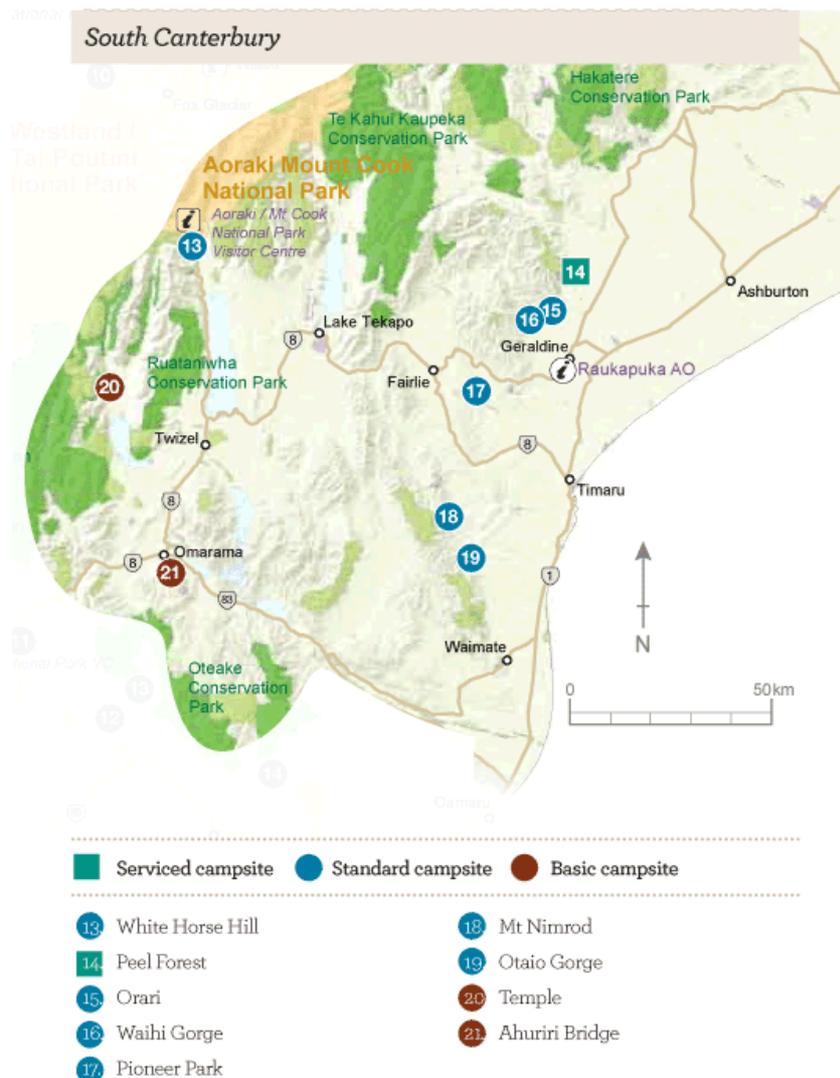
- Harris, S., Butcher, G. and Smith, W. (2006) *The Opuha Dam: An Ex Post Study of its Impacts on the Local Economy and Community*. Harris Consulting, Christchurch.
- Janssen, P. (2008). *Excellent Short Walks in the South Island*. New Zealand. New Holland Publishers.
- Kent, J. (2006). *South Island Trout Fishing Guide*. New Zealand: Reed Books.
- Kelly, D. (2015). *South Canterbury Coastal Streams (SCCS) limit setting process. Predicting consequences of future scenarios: Surface water quality and associated values*. Environment Canterbury Technical Report.
- Leung-Wai, J. (2013). *BERL Regional Rankings 2012*. Business and Economic Research Ltd, Wellington.
- Local Services Mapping (2009). *South Canterbury Community Profile 2009*. Family and Community Services, Ministry of Social Development, Wellington.
- McKay, S. (2006). *Waimate District Social Needs Analysis*. Report prepared for the Waimate District Social Services Committee, Waimate.
- McClintock, W., Taylor, N. and McCrostie Little, H. (2002). *Social assessment of land use change under irrigation*. Working Paper 33, prepared for the Foundation for Research Science and Technology Project -Resource Community Formation & Change (TBA 801). Taylor Baines & Associates, Christchurch.
- MFE (2004). *Water Bodies of National Importance: Potential Water Bodies of National Importance for Recreation Value*. Report published by the Ministry for the Environment. Last accessed 14/04/2013 from: <http://www.mfe.govt.nz/publications/water/national-importance-rec-dec04/html/page4.html>.
- Ministry for Primary Industries (2012). *National Exotic Forest Description as at 1 April 2012*. Ministry for Primary Industries, Wellington.
- NZ Fishing (online). *Waihao River Trout Fishing*. Accessed 05/04/2013 from <http://www.nzfishing.com/FishingWaters/CentralSouthIsland/CSIFishingWaters/CSIWaihao.htm>.
- Norton, N., Robson, M. (2015). *South Canterbury Coastal Streams (SCCS) limit setting process. Predicting consequences of future scenarios: Overview report*. Environment Canterbury Technical Report.
- O'Donnell, C. F. J. (2000). *The significance of river and open water habitats for indigenous birds in Canterbury, New Zealand*. Environment Canterbury Report U00/37.
- Oncescu, J. (2014). *Rural restructuring and its impact on community recreation opportunities*. *Annals of Leisure Research*, DOI: 10.1080/11745398.2014.980834.
- Pompei, M. (2011). *Monitoring Public Access to River Environments: Waimate District*. Environment Canterbury Regional Council Report No. R11/39. ISBN 978-1-927161-60-9.
- Schilling, C., Zuccollo, J. and Nixon, C. (2010). *Dairy's role in sustaining New Zealand - the sector's contribution to the economy*. Report to Fonterra and Dairy NZ. New Zealand Institute of Economic Research, Wellington.

- Scott, M., Etheridge, Z. (2015). South Canterbury Coastal Streams (SCCS) limit setting process, predicting consequences of future scenarios: groundwater quality. Report No R14, Environment Canterbury.
- Shadbolt, Maurice (2009). Canterbury's Spectacular Coast. Christchurch City Council, Environment Canterbury Regional Council, Department of Conservation, Southern Encounter. Accessed 05/04/2013 from <http://ecan.govt.nz/advice/your-school/lesson-resources/Documents/CoastalDunesLoresA.pdf>.
- Sunderland-Downing, V., Elley, R. and Daly, A. (2003). Inventory of instream recreational values for rivers and lakes of Canterbury, New Zealand. Environment Canterbury Report U03/66.
- Sutherland, D., Norton, N. (2011). Assessment of augmentation of water flows in Wainono Lagoon. NIWA Client Report No. CHC2011-043.
- Tipa, G. (2012). Cultural associations and their flow and water management implications for the Waihao/Wainono catchment. Prepared by Tipa & Associates, December 2012.
- Ward, J. and Pyle, E. (1997). Environmental Indicators for the Sustainable Management of Freshwater. Report No 2416/1. Ministry for the Environment, Wellington.
- WDC (n.d.). Lake Wainono Wetland [Information Brochure]. Waimate District Council, Canterbury. Accessed 04/04/2013 from [www.waimatedc.govt.nz/NR/.../No7WainonoLagoon.pdf](http://www.waimatedc.govt.nz/NR/.../No7WainonoLagoon.pdf).
- WDC (2006a). The Waimate District Sport and Recreation Plan. Part One: Physical Activity Strategy. Waimate District Council, Canterbury.
- WDC (2006b). Community Services Manager's Report – April 2006. Waimate District Council. Accessed 10/04/2013 from <http://www.waimatedc.govt.nz/NR/rdonlyres/24B37F09-9F16-4DA8-AE59-4BB4DE6FF06B/30461/InfoReportcommerviceapril06.pdf>.
- WDC (2006c). Draft Long Term Community Plan 2006-2016 - Volumes 1-5. Waimate District Council, Waimate, 29 March 2006.
- WDC (2012). Long Term Plan 2012-2022 – Volume 1. Waimate District Council, Waimate, 29 June 2012.
- Wilson, J. (1999). Waikakahi: Fulfilling the Promise. The Waikakahi Centennial 1999 Incorporated Society, Waimate
- Wilson, J. (2012). 'South Canterbury places - Waimate', Te Ara - the Encyclopaedia of New Zealand, updated 13-Jul-12. Accessed 14/04/2013 from: <http://www.TeAra.govt.nz/en/south-canterbury-places/page-7>.

Attachment 1 Maps of the SCCS area



 South Canterbury Streams



Map of South Canterbury Campsites, including Mt Nimrod (18) and Otaio Gorge (19). Source: <http://www.doc.govt.nz/parks-and-recreation/places-to-stay/conservation-campsites-by-region/canterbury/map-of-south-canterbury-campsites/>

See also Waihao Hunting Block. Source: <http://www.doc.govt.nz/documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunting/north-waihao-hunting.pdf>

Mountain Bike Trails:

[http://www.waimatedc.govt.nz/\\_data/assets/pdf\\_file/0016/23830/MountainBikeBrochure.pdf](http://www.waimatedc.govt.nz/_data/assets/pdf_file/0016/23830/MountainBikeBrochure.pdf)

Walking Tracks:

[http://www.waimatedc.govt.nz/\\_data/assets/pdf\\_file/0005/23999/DistrictTrackLocationsandurbanwalkwaybacktoback.pdf](http://www.waimatedc.govt.nz/_data/assets/pdf_file/0005/23999/DistrictTrackLocationsandurbanwalkwaybacktoback.pdf)

4WD tracks, scenic reserves and conservation land (Hunter Hills):

<http://www.doc.govt.nz/Documents/parks-and-recreation/places-to-visit/canterbury/raukapuka/hunters-hills-brochure.pdf>

Fishing waters map

<http://www.nzfishing.com/FishingWaters/CentralSouthIsland/CSIRegion/CSICentralSouthIslandregion.htm>



## Attachment 2 Further tables and commentary on the social profile of the area in 2013

These profiles of selected areas in Waimate District were compiled from 2013 census statistics. The profiles of the communities were either prepared by combining data from a number of mesh blocks or by using data from area units.

Profiles were compiled for the following areas:

- South Canterbury Coastal Streams Catchments (MBs 2815000, 2815100, 2815201, 2815202, 2815300, 2815401, 2815402, 2815501, 2815502, 2815503, 2815600, 2815700, 2815800, 2815900, 2816000, 2816100, 2816200, 2816300, 2816400, 2816500, 2816600, 2816700, 2816800, 2816900, 2817000, 2817100, 2817200, 2817300, 2817400, 2817501, 2817502, 2817503, 2817504, 2817505, 2817600, 2817700, 2817800, 2817901, 2817902, 2818000, 2818100, 2818200, 2818300, 2818400, 2818500, 2818600, 2818700, 2818800, 2818900, 2819000, 2819100, 2819200, 2819300, 2819400, 2819500, 2819600, 2819700, 2819800, 2819900, 2820000, 2820100, 2820200, 2820300, 2820400, 2820500, 2820600, 2820700, 2820800, 2820900, 2821000, 2821100, 2821200, 2821300, 2821400, 2821500, 2821600, 2821700, 2821800, 2821901, 2821902, 2822000, 2822100, 2822200, 2822300, 2822400, 2822500, 2822600, 2822701, 2822702, 2822800, 2822900, 2823000, 2823100, 2823200, 2823300, 2823400, 2824500, 2824801, 2824802, 2824803, 2824900, 2825002, 2825100, 2825200, 2825400). *These mesh blocks include all those from the St Andrews and Waimate area units as well as many of the mesh blocks from the Waihao area unit.*
- St Andrews Village (area unit)
- Waimate Town (area unit)

Census statistics for Waimate District and New Zealand have been used as a basis of comparison for all the selected areas profiled here.

Census data were collected for the following key variables for each of these selected areas, Waimate District, and New Zealand:

- usually resident population (2001, 2006 and 2013)
- age and sex structure
- ethnic composition
- period of residence of the population
- educational qualifications
- labour force status
- employment status
- occupational status
- employment by industry for residents of the area
- family types
- household types
- household income
- sources of income received from government
- dwelling tenure
- access to motor vehicles by households

### Usually resident population

The population of the SCCS Catchments was 5,970 in 2013. It grew at half the rate (3%) as the District's population between 2001 and 2013. Over the same period the number of residents of Waimate Town and St Andrews Village remained static, with the population of the former settlement increasing by 18, and the latter declining by 3.

*TableA1: Changes in usually resident population of selected areas of Waimate District - 2001-2013*

Area	2001	2006	2013	Per cent change 2001-2013
SCCS Catchments	5,799	5,868	5,970	2.9
St Andrews Village	183	177	180	-1.6
Waimate Town	2,757	2,835	2,775	0.7
Waimate District	7,101	7,209	7,536	6.1
New Zealand	3,737,277	4,027,947	4,242,048	13.5

Source: Statistics New Zealand

### Population by age and sex

The population of Waimate Town was relatively older than the District's population in 2013, with a lower proportion of children, and a higher proportion of people aged 65 years and over among its residents. The latter age group comprised 36 per cent of the town's population compared with 25 per cent of the population of the SCCS catchments and 22 per cent of the District's population. Females predominated in the population of Waimate Town and males predominated in the population of St Andrews Village, while males and females were more evenly balanced in the SCCS Catchments and District populations.

*TableA2: Percentages of usually resident population by age groups for selected areas of Waimate District - 2013*

Area	14 years & under Per cent	15-64 years Per cent	65 years & over Per cent
SCCS Catchments	15.9	59.0	25.1
St Andrews Village	20.3	61.0	18.6
Waimate Town	13.1	51.2	35.7
Waimate District	17.9	59.8	22.3
New Zealand	20.4	65.3	14.3

Source: Statistics New Zealand

Dependency ratio: 0.69 SCCS Catchments, 0.64 St Andrews Village, 0.95 Waimate Town, 0.67 Waimate District, 0.53 New Zealand.

Sex ratio Males/Females: 0.99 SCCS Catchments, 1.07 St Andrews Village, 0.89 Waimate Town, 1.02 Waimate District, 0.95 New Zealand

### Ethnic composition

The populations of the SCCS Catchments, St Andrews Village, Waimate Town and District were relatively homogeneous in their ethnic composition compared with the national population, with 79 to 87 per cent of residents of these areas identifying themselves as European. St Andrews Village had a relatively higher proportion of residents who indicated they were Maori (12%). The latest census also indicates that only a very small number of Pacific and Asian people were resident in the Catchments in 2013.

*TableA3: Percentages of usually resident population areas belonging to major ethnic groups for selected areas of Waimate District - 2013*

Area	European Per cent	Maori Per cent	Pacific & Asian Per cent
SCCS Catchments	84.1	5.4	2.8
St Andrews Village	79.1	11.9	1.5
Waimate Town	85.2	5.5	1.8
Waimate District	87.0	5.9	3.3
New Zealand	70.0	14.1	18.1

Source: Statistics New Zealand

Note: Where people reported more than one ethnic group, they were counted in each applicable group.

### Period of residence of population

Residents of the SCCS Catchments and Waimate Town had similar patterns of residential mobility as those of the District in 2013. They were relatively less mobile than the national population. People living in St Andrews were relatively more mobile than residents of Waimate Town and SCCS Catchments, however, only 15 per cent of them had been domiciled there for fifteen or more years.

*TableA4: Period of residence of population of selected areas of Waimate District - 2013*

Area	Less than five years Per cent	Fifteen or more years Per cent
SCCS Catchments	39.3	21.3
St Andrews Village	31.7	15.0
Waimate Town	38.8	22.3
Waimate District	38.6	20.5
New Zealand	48.8	15.1

Source: Statistics New Zealand

## Educational qualifications

About a third of residents of Waimate Town (37%) and St Andrews Village (33%) aged 15 years and over, reported they held no educational qualifications in 2013. This was a higher proportion than for the District (29%) and the SCCS Catchments (30%), and in the case of Waimate Town is partly explained by the relatively older age structure of its population. A fifth of residents of the SCCS Catchments (20%) and just under a quarter of residents of the District (24%) possessed tertiary qualifications, but this was considerably lower than the national total of 35 per cent.

*TableA5: Percentages of usually resident population aged 15 years & over with tertiary and no educational qualifications for selected areas of Waimate District - 2013*

Area	Tertiary qualifications Per cent	No qualifications Per cent
SCCS Catchments	20.3	29.7
St Andrews Village	22.9	33.3
Waimate Town	18.4	36.6
Waimate District	24.3	29.1
New Zealand	34.7	18.6

Source: Statistics New Zealand

Note: Tertiary qualifications include Level 4 Certificate, Level 5 or Level 6 Diploma, Bachelor Degree and Level 7 qualifications, Postgraduate and Honours Degree, Master Degree and Doctorate Degree.

## Labour force status

People living in the SCCS Catchments and St Andrews Village had higher levels of participation in the labour force when compared with residents of Waimate Town. Under half of residents of Waimate Town aged over 15 years (46%) participated in the labour force in 2013 compared with over three-fifths of the District's residents (60%). Thirty per cent of Waimate Town residents who were employed had part-time positions (cf. 25% for Waimate District).

*TableA6: Labour force status of residents of selected areas of Waimate District - 2013*

Area	Employed FT Per cent	Employed PT Per cent	Unemployed Per cent	Not in Labour Force Per cent
SCCS Catchments	39.3	14.6	2.8	38.5
St Andrews Village	46.8	12.8	6.4	31.9
Waimate Town	29.4	12.9	3.2	49.8
Waimate District	43.0	14.5	2.4	34.9
New Zealand	45.6	13.6	4.5	31.3

Source: Statistics New Zealand

## Employment status

About four-fifths of residents of St Andrews Village (86%) and Waimate Town (84%) who had jobs in 2013 were paid employees. The SCCS Catchments and District had higher proportions of employers (10-11%) and self-employed persons among their workforces (both 15%) reflecting the pattern of employment status which is usually associated with primary production and its support services.

TableA7: Percentages of paid employees, employers and self-employed persons resident in selected areas of Waimate District - 2013

Area	Paid employees Per cent	Employers Per cent	Self-employed persons Per cent
SCCS Catchments	67.9	9.5	14.6
St Andrews Village	86.2	3.4	6.9
Waimate Town	84.2	4.7	7.3
Waimate District	65.8	11.0	15.2
New Zealand	77.6	6.5	11.8

Source: Statistics New Zealand

### Occupational status

Just over a third (35%) of the resident workforce of the SCCS Catchments had higher status occupations as managers and professionals in 2013 (cf. 37% for the District and 39% for New Zealand), while three-tenths (30%) had blue collar occupations (cf. 30% for the District and 16% for New Zealand). This pattern reflects the high presence of farmers in the Catchments (classified as managers for census purposes), and less skilled workers employed on-farm and in agricultural support services. The workforces of Waimate Town and St Andrews Village, however, had relatively fewer people with higher status positions and relatively more with blue-collar occupations. This was most evident in the case of St Andrews Village where 45 per cent of its resident workers were machinery operators, drivers and labourers.

TableA8: Percentages of residents with higher status and blue collar occupations in selected areas of Waimate District - 2013

Area	Higher status occupations Per cent	Blue collar occupations Per cent
SCCS Catchments	34.5	29.5
St Andrews Village	20.7	44.8
Waimate Town	22.3	33.1
Waimate District	36.9	29.6
New Zealand	39.1	15.7

Source: Statistics New Zealand

Note: Higher status occupations are the manager and professional categories, and blue collar occupations are the machinery operators and driver, and labourer categories.

### Employment by industry for residents of the area

The major source of employment for residents of the SCCS Catchments in 2013 was the agriculture/forestry/fishing sector which provided a livelihood for 47 per cent of them. By contrast the sources of jobs for the people of Waimate Town and St Andrews Village were more diverse. Nineteen per cent of the town's workers, for instance, were employed by the education/health/social/arts sector, 18 per cent by the wholesale/retail/hospitality sector, 14 per cent by the manufacturing sector, and only 11 per cent by the agriculture/forestry/fishing sector. Just under a third of workers resident in St Andrews Village (31%) were employed in the manufacturing sector, with most of the remainder having jobs in the agriculture/forestry/fishing, wholesale/retail/hospitality, and education/health/social/arts sectors (all 15 per cent).

TableA9: Percentages of residents employed by industry in selected areas of Waimate District - 2013

Area	Agriculture, forestry, fishing Per cent	Manufacturing Per cent	Wholesale, retail, hospitality Per cent	Professional, technical, administrative Per cent	Education, health, social, arts Per cent
SCCS Catchments <sup>141</sup>	47.3	8.8	9.2	5.6	11.7
St Andrews Village	15.4	30.8	15.4	3.8	15.4
Waimate Town	11.1	13.5	18.2	9.9	19.0
Waimate District	38.0	9.6	11.5	7.2	13.1
New Zealand	6.4	9.4	19.9	16.5	19.4

Source: Statistics New Zealand

Note: The wholesale, retail and hospitality category is the sum of the wholesale trade, retail trade and accommodation and food services industry divisions; the professional, technical and administrative category is the sum of the professional, scientific and technical services, administrative and support services and public administration and safety industry divisions; and the education, health, social, arts category is the sum of the education and training, health care and social assistance and arts and recreation services industry divisions.

### Family types

Couple only families were predominant in the SCCS Catchments (54%), Waimate Town (60%) and the District (54%), while St Andrews Village had the highest proportion (38%) of two parent families. Waimate Town also had significantly more one parent families (17%) than the District.

TableA10: Family types in selected areas of Waimate District - 2013

Area	Couple only Per cent	Two parent Per cent	One parent Per cent
SCCS Catchments	54.2	34.3	11.4
St Andrews Village	50.0	37.5	12.5
Waimate Town	59.5	23.8	16.7
Waimate District	53.7	36.1	10.3
New Zealand	40.9	41.3	17.8

Source: Statistics New Zealand

### Household types

One family households were higher proportions of total households in St Andrews Village (65%) and the SCCS Catchments (65%) than for Waimate Town (56%) in 2013. Thirty-eight per cent of Waimate Town's households were occupied by one person; reflecting the presence of a relatively large number of residents aged 65 years and over.

<sup>141</sup> Because of the small number of resident workers in many of the SCCS catchments meshblocks the totals for each sector are incomplete due to confidentiality exclusions. However, the proportions shown in the table (based on the larger mesh blocks indicate no obvious discrepancies for the SCCS row and can be considered reasonably reliable.

TableA11: Types of households in selected areas of Waimate District - 2013

Area	One family Per cent	One person Per cent
SCCS Catchments	64.8	29.7
St Andrews Village	65.2	26.1
Waimate Town	55.7	38.0
Waimate District	65.8	27.7
New Zealand	66.4	22.9

Source: Statistics New Zealand

### Household income

The distribution of household incomes reveals significant differences between the SCCS Catchments, Waimate Town and St Andrews Village. Both Waimate Town (59%) and the Catchments (48%) had relatively more households with incomes of \$50,000 and under than the District (45%) and St Andrews (35%). These two areas also had fewer households with incomes between \$50,001 and \$100,000 (22% Town, 28% Catchments) than the District (29%) and St Andrews (44%). The median household income of Waimate Town in 2013 was \$33,700, or 70 per cent of median household income of Waimate District (\$48,100).

TableA12: Distribution of household incomes in selected areas of Waimate District - 2013

Area	\$50,000 & under Per cent	\$50,001-\$100,000 Per cent	\$100,001 & over Per cent
SCCS Catchments	47.6	28.1	10.2
St Andrews Village	34.8	43.5	8.7
Waimate Town	59.2	21.6	5.5
Waimate District	44.9	28.8	12.7
New Zealand	33.8	27.7	23.4

Source: Statistics New Zealand

### Sources of income received from government

These differences in the distribution of household incomes between the SCCS Catchments, Waimate Town and St Andrews Village are partly explained by the varying degrees of dependence residents of these areas have on income received from government sources. The degree of dependence residents of all the areas had on government sources was higher than the national average of 32 per cent. The total number of government payments received by residents of the Catchments, for instance, represented 39 per cent of its residents (15 years & over) in 2013, while it was 40 per cent for St Andrews Village and 54 per cent for Waimate Town. The main type of government payment received by residents of all the areas was NZ superannuation and veteran's pension.

TableA13: Sources of income from government received by residents of selected areas of Waimate District - 2013

Area	Total number of payments received	Number of residents (15 years & over)	Total payments received ÷ number of residents Per cent	NZ superannuation & veteran's pension received Per cent of residents
SCCS Catchments	1,956	5,020	39.0	26.1
St Andrews Village	57	141	40.4	23.4
Waimate Town	1,314	2,415	54.4	37.1
Waimate District	2,310	6,189	37.3	24.6
New Zealand	1,077,444	3,376,416	31.9	15.6

Source: Statistics New Zealand

### Dwelling tenure

All three areas had higher levels of home ownership (owned/partly owned and held in a family trust) in 2013 than the national figure of 61 per cent; with 74 per cent of dwellings in St Andrews, 68 per cent of dwellings in the Catchments, and 67 per cent of dwellings in Waimate Town being owner occupied.

TableA14: Tenure of dwellings held by residents of selected areas of Waimate District - 2013

Area	Owned/partly owned Per cent	Held in a family trust Per cent	Not owned Per cent
SCCS Catchments	56.3	11.6	25.1
St Andrews Village	65.2	8.7	21.7
Waimate Town	58.8	8.2	25.3
Waimate District	53.0	11.9	27.4
New Zealand	46.8	13.9	33.0

Source: Statistics New Zealand

### Access to motor vehicles by households

Few households in St Andrews Village, the Catchments, and District did not have a motor vehicle. For residents of these areas the general access to motor vehicles was high by national standards; particularly for people living in St Andrews Village where two-thirds of households (64%) reported they had two or more vehicles. Households in Waimate Town, by contrast, had much lower access to this form of private transport than other parts of the District as 47 per cent of them had only one vehicle (cf. 34% for the District), and a further 11 per cent did not have any motor vehicle (cf. 6% for the District).

TableA15: Access to motor vehicles for households in selected areas of Waimate District - 2013

Area	None Per cent	One motor vehicle Per cent	Two motor vehicles Per cent	Three or more motor vehicles Per cent
SCCS Catchments	6.7	36.1	34.9	17.4
St Andrews Village	4.0	28.0	44.0	20.0
Waimate Town	10.7	47.4	26.9	9.6
Waimate District	5.7	33.9	36.2	18.5
New Zealand	7.5	35.7	36.5	15.3

Source: Statistics New Zealand

## Attachment 3 Description of scenarios

For a detailed description of each scenario and associated assumptions see Appendix 4 of the Overview Report (Norton and Robson 2015).

<p><b>Scenario 1</b> <b>(pre HDIS &amp; WDIS)</b></p>	<p>This scenario considers what the future will look like before Hunter Downs Irrigation and Waihao Downs irrigation schemes are built, consented schemes that will bring new (Waitaki) water into the SCCS area. Assumptions include:</p> <ul style="list-style-type: none"> <li>• Negligible new irrigated area due to in-catchment water constraint and regional water quality rules in the pLWRP;</li> <li>• All land users required by the pLWRP to operate at Good Management Practice (GMP – see definition in Glossary)</li> </ul> <p>Three sub-scenarios with different flow and allocation limits are considered as below.</p> <p>Scenario 1 looks at what may happen 10 years out.</p>
<p><b>Scenario 1a</b> <b>(approx. current minimum flows &amp; allocations)</b></p>	<p>Assumes the pLWRP minimum flow and allocation limits for streams, rivers and groundwater within the SCCS area<sup>142</sup>. For most rivers these allocation limits are approximately the current total allocation; the exceptions are the Otaio, Kohika, Horseshoe Bend Creek and the Makikihi, for which the default pLWRP minimum flows (50% MALF7d) and allocation limits (20% of MALF7d) are applied.</p>
<p><b>Scenario 1b</b> <b>(manawhenua &amp; environment - higher flows)</b></p>	<p>Assumes alternative minimum flows that are generally higher and with smaller total allocations to better meet the preferences of Manawhenua<sup>143</sup> and to benefit environmental values.</p>
<p><b>Scenario 1c</b> <b>(lower minimum flows)</b></p>	<p>Assumes alternative minimum flows that are generally 25% lower than Scenario 1a. For most rivers the same allocation limits as Scenario 1a (i.e. current allocation) apply; the exceptions again are the Otaio, Kohika, Horseshoe Bend Creek and the Makikihi, for which the current allocation applies and this is significantly higher than the 20% of MALF7d assumed in Scenario 1a.</p>
<p><b>Scenario 2a</b> <b>HDIS &amp; WDIS as</b></p>	<p>This scenario considers what the future looks like if HDI and WD schemes are developed as consented, bringing approximately 20 m<sup>3</sup>/s new (Waitaki) water into the SCCS area. Scenario 2 looks at what may happen with these schemes out to 20 years (allowing time for them to be built) and beyond. Key</p>

<sup>142</sup> See Section 15 of the pLWRP and Regional rule 5.96 (v Aug 2012) - [Proposed Canterbury Land & Water Regional Plan](#)

<sup>143</sup> The flow and allocation preferences of Manawhenua are expressed in a report (Tipa 2012) available on the website ( <http://ecan.govt.nz/publications/Reports/cultural-associations-flows-water-implications-wainono-catchment.pdf> ). These are partly (but not entirely) based on recommendations in the proposed NES (i.e. minimum flow 90%MALF; allocation 30% MALF) (MfE 2008).

<p><b>consented</b> <b>(no flow augmentation)</b></p>	<p>assumptions include : irrigation of all potentially irrigable area; GMP employed across the entire SCCS area, an HDI-levied environment enhancement fund, an increased nutrient load on the environment, some increase in groundwater levels and therefore stream flows, but with no direct flow augmentation to streams or Wainono Lagoon because this was not part of the HDI consent requirements.</p>
<p><b>Scenario 2b</b> <b>HDIS &amp; WDIS with flow augmentation</b></p>	<p>As for Scenario 2a, but with additional Waitaki water (~1m<sup>3</sup>/s average) to augment flow in the lower Hook River and through Wainono Lagoon.</p>
<p><b>Scenario 3a</b> <b>HDIS &amp; WDIS + maximum (MFM) mitigations</b></p>	<p>As for Scenario 2a, but explores what the costs and benefits would be of employing Maximum Feasible Mitigations (MFM) on-farm, which equate to an average 30% reduction in N losses compared to GMP (varies between 0 and 40% reduction depending on landuse type).</p>
<p><b>Scenario 3b</b> <b>HDIS &amp; WDIS + midpoint mitigation</b></p>	<p>As for Scenario 2a, but includes on-farm mitigations at the “mid-point” between GMP and MFM (i.e. an average 15% reduction in N losses compared to GMP (varies between 0 and 20% depending on landuse type).</p>
<p><b>Zone Committee Solutions Package (ZCSP)</b></p>	<p>The ZCSP includes a staged package of solutions out to 2025 and assumes:</p> <ul style="list-style-type: none"> <li>• HDI and WD schemes are fully developed – this doubles the irrigated area in SCCS.</li> <li>• All land users have Farm Environment Plans (FEPs) that include Overseer budgets for N, an assessment of P loss risk and identification of critical source areas for management of contaminant loss (sediment, P, N, microorganisms).</li> <li>• Total N load limits for all catchments (includes farming and point discharge limits).</li> <li>• All land users subject to a nitrogen allocation framework that includes: i) minimum effort of GMP for all users; ii) “Maximum Caps” (based on soil type) that require high emitters to reduce N loss (better than GMP in some cases) through time; iii) A “Flexibility Cap” for low emitters that increases through time as flow augmentation is implemented and N gains are realised from the Maximum Caps.</li> <li>• Flow augmentation of Wainono Lagoon.</li> <li>• Improved ecological flows in SCCS streams and rivers due to increased minimum flows and reduced allocations through time – ultimately meeting Manawhenua preferences (Scenario 1b) in many streams by 2025 and almost meeting preferences in the remainder.</li> <li>• Small further increase to flows in lower reaches of rivers due to increased irrigation.</li> </ul>

	<ul style="list-style-type: none"><li>• Waihao Box repaired and maintained – improved opening frequency (drainage, fish).</li><li>• Catchment Group actions supported and continuing (eg riparian restoration)</li><li>• Wainono Restoration Project (WRP) fully implemented including following:<ul style="list-style-type: none"><li>• Decreased soil and bank erosion from bunding, battering and planting;</li><li>• Restoration of Hook delta wetland (weed management and planting);</li><li>• Identification of optimal level for lagoon management;</li><li>• Development of sediment retention and denitrifying wetland at lower Hook Drain;</li><li>• Spring-head wetlands enhanced through restoration planting;</li><li>• Riparian corridor planting and shading to reduce periphyton and macrophytes;</li><li>• Targeted in-stream sediment removal using sand wand or similar;</li><li>• Targeted stream habitat and biodiversity enhancement;</li><li>• Identification and protection of remnant mudfish populations by protecting habitat and excluding predator (trout) access;</li><li>• Monitor &amp; respond to problem areas – HDI consent required monitoring and HDI Environment Enhancement Fund – backed up by ECAN environment monitoring.</li></ul></li></ul>
--	--