

8.1 Introduction

In the context of this chapter, water quality refers to both the character of water, encompassing the health and other values of ecosystems, and the sediments or contaminants that may be carried in/or deposited by that water.

Water quality is a significant issue in the Auckland Region. Auckland is a maritime Region with an extensive, often rugged, coastline, large harbours and estuaries and attractive islands of the Hauraki Gulf. The Region also has numerous lakes, rivers, streams, wetlands and aquifers. The quality of water can either enhance the values of these resources or degrade them with a direct effect on the quality of life of Aucklanders, visitors and all those who are resource users. Water is a resource which is sensitive to the impacts of activities on land or water. Hence, maintaining or enhancing its quality requires a comprehensive and integrated approach to its management.

- The overall vision for water quality in the Auckland Region is as follows:
- water quality at beaches, rivers and lakes will be suitable for swimming;
- people will continue to enjoy the abundant resources of our beaches, rivers, streams and lakes for fishing and shellfish gathering, cultural, commercial and other purposes;
- natural ecosystems, valued for their own sake, will function without adverse effect.

Work towards this vision will seek to achieve:

- a steady reduction of sediment, sewage overflows and other contaminants into our waterways;
- the prevention of discharges of toxic and persistent contaminants which may have an adverse effect on aquatic ecosystems.

The ARC has primary responsibility for the protection of water quality in the Region, pursuant to section 30(1) of the RM Act and section 8 (a) of the Hauraki Gulf Marine Park Act 2000 (HGMPA). These sections state that a regional council has the functions of:

RMA S30(1)

- (c) *The control of the use of land for the purpose of:*
 - (ii) *The maintenance and enhancement of the quality of water in water bodies and coastal water.*

- (f) *The control of discharges of contaminants into or onto land, air or water and discharges of water into water; (within the CMA this function is jointly shared with the Minister of Conservation, section 30 (d) (iv)).*

HGMPA s 8(a)

- (a) *The protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments.*

The management of water quality has a strong regulatory focus. This is because the RM Act stipulates that the discharging of contaminants into water is prohibited, unless allowed by a resource consent or a rule in a regional plan or by regulation. Some activities are considered to be existing uses and these may continue until a regional plan says otherwise (section 20 of the RM Act).

TAs also have several functions that can affect water quality. District plans contain the framework and rules for land uses within each district. These include the location of activities, subdivision of land and rules on the use, storage, disposal and transport of hazardous substances. These can have implications for water quality. TA activities may also affect water quality through service provisions, such as local stormwater and sewerage systems and the maintenance of public drains. The Health Act also confers responsibilities on TAs relating to public health.

A high standard of water quality is needed to maintain the health of aquatic ecosystems and for a variety of other purposes. These include domestic uses of water; commercial uses of water in industry, agriculture, commercial fishing and aquaculture; recreational uses of water for activities such as swimming, shellfish gathering and fishing; scenic and tourism purposes; and its assimilative capacity for waste disposal. Water is of significant cultural importance to Tangata Whenua.

The Region's coastal, harbour and estuarine waters are generally of good quality. There are however significant localised areas, particularly in the urban estuaries and sheltered harbour areas, where water quality has been degraded. Water quality of the Region's freshwater lakes varies from relatively unaffected to severely impacted. Runoff from rural sources of wastes is considered the major influence. Groundwater quality is generally good in most of the Region, however in some areas it has been impacted by industrial and rural activities. Many of the Region's streams have also been adversely affected as natural instream values have been destroyed by, among other influences, total removal of adjoining vegetation,

stock damage and piping or channelisation of the water course. Many urban streams are severely degraded by discharges, including those from combined sewer overflows, and by urban stormwater and litter. Emergency discharges from sewage pumping stations and sewage reticulation faults, where they occur, contribute to this degradation.

Many activities have adverse effects on water quality. These effects include increased turbidity, removal of oxygen, smothering of habitats, changes in temperature and the addition of a variety of contaminants. This can lead to a decline in the diversity and abundance of aquatic species. There is potential for some of these effects to move up the food chain, resulting in less and/or contaminated food for birds and other animals. The accumulation of a potentially wide range of chemicals in aquatic species (which are dangerous to health when eaten by larger animals) and contaminants in water can also impact on users and the food chain. The result is that water can become unsuitable for domestic, commercial and other uses. The smell and appearance of water, particularly colour, is affected by pollution and this can also affect visual and recreational values of water resources. This can be costly in terms of economic impacts on, for example, property values, water-based tourism and recreational uses. The discharges from a large variety of activities often combine to result in cumulative adverse effects on water quality.

Contaminants can enter the soil and aquatic environment via a wide range of pathways and mechanisms. The environmental consequences of such discharges are equally diverse, both in a temporal and spatial sense. The main categories of contaminant discharge involve diffuse runoff from urban and rural land and from point sources approved through resource consent processes. The ARC uses, and will continue to use, a wide range of management approaches for setting the standards and achieving control.

Diffuse runoff will be controlled using a 'best practicable option' approach involving cleaner production, waste minimisation, discharge minimisation and an appropriate level of monitoring and surveillance (i.e., pollution abatement and control). Education will play a major role in achieving the environmental objectives. The ARC will continue to monitor advances in national and international non-point source controls and will review its approaches as appropriate.

All point source discharges will continue to be controlled in terms of the RM Act. Control of permitted and controlled activities will include the publishing of guidelines on issues such as sediment, stormwater and on-site sewage disposal. Other controls will take the form of descriptive standards, e.g., for dairy shed discharges and sewage pumping stations. Other point source discharges will be dealt with using 'limited discretionary' and 'full discretionary' controls. The adverse effects will be minimised by establishing numeric standards that protect identified resource values. These will be set using locally derived standards where these are available, or in the absence of these, international standards. International standards used by the ARC include those published by the US Environmental Protection Agency, Australian Water Resources Council and Environment Canada. In the case of complex effluents these will, in addition to numeric standards, be subject to complex effluent toxicity testing procedures (CETTP) involving standardised biological toxicity testing. Where toxicity is detected, applicants will be required to identify the toxic components and mitigate their adverse effects. Financial contributions will also be required, where appropriate, to fund works to protect water quality.

Discharges to large rivers and estuarine/coastal waters will be able to make use of 'mixing zones' as provided for in the RM Act, within which environmental standards may not be achieved. The size of such mixing zones will be determined using standard evaluation techniques taking into account the dispersion and dilution available, the characteristics of the contaminants and values to be protected. The values that will be used to determine the extent of any given mixing zone will include areas used for contact recreation, shellfish gathering, and areas containing sensitive ecosystems.

In terms of avoiding, remedying, or mitigating the adverse effects of stormwater and sewage discharges on receiving waters, there are substantial short- and long-term costs associated with any works which are undertaken for this purpose. In most cases, TAs will be the agency responsible for the implementation of such works and, because of the large financial costs involved, TAs will have to make decisions on priorities.

The role of the ARC in this process is:

- to document as far as possible the adverse effects of activities on water quality;

- to provide information from which the environmental benefits of avoiding, remedying, or mitigating such effects can at least be inferred;
- to work with the TAs and other affected parties to establish a strategy for addressing each issue. Each strategy will include a prioritisation of the works needed to achieve the desired outcomes and the appropriate time frames for their implementation. Establishing the priorities for works to address each issue (such as stormwater quality treatment) has been given emphasis in this first RPS. The strategies are to be developed through public consultation processes during the process of preparing and implementing the RPS and regional plans.

Once prioritisation of the works which need to be undertaken to address each issue have been established, TAs then have to decide how to allocate funds between all the issues. This requires a second level of priority setting, which involves making decisions on whether more funding should be allocated to one issue or to another (such as stormwater quality treatment versus upgrading sewage pumping stations). These funding decisions are debated through the yearly annual plan public consultation process, and the ARC participates in this process as appropriate.

Prioritisation of works at both levels is not an easy task. It involves consideration of:

- adverse effects of stormwater and sewage,
- sensitivity of receiving waters,
- cultural issues,
- public health issues,
- socio-economic effect of costs.

The ARC will work with TAs and other affected parties to develop appropriate decision-making processes to determine agreed priorities at both levels, for public and political consideration.

The ARC will continue to monitor the efficacy of its management approaches by using a wide range of scientifically based survey and monitoring methods to determine environmental quality. Discharge consents will continue to be regularly monitored to ensure they comply with standards. The results of all monitoring will be the subject of routine reports and a State of the Aquatic Environment Report will be published annually.

8.2 Issues

8.2.1 Many activities have adverse effects on water quality

The main effects on water quality in the Auckland Region are a result of Auckland being the largest urban area in New Zealand. The processes of urbanisation and concentration of urban activities result in the Region's waters being continuously under pressure.

Development and Redevelopment

Development and redevelopment processes associated with urbanisation, which have adverse effects on water quality, include vegetation clearance, earthworks, the provision or upgrading of utility services, stream-works, the modification or construction of roads, motorways, and so on. Removal of vegetation, and increases in the extent of impervious surfaces, greatly increase the speed and volume of runoff. Modifications such as these change the patterns of stormwater runoff, and have profound effects on the amount of contaminants and sediments carried by stormwater. Poor stream management, including excessive modification of the natural habitat, also detrimentally affects instream habitat and biota, as well as aspects of water quality.

Urban activities, especially industrial and transport activities, are the main contributors of contaminants to stormwater. In Auckland, rain occurs frequently and is often heavy. The resulting stormwater flows carry high levels of contaminants including heavy metals, micro organisms, and organic material to the Region's water bodies and coastal waters.

Residential areas occupy the greatest proportion of urban land. In residential areas, household and garden chemicals such as solvents, fertilisers, pesticides, oil, cleaners and paints are frequently disposed of into stormwater drains or to ground. This often results in urban streams becoming contaminated. In addition, illegal connections of stormwater to sewerage systems can cause hydraulic overloading, leading to pumping station overflows and the discharge of untreated sewage to the Region's waterways.

From a Regional perspective, the main parts of the Region affected by urban activities (including industrial, transport and residential activities) are the estuarine areas and shallow harbour inlets adjacent to the most

intensively developed parts of the isthmus. These include the Tamaki estuary and middle Waitemata Harbour, and the north eastern Manukau Harbour. Many urban streams are also severely degraded. Lake Pupuke, because of its poor flushing and delicately balanced ecology, is highly sensitive to pollution generated by urban activities.

Transport Activities

Of the urban area, 40% is dedicated to motor transport (this area includes public and private carparks, garages and service stations as well as roads).

The deposition of materials such as petrochemicals and heavy metals, from motor vehicles onto roads and vehicle servicing areas, is a major source of water pollution. These contaminants are transported by runoff into stormwater systems and into the Region's water bodies and coastal waters.

It is estimated that about half of all air contaminants come from mobile sources. Exhaust emissions deposited or stripped by rainfall are a continual source of water quality degradation. Lead, zinc, copper, chromium, and hydrocarbons are the most common contaminants in urban stormwater. The largest producers of these are transport related activities. The main effects occur adjacent to the most densely urbanised parts of the isthmus – the Tamaki estuary, Manukau and Waitemata harbours.

Industrial and Trade Activities

Nearly all water pollution caused by industrial activities occurs through contaminants entering stormwater systems. The main causes are untidy yard practices, accidental spills, and lack of awareness in the workforce of the pollution consequences that can stem from actions on industrial sites. Other major contributing factors include inappropriate storage of products, new industries moving into premises which are unsuitable for their operation, illegal stormwater connections and inappropriate methods for disposal of industrial wastewaters.

The estuarine areas of the Manukau and Waitemata harbours, including the Mangere inlet, Tamaki estuary, and Whau River, are the main areas which have been detrimentally affected by industrial activities. Disposal of stormwater to ground soakage, particularly in industrial areas, has affected the water quality of the One Tree Hill – Onehunga, and Mount Wellington aquifers,

and probably also affects other aquifers such as Papatoetoe and Western Springs. Groundwater quality in these areas can also be affected by leakage from above-and-below-ground storage tanks, and by accidental spills.

There are several industrial areas outside the metropolitan urban area (such as Silverdale and Waiuku) which lack adequate provision for disposal of trade wastes. Selection of such locations for industries generating trade wastes is considered inappropriate and can result in adverse effects on water quality in nearby streams and rivers.

Rural Activities

The most widespread and significant cause of water pollution in the rural parts of the Region is overland runoff. This is affected by faeces and urine from grazing stock, herbicide and pesticide use, fertiliser and soil conditioning and tillage practices. Pollution also arises from loss of riparian vegetation and damage to riparian margins and waterways by stock access. Where there is sediment generation and discharge from vegetation clearance and land disturbance activities, this is a further cause of pollution.

Point source pollutive discharges of high strength organic wastes can arise from dairying, piggeries and other rural industries. Leachate from silage stacks, although small in volume, can also have significant localised impacts.

High nitrate concentrations are found in volcanic aquifers at Pukekohe, Bombay and Glenbrook, and in the baseflow of streams which are spring fed from these aquifers. This is believed to be due to the shallow, unconfined and permeable nature of the aquifers, and the intensity of land use, with widespread use of fertilisers for market gardening.

Lakes such as Kuwakatai and Spectacle are susceptible to pollution from rural activities, as they have limited flushing and have already been significantly degraded by runoff from adjacent land activities.

Maritime Activities

Most adverse effects on coastal waters are caused by land based activities. However, degradation of coastal waters can also result from a number of common maritime activities. These include reclamations and foreshore works (particularly during construction), discharges of sewage and oily bilge water from boats, petrol/diesel from

refuelling spillages, runoff from maritime industries such as boat builders and general littering of waterways. The effects of most of these activities on water quality tend to be short-lived unless they occur on a significant scale and are ongoing in a localised area.

Antifoulants used to protect boat hulls enter waterways over a period of time either as a result of general leaching or during boat maintenance. The ARC is currently undertaking research to determine the ecological effects of antifoulants.

Disposal of dredgings has raised concerns partly because the sediments in the dredgings can, in some circumstances, be contaminated to varying degrees. Consideration is being given to the various disposal options which may be available in the future.

Sewage Reticulation and Disposal

There are some 87 sewage treatment plants in the Region. Auckland's major sewage treatment facilities are the Manukau and North Shore sewage purification works, which serve about 83% of the Region's population. The remaining 85, serving 17% of the population, are predominantly small facilities using a wide range of treatment and disposal systems.

The major sewage effluent outfalls are located in the Manukau Harbour (Manukau Wastewater Treatment Plant), off Castor Bay (North Shore Wastewater Treatment Plant), Tiri channel (Whangaparaoa Peninsula System) and off Orewa Beach (Orewa/Red Beach System). About 15 outfalls from other small types of treatment plants also discharge into the Manukau, Kaipara, Waitemata harbours and inner gulf.

The largest treated sewage discharges occur in the Manukau Harbour and off Castor Bay (Rangitoto Channel). The Manukau outfall has historically had a significant impact on water quality in the inner Manukau Harbour. However recent upgrading of the plant has led to a significant improvement in effluent quality and reduced impact on receiving waters. The North Shore outfall has been shown to have a limited impact on some east coast beaches under certain weather conditions, with most effects restricted to offshore waters.

Sewage discharges are assessed through the discharge permit consent procedure. The exceptions are the Manukau and North Shore wastewater treatment plants which have their own empowering legislation. These are

deemed to have coastal permits under the RM Act, with a life of 10 years from enactment. At the expiry of these transitional consents, both activities will be required to be authorised by a range of consents under the Act. Both discharges have been the subject of detailed technical evaluation and public involvement on future disposal options.

The combined sewer system in the central isthmus area serves about 10% of the Region's population. Combined sewers are designed to overflow when it rains and this results in water pollution. Combined sewers discharge a mixture of wastewater and stormwater into the Waitemata Harbour and streams leading into it. Further urban intensification exacerbates the problem of overflows by increasing the volume of sewage and the quantity and rate of stormwater runoff. Other factors such as the age of the system also contribute to the problem. The main impacts occur in the downtown wharf area and in urban streams and the harbour edge between Point Chevalier and Achilles Point.

There are around 400 sewage pumping stations in the Region. A significant proportion of raw sewage discharges are derived from sewage pumping station overflows. These result from, among other causes, excessive infiltration to the reticulation system in wet periods, and breakdowns, including power failures. The result is generally localised and causes intermittent water quality impacts. The worst impacts occur in confined waters with poor dilution and dispersion. As many stations are sited adjacent to recreational areas, the aesthetic and potential public health impacts can be significant. Criteria have been developed for minimising overflows from sewage pumping stations. It is noted that, prior to the RM Act, the legal situation as to whether consents could be required for overflows from sewage pumping stations was ambiguous. It is now considered that the matter has been clarified under the RM Act, and consents can be required. The main impacts from sewage pumping stations have occurred in the Manukau and Waitemata harbours including the Tamaki estuary. Sewage pumping station and reticulation failures on the North Shore have resulted in intermittent degradation of water quality on East Coast beaches.

Outside the metropolitan urban areas septic tanks with on-site effluent disposal fields are commonly used for sewage disposal from individual dwellings, motels, rest

homes and other small-scale commercial developments. Provided that septic tank based systems are properly designed, installed and maintained, they are considered to be an environmentally sound method of effluent disposal. Localised problems do however occur at various times in rural and coastal communities as a result of cumulative impact. These are commonly due to a combination of poor soil types, higher densities of septic tank use, insufficient land for ground disposal and poor maintenance practices. There is a need for proactive management of septic tanks by TAs.

Solid Waste Disposal

There are more than 100 landfill refuse disposal sites scattered throughout the Auckland Region. The majority are closed sites which were constructed prior to the introduction of modern technologies to deal with groundwater and surface water protection, and which, therefore, did not provide for adequate leachate and stormwater collection and disposal. It is likely that there are a large number of other older landfills in the Region. However, the exact number and location of these is unknown. More recent landfills have been constructed to much higher environmental standards. Illegal private landfills and illegal dumping along waterways is also a widespread problem. Leachate from landfills has had localised impacts on water quality in several parts of the Region. It is potentially a major problem in terms of protecting groundwater quality.

8.2.2 Some parts of the Region are more susceptible to water quality degradation than other areas and/or have significant values that warrant special protection.

Streams, lakes and estuarine areas are particularly susceptible to water quality degradation as these are generally enclosed, or long and narrow, with poor flushing characteristics. Shallow, permeable, unconfined aquifers (e.g., volcanic aquifers) are sensitive to pollution as they receive direct and rapid recharge from the ground surface and are susceptible to any contamination of the recharge water. Deeper aquifers which are overlaid by and recharged from degraded aquifer systems are also susceptible to degradation.

Coastal waters adjacent to areas which have been extensively urbanised are also at high risk of degradation, due to the cumulative effects of urban activities. The impact of contaminant discharges on areas with good tidal flushing is difficult to determine given our current

state of knowledge. Therefore these have been called susceptible to degradation, but indeterminate, on Map 5: Sheets 1 and 2.

Some water bodies and coastal waters have significant high ecological values and are susceptible to degradation. These areas are shown on Map 5 : Sheets 3 and 4.

Protection of surface waters used for potable water supply is considered important. Most of the water supply dams operated by Watercare Services Ltd are protected by vegetative buffers and restricted public access. This is not the case at Helensville, Warkworth, Wellsford and Hays Creek (Papakura) water supplies. Additional protection is needed to prevent degradation of these water supplies. It is noted that water bodies and coastal waters are also valued by the regional community for recreational, ecological, cultural, commercial and other reasons.

In these areas (which are listed in Table 8.1) additional methods, such as more emphasis on pollution abatement work and education programmes, and/or regulations (additional to those which apply to the rest of the Region) may be needed to ensure that water quality is adequately protected. For example, research may be required in some areas listed as priorities to investigate techniques to remedy poor water quality. More stringent rules may also need to be complied with. For example, a discharge which has a minor adverse effect can be a permitted or controlled activity (subject to appropriate conditions) for much of the Region. But it could be a discretionary or even prohibited activity if the proposed discharge is to a lake.

8.2.3 Water quality in some parts of the Region has already been degraded

Water quality in some parts of the Region has already been significantly degraded. This is due to the historical location of polluting activities adjacent to estuarine areas and/or to the sensitive nature of some receiving waters. These areas are listed in Table 8.2. Water quality in these areas can be improved although, for some areas, a considerable time period (longer than the 10 year life of this document) will be needed before a significant improvement is achieved. In many instances, improvement can occur by ensuring that the activities which historically caused the degradation comply with modern standards, and by remedial work being carried out. The ARC intends to include provisions in a regional plan for improving the Region's degraded water bodies

and coastal waters. It will be prepared in consultation with affected parties and will include a range of methods to improve water quality including: pollution abatement control, stormwater and sewerage infrastructure upgrading and environmental monitoring.

8.2.4 Water quality is a significant resource management issue for Tangata Whenua

In Maori culture water represents the tears of Ranginui, the life-blood of Papatuanuku, and is the domain of Tangaroa. To Tangata Whenua water must be managed in a holistic manner, and be nurtured as a living entity. Water quality matters of significance to Iwi authorities in the Auckland Region have been identified as:

The Uses of Water and Associated Habitats

Matters of concern to Tangata Whenua include protecting the mauri of water. Tangata Whenua state that mauri is the essence within water that ensures the continuation of life that dwells within it. In order for future generations to gain benefits from both the sea and freshwater, the mauri of water must not be defiled.

The Degradation and Integrity of Water

Tangata Whenua have identified as a principle the desire to see all wastes derived from land returned to the land. Contaminants of particular concern are:

- Sewage and effluent discharges; rural, industrial and urban discharges; stormwater and sediment runoff; leachate from landfills; disposal of dredgings; sedimentation; burial of ashes at sea; discharges from boats; dumping of animal carcasses; and shelling and gutting fish and shellfish on the foreshore or on the water.
- Mixing of water from different sources is also spiritually offensive.

Manukau Harbour

The healing of the Manukau Harbour has a high environmental priority to the people of the Tainui waka and Te Kawerau a Maki and, in particular, the tribes of the Waikato.

Matters of significance include:

- the degradation and integrity of water, ecosystems and wider environs;
- the effects of the Mangere oxidation ponds on the mana and mauri of the harbour and Tainui;

- other inappropriate land uses around the harbour;
- provision for the taiapure application over the harbour.

Kaipara and Waitemata Harbours

These harbours are of the highest priority to Ngati Whatua and Te Kawerau a Maki. Matters of significance include:

- a desire to restore the buffer of native vegetation around the harbour;
- the adverse effects of widespread siltation on ecosystems, in particular, shellfish;
- the effects of discharging hot geothermal water into the Kaipara Harbour;
- ensuring integrated management of the Kaipara Harbour.

Hauraki Gulf

The Hauraki Gulf is of high priority to the Tangata Whenua.

The matters of significance include:

- the adverse effects of siltation on ecosystems, in particular the habitats of shellfish;
- insuring integrated management of the Hauraki Gulf and Islands;
- the degradation and integrity of water ecosystems, sewage and effluent discharges (including those from vessels).

8.3 Objective

1. *To maintain water quality in water bodies and coastal waters which have good water quality, and to enhance water quality which is degraded particularly for the following purposes:*
 - (i) *Estuaries and harbours: protection of aquatic ecosystems, recreation, fishing and shellfish gathering, cultural and aesthetic purposes.*
 - (ii) *Open coastal waters, including parts of the Hauraki Gulf: its natural state.*
 - (iii) *Groundwater: water supply.*
 - (iv) *Lakes, rivers and streams: protection of aquatic ecosystems, recreation, food gathering, water supply, cultural and aesthetic purposes.*
 - (v) *Wetlands: protection of aquatic ecosystems.*

8.4 Policies, Methods and Reasons

All the following policies and methods are designed to achieve the Objective 8.3.

The methods listed in Section 1.9 in Chapter 1 will be used in conjunction with the policies and methods in this chapter.

8.4.1 Policies: General

1. *Adverse effects on water quality caused by the discharge of contaminants (including non-point source discharges) shall be avoided, particularly the discharge of potentially toxic, persistent or bio-accumulative contaminants. Where it is not practicable to avoid discharges, they shall be adequately remedied or mitigated.*
2. *Minimum standards for water quality in terms of section 69 of the RM Act shall be set where the use of minimum standards is shown to be the most appropriate means for achieving the purpose of the RM Act, having regard to their efficiency and effectiveness relative to other means.*

8.4.2 Methods

1. *District plans, regional plans and the Regional Plan: Coastal will contain provisions which give effect to Objective 8.3 – 1 and Policies 8.4.1 – 1 and 2.*
2. *All regional plans containing rules on the discharge of contaminants to water shall provide for a review of all discharge permits which are relevant to the issues/activities to which the plan applies. Where the standards set by the rules are not being met, and it is desirable that the standards are met, the ARC will review the conditions of those permits.*
3. *The ARC will use the most efficient and effective method, including setting appropriate standards and/or measures of environmental quality as part of a regional plan for protecting significant water bodies and coastal waters and improving the region's degraded water bodies and coastal waters.*

8.4.3 Reasons

Ideally the best way to protect water quality is to avoid any adverse effects. However, this is not always practicable as almost all activities have an adverse effect of some sort on water quality. The approach adopted by the ARC is to

require any discharge to be avoided where there are potential adverse effects. Where this is not feasible, the ARC requires the effect of the discharge to be mitigated as far as practicable. This often results in remedying the effects of past discharges. All discharges are required by the RM Act to be authorised by either rules in regional plans or by obtaining a resource consent from the ARC.

'Minimum standards' means the lowest level of natural water quality that is considered acceptable for any given use, including, but not limited to, those specified in the Third Schedule of the RM Act.

Policy 8.4.1-2 acknowledges that the RM Act makes provision for the setting of minimum water quality standards to protect particular values and uses. However, the Act also requires that, in adopting any particular method, alternatives be considered and the best option for delivering the desired environmental outcome be adopted.

It is considered that protecting water quality using a range of methods is the best approach. These include:

- Controlling contaminants at source through a comprehensive pollution abatement and control programme.
- Avoiding, remedying, or mitigating the adverse effects of stormwater runoff.
- Ensuring that discharge permits include appropriate conditions and comply with environmental standards. These standards will be included in regional plans.
- That where discharges occur, mixing zones are defined in such a way as to protect resource values.

Minimum standards should be applied in specific circumstances where these are shown to be the most appropriate method for achieving the desired environmental outcome.

Monitoring to ensure the efficiency of this approach will be undertaken where appropriate and will include:

- monitoring of contaminant levels in water, shellfish, finfish and sediments and measurement of biological response using a range of tools including baseline ecological monitoring;
- monitoring of land use practices to avoid, remedy or mitigate adverse water quality effects.

8.4.4 Policies: Development and redevelopment

1. *Land use intensification in urban areas shall only occur where adequate provision is made for:*
 - (i) *control of sediment discharges;*
 - (ii) *control of stormwater discharges;*
 - (iii) *collection, transport, treatment, purification and disposal of sewage;*
 - (iv) *protection of the quality of groundwater recharge especially into aquifers used for water supply purposes;*
 - (v) *protection of water quality and riparian margins;*

Note: Land use intensification in urban areas shall be in accordance with Policy 2.6.1.

2. *Land use intensification in rural areas to countryside living or urban developments (whether reticulated or not) shall only occur where adequate provision is made for:*
 - (i) *the matters listed in 8.4.4-1;*
 - (ii) *retention of vegetation (excluding plant pests) wherever practicable adjacent to water bodies and coastal waters;*
 - (iii) *maintenance of normal access for biota throughout stream channels;*
 - (iv) *protection of the intrinsic ecological values of aquatic systems.*

Note: Land use intensification of rural areas shall be in accordance with Policy 2.6.2.

3. *Sewer overflows during wet weather caused by stormwater entry to sewerage systems shall be avoided.*

Refer also to Policy 8.4.21-2.

8.4.5 Methods

1. *When proposals for land use intensification are initiated, sufficient investigations will be undertaken by the persons initiating such proposals to establish the feasibility of making adequate provision to deal with the matters listed in Policy 8.4.4-1 and 8.4.4-2. Those investigations must be documented as part of the proposed change, variation or application.*

2. *Where land use intensification is proposed, the need to prepare a catchment management plan or structure plan (see Appendix A) will be determined by consultation and agreement between the ARC, relevant TA and persons initiating the proposal. The need for a plan will be determined by assessing the proposal in terms of the following criteria:*

- (i) *the scale of the proposal;*
- (ii) *the sensitivity of the receiving environment;*
- (iii) *the potential for adverse effects, particularly cumulative adverse effects to water quality.*

The catchment management plan or structure plan will include the measures which are necessary to address the matters set out in Policy 8.4.4-1 and 8.4.4-2 and the implementation of those measures will be secured by means of resource consents and related conditions, and/or measures in district plans and/or regional plans.

3. *Where land use intensification occurs in accordance with Policies 8.4.4-1 and -2, district plans and district structure plans shall provide for the establishment and retention of riparian protection yards, wherever practicable, between land use activities and water bodies and coastal waters.*

Refer also to Chapter 6 (6.4.10-11) and Chapter 18.

4. *District plans shall not provide for land use intensification in sewered catchments that are at a maximum capacity for sewage disposal and/or have inadequate drainage (which is resulting in hydraulic overloading of the sewers) unless services are upgraded to an adequate capacity, or a commitment made to upgrading, sufficient to handle the demand that will result from the intensification.*

5. *Where district plans are changed, varied or reviewed in ways which enable land use intensification, TAs will investigate and report on the overall adequacy of the existing and planned capacity of the wastewater reticulation and treatment system and stormwater utility systems, relative to the demands on those services which will arise from the planned intensification of land use. Documentation of those investigations will form part of the information supporting the proposed changes, variations or reviews.*

6. *All catchments with sewerage reticulation will be investigated by relevant TAs to ascertain the extent of stormwater entry to sewers (including illegal stormwater connections and infiltration). A prioritised programme of source detection and remedial works will be developed and agreed upon jointly by the ARC and relevant TAs. Adequate consultation with Tangata Whenua shall be undertaken during the preparation of the programme.*

8.4.6 Reasons

The purpose of Policy 8.4.4-1 and the methods under 8.4.5 is to ensure that the potential adverse effects, including cumulative effects, of new development and redevelopment are considered prior to committing an area to further intensification and that adequate controls are implemented as development proceeds to avoid or mitigate adverse effects.

The matters listed in Policy 8.4.4-1 need to be given consideration at a strategic level prior to changing district plans to enable further intensification to occur. Once the decision to develop an area has been made, the specific details of control measures that will need to be implemented to avoid, remedy, or mitigate adverse effects should be planned for in an integrated manner. The method by which this is achieved is through the preparation of catchment management plans and/or structure plans. The recommendations in these plans are given statutory effect through incorporating them in district and/or regional plans and/or through including conditions on discharge permit resource consents. The policy does not distinguish levels of priority for the matters listed, as these will vary from catchment to catchment.

It is considered important that the matters listed in Policy 8.4.4-2 are given priority where land use intensification of rural areas is proposed, to avoid, remedy or mitigate adverse effects on water quality. In many urban areas these matters have already been compromised. Policies 8.4.10 and 8.4.21 are relevant to urban areas.

Methods 8.4.5-4 to -6 are intended, first, to avoid sewage overflows from sewage reticulation and sewage pumping stations when development takes place ahead of the upgrading of services. Second, to mitigate the cumulative effects which result from incremental increases in

impervious surfaces (which occur from the intensification of land uses) increasing the quantity and rate of stormwater runoff.

Illegal connections to sewerage systems, low gully traps and leaking manholes, cause adverse effects to water quality in the urbanised parts of the Region by causing hydraulic overloading, resulting in discharges from various components of the system. Method 8.4.5-3 requires these discharges to be reduced to a practical minimum to comply with sections 5 and 15 of the RM Act. Inspections for illegal connections need to be targeted to areas where direct entries are suspected or known to be a concern.

It is important to note that while the costs of detecting and correcting illegal connections and infiltration can be high, not doing so also has a high cost in maintaining infrastructure at levels above good minimum engineering design standards. These are over and above the environmental costs.

8.4.7 Policies: Stormwater and sediment discharges

1. *All new developments discharging stormwater, whether allowed as a permitted activity or by a resource consent, shall adopt appropriate methods to avoid or mitigate the adverse effects of urban stormwater runoff on aquatic receiving environments.*
2. *The ARC will promote stormwater quality control on a catchment wide basis to avoid or mitigate the adverse effects of urban stormwater runoff on aquatic receiving environments.*
3. *All land disturbance activities which may result in elevated levels of sediment discharge shall be carried out so that the adverse effects of such discharges are avoided, remedied, or mitigated.*

8.4.8 Methods

1. *A strategy to prioritise catchments for retro-fitting within existing development will be developed and agreed jointly at a date to be agreed upon by the ARC and relevant TAs.*
2. *The ARC will implement a Stormwater Quality Control Programme including public education, source controls and retro-fitting and could include rules in a regional plan to control stormwater.*

3. *Policy 8.4.7-3 will be implemented through the Proposed Erosion and Sediment Control Regional Plan, district plans, and resource consents and other methods such as those listed in Chapter 1. Refer also to Chapter 12 – Soil Conservation.*
4. *The ARC will continue to study the quality of urban stormwater, its effects on the environment and the methods available for treatment to further improve the efficiency and effectiveness of controls.*
5. *The ARC will encourage TAs to reduce stormwater contamination by adopting the ‘best practicable option’ for catchment wide stormwater quality control in consultation with the ARC.*
6. *All new developments discharging stormwater, whether allowed as a permitted activity or by a resource consent, shall adopt the ‘best practicable option’ to achieve stormwater quality control.*

8.4.9 Reasons

Stormwater Control

The impervious surfaces which result from new urban development affect the quantity, rate and quality of runoff discharged from these surfaces. Stormwater has been identified as a principal source of uncontrolled contamination of the Region’s water quality. The ARC is responsible for authorising these discharges as either permitted activities or through resource consents. There are a number of techniques that can be implemented to avoid or mitigate adverse effects. These include education programmes, source controls and planning controls which can influence urban design and reduce the amount of impervious surfaces or retain natural stream character and riparian vegetation. Structural controls, such as wet detention ponds, sand filters and grass swales, may also be appropriate where the scale of development allows for these. Where it is not practicable for a development to provide controls, it is appropriate that a financial contribution under section 108 of the RM Act will be imposed to provide funds for the implementation of public sector initiatives. The ARC has produced a design manual to assist in the selection and design of structural controls which are considered to be practicable options. Implementing controls which mitigate the effects of stormwater contamination from existing areas will require retro-fitting, that is, installing the controls retrospectively. In some catchments, catchment-wide

stormwater treatment devices may be the best practicable option for stormwater control. The ARC recognises that opportunities for retro-fitting controls into areas of existing development may be limited by physical and financial constraints. There are, however, both planning and structural techniques that can be used to improve stormwater quality from existing urban catchments. In any event, the suite of techniques applied should represent the best practicable option.

To ensure the resources needed for retro-fitting are allocated optimally, it is prudent to develop a strategy that identifies a ranking of priority catchments throughout the Region. The priority may be based on the contaminant load from the catchment and/or the sensitivity of the receiving environment. An effective strategy can only be developed in conjunction with the TAs. A joint strategy will provide the necessary detail on the catchments and the necessary commitment to retro-fitting. The detail on the level of contamination and the demonstration of the best practicable option can be best obtained through comprehensive catchment studies.

Notwithstanding the need to prioritise catchments for retro-fitting stormwater quality controls, where significant re-development is proposed in an existing urban catchment, the opportunity needs to be taken for retro-fitting. The term ‘best practicable option’ (BPO) is defined in the RM Act. It is recognised that BPO means the best method for preventing or minimising effects on the environment, having regard to the sensitivity of the specific receiving environment.

Sediment Control

In any one year, hundreds of hectares of land are exposed for development purposes. Very high levels of sediment from these operations can result in adverse effects on water quality. ARC studies indicate that the most significant contributors of sediment are those construction activities associated with urban development. These are usually short-term in duration. Other short-term activities resulting in elevated sediment levels include stream works, roadworks and vegetation clearance (such as that associated with logging operations). Longer term operations of concern include cleanfills and quarries.

The Proposed Erosion and Sediment Control Regional Plan specifies how controls will be directed to avoid or mitigate elevated sediment levels. Controls will vary, e.g.,

apply to activities within a defined Soil Conservation Protection Area, or may be targeted to specific areas of concern such as parts of a catchment. They will involve a variety of methods ranging from education, liaison, development of guidelines, codes of practice and best management methods, regulation through the RM Act and development of minimum earthworks strategies. An active research component will be part of this programme to ensure management initiatives are appropriately directed. The emphasis of the sediment control programme, as expressed in the regional plan, will vary as a result of information gained from ongoing research and performance monitoring. Ongoing active and full consultation will occur through a variety of methods in order that changes required as a result of new information can be accommodated.

8.4.10 Policies: Industrial, trade and rural production and processing activities

1. *All industrial, trade and rural production and processing activities shall be carried out in a manner which:*
 - (i) *prevents wherever practicable the adverse effects of discharges and wastes;*
 - (ii) *prevents wherever practicable unauthorised or accidental discharges and ensures that when these occur, they are detected quickly, so that immediate action is undertaken to reduce the extent of any discharge.*
2. *Industrial and trade activities producing trade wastes shall be located in areas where trade wastes can be disposed of to a trade waste sewer, unless adequate systems are in place to ensure trade wastes are contained and regularly collected for approved treatment and disposal.*
3. *Industrial and trade activities which directly adjoin water bodies and coastal waters shall be separated from them, wherever practicable, to avoid adverse effects to cultural and amenity values, and to minimise adverse effects of discharges and wastes.*

Note: People carrying out industrial, trade and rural production and processing activities are expected to be aware of their responsibilities under the RM Act and to give effect to these policies.

8.4.11 Methods

1. *District plans will contain provisions which give effect to Policies 8.4.10-1, 2 and 3.*
2. *Methods for industry, trade, and rural production and processing activities to achieve Policy 8.4.10-1 include:*
 - (i) *the design and implementation of effective containment systems;*
 - (ii) *the implementation of cleaner production;*
 - (iii) *effective site management practices including:*
 - (a) *good housekeeping*
 - (b) *the identification and review of past problems*
 - (c) *preventative maintenance*
 - (d) *stock inventory and rationalisation*
 - (e) *spill prevention systems;*
 - (iv) *spill contingency and response;*
 - (v) *waste minimisation and appropriate disposal;*
 - (vi) *staff education.*
3. *Methods to achieve Policy 8.4.10-3 include bunding, cut-off drains, fencing and riparian planting.*
4. *The ARC will prepare and implement an Industrial and Trade Pollution Programme to avoid, remedy, or mitigate the adverse effects of discharges from industrial and trade activities.*
5. *The ARC will include provisions in a regional plan to avoid, remedy, or mitigate the adverse effects of discharges from rural production and processing activities.*
6. *The ARC and TAs will investigate, evaluate, and if appropriate, implement methods to track the locations of industries with a high pollution potential.*

Note: Some of the principles of cleaner production are outlined in Policy 15.4.1-3.

Refer also to Chapter 15 – Waste, Chapter 16 – Hazardous Substances and Chapter 17 – Contaminated Sites.

8.4.12 Reasons

Policy 8.4.10-1 requires discharges and wastes to be avoided or mitigated in accordance with sections 5 and 15 of the RM Act. Cleaner production and waste minimisation lessens the quantity and noxiousness of substances on-site. This means that if an accidental discharge occurs, adverse effects on water quality will be lessened. Good site management such as bunding, spill contingency planning and maintenance of equipment, etc. reduces the potential for spills, and ensures that if any accidental discharges do occur, the extent and duration of the discharge is minimised.

Urban and rural industrial and trade activities producing trade wastes should be located in serviced areas so that such wastes can be discharged to an appropriate treatment facility. If these activities are located in an unserviced area, trade wastes need to be suitably stored and collected for appropriate treatment. The preferred option is for these activities to locate in serviced areas, as there is more potential for pollution to occur if trade wastes are stored and collected. However, it would be unfair to require this of existing and proposed new industries which have established appropriate collection and disposal systems. Accordingly, Policy 8.4.10-2 provides for discharge and/or trade waste permits to be granted, where appropriate, to enable flexibility as to the option chosen to avoid adverse effects.

In areas where there has historically been no barrier or separation between industries and water bodies/coastal waters, there has been a tendency for the storage of equipment and substances directly adjacent to water bodies/coastal waters, resulting in water pollution from spillages and litter. The aim of Policy 8.4.10-3 is to discourage these practices.

Urban and rural industrial and trade activities have a responsibility to avoid, remedy, or mitigate the adverse effects of discharges from their activities. A number of methods can be used to achieve this, including the implementation of effective containment systems, the use of cleaner production, spill contingency and response and good site management practices.

The ARC will assist in this through the development of an Industrial and Trade Pollution Programme and a regional plan for rural activities. The Industrial and Trade Pollution Programme will consider methods (including the development of codes of practice and guidelines,

implementation of a regional plan and an education programme) and determine the most efficient and cost effective courses of action. The regional plan for rural activities will include methods to avoid or mitigate discharges from activities such as dairy sheds, piggeries, factory farms, silage stacks and pesticides, fertilisers and herbicides. Both will be prepared in conjunction with user groups. The ARC will also continue to carry out pollution abatement work to complement the above methods.

8.4.13 Policies: Maritime activities

Refer to Chapter 7 – Coastal Environment for other policies relating to the coastal environment.

1. ***Adverse effects of discharges from maritime activities shall be avoided, remedied, or mitigated.***
2. ***The introduction of undesirable aquatic species via discharges (including ballast water) shall be avoided.***

8.4.14 Methods

The ARC will include provisions in the Regional Plan: Coastal to control discharges to the CMA. With regard to ballast water, the ARC advocates measures at a national level to avoid the introduction of undesirable aquatic species.

8.4.15 Reasons

Maritime activities are generally those activities which are located in the CMA and discharge directly to the CMA, and include:

- (i) discharges of water and sediment as an integral part of the activity of dredging and the disposal of dredgings;
- (ii) discharges from vessels and off-shore installations;
- (iii) discharges from marinas, marine farms, foreshore structures and reclamations;
- (iv) discharges of water and sediment as an integral part of the activity of sand, shingle, and mineral extraction.

Where discharges from activities on land occur to other water bodies as well as to coastal waters, rules will be included in regional plans. The Regional Plan : Coastal and regional plans will be cross-referenced to each other, as appropriate. Discharges to the CMA will also need to

comply with any minimum standards detailed in the Regional Plan: Coastal. A method is included in the Regional Plan: Coastal on ballast water discharges as the introduction of undesirable marine organisms through ballast from foreign vessels is potentially a significant threat to water quality. While there is overlapping jurisdiction, the ARC considers that management appropriately lies with the Ministry of Agriculture and Fisheries under the Biosecurity Act.

The Maritime Transport Act 1994 provides that all New Zealand and foreign oil tankers and any off-shore installation and oil transfer site in the CMA, will be required to prepare and implement oil spill contingency plans. The ARC is required to appoint an on-scene commander and prepare and implement a Regional Marine Oil Spill Contingency Plan.

8.4.16 Policies: Sewage reticulation and disposal

1. *Discharges of raw or treated sewage to water bodies or coastal waters (excluding sewage discharges from vessels and combined sewer overflows) shall only be allowed where it can be demonstrated that:*

- (i) the option of disposing of sewage to water bodies or coastal waters better meets the purpose of the RM Act than any other disposal method including disposal onto land, and is the 'best practicable option';*
- (ii) there has been consultation with Tangata Whenua in accordance with tikanga Maori and due weight has been given to sections 6, 7 and 8 of the RM Act; (Refer also to Chapter 3 – Matters of Significance to Iwi)*
- (iii) there has been consultation with the affected community in determining the suitability of the treatment and disposal system;*
- (iv) the volume of the discharge and the level of contaminants has been minimised to the greatest extent practicable;*
- (v) the discharge after reasonable mixing will not give rise to any or all of the following effects:*
 - (a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;*

- (b) any conspicuous change in the colour or visual clarity;*
- (c) any emission of objectionable odour;*
- (d) any significant adverse effects on aquatic life;*
- (e) any significant adverse effects on amenity values;*
- (f) any significant degradation in the microbiological quality of the receiving environment, which would adversely affect fish and shellfish;*
- (g) any significant adverse effects on the current and reasonably foreseeable use of the receiving environment for recreational purposes and the suitability of fish and shellfish for consumption;*

(vi) the location of the discharge is such that:

- significant adverse effects on the identified values of any Coastal Protection Area 1, Tangata Whenua management areas, or significant freshwater ecosystems shall be avoided;*
- adverse effects on the existing or foreseeable use of the receiving water for recreation or the collection of shellfish for human consumption shall be minor;*

The following matters will be considered in assessing the significance of adverse effects on the use of the receiving waters for recreation or collection of shellfish for human consumption:

- (a) cultural and spiritual values;*
- (b) the nature and suitability of the waters for recreation or collection of shellfish for consumption;*

(vii) all the matters listed in the Fourth Schedule of the RM Act have been fully considered in determining the effects of the discharge on the environment.

2. *Combined sewers shall be upgraded to reduce overflows to a practical minimum.*

8.4.17 Methods

1. The ARC will prepare a strategy or include provisions in a regional plan to:

- (i) *require the operators of sewage pumping stations to submit a programme to the ARC for approval to manage and/or upgrade facilities so as to avoid, remedy, or mitigate the adverse effects of discharges;*
- (ii) *avoid, remedy, or mitigate the adverse effects of discharges from on-site effluent disposal systems.*(ii)
- (iii) *the ARC will prepare a strategy or include provisions in a regional plan to require Combined Sewer Overflow (CSO) operators to submit a programme to the ARC for approval to upgrade combined sewers, to ensure discharges from combined sewer overflows and the effects of these overflows are minimised as far as practicable. The programme will include time frames for upgrading, and a monitoring programme.*

Note: Where different parts of a CSO system are operated by more than one authority, preparation and implementation of this Policy should be carried out jointly, with the responsibilities and duties of each authority defined.

Refer to Policies 8.4.4-1, 2 and 3. and Policy 8.4.21-2.

3. The ARC will encourage TAs to undertake proactive septic tank management programmes.

8.4.18 Reasons

The Transitional Regional Plan contains rules for on-site effluent disposal and these rules will be replaced by provisions in a regional plan prepared under the RM Act. Rules in a regional plan or strategy will include methods to reduce discharges from sewage pumping stations. A regional plan is not proposed for sewage treatment plants, as these need to be assessed on a site-specific basis.

Policy 8.4.16-2 and Method 8.4.17-2 require Combined Sewer Overflow operators to prepare and implement a programme to upgrade combined sewer overflows to an adequate standard. The reasons for establishing time frames for the preparation and implementation of the programme, as indicated in the method, are:

- that further investigations are needed to ensure that the techniques to be used to comply with the policy and method are the most appropriate;

- the costs involved are substantial and appropriate time frames need to be set to enable the work to be funded.

8.4.19 Policies: Solid waste disposal

Refer to Chapter 15 – Waste: Policy 15.4.4.

8.4.20 Methods

The ARC will include provisions in a regional plan to avoid, remedy, or mitigate the adverse effects of discharges from solid waste disposal activities.

8.4.21 Policies: Areas susceptible to water quality degradation/areas that are already degraded/areas that have significant values

1. *In identifying new areas for urban development outside the Metropolitan Urban Limits and, in the case of rural and coastal settlements, the extent of existing urban zones, catchments which drain to areas susceptible to degradation (as detailed in Tables 8.1 and 8.2 and Map Series 5 Sheets 1 – 4) shall be avoided unless the best overall option determined by the process outlined in Policies 2.6.1(1) and (2) indicates otherwise and the adverse effects of new urban development (and, where appropriate, existing urban development) on water quality in that catchment will be remedied or mitigated.*
2. *In determining where it is appropriate for existing urban development to remedy or mitigate its adverse effects under Policy 8.4.21(1), consideration will be given to the significance of the adverse effect on water quality and the sensitivity of the receiving environment.*
3. *Priority shall be given to maintaining, and where possible improving, water quality in areas which are susceptible to degradation and/or have significant values (as listed in Tables 8.1 and 8.2 and shown in Map Series 5 – Sheets 1-4).*
Refer also to the policies under 7.4.7.
4. *Existing native vegetation on the riparian margins of estuarine, wetland and coastal areas and lakes and streams listed in Tables 8.1 and 8.2 shall be retained, in accordance with the policies of Chapter 6 – Heritage.*

8.4.22 Methods

1. *District plans, regional plans, and annual plans where appropriate, will give effect to Policies 8.4.21-1, 2, 3 and 4.*
2. *Methods for the ARC and TAs to achieve Policy 8.4.21-3 include:*
 - (i) *pollution abatement and control work, including focus on controlling contaminants at source;*
 - (ii) *stormwater quality control including retrofitting in existing urban areas;*
 - (iii) *drainage remediation programmes for illegal connections and combined sewer discharges, particularly for degraded urban streams and aquifers;*
 - (iv) *techniques to reduce nitrate contamination;*
 - (v) *riparian management techniques to protect water quality;*
Refer also to Chapter 6 (6.4.10-11) and Chapter 18.
 - (vi) *water quality education programmes.*
3. *The ARC will promote the use of riparian management techniques.*
4. *Methods for implementing Policy 8.4.21-2 will include the development of a Regional Stormwater Management Strategy which considers stormwater management issues in both new and existing urban areas. This strategy will be developed jointly by the ARC and the Region's TA s.*

8.4.23 Reasons

Policy 8.4.21-1 enables urban development to proceed in proximity to the areas listed in Tables 8.1 and 8.2, in accordance with Policies 2.6.1 and 2.6.2 in the Regional Overview and Strategic Direction Chapter 2.

Policy 8.4.21-3 and Method 8.4.22-2 require a greater level of protection to be given to the areas which have been found through ARC investigation and monitoring programmes to be particularly susceptible to water quality degradation and/or have significant values.

For areas which are susceptible to water quality degradation this does not mean that these waters have no assimilative capacity, as it is accepted that the degradation may be due to factors which are not affected by the input of certain contaminants or under certain

discharge regimes. Recognition of these factors enables resources to be allocated in an effective and efficient manner. These include the following:

Riparian Management

The ARC is investigating the use of riparian management techniques to avoid, remedy, or mitigate the effects of diffuse runoff, and protect and enhance aquatic habitats, in urban and rural areas. Riparian management techniques have three main components. These are retirement or protection of the riparian margin, establishment of suitable vegetation and ongoing management. The aim of the present investigation is to assess which techniques will be the most effective in the Auckland Region. All the options for implementing these techniques and the costs involved will be assessed prior to their implementation.

(Refer also to Chapter 18 – Esplanade Reserves and Strips.)

Research on Nitrate Contamination of Aquifers

The ARC is assessing the source of nitrate contamination in the volcanic aquifers in the Franklin district. If effective land use management techniques can be found to reduce contamination, an assessment of the costs involved and options for implementation will be carried out prior to their implementation.

Explanation of Tables 8.1 and 8.2 and Map Series 5

Tables 8.1 and 8.2 and Map Series 5 : Maps 1-4 detail water resources that are degraded, susceptible to degradation or have significant values. They have been generated from the ARC's existing resource quality database with input from other data sources where available including: Marine Habitat Mapping for the Auckland Region (NIWA, 1994), the Waitemata and Manukau Harbour Maritime Planning Schemes (Conservation and Habitat Zones), Sites of Special Wildlife Interest: National Habitat Register (DoC) and Wetlands of Ecological and Representative Importance (DoC). They represent our current state of knowledge of the quality of the Region's aquatic resources. They contain more information on significant aquatic ecosystems in coastal waters than in freshwater. The ARC in consultation with relevant agencies will carry out further work to identify significant freshwater aquatic ecosystems including developing a regional evaluation methodology.

The ARC accepts that the current database does not allow definitive statements to be made about every waterway and that amendments will be required as further information comes to hand.

A range of criteria were used to determine which water bodies were significantly degraded including :

- (i) bacterial indicator organisms;
- (ii) trace metal levels in sediments;
- (iii) synthetic organic contaminant levels in sediments;
- (iv) suspended sediment levels.

The levels of contaminants were compared to national guidelines for environmental protection or internationally accepted criteria where national guidelines were not available.

8.4.24 Policy: Significant resource management issues for Tangata Whenua

Maori cultural and traditional values shall be recognised and provided for in the management of water quality.

(Refer to Chapter 3 – Matters of Significance to Iwi for methods, reasons and other relevant provisions.)

8.5 Environmental Results Anticipated

- (a) Water quality will be maintained or improved in streams, lakes, wetlands, groundwater and coastal waters that have good water quality.
- (b) Water quality will be maintained or improved in the parts of the Region where water quality has been degraded.

- (c) Maori cultural and traditional values will be recognised and provided for in the management of water quality.

8.6 Monitoring

The procedures that will be used to monitor the effectiveness of the objectives, policies and methods in this chapter include:

- (i) Long-term baseline surveys for freshwater and saline water quality, biological resources and air quality.

These will indicate whether water quality is being maintained and improved as per Objective 8.3 and Policies 8.4.1 and 8.4.21.

- (ii) Other monitoring programmes, pollution abatement control and special surveys targeted at specific problems will be undertaken as necessary.
- (iii) Compliance monitoring of ARC discharge permits and land use consents, including monitoring of cumulative effects.

This monitors the effectiveness of Objective 8.3 and Policies 8.4.1 to 8.4.24.

- (iv) Monitoring of district plans and annual plans and TA land use applications, and monitoring of the results of ARC submissions;

This monitors Policies 8.4.4 to 8.4.24.

- (v) Reviews of objectives, policies and methods in ARC plans.

The ARC's annual monitoring results are available to the public, upon request.

Table 8.1.**Water bodies/coastal waters susceptible to water quality degradation and/or with significant values***See Map Series 5.***Shallow, permeable, unconfined volcanic aquifers**

Surface waters used for potable water supply at:

- Ohirangi Stream (Helensville),
- Mahurangi River (Warkworth),
- Hoteo River upstream of Wilson Road (Wellsford),

and those parts of the:

- Hays Creek Stream
- Waitakere River
- Nihotupu River
- Huia River
- Cosseys Creek
- Mangatawhiri River
- Wairoa River
- Mangatangi River

and their tributaries above their respective water supply dams.

Areas susceptible to degradation because of tidal flushing characteristics, or indeterminate due to higher flushing characteristics.

- Lakes susceptible to degradation.
- Wetlands.
- Marine habitats of special value.

Water bodies and coastal waters, including the Hauraki Gulf, which are identified in regional plans as being of high value for ecological, cultural, recreation, amenity, water supply, shellfish gathering, marine farming, and other values.

Table 8.2.**Water bodies/coastal waters with significantly degraded water quality.***See Map Series 5.*

Areas of the Manukau and Waitemata harbours, including the Tamaki estuary, as shown on Map Series 5, Sheets 1 and 2.

Shallow, Permeable, Unconfined Volcanic Aquifers in the Franklin District, East Tamaki and Mount Smart/Penrose

Lakes Kuwakatai, Slipper and Spectacle.

The following urban streams:

- Annes Creek
- Cox's Creek
- Edgars Creek
- Glendowie Stream
- Greenmount Stream
- Unnamed creek at the corner of Bowden – Carbine Road, Mt Wellington
- Meola Creek
- Motions Creek
- Newmarket Gully
- Omaru Creek
- Otahuhu Creek
- Otara Creek
- Oteha Stream
- Papakura Stream (lower)
- Puhinui Stream
- Southdown Stream
- Wairau Creek

The following rural streams:

- Ngongetepara Stream
- Hays Stream
- Whangapouri Stream
- Otara Stream (upper)