

5.12 Water quantity monitoring

5.12.1 Monitoring procedures

A regional plan is required by Sections 35(2)(b) and Section 67(1)(i) to state the procedures to be used to monitor the efficiency and effectiveness of policies, rules, or other methods. A regional plan has to be reviewed not more than ten years after it has been made operative. For a review to be successful it is necessary to know how efficient and effective the policies and methods have been in contributing to achieving the plan's objectives and environmental results anticipated. In particular it is necessary to know whether each individual policy, and the methods to implement it, are contributing positively, neutrally or negatively.

Linked to this is the need to monitor the state of the environment and understand the causes of any changes, and the extent to which provisions in this chapter may have brought about those changes.

Chapter 1.3 of the Proposed NRRP outlines the general procedures to be used to monitor the overall effectiveness of the Proposed NRRP. Section 5.12 of this chapter is additional to that. This section sets out the general procedures to be used in Chapter 5 to monitor the:

- (i) Achievement of the anticipated environmental results
- (ii) Efficiency and effectiveness of the chapter's policies and methods.

It also identifies some other areas of environmental monitoring that Council intends to undertake. From time to time Council may need to deviate from the specific programmes listed if it is shown that the monitoring identified is no longer appropriate, or there is a more effective way of undertaking the monitoring."

The procedures to monitor the suitability and effectiveness of the water quantity objectives and policies are outlined below. To meet the requirements of section 35 of the RMA, Environment Canterbury will carry out the following types of monitoring:

- (a) monitoring of key human activities that are likely to exert pressure on the region's water resources and impact on surface and groundwater bodies;
- (b) monitoring of the state of the environment to assess whether anticipated environmental results are being achieved;
- (c) monitoring of surface flows and groundwater levels to assist in the implementation of flow and allocation regimes; and
- (d) compliance monitoring of resource consents, permitted activities and other processes to ensure compliance with conditions and rules.

5.12.2 Monitoring of environmental pressures

Table WQN4: Water quantity pressure indicators

Pressure	Indicator	Location of monitoring	Method of monitoring	Frequency of monitoring	Method of reporting
Surface water takes	Number of takes and volume of water allocated from a surface water body Proportion of primary allocation block allocated Actual volumes of water taken	Each surface water body	ECan database	Continuous	Annual reporting
Ground water takes	Number of bores/ volume of water allocated from an aquifer and/or allocation zone Proportion of primary allocation block allocated Actual volumes of water taken	Each allocation zone	ECan database	Continuous	Annual reporting
Irrigation	Area of land under irrigation Irrigation application method and rate Development patterns	Whole region	ECan consents database MAF AgriBase database Statistics New Zealand Satellite imagery or aerial photography Production sector reports	Continuous	Annual reporting
Dams and diversions	Number, location and size of new dams and/or diversions	Whole region	ECan consents database	Continuous	Two-yearly
Forest plantations in flow-sensitive catchments	Area of planting Changes in flow	Flow-sensitive catchments	Satellite imagery or aerial photography Production sector reports Flow monitoring ECan consents data base	Continuous	Five-yearly

5.12.3 Monitoring anticipated environmental results

Environment Canterbury will undertake to monitor the condition and the water flows, levels and pressures of the region's water bodies to determine how effectively the policies and methods in the plan are achieving the environmental results anticipated and provide a baseline to measure environmental changes. The monitoring programme is outlined in Table WQN4.

Table WQN5 Surface water and groundwater quantity – anticipated environmental results and associated monitoring and reporting

Anticipated environmental result	Environmental indicator(s)	Method of monitoring/ investigation	Frequency of monitoring/ investigation	Reporting
No decline in naturalness of flows and lake levels in natural state and high naturalness water bodies	Natural (baseline) river flows and, lake and wetland water levels, where no or low rate of abstraction	Routine water flow/level recording of a sample of two of each river and lake type in natural state and high naturalness water bodies	Continuous monthly recording	Five-yearly summary report
	River flows and, lake and wetland water levels	River flows if any relevant activity in the area Lake levels if required	As required	Five yearly summary report
Sufficient levels of water and sufficient flows (flow regimes) of water for the protection of instream values, including fisheries, wildlife, natural character and recreation in lakes and rivers	Lake and wetland levels, and spring-fed stream and river flows. The effect of abstraction on water levels and on flows and flow frequencies	Permanent river flow measurement sites and identified gauging sites Groundwater levels in spring discharge zones	Automatic with continuous recording and others on an as required basis Monthly water level measurements	Annual reporting
	The ecological status of lake, wetland and river ecosystems (see "Diversity and productivity of fisheries" Table WQL4 and WQL5)	Liaise with DoC, Fish and Game Council, Royal Forest and Bird Protection Society and other environmental agencies; Ministry of Agriculture and Forestry; and water permit holders	Annually	Annual reporting
	Ambient water quality <ul style="list-style-type: none"> – periphyton growth – sedimentation of gravel beds with fine sediment Ecosystem health <ul style="list-style-type: none"> – biotic health index – habitat health index 	Same as in Table WQL4 and WQL5	Quarterly or monthly sampling At least twice per year over summer	Annual activity report Three-yearly data analysis report Three-yearly regional technical report
	The maintenance of the natural character of water bodies (including natural flow regimes)	Routine water flow/level recording of a sample of two of each river and lake type where little or no abstraction occurs	Continuous monthly recording	Five-yearly summary report
	The recreational opportunities available regionally and in association with specific water	Survey recreational opportunities and community satisfaction	Carry out as part of any minimum flow review then	Five-yearly

Anticipated environmental result	Environmental indicator(s)	Method of monitoring/ investigation	Frequency of monitoring/ investigation	Reporting
	bodies		five-yearly	
Sufficient depth of water and flows for the protection of mauri and for ensuring mahinga kai, wāhi tapu and wāhi taonga requirements are satisfied.	Quality and abundance of mahinga kai Use of the Cultural Health Index (CHI) if appropriate	Ngāi Tahu – survey of selected water bodies Complaints	Ongoing	Report to Environment Canterbury
The risk of an increase in the frequency, duration or severity of low flows in flow-sensitive catchments as a result of land use change is reduced, due to improved understanding, and management of land use change, and riparian planting.	Changes to frequency, duration or severity of occurrences of low flows in flow-sensitive catchments	River flow recording sites or stream gaugings	At least annually	Annual reporting
	Level of understanding by groups within community	Surveys of awareness and practices	5 yearly	Five-yearly reporting
	Area of scrub and forest reversion, spread of wilding pines, trends in spread in flow-sensitive catchments	Aerial or satellite surveys of vegetation type and extent	At least 5 yearly	Five-yearly reporting
	Riparian habitat – species composition and density of canopy in flow-sensitive catchments	Aerial or land based surveys	At least 5 yearly	Five-yearly reporting
No long-term contamination of groundwater as a result of changes in groundwater levels or pressures due to groundwater abstraction.	Coastal groundwater levels	Network of coastal groundwater monitoring bores Specifying appropriate consent conditions	Annually, monthly, six-monthly, or otherwise, depending on risk	Annual reporting As per specific policy or schedule requirements
	Coastal groundwater quality	Network of coastal groundwater monitoring bores (see also Table WQL6) Geophysical surveys where appropriate Specifying appropriate consent conditions	Annually, monthly, six monthly, or otherwise, depending on risk	Annual reporting As per specific policy or schedule requirements
	Groundwater levels and pressures	Network of groundwater monitoring bores Specifying appropriate consent conditions	Annually, monthly, six monthly, or otherwise, depending on risk	Annual reporting As per specific policy or schedule requirements
	Groundwater quality	see Table WQL6	see Table WQL6	see Table WQL6
De-watering of aquifers due to groundwater abstraction does not cause localised land subsidence	Groundwater levels Observation of subsidence	Network of groundwater monitoring bores Specifying appropriate consent conditions	Annually, monthly, six monthly, or otherwise, depending on risk	Annual reporting

Anticipated environmental result	Environmental indicator(s)	Method of monitoring/ investigation	Frequency of monitoring/ investigation	Reporting
Water that is taken is used more efficiently	Adoption of efficient methods of using water	Liaison with Ministry of Agriculture and Forestry, water permit holders, national or regional organisations for producers (e.g. Fruit and Vegetable Growers and Federated Farmers)	Ongoing	Annual reporting
	Test efficiency of methods with consent application, review and renewal	Review or renewal of permits. Specifying appropriate consent conditions	Progressively review on a catchment basis	Annual reporting
	All irrigation methods 80% efficient by 2015	Survey water use and water use methods	Five-yearly	Five-yearly
Allocation limits are established to provide reliable supplies of water enabling sustainable use	Water allocation and compliance with allocation limits	Maintain a register of water allocated	Ongoing	Annual reporting
	Community satisfaction	Survey catchment communities	Progressively as specific flow/level and allocation regimes are implemented	Annual reporting
	Frequency of restrictions	Maintain a record of restrictions	In the event of water shortages	Annual reporting
	Impact on regional productivity and wellbeing of water shortages	Liaison with Ministry of Agriculture and Forestry, water permit holders, and national or regional organisations for producers (e.g. Fruit and Vegetable Growers and Federated Farmers)	In the event of droughts	Two-yearly
	Long term trends in groundwater levels	Network of groundwater monitoring bores Groundwater models Climate variability monitoring	Up to monthly	Annual reporting
Adverse effects on reliable supplies of water are no more than minor in flow-sensitive catchments due to plantation forestry or reversion to woody species	Change in land use Frequency of restrictions	Aerial or satellite surveys of vegetation type and extent	On going	Five-yearly
		River flow measurement and gauging Maintain a record of restrictions	In the event of water restrictions	
Improved availability and enhanced supply of water for abstractive and instream uses as a result of augmentation	What augmentation has occurred River flow measurement sites and gauging sites	Monitor applications		Five-yearly.
All anticipated environmental results	Incidents recorded, or reported to the Regional Council, relating to low river flows, or non-compliance	As reported	As reported	Six-monthly

5.12.4 Compliance monitoring

The following table sets out the compliance monitoring and reporting that Environment Canterbury will undertake to ensure that activities comply with rules and consent conditions. The indicated method and frequency of monitoring is a general description of the minimum monitoring that may be undertaken. In addition, Environment Canterbury will respond to complaints received about any particular matter. The response may include monitoring of resource consents or unauthorised activities, and subsequent enforcement action.

Table WQN6: Compliance monitoring

Type of authorisation	Method of monitoring	Frequency of monitoring	Reporting
Prohibited activities, unauthorised activities	Response to complaints or site inspections	As required	Annually in the Environment Canterbury annual compliance monitoring report
Permitted activities to take, dam or divert water or for plantation forestry	Site inspections Monitoring the area of plantation forestry per property	On a programmed catchment basis in line with the long-term financial strategy	
	Response to complaints.	As required	
Permits to take water	Assessment of electronic abstraction records and/ or on site monitoring of abstraction rates	On a programmed catchment basis in line with the long-term financial strategy During water short periods when restrictions are applying Annually for groundwater takes allocated water on a seasonal basis	Annually in the annual environmental incidents and enforcement report
	Response to complaints	As required	
Permits to dam or divert	Site inspections	In conjunction with monitoring of permit to take Following any major flood event or during low flows As required as a condition of consent and if poor performance requires closer monitoring	
	Response to complaints	As required	
Permits to use.	Assessment of efficiency and improvements required as condition of consent	In conjunction with monitoring of permit to take As required as a condition of consent and if poor performance requires closer monitoring	
	Response to complaints	As required	
Land use permits for plantation forestry	Site inspections Flow measurements Monitoring impact of mitigation measures on instream and out-of-stream values and uses	Five-yearly, or on a programmed catchment basis	
	Response to complaints	As required	

For more information on compliance monitoring of resource consents refer to Resource Consent Information Series Booklet 9 available from your nearest Environment Canterbury office or from the Customer Services section by phoning 0800 EC INFO (0800 32 4636)

5.12.5 Implementation of the plan

A review of the plan's policies, rules and other methods must be undertaken, and be made publicly available at least every five years. The review will consider effectiveness and efficiency of policies, rules and other methods, and include such matters as practicality, cost-effectiveness, and the extent to which they address impacts on water quality, aquatic ecosystems and instream values

Table WQN7: Monitoring effectiveness and efficiency of policies, rules and other methods

Plan implementation	Criteria for assessment	Method of assessment	Reporting
Policies	The extent to which policies in the plan provide guidance for the interpretation of rules Activities or issues that affect water quantity and that are not covered by plan policies	Feedback from Environment Canterbury staff Evaluate the extent to which policies guided decisions on a selection of applications or resource consents for damming, diverting and taking of surface water, and the taking of groundwater	A report every three years
Advocacy	Environment Canterbury's point of view as expressed formally in meetings, hearings, or correspondence		A report every three years
Information and promotion	Awareness of, and extent to which, relevant guidelines for assessment of potential adverse effects of proposals are being used Information is published or has been disseminated	Survey of water permit holders to determine the appropriateness of brochures and guidelines available	A report every three years
Investigations	The extent to which investigations identified in this chapter have been initiated or completed	Review of projects in the Environment Canterbury Annual Plan A project has been initiated, staff time or resources allocated to undertake or support the work Publication of progress report or a completed technical report or paper	Annual progress reports Final report presenting the results of the investigation
Non-statutory strategies	The extent to which non-statutory strategies identified in this chapter have been initiated or completed	Review of non-statutory strategies in the Environment Canterbury Annual Plan Record of non-statutory strategies that have been initiated, staff time or resources allocated to undertake or support the work Publication of and acceptance of non-statutory strategy by those affected	A report every three years
Resource care initiatives	The extent to which such initiatives are tied with general progress in specific catchments relating to water quantity issues	Record of activities or initiatives undertaken by local groups Annual plan reporting	A report every three years
Water user groups Woolston/Heathcote water users group	The extent to which water user groups are involved in co-ordinating abstractions at times of restrictions, and the extent of compliance with restrictions when such groups are involved	Compliance with consent conditions at times of restrictions Record of active water users groups in the region	Annual resource report to group prepared by Environment Canterbury
Woolston/Heathcote	The extent to which current groundwater abstractions affect the trigger levels	Monitoring of groundwater levels in trigger well	Users group meeting

Plan implementation	Criteria for assessment	Method of assessment	Reporting
groundwater management strategy	set in Policy WQN10 (which is effectively the current management strategy)	Variation sought to adjust Policy WQN10 if required	minutes
Regional water distribution strategy	The extent to which such a strategy has been initiated or completed	Annual plan reporting	Annual plan report
Water audits	The extent to which water audits are carried out, either as a result of voluntary actions (including as a result of a water users group action), or to comply with water permit conditions	Compliance with consent conditions Publication of a guideline for carrying out water audits by Environment Canterbury	Environment Canterbury annual compliance monitoring report Compliance monitoring reports
Regional rules	The extent to which activities comply with conditions or standards and terms The practicality, enforceability, and relevance of conditions or standards and terms The extent to which the conditions or standards and terms address adverse effects of the activity on water quantity, aquatic ecosystems and instream values Ease of use and consistency of interpretation	A review of monitoring of compliance with permitted activities and enforcement of unauthorised activities Feedback from Environment Canterbury staff about the effectiveness and practicality of the conditions or standards and terms in the rules of this chapter	Compliance monitoring reports As specified in Tables WQN3, WQN4, WQL4, WQL5 and WQL6
Resource consents	Frequency of standard conditions for a particular activity The extent to which the specific effects caused by a type of activity are addressed by the consent The extent to which a consent application identifies potential adverse effects and proposes measures to avoid, mitigate or remedy the effects Compare predicted adverse effects against the results of monitoring Applicant satisfaction with consent processing, including time and cost The extent to which the application is assessed against the objectives and policies of the plan The practicality, enforceability, and relevance of the consent conditions	A selection of at least three applications and consents for at least five activities requiring a water permit Compliance and enforcement monitoring Monitoring of anticipated environmental results The results of Environment Court decisions Survey of consent holders	A report every three years Compliance monitoring reports As specified in Tables WQN3, WQN4, WQL4, WQL5 and WQL6
Compliance and enforcement	Frequency of non-compliance and complaints for specific activities, in particular for breaches of low flow or level restriction conditions	Compliance and enforcement monitoring	Compliance monitoring reports Annually in the Environment Canterbury annual compliance monitoring report Annually in the annual environmental incidents and enforcement report