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Appendix 1 – Explanation/Principal Reasons for Provisions

This appendix outlines the explanation and principal reasons for provisions in this regional plan. The contents of this appendix were previously included in previous versions of the regional plan in the relevant chapters.

IM Integrated Management of Land and Water

The objectives, policies and methods in the Integrated Management of Land and Water section are necessary to promote the sustainable and integrated management of water and soil resources in the Bay of Plenty region. The Regional Council aims to maintain good quality and quantity of groundwater and surface water, and ensure that soil is used in a sustainable manner. The long-term water quality management goal is to ensure that there is a net improvement in water quality across the region. The principle of water quality improvement, where achievable and practicable, has been adopted in this regional plan, and priority areas identified for targeted action (i.e. the Rotorua Lakes). This is consistent with Community Outcomes – Water in the Regional Council's Long Term Council Community Plan. The provisions also provide a framework for specific policies, methods and rules relating to discharges, water quantity, beds of streams, rivers and lakes, and wetlands. The Strategy for the Lakes of the Rotorua District provides a forum for developing co-operative integrated management approaches between the Regional Council, Rotorua District Council and Te Arawa Maori Trust Board. The Regional Council's Pest Management Strategy addresses biosecurity issues of plant and animal pests. By addressing biosecurity issues the adverse environmental issues of animal pests on soil conservation values are managed. Other mechanisms under the Pest Management Strategy, such as Environmental Programmes and Care Groups, also help address those effects.

Heritage matters are addressed in greater depth in the Bay of Plenty Regional Policy Statement, and relevant objectives and policies are cross-referenced in this regional plan. It is not efficient to replicate or amend provisions that have already been developed through a prior public process. Refer to Table A1 1 for the responsibilities of regional councils, city and district councils, and other resource management agencies with regards to heritage matters. Resource consent applicants are to identify means to avoid, remedy or mitigate adverse effects on the environment, including heritage values, in their consent application.

IM M10 links to the Criteria for Assessing Specified Matters in the Bay of Plenty Region in the Bay of Plenty Regional Policy Statement, which establish significance criteria to enable appropriate assessment of the values at an activity site. IM M10 applies when a resource consent is required under a discretionary rule; or a controlled or restricted discretionary rule where the Regional Council retains control or discretion over a heritage matter. In relation to Maori cultural values, the Regional Council has an existing iwi database (refer to KT M10) to identify appropriate contacts for consultation in the area of the activity site. Registered historic sites have also been mapped. Information on iwi contacts and registered historic sites are available on request and free of charge. Over time the Regional Council will also use the Criteria for Assessing Specified Matters in the Bay of Plenty Region to identify and record significant areas and sites. It will then be possible to schedule such areas and sites in relevant regional plans via publicly notified plan change process.

IM M26 sets the methodology used to establish the Water Quality Classifications for rivers, streams and lakes in the Bay of Plenty region. This follows from IM O3, which clearly identifies the water quality management goals for each classification. Appropriate classifications are applied to each water body in relation to existing environmental quality, aquatic ecological values, and human use values. The management goals in IM O3 will be achieved through the discharge standards and criteria in Schedule 9 (which apply to discretionary discharges to water under DW R8), and various other non-regulatory and regulatory methods in the regional plan. Any change to the Water Quality

Classifications under IM M25 will be via a plan change process in accordance with the Act. IM M23 will be implemented over time as priority catchments and contaminants are identified. Assessment and determination of site-specific toxicity limits will provide certainty for resource consent applicants.

The intent of the methods is to ensure an appropriate mix of ways to achieve sound management of water and soil resources. Education, provision of information and advice (IM M1, IM M2, IM M3, IM M4, LM M1, IM M1, KM M2, LM M3, LM M4, LM M5, LM M6, LM M7, LM M8, LM M9)) is often used as a first method of addressing adverse effects of use and development on water and soil resources. The

Bay of Plenty community believes that raising awareness of issues and ways to address those issues can be more effective than other methods. It is effective and efficient to work with other members of the community to achieve sustainable management, as noted in IM M5, IM M6, DW M19, RL M2, RL M3, LM M14, and IM M8 is a successful existing method used by the Regional Council in conjunction with pastoral landowners to endeavour to achieve sustainable management in the region, on the basis that preventative soil conservation works are one means of avoiding or mitigating erosion. In IM M20 and IM M21 the Regional Council has chosen to use rules to control the adverse effects of a selection of use and development activities. It is particularly important to note that rules will be used to address the risk of adverse effects from use and development activities; where there are actual or potential effects of high probability, or actual or potential effects of low probability but with high potential impact.

Under section 35 of the Act, the Regional Council has a duty to gather adequate information to understand the appropriate management of water, soil, geothermal and wetland resources and to determine the effectiveness of provisions in this regional plan, and monitor the state of the environment. Identification of research requirements relating to water, soil, geothermal and wetland resources will be an ongoing process. Such research may be conducted where cost effective (i.e. where information is needed to accurately manage and sustain the resource, and the risks to the resource are high). This is particularly relevant to investigating the quality and quantity of groundwater resources. Research may be carried out in conjunction with other resource management agencies, tangata whenua, and interest groups where appropriate. IM M14 is to establish environmental monitoring programmes with the community, such as the Stream Sense programme, to allow members of the community to monitor the state of their local environment themselves. In relation to IM M15,

Table A1 1 describes the NERMN monitoring modules that are relevant to this regional plan.

Table A1 1 NERMN Modules Relevant to the Regional Plan

	NERMN Module	Indicators Monitored
(a)	Meteorological	Rainfall monitoring, and other aspects of the weather cycle where necessary and appropriate.
(b)	Surface hydrology	River level and flow monitoring, lake level monitoring, groundwater monitoring and continuous water quality monitoring. Includes monitoring river flows in their natural state during periods of low flow, as seasons permit.
(d)	Groundwater	Quality and quantity of groundwater, including the level of nitrate.
(e)	Water Quality	Water quality in rivers, streams and lakes – bacterial, cyanobacterial toxin levels and nutrient levels in surface water, ionic balance and metals/pesticides, monitoring of bathing sites in accordance with the Ministry of Health/Ministry for the Environment Bathing Standards Guideline (1999) ⁵⁵ , emergence and bloom of water-weed and algae, and natural influences on water quality where appropriate. Includes assessing the effects of low water flows on water quality.
(f)	Freshwater Ecology	Condition of aquatic ecosystems using macroinvertebrate, macrophyte, fish communities, instream habitat and riparian vegetation monitoring.

⁵⁵ Ministry of Health/Ministry for the Environment, November 1999. Recreational Water Quality Guidelines, New Zealand.

	NERMN Module	Indicators Monitored
(g)	River and Stream Channel	Monitoring of gravel movement and effects of gravel extraction using cross-sections of selected rivers.
(h)	Land Sustainability	Land cover and use, soil health (quality), and soil intactness.
(i)	Wetlands	Extent and condition of wetlands.
(j)	Terrestrial Ecology	Extent and condition of terrestrial ecosystems.

The objectives, policies and methods in this section of the regional plan are to achieve the integrated management of natural resources in the region, and to address the effects of use and development activities on water and soil resources, and heritage values. The management of physical resources that cross catchment boundaries, such as state highway and other roading networks, are not subject to these provisions. However, the adverse effects of such resources are addressed under various sections of this regional plan, including Stormwater Discharges (in Discharges to Water and Land section), Activities in the Beds of Water Bodies (e.g. roading culverts and bridges), and rules restricting earthworks (in Land Management section).

It is recognised that a range of methods in this regional plan will be used to achieve integrated management, including sub-catchment management, and methods addressing specific areas within a catchment.

Where the implementation of IM M6 and IM M19 identifies that specific provisions (including regulation) are necessary to control the effects of activities on water quality in the catchments of municipal water supplies, or the recharge areas of potable groundwater supplies, such provisions will be included in district plans or relevant regional plans through formal plan change or variation processes in accordance with the requirements of the Act. Part of the implementation of these methods will include consultation with the community, particularly landowners in the affected areas.

LM Land Management

The retention or enhancement of vegetative cover, particularly in riparian areas, is necessary to maintain water quality, reduce erosion, and maintain or improve terrestrial and aquatic habitats in the region. Riparian areas are areas of land that require appropriate management that may be more restrictive or different to that on land further away from water bodies. This is recognised in the rules in this regional plan, and in the emphasis placed on riparian management in non-regulatory methods. Depending on the primary management objectives for individual riparian areas, management need not be “no go” (i.e. precluding the possibility of economic use). It is possible, for example, that if the objective is primarily water quality in the stream, then the riparian area could be planted in high quality, long rotation trees. This would be economic to harvest in small quantities (possibly selectively rather than by clear felling), with great care, and over long time periods. If, however, the primary objective is indigenous habitat protection, then management would effectively be complete retirement. The implementation of LM P3 is especially relevant in riparian areas, but also other sensitive environments, such as lakes and recharge areas of important aquifers.

DW Discharges to water and land

Discharges to water and land

The provisions in this chapter are necessary to achieve sustainable management of water and soil resources in the region, and to provide specific guidance on the management of discharges in the Bay of Plenty. The objectives, policies and methods are also to achieve the water quality, soil health, heritage values, and mauri objectives in the Integrated Management of Land and Water, and Kaitiakitanga sections of the regional plan.

DW P1 is required to implement RL O1 and IM O3 (in the Integrated Management of Land and Water section), and achieve the TLIs of lakes, the Water Quality Classification of lakes, rivers and streams, and take account of the water quality classifications of the Coastal Marine Area. In relation to Policy 38(b)(vii), dam owners are not required to gain consent for a discharge of contaminants to water, except in relation to dredging activities, but are subject to requirements for a discharge of water to water. Water from upper catchment areas flowing over or through a dam structure is not considered to be 'contaminant', and dam owners and operators are not responsible for the water quality resulting from activities in the catchment above the dam. The effects of discharges of contaminants on community health and safety are addressed through the use of Water Quality Classification standards and criteria, and assessing the effects of the proposed discharge of aquatic ecosystems. Two of the Water Quality Classifications, Water Supply and Contact Recreation, are specifically to protect human use values. Public health is protected by default by setting maximum contaminant levels to protect aquatic ecosystems. However, health and safety is not a primary responsibility of regional councils.

DW O3, DW P2 and DW P3, and DW M3, DW M4, DW M19, DW M20 are a proactive approach to the management of hazardous spills. The provisions recognise that city and district councils have a major role in the management of hazardous substances under the Hazardous Substances and New Organisms Act 1996. Matters relating to the management of hazardous substances and wastes are also addressed in The Regional Council's 'Management Strategy for Hazardous Substances, Waste and Contaminated Sites'⁵⁶ and may also be addressed in district plans.

DW P5 and LM M25, DW M30 are to address the effects of discharges on the mauri of water resources.

DW P8 and DW R8 are to prevent activities that are not acceptable to the wider community, and have adverse effects that may be difficult to remedy or mitigate.

IM O3 and IM P1 state that it is the intent of this regional plan to manage water quality to meet specific water quality classification standards and criteria. Schedule 9 contains the standards and criteria relevant to discharges. The Water Quality Classification map shows which standards and criteria have been applied to individual streams, rivers and lakes in the region in accordance with the criteria in IM M26. IM P6 and IM M25 will be implemented to review and update the water quality classifications. It is the intent of the regional plan to periodically review the water quality classification map to ensure the most appropriate classification applies to a water body, including upgrading a classification where it is necessary to enhance degraded water quality. Any review will be promulgated through a plan change process in accordance with the Act. LM M22 will be used where an existing discharge does not comply with the relevant water quality classification, or upgraded classification.

⁵⁶ The Bay of Plenty Regional Council, Opotiki District Council, Western Bay of Plenty District Council, Rotorua District Council, Tauranga District Council, Whakatane District Council, Kawerau District Council, 2003. Bay of Plenty's Draft Regional Waste Strategy.

Discharge of Stormwater

The provisions are necessary to address stormwater discharges, which are a significant activity in the Bay of Plenty. The provisions recognise and clarify the different functions of the Regional Council, the city council and district councils under the Act and other relevant legislation, as summarised in Table 1. This is an efficient and effective means to resolve stormwater management issues.

An appropriate mix of rules (including comprehensive catchment discharge consents), education, and working with the city council and district councils has been developed to achieve management of stormwater quality and quantity. Many of the methods follow the approach taken in Auckland Region as the approach has proven to be successful, and there are common issues between Auckland and the Tauranga/Western Bay of Plenty area (e.g. high urban growth in a sensitive harbour area).

DW O8, DW P14 and DW M40 are necessary to achieve integrated management of land use and stormwater. Integrated management is a major aim of this regional plan. It is recognised that management of stormwater within a catchment or sub-catchment framework may be problematic in relation to roads and state highways, and that alternative management approaches may be more appropriate in such circumstances. DW O9 and DW O11, DW P10, DW P14, and DW P15, and DW M42 encourage Low Impact Design, which is an efficient means of achieving integrated management and reducing the adverse effects of urban areas. Where there is a resource consent for a discharge of stormwater to water: the Regional Council will consider the requirements of DW O1 and DW O12, and DW P1, DW P14, and DW P15. These provisions provide for discharges to water (subject to reasonable mixing and compliance with the relevant water quality classification), while indicating the Regional Council prefers treatment of stormwater at source rather than reliance on the assimilative capacity of receiving environments. DW O9 requires stormwater discharge quality to be improved where the discharge is adversely affecting the environment. The most effective and practical options for improvement will be determined on a site by site basis. In some situations it may be more practicable to reduce adverse effects by changing from a discharge to water, to land soakage.

Table A1 2 Responsibilities for Stormwater Management

Responsibility	Bay of Plenty Regional Council	City and District Councils	Roading Authorities
Management of stormwater systems and associated infrastructure (flooding purposes)	No	Yes Function of city and district councils under the Local Government Act 1974.	Yes Only in relation to roading.
Treatment of stormwater (as appropriate to the circumstances)	No	Yes Where necessary to meet consent requirements	Yes Where necessary to meet consent requirements
Authorisation of discharges from stormwater systems to water (as defined in the Definition of Terms)	Yes Regional council function under s15 and s30 of the Act, unless the function is transferred to a city or district council.	No Unless the function has been transferred to a city or district council for an area covered by a Comprehensive Stormwater Consent.	No
Monitoring stormwater quality at point of discharge	Yes Compliance and impact monitoring of discharge consents.	Yes If required as part of resource consent	Yes If required as part of resource consent
Authorisation of discharges into piped stormwater systems	No	Yes	No

Responsibility	Bay of Plenty Regional Council	City and District Councils	Roading Authorities
Enforcement action under the Act for discharge of contaminants to stormwater system (prosecution may be taken at point of discharge or end of pipe depending on the circumstances)	Yes	Yes	Yes

Note: Table A1 2 includes functions under the Act, Local Government Act 2002 and the Transit New Zealand Act 1989.

Where there is a discharge of contaminants to a stormwater system, and it breaches the standards established in resource consent conditions for the stormwater system (or permitted activity rule conditions), prosecution may be taken against the operator of the stormwater system, or the discharger to the stormwater system, depending on the circumstances. Persons using stormwater systems as a means to discharge contaminants must be responsible for the appropriate treatment of their discharge to meet appropriate standards. It is recognised that contaminants from upstream areas and unauthorised discharges can enter stormwater systems, which is often beyond the control of the operator of the stormwater. However, the owners and operators of stormwater management systems, including roading authorities, are to take all practicable steps to avoid, remedy or mitigate the adverse effects of stormwater discharges.

The Comprehensive Stormwater Consents ('CSC') mentioned in DW M36 are a means of implementing integrated management of stormwater with catchment (or sub-catchment) frameworks (refer to DW O8 and DW P14). CSC's are required for priority catchments, which will be identified by the Regional Council, the city council and district councils, and documented in the Stormwater Strategy for the Bay of Plenty Region. Priority catchments are identified through a process that identifies where there are significant environmental issues, then overlays additional problem areas relating to city and district councils' concerns (e.g. flooding of urban areas or roading) to give a hierarchy of areas where action is necessary. CSC's are the preferred approach for managing stormwater within urban catchments, and define the overall parameters within which stormwater, and effects on the environment, are managed within a catchment. The CSC may cover a range of stormwater management activities within the specified area, including, but not limited to, stormwater discharges, associated structures (e.g. culverts, etc), maintenance of open stormwater drains, treatment devices, and damming and diversion of water. A CSC may be as broad or as limited as the resource user defines in their resource consent application, and are applied for under DW R8 as a discretionary activity. The consent conditions allow city and district councils to manage stormwater within the overall parameters without requiring individual consents, and set limits on the quality and quantity of stormwater discharges to the environment. Stormwater standards in CSC's will be different than those in DW R9 (which is only for small-scale, individual activities). DW P15, DW P17, DW P18 and DW P19, and DW M22, DW M23, DW M24, DW M30, DW M40, DW M41, DW M42 and DW M43 are also relevant to stormwater management under a CSC.

In relation to Table A1 2 and the implementation of the CSC, it is the intent of the regional plan to provide for the transfer of powers under section 33 of the Act to allow city and district councils to control activities associated with stormwater management in areas covered by a CSC. This may include stormwater discharges to streams, rivers and open drains, depending on the authorisation in the CSC. Individual section 33 transfer document will specify those functions that are transferred from regional council to the city or district council, and how the transfer will affect the regulatory control of activities not specified in the CSC. However, city and district councils will be required to have appropriate regulatory controls to enable appropriate management of discharges to stormwater systems.

It is intended that DW P17 and DW M25 will be implemented through the combination of the identification of high risk facilities as listed in Schedule 4 of this regional plan, and the Drainage Map, which is maintained by city and district councils in accordance with the requirements of the Local Government Act 1974 to show the size and location of stormwater pipes.

As stated by DW O13 and DW P21, it is the intent of this regional plan to encourage the discharge of stormwater to land soakage, where this is appropriate to the environmental limitations of the site. Land soakage is preferable to discharges to surface water bodies. Low Impact Design of urban areas (e.g. minimising the area of impermeable surfaces and retaining natural flood retention areas), and innovative management of stormwater (e.g. swales, land soakage, wetlands, infiltration systems, reuse of stormwater) are emphasised in DW M23, DW M24, DW M42, DW M43 and DW M44. DW R22 and DW R23 specifically provide for the discharge of stormwater to land.

Contaminated Land

The provisions in the Contaminated Land section are necessary to remedy or mitigate the significant adverse effects of contaminated land on the soil and water resources of the region. Avoiding land contamination by discharges to land and hazardous spills is addressed by the provisions of the Discharges to Water and Land section of this regional plan. DW O16, DW P21 to DW P26, and the Methods of Implementation are consistent with the requirements of the Act and national policy from the Ministry for the Environment.

The remediation of orphan contaminated land and innocent polluter issues are to be clarified by central government. In 2005 there are five guidelines by the Ministry for the Environment on contaminated site management in various states of completion or consultation. Central government has issued a policy on orphan sites and innocent polluter matters to state that legislative changes are needed to clarify the matters. DW P26 states that orphan contaminated land will be managed in accordance with national policy. There is an existing national fund for contaminated land remediation, although landowners must apply through regional councils to obtain funding.

With regards to DW P22, guidelines for the assessment and management of contaminated land are often revised and new guidelines are added as appropriate. Current examples of national guidelines include:

- (a) Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Ministry for the Environment, June 1999⁵⁷.
- (b) Guidelines for Assessing and Managing Contaminated Gasworks Sites in New Zealand, Ministry for the Environment, August 1997⁵⁸.
- (c) Health and Environment Guidelines for Selected Timber Treatment Chemicals, Ministry for the Environment, June 1997⁵⁹.

DW P21 to DW P26 and DW M45 to DW M52 are consistent with the responsibilities of the various parties described in Table A1 3 as determined by legislation.

Table A1 3 Responsibilities for Contaminated Land

Person or Agency	Responsibility
	Prevent: Prevent contamination of land or water with hazardous substances
Landowner or occupier	Avoid, remedy or mitigate any adverse effects of their activities (RMA). Apply for resource consent for any discharge of contaminants to land from industrial or trade premises, unless it is allowed by a regional plan (RMA).
Regional Council	Regulate discharges of hazardous substances to land (RMA). Monitor and enforce compliance with the RMA and regional plan rules (RMA).
City and District Councils	Regulate the establishment and operation of activities that use hazardous substances (RMA, BA, HSNO). Monitor and enforce compliance with the RMA and district plan rules (RMA).

⁵⁷ Ministry for the Environment, June 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated sites in New Zealand. Wellington, New Zealand.

⁵⁸ Ministry for the Environment, August 1997. Guidelines for Assessing and Managing Contaminated Gasworks sites in New Zealand, Wellington New Zealand.

⁵⁹ Ministry for the Environment, June 1997. Health and Environment Guidelines for Selected Timber Treatment Chemicals. Wellington, New Zealand.

Person or Agency	Responsibility
Other Agencies ^a	Various responsibilities for regulating hazardous substances use (HSNO).
	Information: Provide information about whether land is or may be contaminated with hazardous substances
Landowner or occupier	Provide relevant information about land contamination to a district council or the Regional Council when applying for resource consents (RMA).
Regional Council	Provide relevant information about land contamination to members of the public who request it (LGOIMA).
City and District Councils	Provide relevant information about land contamination to members of the public who request a Project Information Memorandum (BA) or Land Information Memorandum (LGOIMA).
Other Agencies	N/A
	Investigate: Investigate the nature and effects of land contamination
Landowner or occupier	No specific obligation to investigate contamination except under the general responsibility to avoid, remedy or mitigate adverse effects, or if required to by the Regional Council (RMA), a district council (RMA, HA) or another agency.
Regional Council	Investigate or encourage/ensure investigation of contaminated land to assess whether they comply with the RMA and regional plans (RMA). Identify and rank contaminated land by level of risk.
City and District Councils	Investigate or encourage/ensure investigation of contaminated land to assess whether they comply with the RMA and the district plan (RMA).
Other Agencies	Investigate or encourage/ensure investigation of contaminated land to assess whether they comply with other legislation (HA, HSEA).
	Regulate land use: Regulate how contaminated land can be used (what activities can take place there)
Landowner or occupier	N/A
Regional Council	Regulate activities occurring on contaminated land, such as earthworks, that may cause discharges (RMA).
City and District Councils	Regulate activities occurring on contaminated land that do not comply with the RMA or the district plan, except if they are allowed by existing use rights (RMA).
Other Agencies	Regulate activities occurring on contaminated land that do not comply with other legislation such as the Health Act and the Health and Safety in Employment Act.
	Ensure appropriate management: Ensure remediation or other appropriate management of contaminated land.
Landowner or occupier	N/A
Regional Council	Ensure remediation or other appropriate management if the contamination is causing, or is likely to cause, effects on the environment that do not comply with the RMA or regional plans (RMA).
City and District Councils	Ensure remediation or other appropriate management if the contamination is causing, or is likely to cause, effects on the environment that do not comply with the RMA or the district plan (RMA).
Other Agencies	Ensure corrective action if the contamination is causing, or is likely to cause, effects on health and safety (HA, HSEA).
	Regulate remediation: Regulate how contaminated land is remediated (cleaned up)
Landowner or occupier	N/A
Regional Council	Regulate discharges to water or air caused by remediation, earthworks and similar activities on contaminated land (RMA).
City and District Councils	Regulate effects on the environment, other than discharges to water or air, caused by remediation, earthworks and similar activities on contaminated land

Person or Agency	Responsibility
	(RMA).
Other Agencies	Require compliance with other legislation during remediation, earthworks and similar activities on contaminated land (HA, HSEA).

Note:^(a) 'Other agencies' include the Environmental Risk Management Agency, the Medical Officer of Health and the Occupational Safety and Health Service of the Department of Labour.

Key to abbreviations

BA	Building Act 2004
ERMA	Environmental Risk Management Authority (responsible for administering the HSNO Act)
HA	Health Act 1956
HSEA	Health and Safety in Employment Act 1992
HSNO	Hazardous Substances and New Organisms Act 1996, and related Acts such as the Dangerous Goods Act 1974
LGOIMA	Local Government Official Information and Meetings Act 1987
RMA	Resource Management Act 1991

Water Quantity and Allocation

Damming and Diversion of Water

WQ P32 identifies the adverse effects of damming and diversion that are of particular concern to the Regional Council, and the requirements link to other sections of the regional plan, including take and use of water, land and water integration, and beds of streams, rivers and lakes. Both WQ P32 and WQ P34 provide guidance to the community about how existing and new damming and diversion activities are to be managed.

WQ P37 and WQ M10 and WQ M11 are efficient means of avoiding or mitigating the adverse effects of land use and development on natural water flowpaths. WQ M12 is to allow for the remediation of such effects. WQ R21 will be enacted where there are significant adverse effects on natural water flowpaths (including flood flow paths) resulting from land use and development.

Control of Water Levels in Natural Lakes

The provisions are necessary to avoid the adverse effects of artificial control of lake water levels and difficult associated management issues, while allowing for existing lake level controls.

WQ P41 and NH M4 are an efficient means of recognising the primary responsibilities of the city council and district councils to control land use and development under the Act and the Building Act 2004. It is often more efficient to avoid development in hazard areas, than to control the potential hazard of rising lake levels.

The 2% AEP levels in WQ P39 have been calculated for each lake using hydrological data collected by The Regional Council and its predecessors, and include freeboard to account for:

- (a) Estimate imprecision - 0.3 metres.
- (b) Local wind setup (generated by wind stress across the lakes) – 0.2 metres (depending on bathymetry and fetch).
- (c) Wave run-up – 0.3 metres (depending on the slope of the beach).
- (d) Seiche – 0.1 metres (depends on location).
- (e) Construction tolerances – 0.1 metres (allows for minor levelling errors and ground settlement due to the weight of a building).
- (f) The likely joint probability of the above factors bearing in mind that lake levels can remain elevated for several days (or even months).

WQ P40 and WQ M13 recognise that more appropriate control levels may be established in specific circumstances.

WQ P42 is an important means of educating the community to avoid certain activities in floodable areas around lakes, to understand and provide for natural fluctuations in the environment, and maintain realistic expectations in relation to lake level control.

BW Beds of Water Bodies

Activities in the Beds of Water Bodies

The provisions in this regional plan relating to activities in, on, under or over the beds of rivers, streams and lakes are necessary to achieve the integrated and sustainable management of surface water bodies and heritage values (particularly ecological values), in relation to soil conservation, water quality, water quantity and flood hazard management. The provisions link to the Strategy for the Lakes of the Rotorua District (August 2000)⁶⁰, the Bay of Plenty Pest Management Strategy 2003-2008⁶¹, and provisions in the Integrated Management of Land and Water section of this regional plan.

BW O4, and BW P2 and BW P3 are applicable to all activities in, on, under or over the beds of rivers, stream and lakes and signal to the community those adverse effects that are of particular concern to the Regional Council. BW P4, BW P7, BW P9, BW P10 and BW P11, and BW M9 and BW M10 provide guidance on what activities are discouraged or preferred in relation to environmental effects. BW M1 to BW M10 are also to encourage activities to be carried out to avoid, remedy or mitigate adverse effects. In relation to BW O1, temporary adverse effects on aquatic habitats from an activity can be accounted for by resource consent conditions.

BW P2 and BW P5 recognise that there are many existing structures and it may not be possible or equitable to avoid or remedy adverse environmental effects in these circumstances. BW P6 and BW M17, BW M21, BW M22, BW M23 and BW M27 specify the actions that will be taken to address derelict structures. In relation to BW P5, the Regional Council will initially assume any existing structure in, on, under or over the bed of a stream, river or lake is an 'authorised' structure, unless there is an adverse effect on the environment from the structure. The onus will then be on the owner or user of that structure to provide evidence of authorisation, and to comply with the requirements of this regional plan.

BW P10 specifies lakes that are identified as having high natural character in the Strategy for the Lakes of the Rotorua District.

The implementation of BW M12 will be a priority to the Regional Council due to the linkages to various permitted activity rules in this regional plan, and to maintain or enhance aquatic habitats. In the interim, fish passage devices and designs have been investigated and documented by NIWA and other agencies; and advice on the maintenance, enhancement or reinstatement of aquatic habitats may be obtained from the Regional Council, the Department of Conservation, or Fish and Game New Zealand.

BW P14 will be implemented when assessing resource consents for activities in, on, under or over the beds of streams, rivers or lakes; and land disturbance activities. It is recognised that maintaining public access to and along the margins of rivers and lakes is a matter of national importance under section 6(d) of the Act. However, there are circumstances where public access is not appropriate. These are listed in BW P14 to provide certainty to resource users.

⁶⁰ Te Arawa Maori Trust Board, Environment Bay of Plenty, Rotorua District Council, August 2000. Strategy for the Lakes of the Rotorua District.

⁶¹ Environment Bay of Plenty, 2003. Bay of Plenty Regional Pest Management Strategy 2003-2008. Environment Bay of Plenty, New Zealand.

Stock in Surface Water Bodies

The intent of BW O8 and BW O10 is to ensure landowners manage adverse effects of stock on streams, rivers, lakes and wetlands, and their existing uses of the surface water body. The policies and methods in the Stock in Surface Water Bodies section are necessary to achieve the soil conservation, water quality, aquatic habitat and wetland objectives of this regional plan. The provisions are intended to be practicable, and be implemented on a case-by-case basis on individual farms in relation to the specific environmental issues and values of the location. BW P15 and BW P20 target the problem areas in the Bay of Plenty region. IM M1 and IM M8 use existing successful programmes that have been proven to be effective at addressing agricultural issues. The Regional Council will encourage landowners to retire and fence riparian areas, and install single span bridges or culverts through non-regulatory methods, such as Environmental Programmes, where funding is first agreed by all parties.

The approach taken in this regional plan to address the adverse effects of stock access and crossing of surface water bodies is pragmatic, and practicable. It provides for the concerns of the wider community in addressing this issue, while recognising that the provision of alternative stock crossings or fencing of riparian areas may not be practicable in some circumstances, and that fencing may not be immediately affordable to landowners (or the community where such fencing is subsidised by the Regional Council and the city or district councils). A combination of rules (refer to BW R37 to BW R40) and non-regulatory methods are used to address the adverse effects of the activity, establish performance standards, and target priority areas.

WL Wetlands

The objectives, policies and methods in the Wetlands section of this regional plan are necessary to enact and clarify the Regional Council's responsibilities for wetland management under section 30 of the Act, as described in Table 1. WL M10 to WL M13 recognise that it is efficient to work with other resource management agencies who have management or advocacy roles.

Wetlands are particularly vulnerable to the adverse effects of use and development activities, which necessitates WL O1, WL P1, WL P2 and WL P3 and the Methods of Implementation (particularly WL R3). It is also important to encourage the creation of new wetland habitats to replace those lost in the past, as achieved by WL O3 and WL P7. WL P3 and WL P4 are necessary to enhance existing wetlands that have been degraded by human activities, and identify where it is most beneficial to target works. The Regional Council's Environmental Enhancement Fund is also available for financial assistance with wetland enhancement.

In regards to the implementation of WL M4 (wetland care groups), The Regional Council will encourage and support the development of wetland care groups where the community has expressed interest in forming a group, or where this would benefit a significant wetland. This would be subject to the involvement of the owner or manager of the wetland. Other organisations may also be involved as appropriate, including but not limited to, Department of Conservation, Fish and Game New Zealand, Landcare Trust, iwi, etc.

Wetland Management Agreements ('WMA') under WL M8 and WL R2 are developed and completed by landowners in partnership with a Regional Council Land Management officer. These are voluntary agreements. A WMA is to promote wetland management, and facilitate specified works that are necessary for wetland maintenance and enhancement. WMA's are intended to be a cost-effective and efficient alternative to resource consent processes, and promote and achieve best management practices for the site. Funding for wetland enhancement works is provided by the Regional Council's Environmental Enhancement Fund or Environmental Programmes. Templates for WMA's are available from the Land Resources section of Regional Council, or on Council's website (www.boprc.govt.nz). WMA's may include all activities listed in WL R2 (where applicable to the wetland), or be limited to those works necessary to a particular site. Other WMA's can be developed for a wetland where a landowner wishes to undertake further works in the future. The process to complete a WMA is:

- (a) Landowner contacts The Regional Council Land Management officer, and discuss proposed wetland maintenance and enhancement works.
- (b) WMA is drafted to document the proposed works and how the works will be undertaken to minimise adverse effects. This can be achieved either by the landowner with advice from a Land Management officer, or through a joint approach between the landowner and a Land Management officer.
- (c) Wetland Management Agreement is completed, agreed and signed by the landowner and Land Management officer.
- (d) Landowner undertakes wetland maintenance and enhancement works in accordance with the WMA.
- (e) Works monitored in accordance with agreements in the WMA.

Table A1 4 Responsibilities for Wetland Management

Responsibility	The Regional Council	City and District Councils	Department of Conservation and Fish and Game NZ ¹	Landowners
Direct ownership and management of wetlands	No	Yes Where the wetland is a city or district council reserve	Yes Where the wetland is a Department of Conservation or Fish and Game NZ reserve	Yes
Advocacy role for management of wetlands	Yes (includes advocacy, advisory services and hydrological expertise)	Yes	Yes	Yes Can become involved in Wetland care groups and other community groups
Control of activities in wetlands – statutory functions under the Act	Yes Detailed below ²	Yes Detailed below ³	No Have advocacy role	No But can have input through submissions on resource consents and regional plans
Wetlands on land not in the bed of a river or lake (section 9 of the Act)	Yes Control of the use of land is restricted to effects on water quality, water quantity and soil resources.	Yes Control the effects of the use, development or protection of land for any purpose under the Act (including matters in section 6 and 7), and control of subdivision		
Wetlands in the beds of rivers or lakes (section 13 of the Act)	Yes Control of the use of beds or rivers and lakes is solely regional council function, includes control of effects on plants and habitats of plants and animals.	No		

Responsibility	The Regional Council	City and District Councils	Department of Conservation and Fish and Game NZ ¹	Landowners
Take, use, damming or diversion of water in wetlands, includes the control of water quantity, levels and flow in water bodies (section 14 of the Act)	Yes Control of water quantity activities is solely regional council function	No		
Discharges of contaminants or water to wetlands (section 15 of the Act)	Yes Control of discharges is solely regional council function	No		

Notes:

¹ Both the Department of Conservation and Fish and Game NZ have responsibilities for wetlands under legislation other than the Act.

² The Regional Council's responsibilities are defined in section 30 of the Act.

³ District councils' (including city councils) responsibilities are defined in section 31 of the Act.

TH Tauranga Harbour

TH O1 is to achieve the sustainable management of riparian margins of permanent water bodies in priority catchments to maintain or enhance the values or management goals in riparian margins. Different environmental goals affect how riparian areas are managed, and there are different management options for various areas in the region. An element of interpretation and practical application is necessary on a site-by-site basis to determine the most appropriate practice for the riparian management goals and site characteristics.

For example:

- (a) Water quality maintenance or enhancement involves the retention of vegetation buffers to filter and absorb contaminants present in surface runoff. Long grass can provide a suitable buffer in some situations.
- (b) Soil conservation and erosion prevention involves appropriate plantings to stabilise margins, and avoiding use of riparian areas that is not suitable to the site characteristics.
- (c) Terrestrial habitat enhancement may require restoration plantings.
- (d) Aquatic habitat enhancement requires appropriate planting to increase shade, and provide leaf and natural vegetation debris.
- (e) Natural character and landscape enhancement requires plantings appropriate to those values of the area.

The Regional Council measures the achievement of TH O1 as either (a) or (b) below:

- (a) Exclusion of stock from water bodies – includes:
 - (i) Permanent stock-proof fencing with adequate riparian margin distance, and appropriate riparian vegetation to intercept nutrients and sediment in overland flow from adjoining pastoral land. Different fence types are more appropriate for flood plain areas.

- (ii) Permanent fencing with adequate riparian margin distance that prevents stock access to streams, with no riparian planting. Different fence types are more appropriate for flood plain areas.
 - (iii) Temporary electric fences with adequate riparian margin distance, with no riparian planting, that are sufficient to contain the stock type being controlled. Temporary fences can be shifted, and reused on other areas where stock are grazing.
- (b) Alternative land uses (other than stock grazing) in riparian areas, which may include full retirement and restoration.

TH O1 does not apply to ephemeral flowpaths or artificial watercourses. The measures to implement the Objective in this regional plan are non-regulatory mechanisms, including voluntary action by landowners (refer to LM M1, IM M1, LM M2, IM M3, LM M5, LM M6, and IM M8). Funding for riparian management is available through the Regional Council's Environmental Programmes (refer to IM M8). In relation to modified watercourses, appropriate riparian management will be agreed with the landowner/land user.

The Regional Council and landowners may also develop environmental management approaches specific to a catchment or property to achieve the sustainable management of riparian areas. Implementation of catchment or property specific documents, including Environmental Programmes or other farm management documents that address riparian management, will also be used to measure the achievement of TH O1. These types of documents are consistent with LM M1, IM M1, LM M2, IM M4 and LM M11, and may involve the application of the ethic of stewardship (Section 7 (aa) of the Act). Sustainable management of riparian areas as applied in practice can depend upon site characteristics, economic factors, land use type, and riparian management goals.

As at February 2005, a majority of the riparian areas in IM O6 have been retired from stock grazing, either with permanent stock-proof fences and appropriate plantings, the areas are in alternative land used, or other fences have been erected to prevent stock access to surface water bodies.

- (c) Tauranga Harbour and catchment:
- (i) Harbour margin – 208.9 kilometres in length, excluding islands. 13 kilometres still requires protection. 94% of the margin has stock excluded.
 - (ii) Streams and rivers in the catchment – 2,000 kilometres in length. 450 kilometres still to protect (900 kilometres of fencing). By 2005 78% of riparian areas of primary streams in the catchment had been protected. Subdivision in the area is assisting riparian retirement due to city and district councils acquiring esplanade reserves and strips as a condition of the subdivision, and changes of land use from pastoral to other land uses where fencing may not be necessary.

RL Rotorua Lakes

IM O1 to IM O7 and LM O1 to LM O5 provide minimum environmental goals, which the policies and methods seek to achieve. Table A1 55 shows the trophic level indices from RL O1 (which have been established in relation to Burns, 2001⁶², and current levels as at 2007. IM P1 is the main guidance mechanism used in this section of the regional plan which links the management of water and land resources. Water Quality Classifications have been established for all rivers, streams and lakes in the region to achieve the aims of the regional plan as described in the Introduction of this regional plan. RL O1 will primarily be achieved through IM P1, LM P1, LM P2, LM P3, RL M1 and RL M4, and rules in the Rotorua Lakes section of this regional plan. Non-regulatory methods (e.g. LM M1) will be used to maintain water quality in lakes that meet their TLI. The priority areas for the promotion of sustainable land management practices, as identified in LM M1, are the Rotorua Lakes (and in particular the lakes that do not meet their TLI), and Tauranga and Ohiwa Harbours. These areas were

⁶² Burns, N., 2001. Trophic Level Index Baselines and Trends for 12 Rotorua District Lakes, 1990 to 2000. Report by Lakes Consultancy prepared for Environment Bay of Plenty.

identified in Bay of Plenty Regional Soil Conservation Assessment (Wilson and Ngapo, February 1993⁶³).

Table A1 5 Trophic Level Indices (TLI) – Current and Management Goals

Lake	TLI in Objective 11	Current 3 year average TLI (to 2007)
Okareka	3.0	3.3
Okaro	5.0	5.5
Okataina	2.6	2.8
Rerewhakaaitu	3.6	3.5
Rotoehu	3.9	4.6
Rotoiti	3.5	4.1
Rotokakahi	3.1	3.5
Rotoma	2.3	2.5
Rotomahana	3.9	3.9
Rotorua	4.2	4.9
Tarawera	2.6	2.8
Tikitapu	2.7	3.0

The Regional Council uses the TLI system as a means of measuring lake water quality based on the amount of total nitrogen, total phosphorus and chlorophyll A (algae) present in the lake, and the clarity of the lake. Chlorophyll A and clarity (measured as secchi depth) are a consequence of the amount of total nitrogen and total phosphorus in a lake. The resulting numeric value is the TLI for an individual lake. The TLI methodology can be used to establish an average TLI value for a lake for the period over which water quality data has been collected, or determine the TLI trend during a specified period of time (i.e. the rate of change in the trophic level of a lake). An average TLI from one period can be used as a baseline, which can then be compared to a second average TLI from a later period of time. This comparison determines if lake water quality is remaining stable, improving or deteriorating. If water quality is found to be changing (either improving or deteriorating), the rate of change can then be investigated. This quantitative system provides definitive information about the state of the lake water quality in the region. The TLI methodology has been adopted by the Ministry for the Environment, and will be used in New Zealand to enable the comparison for water quality between different lakes. For a detailed explanation of the TLI methodology refer to 'Protocol for Monitoring New Zealand Lakes and Reservoirs' (Burns, 2000⁶⁴).

An explanation of each of the TLIs in RL O1 is given in Table A1 6. Many of the TLIs have been set at the 1994 level, as at this time the community expressed the expectation lake water quality should be no lower than at that time during consultation on the Regional Plan for the Tarawera River Catchment. In 1993, Sigma Consultants et al⁶⁵, prepared a report for Rotorua District Council on the effects of land use activities on water quality. The report identified that lake water quality targets should be no less than their present (1993) quality.

Table A1 6 Explanation of TLI in RL O1

Lake	Current 3 year average TLI (to 2007)	TLI in RL O1	Explanation of TLI in RL O1
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⁶³ Wilson, A., and Ngapo, N., 1993. Bay of Plenty Regional Soil Conservation Assessment. Bay of Plenty Regional Council unpublished report.

⁶⁴ Burns, N., 2000. Protocol for Monitoring New Zealand Lakes and Reservoirs. Ministry for the Environment.

⁶⁵ Sigma Consultants, NIWA, Bioresearches Ltd, and NZFRI, June 1993. Report on Rural Land Use Practices in the Rotorua District. Report prepared for Rotorua District Council.

Lake	Current 3 year average TLI (to 2007)	TLI in RL O1	Explanation of TLI in RL O1
Okareka	3.3	3.0	Level in 1994. In 1994 the Regional Plan for the Tarawera River Catchment was publicly notified, which stated that lake water quality would be maintained at current state. Lake Okareka lies within the Tarawera Catchment. Lake water quality classifications have been updated in the Regional Plan to include TLI's, but retain community ideal of 'no degradation from 1994'.
Okaro	5.5	5.0	Set at a realistic level that is lower than current TLI (i.e. to improve lake water quality).
Okataina	2.8	2.6	Level in 1994 (which has been unchanged).
Rerewhakaaitu	3.5	3.6	Level in 1994 (note: the Regional Council has been working within the Rerewhakaaitu Catchment due to concern about lake water quality degradation. However, this seems to be in relation to natural lake water level changes.)
Rotoehu	4.6	3.9	Set at a level that equates to the last 'good' year for water quality in the lake – 1992/93.
Rotoiti	4.1	3.5	Level in 1994. Relates to the year of notification of the Regional Plan for the Tarawera River Catchment, and consistency with the goal for other lakes (i.e. lake water quality to be maintained at 1994 levels).
Rotokakahi	3.5	3.1	Level in 1994 (which has been unchanged).
Rotoma	2.5	2.3	Level in 1994 (which has been unchanged).
Rotomahana	3.9	3.9	Level in 1994 (which is slightly higher than current water quality).
Rotorua	4.9	4.2	Level set in relation to the removal of sewage from the lake. When the Rotorua city sewage discharge was moved to land disposal, water quality expectations for the lake were stated in documents associated with the consent.
Tarawera	2.8	2.6	Level in 1994 (which is slightly lower than current water quality – not sufficient to take regulatory action, and may be part of a natural cycle).
Tikitapu	2.8	2.7	Level in 1994 (which is slightly lower than current water quality – not sufficient to take regulatory action).

The package of methods to improve lake water quality is shown in Table A1 7 below, and the implementation of those methods is illustrated in Figure A1 1. It is important to note that a range of methods will be used to maintain or improve lake water quality, including regulation where necessary. Many methods will be implemented from 2003, or are already being implemented. The Action Plans are the major method used to improve lake water quality, with the rules in the Rotorua Lakes section being a mechanism to ensure nitrogen and phosphorus levels do not increase further. It is intended that the rules in the Rotorua Lakes section will be replaced with mechanisms that are appropriate to specific catchments. RL M1 states that there will be an Action Plan developed for each of the Rotorua Lakes over time. Initial work has focused on the five lakes where water quality exceeds the TLI set in RL O1. A risk assessment will be carried out for the remaining lakes to determine the risk of the lake exceeding the TLI set in RL O1, after which the development of further Action Plans will be prioritised. Should it be necessary to include any other methods (either regulatory and/or non-regulatory) in this regional plan for other Rotorua Lakes, this will be achieved via a publicly notified plan change process in accordance with the requirements of the Act (refer to Figure A1 1).

The rules in the Rotorua Lakes section of this regional plan uses effects-based regulations for land use activities in the Rotorua Lakes' catchments, which target the export of nitrogen and phosphorus. It does not preclude specific land uses from lakes' catchments, prescribe how a land use must be

carried out, or require land retirement within a catchment. Regulations in the Rotorua Lakes section of this regional plan set a nutrient cap for each property in the lake catchment, within which landowners can make their own decisions about the type of land use activity and land management practices implemented on the property. Over time it is likely that technology and innovation will reduce nutrient losses, so it is not appropriate to either prohibit or require a specific land use. Integrating land use planning and regulations in regional council and district council plans under RL M3 will be implemented by applying the water quality objectives in this regional plan, and outcomes from Action Plans developed under RL M1. Under the Act, district plan provisions must not be inconsistent with a regional plan. It is also anticipated that regional plans and district plans may be amended in accordance with catchment requirements identified in Action Plans, which the Regional Council will work in conjunction with Rotorua District Council to achieve. The land use regulations in the Rotorua Lakes section of this regional plan currently apply to Lakes Rotorua, Rotoiti, Ōkāreka, Rotoehu and Ōkaro. Where any of the other Rotorua Lakes meets the requirements of RL M4(1) or (2), an action plan for that lake will be developed in accordance with RL M1, and appropriate land use regulations developed.

Table A1 7 *Methods to Manage Lake Water Quality*

Method	All Lakes	Degraded Lakes
Non-Regulatory Methods		
Riparian Retirement (LM M1)	✓	✓
Action Plans (RL M1)	✓	✓
Review of Rules in the Rotorua Lakes section (RL M2)		✓
Education on nutrient management (IM M1, IM M3, IM M17)	✓	✓
Best Nutrient Management Practices document (IM M17)	✓	✓
Regional Council Environmental Programmes (IM M8)	✓	✓
Ongoing monitoring and research (IM 15, RL M7, LM M26, LM M27, IM M18)	✓	✓
Regulatory Methods		
Rules in Rotorua Lakes section	✓ (Rules for other lakes will be added via a plan change process)	✓
Other discharges in the catchment	✓	✓

Blue-green algae (cyanobacteria) are a group of bacteria, rather than true algae, that have acquired chlorophyll to capture light and behave like plants. Some cyanobacteria produce toxins that can cause a range of health problems, such as skin irritations, nervous system disorders, or cause liver problems, where people are exposed to acute or chronic toxicity levels. Surface blooms occur in the Rotorua Lakes when buoyant *Anabaena* or *Microcystis* species accumulate in surface water by using elevated light and nutrient to proliferate and form surface blooms. High numbers of blue-green algae can accumulate in bays due to wind drift where they can form surface scums. RL O2 and IM P1(c) are necessary to reduce the occurrence and intensity of cyanobacteria blooms in the Rotorua Lakes. Lowering the high levels of both nitrogen and phosphorus in the Rotorua Lakes is the key to reducing the frequency of such blooms. The possibility of solely targeting phosphorus to change the dominant algal species in a lake from blue-green to green has been raised. However, lake scientists have clearly stated that the high concentrations of nitrogen and phosphorus are the critical matters in the Rotorua Lakes, not just the N:P (Nitrogen to Phosphorus) ratio. Different algal species may utilise different nutrients at different times of the year, so reducing just one nutrient may do little more than change the dominant species. Implementation of RL O2 and IM P1(c) are linked to IM P1(a), RL M1, IM M21, and regulatory mechanisms in the Rotorua Lakes section. Regular algal monitoring is carried out to help ensure that recreational users of the Rotorua Lakes receive adequate warning when the lakes are not safe for swimming, and other recreational activities. Health warnings are occasionally issued for lakes or bays alerting lake users of potential health risk from using water affected by high

levels of cyanobacteria. Algal species and algal numbers (blooms) are monitored as part of the NERMN programme (refer to IM M15 and the Explanation/Principal Reasons for Integrated Management of Land and Water section in this appendix).

In relation to IM P1(a), the levels of nitrogen and phosphorus in lakes is managed to prevent a net increase in either nutrient. If nitrogen levels decrease, this will not allow for an allowable increase in phosphorus.

The Regional Council's lake monitoring programme is conducted under the umbrella of the NERMN, and is detailed in Table A1 8. Lake water quality indicators will be reviewed and refined in relation to improved scientific knowledge in accordance with RL M8. The Regional Council also funds the Chair in Lakes Management and Restoration at Waikato University to carry out research on lakes, including the causes of algal blooms. Ongoing research is used to provide a sound scientific basis for lake management actions, and focuses on the following topics:

- (a) In-lake modelling to examine specific processes and dynamics in the Rotorua Lakes.
- (b) Sediment-water interaction, and effects on the water column.
- (c) Algal dynamics.
- (d) Assessment of engineering solutions to lake water quality issues.
- (e) Technological innovation investigations.

Table A1 8 Lake Water Quality Programme (at 2005)

	Lake Water Quality Aspect	Monitoring Programme
(a)	Dissolved oxygen	All lakes monitored monthly.
(b)	Temperature	All lakes monitored monthly.
(c)	Total Phosphorus (TP)	All lakes monitored monthly.
(d)	Total Nitrogen (TN)	All lakes monitored monthly.
(e)	Chlorophyll a	All lakes monitored monthly.
(f)	Algae	All lakes monitored monthly for species present. Summer and autumn – concentration of cyanobacteria (blue-green algae) monitored in at-risk sites on a weekly basis.
(g)	Bathing suitability	Bacterial levels monitored during Summer period in accordance with Environment Bathing Standards Guideline (Ministry of Health/Ministry for the Environment, 2003). Also refer to Algae.
(h)	Lake weed	Monitoring programme in development stage.
(i)	Lake-side wetlands	Monitoring programme in development stage.

(a) to (f) are used to determine the TLI.

RL O3 is to achieve the sustainable management of riparian margins of permanent water bodies in priority catchments to maintain or enhance the values or management goals in riparian margins. Different environmental goals affect how riparian areas are managed, and there are different management options for various areas in the region. An element of interpretation and practical application is necessary on a site-by-site basis to determine the most appropriate practice for the riparian management goals and site characteristics.

For example:

- (a) Water quality maintenance or enhancement involves the retention of vegetation buffers to filter and absorb contaminants present in surface runoff. Long grass can provide a suitable buffer in some situations.
- (b) Soil conservation and erosion prevention involves appropriate plantings to stabilise margins, and avoiding use of riparian areas that is not suitable to the site characteristics.
- (c) Terrestrial habitat enhancement may require restoration plantings.
- (d) Aquatic habitat enhancement requires appropriate planting to increase shade, and provide leaf and natural vegetation debris.
- (e) Natural character and landscape enhancement requires plantings appropriate to those values of the area.

The Regional Council measures the achievement of RL O3 as either (a) or (b) below:

- (a) Exclusion of stock from water bodies – includes
 - (i) Permanent stock-proof fencing with adequate riparian margin distance, and appropriate riparian vegetation to intercept nutrients and sediment in overland flow from adjoining pastoral land. Different fence types are more appropriate for flood plain areas.
 - (ii) Permanent fencing with adequate riparian margin distance that prevents stock access to streams, with no riparian planting. Different fence types are more appropriate for flood plain areas.
 - (iii) Temporary electric fences with adequate riparian margin distance, with no riparian planting, that are sufficient to contain the stock type being controlled. Temporary fences can be shifted, and reused on other areas where stock are grazing.
- (b) Alternative land uses (other than stock grazing) in riparian areas, which may include full retirement and restoration.

RL O3 does not apply to ephemeral flowpaths or artificial watercourses. The measures to implement the Objective in this regional plan are non-regulatory mechanisms, including voluntary action by landowners (refer to LM M1, IM M1, LM M2, IM M3, LM M5, LM M6, and IM M8). Funding for riparian management is available through the Regional Council's Environmental Programmes (refer to IM M8). In relation to modified watercourses, appropriate riparian management will be agreed with the landowner/land user.

The Regional Council and landowners may also develop environmental management approaches specific to a catchment or property to achieve the sustainable management of riparian areas. Implementation of catchment or property specific documents, including Environmental Programmes or other farm management documents that address riparian management, will also be used to measure the achievement of RL O3. These types of documents are consistent with LM M1, IM M1, LM M2, IM M4 and LM M11, and may involve the application of the ethic of stewardship (Section 7 (aa) of the Act). Sustainable management of riparian areas as applied in practice can depend upon site characteristics, economic factors, land use type, and riparian management goals.

As at February 2005, a majority of the riparian areas in IM O6 have been retired from stock grazing, either with permanent stock-proof fences and appropriate plantings, the areas are in alternative land used, or other fences have been erected to prevent stock access to surface water bodies.

- (c) Rotorua Lakes and catchments
 - (i) Margins of all Rotorua Lakes – 306 kilometres in length. 99% had been completed by 2005 with approximately 4 kilometres still to protect.
 - (ii) Streams and rivers in the catchments of the Rotorua Lakes – 70% of the margins and tributaries have been completed by 2005. There are an estimated 35 kilometres of stream margin still to be protected, half of which is in the Lake Rotorua catchment. It is important to note that only the catchments of Lakes Rotorua and Rotoiti were targeted by the Kaituna Scheme, and retirement in all other lakes has been achieved by landowners in conjunction with Regional Council soil conservation works.

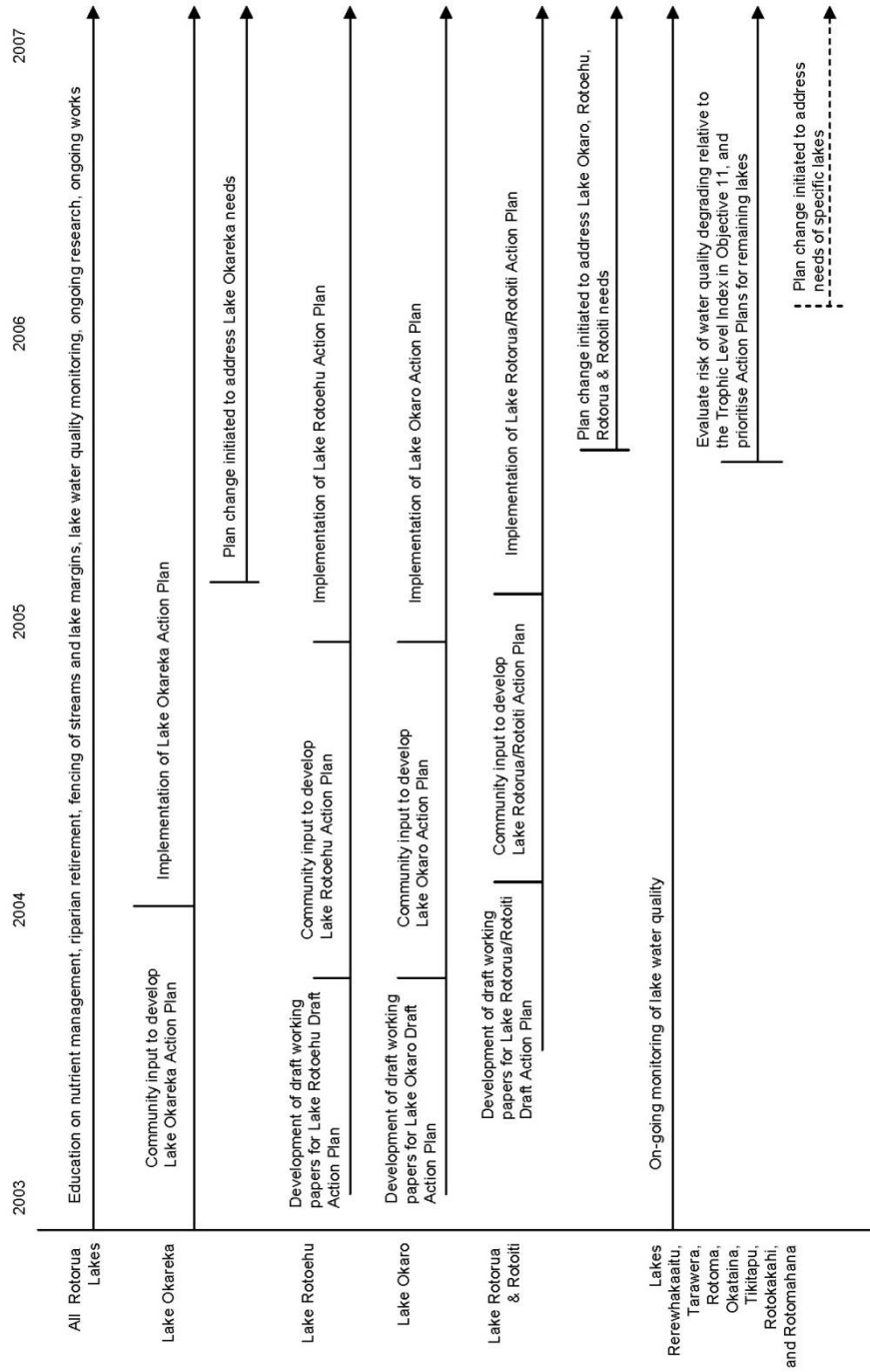


Figure A1 1 Lake Water Quality Management Timetable

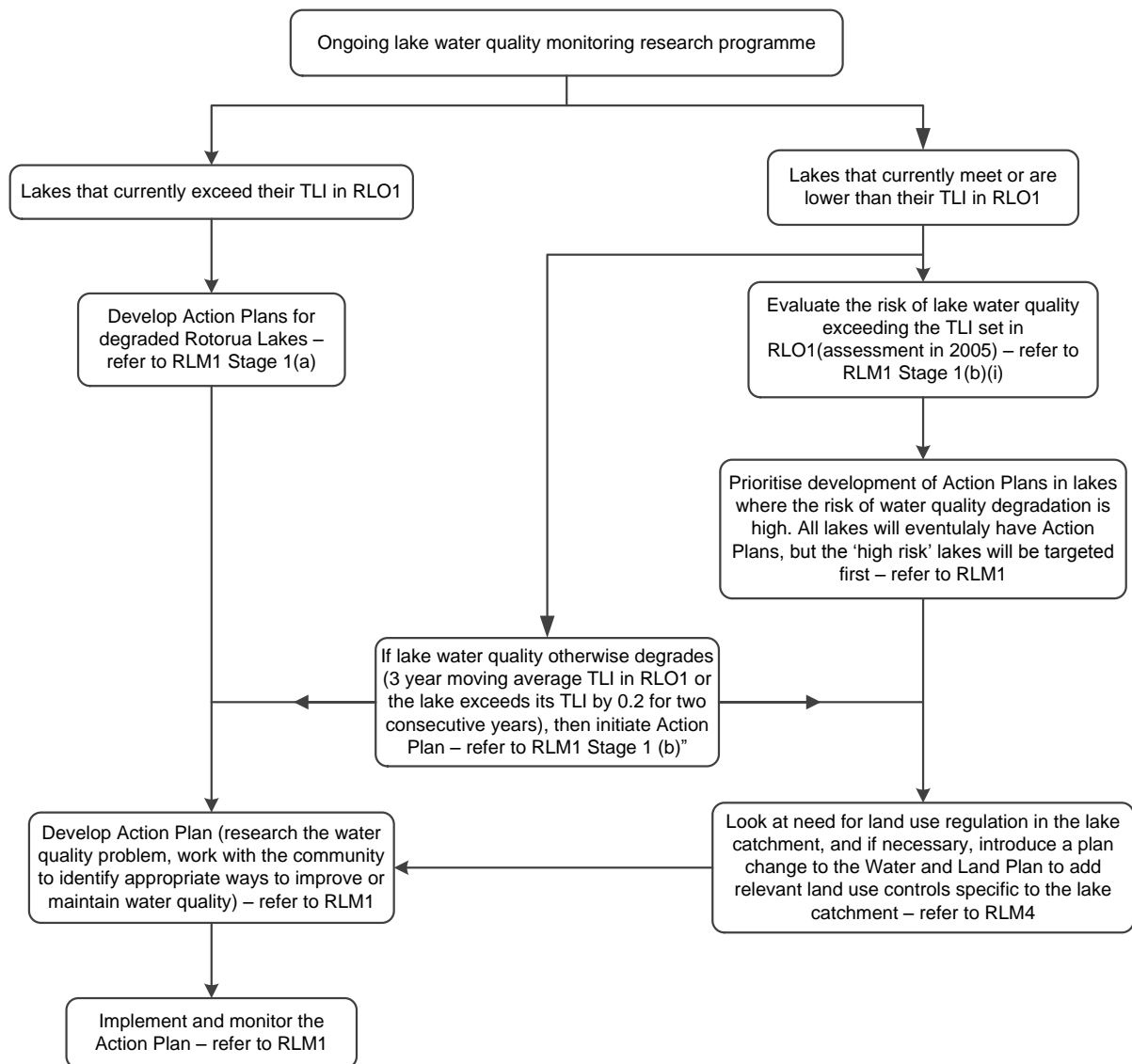


Figure A1 2 Lake Action Plans and Regulation

OH Ōhiwa Harbour

OH O1 is to achieve the sustainable management of riparian margins of permanent water bodies in priority catchments to maintain or enhance the values or management goals in riparian margins. Different environmental goals affect how riparian areas are managed, and there are different management options for various areas in the region. An element of interpretation and practical application is necessary on a site-by-site basis to determine the most appropriate practice for the riparian management goals and site characteristics.

For example:

- (a) Water quality maintenance or enhancement involves the retention of vegetation buffers to filter and absorb contaminants present in surface runoff. Long grass can provide a suitable buffer in some situations.
- (b) Soil conservation and erosion prevention involves appropriate plantings to stabilise margins, and avoiding use of riparian areas that is not suitable to the site characteristics.
- (c) Terrestrial habitat enhancement may require restoration plantings.
- (d) Aquatic habitat enhancement requires appropriate planting to increase shade, and provide leaf and natural vegetation debris.
- (e) Natural character and landscape enhancement requires plantings appropriate to those values of the area.

The Regional Council measures the achievement of OH O1 as either (a) or (b) below:

- (a) Exclusion of stock from water bodies – includes:
 - (i) Permanent stock-proof fencing with adequate riparian margin distance, and appropriate riparian vegetation to intercept nutrients and sediment in overland flow from adjoining pastoral land. Different fence types are more appropriate for flood plain areas.
 - (ii) Permanent fencing with adequate riparian margin distance that prevents stock access to streams, with no riparian planting. Different fence types are more appropriate for flood plain areas.
 - (iii) Temporary electric fences with adequate riparian margin distance, with no riparian planting, that are sufficient to contain the stock type being controlled. Temporary fences can be shifted, and reused on other areas where stock are grazing.
- (b) Alternative land uses (other than stock grazing) in riparian areas, which may include full retirement and restoration.

OH O1 does not apply to ephemeral flowpaths or artificial watercourses. The measures to implement the Objective in this regional plan are non-regulatory mechanisms, including voluntary action by landowners (refer to LM M1, IM M1, LM M2, IM M3, LM M5, LM M6, and IM M8). Funding for riparian management is available through the Regional Council's Environmental Programmes (refer to IM M8). In relation to modified watercourses, appropriate riparian management will be agreed with the landowner/land user.

The Regional Council and landowners may also develop environmental management approaches specific to a catchment or property to achieve the sustainable management of riparian areas. Implementation of catchment or property specific documents, including Environmental Programmes or other farm management documents that address riparian management, will also be used to measure the achievement of OH O1. These types of documents are consistent with LM M1, IM M1, LM M2, IM M4 and LM M11, and may involve the application of the ethic of stewardship (Section 7 (aa) of the Act). Sustainable management of riparian areas as applied in practice can depend upon site characteristics, economic factors, land use type, and riparian management goals.

As at February 2005, a majority of the riparian areas in IM O6 have been retired from stock grazing, either with permanent stock-proof fences and appropriate plantings, the areas are in alternative land used, or other fences have been erected to prevent stock access to surface water bodies.

(a) Ohiwa Harbour and catchment

- (i) Harbour margin – 55.8 kilometres in length, excluding islands. Four kilometres of margin still to protect. 93% of margin retired by 2005.
- (ii) Streams and rivers in the catchment – 500 kilometres in length. 70 kilometres of stream margin still to protect (140 kilometres of fencing), half of this in the Nukuhou Catchment. 86% of riparian areas retired by 2005.

GR Geothermal Resources

GR O2, GR O3 and GR O4 and GR P1, GR P2 and GR P3 are necessary to preserve outstanding geothermal surface features, protect significant natural geothermal surface features from the inappropriate use and development, and protect significant indigenous geothermal ecosystems. The intent of GR P3 is self-explanatory (identify geothermal fields that are to be preserved, or are available for use and development). GR P4 uses a precautionary approach for the management of newly discovered geothermal fields until the values and surface features have been properly assessed. GR O1 is to be achieved through the implementation of GR P1, GR P3, GR P5, GR P6 and GR P9 and GR M3, GR M5, GR M7, GR M8, GR M10 and GR M13. GR M5 will be implemented over the life of this regional plan to account for the availability of funding from the organisations involved. It is also recognised that some geothermal surface features and associated natural ecosystems are already noted in existing ecological and heritage surveys.

GR P1 and GR P5 are fair and equitable means of allocating geothermal resources, and using such resources in an efficient way. GR P6 provides guidance to the community on the preferred means of discharging used geothermal fluid to the environment. GR P8 and GR P12, and IM M15, GR M8 and GR M10 are to assist the Regional Council to collect sufficient information to manage geothermal resources efficiently and effectively. GR O8 is necessary to promote the sustainable management of geothermal resources through efficient use. GR P1 and GR P5, and GR M2 and GR M10 implement GR O8. It is appropriate to assess the efficient use of geothermal resources on a case by case basis. In relation to GR P1, an integrated field management approach will be implemented through the resource consent process. Many fields have multiple users, however, it is recognised that single users or consortia may be more appropriate in some situations. The appropriateness of multiple or single users will be assessed relative to the characteristics of the individual field, including existing development. It is not the intent of GR P6 and the definition of 're injection' to require the reinjection of gases, rather to provide guidance on the discharge of geothermal fluid, condensates and gases. It is recognised that the reinjection of gases may not be economically viable relative to the environmental effects. The discharge of gases to air is addressed by provisions in the Operative Bay of Plenty Regional Air Plan.

Managing the effects of geothermal hazards is addressed by GR P14 and GR M3, GR M5 and GR M6. These provisions are to achieve GR O7, and recognise the responsibility city and district councils to also address this issue.

Under section 35 of the Act, the Regional Council has a duty to gather adequate information to understand the appropriate management of geothermal resources and to determine the effectiveness of provisions in this regional plan, and monitor the state of the environment. In relation to GR M14. Table A1 9 describes the NERMN monitoring modules that are relevant to geothermal resources.

The use and development of geothermal resources may be staged (i.e. the consent extraction may be increased in steps as greater understanding of the resource is gained from each preceding step) in accordance with GR P1 and GR M9. Such staging would be reflected in conditions of resource consent. The Regional Council may set an allocation limit in a resource consent, and the resource user may apply for a greater volume when appropriate information is available to justify that higher level (refer to GR M9). Alternatively, the Regional Council may set staged allocation limits in resource consent (*i.e. allocate x volume to be used up to year 5, y volume to be used from year 5 to 10, and z volume to be used for the remainder of the consent*). The ability of the consent holder to continue operating according to current resource consent conditions, or to exercise any increase in the allocation from one stage to another, would be determined following review by the Regional Council of the effects of extraction to date (including environmental monitoring results), where such reviews are provided for in the resource consent.

Table A1 9 NERMN modules relevant to Geothermal Resources

	NERMN Module	Indicators Monitored
(a)	Geothermal Groundwater	Quantity of geothermal groundwater.

NH Natural Hazards

Management of Flood Hazards and Drainage

The provisions in this section are necessary to address the Regional Council's responsibilities for flood hazard mitigation under section 30 of the Act, and manage the adverse environmental effects of river and land drainage schemes.

NH O1, NH P1 and NH P3 are intended to manage the effects of flood hazards on the community. NH M2, NH M3, NH M4, NH M5 and NH M9 are efficient means of achieving the policies, and recognise the different roles of regional, city and district councils in hazard mitigation.

NH O2, NH P4 and NH P5, and NH M8 provide the basis for the appropriate management of river and land drainage schemes. NH M8 requires implementation of the the Regional Council 'Environmental Code of Practice for Rivers and Drainage Maintenance Activities'⁶⁶, but other river or land drainage scheme administrators may develop their own code of practice to comply with the requirements.

NH O3, NH P2, and NH M6 are to recognise the primary function of the city council and district councils to protect the integrity of flood control structures from the adverse effects of land use and development. However, NH M7 does provide for appropriate conditions in regional rules controlling the use and development of the beds of rivers and streams in relation to adverse effects on flood control structures.

⁶⁶ Crabbe, B., and Ngapo, N., 2000. Environmental Code of Practice for Rivers and Drainage Maintenance Activities. The Regional Council Operations Report 2000/01.