

Canterbury Water Management Strategy

Revised targets

Background

The desired outcome of the CWMS is:

To enable present and future generations to gain the greatest social, economic, recreational and cultural benefits from our water resources within an environmentally sustainable framework.

The targets are an agreed way to measure progress toward this outcome. The targets include a set of goals applying from 2010 that reflect the fundamental principles. Targets are then set for 2015, 2020 and 2040 to provide a set of long-term environment, social, economic and cultural targets reflecting a sustainable development approach.

The approval of zone and regional implementation programmes will be dependent on the programmes addressing all targets relevant to the zone or region.

What do targets cover?

Targets have been developed for:

1. Ecosystem health/biodiversity
2. Natural character of braided rivers
3. Kaitiakitanga
4. Drinking water
5. Recreational and amenity opportunities
6. Water-use efficiency
7. Irrigated land area
8. Energy security and efficiency
9. Regional and national economies
10. Environmental limits

For each target area, a list of possible activities is included covering investigations, monitoring, RMA tools, infrastructure, and industry/education/community initiatives. These tables set out how the zone and regional actions align with and complement existing activities of Environment Canterbury, district/city councils and other agencies.

Environmental limits

The first nine topic areas covered by the targets are strongly influenced by the policy and planning framework of the Resource Management Act, and instruments under the Act – national water conservation orders, national environmental standards, regional policy statement, regional plans and district plans. A critical role of these instruments is to establish the environmental limits for water bodies. To recognise this role, a tenth target area covers the setting of environmental limits. Environmental limits are, in a water quantity context, environmental flows or water levels and, in a water quality context, catchment load limits or water quality outcomes/standards.

Many environmental limits are already in place through proposed and operative regional plans (refer Annex K), and Water Conservation Orders on the Ahuriri, Rakaia, Rangitata Rivers and Lake Ellesmere/Waihora. The CWMS places a priority on having environmental limits in place on all water bodies within the first two years of the strategy.

Environmental limits are set for the purpose of sustainable management as set out in Part 2 of the RMA, and require the decision-maker (usually the regional council) to consider all values in its decision-making. Environmental limits have been separated out as, by their nature, they integrate over all other target areas, with the final decision made through RMA instruments rather than zonal or regional implementation programmes.

Role of the targets

The targets will:

- Guide actions by the zone and regional committees
- Set a reporting framework for the strategy – progress towards the targets will be reported annually
- Set clear direction to infrastructure proposals and to the development of efficiency and land management solutions by the regional and zone committees
- Apply in both urban and rural areas to all sources of contaminants. However there is an emphasis on irrigation-related effects as this is a key focus of the strategy.

The first nine target areas apply in each zone – it will be up to each zone committee to set out a programme of actions that best achieve the targets in their zone. These actions will be contained in the zone and regional implementation programmes. Achieving the targets will require liaison across boundaries and between the regional and zone committee.

How were the targets created?

The Targets have been subject to extensive stakeholder and public discussion as outlined:

- **Stakeholder meetings**
Groups of stakeholders with common interests – farming, environment and recreation – were gathered to input into the initial draft of the targets. About 70 people were involved in this activity in mid/late 2009.
- **Publication in the November 2009 Strategy Framework document**
This document contained a first draft of the Targets and was published in November 2009 with the endorsement of the Mayoral Forum.
- **Interest Groups**
Interest groups such as Dairy NZ, Horticulture NZ, Forest and Bird, Fish and Game, representatives of irrigation companies and many others individually considered the Targets and made comment. Special meetings were held with energy generators and with parties interested in economic targets to agree those particular targets. This involved 10-12 organisations in early 2010.
- **Public Consultation**
The draft Targets were then distributed for wide stakeholder consultation and were listed on the web site for comment. They were sent to 800 people and organisations in February 2010 and 45 submissions were received and changes made to the Targets as appropriate.

- **Joint Collaboration**
In April-June 2010 farming, recreation, conservation and environmental groups got together and further reviewed the Targets as one group. The total group was around 25 with sub-groups working on particular topics in early to mid 2010.
- **Steering Group**
The CWMS Steering Group signed off the Targets in June 2010.

What are (and aren't) the Targets?

The Targets:

- Are the best attempt, within current knowledge, to specify commonly agreed achievement targets for the CWMS.
- Will experience "real world" testing in the zone and regional committees and with stakeholders and will be gradually refined
- Should be read as a whole, taking account of their general thrust as well as specific direction
- Are committed collaborative actions that will be genuinely and honestly pursued
- Reflect the parallel development ethos of the Strategy
- Will be reviewed in three years in the light of experience and new knowledge.

The Targets are not:

- Regulation or legislation
- Rules as in an RMA sense
- Just hopes, wishes or visions.

How will they be reviewed?

All of the strategy including the targets will be reviewed every three years by the Mayoral Forum and Ngāi Tahu. Regional and zone committees will be able to make recommendations into this review.

The targets are based on best available information and current understanding of future climate and land-uses. New information, markets trends and other changes may necessitate changes in the targets.

Completeness

To apply these targets effectively, it is essential that they are viewed as a whole and not each separately and in isolation. Targets inform each other and are designed to build a whole picture. In addition, these are regional targets. It is anticipated that there will be issues of application in specific zones due to particular zone characteristics. Commonsense is required in the interpretation of these targets in specific situations.

1. Ecosystem health/ biodiversity

The importance of healthy ecosystems is a key plank of the Canterbury Water Management Strategy as reflected in the fundamental principles. Protection and restoration of biodiversity/ecosystems requires a dual approach of action on-the-ground (for example, planting and covenants) and improved planning frameworks. A systems approach is needed because freshwater habitats and ecosystems are generally part of larger, connected systems, and biodiversity depends on wider decision on environmental flows and water quality standards.

Over time, restoration and protection of biodiversity will become a pre-requisite of any new or reconfigured development. In the meantime, the Immediate Steps Protection and Restoration Programme outlined in Annex I of the strategy will provide funding in the first five years for biodiversity protection and restoration. This funding will allow the regional and zone committees to address biodiversity outcomes in the short-term.

Braided rivers are a defining characteristic of Canterbury's biodiversity and landscapes. They are addressed in a separate suite of targets.

Goals

From 2010:

- Implement actions to correct the decline in freshwater species, habitat quality or ecosystems
- Implement actions to prevent further loss of ecosystem health in river mouth and coastal lagoons
- Prevent further loss of area of naturally occurring wetlands¹
- Maintain existing high quality indigenous aquatic and dryland ecosystems in intermontane basins and on the plains
- Identify and prioritise for protection lowland streams ecosystems in each zone.

By 2015:

- Protected and enhanced the ecological health of the best examples of lowland streams ecosystems in each zone
- Improved ecosystem condition in at least another 10% of lowland streams in each zone.

¹ A naturally occurring wetland includes:

- (a) wetlands which are part of river, stream and lake beds;
 - (b) natural ponds, swamps, marshes, fens, bogs, seeps, brackish areas, mountain wetlands, and other naturally wet areas that support an indigenous ecosystem of plants and animals specifically adapted to living in wet conditions, and provide a habitat for wildlife;
 - (c) coastal wetlands above mean high water springs;
- but excludes:
- (d) wet pasture or where water temporarily ponds after rain (e)artificial wetlands used for wastewater or stormwater treatment except where they are noted for high ecological values;
 - (f) artificial farm dams, drainage canals and detention dams;
 - (h) reservoirs for firefighting, domestic or community water supply

- Highlighted any high country spring-fed or foothill streams where ecosystem health is declining, and identified the cause with an action plan in place
- Protected all and restored at least two significant wetlands in each zone
- Identified where environmental flows are not met or require change to meet ecosystem health and biodiversity outcomes and implemented actions to rectify
- Identified areas where catchment load limits for nutrients are not met, prioritised areas and implemented actions to ensure there is no further enrichment
- Demonstrated, and included in implementation programmes, how land within the zone will be managed to achieve catchment load limits
- Achieved nutrient efficiency targets for the zone on all new irrigated land and 50% of other rural properties (and of properties within urban boundaries that apply nutrients over significant areas)
- Increasing annual trout spawning counts in identified important areas (based on a 5-year average) as an indicator of habitat availability for salmonid and indigeneous fish species
- No further reduction in the number and areas of existing salmon spawning sites²
- Understood any emerging contaminant risks and identified any at risk areas for targeted management
- Accelerated the current riparian restoration and management programme for Waihora/Lake Ellesmere and tributary streams.

By 2020:

- Improved condition and water quality in at least 60% of lowland streams and 60% of lowland lakes in each zone
- All foothill rivers and high country rivers and/or lakes either in good ecological health³ or better, or showing upwards trends
- An upward trend in diversity and abundance of native fish populations
- Protected all existing wetlands⁴
- A significant protection and restoration programme is in place on the most ecologically significant river mouth or coastal lagoon in each management zone
- Increased the length of waterway with riparian management appropriate to aquatic ecosystem protection by 50% from 2010 figures
- Achieved nutrient efficiency targets for the zone on all new irrigated land and 80% of other land in major rural land uses (pasture, major⁵ arable and major horticulture crops), and have 100% of rural properties working towards those targets (and of properties within urban boundaries that apply nutrients over significant areas)

² Refer Unwin, M. (2006) Assessment of significant salmon spawning sites in the Canterbury Region, Environment Canterbury U06/59

³ Environment Canterbury Ecological Health Annual survey

⁴ This target may need to be revisited on basis on wetland inventory

⁵ Arable crops that cover at least 10% of arable area in Canterbury, horticulture crops that cover at least 10% of horticultural area in Canterbury.

- Made progress towards achieving environmental flow and catchment load limits.

By 2040:

- Achieved all environmental flow and catchment load limits
- Examples of thriving coastal lagoons, and lowland or spring-fed ecosystems in each water management zone
- Protected all wetlands
- 100% of lowland and spring-fed streams with at least good aquatic ecosystem health or showing an upward trend
- 80% of other rivers/streams and lakes with very good aquatic ecosystem health
- Maintained upland spring-fed streams and lakes in very good aquatic ecosystem health (no decline from 2010)
- Achieved nutrient efficiency targets for the zone on all new irrigated land and 100% of other rural properties (and of properties within urban boundaries that apply nutrients over significant areas)
- Understood any emerging contaminant risks and identified any at-risk areas for targeted management.

Activities

		Lead agency(s)
Investigation/ Monitoring	<ul style="list-style-type: none"> • State of environment monitoring of all potential contaminants • Investigate opportunities to maintain and enhance biodiversity associated with water races and other water infrastructure (but giving recognition to the purpose for which they were designed) • Ecosystem health monitoring of all river types, lake ecosystem monitoring • Inventory of wetlands • Development of indicators for ecosystem health of coastal lagoons and lakes • Understand drivers of change in lowlands ecosystem health and viability of restoration/repair • Baseline information on extent of riparian vegetation • Improving understanding how land cover in upper catchment influences water yield • Develop other measures of the availability of fish habitat particularly for indigenous species 	Environment Canterbury
RMA tools	<ul style="list-style-type: none"> • Water quality standards and catchment limits for contaminants for surface and groundwater • Environmental flows for surface and groundwater • Resource consents - conditions and monitoring • National policy statements and national 	Environment Canterbury

	<p>environmental standards</p> <ul style="list-style-type: none"> • Control of vehicle access to and use of riverbeds • Control of structure that may be barriers to fish passage • Fish screen guidelines and conditions • Management of limits in response to monitoring results 	
Incentives	<ul style="list-style-type: none"> • Link to water supply agreement for individual properties 	Water Executive
Education, community, industry/sector initiatives	<ul style="list-style-type: none"> • Immediate Steps restoration programme • Riparian management • Pest and weed management • Use and classification of artificial and modified water bodies – water races/drains • Reinstate/construct wetlands • Translocation of species • Management of land-use adjacent to rivers to protect/enhance aquatic biodiversity • Prevention of stock access to waterways • Extension services re riparian options • Management of water use to prevent loss of indigenous dryland ecosystems • Living Streams 	Regional committee Zone committee

Tools

- Immediate Steps restoration programme and funding (funded in initial stages by Environment Canterbury)
- Canterbury Biodiversity Strategy (partnership facilitated by Environment Canterbury)
- Environment Enhancement Fund and Living Streams (Environment Canterbury initiatives)
- Biodiversity protection and restoration funding through development levy
- AquiferSim - Understanding aquifer flows – tool developed by collaboration of Crown Research Institutes
- Nutrient models- Understanding nitrate contributions from land uses and potential for best practice to reduce contaminants
- Department of Conservation Waters Of National Importance and other databases and analysis tools

Comment

Environment Canterbury Annual Report 08/09 showed 55% of foothill streams and 10% of lowland streams were graded with fair, good or very good ecosystem health. For 2009-10 the equivalent statistics are 81% of foothill streams and 24% of lowland stream were graded with fair, good or very good ecosystem health

2. Natural character, processes and ecological health of braided rivers

Braided rivers are a defining characteristic of Canterbury's biodiversity and landscapes. The seven alpine rivers that contribute 88% of the flow within the region - Clarence, Waiau, Hurunui, Waimakariri, Rakaia, Rangitata, Waitaki - are all braided. Other foothill rivers are braided or have braided reaches. The beds, riparian wetland/springs, riparian margins and floodplains of braided rivers support many of the regions endangered and rare species – birds, plants, fish, lizards and insects.

The flow of sediment and river bed material is critical to the braided nature of these rivers, so making sure the bed and floodplains are reworked by floods at close to a natural frequency is important. Similarly water quality is a key feature of a braided river. In addition, to control of water flows and water quality there is a need to manage gravel extraction weed control, land-use on the floodplains and river control works because these are also key influences on the state of braided rivers. The Immediate Steps Protection and Restoration Programme outlined in Annex I recommends weed and pest control, management of vehicle use and other bed disturbances, and stock exclusion as priority actions for braided rivers.

Goals

From 2010:

- Maintain the braided character of all Canterbury's braided rivers by
 - Maintaining the upper catchments of Canterbury's alpine braided rivers as largely natural ecosystems and landscapes
 - No new dams on the mainstem of major alpine braided rivers
 - Maintaining the extent of active floodplains, flow variability and sediment flow processes including when undertaking river protection works, land-use change or deliberate vegetation stabilisation
 - Supporting the dynamics of river mouths and coastal processes
- Implement actions to correct the decline in useable braided river bird habitat.

By 2015:

- Identified where environmental flows do not include flood peaks, flow variability, flood periodicity, and channel forming flows and implemented actions to rectify
- Protected the indigenous habitats in riparian wetlands, springs and the lagoons associated with braided rivers
- Enhanced and protected of breeding population of indigenous braided river birds.

(Note restoration of lowland streams covered under biodiversity)

By 2020:

- Protected significant habitat for a full range of indigenous braided river flora and fauna
- Protected and enhanced the habitats in riparian wetlands, springs and the lagoons associated with braided rivers
- Made progress towards achieving environmental flows.

By 2040:

- Achieved all environmental flows
- Canterbury's braided rivers show the dynamic, braided nature typical of such rivers
- All indigenous braided river-dependent species are showing positive trends in abundance and health
- Increase habitat area usable by all species of braided river indigenous birds.

Activities

		Lead agency(s)
Investigation/ Monitoring	<ul style="list-style-type: none"> • Land tenure mapping • Mapping and clear definition of floodplains including recognition of stopbanks • Mapping of river bed habitat status • The habitat of the full range of braided river flora and fauna and associated habitat is mapped 	Environment Canterbury
Resource Management Act tools	<ul style="list-style-type: none"> • Environmental flows, particularly variability at high flows • Control of structures • Fish screen and passage 	Environment Canterbury
Incentives	<ul style="list-style-type: none"> • Immediate Steps restoration programme • Regional storage plan sets strategic requirements for new water storage • Water supply agreements 	Water Executive and Environment Canterbury
Education, community, industry/ sector initiatives	<ul style="list-style-type: none"> • Immediate Steps restoration programme • River bed activities • Vegetation clearance/management • Pest control (animal and vegetation) • Riparian management • Design of river control works • Use of flood protection/river control works consistent with braided river character • Prevention of stock access • Control of vehicle access • Managing gravel extraction 	Regional and zone committee Environment Canterbury

3. Kaitiakitanga

Kaitiakitanga entails the active protection and responsibility for natural and physical resources by tangata whenua. Exercise of kaitiakitanga requires both a role in decision making and the achievement of environmental outcomes. The governance at zonal, regional and national scales under this strategy is therefore very important to the achievement of kaitiakitanga.

Ongoing tripartite discussions between Ngāi Tahu, the Crown and Canterbury local government will lead to increased clarity around the arrangements and commitments needed to give effect to the Treaty of Waitangi relationship as it relates to water management in Canterbury. That process may require changes and adjustments in these targets.

Goals

From 2010:

- Prevent further decline in the quality or quantity of water bodies used as a drinking water supply to marae and associated papakāinga
- Prevent further loss or degradation of Ngāi Tahu nominated wāhi taonga
- Increase understanding in each zone of the customary values and uses associated with specific waterbodies or parts of waterbodies
- Involve Papatipu Rūnanga in the Immediate Steps restoration programme and the setting of priorities
- Formally recognise Te Rūnanga o Ngāi Tahu Freshwater Policy and, in each zone, work towards resolving issues related to Ngāi Tahu policies on:
 - environmental flows that afford protection to instream values
 - direct discharge of point source contaminants to water
 - the unnatural mixing of water sourced from different waterbodies
 - addressing non point source pollution through a range of measures including regulatory control.

By 2015:

- Protocols for the recognition and exercise of mana, including kaitiakitanga within the Ngāi Tahu rohe, are implemented
- All degraded wāhi taonga and mahinga kai⁶ waterways nominated by Ngāi Tahu have an active restoration programme in place that responds to cultural priorities
- A report on the health of all Ngāi Tahu nominated waterbodies using Ngāi Tahu Cultural Health Monitoring Tool
- Identified customary uses (current and potentially restored) for all waterways
- Iwi Management Plans in place for all zonal areas
- Institutional capability within local government to adequately recognise and provide for the principle of kaitiakitanga in water management

⁶ Mahinga kai - traditional food and other resources and the areas that they are sourced from.

- A formal co-governance arrangement (developed in partnership by Ngāi Tahu, the Crown and Canterbury local government) for the active management of Te Waihora (Lake Ellesmere) and its catchment
- A programme for identifying cultural preferences for river and stream flow agreed in each zone
- A system for appointing Ngāi Tahu tangata tiakiwai (water guardians) that have formal recognition and support from local government is established
- Work and research has commenced on establishing a mahinga kai food gathering standard

By 2020:

- Increased the abundance of, access to and use of mahinga kai
- Further co-governance arrangements (developed in partnership by Ngāi Tahu, the Crown and Canterbury local government) for the active management of a nominated waterbodies in North and South Canterbury
- Integrated Ki Uta Ki Tai⁷ environmental management philosophies into zonal and regional management planning
- All marae and associated papakāinga have access to high quality drinking water
- At least one Ngāi Tahu tangata tiakiwai is appointed within each zone
- A mahinga kai food gathering standard is confirmed and implemented as a water quality monitoring tool.

By 2040:

- Protection, in accordance with Ngāi Tahu values and practices, of waahi taonga and mahinga kai waterways
- Kaitiakitanga is a normalised and an integrated practice of water management.

Activities

		Lead agency(s)
Investigations/ Monitoring	<ul style="list-style-type: none"> • Cultural mapping - identification of wahi taonga and mahinga kai, including opportunity mapping • Implementation and ongoing/regularly programmed application of Ngāi Tahu cultural health monitoring system • Reports on the state of waterways in a takiwā 	Environment Canterbury and Ngāi Tahu
Resource Management Act tools	<ul style="list-style-type: none"> • Engagement regarding the practical means by which resource management agencies and users can integrate into their own resource management practice the restrictions imposed by a rahui⁸, and the outcomes sought by the rahui (or other cultural management mechanism). 	Environment Canterbury and Ngāi Tahu

⁷ A mountains to the sea approach to water management

⁸ Rahui Restrictions on use of a resource for purposes of conservation, to ensure the sustainability of a resource, and safeguard long-term availability.

	<ul style="list-style-type: none"> • Development of protocols for the recognition and exercise of mana including kaitiakitanga. • Identify the full range of mechanisms that support or limit the exercise of kaitiakitanga under the Act 	
Incentives	<ul style="list-style-type: none"> • Immediate Steps restoration programme and access of papatipu runanga to funds for protection and restoration of waahi taonga. 	Water Executive
Education, community, industry/sector initiatives	<ul style="list-style-type: none"> • Information is available to stakeholders regarding the position of Ngāi Tahu on important water issues and appropriate management strategies for water resources over which they are kaitiaki. • Development of information and training for resource management staff and the general public regarding the importance of cultural indicators, honourable implementation of the treaty relationship and kaitiakitanga values. • Education of resource users and wider public by Ngāi Tahu of the existence of rahui, its purpose and means for the restriction is to be observed. 	Ngāi Tahu

4. Drinking water

The quality and quantity of drinking water supply depends on management of point sources and non-point sources of contaminants in drinking water supply catchments/aquifers, land-use in the catchment/recharge area and on the treatment provided by the local authority. Management of non-point source contaminants from land-use is a key focus of this strategy. This target has an emphasis on nitrate in groundwater, complemented by investigations into new and emerging contaminants. The activities recognise the important role water supply and treatment infrastructure, and health authority/regulation in the provision of drinking water.

Goals

From 2010:

- For those communities that currently have access to untreated and safe drinking water, implement actions to ensure the source water quality remains high enough to meet the current Drinking Water Standards for New Zealand⁹ without treatment
- Prevent further decline in source water quality for those communities that currently have to treat drinking water, such that this requires increased level of treatment or monitoring requirements
- No new activities in a drinking water catchment that reduce access to sufficient quantities of drinking water supplies.

By 2015:

- Set catchment load limits for nitrate consistent with drinking water quality targets for each zone, identified priority areas where targets are not met and implemented actions to ensure there is no further enrichment
- Demonstrated, and included in implementation programmes, how land within the zone will be managed to achieve catchment load limits
- Emerging contaminant risks are understood and any at risk areas identified for targeted management, and a remedial programme underway.

By 2020:

- Achieved nutrient efficiency targets for the zone on all new irrigated land and 80% of other land in major rural land uses (pasture, major¹⁰ arable and major horticulture crops), and have 100% of rural properties working towards those targets (and of properties within urban boundaries that apply nutrients over significant areas)
- A demonstrable decrease in nitrate concentrations in shallow groundwater in priority areas is achieved
- There is an increase in the percentage of the population supplied with water that meets the New Zealand Drinking Water Standards for health-based determinants
- Understood any emerging contaminant risks and identified any at risk areas for targeted management and a remedial programme underway.

⁹ Drinking water standards for New Zealand 2005 Ministry of Health, New Zealand

¹⁰ Arable crops that cover at least 10% of arable area in Canterbury, horticulture crops that cover at least 10% of horticultural area in Canterbury.

By 2040:

- Average annual nitrate levels in all groundwater wells¹¹ in Canterbury are below 50% of the maximum allowable value for drinking water
- Nitrate levels in community drinking wells are below the maximum allowable value of drinking water
- Achieved nutrient efficiency targets for the zone on all new irrigated land and 100% of other rural properties (and of properties within urban boundaries that apply nutrients over significant areas)
- Understood any emerging contaminant risks and identified any at risk areas for targeted management and a remedial programme underway

Activities

		Lead agency(s)
Investigations/ monitoring	<ul style="list-style-type: none"> • Two – four years to apply AquiferSim throughout region and understand carrying capacity of N for each groundwater zone – will help understand present and projected dynamics in groundwater and impacts of increasing land-use intensification • Ministry of Health information on current status and risks to drinking water • Shallow groundwater monitoring programme (understanding risks to private water supply wells) • Obtain better Canterbury-specific information on leaching rates and best practice potential and appropriate nutrient models and install lysimeter network to give relevant data to test • Catchment load limits defined for nitrates in all groundwater zones • Assess the need for limits of other contaminants – microbial, chemical • Research programmes looking at emerging contamination issues • Identification of hot spots where land use may need local-specific control • Investigations re availability, feasibility and cost of alternative or improved land use practices • Ongoing monitoring of aquifer and river water quality • State of environment monitoring of all potential contaminants – and of aquifer flows, farm management practices 	Environment Canterbury supported by Crown Research Institutes, health authorities and industry research

¹¹ The average of all the measurements taken in each well in the year...

	<ul style="list-style-type: none"> • Drinking water risk management plans • Intervention studies for drinking water catchments (surface water) to understand economics of treatment in relation to improving water source quality 	TLAs/health authorities
Resource Management Act tools	<ul style="list-style-type: none"> • Land-use practice improvements encouraged by resource consent • Point source resource consents • Link water quality considerations into environmental flow decisions • Regulatory framework to complement other initiatives • Management of limits in response to monitoring results 	Environment Canterbury and zone committees
Incentives	<ul style="list-style-type: none"> • Water supply agreements – land use practices requirements 	Water Executive
Infrastructure	<ul style="list-style-type: none"> • Investment in water treatment, stormwater and waste water systems 	TLAs
Education, community, industry/ sector initiatives	<ul style="list-style-type: none"> • Promoting nutrient budgeting and management such as primary sector water partnership, fertilizer companies • Industry extension/advisory services • Education for wider community about expectations and standards of drinking water • Education programmes regarding the present and projected dynamics in groundwater and impacts of increasing land-use intensification 	Zone committees Sector groups and TLAs

Available tools

- AquiferSim - Understanding aquifer flows – tool developed by collaboration of Crown Research Institutes
- Nutrient models to understanding nitrate contributions from land uses and potential for best practice to reduce contaminants
- National Environmental Standard for Sources of Human Drinking Water (operative 2008)
- Intervention studies for drinking water catchments (surface water) to understand economics of treatment in relation to improving water source quality
- Central government – fund for small communities to improve drinking water supply.

5. Recreational and amenity opportunities

Recreational and amenity opportunities provided by Canterbury's water bodies are of social, cultural and economic benefit to the region. There is no consistent information source on the extent and quality of water-related recreational activities in Canterbury, with the exception of the angler surveys by Fish and Game. Without this information, the benefits of recreation including tourism benefits cannot be accurately described/measured. Information on existing recreational use is an important first step in developing more detailed targets.

Goals

From 2010:

- Maintain the existing diversity and quality of water-based recreational sites, opportunities and experiences.

By 2015:

- At least 80% of river bathing sites graded as suitable for contact recreation
- A positive trend in the availability and/or quality of fresh water angling opportunities. An increase in freshwater angler numbers (or catch rate) assessed over a 5 year average
- A positive trend in the availability and/or quality of recreational opportunities¹² in each zone
- Identified where environmental flows are not met or require change to meet recreational outcomes and implemented actions to rectify.

By 2020:

- Of the lake and river sites used for contact recreation¹³, an increase in the percentage of them that meet recreational water quality guidelines
- A positive trend in the availability and/or quality of recreational opportunities in each zone
- Made progress towards achieving environmental flows.

By 2040:

- Achieved all environmental flows
- Restored fishing opportunities in most lowland streams in each water management zone
- Restored at least one major fresh water recreational opportunity in each zone that is not currently available in 2010.

Activities

		Lead agency(s)
Investigation/ Monitoring	<ul style="list-style-type: none"> • Need to map and better understand recreational opportunities available at present, where activities occur and trends • Better understanding what contributes to the quality of recreational experiences and differences among natural and artificially 	TLAs Zone and regional committees

¹² Following on from a baseline survey of existing opportunities (see activities)

¹³ Contact recreation sites are selected by local authorities

	<p>created environments)</p> <ul style="list-style-type: none"> Identify key recreational sites in the region 	
	<ul style="list-style-type: none"> State of environment monitoring of all potential contaminants Results of Fish and Game angler survey <i>New Zealand Guidelines for Cyanobacteria in Recreational Fresh Waters (2009)</i> 	Environment Canterbury
Resource Management Act tools	<ul style="list-style-type: none"> Environmental flows, particularly variability at high flows Control of structures Water quality standards and catchment limits for contaminants Fish screen and passage (Fisheries act) 	Environment Canterbury Department of Conservation
Incentives	<ul style="list-style-type: none"> Regional storage plan sets strategic requirements for new water storage some of which relate to protection, restoration and provision of new recreational opportunities, and to identify recreational opportunities that may be lost (substitutability principle) 	Regional committee
Education, community, industry/sector initiatives	<ul style="list-style-type: none"> Prevention of stock access Management of vehicle access 	Environment Canterbury

Comment

Environment Canterbury 2008/9 Annual report – 85% of lakes and 55% of river bathing sites were graded as suitable for contact recreation. The equivalent statistics for 2009/10 are 85% of lakes and 56% of river bathing sites were graded as suitable for contact recreation.

6. Water use efficiency

Efficiency of water use is a major theme of the Canterbury Water Management Strategy alongside Infrastructure and Biodiversity protection and restoration. Defining "efficiency" is not straightforward, particularly in irrigation where water use varies, with soil type, crop type, and varies from month to month and year to year with climate. Water use efficiency must be addressed in context of the other targets because some actions that improve water use efficiency can be detrimental to energy efficiency and biodiversity protection. Development of benchmarks is therefore part of the targets. There is a concentration on irrigation water use but targets for community water supplies and other uses have been included.

Goals

From 2010:

- No decline in the efficiency of water use
- Initiate the development of models/benchmarks of reasonable and efficient use of water in irrigation.

By 2015:

- Established and reported against a benchmark of current water use efficiency for irrigation, community (potable, industrial and commercial) and stockwater
- 60% of water used for irrigation is operating according to best practice water use.

By 2020:

- 80% of water used for irrigation and stockwater is operating according to best practice water use
- Reduced water used for community water supply by 10% (measured in litres per person per day) compared to that used in 2010
- Increased the benefits gained per unit of water so that the volume of water beneficially used (used in production of crops, electricity, or commercial uses) in each zone as a proportion of the volume of water taken is, on average, 5% greater than that achieved in 2010.

By 2040:

- Implemented best practice water use on all irrigation, stockwater and industrial/commercial use in Canterbury
- Increased the benefits gained per unit of water so that the volume of water beneficially used (used in production of crops, electricity, or commercial uses) in each zone as a proportion of the volume of water taken is, on average, 25% greater than that achieved in 2010
- Reduced water used for community water supply by 20% (measured in litres per person per day) compared to that used in 2010.

Activities

		Lead agency(s)
Investigation/ monitoring	<ul style="list-style-type: none"> • Models of reasonable water use over an irrigation season for all combinations of land-use, climate and soils in Canterbury • In 2010 establish benchmarks of water use for major irrigated land uses in Canterbury • Establishment of a measure of water use efficiency for each sector- benchmark existing use and best practice – include irrigator type as a variable. • Investigate land use practices that use less water 	Industry sectors
Resource Management Act tools	<ul style="list-style-type: none"> • Consent conditions • Efficiency standards in regional plans 	Environment Canterbury
Incentives	<ul style="list-style-type: none"> • Water supply agreements • Consent reliabilities 	Water Executive
Education, community, industry/ sector initiatives	<ul style="list-style-type: none"> • Industry standards for irrigation design and operation • Community water supply strategies and asset management plans • Replacement and/or gradual upgrading of irrigation equipment and stockwater/community water supply distribution systems • Household and farm extension services and education initiatives 	Industry sectors, regional and zone committees, TLAs

Available tools

- Water measuring, recording and reporting – as per proposed Resource Management Act regulation on Measurement of Water Use (initially due to be a regulation in 2009 – now proposed for 2010).

7. Irrigated land area

Increasing irrigated area and reliability is a key driver for this strategy. There is an estimated 1.3 million hectares of irrigable land in Canterbury, of which 500,000 hectares is currently irrigated. The target for irrigated area and reliability will be refined through:

- the regional storage plan and zonal implementation programmes
- more definite location-specific knowledge on the potential for efficiency improvements
- testing of infrastructure proposals against the fundamental principles
- setting of environmental limits and
- refining of financial viability/funding mechanisms.

Goals

From 2010:

- No reduction in irrigated land area in Canterbury or in overall reliability with each zone.

By 2015:

- A system of regionally distributed rural water infrastructure for the storage and distribution of water that provides reliable water to all irrigated land has been designed, timetabled, costed and staged. The system has been demonstrated to align with the principles and targets of this strategy
- Decided mechanisms for funding infrastructure and the ongoing operation of the strategy
- Started on infrastructure (or reconfiguration of existing consents) that facilitates efficiency improvements and is linked into the regional storage plan
- Specified, for each zone, their infrastructure requirements consistent with the regional storage plan, and the principles and targets of the strategy
- Increased the area of irrigated land and/or reliability of irrigation.

By 2020:

- Started construction of regional storage and improved reliability of supply for at least 50% of irrigated land
- Started construction of infrastructure identified in zonal implementation programmes.

By 2040:

- A substantial increase in the reliability of supply and the area of land irrigated in Canterbury all of which has demonstrated high standards of riparian, nutrient and water use management, and has been shown to be consistent with the principles of the strategy. An indicative target is 850,000 hectares of irrigated land with at least 95% reliability
- Improved reliability of supply for all irrigated land.

Figure 1: Central Canterbury irrigation areas from satellite imagery

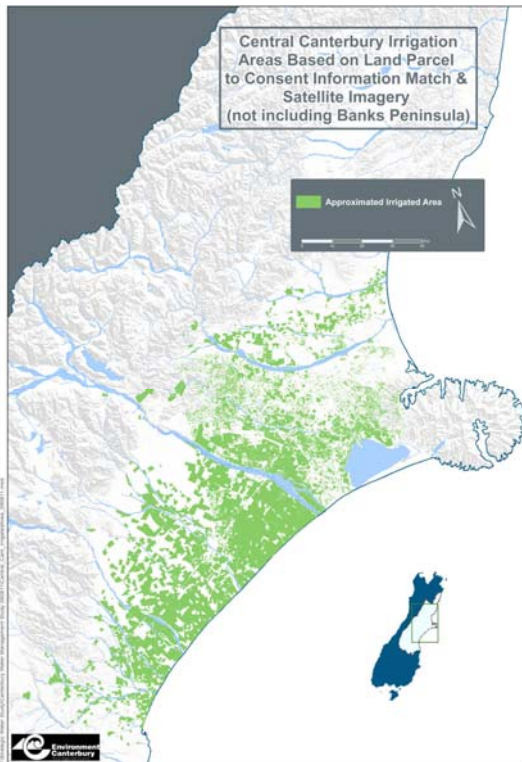


Figure 2: Location of all irrigation takes in Canterbury, classified by consented irrigated area

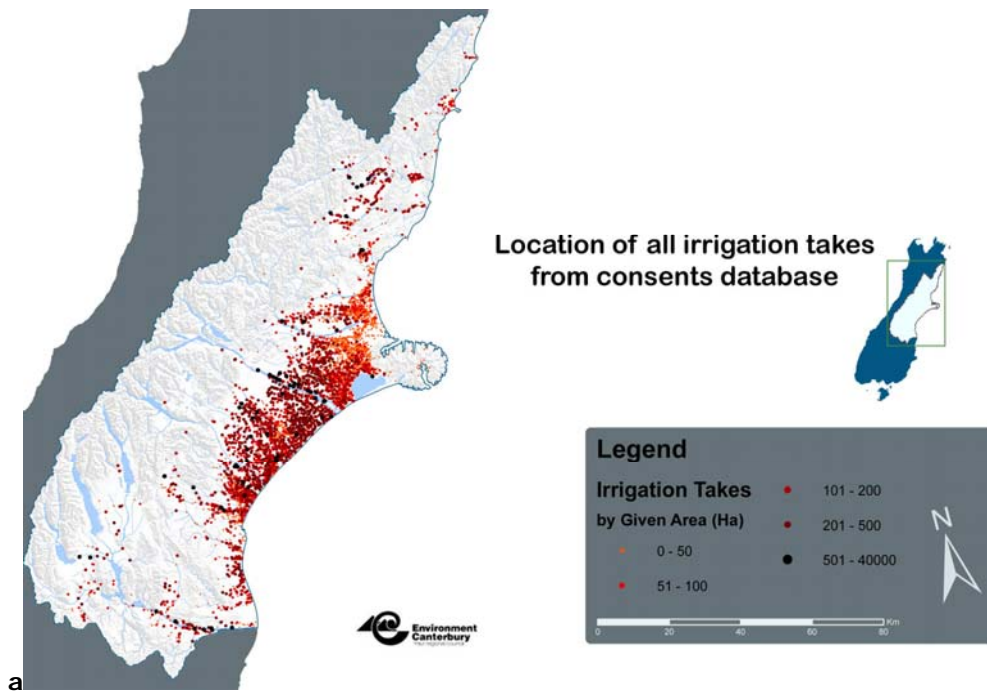
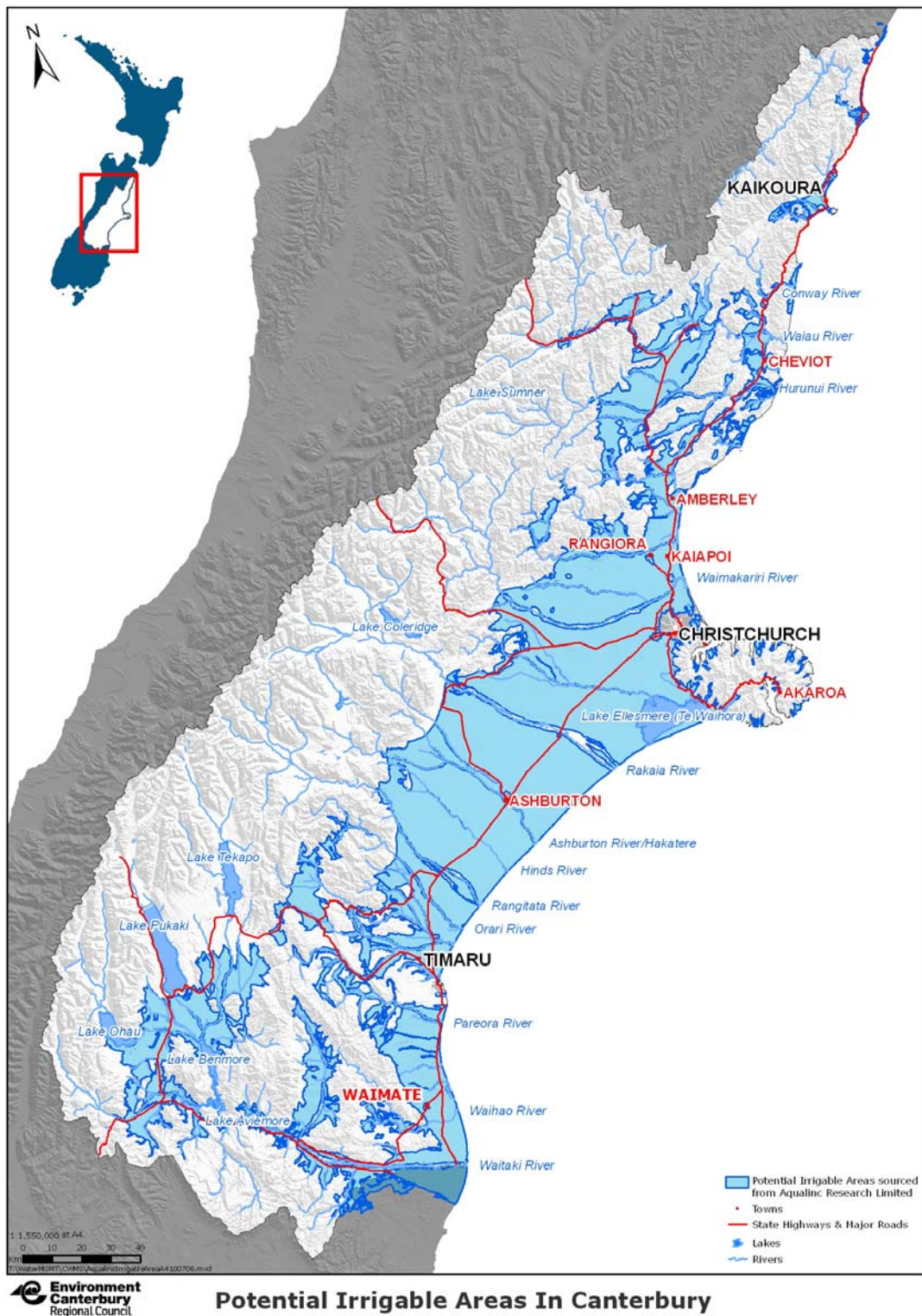


Figure 3: Potentially irrigable areas



Over the course of development of the Canterbury Strategic Water Study, a number of preliminary assessments of potentially irrigable land area were made. Note that these are indicative only and are included to illustrate the potential scope of various development options, rather than specific proposals.

8. Energy security and efficiency

Canterbury's water bodies play a critical role in the provision of renewable energy and security of electricity supply in New Zealand. The existing hydro-electricity infrastructure in Canterbury is nationally important and its use, because it is already in place and paid for, is economically efficient for New Zealand. Canterbury's storage capacity can also act as an enabler for other renewable generation technologies, such as wind, which rely on the generation from hydro storage being available on demand. Hydro generation with storage is key to wider implementation of renewable generation technologies. New infrastructure and additions to existing irrigation infrastructure has considerable potential to increase electricity generated in the region.

These targets require that the zone and regional committees preserve the existing contributions of hydro-generation, the potential for new generation, and changes to demands for electricity. In addition, they promote the ability for new infrastructure to provide both electricity and irrigation water. Energy use is very closely linked to water user efficiency and many of the activities under water use efficiency relate to energy use (but have not been repeated in this section)

Goals

From 2010:

- Maintain Canterbury's existing contribution to New Zealand's security of electricity supply
- Seek opportunities, as part of design and planning for new infrastructure, to reduce electricity used in the use of water, to provide for multiple use, and to factor generation into existing irrigation infrastructure.

By 2015:

- Identified and implemented opportunities to reduce electricity used in the use of water
- Started projects to generate electricity from existing irrigation infrastructure.

By 2020:

- Increased the productivity per unit of electricity – per hectare consumption for irrigation sector and equivalent measures in other sectors.

By 2040:

- Factored efficient use of electricity in all irrigation infrastructure
- Reduced the energy used per hectare for irrigation in Canterbury compared to that used in the 2010/11 season
- Generate at least 40-45% of the power used by irrigation in Canterbury from irrigation infrastructure (including multi-use hydro and irrigation systems) within Canterbury¹⁴ and other renewable on-farm sources.
- Maintain or increase Canterbury's contribution to New Zealand's security of electricity supply.

¹⁴ This target will require adjustment once regional infrastructure plan and the potential for efficiency and generation gains are known.

Activities

		Lead agency(s)
Investigation/ monitoring	<ul style="list-style-type: none"> • Understand current electricity use and potential for efficiency gains • Understand projected irrigation and energy profile up to 2040 	Water Executive Power companies Environment Canterbury
Resource Management Act tools	<ul style="list-style-type: none"> • Make energy production (and complementary use of water) part of development proposals to store water • Enable consenting of multi-use proposals • Reconfiguration of consents (noting that the strategy seeks reconfiguration on a voluntary basis) 	Zone committees
Education, community, industry/ sector initiatives	<ul style="list-style-type: none"> • Scope and prioritise Combined hydro-electricity and irrigation projects • Understanding contribution of existing hydro-electricity infrastructure to New Zealand's electricity system • Installation of generation facilities on existing irrigation infrastructure • Use of pipes to deliver water to properties under pressure from gravity 	Irrigation/hydro-electricity sectors Regional and zone committees

Comment: The viability of generating electricity from irrigation supply systems has recently improved. The main barriers are information and capital. There is potential to better integrate irrigation water supply and energy generation, as well as reducing energy use.

9. Indicators of regional and national economies

All actions in this strategy should contribute to improved quality of life and economic prosperity in Canterbury. This set of targets measures the combined effects of many of the other targets. It is acknowledged that some of these targets such as regional GDP are influenced by initiatives outside this strategy, but it is considered important that the zone and regional committees evaluate how their implementation programmes will contribute to economic wealth. These economic targets will require reassessment as the regional infrastructure programme, economic assessments, potential for efficiency improvement, ecosystem services and recreational benefits are further understood.

Goals

From 2010:

- No decline in the contribution water makes to Canterbury economy “as measured through value added” (economic impact)
- Any assessment of regional economic value factors in externalities (e.g. water quality treatment costs, climate change emissions, changed recreational values) and the cost of environmental repair and restoration

By 2015:

- Increased the “value added” and employment per unit of water

By 2020:

- Increased production through the direct application of water to agriculture contributes an additional \$0.4 billion per annum value-added to the Canterbury economy. Note this is an indicative target and will need revision as the regional infrastructure plan and associated externalities are fully evaluated, designed and costed
- Measures in place to assess the economic wealth benefits of freshwater biodiversity (and other ecosystem services) and recreational use of water.

By 2040:

- Increased production through the direct application of water to agriculture contributes an additional \$1.7 billion per annum value-added to the Canterbury economy. Note this is an indicative target and will need revision as the regional infrastructure plan and associated externalities are fully evaluated, designed and costed
- Recognised and reported on the employment benefits (direct and indirect) that arose from the CWMS
- Increased Canterbury’s contribution to national GDP from 15% to 20%, of which 2% is attributable to increased production and better water management
- A demonstrable increase in economic wealth due to biodiversity protection and improvement, and increased recreational use of water resulting from implementation of the CWMS.

10 Environmental Limits

The Environmental limits referred to in this target are-

- Environmental flows and water levels (water quality)
- Catchment load limits or water quality outcomes/standards (water quality)

Water quantity and quality limits are interconnected. Limits therefore need to be set and reviewed with regard to these complex relationships.

Environmental limits are set for the purpose of sustainable management as set out in Part 2 of the RMA, and require the decision-maker (usually the regional council) to consider all values in its decision-making.

Implementation of environmental limits for all waterbodies is a priority for this strategy. Some are already in RMA planning documents. This is predominantly a role for the regional council (other than when a national RMA instrument such as a Water Conservation Order, National Policy Statement or National Environmental Standard is used).

Alignment between the implementation programmes and RMA instruments will occur through:

- Incorporating the fundamental principles and approach of the CWMS in the water quantity and quality part of the Regional Policy Statement (refer Annex). Regional plans must give effect to the RPS
- Both regional and local councils will be asked to approve implementation programmes before they are finalised. This reduces potential for development of options that conflict with council policy
- Regional and Zone Committees can recommend changes to regional or district plans for consideration by councils.

Goals

By 2015:

- Set environmental flows¹⁵ for surface streams, rivers and groundwater that are consistent with the fundamental principles of the CWMS and that:
 - are consistent with ecosystem health and biodiversity targets
 - for all braided rivers include flood peaks, flow variability, flood periodicity, and channel forming flows to maintain their braided character and ecosystems
 - afford protection to instream values identified in Ngāi Tahu policies
 - are consistent with the recreational uses of the water body; and
 - consider all the target areas of this strategy.
- Set catchment load limits for nutrients for each water management zone that are consistent with the fundamental principles of the CWMS and that:
 - are consistent with ecosystem health, drinking water and biodiversity targets
 - afford protection to instream values identified in Ngāi Tahu policies
 - are consistent with the recreational uses of the water body; and

¹⁵ Many of these are already in place through RMA plans

- consider all the target areas of this strategy.
- Established and begun to implement a programme to apply environmental flows to existing consents.

By 2020:

- Review of environmental flows and catchment load limits in response to changing monitoring information, new understanding and technologies, and if requested by regional and zone committees
- Established and begun to implement a programme to review existing consents where such review is necessary in order to achieve catchment load limits.

By 2040:

- Review of environmental flows and catchment load limits in response to changing monitoring information, new understanding and technologies, and if requested by regional and zone committees
- Environmental flow and catchment load limits achieved in all waterbodies.