

1. INTRODUCTION

As a primary production economy, Southland is dependent on both the quantity and quality of water available in the region. Water in the region is found either as surface water (in rivers, streams, lakes and wetlands) or groundwater. Water has both instream and abstractive values. Instream it provides for a wide variety of ecological values, and natural character, aesthetic values and recreational values. Abstraction of water provides for the social and economic wellbeing of people and communities. Water is also frequently used to assimilate waste.

Southland water resources

The Southland region is drained by four major river catchments – the Waiau, Aparima, Oreti and Maitara catchments, which cover a combined area of 18,305 km², or 54% of the land area of Southland.



The Waiau catchment lies on the eastern edge of Fiordland, and is Southland's largest catchment. Its major tributary is the Mararoa River. The Waiau catchment contains a

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large number of lakes, and is the least developed of the four major catchments. However, the operation of the Manapouri Hydro-Electric Power Scheme on the western arm of Lake Manapouri results in the diversion of up to 90% of the flow in the catchment and its discharge into Doubtful Sound.

The Mataura catchment is the second largest in Southland, both in terms of area and flow of water. The catchment stretches from the southern tip of Lake Wakatipu to the Fortrose estuary, east of Invercargill. The major tributary in the catchment is the Waikaia River, which joins the Mataura east of Riversdale, and contributes half the flow of the catchment above its confluence with the Mataura. Other major Mataura catchment tributaries include Eyre Creek and Roberts Creek in the upper catchment, the Nokomai River, Waimea Stream and Waikaka Stream in the mid catchment, and the Mokoreta River in the lower catchment. The majority of the Mataura catchment has been developed for agriculture, with intensive farming in the middle and lower reaches of the catchment. The catchment also has significant water supply values for various communities and industrial uses, and receives point-source discharges of municipal sewage and industrial effluent in the middle and lower catchment. The Mataura and Waikaia Rivers are the subject of a National Water Conservation Order, which was promulgated to protect the outstanding fisheries and angling amenity features of the catchment.

The Oreti catchment is the third largest in the region and runs from the Thomson Mountains in the north of the region to the New River estuary adjacent to Invercargill. Like the Mataura catchment, the mid and lower reaches of the Oreti catchment have been substantially modified by drainage, flood control and channel clearance work undertaken in order to develop productive farmland. Major tributaries of the Oreti mainstem include Winton Stream, Waikiwi Stream and the Makarewa River, which are each subject to point-source discharges of effluent from industry and municipal sewage treatment. In August 2008 the Oreti River became subject to a National Water Conservation Order, in order to recognise the value of the catchment in terms of habitat for brown trout and black-billed gulls, angling amenity and significance in accordance with tikanga Maori.

The Aparima catchment is the smallest of the four main catchments and extends from west of Mossburn to the coast at Riverton. The movement of large volumes of gravel from the headwaters of the catchment has assisted in the formation of the western Southland Plains. Much of the lower area of the catchment has been extensively modified over the last century, with the drainage of wetlands and the straightening of streams to assist in flood management activities. Important areas of wetland do still remain in the catchment, particularly the Castle Downs Swamp, the largest remaining wetland area in Southland.

The balance of the region is drained by smaller rivers and streams (such as the Waimatuku Stream and Waihopai River) in the lower Southland Plains and the Catlins, and the larger waterways contained within the Fiordland and Rakiura National Parks.

Groundwater in Southland is principally found under the plains and downlands of central and eastern Southland, as well as the Waimea Plains and Te Anau Basin in northern Southland. Alluvial gravel aquifers associated with the region's surface waterways form the major unconfined aquifers in Southland, with the sandstone and fractured limestone sediments underlying the alluvial gravels forming extensive semi-confined and confined aquifer systems. The greywacke basement rocks of the Hokonui Hills and Catlins areas also form locally significant aquifers.

Water quality on a national basis

Water quality is a prime determinant of the health of aquatic ecosystems and its use by communities. In early 2008 the Ministry for the Environment released ENZ07, the second national State of the Environment report. ENZ07 contains details of trends in water quality on a national basis over the last ten to twenty years from the national water quality monitoring network. Monitoring sites on the Waiau, Monowai, Oreti and Mataura Rivers are included within this network.

As part of the background work underlying ENZ07, in 2006 NIWA reported for the Ministry for the Environment on state and trends in the national water quality network from 1989 to 2005. This assessment found that the Mataura and Oreti Rivers in Southland, along with the Waingongoro River in Taranaki and the Waihou River in Waikato are some of the most nitrogen enriched rivers in the country. The assessment also found a trend of increasing nitrogen levels in these rivers, and a corresponding deterioration in water quality over the last 17 years, probably as a result of land use intensification. In terms of dissolved reactive phosphorus, the NIWA assessment found that the Mataura and Oreti Rivers had higher concentrations than the national median and were also demonstrating a trend of increasing levels.

Levels of nitrogen and phosphorus in surface water nationwide have increased over the past two decades, with those rivers that already have relatively high levels of nitrogen deteriorating more rapidly than those that do not. The increase in nitrogen and phosphorus levels is not large, but does point to a long-term trend towards nutrient enriched conditions in rivers and streams that are likely to trigger adverse environmental effects. There are some encouraging results with regard to phosphorus in those rivers that already have high levels, with a steady decrease in phosphorus levels from a peak in the mid 1990s. ENZ07 notes that this *'may signal improved pasture management in intensively farmed areas (for example, through reduced erosion and better fertiliser application practices), which may have led to reductions in the amount of phosphorus run-off to waterways.'*

Nutrients in rivers and streams are influenced by natural factors such as rainfall and river flow patterns, and by human activities. In urban areas the main source of nutrients is human sewage. In rural environments agricultural fertilisers and stock manure and urine are the main sources of non-point source discharges of contaminants, with point-source discharges such as dairy effluent treatment systems also contributing.

In terms of bacterial contamination of water, 230 sites across the country are regularly monitored for compliance with water quality guidelines for contact recreation. Six of these sites are in Southland. In 2006/07 60% of the sites complied with the guidelines for at least 95% of the time. 10% of the sites breached the guidelines regularly. These results are noted in ENZ07 as being an improvement on the two previous years' monitoring, but the current data set is not of a sufficient length to demonstrate an overall trend of improving bacteriological water quality.

Typically, waterways in urban areas tend to have the highest levels of bacterial contamination, due to faecal matter from animals being carried directly to surface water through stormwater discharges. Rivers and streams in rural areas can also have high levels of bacteria, particularly where stock access to waterbodies is not controlled.

Over the past two decades water clarity at sites in the national monitoring network has improved. Soil erosion is the primary human mediated cause of reductions in water clarity, although natural factors (such as the geology of the catchment) can also have an influence. The improvement in water clarity shown in the national network may be as a result of better forestry and farm management leading to lower levels of soil erosion.

Biochemical oxygen demand (a measure of the amount of oxygen required by microorganisms to digest organic waste, and therefore a measure of how contaminated water is) has decreased steadily in waterways across the country. Measurements of ecosystem health (macroinvertebrate richness) have shown that the relative abundance of pollution sensitive species has increased in waterways where diversity had been reduced, which is a further indication of overall improvements in water quality. In relation to biochemical oxygen demand, ENZ07 notes that:

'The Mataura River in Southland is an example of a major New Zealand waterway in which water quality has improved since point-source discharges of organic waste were reduced and/or received improved treatment before discharge. In 1975, 15.5 tonnes of organic waste were discharged into the river each day. By 2000, because of improvements to effluent treatment at a large meatworks alongside the river, the organic waste discharged had decreased to just over 3 tonnes a day. Similar reductions in the amount of suspended-solid material were achieved over the same period.'

*'While the Mataura River still has elevated nutrient and bacteria levels from non-point sources, marked improvements in the appearance of the river (less surface scum and foam) have been attributed to the reduction in organic matter entering it (Environment Southland, 2000).'*¹

¹ Ministry for the Environment. Environment New Zealand 2007. Wellington: Ministry for the Environment (p293)

The Maitara River at the Maitara Falls was, however, one of the lowest ranked sites in terms of water quality in a recent cultural environmental health assessment of South Island waterways undertaken by Te Runanga o Ngai Tahu.

In relation to groundwater, nitrate levels, microbiological contamination, salinity, metals and pesticides have all been monitored at sites around the country. More than a third of groundwater monitoring sites show elevated levels of nitrate when compared to background concentrations, with nitrate levels being highest in shallow unconfined aquifers. There is however no clear nationwide trend of an increase or decrease in nitrate concentrations in recent years. 80% of groundwater sites monitored for bacteriological contamination comply with drinking water standards, but Southland is identified in ENZ07 as one of the regions of New Zealand where the drinking water standard is breached most commonly. There has been no significant trend in changes in contamination levels over the last ten years.

Groundwater salinity exceeds drinking water standards at up to 5% of monitored sites, and metals (iron, manganese and arsenic) exceed drinking water standards at 10-33% of monitored sites. These results may reflect natural conditions (such as the surrounding soils and geology) or the effects of human activities (such as the use of arsenic in timber treatment and agriculture).

Since 1990 there have been five national surveys of pesticides in groundwater. The most recent survey found detectable quantities of pesticides in 19% of the groundwater areas sampled, a comparable level to earlier surveys. All but one of the areas sampled complied with drinking water standards.

Overall, there remain a number of challenges in terms of water quality around the country, and no significant trends of improving quality.

Southland water quality

On a regional basis, Environment Southland has been monitoring water quality in surface water and groundwater throughout the region for a number of years. Surface water quality monitoring has focused on physical, chemical and microbiological indicators (such as nutrients, bacteria, temperature, clarity and dissolved oxygen) as well as general ecosystem health (which can be an indicator of overall water quality). Groundwater quality monitoring has concentrated on nitrate, bacteria and chloride (the latter providing a good indicator of general water quality²).

With respect to surface water quality, many rivers and streams in middle to lower catchment areas show levels of nutrients that exceed accepted water quality guidelines. In rivers and streams where both nitrogen and phosphorus levels are high there is an increased risk of excessive algae growth during summer low flows. Monitoring over the

² Chloride is naturally present in groundwater as a result of rainfall and geological interactions, but also occurs in elevated concentrations in association with many forms of contamination, particularly those caused by effluent discharges.

last eight years has demonstrated a trend of steadily increasing levels of nutrients in waterways, particularly in the areas where more intensive land use is occurring.

Continuous temperature recording in a number of the region's major rivers shows a consistent pattern of cooler temperatures in the headwaters and progressively warmer temperatures in the lower catchment areas, consistent with increased ambient air temperatures at lower elevations and the removal of much of the streamside shading vegetation in lower catchment areas. The only exception to this pattern is the upper Mataura River in winter, where water temperatures are significantly warmer than surrounding catchments. This is thought to reflect the influence of significant spring discharges to the river in the upper catchment offsetting the reduction in ambient air temperature.

Most catchments in the region have acceptable water clarity, although the Waimatuku/Awarua, Waihopai, lower Mataura, lower Oreti and monitoring sites in the Catlins show consistently low clarity, regularly falling below water quality guidelines. In some cases this can be as a result of natural conditions, particularly for those waterways draining peat soils, where the natural tannins contribute to reduced water clarity. Dissolved oxygen levels generally exceed guideline values across the region.

Measurements of bacteria provide an indication of how safe a particular waterway is for contact recreation, such as swimming. A high concentration of indicator bacteria means that it is more likely that disease causing organisms are present and there is therefore a higher health risk associated with contact recreation. Monitoring of Southland rivers and streams from December to March generally shows that, on approximately a quarter of monitoring occasions, indicator bacteria exceed guidelines for public health. The causes of these results are not always clear. Bacteria levels commonly increase after high rainfall, as surface runoff conveys contaminants (including faecal matter) from the land into water. However, in the 2006/07 monitoring year, 36% of the occasions on which the guidelines were exceeded were not linked to rainfall events. This suggests that a number of the monitoring sites have elevated ambient concentrations of bacteria, which is of concern.

By measuring ecosystem health, Environment Southland can assess a wide range of factors, such as water quality, habitat and instream life. Two measures are used to assess ecosystem health – streambed macroinvertebrates (the small creatures that live in the beds of rivers and streams) and periphyton (algae) coverage of the bed. Macroinvertebrate communities are assessed using a series of biological indicators that measure the community structure of the invertebrates and the proportion of them in any particular community that are sensitive to pollution. The biological indicators are then used to classify each site that is monitored into one of four categories – poor, fair, good or very good. For example, a diverse range of species within a community, with a high proportion of species that are sensitive to pollution would indicate a site with good or very good ecosystem health. Conversely, a small number of species in a community dominated by pollution tolerant organisms would indicate a site with poor ecosystem health.

The general trend throughout Southland is of good or very good macroinvertebrate indices in headwater and upper areas of catchments, with the indices steadily declining the further downstream the monitoring sites are located. This reflects the influence of increasing intensification of land use lower in catchments, and the effects of point-source and non-point source discharges to rivers and streams.

Assessment of the periphyton coverage on stream and river bed monitoring sites can provide an indication of the water quality at the site. Periphyton growth is influenced by the levels of nitrogen and phosphorus in the water - increased levels of nutrients can give rise to excessive periphyton growth, particularly during periods of low flow. Excessive periphyton growth can smother river and stream beds, reducing available habitat for aquatic life and decreasing ecosystem health.

Over the last eight to ten years a consistent pattern has been that approximately half of the monitoring sites exceed guideline values for periphyton cover and biomass, therefore adversely affecting ecosystem health. As with the macroinvertebrate measurements, the sites which fail the guideline levels tend to be in the lower reaches of catchments, particularly the Mataura, Oreti, Aparima, Waiau, Mararoa and Makarewa Rivers. This is likely to reflect the influence of more intensive land use in lower catchment areas, resulting in greater non-point source discharges of nitrogen and phosphorus, as well as point-source discharges of industrial and municipal sewage effluent.

In relation to groundwater quality, monitoring has been conducted on a regular basis since 2000 to assess whether groundwater remains suitable for drinking and what the effects of groundwater discharge to surface water may be. This monitoring has shown that groundwater quality is generally good throughout the region, with most samples meeting drinking water standards. In some aquifers groundwater quality is naturally reduced by high levels of iron, manganese and hardness, which are derived from the surrounding geology. Chloride and nitrate monitoring has shown a statistically significant trend of increasing levels, particularly in more intensively farmed areas, which indicates effects from the overlying land use. Increased contaminant levels in groundwater can have flow on effects on surface water quality when the groundwater discharges naturally into local waterways. Bacterial levels within groundwater in Southland also generally fall within drinking water guidelines. Areas where bacterial contamination is being demonstrated are generally as a result of the condition, maintenance and location of bores, particularly wellhead protection to prevent contamination.

Pressures on water quality in Southland

A number of human activities cause adverse effects on water quality in Southland. These include:

- Intensive farming – particularly dairy and deer farming, and development of cropping to provide dairy winter grazing
- Fertiliser usage

- Direct discharges of contaminants (including industrial, municipal and agricultural wastes) to surface water and to land, including ongoing disposal of waste into unlined landfills
- Stock access to waterways
- Flood and drainage works in river and stream beds
- Gravel extraction and quarrying adjacent to river beds
- Land development leading to increased discharges of sediment and stormwater to local surface waterways

Extraction of large quantities of water can also reduce levels and flows of water in rivers and streams with consequent effects on water quality as the volume of water available to dilute contaminants decreases³. The Department of Conservation has also identified the link between water quality and natural character, and the need to maintain the health of the headwaters of rivers and streams.

Southland contains nationally significant deposits of coal, lignite and gas. Development of these resources has the potential to have significant adverse effects on water quality as well.

The following are identified as issues in relation to water quality in the existing Regional Policy Statement:

- the need for appropriate quality water for a wide range of uses
- the wide range of human and natural activities that can cause effects on water quality
- insufficient regard to alternative options for treatment and disposal of wastes, and
- insufficient information about the quality of groundwater.

A number of more specific issues have arisen in Southland since the Regional Policy Statement became operative. Considerable policy advice and additional requirements have also been released by central government in this time. It is important that the Regional Policy Statement both accurately reflects the water quality issues in Southland and is consistent with national requirements.

2. RELEVANCE OF EXISTING REGIONAL POLICY STATEMENT AND SOUTHLAND DISTRICT PLAN ISSUES

One of the purposes of this paper is to assess whether the existing issues relating to water quality contained in the Regional Policy Statement and the Southland District Council District Plan are still relevant to the management of water quality in Southland, and whether the objectives and policies that are presently contained in the Regional Policy Statement and the District Plan address those issues appropriately.

There are four issues contained in the existing Regional Policy Statement with respect to water quality in Southland. In summary the issues are that:

³ This pressure is not discussed further in this paper, but is addressed in Issues and Options – Water Quantity/Allocation.

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- the community requires water of an appropriate quality to provide for a range of activities and values (Issue 1);
- water quality can be affected in both a positive and negative way by a wide range of events and activities (Issue 2);
- insufficient regard is given to alternatives for treatment and discharge of waste (Issue 3); and
- there is insufficient information about the quality of groundwater (Issue 4).

That the community requires an appropriate quality of water for its needs (both physical and social) is still a relevant issue in Southland, particularly as the community's expectations in terms of water quality are rising. Many of the stakeholders consulted as part of the preparation of this paper identified different activities and values that either could or were being affected by water quality in Southland at present. Analysis of the objectives, policies and methods that give effect to Issue 1 has identified that the majority of them remain relevant and appropriate to addressing the issue.

The information that is available relating to the quality of groundwater also remains an issue in Southland, although to a lesser extent than when the Regional Policy Statement first became operative. In response to the previous lack of information, from 2000 onwards Environment Southland has implemented a comprehensive groundwater monitoring programme, although there are still some areas of the region ('hotspots') where there is a need for further information. Analysis of the objectives, policies and methods that give effect to this issue has concluded that many of them are not relevant and appropriate, and therefore need to be addressed.

Issue 2, relating to the events and activities that can affect water quality (both positively and negatively), is more a statement of fact than an issue. Even though a wide range of events and activities, both natural and resulting from human activity, are listed in the issue, it is not clear whether or not in Southland water quality is affected by these sorts of activities, which activities and events specifically are issues, and what sort of adverse effects are occurring.

None of the individuals or organisations consulted as part of the preparation of this paper identified concerns with the consideration of alternative treatment or methods of discharge of waste.

A detailed analysis of each issue and its objectives, policies and methods is included in Appendix 1. A tabular summary of this information is provided in Table 1 below.

Table 1: Relevance of existing Regional Policy Statement policy framework

Issue	Relevant?	Relevant Objectives	Relevant Policies	Relevant Methods
1	Yes	1.2, 5.1*, 5.2*, 5.3, 6.4*	5.1*, 5.2, 5.3*, 5.4*, 5.5*, 5.7, 5.8*	5.1, 5.2*, 5.5, 5.6*, 5.9, 5.10*, 5.11*, 5.12*, 5.13*, 5.14*, 5.16*
2	No			
3	No			

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Issue	Relevant?	Relevant Objectives	Relevant Policies	Relevant Methods
4	Yes		5.6	5.4, 5.7, 5.8, 5.10*(possibly)

* = needs amendment in order to be completely relevant.

Issues contained in other parts of the Regional Policy Statement are also considered to be relevant to water quality, and are outlined in Appendix 1.

District Plan

Staff at Southland District Council have provided input into this paper by way of this section, which provides a Southland District Council perspective on water quality.

The Southland District Plan contains a number of sections relevant to water quality. Section 1 of the Southland District Plan ('The Resources of the District') includes a section on water (Section 1.5), which details the District's water sources, including river catchments, lakes and wetlands. Section 1.5 also discusses water quality, before identifying the following issues relating to water:

The need to avoid and mitigate the degradation of water quality as a result of human activities, removal of vegetation and contamination from sewage and animal effluent.

Explanation

While the control of water quality is the responsibility of the Southland Regional Council the proposed Regional Policy Statement (Policy 4.5) requires Local Authorities to assess the effects of land use activities at the time of consent.

The need to maintain and enhance the District's significant aquatic plant and animal life, particularly indigenous species, and the district's fresh water fishing resources.

Explanation

Many water bodies within the District are expected to perform a diverse range of function and care needs to be exercised to ensure a balance is achieved between activities and species.

As noted in the discussion on the Southland District Council's perspective on water quantity (see the Issues and Options – Water Quantity/Allocation paper), the need to avoid and mitigate the degradation of water is identified in Section 1.5 of the District Plan. The explanation to the first issue in Section 1.5 also notes that Local Authorities are required to assess the effects of land use activities at the time of granting a resource consent.

As noted in the companion Issues and Options – Water Quantity/Allocation paper, currently the District Plan has quite a permissive approach to land use change. A number of land use changes could potentially adversely affect water quality. More intensive grazing in close proximity to watercourses, for example, can detract from water quality, but can be undertaken without the need for a resource consent. As activities such as this are permitted, the effects of these land use changes are not assessed or scrutinised

through any District Council consent process and there is therefore no ability to impose conditions.

Section 3 of the District Plan lists the significant resource management issues facing the District's water resources.

3.5.2 – THE ISSUES

The following are considered to be significant resource management issues facing the District's water resource;

- ***Land use activities may have an adverse effect on water quality in some parts of the District***

Explanation

Both ground water and surface water quality and quantity are being adversely affected by certain land management practices. Activities such as vegetation clearance, working soil on steep slopes, grazing riparian margins, applying fertiliser in riparian margins, draining wetlands, effluent discharge and harvesting tree crops in riparian margins have all contributed to a significant increase in sediment and nutrient loads in a number of the District's waterways. Degradation of the District's water seriously affects the ecological health of the District and greatly affects recreation and consumption uses.

- ***The viability of water schemes can be threatened by the change of land uses in their catchment areas.***

Explanation

The viability of water schemes can come under threat if land uses were to change in their catchment areas. The principal options Council has considered include economic measures such as rates relief, the funding of fencing, and the outright purchase of properties affecting the supply catchment and the control of the effects of land use in those affected areas.

Section 3.5 ('Water') of the District Plan outlines the objectives and policies relating to water and water issues. This section recognises that land use activities can have an adverse effect on water quality and that the viability of water schemes can be threatened by land use changes within a scheme's catchment area.

At the time these objectives and policies were formulated Southland District Council sought to manage the issues through the use of economic measures, such as those outlined in the explanation to the second issue (see above). The use of these economic measures has been very limited since the current District Plan became operative in 2001.

Section 3.5 of the District Plan also lists the following objectives and policies relating to water quality:

Objective WAT.4

To ensure that the adverse effects of land activities on water quality are avoided, remedied or mitigated,

Objective WAT.5 – Water Supply Catchments

To ensure land use practises maintain, and where appropriate, enhance, both the quality and quantity of water within the catchment areas of Southland District's, Invercargill City's and Gore District's water supply schemes to ensure a continued safe and economic supply of water.

Policy WAT.11

To avoid, remedy or mitigate the adverse effects of land use on water quality and quantity within the water supply catchments in the District.

Explanation

Any increase in sediment or pollutants significantly increases the cost of clean water and can undermine the future operation of water schemes. Activities such as wetland drainage, vegetation clearance, and intensive grazing can have effects such as increased sedimentation, increased runoff and a resultant decrease in quality and quantity.

It is important to note that the significant resource management issues facing the District's water resource have altered since the District Plan was adopted. Emerging issues are discussed in greater detail in Section 3 of this paper.

3. EMERGING WATER QUALITY ISSUES IN SOUTHLAND

Since the Regional Policy Statement became operative in 1997 a variety of water quality issues have arisen, nationally, regionally and locally within Southland District. In general terms the regional issues have arisen as a result of Environment Southland gaining a better understanding of the Southland environment through increased water quality monitoring, and as a result of significant economic growth in the agricultural sector.

Over the last ten years the Government has also taken a more active role in determining and directing national policy in relation to water quality.

3.1 National Issues

Resource Management Act 1991

The Resource Management Amendment Act 2005 introduced or amended provisions that affect the responsibilities and functions of Environment Southland in relation to the management of water quality.

Sections 30(1)(c)(iiia), (ga) and (gb) were all introduced by the Amendment Act:

Every regional council shall have the following functions for the purpose of giving effect to this Act in its region:

- ...
- (c)(iiia) *the maintenance and enhancement of ecosystems in water bodies...*
- ...
- (ga) *the establishment, implementation, and review of objectives, policies, and methods for maintaining indigenous biological diversity*
- (gb) *the strategic integration of infrastructure with land use through objectives, policies and methods*

Ecosystems and indigenous biological diversity can both be affected by the quality of the water surrounding them, and the review of the Regional Policy Statement should take these new functions for Environment Southland into account. The strategic integration of infrastructure with land use is most likely to refer to provision of infrastructure (such as water supply, wastewater treatment and disposal, and land transport networks) in co-ordination with the growth of towns and cities. Embodying strategic consideration of infrastructure development in the Regional Policy Statement would provide additional imperatives to resource users and assist in managing effects on water quality.

Section 67(3) of the Resource Management Act now requires any regional plans prepared by Environment Southland to ‘give effect to’ any regional policy statement. The pre-eminent position of the Regional Policy Statement is therefore confirmed, and it is therefore important that it sets out strategic direction for the management of water quality in the region.

Section 75(3) mirrors section 67(3) and requires district plans to ‘give effect to’ any regional policy statement. This has been recognised through the co-ordinated approach that Environment Southland and the Southland District Council are adopting to the review of the Regional Policy Statement and the Southland District Plan.

The Resource Management Amendment Act 2005 substantially altered section 137. Section 137 previously restricted the transferability of discharge permits to only being between owners/occupiers of a particular site. Of particular note are sections 137(1) – (5), which state:

- (1) *The holder of a discharge permit may –*
- (a) *transfer part of all of the holder’s interest in the permit; and*
- (b) *make the transfer for part or all of the remaining period of the permit.*
- (2) *The holder may make the transfer if it –*
- (a) *is for the site for which the permit is granted; and*
- (b) *is to –*
- (i) *another owner or occupier of the site for which the permit is granted; or*
- (ii) *a local authority.*

- (3) *The holder may make the transfer if it is for another site and is to any person, if a regional plan –*
- (a) *allows the transfer; or*
 - (b) *allows the holder to apply to the consent authority that granted the permit to be allowed to make the transfer.*
- (4) *A regional plan may allow a transfer or a consent authority may allow a transfer if –*
- (a) *the transfer does not worsen the actual or potential effect of any discharges on the environment; and*
 - (b) *the transfer does not result in any discharges that contravene a national environmental standard; and*
 - (c) *if the discharge is to water, both sites are in the same catchment; and*
- ...
- (5) *An application under subsection (3)(b)-*
- (a) *must be in the prescribed form; and*
 - (b) *must be lodged jointly by the holder of the permit and the person to whom it is proposed to transfer the interest in the permit; and*
 - (c) *must be considered under sections 88 to 115, 120 and 121 as if –*
 - (i) *the application for a transfer were an application for a resource consent; and*
 - (ii) *the holder were an applicant for a resource consent.*

The new section 137 potentially offers Environment Southland an additional tool for managing effects on water quality as a result of point-source discharges of contaminants.

In any discussion of national initiatives it is important to note that the recent change in Government may lead to some re-prioritisation. Prior to the 2008 election the National Party's resource management policy included putting the National Policy Statement on hold and initiating a '*collaborative governance process*' to engage key stakeholders to develop an effective framework for addressing issues of water quality and allocation. For completeness, the existing national policy documents are discussed below because no matter what the final fate of these documents is, there has been a clear signal from both the past and present Governments that there will be more national direction in terms of how our water resources are managed.

Proposed National Policy Statement for Freshwater Management

The Proposed National Policy Statement for Freshwater Management (the NPS) was publicly released in July 2008. The purpose of the NPS is:

'...to state inter-related and integrated objectives and policies as to the management of Freshwater Resources as a matter of national significance that is relevant to achieving the purpose of the Act.'

In developing the NPS the Government has recognised the need for clear central government policy on freshwater management, in order to achieve the following goals:

- addressing existing and future constraints on the availability of water

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- addressing effects of existing and future discharges of contaminants on fresh water
- providing more certainty with respect to competing demands for water and facilitating opportunities to increase benefits from the use of water
- meeting the community's aspirations for water that is suitable for recreation
- addressing matters of national significance relating to water, and
- improving integrated management of water by territorial authorities, regional councils and other stakeholders.

The NPS has a number of specific objectives and policies that relate to the management of water quality. The objectives include ensuring the progressive enhancement of the overall quality of water, ensuring life-supporting capacity and ecological values are protected from inappropriate discharges of contaminants, and ensuring effective integrated management of the effects of land use development and discharges of contaminants on water quality.

Policies 1 and 4 are of particular relevance to Environment Southland and the current review of the Regional Policy Statement. Policy 1 requires that:

'By the second anniversary of the date of commencement of this National Policy Statement, every regional council must notify, in accordance with Schedule 1 of the Act, a proposed regional policy statement or variation to a proposed regional policy statement or change to its operative regional policy statement in order that as soon as practicable thereafter every regional policy statement specifies objectives, policies and methods which –

- (a) *Determine and timetable priorities for when regional plans will set Freshwater Quality Standards...for all Freshwater Resources of the region; and*
- (b) *Identify Notable Values (including potential values) of –*
 - (i) *Any Outstanding Freshwater Resources; and*
 - (ii) *Any Degraded Freshwater Resources; and*
- (c) *In accordance with Policy 1(a) and (b), guide and direct the setting in regional plans for all Freshwater Resources of the region of –*
 - (i) *Freshwater Quality Standards;*

...

including for the protection of Notable Values of any Outstanding Freshwater Resources and the enhancement or restoration of Notable Values of any Degraded Freshwater Resources; and

...

- (h) *Guide and direct regional and district plans (including considerations for the determination of resource consent applications and notices of requirement) to effectively manage Land-use Development and discharges of contaminants to control the adverse effects of the discharge of contaminants into fresh water or onto or into land in circumstances where contaminants may enter fresh water; and*

...

- (j) *Guide and direct regional and district plans (including considerations for the determination of resource consent applications and notices of requirement) to ensure integrated management of the effects of Land-use Development –*
 - (i) *by encouraging co-ordination and sequencing of infrastructure for supply, storage and distribution of fresh water; and*
 - (ii) *by controlling adverse effects (including associated discharges of contaminants) on the quality and available quantity of Freshwater Resources.*

Policy 4 requires that:

‘When preparing a regional policy statement or variation or change to give effect to Policy 1 ...every regional council must consider the following:

- (a) *The Notable Values of each Freshwater Resource*
- (b) *The sensitivity of each Freshwater Resource and its Notable Values to adverse effects including effects of Land-use Development and the discharge of contaminants*
- ...
- (d) *The contribution of existing and potential uses of Freshwater Resources and of existing economic investment to regional and national social, economic and cultural well-being*
- ...
- (h) *The value of swimmability to the community.’*

Policies 2 and 3 relate to regional plans. Policy 2 requires regional councils to notify proposed regional plans (or changes or variations to existing plans) to give effect to the regional policy statement. The notified regional plans are to set Freshwater Quality Standards, and include rules requiring:

‘...that all discharge permits affecting Freshwater Resources granted after the date of commencement of this National Policy Statement include conditions for –

- (A) *Protection against degradation of the quality of fresh water of Freshwater Resources (including through the management of activities giving rise to stormwater discharges); and*
- ...
- (C) *Integrated management of the effects of Land-use Development and discharges of contaminants on the quality...of Freshwater Resources; to be achieved, as a minimum, by the use of industry good practice*

Policy 3 includes identical clauses with regard to district plans.

The Proposed Regional Water Plan for Southland, particularly the variations that have been notified over the past few years are likely to be largely consistent with the requirements of the NPS with respect to Freshwater Quality Standards and the identification of values. The Water Plan notes that, in many areas of Southland, water quality is degraded, and identifies that the first priority is to ensure that water quality does

not degrade further. The goal is then to improve water quality so that water uses and values specified in Water Plan Objective 3 are supported. Objective 4 of the Water Plan sets specific targets for water quality improvements in degraded water bodies.

The effects of land use activities, such as intensive farming and earthworks associated with subdivision, on water quality however is becoming an increasingly significant issue in Southland, and a number of the stakeholders consulted as part of the development of this Issues and Options paper identified this as a matter of concern. The notification of the NPS gives additional impetus to the need to address these effects in an integrated way.

The requirements of the NPS will need to be considered and given effect to during the review of the existing Regional Policy Statement.

Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007

The NES for Sources of Human Drinking Water was gazetted on 17 December 2007, and came into effect on 1 July 2008. The NES was developed to attempt to reduce the risk of contamination of drinking water sources. To do this it takes a three part approach to protecting drinking water supplies.

First, the NES requires regional councils to consider the effects of granting a water permit or discharge permit on any downstream water supplies, in terms of the quality of the water provided by the supply to its community. A council is not allowed to grant a permit if the effect of granting the permit is that, after existing treatment, the downstream water supply can no longer meet the criteria contained in the Drinking Water Standards for New Zealand 2005.

Second, drinking water supplies are further protected by the requirements in the NES in relation to permitted activities. The NES states that no permitted rule be included in a regional plan that would result in a downstream water supply, after existing treatment, no longer meeting the criteria contained in the Drinking Water Standards for New Zealand 2005.

Finally, the NES requires both regional councils and territorial authorities to impose a notification requirement⁴ on resource consents for activities where an event occurs (such as a spillage of chemicals, or a heavy rainfall event) that may have a significant adverse effect on a drinking water source.

In general, the NES applies to those registered drinking water supplies that provide no fewer than 501 people with drinking water for not less than 60 days each calendar year. The regulation relating to notifying drinking water suppliers of events with the potential for significant adverse effects also applies to much smaller communities (those that

⁴ Meaning that the consent holder is required to notify, as soon as reasonably practicable, both the drinking water supplier and the consent authority of any event that may have significant adverse effects on the supply.

supply no fewer than 25 people with drinking water for not less than 60 days each calendar year).

Southland has 45 current resource consents for community water supplies issued by Environment Southland. Significant supplies (such as those for Invercargill and Bluff) are located towards the bottom of catchments, with other supplies (for example for Winton) located no higher than mid-catchment. There are consequently large areas of river catchments that will be affected by the requirements of the NES. There is therefore likely to be an increased focus, particularly on those activities involving discharges of contaminants, on the potential effects of activities on water supplies, with the complexity of multiple interactions and sources of contaminants on a catchment wide basis to be taken into account.

Proposed National Environmental Standard for On-site Wastewater Systems

Feedback from local government to the Ministry for the Environment over the past three years has identified the need for tools to help councils manage on-site wastewater systems and their effects. As a result, the Government is proposing to develop a National Environmental Standard to improve the management and environmental performance of domestic on-site wastewater systems, in order to reduce the risks to human health and the environment.

Investigations by the Ministry have identified that regular inspections and maintenance would make a significant difference to the problems being experienced from on-site wastewater systems around the country. The Ministry considers that the current regulatory regime is failing to recognise the significance of the problems. The problems that have been identified are as follows:

1. *A large number of on-site systems in New Zealand are not performing in a way that provides acceptable levels of treatment of domestic wastewater.*
2. *Failing on-site systems are causing adverse effects on the environment and creating risks to human health by:*
 - *direct contact with overflowing or ponding effluent*
 - *leading to contamination of groundwater and surface-water supplies, which affects the quality of drinking-water supplies and may increase the occurrence of algal blooms*
 - *contributing to lakes, rivers, estuaries and beaches becoming unfit for swimming, gathering seafood and marine farming.*
3. *The current regime is failing to recognise or address the significance of the problem, and regional councils and territorial local authorities lack the tools to proactively seek to minimise adverse environmental and health effects from failing on-site systems.*

4. *Inadequate management, including a lack of ongoing servicing and regular maintenance, is a primary cause of the high number of failing systems in New Zealand.'*

The objective of the proposed NES is *'To improve the management of on-site wastewater systems and to minimise the risk to people and the environment from the cumulative effects of malfunctioning or poorly maintained on-site systems.'* In order to achieve this, the Ministry is proposing to develop a standard that will require the owners of domestic on-site wastewater systems in areas identified by a regional council to hold a warrant of fitness for the system, that confirms that it is functioning properly and being maintained to an appropriate standard. By focussing on areas that have been identified by regional councils, the proposed standard would aim to address the cumulative effects of a number of poorly performing systems, and achieve the greatest possible benefits. Regional councils would identify areas where the standard was to apply by, for example, undertaking a broad-scale risk assessment, and/or consulting with stakeholders in potential areas to assess the scale of the issue. The identified areas would then be gazetted by the Minister for the Environment (in much the same way that 'airsheds' have been gazetted under the Air Quality NES) and system owners would then be required to obtain a warrant of fitness. The areas that are likely to be identified are those that are 'hotspots' (areas with existing problems such as a high number of failing septic tanks) or 'sensitive areas', where the presence of a number of on-site systems would create a risk to the environment.

A number of communities in Southland are not reticulated for sewage and rely on on-site wastewater systems. Fish and Game has identified an issue with respect to septic tank discharges in peri-urban areas, particularly those located on areas with a predominance of tile drains, leading to contamination of local surface water. Southland District Council is also observing issues of reverse sensitivity in the establishment of rural residential developments in close proximity to dairy farms sourcing groundwater for dairymshed use. The proposed NES would seek to address these types of problems.

3.2 Emerging Regional Issues

Existing Water Quality Issues

There are water quality issues apparent in Southland that have developed since the existing Regional Policy Statement became operative. In general, nutrient levels are increasing in surface water, particularly nitrogen and phosphorus which have the potential to encourage undesirable algal growth, particularly during periods of low flow. Bacterial contamination of surface water is generally not improving either. Poor water quality can be exacerbated by seasonal low flows, loss of riparian vegetation and the shade it provides, and changes in the physical form of a waterway, all of which can lead to increased water temperatures. Some waterbodies are acknowledged to be more sensitive to activities that decrease water quality (such as the Lower Waiau Arm of Lake Manapouri, and Waituna Lagoon and other coastal lakes) but all waterways within the region are potentially susceptible and have values that need to be taken into account in

the management of water quality. Potential causes of water quality issues are discussed in more detail below.

Groundwater quality is generally good, although there are localised hot-spots of poorer quality groundwater. Effects of previous cropping activities are appearing in some aquifers, and there is concern that further intensification of land use in these areas will lead to more issues with groundwater quality. As discussed below, there is concern that the current land use intensification occurring throughout the region will have long-term adverse effects on groundwater quality.

If the Proposed National Policy Statement on Freshwater Management becomes operative without substantial changes, the onus will be on Council to specifically identify degraded catchments and set out policies and methods for improving water quality.

Point source discharges to water

Point source discharges continue to cause water quality effects in Southland. A number of the stakeholders consulted during the drafting of this Water Quality Issues and Options paper identified discharges of sewage, stormwater and industrial wastewater as contributing factors in poor surface water quality. Industrial discharges into the lower Maitai and Makarewa Rivers continue to cause water quality problems, and water in rivers and streams in urban areas tends to be of lower quality because of the contamination of stormwater being discharged to surface water. Concerns have also been expressed about the discharge of contaminants to stormwater systems that are not stormwater, and the effects of this on surface water in urban areas.

Activities in the beds of rivers and lakes can lead to releases of sediment and decreases in water quality. The effects of climate change and the resultant increase in rainfall and therefore sediment in waterways is also of concern. Major effects as a result of river and lake bed works can be reduced by appropriate timing of the activities (i.e. avoiding fish spawning times) and by design of river works ensuring that maintenance is not necessary on a frequent basis.

A number of stakeholders have identified that the potential development of Southland's lignite and coal resources could have major implications for water quality, that need to be dealt with proactively rather than reactively.

While tangata whenua prefer, wherever possible, discharges of contaminants to be to land, there is a recognition that this may not always be possible or practical. In cases where surface water discharges are necessary however, there is a clear expectation from tangata whenua that there will be a regular review of treatment technologies and an upgrading of treatment systems so that the best quality discharge can be obtained.

Effects of land use on water quality (non-point source discharges)

Land use activities are seen as having the most significant effects on water quality in Southland. One of the most frequently discussed concerns was the intensification of land use that has occurred over the last few years.

The principal change has been the replacement of sheep farming with dairy farming, particularly in northern and south-eastern Southland, areas that have not traditionally been used for dairy farming. In terms of effects on water quality, more intensive land use results in:

- greater non-point source discharges of nutrients such as nitrogen and phosphorus from dung, urine patches, farm dairy effluent discharges and fertiliser application
- higher sediment loads in waterways from physical disturbance of river and stream banks and beds by animals and cultivation, and
- faecal contamination of waterways through stock access, either for water supply or at crossing points

Drainage of land to make it more productive (such as the large scale drainage and straightening of land in the Waimatuku catchment from the 1920s, and the management of Waituna Lagoon water levels) and extraction of gravel for farm development from either river beds or land in close proximity to surface water can also cause adverse effects on water quality.

Intensification of land use can lead to effects on both groundwater and surface water. In relation to groundwater, Environment Southland monitoring of nitrate and chloride levels in groundwater throughout the region is demonstrating a number of areas where existing land use is impacting on groundwater quality. In some 'hotspots' groundwater from bores regularly exceeds drinking water standards for nitrate. The effects of land use intensification on groundwater is also demonstrated by long-term trend analysis of chloride levels in groundwater, which shows 58% of baseline monitoring sites have statistically significant increasing chloride levels.

Both dairying and arable farming have the potential to result in significant nitrate leaching from the land into groundwater, which is a concern with the trend of increasing dairy conversions and growing of crops for winter dairy grazing throughout the region. The potential time-lag between effects of land use and effects on groundwater quality that has been observed in Southland means that the effects of recent land use intensification may be yet to be observed in groundwater that is already showing effects as a result of past land use practices. It is important to note however that environmental conditions (such as soil permeability, groundwater recharge source and depth to groundwater) and farm management practices have the potential to reduce effects of land use intensification.

Poor quality groundwater can also impact on surface water, particularly through the presence of networks of drains. The installation and use of sub-surface drainage, such as tile and mole drains is common practice in those areas of the region where heavy soil conditions mean that land is slow to drain. However, if dairy effluent (in particular) is irrigated onto tile and mole-drained land when the soil water holding capacity is at saturation or in wet weather conditions, nutrients can leach through the soil and be caught in the drainage system and conveyed to the nearest surface water body. Appropriate farm management practices, such as deferring effluent irrigation until soil conditions are

suitable and keeping stock off wet or waterlogged areas can assist in addressing effects on groundwater, but with increasing dairying in the region, effects due to mole and tile-drained land will need to be managed on an ongoing basis.

In areas where production dairy farming is not occurring, an increasing trend in recent years has been the use of land for winter grazing for dairy stock. This is particularly noticeable in northern Southland, and has implications for water quality. Many of the areas being used for winter grazing are in headwaters or upper reaches of significant catchments, and water quality effects can therefore be cumulative, with the water in a river or stream being affected in the upper reaches by winter grazing activities, and in the lower reaches by production farming. Winter grazing tends to give rise to two significant effects on water quality – effects as a result of grazing of stock in close proximity to (or in) the beds of waterbodies, and effects from the growing of winter fodder crops.

Grazing stock in close proximity to or in, the beds of watercourses can lead to adverse effects as a result of intensive grazing resulting in bare and often pugged soil, and the types of contamination described above due to the concentration of effluent on land areas close to watercourses. The Council has recently introduced an intensive winter grazing rule into the Regional Water Plan for Southland to address this, requiring that stock be excluded a distance of at least 3 metres from a lake, river, modified watercourse, stream or artificial watercourse, unless a resource consent is gained.

Growing of fodder crops for winter grazing also has the potential to have adverse effects on water quality. The more intensive nature of crop growing when compared with traditional extensive sheep farming results in greater inputs of fertiliser, and the potential for greater leaching of contaminants to groundwater. Contaminated groundwater can then discharge to surface water and result in decreases in water quality. As effects of historical cropping are being identified in groundwater within Southland at present, there is concern that increased production of winter fodder crops will increase the problem.

Stock access has also been the subject of concern to a number of stakeholders in Southland, with Fish and Game New Zealand strongly advocating that stock access should require resource consent as a controlled activity, rather than being permitted. The effects on water quality as a result of stock access depend on a number of different factors, including the type of stock, the size of the waterbody, the availability of shade and forage alongside the waterbody, whether direct access is possible, and the soil type. The most significant water quality effect as a result of stock access is faecal contamination. Studies have shown that contact with water increases the defecation rate of cattle, and deer tend to exhibit wallowing behaviour that increases both the faecal and sediment contaminant loads. Faecal contamination has implications for both public health (drinking water quality and contact recreation activities) and stock drinking water quality. Effects are not restricted solely to dairy farming activities, with intensive deer farming, winter grazing and hill and high country sheep and cattle farming also causing effects.

Increasing sediment concentration in the water can result from the disturbance of stream and river banks, and from runoff from cultivated or intensive winter grazing paddocks. Nutrient increases can also occur as a result of the deposition of urine and dung in the water as stock move through or access water, although this type of effect is generally of a lesser scale than the faecal and sediment contamination. While the Council has rules in the Regional Water Plan for Southland to address the effects of stock access, some stakeholders would prefer to see a consent required for stock access to waterways in areas of intensive agricultural activity.

Council staff as well as stakeholders have noted that water quality effects from intensive land use activities can be very dependent on the soil type in particular areas. It has been suggested by a number of organisations that the link between land use classes or capability and the level of effects on water quality should be more specifically recognised, and taken into account in the management of water quality in Southland. This is further discussed in section 4 of this paper.

It is not only the direct use of land for intensive farming that can result in effects on water quality. Stakeholders consulted as part of the preparation of this Water Quality issues and options paper noted that the abstraction of water from rivers and streams can also have an effect on water quality, by reducing the volume of water in the waterbody and thus affecting the assimilative capacity of the receiving water for discharges. However, it is important to note that stakeholders were not advocating for increased volumes of water in waterbodies in order to provide sufficient dilution for contaminants.

A final point to note in relation to intensive land use is a concern that has been expressed that Council decisions are starting to drift away from the established policy framework. In an effort to address the water quality issues that are arising from intensive land use, consent conditions are being imposed relating to storage of effluent during wet conditions, and preparation of farm environmental plans to address effects. There is some concern being expressed about the enforceability of these types of conditions on consents that are addressing the discharge of contaminants (not the land use practices that give rise to the need for a discharge permit), and the need for a policy framework that provides a justification for these types of conditions.

Environment Southland has acknowledged the significance of the issue of non-point source discharges and their potential effects on water quality, and in June 2005 adopted the following goal:

Southland will have beaten the non-point source pollution problem by 2015

Key actions undertaken and/or currently underway to assist in achieving this goal include:

- a review of all Environment Southland work programmes in reference to the goal
- a rationalisation of investigation and monitoring programmes focusing on surface water use and quality, and a refinement of existing State of the Environment monitoring programmes for both fresh water and coastal resources

- the Living Streams projects
- the development and advancement of Variation 5 (Stock Access) to the Water Plan
- all dairy farm water quality monitoring is now undertaken by Environment Southland
- a review of the regional plans covering discharges to land (the Discharge Plan project)
- tightening of the targets contained in the Regional Action Plan to implement the Dairying and Clean Streams Accord in Southland and extension of these targets to wintering blocks
- a council-wide Environmental Education Strategy with a focus on developing tangible and trackable education indicators
- investigations into an integrated catchment management framework specific to Southland's environment
- investigations into stormwater quality and management.

These actions are incorporated within Environment Southland's Long Term Council Community Plan and Annual Plan. Some of these actions will help to identify 'hot spots' where greatest effort to improve water quality needs to be focused.

Activities other than intensification of land use have also been identified as giving rise to water quality issues. Of particular concern are land use activities such as earthworks associated with new subdivisions (particularly associated with rural residential and peri-urban developments), and ditch and drain clearance beside roads, both of which can lead to increased levels of sediment in local waterways. A number of stakeholders have identified the need for better integration of the management of land use activities between Environment Southland and the region's territorial authorities to try to better manage the effects of these types of land use on water quality.

Cumulative effects

The majority of stakeholders consulted in the preparation of this Water Quality Issues and Options paper identified cumulative effects on water quality as one of the most significant issues facing water quality management in Southland. Specific examples included the cumulative effects of stock excreta (both urine and faeces) in combination with irrigation of dairyshed effluent, and the potential effects of this on groundwater and (via tile drains) on surface water.

There is a general feeling that the existing Regional Policy Statement does not adequately address cumulative effects, and in particular the influence of land use activities on water quality. It is felt that there is a lack of integration between Environment Southland and the region's territorial authorities in relation to addressing cumulative effects, and that any review of the Regional Policy Statement should attempt to address this. It is interesting to note also that most of the stakeholders who identified cumulative effects as an issue also noted how difficult and complex the issue would be to address. There was a general request however that the Regional Policy Statement be more specific and directive about how cumulative effects are to be addressed.

Information needs

Information about water quality in the region has generally been better than that available for water quantity, due to the longer history of monitoring activities. However, lack of information on water quality in lakes, and particularly the mixing of discharges in lake environments, has been a cause for concern for both Council staff and stakeholders.

There will also be a need to clearly identify those catchments that have degraded water quality, in order to give effect to the Proposed National Policy Statement.

Administrative issues

While not specific water quality issues, a number of administrative issues were also identified that relate to how water quality issues are currently managed and addressed.

Many of the issues raised in relation to water quality and the relationships necessary to address them are cross-jurisdictional. It has been suggested that the Regional Policy Statement needs to recognise this and provide for a clearer understanding of the relative roles and responsibilities of the various agencies and organisations involved in water quality management.

The need to set goals and timelines for meeting them in relation to water quality has been identified. Stakeholders suggested that, while improvements have been made in the management of water quality, existing consents need to be reviewed so that they are consistent with new approaches that are being adopted. The new developments and initiatives as a result of scientific work and research into issues need to be better linked to implementation in the environment. Shorter term consents and an increased focus on monitoring and enforcement were also suggested.

The need to recognise the difference between catchments and the significance of specific waterways, particularly those of national and international significance was also raised as an issue. A possible approach to this is discussed further in section 4 of this paper.

It should be acknowledged that the Regional Policy Statement was prepared before the Regional Water Plan, and that the various amendments to the Regional Water Plan have meant that the management of water quality has moved on since the Regional Policy Statement was first notified. It is therefore important that this is taken into account in reviewing the Regional Policy Statement and that any revisions support the advances that have been made through the Regional Water Plan.

Overall, the conclusion from the review of existing literature and policy responses, and consultation with stakeholders, is that good work in relation to water quality is being done by Environment Southland, but that it is currently being outweighed or counterweighted by the effects of intensification of land use within the region. Stakeholders have identified the need to have a Regional Policy Statement that sets timelines and performance targets for the achievement of objectives for water quality, but also one that is sufficiently flexible to allow changes in methods of implementation to achieve those objectives without the necessity for formal variations.

3.3 Local Issues

The Southland District covers approximately 11% of the land area of New Zealand, an area of 30,753km². Of the four major catchment systems in the region, the Southland District encompasses the whole of the Waiau and Aparima catchments, and the majority of the Maitai and Oreti catchments (parts of which fall within Gore District and Invercargill City boundaries). The existing District Plan has clearly identified water quality as an issue throughout the district.

The 2006 Ministry for the Environment report *State and Trends in the National River Water Quality Network (1989 – 2005)* found that the Maitai and Oreti Rivers were two of the most nitrogen enriched rivers in New Zealand, with a trend of increasing nitrogen levels in these rivers. The report noted that this trend was probably as a result of land use intensification. This example highlights a specific water quality issue in the District, and it is important to note that there is a growing public awareness of and concern about water quality in the District and the wider Southland Region.

The Southland District Council has community drinking water systems servicing the communities of Te Anau, Winton, Riverton, Manapouri, Tautapere, Ohai-Nightcaps, Otatahu, Edendale, Mossburn, Lumsden-Balfour, Eastern Bush and Orawia. As noted in the companion Issues and Options – Water Quantity/Allocation paper, the construction of reticulated water supplies is also required in the near future for the townships of Browns, Drummond, Riversdale, Tokanui, Waikaia and Wyndham. Under the Health (Drinking Water Amendment) Act 2007 all the District Council's community drinking water supplies will have to comply with the New Zealand Drinking-water Standards 2005 by 2012 at the latest. Larger towns such as Te Anau and Winton will have to comply by 2010. This may mean that the Southland District Council has to find new water sources due to potential treatment costs.

The District has extensive coal, lignite and oil shale reserves that could potentially be extracted in the near future. The potential impact of these industries on water quality and quantity should be recognised. Section 1.6 ('Minerals') of the District Plan details the extent of some of these reserves. This section notes that there are no commercial lignite mines operating in the District, however this situation could possibly change within the operative time span of the second-generation District Plan, possibly through the development of a lignite mine or through oil production in parts of the District. Also, it is considered to be highly likely that there will be other new commercial and industrial activities that will arise during the lifespan of the second-generation District Plan that could also impact on water quality.

There has been an increase in the number of rural/residential 'lifestyle' block developments in certain areas of the District, such as Makarewa and the periphery of Winton. These properties are not connected to reticulated sewerage systems and use on-site wastewater systems. As well as these newer systems there are a large number of older existing systems located throughout the District and some of these may have poor levels

of performance in terms of treating domestic wastewater. Potentially, on-site wastewater systems can give rise to adverse effects on water quality in the District, although at present this issue and potential adverse effects are poorly quantified.

4. OPTIONS FOR ADDRESSING ISSUES

This section identifies potential options for addressing issues identified in section 3 of this paper.

Guidance and advice

Through its Catchment, Environmental Information and Environmental Education sections, Environment Southland provides guidance and advice to resource users within the region on a wide variety of issues, many relating to water quality. The Catchment section provides services such as the preparation of riparian plans and environmental farm plans, runs field days and assists demonstration farms, all with the aim of improving water quality through non-regulatory guidance and advice. Riparian plans are developed to recommend planting for a variety of reasons including stock shelter, shading of waterways to benefit stream health, protection of stream banks from erosion, and protection of soil from wind erosion. Environmental farm plans include advice on best management practices for a variety of activities that have effects on water quality, and include nutrient budgeting, which has implications both for farm productivity and for environmental effects. In May 2007 Environment Southland published *Farm Dairy Effluent Best Practice Guidelines*. In combination with appropriate regulation, these types of guidance and advice are likely to be an effective way of obtaining improvements in water quality in relation to agricultural activities.

There are some additional areas where targeted guidance and advice may be appropriate to assist in achieving water quality improvements:

- the Department of Conservation has suggested that more information on suitable land uses for various soil types would be useful. This could cover more than agriculture, and could relate to arable cropping and forestry for example
- the effects of subsurface drainage systems on water quality has been discussed earlier. More specific guidance on best practice for land management in tile drained areas could assist in improving water quality
- a number of regional councils operate guidance and advice programmes in conjunction with local industry, both in municipal areas and at stand-alone sites. Developing this type of guidance in Southland could be co-ordinated with an appropriate regulatory approach to address water quality issues, particularly in urban areas of the region
- there is also merit in considering working more closely with the region's territorial authorities in a guidance capacity in relation to stormwater and wastewater discharges, and opportunities to improve the quality of both.

Regulation and conditions on resource consents

The existing regulatory regime is based on water quality standards for receiving water bodies, with a variety of permitted activities for discharges considered to have a lesser

potential for adverse effects. The water quality standards have been the subject of a relatively recent variation to the Regional Water Plan, based on a scientific review of effects of contaminant levels in receiving water, and set relatively high standards for consent discharges in the region.

Permitted activity rules for discharges typically cover minor discharges of contaminants, such as agrichemicals and stormwater (but not from reticulated systems). Discharges from stock access and subsurface drainage have both been identified during consultation in relation to this paper as areas of concern. Potentially the regulatory regime could be adjusted to address these concerns. In relation to stock access, Environment Southland's decision to permit discharges is the subject of an appeal by Fish and Game New Zealand. With respect to subsurface drainage discharges, a stricter regulatory regime could be considered (for example requiring discharge permits as a controlled activity, but imposing conditions relating to best management practices to improve the quality of the discharge).

In light of emerging water quality issues, new objectives, policies and rules in the Southland District Plan relating to safeguarding water quality may be appropriate. One option could be a stronger regulatory approach, which could include a requirement for resource consent for certain land use changes, although this would need to be targeted to ensure that it was not 'rules for rules sake' but had appropriate scientific backing to quantify that positive effects on water quality would be achieved. A number of land use activities can currently be undertaken without resource consent. The resource consent process could be one way of controlling activities such as vegetation clearance, the working of soil on steep slopes, grazing of riparian margins, planting and maintenance of riparian margins and harvesting of tree crops. In assessing the effects of land use on water quality, Southland District Council could also evaluate effects of land use practices such as application of fertiliser in riparian margins, draining of wetlands, and effluent management, to reduce adverse effects on water quality. In addition, as discussed in the following paragraphs, there is a wider range of land use activities that can affect water quality that could be added to this list.

For those activities where discharge permits are required, Environment Southland could consider the imposition of further conditions to improve water quality, relating for example to enshrining best management practices as requirements for discharges. An example of this is in Taranaki where financial contribution conditions are imposed to require donations towards riparian planting of waterways in the region.

As well as potential amendments to the existing regulatory framework, it is important to note that the 2005 amendments to the Resource Management Act 1991 replaced section 137 in its entirety. The new section 137 allows for transferable discharge permits (similar to transferable water permits under section 136). Transfers of discharge permits can be allowed by a regional plan or the council provided that, among other things, the actual or potential effects of the discharge on the environment are not worsened and that a national environmental standard is not contravened. The new section 137 potentially offers Environment Southland a tool to manage water quality in selected catchments where

differing environmental conditions between different discharge sites may result in a reduction in effects on water quality if a discharge is transferred.

Industry driven initiatives

Industry driven initiatives offer an opportunity for Environment Southland to work in conjunction with industry to achieve water quality enhancement in the region. The most prominent industry driven initiative operating in the region at present is the Clean Streams Accord, an agreement entered into between Fonterra, regional councils, the Ministry for the Environment and the Ministry of Agriculture and Forestry. Other industry driven initiatives include the *Code of Practice for the Management of Agricultural Chemicals* (developed by the New Zealand Agrichemical Education Trust in 1999) and the *New Zealand Code of Practice for Plantation Forestry* (developed by the Forestry Owners Association in 2007).

While industry driven initiative offer opportunities for non-regulatory methods of improving water quality, stakeholders have expressed some concern about the effectiveness of industry driven initiatives in isolation and are more comfortable with the concept of a combination of voluntary initiatives and regulation. Concern has been expressed about the level of uptake and compliance with non-statutory codes of practice.

Environment Southland could also consider the potential of engaging with local regional industry to develop industry initiatives that relate only to Southland. For example, Environment Southland could work with Fonterra at Edendale or Alliance at Matura to influence the environmental practices adopted by their suppliers throughout the region.

Catchment management planning

Several of the stakeholders consulted as part of the development of this Water Quality Issues and Options paper suggested that catchment management planning would be an appropriate way to address many of the issues that are arising in Southland. This is an approach that is gaining increasing traction in the North Island as well, with a number of regional councils reviewing Regional Policy Statements and contemplating adopting a hybrid model where area specific as well as region-wide issues are identified and addressed.

Catchment management planning has potential advantages over the current region-wide consideration of issues, in that it can allow an integrated approach to interconnected issues of both land and water planning within a relatively restricted geographical area. Consideration of interconnected issues is not as easy on a region-wide basis because of the sheer physical size of the region and the difference in variables contributing to issues in different areas of the region. In comparison the generally reduced size of catchments (and sub-catchments for that matter) provides greater opportunities to understand the linkages between variables, such as for example land use and effects on water quality, and therefore plan management approaches to address issues. Ideas such as: establishment of nutrient limits on a catchment basis that would operate in a similar way to minimum flows for water quality; identification of land capability and sustainable

stocking rates; and then implementation of a rule regime to give effect to this have been suggested.

It has also been recognised however by stakeholders that constraints on Council resources mean that it is unlikely that catchment management planning can be implemented over a short time period throughout the region, and instead a priority catchment approach has been suggested, in order to address the most vulnerable catchments first.

Land zoning

As territorial authorities are now required by section 75 of the Resource Management Act to *give effect to* regional policy statements, Environment Southland could include provisions in the Regional Policy Statement that were more directive in terms of the management of use of land within the region.

At present, most zones contained in district plans are based on controlling effects rather than activities. This has led to the problem, acknowledged by Southland District Council earlier in this paper, of land use intensification in areas where it may not be suitable, and in a variety of other land use practices that may be having unanticipated adverse effects on water quality. Territorial authorities could therefore implement more stringent land zoning provisions in district plans, and specify areas where particular land uses are not considered to be appropriate because of their likely effects on water quality.

Environment Southland has the function of the control of the use of land for the purpose of maintaining and enhancing water quality, under section 30(1)(c)(ii) of the Resource Management Act. An alternative approach to the territorial authorities including more stringent zoning provisions in district plans would be for Environment Southland to establish regional rules under section 9 of the Resource Management Act to control particular activities that are recognised as having adverse effects on water quality.

Economic incentives

Southland District Council has noted earlier in this paper that economic incentives may still be an appropriate non-regulatory method of improving water quality, although they would need renewed emphasis in order to be effective. Examples of direct economic incentives from other regional councils in New Zealand include the provision of native plants at cost for riparian planting and subsidies and grants for fencing waterways or protecting wetlands.

Economic measures may still be an appropriate non-regulatory tool that can be used by Southland District Council to prevent degradation of the District's water quality. A renewed emphasis and focus on such economic measures would be required to ensure this. However, while the use of economic measures may still be a useful approach to managing the effects of land use change on water schemes it may no longer be the most effective approach, especially given the changes to patterns of land use in the District. The outright purchase of properties, for example, may no longer be an option. When policymakers formulated the current District Plan in the early 1990s, land acquisition was viewed as a potential method that could be used to maintain water quality in the District.

At the time this policy was formulated, the extent and level of land use change now occurring in the District was not contemplated. In terms of affordability, the widespread acquisition of extensive areas of high value farmland (for example in the Waituna area) is not a realistic option. Southland District Council therefore needs to look to alternative options to maintain and enhance water quality. Other measures, such as rates relief and the funding of fencing, may still be appropriate, but these measures alone may not be enough to mitigate adverse effects.

There is an opportunity for a co-ordinated approach to economic incentives between Environment Southland and the Southland District Council, in the context of the integrated review of the Regional Policy Statement and the District Plan.

5. QUESTIONS FOR FURTHER DISCUSSION

Question 1 – the existing Regional Policy Statement and District Plan

What are your thoughts on the relevance of the issues identified in the existing RPS and District Plan? Are there some issues that are more relevant now than others? Should the existing policy framework be revisited or is what we have appropriate to manage the issues that we have?

Question 2 – emerging issues

Have we got a complete list of the major pressures on water quality in Southland and have we identified all the potentially significant emerging issues? Are there other issues that are also relevant and need to be considered for Southland? How should the RPS deal with these issues – should it deliberately set out a management framework, or leave that to the Water Plan? Should District Plans also provide more guidance and direction on maintaining water quality in Southland? How should Southland address the matters raised in national planning instruments such as the Proposed National Policy Statement for Freshwater Management and National Environmental Standards?

Question 3 – priorities

What are the priority areas for action? Are point source discharges or non-point source discharges of greater concern? What types of point source discharges do you think are still causing water quality issues in the region? Are land uses causing water quality problems, and if so, which land uses are the most significant? Are industry driven initiatives a good way to address adverse effects on water quality? Are there other specific areas where more guidance and information would be helpful to the Southland community?

Question 4 – Environment Southland and territorial authorities

How might Southland councils work together to address the interconnected issues of land use and water quality? Should the region's district and city councils develop land use controls to manage the effects of land use change on water quality? Or should Environment Southland develop rules under its function to manage the use of land to control effects on water quality? Does the issue need a rule framework, or can it be

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effectively managed by other means (such as economic instruments or guidance and information)?

Question 5 – catchment management planning

How do you think the concept of catchment management planning might work? Would it be more effective than Environment Southland's current region wide approach to water management?

APPENDIX 1: ANALYSIS OF EXISTING REGIONAL POLICY STATEMENT ISSUES

Issue 1

The community requires water of an appropriate quality to sustain:

- *its life-supporting capacity*
- *the quality of life presently gained from using water*
- *the natural aquatic ecosystems*
- *a range of residential, commercial, industrial, recreational and cultural activities*
- *intrinsic values*
- *cultural and heritage values*
- *food gathering*
- *social, economic and cultural well-being*
- *trout and salmon habitats.*

[Refer to Objectives 1.2, 5.1-5.4, 6.1, 6.4; Policies 5.1-5.8; Methods 5.1-5.16]

This issue remains relevant, particularly as the community's expectations in terms of water quality are rising. It encompasses both instream values sustained by good water quality (such as life-supporting capacity, natural aquatic ecosystems, intrinsic values, and cultural and heritage values) and extractive uses that rely on good quality water (for residential, commercial and industrial activities). Discussions with Southland District Council have highlighted instances where Southland communities are having difficulty accessing sufficient supplies of good quality water for community water supplies. If this situation is widespread in Southland, it would have significant implications for the region's territorial authorities and their responsibilities under the Local Government Act 2002 to provide for the economic, social, cultural and environmental wellbeing of their communities.

Public Health South has also identified concerns in relation to the need of the Southland community for good quality water, related both to potable water supplies and contact recreation.

Both the Department of Conservation and Fish and Game New Zealand have identified the effects of poor water quality on the health and functioning of waterways as a significant issue, citing the Waituna Lagoon as a specific example.

Te Ao Marama has suggested that taonga species habitat should be added to the list of values that need to be maintained by appropriate quality water.

Objective 1.2: To recognise the importance of wahi tapu, wahi taoka, mahika kai and the customary use of water to Kai Tahu

This objective appropriately relates to Issue 1. By recognising the importance of various cultural values there is an acknowledgement that an appropriate quality of water is needed in order to sustain these values.

Objective 5.1: To sustain the quality of the Region's water resources so as to:

- a meet the needs of a range of uses, including the reasonably foreseeable needs of future generations*
- b safeguard the life-supporting capacity of water and related ecosystems.*

The objective relates to Issue 1, but is less specific than the issue. Issue 1 specifies a range of uses and values for which appropriate quality water is necessary, but Objective 5.1 is phrased in much more general terms.

Objective 5.2: To ensure that in the use and development of water and land resources, and the discharge of contaminants, water quality is maintained and wherever practicable enhanced.

The objective partially relates to Issue 1. At present, Objective 5.2 does not recognise that there are some areas of the region's waterways, particular in the lower reaches, that are not suitable for some of the uses included in Issue 1. Te Ao Marama also considers that the objective should be strengthened by inclusion of restoration of water quality.

Objective 5.3: To ensure the taking, use, damming, diversion of water and the discharge of contaminants into water does not compromise water quality standards established for the region.

Provided that water quality standards are set that appropriately recognise the uses and values of particular waterways, Objective 5.3 is appropriate to give effect to Issue 1. It is important to note however that establishing whether or not the taking, damming or diversion of water would compromise established water quality standards will be much more difficult than assessing the effects of discharges, and would require a greater level of knowledge concerning the interaction between the flows and levels of a waterbody than Environment Southland currently appears to have.

Objective 5.4: To recognise the relationship of Maori with water

Objective 5.4 essentially repeats Objective 1.2, but in a much less specific way. It is doubtful that it is specific enough to appropriately give effect to Issue 1. As part of consultation on this paper Te Ao Marama identified the spiritual relationship of Maori with water, through whakapapa (genealogy), with mākū (moisture) being considered the first form of life and awaawa (rivers) being the uaua (veins) of Papatuānuku (Earth mother). Mākū is in the whakapapa of all Māori. Retaining the names of waterways/bodies is extremely important for cultural wellbeing, and there are many historical incidents associated with the various waterways/bodies.

Te Ao Marama has noted that Papatuānuku is also in the whakapapa of all Māori. If water quality is poor then Papatuānuku is adversely affected and so are the people.

For Te Ao Marama rivers are also part of ancient trails and bring to mind the ancient words of wisdom, *takahia ngā tapuwae o ngā tūpuna kia kore koe e ngaro* (walk in the sacred footsteps of the ancestors and you will never be lost).

Objective 6.1: To protect the natural character, heritage values and outstanding natural features of lakes, rivers and wetlands in the Region.

This objective does not appear to be relevant to Issue 1. There is no specific reference to water quality, and while protecting natural character, heritage values and outstanding natural features may intrinsically include protection of water quality, the link is currently too vague to be useful. Natural character and outstanding natural features are also not definitely dependent on good water quality, tending to be more connected with the visual appreciation of a particular viewpoint of a waterway. Only the grossest level of contamination would significantly affect natural character and outstanding natural features. An activity could therefore be consistent with the requirements of Objective 6.1 and yet not sustain an appropriate water quality for the range of uses and values contained in Issue 1.

Objective 6.4: To avoid wherever practicable, remedy or mitigate, the adverse effects of activities in, on, under, adjacent to, or over the beds of lakes, rivers and wetlands.

Objective 6.4 is very general. Of interest is that the explanation of Objective 6.4 is much more specific in relation to water quality:

'Water quality and quantity in these water bodies is important to the well-being of water ecosystems and the social, economic and cultural values of the people of Southland. Rivers and lakes are also an important source of water for both stock and people. A number of Southland towns source their potable water from rivers and as a result, for health reasons, there is a need to ensure that adequate supply of a suitable quantity is available for essential use.'

Objective 6.4 is therefore considered to be partially relevant to Issue 1.

Policy 5.1: Review classifications for water bodies, including ground water.

The explanation to Policy 5.1 discusses the reassessment of the existing water quality standards for both surface water and groundwater resources. It also makes reference to any new water classification system being orientated to the uses and values relevant to a particular waterway. Taken together, Policy 5.1 and its explanation are relevant as a means of giving effect to Issue 1.

Policy 5.2: Require all point source discharges, after reasonable mixing, to comply with water quality standards.

Taken together with Policy 5.1 (which outlines the proposed review of the existing water quality standards and an orientation of new standards to relevant uses and values), Policy 5.2 remains relevant to Issue 1 as the water quality standards will be set to sustain particular uses and values. Requiring point source discharges to comply with those standards will therefore ensure that Issue 1 is addressed.

Policy 5.3: Prepare Regional Plan(s) for the management of water quality considering both point and non-point source discharges.

Managing water quality by considering the appropriate resource management framework for both point and non-point source discharges will address Issue 1 and assist in sustaining water quality. Policy 5.3 should be updated to reflect the existence of the Regional Water Plan for Southland.

Policy 5.4: Utilise land treatment of liquid wastes where this can be undertaken in a sustainable manner and without significant adverse environmental effects.

Policy 5.4 needs to be more closely tied to sustaining water quality in order to fully relate to Issue 1. The explanation to the policy notes only that many ‘water treatment methods’ (which it is assumed means the use of surface water as a receiving environment for waste discharges) rely heavily on dilution, which may be highly variable. It is not currently clear that land treatment would be preferred because it can reduce effects on water quality and therefore sustain water quality for the range of uses and values noted in Issue 1.

Policy 5.5: In preparing, implementing and administering Regional and District Plans and in considering resource consents, local authorities shall assess the effects of land use and development on ground water and surface water quality, including both point and non-point source discharges, and provide for any adverse effects to be avoided, remedied or mitigated.

This policy appropriately reflects Issue 1. By assessing the effects of discharges on water quality and ensuring that they are avoided, remedied or mitigated, water quality can be sustained. Te Ao Marama considers that mitigation is difficult and often doesn’t appropriately address water quality issues, and that effects should therefore be avoided or remedied.

Policy 5.6: Undertake investigations into water quality in the Region.

Policy 5.6 is not of specific relevance to Issue 1. Investigations in isolation will not sustain water quality.

Policy 5.7: Encourage and, where practicable, require marine and freshwater vessels to dispose of sewage into a shore-based sewage treatment/disposal system.

Policy 5.7 is relevant to Issue 1 as disposal of sewage from vessels to shore-based treatment and disposal systems will avoid the direct discharge of untreated sewage to water (which has significant adverse cultural and community effects) and thus sustain water quality by avoiding adverse effects.

Policy 5.8: Manage the Region’s water resources in ways that recognise and provide for the values that Maori place on water.

Policy 5.8 relates to Issue 1, but is less specific than the issue, and therefore is only partially relevant. Te Ao Marama has noted that Policy 5.8 could include references to values such as wai tapu, wai tohi, wai maori, mauri, mahinga kai and taonga species.

Method 5.1: Information, education and public awareness

Method 5.1 is an appropriate way to address Issue 1 and should continue. Providing information and publicising water quality standards to raise public awareness and understanding, and encouraging landowners, interest groups and other individuals and organisations to undertake certain actions will seek to change behaviours and thus improve water quality. Improving water quality will assist in sustaining an appropriate water quality for the variety of uses and values outlined in Issue 1.

Method 5.2: Promotion

Method 5.2 is appropriate and should continue. The explanation notes as an example the encouragement and promotion of land treatment systems ahead of those to water, but without making a clear link about the value of this in terms of sustaining water quality.

Method 5.3: Advocating (adoption of particular policies under other plans & strategies)

Method 5.3 is not specific enough in terms of how advocacy would sustain water quality to be considered effective in terms of addressing Issue 1.

Method 5.4: Consultation (with water users, takata whenua, interest groups etc)

It is not clear how Method 5.4 would address Issue 1. Consultation by itself will not have any effect on water quality.

Method 5.5: Developing guidelines for resource users

Method 5.5 is appropriate to address Issue 1 and should continue. The development of guidelines, particularly for land use activities, is an appropriate way to motivate resource users to change, and to achieve water quality improvements on a voluntary basis. The preparation and adoption of dairying guidelines recently is a good example of this type of work.

Method 5.6: Protocols and accords (industry codes of practice)

Codes of practice, such as for example the Dairying and Clean Streams Accord, can be useful means of achieving gains in water quality. Method 5.6 would therefore assist in addressing Issue 1. Protocols and accords will however need to be targeted towards activities that affect water quality in order for them to have any meaningful effect.

Method 5.7: Monitoring

Monitoring in isolation will have no effect on water quality and is therefore not of specific relevance to addressing Issue 1. It is however important within the context of assessing the effectiveness of other measures adopted to sustain water quality (for example the effectiveness of the regulatory framework contained within a regional plan) and should therefore be continued.

Method 5.8: Investigations and research

As with Method 5.7, investigations and research in isolation will have no effect on water quality, and are therefore not of specific relevance to addressing Issue 1. It is the policies and other methods that may be developed as a result of investigations and research that would sustain water quality.

Method 5.9: Strategies

Method 5.9 is appropriate to address Issue 1 and should be continued. Development of specific strategies, where necessary, to address effects on water quality will assist in sustaining water quality for the range of uses and values outlined in Issue 1.

Method 5.10: Prepare, Implement and Administer a Regional Plan(s) for the management of water quality which considers-

- a water quality classes, in a manner which is consistent with national guidelines or standards, particularly in respect of health issues*
- b minimum water levels and flow regimes required to protect instream values and the aquatic environment*
- c criteria, in addition to the matters set out in Part II of the Act, to assess competing applications to use the assimilative capacity of water*
- d means to manage the effects of point and non-point discharges, and land use, on water quality*
- e links between water quality, water quantity and ecosystems*
- f circumstances where riparian strips may be appropriate as a means of protecting water quality.*

Method 5.10 is consistent with Policy 5.3, and both are appropriate to address Issue 1. The method should be updated to recognise the preparation of the Regional Water Plan for Southland.

Method 5.11: Prepare, implement and administer Regional and District Plans

Method 5.11 is relevant to Issue 1, but, in part, Method 5.11 repeats Method 5.10. It is acknowledged that other regional plans that are not specific to water may contain provisions that are relevant to the management of water quality. Method 5.11 should be rewritten to more accurately reflect its explanation, and to make the link to the sustaining of water quality clearer.

Method 5.12: Resource Consents (to take, use or discharge to water)

A requirement to obtain a resource consent for an activity that will have adverse effects on water quality is fundamental to sustaining the quality of water, and Method 5.12 is therefore an appropriate means of addressing Issue 1. The explanation to Method 5.12 makes reference to cases where activities are likely to affect water quality but no water related consent is needed, and suggest that it would be appropriate for bodies deciding these sorts of consents to have regard to water quality matters. This would also be an appropriate way of ensuring that the quality of water is sustained.

Method 5.13: Plans, other documents and action under other Acts

The explanation to Method 5.13 refers to the adoption of bylaws to manage various types of discharges. This is an appropriate method to give effect to Issue 1, although the wording of Method 5.13 is not very specific.

Method 5.14: Public works

Method 5.14 is an effective way to address Issue 1 for those public works for which Environment Southland is responsible. It is not clear how Environment Southland will ensure that consideration is given to management practices that should be adopted to protect water quality for public works that other organisations are responsible for.

Method 5.15: Economic Instruments

The explanation to Method 5.15 states that:

'There will be circumstances when it is appropriate to adopt economic instruments to encourage efficient alternatives to contaminant discharge.'

Adoption of alternatives to discharges of contaminants would avoid adverse effects on water quality and thus sustain water quality, addressing Issue 1. However, Method 5.15 does not currently outline what sort of economic instruments could be considered, nor the circumstances in which they could be applied. Assessing the effectiveness of the method in addressing Issue 1 is therefore difficult.

Method 5.16: Review and extend water classifications

This work has already been carried out, through recent variations to the Regional Water Plan for Southland. The method could be updated to reflect this, but it is relevant to Issue 1.

Issue 2

Water quality can be affected in both a positive and negative way by a wide range of events and activities, including:

- *natural causes, for example, leaching of soluble chemicals in the ground, breakdown of plant and animal material, algal growth, flooding*
- *sewage disposal, either treated or untreated*
- *timber treatment plant discharges*
- *fixed and mobile animal dipping plants*
- *underground storage tanks, for example, petrol*
- *stormwater disposal*
- *industrial spills*
- *industrial waste-water disposal*
- *agricultural chemicals*
- *waste chemical dumps and landfill sites*
- *agricultural waste-water disposal, for example, dairy sheds*
- *agricultural practices, for example, ploughing, constructing and cleaning ditches and drainage channels*
- *animal waste*
- *stock disposal and offal pits*
- *the activities of animals in and near water courses*
- *cooling water discharges*

- *discharges from boats, in coastal and inland waters*
- *climatic conditions, for example, heavy rainfall and cold, which affect biological processes and the ability of land and water to absorb discharges*
- *land use practices, for example, afforestation, urban development, road development and maintenance, harvesting of crops*
- *reductions in water quality*
- *watercourse engineering works.*

[Refer to Objectives 5.1-5.3, 8.2, 13.8, 16.1, 17.1; Policies 5.1-5.9, 13.6, 13.13, 13.16, 15.7, 15.8, 15.19, 16.2, 17.5; Methods 5.1-5.16]

Issue 2 as currently written is more a statement of fact than an issue. It is true that water quality can be affected, both positively and negatively by the sorts of activities and events that are listed in the issue. However, Issue 2 is not clear about whether or not in Southland water quality is affected by these sorts of activities, which activities and events specifically are issues in relation to Southland's water resources, and what sort of adverse effects are occurring.

As a further note, whether or not positive effects can be seen to be an 'issue' is also debateable. Identifying something as an issue gives rise to a clear expectation that some measures will be undertaken to address it. However, by their very nature, positive effects do not need to be addressed, unless the issue is actually that they are not being recognised and provided for through the existing resource management framework (for example). However, Issue 2 does not currently identify that positive effects are not being appropriately recognised.

In addition, the provision of a list of 'events' and 'activities' as currently appears in Issue 2 runs the risk of not being sufficiently comprehensive or targeted to identify what the real issues for Southland's water quality are.

In order to improve Issue 2 a more detailed analysis of what are actually the activities that cause water quality issues could be undertaken, and the issue rewritten. It may be appropriate to split the issue into a number of more specific issues, if there will be different policies and methods for addressing different activities that are causing effects.

As Issue 2 is not considered to be relevant or effective in its current form, a detailed analysis of the objectives, policies and methods that are referred to as addressing the issue has not been undertaken.

Issue 3

Insufficient regard is given to the range of options available for the alternative means of treatment of waste and the alternatives for its subsequent discharge to different receiving environments.

[Refer to Objectives 5.1-5.3, 16.1, 16.2; Policies 5.1-5.7, 13.13, 13.16, 16.1, 16.2, 16.8; Methods 5.1-5.2, 5.6, 5.8, 5.10, 5.12, 5.13, 5.15]

There is no explanation attached to Issue 3 that outlines who is giving insufficient regard to alternative treatment and discharge options for waste, the consenting authority, consent

applicants or a combination. There is also no information contained in the Regional Policy Statement that would suggest that this has been a significant issue in the region.

None of the individuals or organisations consulted as part of the preparation of the draft issues and options paper identified concerns with the consideration of alternatives, although Te Ao Marama and Public Health South both identified the need for improvements in technology and management practices to be implemented through consent conditions, and Te Ao Marama suggested altering Issue 3 to make it about ensuring sufficient regard is given to alternatives, therefore casting the issue in a more positive light. Fish and Game New Zealand has suggested that Issue 3 originally arose because discharges to water predominated in the region at the time of the development of the existing Regional Policy Statement, but were already at that time becoming less acceptable. To a certain extent this particular issue has been addressed through the work that Environment Southland has done (including for example the development of the *Farm Dairy Effluent Best Practice Guidelines*). Fish and Game New Zealand has therefore suggested that the issue could be reworded to reflect the current situation.

For any discharge of contaminants that requires resource consent, consideration of alternatives is required under section 107 and the Fourth Schedule of the Resource Management Act 1991. Discussions with the Consents Section at Environment Southland have not highlighted any concerns with applicants not undertaking this consideration in sufficient detail.

Based on current information Issue 3 is no longer considered to be relevant. As a result, a detailed analysis of the objectives, policies and methods that are referred to as addressing the issue has not been undertaken.

Issue 4

Insufficient information is known about quality of ground water on which to base good decisions.

[Refer to Objective 5.1; Policies 5.1, 5.5, 5.6; Methods 5.1, 5.8, 5.10, 5.12]

Issue 4 is still relevant in relation to the management of water quality in Southland, although to a lesser extent than when the existing Regional Policy Statement became operative 10 years ago. Since 2000 Environment Southland has implemented a comprehensive groundwater monitoring programme, in response to the lack of information. Knowledge of groundwater quality has therefore increased substantially over the last eight years. Where hot spots of poor water quality exist there is however still a need to advance knowledge of the groundwater resource as quickly as possible, particular where the groundwater is being used to supply drinking water.

Objective 5.1: To sustain the quality of the Region's water resources so as to:

- a meet the needs of a range of uses, including the reasonably foreseeable needs of future generations*
- b safeguard the life-supporting capacity of water and related ecosystems.*

Objective 5.1 is not relevant to Issue 4. Issue 4 relates to insufficient information, but Objective 5.1 makes no reference to the need to have sufficient information in order to be able to sustain the quality of the region's water resources.

It is also important to note that none of the other objectives contained in the Water Quality section of the existing Regional Policy Statement are relevant to Issue 4.

Policy 5.1: Review classifications for water bodies, including ground water.

Policy 5.1 is not directly relevant to Issue 4. The explanation to the policy prioritises the review of groundwater classifications as the lowest priority, 'on the basis of present knowledge', which suggests that the knowledge that existed at the time the existing Regional Policy Statement became operative was not sufficient to undertake a review of classifications.

Policy 5.5: In preparing, implementing and administering Regional and District Plans and in considering resource consents, local authorities shall assess the effects of land use and development on ground water and surface water quality, including both point and non-point source discharges, and provide for any adverse effects to be avoided, remedied or mitigated.

Policy 5.5 is not relevant to Issue 4. It would have been extremely difficult for decision makers to give effect to Policy 5.5 on the basis of the existence of Issue 4, as the lack of information (identified as the issue) would have made assessment of effects difficult.

Policy 5.6: Undertake investigations into water quality in the Region.

Policy 5.6 is appropriate to address Issue 4. The policy appropriately recognises the need to collect further information on groundwater quality in order to both expand the existing database on water quality and to assist in decision making and policy formulation. Policy 5.6 should be retained, as it is still relevant, given the identified need for further information to add to that which has been collected in recent years.

Method 5.1: Information, education and public awareness

It is not clear how the provision of information to the general public is relevant to an issue that identifies a lack of information as a problem. Method 5.1 is therefore not considered to be relevant to Issue 4.

Method 5.8: Investigations and research

Method 5.8 is appropriate and should be continued. The explanation to the method identifies that 'in order to assess the effect of activities on water quality, it may be necessary to carry out research, or other investigations'. This is directly applicable to Issue 4, and clearly addresses the need for further information.

Method 5.10: Prepare, Implement and Administer a Regional Plan(s) for the management of water quality which considers-

a water quality classes, in a manner which is consistent with national guidelines or standards, particularly in respect of health issues

- b* minimum water levels and flow regimes required to protect instream values and the aquatic environment
- c* criteria, in addition to the matters set out in Part II of the Act, to assess competing applications to use the assimilative capacity of water
- d* means to manage the effects of point and non-point discharges, and land use, on water quality
- e* links between water quality, water quantity and ecosystems
- f* circumstances where riparian strips may be appropriate as a means of protecting water quality.

It is not clear how the preparation of a regional plan for the management of water quality will address the issue of a lack of information about groundwater quality. The method does not identify a lack of information as one of the matters to be considered. Method 5.10 is therefore not considered to currently be appropriate in relation to Issue 4. However, if a matter for consideration were added to the method that identified the need to collect information on resources about which there was currently insufficient information, it would be more appropriate.

Method 5.12: Resource consents

There is no clear link between Method 5.12 and Issue 4. If it has been determined that, due to a lack of information, a precautionary approach should be adopted to activities that will adversely affect groundwater quality, and that therefore resource consents will be required for most discharges to land, neither Method 5.12 nor its explanation are explicit about this.

It should be noted that Methods 5.4 (Consultation) and 5.7 (Monitoring) are also relevant to addressing Issue 4.

Table 1 below sets out the analysis detailed above in tabular form for ease of reference.

Table 1: Relevance of existing Regional Policy Statement policy framework

Issue	Relevant?	Relevant Objectives	Relevant Policies	Relevant Methods
1	Yes	1.2, 5.1*, 5.2*, 5.3, 6.4*	5.1*, 5.2, 5.3*, 5.4*, 5.5*, 5.7, 5.8*	5.1, 5.2*, 5.5, 5.6*, 5.9, 5.10*, 5.11*, 5.12*, 5.13*, 5.14*, 5.16*
2	No			
3	No			
4	Yes		5.6	5.4, 5.7, 5.8, 5.10*(possibly)

* = needs amendment in order to be completely relevant.

There are other resource management issues contained within the existing Regional Policy Statement that were considered to be relevant to water quality, as follows:

Takata whenua

Issue 1 *Protection of wahi tapu*

Issue 2 *Recognition of customary use of water and importance of wahi tapu, wahi taoka and mahika kai*

Issue 3 Consideration of cultural and traditional spiritual values

Issue 4 Regard for kaitiakitanga

Takata whenua issues relate to water quality because discharges of contaminants (either point-source or non-point source discharges) affect the cultural and spiritual values that takata whenua associate with water, and affect their ability to exercise kaitiakitanga. These issues will be covered in greater depth in the Tangata Whenua paper.

Biodiversity

Issue 3 Effects on biodiversity

Issue 4 Ecological effects beyond the immediate area

Issue 6 Scarcity of information on the Region's ecosystems

Issue 7 Lack of awareness of ecological processes and potential environmental impacts of activities

Biodiversity issues relate to water quality because of the significant adverse effects that degraded water quality can have on aquatic ecosystems and therefore biodiversity. It is also important to note that ecosystem health is one of the key measures that Environment Southland uses to assess the water quality of rivers, streams and lakes in the region. Biodiversity issues will be covered in greater depth in the Biodiversity paper.

Water Quantity

Issues 1,2 Changes in flows and levels of water

Issue 3 Conflicts in allocation of water

Issue 4 Effects of taking, diversion and damming of water

Issue 5 Consequences of uses to which water is put

Issue 6 Effects on water quality

Issue 8 Further information on the ground water resources required

Water quality and water quantity are inextricably intertwined. A reduction in the quantity of water in a waterway results in there being less assimilative capacity for any contaminants that are discharged to that waterway. Conversely, discharges of contaminants to water and their effects on water quality can lead to reduced quantities of water available for abstraction and use. These issues will be covered and addressed in greater detail in the Water Quantity/Allocation paper.

Lakes, Rivers and Wetlands

Issue 6 Changes in water quality can result in loss of natural character and instream values

Issue 9 Agricultural runoff and inappropriate riparian management adversely effects [sic] water quality

Issue 10 Increased sediment loads through vegetation clearance and landscape modification

Issue 12 Impacts of hydro-electric power generation

Land use activities (both on adjacent land and within river and lake beds) can affect water quality, particularly in relation to non-point source discharges. These issues are covered and addressed both in this Water Quality paper and in the Land Use paper.

Soils

Issue 6 Activities can have cumulative effects lower in the catchment

As noted above in relation to Lakes, Rivers and Wetlands, land use activities can affect water quality, particularly those that result in non-point source discharges. The issue of cumulative effects is covered and addressed both in this Water Quality paper and in the Land Use paper.

Built Environment

Issues 1,7 Effects of the built environment

Issue 5 Cumulative adverse effects can be significant

The effects of the built environment on water quality are largely those associated with land use and its associated non-point source discharges. Urban environments can also be responsible for a wide range of point source discharges. Issues associated with land use and discharges of contaminants, and their effects on water quality, are covered and addressed in this Water Quality paper.

Transportation

Issue 1 Effects of all forms of transportation

Transportation can have effects on water quality primarily through point source and non-point source discharges from roads. This issue will be covered and addressed in greater detail in the Transportation paper.

Mineral and Energy Resources

Issue 2 Effects of use, development, production and transportation of energy resources

The development, production and transportation of energy resources can have effects on water quality as a result of the associated discharges to land and water. This issue will be covered and addressed in greater detail in the Energy paper.

Natural Hazards

Issue 11 Pollution of flood waters by sewage

Reticulated sewage systems are generally designed with emergency discharge points for those occasions (usually during rainfall events) when flow exceeds the capacity of the system. While the water quality of rivers and streams during rainfall/flood events is generally lower due to the contamination being washed off the land, discharges of sewage can further reduce water quality. This issue will be covered and addressed in greater detail in the Natural and Other Hazards paper.

Solid Waste Management

Issue 3 Historic refuse sites could pose a threat to the environment

Issue 8 Illegal tipping and littering

Historically, refuse sites were not lined, and therefore leachate from decomposing rubbish at these sites can filter through the soil to groundwater and then be transported to surface water. Illegal tipping and littering also has the potential to have adverse effects on water quality, depending on where the waste is disposed of. These issues will be covered and addressed in greater detail in the Solid Waste paper.

Hazardous Substances

- | | |
|-------------------|---|
| <i>Issues 2,3</i> | <i>Insufficient information about the movement of hazardous substances</i> |
| <i>Issue 5</i> | <i>Risks from the movement of hazardous substances</i> |
| <i>Issue 6</i> | <i>Accidental spillages and emergency discharges</i> |
| <i>Issue 7</i> | <i>Insufficient knowledge about the long term effects on ecosystems of using hazardous substances</i> |

Hazardous substances issues relate to water quality because of the significant adverse effects that the accidental discharge and deliberate use of hazardous substances can have on water quality and aquatic ecosystems. These issues will be covered and addressed in greater detail in the Solid Waste Paper.

Cross Boundary

- | | |
|--------------|-----------------------------------|
| <i>Issue</i> | <i>Water quality and quantity</i> |
| | <i>Consistency in monitoring</i> |

A number of issues relating to water quality cross local authority boundaries, both within Southland (between each of the territorial local authorities) and across the regional boundary (between the three regional councils and the various territorial local authorities). An issues and options paper specifically relating to Cross Boundary Issues has not been prepared, however a number of the issues are covered and addressed in other papers, such as the Water Quantity/Allocation paper. In addition, Cross Boundary Issues will be considered in greater detail as part of consultation with key stakeholders during the RPS review process.

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